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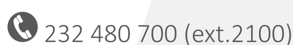 232 480 700 (ext.2100)
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# Editorial | Editorial | Editorial

A *Millenium* está de parabéns! Perfaz um ciclo de 20 anos, coroados de sucesso com a publicação de múltiplos artigos a que dão corpo 50 números de edição regular e 2 edições especiais.

A aposta da nova Equipa Editorial da Revista iniciou-se com a opção de designá-la de *Millenium - Journal of Education, Technologies, and Health*. Segue-se a publicação dos artigos em texto integral, em formato bilingue, sempre com versão em língua inglesa e o processo de revisão de um artigo científico, da submissão à divulgação, em meio digital via Serviço de Alojamento de Revistas Científicas (SARC) do Repositório Científico de Acesso Aberto de Portugal (RCAAP).

Com o número 1 que agora se publica inicia-se a sua série 2, afirmando como o seu principal objetivo divulgar ciência e tecnologia. A afiliação ao CI&DETS, Unidade de Investigação do IPV, em 2016, reafirma o desiderato de integrar novas redes de conhecimento de acesso livre, sólidas e credíveis capazes de conquistar novos públicos de autores/leitores.

A presente Equipa Editorial visa potenciar o debate científico, apoiar a mobilidade de talentos, a circulação de ideias e a transferência de saberes para públicos especializados e também para os menos especializados, pela via da difusão do conhecimento científico.

Nesta nova etapa da Revista, em que se procura conquistar inovação e rigor, define-se como missão divulgar os resultados das atividades académicas na vertente pedagógica e de investigação e consequentemente tornar acessíveis conhecimentos e tecnologias que ajudem a melhorar e desenvolver de uma forma sustentável os sectores económicos e sociais, proporcionando um aumento do nível de educação, saúde e qualidade de vida das pessoas com potenciais repercussões no desenvolvimento das empresas e das comunidades.

A Millenium tem contribuído, ao longo dos seus vinte anos de existência, para a difusão do conhecimento produzido nas áreas das ciências da vida e da saúde, das ciências agrárias, alimentares e veterinárias, da educação e desenvolvimento social, e das engenharias, tecnologia, gestão, turismo e artes, particularmente estudadas e investigadas por professores do Instituto Politécnico de Viseu. O presente número, integra 14 artigos, cuja versatilidade temática compreende a dimensão multidisciplinar que se pretende proporcionar a este periódico.

Acresce salientar que a implementação de novas formas de gestão e a mudança de procedimentos, implicam ajustes, pelo que a Equipa Editorial agradece aos autores, revisores e elementos das unidades técnicas, todo o apoio recebido para adequação da revista às exigências da contemporaneidade da didáctica editorial.

Bem hajam!

*A Equipa Editorial*

*Madalena Cunha, José Luís Abrantes, Maria João Amante, José Paulo Lousado, Paula Correia*

*Millenium* is to be congratulated! It completes a cycle of 20 years, crowned with success for the publication of multiple journal articles, embodied in 50 regular edition numbers and 2 special editions.

The commitment of the Journal's new Editorial Board began with the option to entitle it *Millennium - Journal of Education, Technologies, and Health*. Full-text articles follow, published bilingually, always having an English version and the process of review of a scientific article, from submission to its disclosure, in digital media via Serviço de Alojamento de Revistas Científicas (SARC) do Repositório Científico de Acesso Aberto de Portugal (RCAAP).

With the number 1 being published now, issue No. 2 is out, and it establishes the dissemination of science and technology as its main goal. Its affiliation with CI&DETS, the IPV Research Centre, in 2016, reaffirms the desideratum of integrating new knowledge networks, both sustainable and reliable, with open access and able to conquer new authors/reading audiences.

This Editorial Board aims to enhance the scientific debate, to support the mobility of talent, the circulation of ideas and the transfer of knowledge to specialised and also to less specialised audiences, through the dissemination of scientific knowledge.

In this Journal's new stage, in which innovation and rigour are to be sought, the mission is to disseminate the results of academic activities in the educational and research fields and, thus, make expertise and technologies available to help improve and develop both the economic and social sectors, in a sustainable manner, providing an increased level of education, health and quality of people's lives, with potential impacts on the development of companies and communities.

Over its twenty years of existence, Millenium has contributed to the dissemination of knowledge produced in the areas of life and health sciences, of agrarian, food and veterinary sciences, of education and social development, as well as of engineering, technology, management, tourism and arts, particularly studied and investigated by the teaching staff of the Polytechnic Institute of Viseu. This number includes 15 articles, whose thematic versatility includes the multidisciplinary dimension that this journal intends to facilitate.

It is worthwhile to stress that the implementation of new forms of management and the change in procedures result in adjustments; hence, the Editorial Board wishes to thank the authors, reviewers and members of technical units for all the support received in helping ensure the journal's adjustment to the requirements of contemporary editorial didactics.

A heartfelt thank you!

*The Editorial Board*

*Madalena Cunha, José Luís Abrantes, Maria João Amante, José Paulo Lousado, Paula Correia*

*Millenium* está de enhorabuena! Cumple un ciclo de 20 años, coronados por el éxito con la publicación de múltiples artículos que dan cuerpo a 50 números de edición regular y 2 ediciones especiales.

La apuesta del nuevo Equipo Editorial se ha iniciado con la opción de designarla *Millenium - Journal of Education, Technologies, and Health*. Se sigue la publicación de los artículos en texto integral, en formato bilingüe, siempre con traducción en lengua inglesa y el proceso de revisión de un artículo científico, de la publicación a la divulgación en medio digital vía Serviço de Alojamento de Revistas Científicas (SARC) del Repositório Científico de Acesso Aberto de Portugal (RCAAP).

Con el número 1 que ahora se publica comienza su serie 2, reiterando como su principal objetivo divulgar ciencia y tecnología. La afiliación al CI&DETS, Unidad de Investigación del IPV, en 2016, confirma la determinación de integrar nuevas redes de conocimiento de acceso libre, sólidas y creíbles, capaces de conquistar nuevos públicos de autores/lectores.

En esta nueva etapa de la Revista, en que se busca conquistar innovación y rigor, se define como misión divulgar los resultados de las actividades académicas en el ámbito pedagógico y de investigación y, consecuentemente, volver accesibles conocimientos y tecnologías que ayuden a mejorar y desarrollar de una forma sustentable los sectores económicos y sociales, proporcionando un aumento del nivel de educación, salud y calidad de vida de las personas con potenciales efectos en el desarrollo de las empresas y de las comunidades.

El presente Equipo Editorial pretende potenciar el debate científico, apoyar la movilidad de talentos, la circulación de ideas y la transferencia de saberes para públicos especializados y también para los menos especializados por medio de la difusión del conocimiento científico.

*Millenium* viene contribuyendo, a lo largo de sus veinte años de existencia, para la difusión del conocimiento producido en las áreas de las ciencias de la vida y de la salud, de las ciencias agrarias, alimentarias y veterinarias, de la educación y desarrollo social, y de las ingenierías, tecnología, gestión, turismo y artes, particularmente estudiadas e investigadas por profesores del Instituto Politécnico de Viseu. El presente número integra 14 artículos con una versatilidad temática que contiene la dimensión multidisciplinar que se pretende proporcionar a esta publicación.

Interesa subrayar que la implementación de nuevas formas de gestión y el cambio de procedimientos implican ajustes, por lo que el Equipo Editorial agradece a los autores, revisores y elementos de las unidades técnicas todo el apoyo recibido para adaptación de la revista a las exigencias de la contemporaneidad de la didáctica editorial.

Muchas gracias.

*El Equipo Editorial*

*Madalena Cunha, José Luís Abrantes, Maria João Amante, José Paulo Lousado, Paula Correia*

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# Sumário | Summary | Resumen

## AGRICULTURAL SCIENCES, FOOD AND VETERINARY

EVALUATION OF MORPHOLOGICAL AND PHYSICAL CHARACTERISTICS OF HAZELNUT VARIETIES 13

ADAPTATION OF THE ABCDE MODEL FROM HUMAN MEDICINE TO COMMUNICATE BAD NEWS TO THE OWNER OF THE ONCOLOGIC PATIENT IN VETERINARY MEDICINE 27

## LIFE AND HEALTH SCIENCES

PHYSIOLOGICAL DYNAMICS OF HEART RATE VARIABILITY: A STATISTICAL MODELING APPROACH IN VASOVAGAL SYNCOPE 39

ATTITUDES OF THE PORTUGUESE POPULATION REGARDING DIETARY FIBRE 49

A RISKY SITUATION WITH IMPACT ON THE WHOLE FAMILY: TEENAGE PREGNANCY 65

HEALTH DETERMINANTS AMONG A SAMPLE OF PORTUGUESE CHILDREN 77

VALIDATION OF THE PORTUGUESE ROME III QUESTIONNAIRE FOR DIAGNOSIS OF FUNCTIONAL DYSPEPSIA IN ADULTS 87

INFORMATION AS SUPPORT FOR PEER SUPERVISION IN NURSING 95

INTERNAL COMMUNICATION IN ORGANIZATIONS: PRACTICAL INSTRUMENTS TO HELP THE SHIFT CHANGE 105

CLINICAL COMMUNICATION (HANDOVER) AND SAFETY OF NURSING CARE: A LITERATURE REVIEW 117

CHALLENGES OF CONDUCTING RESEARCH IN PALLIATIVE CARE: CONTRIBUTION OF THE MASTER’S DEGREE IN PALLIATIVE CARE BY THE FACULTY OF MEDICINE, UNIVERSITY OF LISBON 127

## EDUCATION AND SOCIAL DEVELOPMENT

FUNDAMENTS OF THE ETHICAL ACTING IN HIGHER EDUCATION STUDENTS 143

## ENGINEERING, TECHNOLOGY, MANAGEMENT AND TOURISM

LEADERSHIP STYLES OF TECHNICAL DIRECTORS AND JOB SATISFACTION OF EMPLOYEES: A STUDY CONDUCTED IN PSSI`S OF THE DISTRICTS OF GUARDA AND VISEU 159

PERCEPTION OF NURSES’ EMPOWERMENT IN HEALTHCARE ORGANIZATION SETTINGS 179

# Autores | Authors | Autores


*Alexandra Rodrigues, 105*
*Alexandre Matos, 13*
*Ana Andrade, 65*
*Ana Cristina Mega, 27*
*António Barbosa, 127*
*Arminda Lopes, 13*
*Artur Pacheco, 95*
*Carla Santos, 27*
*Carlos Azevedo, 105*
*Carlos Pereira, 77, 87*
*Carmen Nóbrega, 27*
*Cecília Alves, 95*
*Célia Ribeiro, 159*
*Cláudia Brás, 117*
*Fernando Esteves, 27*
*Helena Vala, 27*
*Inês Coelho, 77, 87*
*Inês Esteves, 65*
*Isabel Bica, 65*
*Jéssica Figueiredo, 143*
*Joana Breia, 143*
*Joana Pereira, 77, 87*
*João Duarte, 49*
*João Mesquita, 27*
*João Pina, 143*
*Madalena Cunha, 143*
*Manuela Ferreira, 49, 117*
*Maria Alexandra Seco, 39*
*Maria do Céu Cunha, 143*
*Maria Odete Amaral, 77*
*Nélio Veiga, 77, 87*
*Nuno Neves, 179*
*Odete Amaral, 87*
*Olivério Ribeiro, 179*
*Paula Correia, 49*
*Paulo Pereira, 159*
*Raquel Guiné, 13, 49*
*Rosalina Loureiro, 77*
*Rui Pinto, 39*
*Sara Cruz, 65*
*Sónia Almeida, 143*
*Susana Gomes, 159*
*Tiago Oliveira, 143*
*Vítor Calvo, 105*

## CIÊNCIAS AGRÁRIAS, ALIMENTARES E VETERINÁRIAS
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AVALIAÇÃO DE CARACTERÍSTICAS MORFOLÓGICAS E FÍSICAS DE VARIEDADES DE AVELÃ 13
EVALUATION OF MORPHOLOGICAL AND PHYSICAL CHARACTERISTICS OF HAZELNUT VARIETIES 13
EVALUACIÓN DE CARACTERÍSTICAS MORFOLÓGICAS Y FÍSICAS DE VARIEDADES DE AVELLANAS 13

ADAPTAÇÃO DO MODELO ABCDE PARA COMUNICAR A MÁ NOTÍCIA AO PROPRIETÁRIO DO PACIENTE ONCOLÓGICO EM MEDICINA VETERINÁRIA 27
ADAPTATION OF THE ABCDE MODEL FROM HUMAN MEDICINE TO COMMUNICATE BAD NEWS TO THE OWNER OF THE ONCOLOGIC PATIENT IN VETERINARY MEDICINE 27
ADAPTACIÓN DEL MODELO ABCDE DE MEDICINA HUMANA PARA COMUNICAR MALAS NOTÍCIAS A LO DUEÑO DEL PACIENTE ONCOLOGICO EN MEDICINA VETERINARIA 27

millenium 13

*Millenium, 2*(1), 21-32.

# AVALIAÇÃO DE CARACTERÍSTICAS MORFOLÓGICAS E FÍSICAS DE VARIEDADES DE AVELÃ

# EVALUATION OF MORPHOLOGICAL AND PHYSICAL CHARACTERISTICS OF HAZELNUT VARIETIES

# EVALUACIÓN DE CARACTERÍSTICAS MORFOLÓGICAS Y FÍSICAS DE VARIEDADES DE AVELLANAS

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## RESUMO

Introdução: As avelãs são culturas importantes em Portugal, cujos os frutos podem ser usados para consumo direto ou introduzidos numa gama alargada de alimentos.

Objetivos: Neste estudo foram avaliadas 15 variedades de aveleira existentes numa coleção na Estação Agrária de Viseu.

Métodos: As avelãs foram estudadas no que respeita a características morfológicas, como peso do fruto, peso do miolo, índices de forma e de compressão e espessura da casca. O estudo foi complementado com análises de propriedades físicas como a cor e a textura, e ainda com a determinação da humidade e da atividade da água, uma vez que estes últimos parâmetros assumem bastante importância na capacidade de conservação dos frutos. Todas as determinações seguiram métodos estandardizados, tendo ainda sido usados os seguintes equipamentos: texturómetro, colorímetro e higrómetro.

Resultados: Os resultados obtidos permitiram conhecer os intervalos espectáveis para cada um dos parâmetros cromáticos na casca, película e miolo: L*, a*, b* croma e tonalidade, havendo entre as cultivares em estudo diferenças estatisticamente significativas. No que respeita aos parâmetros de textura avaliados pelos testes de britagem da casta e corte do miolo (dureza, fraturabilidade e resiliência) verificaram-se também diferenças significativas. A avaliação da humidade revestiu-se de grande importância pois permitiu confirmar que a secagem solar, utilizada para extrair o excesso de humidade dos frutos, foi suficiente para que estes atingissem valores compatíveis com uma boa conservabilidade (entre 1,66% e 4,52%).

Conclusões: Este trabalho permitiu identificar as carateristicas de algumas variedades de avelã no que respeita às suas propriedades morfológicas e físicas.


**Palavras-chave:** *Corylus avellana* L.; dimensões; cor; textura; humidade.


## ABSTRACT

Introduction: Hazelnut are an important crop in Portugal, wich fruits can be used for direct consumption or introduced in a large range of food products.

Objectives: In this study 15 hazelnut varieties existing in a collection of Viseu Agricultural Station were evaluated.

Methods: The nuts were studied in respect of their morphological characteristics, such as fruit and kernel weight, index of compression and of shape and shell thickness. The study was complemented with analysis of physical properties such as colour and texture, and the determination of moisture content and water activity, given the importance that these parameters take in the conservation capacity of the fruits. All experiments followed standard methods, being also used the following equipment: texturometer, colorimeter and hygrometer.

Results: The results obtained allowed to know the expectable ranges for each color parameters in the shell, film and kernels: L*, a*, b* chroma and hue, having been found statistically significant differences among the cultivars studied. As regards the textural parameters evaluated by crust crushing and crumb cutting tests (hardness, friability and resilience) there were also significant differences. Evaluation of moisture was of great importance because confirmed that the solar drying, used to extract the excess of moisture from the fruits, was sufficient to reach low values, between 1.66% and 4.52%, being so a guarantee of preservation.

*Conclusions:* This work allowed identifying the characteristics of several hazelnut varieties concerning the morphological and physical properties.


**Keywords**: *Corylus avellan*a L.; dimensions, color; texture; moisture.


## RESUMEN

Introducción: Las avellanas son una cultura importante en Portugal, que se puede utilisar para el consumo directo o introduzido en una amplia gama de alimentos

Objetivos: Este estudio incluyó 15 variedades de avellana existentes en una colección en la Estación Agraria de Viseu.

Métodos: Las avellanas se estudiaron con respecto a las características morfológicas, tales como el peso del fruto, peso del grano, forma y índice de compresión y la grosor de la cáscara. El estudio se completó con el análisis de las propiedades físicas tales como el color y la textura, y con la determinación de la actividad de la agua y la humedad, ya que los últimos parámetros asumen gran importancia en la capacidade de conservación de la fruta. Todas las determinaciones siguieron métodos estándar, todavía hay sido utilizado el siguiente equipo: texturometro, colorímetro y el higrómetro.

Resultados: Los resultados obtenidos permitieron conocer los rangos esperables para cada uno de los parámetros de color de la cáscara, el cine y lo grano: L*, a *, b* croma y tonalidad, existiendo entre los cultivares estudiados diferencias estadísticamente

significativas. En cuanto a los parámetros de textura evaluados por pruebas de trituración de la cáscara e corte del grano (dureza, friabilidad y resistencia) también hubo diferencias significativas. La evaluación de humedad es de gran importancia, ya que se confirmó que el secado solar, utilizado para extraer el exceso de humedad de los frutos, fue suficiente para que se alcanzaron valores compatibles con una buena conservación (entre 1,66% y 4,52 %).

Conclusiones: Las avellanas son una cultura importante en Portugal, que se puede utilizar para el consumo directo o introduzido en uma ampla gama de alimentos.

**Palabras clave:** *Corylus avellana* L.; tamaño; color; textura; humedad.

## INTRODUCTION

The hazelnut is the fruit of the hazel tree (*Corylus avellana* L.), a shrub of the family Betulaceae that grows naturally in most European countries, Asia Minor and part of North America. This species is well adapted to different climatic conditions, but prefers cool areas and moderate altitudes (Ekinci *et al.*, 2014).

Besides its use for direct consumption, the hazelnut crumb is widely used in bakery and confectionery. The toasted hazelnuts are used in snacks and also used as ingredients in many products such as cookies, ice cream, breakfast cereals, spreadable creams or chocolates (Caligiani *et al.*, 2014).

The nutritional and nutraceutical properties of hazelnut are widely documented, taking this fruit an important role in nutrition and human health due to its composition. It is rich in monounsaturated fatty acids, proteins, carbohydrates, fibre, vitamins (A, C and E), minerals (such as magnesium), phytosterols and phenolic antioxidants (Oliveira *et al*., 2008; Guiné *et al.*, 2015b). The antioxidant activity of the phenolic compounds is based on their ability to scavenge free radicals, and thus plays a crucial role in preventing certain diseases such as cancer, atherosclerosis or diabetes (Guiné *et al.*, 2015a).

The quality of food is a concept that has unquestionable interest to industries and consumers, hence the concern to preserve the products in appropriate conditions, avoiding physical and chemical changes that endanger the integrity. The quality of hazelnuts is evaluated according to the chemical and nutritional properties, but also depends on the appearance aspects, such as absence of broken cores and presentation of a clear and uniform colour. Other types of problems may be associated with pests or diseases (Delprete & Sesana, 2014).

According to Ghirardello *et al*. (2013) storage conditions influence the quality hazelnut, therefore, it is a concern for both the food industry and the consumer. However, the final quality of these fruits is influenced by a number of other factors, such as the appearance, texture, flavour, chemical composition, nutritional value, and other food safety issues.

The aim of this work was to study 15 cultivars of hazelnut, with respect to morphology and physical properties like colour and texture, which are of great importance in terms of quality, and also the determination of moisture and water activity , by the importance that the latter parameters take on the fruits conservation capacity.

## 1. METHODS

The plantation from where the samples were collected was installed in March 1989, in Agricultural Station of Viseu (Estação Agrária de Viseu- DRABL), and comprises a total of 270 plants of 15 varieties (Butler, Dawton, Ennis, Fertile of Coutard, Gentle of Viterbo, Gironela, Grada of Viseu, Grosse of Spain, Gunslebert, Empress Eugénie, Merveille de Bollwiller, Negreta, Provence, Segorbe and Tonda of Giffoni). Each variety is represented by 18 trees, 6 in each of the three repetitions, with a plant spacing of 5 m x 3 m.

The fruits were harvested in 2013 and the weight was measured for each variety in 50 whole fruits and respective core in a precision scale (±0,0002 g). The shell thickness was measured with calipers on 20 fruits.

The shape and compression ratios were calculated from measurements of the height (distance between centres), width (wider equatorial zone) and depth (narrow equatorial zone perpendicular to the latter) in 50 fruits. The rates were calculated by equations (Yao & Mehlenbacher, 2001):

$$Shape\ ratio = \frac{(Width + Depth)}{2\ x\ Height} \quad (1)$$

(2) $$Compression\ ratio = \frac{Width}{Depth}$$

The moisture content was determined by drying at 105 ºC to constant weight and the water activity by a hygrometer BT-RS1 (Rotronic) at 25ºC.

The colour was measured immediately after harvest on 25 fruits, with a colorimeter Konica Minolta CR-400 which evaluates the Cartesian coordinates CIE L*, a* e b *. The L* is the lightness, which is light reflected by the fruit and ranges from 0 to 100, corresponding respectively to black and white. The a* and b* are chromaticity coordinates, which vary between -60 e +60, the first going from green to red and the second from blue to yellow. These coordinates allow the calculation of the cylindrical coordinates Hue angle (ºH) and chroma (C), according to the equations:

(3) $$C = \sqrt{(a*)^2 + (b*)^2}$$

(4) $${}^{o}H = tan^{-1}\left(\frac{b*}{a*}\right)$$

The coordinate ºH assumes the values 0º (red), 90º (yellow), 180º (green) and 270º (blue). The chroma defines the purity or intensity of colour, and takes a value between zero (washed out) and 60 (vivid colour) (Guiné & Barroca, 2012).

For determining the texture properties was used a texturometer TA.XT.Plus (Stable Micro Systems) and 25 repetitions were made. For evaluation of the crushing strength was used the compression test with a flat probe P/75 and for the cutting force of the core, was used a cutting test with a probe Warner-Bratzler (Blade Set HDP/BS). The obtained graphs were used to determine the textural properties: hardness, friability and resilience, according to the illustrated in Figure 1.

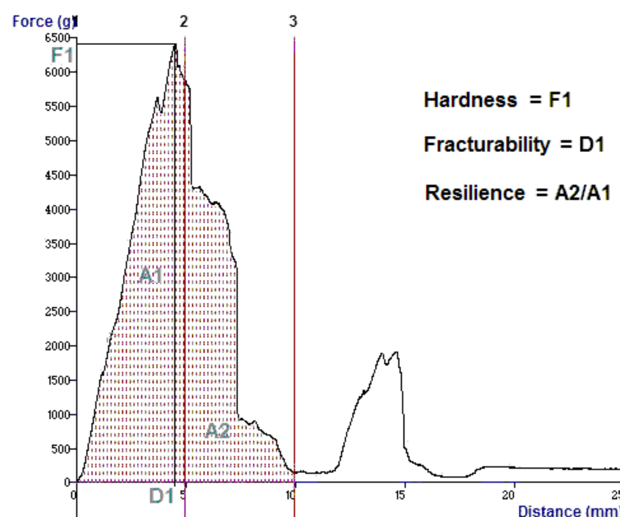


Figure 1. Example of a texture analysis - cutting test of the kernels.

The results were subjected to a one factor analysis of variance (ANOVA) to compare the means between the different cultivars. ANOVA is used in order to assess whether the sample differences are real or casual. In cases where statistically significant differences were detected, Tukey's test for multiple comparisons was used to verify which samples were different. Statistical analysis was performed using SPSS (IBM, Inc.) version 23, and was considered a 5% significance level for all tests.

## 2. RESULTS AND DISCUSSION

Table 1 shows the values obtained from the measurements of weight of the fruits with shell, the kernel and also the thickness of the shell. The fruits of the variety Ennis are heavier on average (4.42 ± 0.42 mm) and also with greater kernel weight (1.79±0.27 mm) being the fruits of the variety Empress those who, on average, are lighter, both in shell as only considering the kernel (1.72±0.28 mm e 0.86±0.19 mm, respectively), and that the differences encountered are statistically significant (p = 0.000). Among the lighter varieties still appear the varieties Negreta and Dowton. As regards the thickness of the shell, the fruits of the variety Dawton have a thinner skin (0.93±0.07 mm) being those who presented the thicker shell those of the variety Provence (1.54±0.21 mm) and again the differences are significant (p = 0.000). Also with a thick skin appear the fruits of the variety Fertile.

Table 1 – Fruit weight, kernel weight and thickness of the shell (mean ± standard deviation, n = 50 for the weights and 20 to the thickness).

| Variety | Fruit weight[1] (g) | Kernel weight[1] (g) | Shell thickness[1] (mm) |
|---|---|---|---|
| Butler | 3.68±0.41$^{bc}$ | 1.65±0.26$^{ab}$ | 1.38±0.24$^{abc}$ |
| Dawton | 1.84±0.26$^{g}$ | 0.98±0.20$^{f}$ | 0.93±0.07$^{e}$ |
| Empress | 1.72±0.28$^{g}$ | 0.86±0.19$^{f}$ | 1.05±0.14$^{de}$ |
| Ennis | 4.42±0.42$^{a}$ | 1.79±0.27$^{a}$ | 1.35±0.17$^{abc}$ |
| Fertile | 3.63±0.40$^{c}$ | 1.48±0.22$^{c}$ | 1.52±0.19$^{a}$ |
| Gentil | 2.49±0.42$^{ef}$ | 0.98±0.17$^{f}$ | 1.47±0.25$^{ab}$ |
| Gironela | 2.33±0.35$^{f}$ | 0.98±0.21$^{f}$ | 1.29±0.20$^{bc}$ |
| Grada | 3.67±0.45$^{c}$ | 1.47±0.23$^{cd}$ | 1.45±0.19$^{ab}$ |
| Grosse | 3.65±0.51$^{c}$ | 1.46±0.25$^{cd}$ | 1.45±0.23$^{ab}$ |
| Gunslebert | 3.01±0.56$^{d}$ | 1.31±0.37$^{de}$ | 1.20±0.14$^{cd}$ |
| Merveille | 3.97±0.53$^{b}$ | 1.40±0.21$^{cd}$ | 1.37±0.17$^{abc}$ |
| Negreta | 1.94±0.27$^{g}$ | 0.96±0.14$^{f}$ | 1.07±0.14$^{de}$ |
| Provence | 3.60±0.48 | 1.50±0.28$^{bc}$ | 1.54±0.21$^{a}$ |
| Segorbe | 2.76±0.28$^{de}$ | 1.21±0.12$^{e}$ | 1.39±0.15$^{abc}$ |
| Tonda | 3.16±0.48$^{c}$ | 1.39±0.26$^{cd}$ | 1.45±0.27$^{ab}$ |

[1]Values in the same column with the same letter are not statistically different, p < 0.05.

Table 2 shows the values for the height, width, and depth, as well as the shape and compression ratios. As regards the height, this varies from 17.58±0.89 mm and 24.97±0.89 mm, respectively for the varieties Gentil and Ennis, with significant differences between the varieties (p = 0.000). The width has values between 14.73±0.64 mm and 22.84±0.93 mm, found for the varieties of hazelnuts Dawton and Ennis, respectively, and the differences are statistically significant (p = 0.000). The depth of the fruit also shows significant differences between the varieties (p = 0.000) assuming values between 13.17±0.56 mm (var. Dawton) and 21.67±1.03 mm (var. Ennis). It is observed that the variety with lower value for width is also has that with lower depth, corresponding to small fruits (var. Dawton) and contrarily the variety Ennis has larger fruits (greater width, greater height and greater depth). Moreover, these results are consistent with the previously observed relative to the weight of the fruit kernels and, since the variety Ennis presented the highest values of these measures.

Table 2 – Height, width, depth, shape ratio and compression ratio (mean ± standard deviation, n = 50).

| Variety | Hight[1] (mm) | Width[1] (mm) | Depth[1] (mm) | Shape ratio[1] | Compression ratio[1] |
|---|---|---|---|---|---|
| Butler | 21.93±1.08$^{d}$ | 20.72±1.12$^{c}$ | 18.56±0.89$^{de}$ | 0.90±0.05$^{e}$ | 1.12±0.05$^{cd}$ |
| Dawton | 22.61±1.15$^{cd}$ | **14.73±0.64$^{g}$** | **13.17±0.56$^{i}$** | **0.62±0.03$^{g}$** | 1.12±0.05$^{c}$ |
| Empress | 19.39±0.95$^{e}$ | 16.27±0.91$^{f}$ | 14.47±0.79$^{h}$ | 0.79±0.04$^{f}$ | 1.12±0.04$^{bc}$ |
| Ennis | **24.97±0.89$^{a}$** | **22.84±0.93$^{a}$** | **21.67±1.03$^{a}$** | 0.89±0.04$^{e}$ | **1.05±0.03$^{f}$** |
| Fertile | 20.72±1.00$^{d}$ | 22.12±0.94$^{b}$ | 19.44±1.03$^{b}$ | 1.00±0.04$^{ab}$ | 1.14±0.06$^{bc}$ |
| Gentil | **17.58±0.89$^{f}$** | 19.27±0.87$^{d}$ | 16.39±0.78$^{g}$ | 1.02±0.06$^{a}$ | **1.18±0.04$^{a}$** |
| Gironela | 17.75±0.96$^{f}$ | 17.94±0.99$^{e}$ | 15.89±0.77$^{g}$ | 0.96±0.06$^{d}$ | 1.13±0.05$^{bc}$ |
| Grada | 20.87±0.90$^{d}$ | 22.01±0.90$^{b}$ | 19.68±0.91$^{b}$ | 1.00±0.04$^{abc}$ | 1.12±0.0$^{bc}$ |
| Grosse | 20.37±0.75$^{d}$ | 22.19±1.18$^{ab}$ | 19.29±0.81$^{bc}$ | **1.02±0.05$^{a}$** | 1.15±0.04$^{ab}$ |
| Gunslebert | 24.21±0.89$^{b}$ | 19.60±1.08$^{d}$ | 18.05±0.74$^{e}$ | 0.78±0.04$^{f}$ | 1.09±0.05$^{de}$ |
| Merveille | 22.62±1.23$^{c}$ | 22.56±1.30$^{ab}$ | 21.27±1.29$^{a}$ | 0.97±0.04$^{cd}$ | 1.06±0.03$^{ef}$ |
| Negreta | 19.48±0.94$^{e}$ | 16.80±0.70$^{f}$ | 14.77±0.62$^{h}$ | 0.81±0.05$^{f}$ | 1.14±0.04$^{bc}$ |
| Provence | 20.33±1.14$^{d}$ | 20.91±1.08$^{c}$ | 18.70±0.96$^{cd}$ | 0.98±0.04$^{bcd}$ | 1.12±0.04$^{c}$ |
| Segorbe | 18.86±1.00$^{e}$ | 19.37±0.99$^{d}$ | 17.19±0.84$^{f}$ | 0.97±0.05$^{cd}$ | 1.13±0.05$^{bc}$ |
| Tonda | 19.48±1.37$^{e}$ | 20.81±1.05$^{c}$ | 18.29±0.89$^{de}$ | 1.01±0.05$^{ab}$ | 1.14±0.05$^{bc}$ |

[1]Values in the same column with the same letter are not statistically different, $p < 0.05$.

As for the shape and compression ratios (Table 2), varieties with lower shape ratio, which correspond to longer hazelnuts, are Dawton, Gunslebert and Empress (<0.8), while the varieties Fertile, Gentil, Grada, Grosse and Tonda have the highest values of the shape ratio (≥1). The values of compression ratio close to 1, shown by Ennis and Merveille varieties (with values 1.05±0.03 and 1.06±0.03, respectively) indicate that these fruits are more rounded in the equatorial zone. In contrast, the variety Gentil has the highest compression ratio, indicating that these are more asymmetric hazelnuts (1.18±0.04). In the case of both ratios, shape and compression, statistically significant differences were observed between the varieties under study ($p = 0.000$ in both cases).

The moisture content of the fruits is one of the parameters that most influence their conservation capacity, and 6% is the maximum limit recommended by the EU for international trade of peeled hazelnuts (Silva *et al* 2005). The percentage of moisture present in all varieties studied, is less than the limit values (Table 3), which gives a good indication of the storage capacity of these fruits. Still, there are varieties with much lower moisture concentration than the recommended limit, such as the variety Dawton (1.66±0.43%) compared to Gunslebert variety, which has the largest value (4.52±0.94%), being the differences between varieties statistically significant ($p = 0.000$).

Table 3 – Moisture and water activity (mean ± standard deviation, n = 10 and 5, respectively).

| Variety | Moisture[1] (%) | Water activity[1,2] |
|---|---|---|
| Butler | 2.42±0.56$^{de}$ | 0.52±0.01$^{ab}$ |
| Dawton | **1.66±0.43$^{e}$** | n.d. |
| Empress | 1.85±0.73$^{e}$ | n.d. |
| Ennis | 4.40±0.61$^{ab}$ | 0.52±0.01$^{a}$ |
| Fertile | 3.71±0.61$^{abc}$ | n.d. |
| Gentil | 1.77±0.48$^{e}$ | n.d. |
| Gironela | 1.81±0.38$^{e}$ | n.d. |
| Grada | 3.68±0.75$^{abc}$ | 0.47±0.01$^{c}$ |
| Grosse | 3.67±1.04$^{abc}$ | n.d. |
| Gunslebert | **4.52±0.94$^{a}$** | n.d. |
| Merveille | 3.59±0.81$^{abc}$ | n.d. |
| Negreta | 1.92±0.62$^{e}$ | 0.51±0.01$^{b}$ |
| Provence | 3.19±0.37$^{cd}$ | n.d. |
| Segorbe | 3.32±0.40$^{cd}$ | n.d. |
| Tonda | 3.52±0.50$^{bc}$ | 0.47±0.00$^{c}$ |

[1]Values in the same column with the same letter are not statistically different, $p < 0.05$.

[2]n.d. = not determined

The water activity ($a_w$) in a food is the fraction of water which is in the free form and hence available for reactions from microbial, enzymatic or chemical nature. The $a_w$ is thus one of the best ways to predict and control food deterioration. The development of microorganisms is strictly linked to this parameter, so that to less than 0.62, mentioned as the limit for fungal activity, ceases all microbial activity (Guiné, 2011). In the present study it was not possible to determine the $a_w$ for all samples studied, but those in which this has been reported, it appears that all have values that ensure stability in terms of prevention of microbial growth, since the largest recorded value is 0.52 (for var. Butler and Ennis). The Grada and Tonda varieties have an even lower value (0.47), which is statistically different from the others ($p = 0.000$).

In Tables 4, 5 and 6 are presented, respectively, the chromatic parameters for the shell, the film and the kernel of the fruits studied. The values of L* for the shell vary significantly ($p = 0.000$) 42.58±1.57 (ver. Dawton) and 51.07±1.91 (var. Empress), situated at approximately the middle of the scale, indicating that they are only slightly darker (Table 4). The chromatic coordinates a* and b* are positive in all cases, with higher values indicating a prevalence of the red colour with yellow, resulting in a brown hue as expected for hazelnut shells. While the a* varied between 14.74±2.01 (var. Gentil) and 21.96±1.89 (var. Merveille) the b* varied in the range from 19.82±4.25 (var. Fertile) to 29.93±2.24 (var. Ennis), being the encountered differences statistically significant ($p = 0.000$ in both cases). The chroma values range from 25.95±5.21 and 35.66±2.30, corresponding to a strong colour purity, being registered for the varieties with correspondingly lower and higher intensity of yellow (b*). The hue angle varies from 48.25±1.60º (var. Negreta) to 58.73 ± 2.44º (var. Empress), corresponding to a red colour. In both cases the differences are significant ($p = 0.000$).

Table 4 – Chromatic parameters in the shell: L*, a*, b*, chroma and hue (mean ± standard deviation, n=25).

| Variety | Cartesian coordinates | | | Cylindrical coordinates | |
|---|---|---|---|---|---|
| | L*[1] | a*[1] | b*[1] | Croma[1] | Hue angle[1] |
| Butler | 46.39±2.48$^{cd}$ | 20.22±1.82$^{ab}$ | 29.25±2.82$^{a}$ | 35.61±2.72$^{a}$ | 55.26±3.21$^{bcd}$ |
| Dawton | **42.58±1.57$^{h}$** | 18.86±1.85$^{bcd}$ | 21.56±2.65$^{de}$ | 28.66±3.11$^{cd}$ | 48.74±1.83$^{h}$ |
| Empress | **51.07±1.91$^{a}$** | 17.94±1.68$^{cd}$ | 29.55±2.26$^{a}$ | 34.60±2.40$^{a}$ | **58.73±2.44$^{a}$** |
| Ennis | 48.38±2.18$^{b}$ | 19.32±1.68$^{bc}$ | **29.93±2.24$^{a}$** | **35.66±2.30$^{a}$** | 57.13±2.59$^{ab}$ |
| Fertile | 43.66±1.57$^{gh}$ | 16.73±3.14$^{d}$ | **19.82±4.25$^{e}$** | **25.95±5.21$^{d}$** | 49.70±1.97$^{gh}$ |
| Gentil | 47.77±1.90$^{bc}$ | **14.74±2.01$^{e}$** | 22.66±3.62$^{cde}$ | 26.91±4.04$^{d}$ | 57.31±2.06$^{ab}$ |
| Gironela | 44.44±2.03$^{efgh}$ | 17.12±2.24$^{cd}$ | 21.63±4.35$^{de}$ | 27.62±4.67$^{cd}$ | 51.31±3.06$^{efg}$ |
| Grada | 42.61±1.88$^{h}$ | 17.16±3.25$^{cd}$ | 20.08±4.18$^{e}$ | 26.43±5.21$^{d}$ | 49.38±2.08$^{gh}$ |
| Grosse | 43.22±2.05$^{gh}$ | 17.70±2.51$^{cd}$ | 20.07±3.25$^{e}$ | 26.79±3.91$^{d}$ | 48.52±2.72$^{h}$ |
| Gunslebert | 45.75±1.32$^{def}$ | 17.35±1.66$^{cd}$ | 23.35±2.85$^{cd}$ | 29.10±3.18$^{cd}$ | 53.30±1.77$^{de}$ |
| Merveille | 44.18±1.25$^{fgh}$ | **21.96±1.89$^{a}$** | 27.60±2.84$^{ab}$ | 35.29±3.24$^{a}$ | 51.44±1.76$^{efg}$ |
| Negreta | 43.12±1.64$^{h}$ | 18.43±1.96$^{bcd}$ | 20.64±2.11$^{de}$ | 27.68±2.78$^{cd}$ | **48.25±1.60$^{h}$** |
| Provence | 45.13±2.81$^{defg}$ | 17.56±3.06$^{cd}$ | 22.05±3.13$^{cde}$ | 28.21±4.17$^{cd}$ | 51.56±2.75$^{efg}$ |
| Segorbe | 46.22±1.69$^{cde}$ | 18.03±2.31$^{bcd}$ | 24.98±3.15$^{bc}$ | 30.83±3.73$^{bc}$ | 54.19±2.25$^{cd}$ |
| Tonda | 47.79±2.68$^{bc}$ | 18.63±2.53$^{bcd}$ | 28.19±3.46$^{a}$ | 33.87±3.62$^{ab}$ | 56.46±3.99$^{abc}$ |

[1]Values in the same column with the same letter are not statistically different, $p < 0.05$.

The film shows values of the chromatic parameters very similar to the shell, with L* varying between 43.87±4.26 (var. Grosse) and 52.42±2.91 (var. Butler), a* between 14.61±1.65 (var. Gunslebert) and 18.41±1.21 (var. Butler) and b* between 23.62±2.61 (var. Gentil) and 28.64±1.85 (var. Butler) (Table 5). In all three cases the differences between varieties are statistically significant ($p = 0.000$). With regard to chroma that varies within a narrow range between 29.08±2.48 (var. Gentil) and 33.81±1.68 (var. Ennis) and the hue angle between 53.43±1.86º and 60.21±3.20º, respectively for Grada and Gentil varieties, so it is slightly brown. Also in this case the observed differences are significant ($p = 0.000$).

Table 5 – Chromatic parameters on the film: L*, a*, b*, chroma and hue (mean ± standard deviation, n=25).

| Variety | Cartesian coordinates | | | Cylindrical coordinates | |
|---|---|---|---|---|---|
| | L*[1] | a*[1] | b*[1] | Croma[1] | Tonalidade[1] |
| Butler | **52.42±2.91$^{a}$** | 17.22±1.07$^{abcd}$ | **28.64±1.85$^{a}$** | 33.46±1.41$^{a}$ | 59.91±2.70$^{abc}$ |
| Dawton | 46.47±4.45$^{bcd}$ | **18.41±1.21$^{a}$** | 25.85±3.63$^{b}$ | 31.83±2.93$^{ab}$ | 54.20±4.65$^{ef}$ |
| Empress | 51.53±3.28$^{a}$ | 17.34±1.07$^{abcd}$ | 28.55±1.16$^{a}$ | 33.42±1.04$^{a}$ | 58.73±2.02$^{abc}$ |
| Ennis | 49.71±2.89$^{ab}$ | 18.15±1.39$^{a}$ | 28.48±1.94$^{a}$ | **33.81±1.68$^{a}$** | 57.44±2.83$^{bc}$ |
| Fertile | 45.41±4.47$^{cd}$ | 17.96±1.06$^{ab}$ | 24.72±2.50$^{bc}$ | 30.59±2.32$^{bc}$ | 53.88±2.58$^{f}$ |
| Gentil | 51.54±4.87$^{a}$ | 14.37±1.36$^{f}$ | 25.23±2.60$^{bc}$ | **29.08±2.48$^{c}$** | **60.21±3.20$^{a}$** |
| Gironela | 49.13±4.40$^{ab}$ | 16.41±1.21$^{de}$ | 25.32±2.49$^{bc}$ | 30.21±2.22$^{bc}$ | 56.93±3.16$^{cd}$ |

| | | | | | |
|---|---|---|---|---|---|
| Grada | 44.04±4.16[d] | 17.84±1.35[abc] | 24.12±2.55[bc] | 30.01±2.71[bc] | **53.43±1.86[f]** |
| Grosse | **43.87±4.26[d]** | 17.35±1.47[abcd] | **23.62±2.61[c]** | 29.33±2.77[c] | 53.60±2.27[f] |
| Gunslebert | 49.10±3.98[abc] | **14.61±1.65[f]** | 25.23±1.66[bc] | 29.20±1.76[c] | 59.94±3.10[ab] |
| Merveille | 46.91±2.76[bcd] | 16.72±1.00[bcd] | 25.49±1.40[bc] | 30.49±1.61[bc] | 56.74±1.09[cde] |
| Negreta | 46.72±3.54[bcd] | 16.54±1.11[cd] | 25.58±2.45[bc] | 30.50±1.89[bc] | 57.00±3.05[cd] |
| Provence | 45.09±3.98[d] | 17.76±1.84[abc] | 24.80±1.86[bc] | 30.52±2.42[bc] | 54.46±2.00[def] |
| Segorbe | 49.89±3.00[ab] | 16.38±1.20[de] | 26.12±2.25[b] | 30.85±2.32[bc] | 57.86±2.03[abc] |
| Tonda | 52.10±3.96[a] | 15.24±1.85[ef] | 25.04±1.33[bc] | 29.36±1.48[c] | 58.73±3.44[abc] |

[1]Values in the same column with the same letter are not statistically different, $p < 0.05$.

The values in Table 6 show that the colour of the kernel is quite different from the colour of the shell and the film, with L* values much higher (between 73.48±6.08 and 80.01±3.15, respectively for var. Fertile and Gunslebert) corresponding to higher brightness, i.e., a colour more or near the white. The values of a* are very close to zero (less than 3), indicating that the red colour is practically not present, but the b* values are high (from 21.15±1.54 to 26.73±3.17, respectively for var. Grosse and Ennis), though slightly smaller than the shell and the film, which indicates the presence of yellow colour in the kernel. Moreover, this parameter dominates on the definition of the colour, since virtually the a* dos not contribute to the setting of the kernel colour. In this case the range for the chroma is lower (from 21.19±1.53 to 26.81± .16, for var. Grosse and Ennis) indicating lower colour purity. But the tone is higher, approaching more the value of 90º, corresponding to yellow (with values varying between 84.03±3.25 and 87.68±0.79, respectively for the var. Gunslebert and Gironela). For all chromatic parameters evaluated in the kernell the differences observed between the studied varieties are statistically significant ($p = 0.000$).

Table 6 – Chromatic parameters in the kernel: L*, a*, b*, chroma and hue (mean ± standard deviation, n=25).

| **Variety** | **Cartesian coordinates** | | | **Cylindrical coordinates** | |
|---|---|---|---|---|---|
| | **L*[1]** | **a*[1]** | **b*[1]** | **Croma[1]** | **Tonalidade[1]** |
| Butler | 74.29±3.54[de] | **2.69±0.87[a]** | 26.11±2.14[ab] | 26.26±2.18[ab] | 84.16±1.63[e] |
| Dawton | 78.62±4.32[ab] | 1.62±1.12[bcd] | 25.52±2.30[abc] | 25.59±2.36[abc] | 86.42±2.05[abc] |
| Empress | 77.72±3.16[abcd] | 2.07±0.83[abc] | 26.71±3.01[a] | 26.80±3.03[a] | 85.61±1.61[bcde] |
| Ennis | 74.35±4.65[de] | 1.86±1.04[abcd] | 26.73±3.17[a] | 26.81±3.16[a] | 85.92±2.19[abcde] |
| Fertile | **80.01±3.15[a]** | 1.47±0.96[bcd] | 22.28±2.29[de] | 22.34±2.33[de] | 86.29±2.09[abcd] |
| Gentil | 80.00±2.53[a] | 1.18±0.49[cd] | 23.15±2.82[cde] | 23.18±2.83[cde] | 87.11±0.99[ab] |
| Gironela | 79.53±2.01[ab] | **0.91±0.32[d]** | 22.35±2.15[de] | 22.37±2.15[de] | **87.68±0.79[a]** |
| Grada | 77.18±4.49[abcd] | 1.93±1.89[abc] | 22.48±1.98[de] | 22.62±2.20[de] | 85.32±3.75[bcde] |
| Grosse | 79.41±2.26[ab] | 1.23±0.38[cd] | 21.15±1.54[e] | **21.19±1.53[e]** | 86.65±1.04[abc] |
| Gunslebert | **73.48±6.08[e]** | **2.69±1.89[a]** | 25.06±3.01[abc] | 25.20±3.18[abc] | **84.03±3.25[e]** |
| Merveille | 76.21±2.62[bcde] | 1.67±0.47[bcd] | 23.61±2.08[cd] | 23.67±2.08[cd] | 85.95±1.05[abcde] |
| Negreta | 76.17±4.13[bcde] | 2.09±0.79[abc] | 22.24±2.50[de] | 22.35±2.52[de] | 84.69±1.80[cde] |
| Provence | 79.25±2.91[ab] | 1.69±0.60[bcd] | 21.96±2.70[de] | 22.03±2.71[de] | 85.60±1.41[bcde] |
| Segorbe | 74.77±5.39[cde] | 2.37±1.21[ab] | 23.92±2.32[bcd] | 24.07±2.37[bcd] | 84.41±2.67[de] |
| Tonda | 78.24±2.89[abc] | 2.09±0.91[abc] | 22.26±2.69[de] | 22.37±2.74[de] | 84.73±1.94[cde] |

[1]Values in the same column with the same letter are not statistically different, $p < 0.05$.

The texture of the fruits was assessed using two tests: crushing the shell and cutting the kernel, whose results are shown in Tables 7 and 8, respectively. The first test proves very important to determine how the nuts are separated from their outer shell by breaking the latter. It provides information on the force required to produce the breaking of the shell, being associated to the needs and conditions of operation of the crushing equipment. On the other hand, the cutting test of the kernel has relevance whether the hazelnut is intended to be swallowed whole or subjected to various cutting operations to produce for example grated hazelnuts, chips or other forms intended for direct sale or for incorporation into other food products.

The Fertile variety has a harder shell (46.21±7.13 kg) also being one of the varieties with greater skin thickness, which may explain the greater force required for crushing (Table 7). The Empress and Gunslebert varieties are those which have showed a softer skin (with values close to 20 kg). As regards friability of the shell, the variety Ennis is less susceptible to fracture (being necessary to go 2.51 mm before rupture occurs) while the variety Tonda has the lowest value of the friability and therefore more easily fractures (1.69 mm only to occur break). Resilience is considerably variable between the samples analysed, ranging from 4% (var. Ennis) to 130% (var. Negreta). For the different texture properties assessed in shell statistically significant differences were found between varieties (p = 0.000 in all three cases).

Table 7 – Texture parameters in the test of crushing the shell (mean ± standard deviation, n=25).

| Variety | Hardness[1] (kg) | Fracturability[1] (mm) | Resilience[1] |
|---|---|---|---|
| Butler | 31.47±8.07[fg] | 2.03±0.44[bcde] | 0.05±0.74[bcdef] |
| Dawton | 22.18±4.91[hi] | 1.80±0.44[de] | 0.91±0.60[abcde] |
| Empress | **20.03±3.51[i]** | 1.75±0.25[e] | 0.38±0.18[efg] |
| Ennis | 39.77±5.47[bcd] | **2.51±0.28[a]** | **0.04±0.07[g]** |
| Fertile | **46.21±7.13[a]** | 2.33±0.38[ab] | 0.15±0.22[fg] |
| Gentil | 33.18±7.14[efg] | 1.93±0.35[cde] | 1.03±1.01[abc] |
| Gironela | 44.59±6.13[ab] | 2.35±0.35[ab] | 0.24±0.32[fg] |
| Grada | 38.63±7.39[bcde] | 2.13±0.40[bcd] | 0.55±0.66[cdefg] |
| Grosse | 38.30±9.56[cde] | 2.19±0.40[abc] | 0.38±0.48[efg] |
| Gunslebert | 20.68±4.10[i] | 1.81±0.21[de] | 1.19±0.65[ab] |
| Merveille | 42.20±7.24[abc] | 2.33±0.30[ab] | 0.18±0.20[fg] |
| Negreta | 22.88±5.43[hi] | 1.86±0.50[cde] | **1.26±1.00[a]** |
| Provence | 34.84±5.59[def] | 2.16±0.32[bc] | 0.41±0.31[defg] |
| Segorbe | 27.69±4.35[gh] | 1.97±0.32[cde] | 0.94±0.57[abcd] |
| Tonda | 27.98±4.62[gh] | **1.69±0.35[e]** | 1.24±0.54[a] |

[1]Values in the same column with the same letter are not statistically different, p < 0.05.

Regarding the kernel it was found that the hardness ranges between 2.70±1.70 kg (in var. Dawton) and 5.52±2.36 kg (in var. Merveille), and therefore, and as expected, values are considerably lower than those found for the hardness of the skin (Table 8). As regards friability, the range of variation is slightly wider than that of the shell, between 1.39±0.79 mm and 3.11±1.55 mm (for var. Dawton and Tonda), whereby the ability of the fruits to resist fracture is higher, i.e., they resist more before rupture occurs. This is due to the fact that the shell has a much more rigid structure, which does not absorb the strain caused by force in the same way that the kernel does, for being more deformable. Finally, and similarly to what was observed for the test of crushing the shell, resilience also showed to be very variable (from 0% to 114%). Also in this case the differences are statistically significant, with p values of 0.000 for the hardness and resilience of the crumb, and 0.001 for the case of friability.

Table 8 – Texture parameters in the test of crushing the shell (mean ± standard deviation, n=25).

| Variety | Hardeness[1] (kg) | Fraturability[1] (mm) | Resilience[1] |
|---|---|---|---|
| Butler | 4.76±2.64$^{abc}$ | 2.38±1.32$^{ab}$ | 0.23±0.19$^{ef}$ |
| Dawton | **2.70±1.70$^{c}$** | **1.39±0.79$^{b}$** | **0.17±0.28$^{f}$** |
| Ennis | 5.34±2.84$^{a}$ | 2.48±1.29$^{ab}$ | 0.65±0.46$^{bcd}$ |
| Fertile | 4.45±2.25$^{abc}$ | 1.93±0.88$^{ab}$ | 0.54±0.35$^{cdef}$ |
| Gentil | 3.29±1.95$^{abc}$ | 1.83±0.97$^{b}$ | 0.47±0.40$^{cdef}$ |
| Gironela | 2.83±2.22$^{c}$ | 1.63±1.08$^{b}$ | 0.85±0.71$^{abc}$ |
| Grada | 4.25±2.60$^{abc}$ | 2.11±1.41$^{ab}$ | 0.52±0.38$^{cdef}$ |
| Grosse | 4.93±1.74$^{abc}$ | 2.35±0.80$^{ab}$ | 0.76±0.46$^{abcd}$ |
| Gunslebert | 3.88±2.41$^{abc}$ | 2.46±1.75$^{ab}$ | **1.14±0.53$^{a}$** |
| Imperatriz | 3.07±1.96$^{bc}$ | 1.68±1.01$^{b}$ | 0.30±0.29$^{ef}$ |
| Merveille | **5.52±2.36$^{a}$** | **3.11±1.55$^{a}$** | 1.07±0.39$^{ab}$ |
| Negreta | 3.54±1.52$^{abc}$ | 1.93±0.84$^{ab}$ | 0.29±0.34$^{ef}$ |
| Provence | 4.50±2.35$^{abc}$ | 1.91±0.95$^{ab}$ | 0.58±0.34$^{cdef}$ |
| Segorbe | 3.26±2.06$^{abc}$ | 1.71±1.05$^{b}$ | 0.49±0.37$^{cdef}$ |
| Tonda | 5.05±2.12$^{abc}$ | 2.07±0.86$^{ab}$ | 0.39±0.33$^{def}$ |

[1]Values in the same column with the same letter are not statistically different, $p < 0.05$.

## CONCLUSIONS

The results obtained in this study for moisture and water activity revealed of great importance because they allowed to confirm that solar drying used to extract the excess of moisture from the fruits was enough for them to reach a moisture content compatible with good conservation during the storage.

It was also possible to characterize the samples analysed in relation to different biometric parameters evaluated, emphasizing the variety Ennis as larger, heavier and more rounded.

The results also allowed to know the expectable ranges for each colour parameters in the shell, film and the core, which may serve as a reference, since they correspond to close to the harvested, and therefore also not subject to storage or processing. The fruits have strongly brown shell and films, while the core is strongly yellow.

Finally, we evaluated the texture characteristics for the shell, which are extremely important for conservation and transportation, and also at the technological level when there is need for its crushing. While the variety Fertile has a high hardness of the shell, the Empress presents a softer shell and therefore is easier to break. The Ennis variety emerges as the most resistant to fracture in the shell, which coupled with its larger size, makes it an interesting variety. Also the kernel has been studied in relation to the texture, which is of great importance at economic level, since it can determine losses by breaking or flaking, or even at the organoleptic level, when during consumption. In this regard, it was concluded that the Dawton variety presents itself softer, making it pleasant to chew, but perhaps less resistant to stresses originating from the processing and/or transportation, offering a lesser resistance to rupture.

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27

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# ADAPTAÇÃO DO MODELO ABCDE PARA COMUNICAR A MÁ NOTÍCIA AO PROPRIETÁRIO DO PACIENTE ONCOLÓGICO EM MEDICINA VETERINÁRIA

# ADAPTATION OF THE ABCDE MODEL FROM HUMAN MEDICINE TO COMMUNICATE BAD NEWS TO THE OWNER OF THE ONCOLOGIC PATIENT IN VETERINARY MEDICINE

# ADAPTACIÓN DEL MODELO ABCDE DE MEDICINA HUMANA PARA COMUNICAR MALAS NOTÍCIAS A LO DUEÑO DEL PACIENTE ONCOLOGICO EN MEDICINA VETERINARIA

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## RESUMO

Introdução: À semelhança do que ocorre na Medicina Humana, também em Medicina Veterinária, a prevalência da doença oncológica em animais de companhia tem vindo a aumentar significativamente.

Desenvolvimento: A evolução da Medicina Veterinária, nas últimas décadas, veio trazer mudança nos paradigmas clínicos, nomeadamente no respeitante à relação com o animal mas também com o proprietário. Sendo a oncologia a especialidade em que há maior probabilidade de ter que comunicar uma má notícia, neste trabalho propõe-se a adaptação do modelo ABCDE da Medicina Humana para a Medicina Veterinária.

Conclusões: A adaptação do modelo ABCDE para a Medicina Veterinária permite melhorar a comunicação com o proprietário cuidador e dotar os profissionais da equipe Médica Veterinária de melhores competências.

**Palavras-chave:** animais de companhia; oncologia veterinária; comunicação; má notícia; modelo ABCDE.

## ABSTRACT

Introduction: Similar to what occurs in Human Medicine, also in Veterinary Medicine, the prevalence of oncological diseases has significantly increased.

Development: The evolution of Veterinary Medicine, in last decades has brought changes in clinical paradigms, particularly concerning the relationship with the animal and also with the owner. More than any other specialty, members of the Veterinary Medical Team that work in the oncology field, are unavoidably forced to break bad news. This paper proposes the adaptation of the ABCDE model from Human Medicine to Veterinary Medicine.

Conclusions: The adaptation of the ABCDE model for Veterinary Medicine improves communication with the owner and offers all the members of the Veterinary Medical Team better communication skills.

**Keywords:** pets; veterinary oncology; communication; bad news; ABCDE model.

## RESUMEN

Introducción: Similar a lo que ocurre en medicina humana, en Medicina Veterinaria la prevalencia de las enfermedades oncológicas en los animales de compañía también ha incrementado significativamente.

Desarrollo: En las últimas décadas la evolución de la Medicina Veterinaria, ha comportado cambios en los paradigmas clínicos, especialmente en la relación con el animal, pero también con el propietario. Dado que la especialidad de Oncología es la que comunica más malas noticias, en este trabajo se plantea la adaptación del modelo ABCDE de Medicina Humana a Medicina Veterinaria.

Conclusiones: La adaptación del modelo ABCDE a la Medicina Veterinaria mejora la comunicación con el propietario e proporcionará a los profesionales del equipo Medica Veterinaria de mejores competencias.

**Palabras clave:** animales de compañía; oncología veterinaria; comunicación; malas noticias; modelo ABCDE.

## INTRODUCTION

Providing better health care and better living conditions for animals, particularly pets, along with the development of protective legislation of their rights (Lei n.º 69/2014, de 29 de agosto), has been improving substantially their quality of life, with the consequent increase on longevity, making them, similarly to their owners, a target population for geriatric diseases, including oncologic ones.

Along with the evolution of Veterinary Medicine, the technical conditions of Veterinary Medical Centers (VMC) and also the skills of the veterinary team members, the oncology specialty has also evolved. Nowadays, it is possible to offer better therapeutic options, resulting not only in a better quality of life, but also in an increased survival rate. Despite all these achievements, it is important to notice, that there are also situations where patients are not candidates for definitive treatment or palliative care, being candidates to euthanasia.

Communication skills are highly valued in Humane Medicine, but neglected in Veterinary Medicine for many years. Communication is now increasingly recognized as a core skill for veterinary practitioners. The communication of an oncologic diagnosis is of great delicacy and difficulty, as many owners have had or have feared to have a personal experience with this disease (Withrow & Vail, 2007). The consequences of poor communication in the clinical field are associated with a worse clinical case management and a poorer outcome (Baile *et al*., 2000). It is noteworthy that the owner's information and cooperation, only achieved with good communication skills, will contribute to prolong and improve the animal's quality of life (Vala, 2011).

In the organization of the Veterinary Medical Team (VMT), it is now well accepted that the Veterinary Nurse (VN) can play an important role in the relation with the owner, since he detains the most privileged conditions to develop a closer relationship with him, in the agitated day-to-day clinical practice in VMC (Vala, 2016).

The adaptation of studies and knowledge, already available and developed in Human Medicine will be of great advantage in this process, thanks to its extensive, advanced and enriching experience (Hamlin, 2010).

This work analyses the importance of communication with the pet owner and addresses the basic principles of an effective, informative, frank and honest communication that can be helpful when making informed and conscious decisions. It also proposes an adaptable model to VMC day- to-day, clarifying the role of the VN, as privileged communicator, although the Veterinarian Doctor (VMD) has the greatest responsibility and the lead role in this matter. The authors suggest a modification of the ABCDE model, the one which revealed greater adaptability to Veterinary Medicine and also a model capable of improving the communication skills in every step of the evolving clinical course, in favour of the quality of health care in oncology.

## 1. METHODS

The research of published literature on communication models of bad news in oncology was made through bibliographic databases PubMed, Web of Science and ISI Web of Knowledge, using every possible combination of these search terms: "bad news", "oncology" and "communication".

A lower date limit of January 01, 1999 was applied, without any upper date limit. The research included full-text articles, conference proceedings, reviews, letters, case reports or opinion articles.

An analysis and compilation of the most commonly used guidelines and models was performed, and two of them were taken in consideration: the ABCDE model (EPEC, 1999; Vandekieft, 2001; Lickerman, 2013; Knott, 2015) and the SPIKES model (Knott, 2015). An adaptation to Veterinary Medicine was carried out.

## 2. RESULTS AND DISCUSSION

The development of communication skills of the professional who deals with the oncologic pet owner, provides a real contribution to improve the quality of care. The communicator must hold technical knowledge that allows a clear and effective communication, along with perfect knowledge of the clinical evolution of the patient, comprising diagnosis, prognosis, treatment and follow up (Vala, 2016).

### 2.1 - Communication in the diagnosis stage

The physical condition and quality of life of the oncologic patient will suffer deterioration, more or less accentuated, depending on the type of neoplasia and the evolution of the disease. It is essential a precocious diagnosis, allowing to establish treatment as soon as possible. This will avoid the dramatic worsening of the physical condition and the maintenance of the animal's quality of

life (Vala, 2016), minimizing the owner´s stress.

In the diagnosis stage, responsibility of the VMD, details provided by the owner about the changes in lifestyle and animal behavior, which may represent useful "signs" to reach the final diagnosis are interpretated (Vala, 2016). During the triage, the VN should also register all the aditional information that might be useful for diagnosis purposes and establishment of veterinary nursing care plans.

At this point, the VN shoul help the VMD explaining to the owner what might come next: tests; treatments; more tests and treatments; none of these options (nothing to do; euthanasia?); being this last alternative the most devastating one, only applicable in severe and terminal cases with no therapeutic alternatives (Vala, 2011 & Lickerman, 2013).

It is also essential to alert the owners for the possibility of new tumors development. The professional communicator should be able to convey the idea that the diagnosis should start at home, proceed into the VMC and that it requires more specific complementary tests (Vala, 2016).

## 2.2 - Communication in the prognosis stage

Despite the fact that both the establishment and communication of the outcome are the entire responsibility of the VMD, the whole VMT must know what to expect from a benign tumor, most probably a favorable prognosis, and what to expect from a malignant one, most probably an unfavorable prognosis (Vala, 2016).

Both the VMD and the VN, should be prepared for the owner´s questions, which will predictably be related with survival time. It might be wiser not to yield to the pressure and answer immediately but, instead, be prudent. Hope is very important in any stage of the process. Nothing reduces more the quality of life than living without hope. The owner will suffer more unnecessarily and its contribution for the improvement of the patient's quality of life will be lower (Lickerman, 2013). However, it is important to keep in mind that there is a tendency to interpret any survival rate that exceeds 50%, as certain healing and any rate below 50%, as certain death (Baile, 2000).

At this stage, it is applicable the theory of expecting the best, but at the same time, prepare for the worst. The whole team should be aware that, being a serious disease, it is for the best that those who are envolved are completely aware of this fact. It is important to avoid surprises and to be able to anticipate the aggravation of the animal's condition. It should never be forgotten that, only during the course of the disease, it will be possible to determine more precisely how the patient will react and have a better prediction of the outcome. It is advisable to recommend owners to undertake some preventive measures such as putting their affairs in order. This will allow that, in case of worsening, more availability for appointments and more preparation to apply more intensive and demanding home cares, which will make the owner and their family less vulnerable to the unexpected (EPEC, 1999).

The VMT should be able to clarify what can be realistically expected, making a clear distinction of what would effectively be desired and also of what is effectively most fearsome. If there are unexpected improvements, unpredictable according to the scientific knowledge, all the team should also be prepared to recognize it, even though these situations are rare (EPEC, 1999 & Knott, 2015).

### 2.2.1.- The bad news communication

Bad news are the ones that alter, dramatically or only negatively, the immediate or long term future of the patient's owner. In Human Medicine are described as examples, a terminal diagnosis, a fetal death during an ultrasound of a pregnant woman, the diagnosis of multiple sclerosis, the diagnosis of several diseases that significantly alter the patient's life, like Parkinson's disease and rheumatoid arthritis, among others (Vandekieft, 2001 & Knott, 2015).

The response of each caregiver to bad news, also depends on the psychosocial context of the moment. It might simply be a diagnosis that comes in an inopportune moment, being described in Human Medicine the example of an unstable angina, requiring angioplasty, during the week of a daughter's wedding, or a diagnosis that is incompatible with one's employment, like a coarse tremor in a Cardiovascular Surgeon (Vandekieft, 2001).

In the past few decades, therapeutic advances have altered the course of cancer, being now easier to give more hope to pacients. By this reason, at the diagnosis stage, paternalistic models created by Hippocrates, defending the patient protection regarding the reality of its present condition to not discourage or depress him (Vandekieft, 2001 & Baile *et al*., 2000), led to the emphasis on patient autonomy and empowerment (Baile *et al*., 2000). This last model can also be adopted in Veterinary Medicine.

Vandekieft (2001) states that in Human Medicine, most patients prefer to know the truth regarding the disclosure of a terminal

diagnosis, in order to plan the rest of their lives and make important decisions. However, other patients can not deal with the threat to their quality of life and survival time and prefer to defend themselves with "denial" or "omission", trying to minimize the impact of the information. The author recomends that, for the few who do not want full disclosure, the deliverer of the bad news should find the best way to approach the subject and must face the challenge of individualize the manner of breaking bad news, according to the patient's desires or needs, fact that, with appropriate safeguards, can be adapted to the animal patient caregiver.

The difficulty in breaking bad news is related to the huge difficulty in estimating its real impact, since it depends on the recipient's expectations. It can also be associated with the foresight of the consequences of this communication for the owner, fear of facing the reaction of the interlocutor and with his own inability to deal with an intense emotional response, capable of causing discomfort in the sender. These reasons are often those that justify the retention of bad news, being now recognized the need to capacitate the communicator with skills to break bad news, in order to be professionally prepared to handle the shock of emotional reactions (Baile *et al*, 2000). Communication difficulties can lead to job dissatisfaction, higher levels of stress and to a high proportion of complaints and errors (Knott, 2015).

In order to communicate, it is essential to have adequate knowledge on the subject. Besides that, a number of other factors , including fatigue, personal difficulties, behavioral beliefs and subjective attitudes, such as a personal fear of death, can affect the ability to break bad news with sensibility (Knott, 2015).

The frenetic rhythm of clinical practice could also agravate the difficulties in breaking bad news and can force the VMD to deliver the bad news unexpectedly. If it is imperative to break the news, in these circumstances, the VMD should endeavor to schedule a new appointment to talk more calmly with the owner. It must avoid sounding rushed and eager to go to a scheduled task. Despite the difficult moment for the professional, it is part of another day of his work routin, but for the patient, owner and their families it is a crucial day, since their lives change to worse (Knott, 2015). The VMD may not feel prepared for the intensity of delivering bad news, or may unjustifiably feel that failed with the patient. The cumulative effect of these factors is exhausting and the VN should have a complementary function, devoting more time to the owner, relieving the VMD for other demanding tasks.

Surviving members of families affected by traumatic deaths, considered important the attitude of those who gave them the bad news, regarding clarity of the message, privacy and ability to answer questions (Knott, 2015).

### 2.2.2 - ABCDE model adaptation for Veterinary Medicine

As a new way to solve an old problem, guidelines and communication models to break bad news were developed, to ensure that the information transmitted was realistic and that the bad news were delivered effectively but compassionately. This is a complex ability which goes beyond the verbal component as it requires the ability to recognize and answer to the owner´s emotions, to deal with the stress created and to be able to involve him in all decisions, maintaining some degree of hope, in a situation where the prognosis may not be favorable (Knott, 2015).

The bad news must be delivered personally, never by phone, so the appointment for this purpose should be quickly scheduled. Leaving the owner anxiously waiting for news may cause a higher level of pain than the news itself. Waiting for the bad news is worse than receiving it. Once received, even if it is worse than what was feared, one can begin to deal with the problem and take action (Lickerman, 2013).

The ABCDE model, adapted from Human Medicine and proposed in the present manuscript (EPEC, 1999; Baile *et al.*, 2000; Vandekieft, 2001; Lickerman, 2013 & Knott, 2015), is the one that, in the authors opinion, better fits the Medical Veterinary multidisciplinary team, in a work context, being intuitive and easy to implement for all staff members:

### A – Advanced preparation

When the communicator has limited experience in communication, he should observe a more experienced colleague, remainig discreet, in order to benefit from an excellent learning opportunity, without disturbing, since it is an intimate and complex moment between the communicator and interlocutor. The use of simulations and educational theaters are alternative methods of learning, which are useful for the preparation of Veterinary Medicine professionals before they are effectively confronted with real situations.

It is appropriate at this stage that the comunicator prepares itself emotionally and professionally, knowing all the relevant clinical and scientific information, such as clinical reports, and being prepared to provide basic information about histological type of tumor, staging, biological behavior, prognosis, treatment options and survival rates. If the professional can not dominate all this information, he should seek to have it in the following appointment, researching the specialty literature or questioning experts in the field (Knott, 2015). He should also possess written information for the owner to read at home, at a time of greater quietness.

It is also advisable that instead of automatically verbalizing what he is thinking, he should previously mentally rehearse the text, practicing out loud, as if he was preparing to speak in public, listing specific words and phrases to use or avoid.

It is essential to schedule the appropriate time, provide a private and comfortable place, and to instruct the rest of the team not to interrupt. Cell phones should be in silent mode or handed over to another team member. It should be taken in consideration that this will be a hard moment, so it is recommended to have facial tissues in the room and to offer a glass of water, a cup of tea, or anything else that can serve as a soothing.

## B – BUILD

This is the step in which the communicator should try to assess the owner's preferences about the degree of truth that he really wants to know, trying to predict and anticipate a poor outcome, as this dialogue is a preparation and an opportunity to determine what the owner already knows, or what information he would actually like to acknowledge.

For this purpose, questions to determine who is the main caregiver of the patient, or to whom the test results should be transmitted, in case they determine a serious illness, should be previously planned and elaborated.

Whenever possible, it should be encouraged the presence of relatives or friends who can support the owner, if according to his will. This care reveals planning and it will be appreciated by the owner and their family members or friends.

In the first meeting, VMT must present themselves properly to everyone present, explaining what is their relationship with the patient, politely asking them to also identify and explain their relationship with the patient and the owner.

This step requires calmness, tranquility, sensibility to cultural and religious differences and personal preferences, avoiding improper mood or disrespectful/inadequate comments.

## C – COMMUNICATE WELL

It is important to be factual, to inform clearly, to speak frankly but with compassion, sensibility, sympathy and empathy, avoiding euphemisms and medical jargon but not fearing the use of realistic and strong terms like “cancer” or “death”.

Several studies argue the importance of pronouncing the bad news bluntly but using anticipating expressions (e.g. I'm sorry, but I don´t bring you good news...), since starting with the negative warning, brings less emotional impact.

Also, the communicator should be aware that after receiving bad news, the owner will not retain much of what is said. It is natural that when receiving bad news, people cease to assimilate what comes next. After the bad news announcement, the person who received them does not remember half of what was explained to him. By this reason, educating and advising should be avoided at that moment and should become a concern for the following appointments. It might be useful to have relevant information written, using drawings or diagrams and repeating the key information several times.

It is recommended to take breaks, not to enter in a constant monologue and encourage questions and check if the message was understood, asking him to whether he is able to explain the situation to the rest of the family at home. It allows verifying if the owner understands the disease and also allowing him to commit himself to share his suffering with other family members. It is well known that in cases where owners want to protect others from the impact and do not share their pain, they will suffer much more.

It is also at this stage that the commitment of the VMT begins, to ensure that they will always be available to support the patient and the owner.The owners must feel that someone with a position of trust, authority and specific knowledge on the subject really cares about what is happening, will not abandon them, will be actively committed to establish a care plan, will always be available to help them dealing with new issues that arise and to support them during all course of the disease, no matter what happens. It is important to ensure the availability repeatedly, given the fact that it is a very effective mean of increasing family self-esteem and confidence in the VMT. It may still be necessary, at this stage, to assure that the team will not let the patient suffer, because adequate information on pain relief provides greater security to owners. This is the greatest relief that can be provided at this stage.

## D – DEAL

This step assumes that the VMD, VN and other team members are able to assess and respond to the emotional reactions of owners. Owners and their families may respond to bad news in very different ways. Some respond emotionally with tears, anger, sadness, love, anxiety, acceptance, while others feel shock, denial, guilt, unbelief, fear, sense of loss, shame or try to intellectualize

the reason of the occurrence.

Veterinary professionals, as communicators, should allow silence and tears, avoiding the urge to talk to overcome their own discomfort and being able to continue at the owner's rhythm, giving them time to react and be prepared to support them, encourage them to describe their feelings, being in harmony with their body language. When the owner develops emotions of anger against the sender of the news, it is advisable to wait in silence, avoiding continuing to talk because, in those moments, the owner is not listening.

Understanding the news and its meaning will improve the veterinarian/owner's relationship, facilitating decision making and future planning.

In subsequent appointments, it is also important to monitor the emotional state of the owner, evaluating his tendency to discouragement and depression, caused by the complication that being in charge of an oncologic animal patient is, in his day-to-day life with his family and work.

Under any circumstances, the VMT should discuss or criticize co-workers, or assume defensive attitudes.

## E – ENCOURAGE AND VALIDATE EMOTIONS

This step reinforces the previous ones, and also defines the ideal moment in the communicative pathway to explore the effects and meaning of the news in the caregiver, informing him of the support that he can receive. It is important to encourage hope, even if cure is not realistic, and to talk about the available options. Explaining the evolution of new oncologic treatments and talking about the frantic rhythm in which new knowledge and treatments are discovered will help. It is fundamental not to minimize the gravity of the situation, since the efforts to soften the issue, although well-intentioned, can lead to uncertainty and confusion. However, it should be remembered that usually, it is what is not said that allows people to continue to have hope, because if nothing is said to contradict it, the natural tendency of each person is to always maintain hope, even when the odds are not so favourable. Dealing with feelings of hope, avoiding to lie or to instigate false expectations, is highly delicate. On the other hand, saying that nothing can be done, ruins irreversibly the hope and can make the client look for another VMC, look for alternative ways or even opt for euthanasia earlier than necessary, since nowadays, palliative care is a reality in Veterinary Medicine.

Although inconsistent with the message of hope, if the case is really terminal, this reality should not be delayed, ignored or hidden. One way to communicate the poor prognosis is to consider the use of expressions such as "I would not be surprised if the patient died next year / month / week / day and I would prefer that everyone at home was warned and prepared". Recognize how excellent the owner was with all the care provided to his pet along all the period, or allow him to share happy memories, can help replace the anxiety feelings associated with death.

Finnally, and in accordance with the last step of the SPIKES model (Strategy and Summary), it is important to finish the meeting with a summary and a plan for the next steps, leaving the next appointments already scheduled. There is no need to approach and decide everything at the first appointment. Whenever there is a lot of information to be transmitted, it must be repeated and clarified in the following appointments.

Necessary measures must be taken with the rest of the team, so that they are all in harmony with the planning and adopted strategy.

The follow-up, even if it is done by phone, it is a humanitarian act regarding any disease. In a serious illness, especially terminal such as oncologic disease, follow-up by phone is not enough and it requires scheduling an appointment for a week after the bad news' communication. It is surprising the progress that some people do, a week after the announcement of the bad news. The human mind has a remarkable ability to adapt to the tragedy and begin to develop defense mechanisms right after the moment of the bad news' transmission (Lickerman, 2013).

At the conclusion of each appointment, it is essential to commit to dedicate and strengthen the support, remembering that the team will always be present, will give full attention to the patient and will always answer the phone. Finally, accurate and easy to understand information must be disclosed, about how to have an accessible and prioritized attendance either for simple questions or for unpredictable and urgent treatments.

Table. 1. Summary of the ABCDE model adapted to Veterinary Medicine

| | |
|---|---|
| A-ADVANCE PREPARATION | The comunicator must prepare himself emotionally and professionally<br>Organize to have the appropriate time, with privacy and no interruptions<br>Review the relevant clinical information<br>Mentally rehearse, identifying words or phrases to use and avoid |
| B-BUILD | Determine what and how much, the owner wants to know<br>Allow family members or friends to be present to give support<br>Get introduced appropriately to all<br>Warn the owner that will communicate bad news |
| C-COMMUNICATE WELL | Speak frankly but compassionately; avoid euphemisms and medical jargon<br>Use silence and body language as tools to facilitate discussion<br>Give people time to react and allow tears, continuing at the rhythm of the interlocutors<br>Encourage the owner to describe what he understood about the information received<br>Allow time to answer questions; write things and provide written information |
| D-DEAL | The whole team should be aware of how to deal with the owner, their reactions and their families |
| E- ENCOURAGE AND VALIDATE EMOTIONS | Assess and respond to the emotional reaction of the owner and his family<br>Communicate to the owner how excellent he was during the care provided to his pet |
| STRATEGY, SUMMARY AND PLANNING[a] | Finish each appointment/contact with a summary<br>Schedule the following appointments and follow-up plan and care<br>Repeat the most important information in each of the subsequent appointments |

[a]Note: this step is adapted directly from the SPIKES model

### 2.3 - Communication in the therapeutic and palliative care stage

The consent of the owner to establish the therapeutic care plan may constitute a contract between the client and the VMC, where economic constraints may also be a decision factor. The informed consent is a legal obligation, which requires that all the steps of treatment are properly explained, as well as potential risks (Wager, 2011).

Communication skills are vital in this step, so that the correct information is transmitted. Although the professional's responsibility to obtain consent belongs to the VMD, the VN can also play a key role in this process (Wager, 2011). In this case, the entire team will benefit if this professional also possesses the knowledge about available treatments, benefits and costs, duration and dosage, frequency of application, mode of application and side effects (Vala, 2016).

## CONCLUSIONS

1st The adaptation of the ABCDE model for Veterinary Medicine, at the various stages of evolutionary clinical course, improves communication with the owner and offers all the members of the VMT better communication skills, allowing to overcome, the difficult task that is the transmission of bad news, so common in veterinary oncology.

2º The VN is part of the team that takes care of oncologic patients and should seek to create a relationship of empathy and concern with the owner and his patient. The VN should assume himself, with respect for the other team members, as a privileged communicator in the relationship with the owner, since he has more contact with the patient.

3º The difficulties in transmitting the bad news are linked to the fact that it is an unpleasant emotional experience for both participant sides, but it also reveals itself as a reflective opportunity, in which the professional must adopt communication strategies to overcome, with professionalism, the fact that he will change irrevocably and for worse, the life of his interlocutor.

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## CIÊNCIAS DA VIDA E DA SAÚDE
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DINÂMICA FISIOLÓGICA DA VARIABILIDADE CARDÍACA: UMA ABORDAGEM ESTATÍSTICA NA SÍNCOPE VASOVAGAL 39
PHYSIOLOGICAL DYNAMICS OF HEART RATE VARIABILITY: A STATISTICAL MODELING APPROACH IN VASOVAGAL SYNCOPE 39
DINÁMICA FISIOLÓGICA DE LA VARIABILIDAD CARDIACA: UN ENFOQUE ESTADÍSTICO EN LA SINCOPE VASOVAGAL 39

ATITUDES DA POPULAÇÃO PORTUGUESA EM RELAÇÃO À FIBRA ALIMENTAR 49
ATTITUDES OF THE PORTUGUESE POPULATION REGARDING DIETARY FIBRE 49
ACTITUDES DE LA POBLACIÓN PORTUGUESA EN RELACIÓN A LA FIBRA ALIMENTARIA 49

SITUAÇÃO DE RISCO COM IMPACTO EM TODA A FAMÍLIA: GRAVIDEZ NA ADOLESCÊNCIA 65
A RISKY SITUATION WITH IMPACT ON THE WHOLE FAMILY: TEENAGE PREGNANCY 65
SITUACION DE RIESGO CON IMPACTO EN TODA LA FAMILIA: EMBARAZO EN LA ADOLESCENCIA 65

DETERMINANTES DE SAÚDE NUMA AMOSTRA DE CRIANÇAS PORTUGUESAS 77
HEALTH DETERMINANTS AMONG A SAMPLE OF PORTUGUESE CHILDREN 77
DETERMINANTES DE LA SALUD EN NIÑOS PORTUGUESES 77

VALIDAÇÃO DO QUESTIONÁRIO ROMA III PARA O DIAGNÓSTICO DE DISPEPSIA FUNCIONAL EM ADULTOS PORTUGUESES 87
VALIDATION OF THE PORTUGUESE ROME III QUESTIONNAIRE FOR DIAGNOSIS OF FUNCTIONAL DYSPEPSIA IN ADULTS 87
VALIDACIÓN DEL CUESTIONARIO III ROMA DE PORTUGAL PARA EL DIAGNÓSTICO DE DISPEPSIA FUNCIONAL EN LOS ADULTOS 87

A INFORMAÇÃO COMO SUPORTE À SUPERVISÃO DE PARES EM ENFERMAGEM 95
INFORMATION AS SUPPORT FOR PEER SUPERVISION IN NURSING 95
LA INFORMACIÓN COMO SOPORTE DE SUPERVISIÓN DE PARES EN ENFERMERÍA 95

COMUNICAÇAO INTERNA NAS ORGANIZAÇÕES: INSTRUMENTO PRÁTICO DE AUXILIO À PASSAGEM DE TURNO 105
INTERNAL COMMUNICATION IN ORGANIZATIONS: PRACTICAL INSTRUMENTS TO HELP THE SHIFT CHANGE 105
COMUNICACIÓN INTERNA EN LAS INSTITUCIONES: HERRAMIENTA PRÁCTICA DE AYUDA AL CAMBIO DE TURNO 105

COMUNICAÇÃO CLÍNICA (HANDOVER) E SEGURANÇA DOS CUIDADOS DE ENFERMAGEM: REVISÃO DA LITERATURA 117
CLINICAL COMMUNICATION (HANDOVER) AND SAFETY OF NURSING CARE: A LITERATURE REVIEW 117
COMUNICACIÓN CLÍNICA (HANDOVER) Y SEGURIDAD DE LOS CUIDADOS DE ENFERMERÍA: REVISIÓN DE LA LITERATURA 117

DESAFIOS À INVESTIGAÇÃO EM CUIDADOS PALIATIVOS: CONTRIBUTO DO MESTRADO EM CUIDADOS PALIATIVOS DA FACULDADE DE MEDICINA DA UNIVERSIDADE DE LISBOA 127
CHALLENGES OF CONDUCTING RESEARCH IN PALLIATIVE CARE: CONTRIBUTION OF THE MASTER'S DEGREE IN PALLIATIVE CARE BY THE FACULTY OF MEDICINE, UNIVERSITY OF LISBON 127
DESAFÍOS A LA INVESTIGACIÓN EN CUIDADOS PALIATIVOS: APORTACIÓN DEL MÁSTER EN CUIDADOS PALIATIVOS DE LA FACULTAD DE MEDICINA DE LA UNIVERSIDADE DE LISBOA 127

*Millenium, 2*(1), 39-47.

# DINÂMICA FISIOLÓGICA DA VARIABILIDADE CARDÍACA: UMA ABORDAGEM ESTATÍSTICA NA SÍNCOPE VASOVAGAL

# PHYSIOLOGICAL DYNAMICS OF HEART RATE VARIABILITY: A STATISTICAL MODELING APPROACH IN VASOVAGAL SYNCOPE

# DINÁMICA FISIOLÓGICA DE LA VARIABILIDAD CARDIACA: UN ENFOQUE ESTADÍSTICO EN LA SINCOPE VASOVAGAL

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## RESUMO

Introdução: A perda transitória da consciência e tónus postural seguido de rápida recuperação é definida como síncope. Tem sido dada atenção a uma síncope de origem central com descida da pressão sistémica conhecida por síncope vasovagal (SVV).

Objetivos: A análise da variabilidade da frequência cardíaca (HRV) é uma das principais estratégias para estudar a SVV através de protocolos padrão (por exemplo tilt test). O principal objetivo deste trabalho é compreender a importância relativa de diversas variáveis, tais como pressão arterial diastólica e sistólica, (dBP) e (sBP), volume sistólico (SV) e resistência periférica total (TPR) na HRV.

Métodos: Foram usados modelos estatísticos mistos para modelar o comportamento das variáveis acima descritas na HRV. Analisaram-se mais de mil e quinhentas observações de quatro pacientes com SVV, previamente testados com análise espectral clássica para a fase basal (LF/HF=3.01) e fases de tilt (LF/HF=0.64), indicando uma predominância vagal no período tilt.

Resultados: O modelo 1 revelou o papel importante da dBP e uma baixa influência de SV, na fase de tilt, relativos à HRV. No modelo 2 a TPR revelou uma baixa influência na HRV na fase de tilt entre os pacientes.

Conclusões: Verificou-se que a HRV é influenciada por um conjunto de variáveis fisiológicas, cuja contribuição individual pode ser usada para compreender as flutuações cardíacas. O uso de modelos estatísticos salientou a importância de estudar o papel da dBP e SV na SVV.

**Palavras-chave**: síncope vasovagal; frequência cardíaca; modelos mistos.

## ABSTRACT

Introduction: The transitory loss of conscience and postural tone followed by rapid recovery is defined as syncope. Recently has been given attention to a central mediated syncope with drop of systemic pressure, a condition known as vasovagal syncope (VVS).

Objectives: The analysis of Heart Rate Variability (HRV) is one of the main strategies to study VVS during standard protocols (e.g. Tilt Test). The main objective in this work is to understand the relative power of several physiological variables - Diastolic and Systolic Blood Pressure, (dBP) and (sBP), Stroke Volume (SV) and Total Peripheral Resistance (TPR) in Heart Rate Variability (HRV) signal.

Methods: Statistical mixed models were used to model the behavior of the above variables in HRV. Data with more than one thousand and five hundred observations from four patients with VVS were used and previously tested with classical spectral analysis for basal (LF/HF=3.01) and tilt phases (LF/HF=0.64), indicating a vagal predominance in the tilt period.

Results: Statistical models reveal, in Model 1, a major role in dBP and a low influence from SV, in the tilt phase, concerning HRV. In Model 2 TPR disclose a low HRV influence in the tilt phase among VVS patients.

Conclusions: HRV is influenced by a set of physiological variables, whose individual contribution can be assessed to understand heart rate fluctuations. In this work, the use of statistical models put forward the importance of studying the role of dBP and SV in VVS.

**Keywords:** vasovagal syncope; heart rate; mixed models.

## RESUMEN

Introducción: La pérdida transitoria de la conciencia y tono postural, seguido de rápida recuperación se define como el síncope. Se ha prestado atención a un síncope acompañado por la disminución de la presión sistémica, conocida como síncope vasovagal (SVV).

Objetivos: El análisis de la variabilidad del ritmo cardíaco (HRV) es una estrategia para estudiar la SVV durante protocolos estândar (por ejemplo, tilt test). El objetivo de este trabajo es comprender la importancia de las diversas variables - presión diastólica y sistólica (dBP) y (sBP), el volumen sistólico (SV) y la resistencia periférica total (TPR) en la variabilidad de la señal de la frecuencia cardíaca (HRV).

Métodos: Se utilizaron modelos estadísticos para modelar el comportamiento de las variables descritas en HRV. Datos de más de mil quinientos observaciones de cuatro pacientes con SVV fueron utilizados y probados previamente con el análisis espectral clásico para el periodo basal (LF/HF=3.01) y del tilt (LF/HF=0.64), lo que indica una predominio vagal en el período tilt.

Resultados: El modelo 1 reveló un papel importante de la DBP y la disminuida influencia del SV en el tilt. En modelo 2, TPR ha mostrado una baja influencia de la HRV en la fase tilt.

Conclusiones: Se ha encontrado que HRV es influenciada por un número de variables, cuya contribución individual se puede utilizar para entender sus fluctuaciones. Los modelos han destacado la importancia de estudiar el papel de dBP y SV en la SVV.

**Palabras Clave:** síncope vasovagal; frecuencia cardíaca; modelos mixtos.

## INTRODUCTION

Syncope is defined as a transient loss of conscientious and postural tone which is followed by a rapid onset. Syncope episodes present high incidence (Aydin, Salukhe, Wilke, & Willems, 2010) being an important cause of medical concerns. One of the main classifications of syncope is the division among benign syncope from other types whose origin is from functional causes. A pathophysiological classification of syncope according to the 2009 guidelines of the European Society of Cardiology (Moya et al., 2009) presented three main causes as origin of syncope. The Reflex syncope (or neural mediated) where it is included the vasovagal syncope (VVS), but also carotid sinus syncope or atypical forms; The orthostatic hypotension cause, including primary and secondary Automonic failures (Parkinson disease and Diabetes Mellitus) and volume depletion causes; and Cardiac Syncope in which the origin is related with arrhythmias or structural diseases (such as myocardial infarction). Causes of VVS still present a challenge for clinical research usually being preceded by symptoms of autonomic activation (pallor, nausea and sweating), and is typically known as "common fainting".

Among reflex syncope the vasovagal type is the most common cause in young patients, revealing a peak incidence between 10 to 30 years (Ganzeboom, Colman, R eitsma, Shen, & Wieling, 2003).

The head-up tilt-table (HUTT) test is used to assess the regulatory response of posture changes, a provocative maneuver to activate homeostasis.

In this work, the aim is to analyze HRV (Heart Rate Variability) signal obtained during HUTT protocols and the power of Diastolic Blood Preasure (dBP), Systolic Blood Pressure (sBP), Stroke Volume (SV) and Total Peripheral Resistance Index (TPR) to explain the influence of each variable with the proposed statistical mixed model. These models will guide the clinical management in VVS by centering the action in the most important variables.

## 1. THEORETICAL FRAMEWORK

HUTT is a clinical test thought to exaggerate the pathogenesis of the neurocardiogenic syncope. The patient is placed in a tilting bed (with foot support) ranging from 0 to 80 degrees (depending on the model and trade mark). During tilt movement, and by the influence of the gravity, the blood moves to the lower extremities, thus decreasing pre-load sensed by the non-myelinated C fibers in the wall of the left ventricle. This information is sent to the nervous system and used to increase the sympathetic outflow (Ljilja, Mišmaš, Adamec, & Habek, 2013) slightly increasing diastolic blood pressure and heart rate. The tilt table apparatus simulates the position change (from decubitus from upright position), thus forcing the reduction in pre-load, which is reinforced by the absence on the muscle contraction of lower extremities muscles. By this way, this provocative maneuver exaggerates the neurocardiogenic syncope conditions, and is used as a clinical test in VVS.

Although HUTT test has been used for more than 60 years, the absence of gold standard protocols is a major drawback concerning sensitivity and specificity levels of diagnosis. Tests with normal volunteers and with patients who had history of VVS, present 90% of specificity and sensitivity ranging from 32% and 82% (Parry & Kenny, 1999b). Provocative additional tests (e.g. carotid sinus massage or the use of pharmacological vasodilatation) may increase sensitivity values (Ljilja et al., 2013; Parry & Kenny, 1999b).

The physiopathological questions around VVS still founds a challenge for clinical research, and the use of statistical mixed linear methods are suitable to establish mathematical models to disclose the importance of standard physiological variables to explain the HRV signal dynamics.

## 2. METHODS

To derive the statistical models, data obtained during the HUTT test were selected. For each patient, one period of the basal phase (dorsal decubitus) of the test with five minute length was selected, and another period in the tilt phase with the same duration was also elected. Data with more than one thousand and five hundred observations from four patients with VVS (two males and two females) were randomly selected from the clinical file of disautonomia consultation, with clinical indication to tilt maneuver diagnosis test. These data were used also in the context of other clinical study whose details can be found in (R. Fonseca-Pinto, Ducla-Soares, Araújo, Aguiar, & Andrade, 2009)fractional Gaussian noise (fGn.

For each period (named basal and tilt, respectively) HRV signal was derived after the processing of ECG (second derivation) by extracting the time instants of R waves and setting the time between R waves. The graphical plotting of this information is known as tachogram. This tachogram is then submitted to an interpolation algorithm by cubic splines, using a 4 Hz interpolation frequency. An example of a tachogram is presented in Figure 1 at the top, and the EKG from which the signal is derived at bottom.

Seco, M. A. & Pinto, R. (2016). Physiological Dynamics of Heart Rate Variability: A Statistical Modeling Approach in Vasovagal Syncope. *Millenium, 2*(1), 39-47.



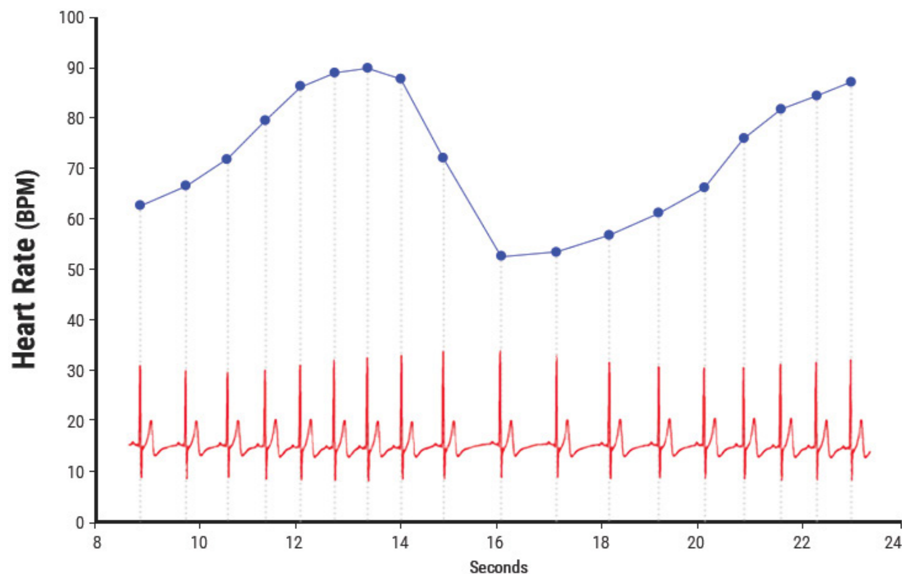


Figure 1 – Bottom- EKG with 18 R waves (in 15 seconds), and the derived tachogram (top). This figure was adapted from (McCraty & Royall, 2015)

The HVR signal is used to assess the cardiac reply to neural firing in response to changes to maintain homeostasis. In fact, back in 1963 in (Hon & Lee, 1963)exercise, and recovery heart rate are receiving increasing interest for monitoring fatigue, fitness and endurance performance responses, which has direct implications for adjusting training load (1 fetal distress was first reported to preceded changes in interbeat intervals, even before heart rate changes. Today there exist a variety of methods to assess the HRV pattern, ranging from the simple time-domain analysis to the new methodologies adapted to the non-linearity and non-stationarity of the physiological dynamics (Rui Fonseca-Pinto, 2011; Parry & Kenny, 1999b).

The methodology used to process HRV signal in this work was the spectral analysis via Kubios software (Tarvainen, Niskanen, Lipponen, Ranta-aho, & Karjalainen, 2014), using the Power Spectral Density (PSD) graph to derive the Sympathovagal Balance (SVB) as the quotient between Low Frequency (LF) band ranging from 0.05 Hz to 0.15 Hz; and the High Frequency (HF) band from 0.15 Hz to 0.4Hz of normalized frequency. This autonomical spectral derived index is defined in Equation 1:

$$SVB = \frac{LF}{HF}. \quad \text{(Equation 1)}$$

As the HF power is a measure of the vagal outflow, in Equation 1 when the quotient is smaller than 1 and there is a parasympathetic dominance in the time period in study. In the reversal case, the sympathetic system supremacy denotes an index bigger than 1. In the present study, SVB index was calculated for each patient, both in the basal and also in the tilt phases. The use of HUTT test, in the context of this work, served to confirm VVS and objectively use data from patients with a certified and objective diagnosis.

Joint with HRV signal, other physiological variables were registered to be used in the statistical model. These variables (sBP, dBP, SV, TPR) belong to the standard protocol of HUTT test and his record does not interfere with the test.

In this study, statistical linear mixed models were used to model the behavior of the above identified variables in the HRV signal. In several cases (as in the case here), data are grouped with variable correlations in the same group. The use of models with fixed and random parameters to model this kind of data is a good option to the work presented among this study in VVS patients and HUTT test (Seco & Vieira, 2014). Models enrolling both effects (fixed and random) are known as mixed models, whose parameters can be linear or nonlinear.

Mixed models use random parameters to translate the dependency between variables whose observed values are grouped. Some fixed parameters are associated with common characteristics of the population and the random parameters represent individual characteristics of each group, or deviations regarding the general population characteristics. These models, developed mainly from the work of (Laird & Ware, 1982), have big potentiality, are flexible and are adequate for equilibrate and non-equilibrate data.

At computational level, and since the work of (Pinheiro & Bates, 2000) these models have significantly evolved, as they use efficient

algorithms, leading to trustful results. Due to its excellent implementation in R software (R Core Team, 2014), the *library nlme* were used in this work.

The details of the model are now presented:

Let be a vector with dimension , *i=1,...,M,* of observations grouped in *M* groups. When there is only one group, the model proposed by (Laird & Ware, 1982) is presented in Equation 2:

$$y_i = X_i\beta + Z_i b_i + \varepsilon_i \quad , i=1,...,M, \quad ;$$
$$b_i \sim N(0,\Sigma), \quad \varepsilon_i \sim N(0,\sigma^2 I), \qquad \text{(Equation 2)}$$

where β is a vector of fixed parameters (fixed effects) of dimension *p*, is a vector of random parameters (aleatory effects) of dimension *q*, e are matrix of the model of order ×*p* e ×q, respectively. The columns of are, in general, a subset from the columns of . is a vector of dimension , designated by «residual error» within groups.

It is assumed that and have Normal multivariate distribution N(0,Σ) and N(0,σ²I) respectively, independent for different *i's* (groups) and independent between themselves. Σ is the variance-covariance matrix.

The assumption that var() = σ²I, *i=1,...M*, can be generalized.

The mixed linear model can be regarded as an extension of the classic linear multivariate regression model, where an additional "error" is considered, traducing the correlations between observations bellowing to the same group (Seco, Felgueiras, Fdez-Riverola, & Pereira, 2011). The estimators from fixed parameters β are obtained from the likelihood function, and the variance components estimation is made using the restricted maximum likelihood method (REML).

## 3. RESULTS

The HUTT test was performed in all patients of the disautonomia consultation, and among them, 4 volunteers were randomly selected. The two five minute period (basal and tilt) were treated with spectral methods to obtain the SVB index defined in (Equation 1).

The mean of the SVB index for the basal period was thus indicating an increasing power of the low frequency, hence a bigger sympathetic prevalence. In the tilt phase, the sympathovagal index was , indicating an over activation of vagal system in this phase of the test. It is important to remind that, in physiological conditions the upright position simulated by the tilt should increase the sympathetic tone. This was not the case within these patients, and the HUTT test was positive for VVS.

In order to derive the mathematical model (in fact two models were presented in this work) more than one thousand and five hundred observations were collected for the two phases of the test. Joint with HRV also dBP, sBP, SV and TPR were collected.

Statistical mixed linear models (as described above) were used to model the behavior of the identified variables with clinical relevance. The main goal was to found a satisfactory model to translate the influence of dBP, sBP, SV and TPR in HRV, being the last one the response variable.

Data represent four groups (one for each patient) and it was considered a random parameter (random intercept) for each one, modeling the correlations between the registered observations for each individual, and also estimating the deviation observed regarding the global mean of the model.

This work put forward two models explaining HRV dynamics, one with 3 variables (SV, sBP and dBP) from now on designated by model 1, and another with four variables (SV, sBP, dBP and TPR), the model 2.

Regarding model 1 the power of each variable for the basal phase and also for the tilt phase can be found in Table 1. It is also possible to see, for each independent variable, the estimated standard errors in the second row and the random intercept in the last row.

Table 1 – Statistical mixed model 1, for HRV in the two phases of the HUTT test. Estimates of each of the three variables in the model in the first raw for each of the two phases (basal and tilt).

| | | Intercept | SV | sBP | dBP |
|---|---|---|---|---|---|
| **Basal** | Model 1 | 5.812 | -0.053 | 0.048 | -0.127 |
| | Standard error | 2.43 | 0.06 | 0.02 | 0.02 |
| | Standard deviation of random intercept | | | 0.572 | |
| **Tilt** | Model 1 | 14.982 | -0.079 | 0.373 | -0.743 |
| | Standard error | 9.79 | 0.06 | 0.1 | 0.16 |
| | Standard deviation of random intercept | | | 2.441 | |

To normalize the values obtained with the model in order to compare with others (in particular with different number and types of variables), the division by the intercept value was implemented. The results of the obtained normalized model can be found in Figure 2.

By the analysis of Figure 2, it is possible to perceive the importance of pressure changes in the HRV signal during the tilt phase. In fact, the tilt phase reinforces de contribution of sBP (in the same direction as in the basal phase) but also, and more significantly in the dBP signal, for which the variation is bigger. As in the systolic pressure, the increasing trend has the same direction. The SV do not have significant power in the HRV signal and in the case of the tilt phase it decreases his influence over HRV inputs. This is explained by the lacking in homeostatic response due to the VVS condition in these patients.

Another interesting result (offering pharmacological relevance) is related to information provided by the model regarding the use of adrenergic receptors in VVS management. In fact, one of the commonly used drugs in VVS are the β-adrenergic blockers, the first choice for many years, by reducing the initial sympathetic activation in the beginning of the syncope. However, the lacking of evidence of its use is pointed as a major risk to this practice (Parry & Kenny, 1999a). Despite the existence of several studies claiming positive results with β-blocker treatment in syncope (Parry & Kenny, 1999a), according to the European Society of Cardiology guidelines, β-blockers should not be used to treat reflex syncope (Moya et al., 2009) due to the absence of effectively proved benefit. Nevertheless, the results advanced by this model 1 are consistent with the use of β-adrenergic blockers. The increased power of systolic pressure in the tilt phase is a marker of sympathetic modulation, thus the use of β-adrenergic blockers are indicated to control this mechanism by reducing heart rate and hence systemic pressure. Regarding the negative exacerbation of dBP (thus decreasing his influence in the HRV signal) during the tilt phase it can be regarded as lacking of peripheral sympathetic response. This is the rational for the use of α-agonists to manage VVS, which is also supported by the model. Adrenergic α-receptors are located in the smooth muscle of the peripheral arteries, thus to balance the vasodilation in the tilt phase, the use of alpha adrenergic agonists can be activated to overcome the lacking of response and contribute to decrease headed syncope symptoms and its recurrence.

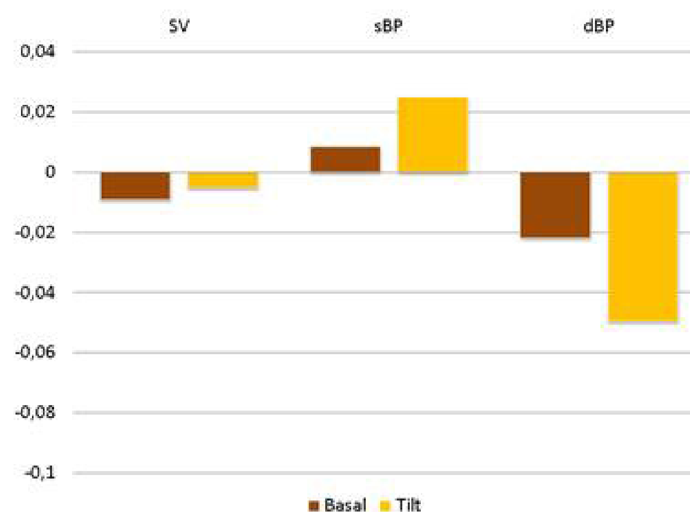


Figure 2 - Normalized model 1 for the basal and tilt period.

Alongside pressure values and stroke volume, another important variable mainly related with sympathetic system is the peripheral resistance (in fact total peripheral resistance, as an overall resistance to blood flow through the systemic blood vessels – TPR). Hence, a second model (model 2) including all the previous variables in model 1 and also TPR were considered.

In accordance with the previous results of model 1, values for the model are presented in Table 2 and the normalized version for comparison purposes was drawn in a bar graph in Figure 3.

Table 2 - Statistical mixed model 2, for HRV in the two phases of the HUTT test. Power of each of the three variables in the model in the first raw for each of the two phases (basal and tilt).

| | | Intercept | SV | sBP | dBP | TPR |
|---|---|---|---|---|---|---|
| Basal | Model 2 | -6.001 | 0.556 | -0.107 | -0.113 | 0.004 |
| | Standard error | 3.00 | 0.09 | 0.03 | 0.03 | 0.00 |
| | Standard deviation of random intercept | | | 2.236 | | |
| Tilt | Model 2 | 13.065 | 0.101 | 0.150 | -0.660 | 0.005 |
| | Standard error | 11.57 | 0.12 | 0.13 | 0.17 | 0.00 |
| | Standard deviation of random intercept | | | 4.581 | | |

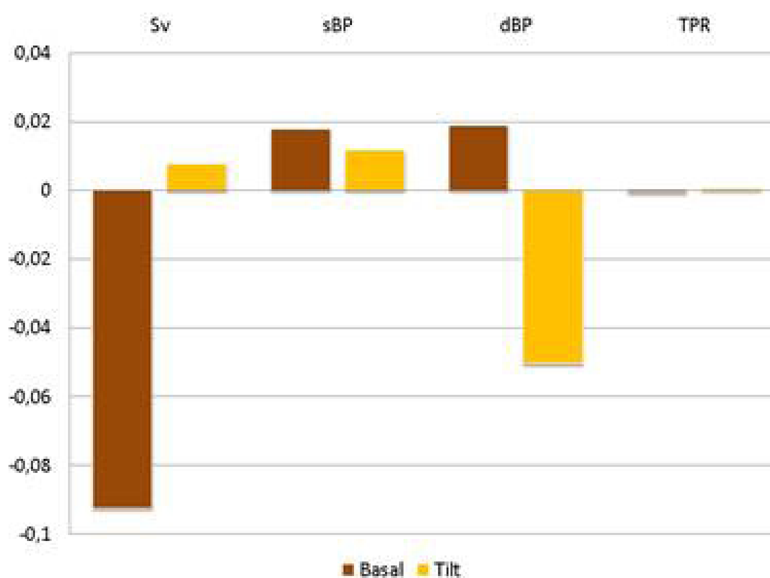


Figure 3 - Normalized model 2 for the basal and tilt period.

## DISCUSSION

The inclusion of TPR in the model 2 denotes important changes in the power of the model variables, which is a mark of system complexity. The major changes occurred in SV and dBP. Regarding dBP, the values obtained in this model 2 for the tilt phase are coherent with the one from the previous discussed model 1, which implies more attention to the role of dBP management in patients with VVS and the ensuing use of α-adrenergic agonists to control vasodilation. Systolic Volume changes in model 2 reflect the introduction of TPR (as both variables contribute to the output value for the systemic pressure).

## CONCLUSIONS

The mechanism of vasovagal syncope is incompletely understood and the overall dynamics of the main variables enrolled in his control were addressed in this work by the construction of two statistical models. As explained before, the lacking of consensus in the VVS management in particular regarding pharmacological targets is still a problem for which data analysis must be regarded as one more contribution. Results put forward in this work indicate the diastolic pressure as a target, but also a deeper understanding

of the relation between pressure and peripheral resistance.

Further work will include more patients and due to the underlying physiological nonlinearities in the process, the use of nonlinear statistical models.

## CONFLICT OF INTERESTS

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

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millenium 49

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# ATITUDES DA POPULAÇÃO PORTUGUESA EM RELAÇÃO À FIBRA ALIMENTAR

# ATTITUDES OF THE PORTUGUESE POPULATION REGARDING DIETARY FIBRE

# ACTITUDES DE LA POBLACIÓN PORTUGUESA EN RELACIÓN A LA FIBRA ALIMENTARIA

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Guiné, R., Ferreira, M., Correia, P. & Duarte, J. (2016). Attitudes of the Portuguese Population Regarding Dietary Fibre.
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## RESUMO

Introdução: A fibra dietética (FD) tem feito parte da dieta humana desde há milénios, embora os seus benefícios tenham sido reconhecidos, principalmente, nas últimas décadas.

Objetivos: Porque a FD é um componente importante de uma dieta saudável, o objetivo deste trabalho foi avaliar os hábitos de consumo dos Portugueses, bem como o seu conhecimento sobre os alimentos ricos em fibras e as suas atitudes em relação à rotulagem dos alimentos.

Métodos: Foi realizado um estudo descritivo transversal usando uma amostra não-probabilística de 382 participantes.

Resultados: Os resultados mostraram que a ingestão de alimentos ricos em fibras, como frutas, vegetais e cereais, foi muito menor do que a ingestão recomendada. Os resultados também indicaram que a maioria das pessoas não presta a atenção desejada à rotulagem de alimentos ou à informação nutricional.

Conclusões: O nível geral de conhecimento sobre FD foi considerado insatisfatório, e, portanto, é necessário mais educação nutricional e desenvolver esforços para informar as pessoas acerca da importância da FD como parte da sua dieta diária.

**Palavras-chave:** alimentos ricos em fibra; fibra dietética; fontes de fibra; hábitos de consumo; pesquisa; rotulagem.

## ABSTRACT

Introduction: Dietary fibre (DF) has been part of human diet for millenniums although its benefits have been recognized mainly in the last dec ades.

Objectives: Because DF is such an important component of a healthy diet, the objective of this work was to evaluate the consuming habits of the Portuguese, as well as their knowledge about the fibre rich foods and their attitudes towards food labelling.

Methods: A descriptive cross-sectional study was carried out on a non-probabilistic sample of 382 participants. The results showed that the ingestion of fibre rich foods like fruit, vegetables and cereals, was much lower than the recommended ingestion.

Results: The results also indicated that most people do not pay the desired attention to food labelling or nutritional information.

Conclusions: Also the general level of knowledge about DF was found unsatisfactory, and hence more education and efforts are necessary to inform people towards the importance of DF as part of their daily diet.

**Keywords:** dietary fibre; consumption habits; labelling, fibre rich foods; sources of fibre; survey.

## RESUMEN

Introducción: La fibra dietética (FD) ha sido parte de la dieta humana durante miles de años, aunque se han reconocido sus beneficios especialmente en las últimas décadas.

Objetivos: Debido a que el FD es un componente importante de una dieta saludable, el objetivo de este estúdio fue evaluar los hábitos de consumo de los Portugueses, así como su conocimiento de los alimentos ricos en fibra y sus actitudes hacia el etiquetado de alimentos.

Métodos: Fue realizado un estudio descriptivo transversal con una muestra no probabilística de 382 participantes.

Resultados: Los resultados mostraron que la ingesta de alimentos ricos en fibra como frutas, verduras y granos era mucho menor que la ingesta recomendada. Los resultados también indicaron que la mayoría de la gente no presta la atención deseada para el etiquetado de alimentos e información nutricional.

Conclusiones: Además, el nivel general de conocimiento de FD se consideró insatisfactorio, y por lo tanto se necesita más educación sobre la nutrición y los esfuerzos para informar a la gente acerca de la importancia de la FD como parte de su dieta diaria.

**Palabras clave:** alimentos ricos en fibra; fibra dietética; fuentes de fibra; hábitos de consumo; pesquisa; etiquetado.

## INTRODUCTION

Dietary fibre (DF) has been consumed since ancient times and in recent decades has been recognized as having many associated health benefits, as evidenced by many scientific studies. At present, plants with DF and bioactive compounds are showing great interest either for the industry or the consumers due to their role in improving human well being (Zhu et al., 2015).

DF has proven to exert different beneficial effects on risk factors associated with the development of many chronic diseases, such as atherosclerosis, haemorrhoids or cardiovascular disease, also helping lowering serum LDL cholesterol and blood pressure. Additionally, many studies have demonstrated a beneficial effect of DF in reducing the incidence of several types of cancer, like colorectal, prostate or breast cancer (Brownlee, 2011; Kendall et al., 2010; Martinho et al., 2013; Russo et al., 2014).

DF also demonstrated major roles in the gut physiology. DF influences the physicochemical characteristics of the digesta and the morphology and microbial ecosystem of the gastrointestinal tract (GIT). Also the maturation and integrity of the mucosa are greatly determined by the adequate ingestion of DF. The functional effects of DF on the previously mentioned variables could be attributed to its physicochemical properties and also, indirectly, to variations in the fermentation pattern as well as to the ability to modify the microbiota profile in the different segments of the GIT (Molist et al., 2014). However, the physiological effects of DF are dependent on its nature, being generally DF divided into two classes, depending on the solubility in water: insoluble and soluble DF. Insoluble DF corresponds to cellulose and lignin, the structural parts of plant materials which are not metabolized by the bacteria in the intestine. Therefore, insoluble DF can also be categorized as unfermentable fibre. In contrast, pectins, gums and mucilages, which exist within and around the plant cells, are soluble in water forming a gel-like structure. This soluble DF is fermentable by the colonic bacteria and hence is called fermentable fibre. In nature, plant foods are formed by a mixture of soluble and insoluble fibres, being both beneficial in different ways for the human health (Ajila and Rao, 2013; Aune et al., 2011; Debusca et al., 2013; Martinho et al., 2013; Phillips, 2013).

Dietary reference intakes (DRI, 2002/2005) recommend an ingestion of at least 25 to 35 g of fibre per day, or more precisely 25 g of fibre for adult women and 38 g for adult men (Russo et al., 2014; Sáyago-Ayerdi et al., 2014).

Fruits, green vegetables and legumes, are all foods typically very rich in DF, besides being also rich in other bioactive components, like phenolic compounds with antioxidant activity or dietary minerals and vitamins (Ajila and Rao, 2013).

Thus, the objective of this study was to evaluate the consuming habits of Portuguese people relating to DF, as well as their knowledge about the fibre rich foods. Furthermore, the attitudes relating to food labelling and the information about DF were also studied.

## 1. METHODS

### 1.1. Questionnaire

The questionnaire used in the present work was previously developed and applied (Guiné et al., 2014; Martinho et al., 2013). The questionnaire consisted of seven different sections, designed to evaluate the attitudes regarding the ingestion of foods rich in dietary fibre. The socio-demographic characteristics were addressed in the first section of the questionnaire (age, gender, level of education and living environment).

Another section permitted evaluating the frequency of consumption of different types of foods and also consumption habits regarding fibre rich foods. The participants were asked to indicate for a typical week (i.e., not including special occasions like celebrations, holidays, or other occasions in which the diet is not constant) how often they eat certain foods using an open-ended question format. The questions focused on eating legumes and/or salads, eating fruit, eating whole cereals, eating out of home or eating fast-food. The attitudes toward food labelling were also addressed, and in this case the respondents were asked a set of questions related to food labelling, and in particular the information about the fibre content. The participants answered on a 5-point scale, varying from 1 (never) to 5 (always), and the questions included the following topics: “When I buy a food I usually consult the label”, “In the label I look for nutritional composition”, “I look for the amount of fibres”, “The quantity of fibres influences my food choices” and “When I buy a food stating fibre-rich, I check what is the amount present”.

The knowledge about the relation between dietary fibre and foods was accessed through another group of questions where the participants were asked to state their accordance measured on a 5-point Likert agreement-scale ranging from 1 (totally disagree) to 5 (totally agree). Hence, they were asked to indicate their extent of agreement towards statements, such as: “Dietary fibres are original from plant foods”, “Dietary fibres are original from animal foods”, “Dietary fibres have calories, i.e., they provide energy to the body when ingested” and “Legumes (beans, peas,...), cereals and fruits are foods rich in dietary fibre”.

## 1.2. Statistical analysis

For the exploratory analysis of the data basic descriptive statistics was used. Also the crosstabs and the chi square test were used to assess the relations between some of the nominal/ordinal variables under study. For evaluating the differences between the quantitative variables (scale) among groups, the non-parametric tests were used due to non-homogeneity of the groups (U-Mann Whitney for comparisons between two groups and Kruskal-Wallis for comparisons between three or more groups).

For all data analysis the software SPSS, from IBM Inc. (version 22) was used. The level of significance considered was 5%.

## 1.3. Sample characterization

This study was undertaken during the year 2015 in Portugal. The total number of participants was 382, from which 233 were female and 143 were male, with 6 participants not indicating their gender. The average age of the participants was 37.8±10.6 years, ranging from 19 to 65 years, being the average age of the male participants (40.0±10.5 years) higher than that of the female (36.4±10.5 years) (Table 1). The enquired were all adults, thus not including elderly people. Still, the variable age was classified into categories according to: • young adults, from 19 to 30 years, accounting for 26.7%; • average adults, from 31 to 50 years, representing 58.9%; • senior adults, from 51 to 65 years, corresponding to 14.4%.

The majority of the participants had a high level of education (82.0% with a university degree), while 18.0% had competed secondary school. Among the participants only one had not completed secondary school. Most of the participants lived in an urban environment (80.4%), while 19.6% lived in rural areas.

Table 1. Age distribution of the participants according to gender.

| Gender | % | Minimum | Maximum | Median | Mean age | Standard deviation |
|---|---|---|---|---|---|---|
| Female | 62.0 | 19 | 62 | 35 | 36.4 | 10.5 |
| Male | 38.0 | 23 | 65 | 38 | 40.0 | 10.5 |
| Total | 100.0 | 19 | 65 | 35 | 37.8 | 10.6 |

# RESULTS AND DISCUSSION

## 2.1. Consuming habits

In Table 2 are presented the results obtained for the consumption of meals including vegetables in a typical week. It was observed an average number of meals per week of 8.66±4.55, corresponding to just slightly more than one meal per day that includes vegetables. It was observed that 33.1% of the respondents admitted eating less than 7 portions of vegetables per week, or less than once a day. This average consumption of vegetables is in fact lower than the recommended ingestion, which stands on 3.5 to 6.5 cups of fruits and vegetables per day for adults, although varying according to age, sex, and level of physical activity (USDHHS, 2010; USDHHS/USDA, 2015). McSpadden et al. (2016) suggest that both friends and family might have a decisive role in the motivational processes that lead to an adequate ingestion of fruits and vegetables. Also Godinho et al. (2016) postulate that the success motivation for an adequate consumption of fruits and vegetables is related to the each person's characteristics, like motivational orientation, baseline intentions or cultural background.

The consumption of vegetables was higher for people in the range of 31 to 50 years (9.32±4.70) and lower for the young adults (7.17±4.24), indicating that this age group might have less concern about a healthy diet. The differences between age groups were statistically significant, as the results of the Kruskal-Wallis test showed (p = 0.000) (Table 2). Also the differences between gender and level of education were significant, being the consumption of vegetables higher for women (9.06±4.69) than for men (p = 0.011). This might be due to a higher concern in women about a healthy diet, so as to obtain a better looking body. The consumption of vegetables was also higher for people with more education, i.e., with a university degree (9.03±4.35), which might be due to educational factors, better economic status and higher income. The consumption of vegetables among people living in rural or urban areas was not significantly different (p = 0.382) (Table 2).

Table 2. Consu mption of meals including vegetables per week.

| Variable | | (Min;Max) | Mean±St. Dev. | p-value |
|---|---|---|---|---|
| Age | Young adults (19-30) | (0;21) | 7.17±4.24 | 0.000[a] |
| | Average adults (31-50) | (1;35) | 9.32±4.70 | |
| | Senior adults (51-65) | (2;16) | 8.75±3.83 | |
| Gender | Female | (0;35) | 9.06±4.69 | 0.011[b] |
| | Male | (0;24) | 7.96±4.30 | |
| Level of Education | Secondary school | (0;35) | 6.87±5.15 | 0.000[b] |
| | University degree | (0;34) | 9.03±4.35 | |
| Living Environment | Rural | (1;34) | 8.47±5.10 | 0.382[b] |
| | Urban | (0;35) | 8.68±4.43 | |
| | Total | (0;35) | 8.66±4.55 | |

[a] Kruskal-Wallis test

[b] U-Mann Whitney test

Table 3 presents the results for the consumption of fruit portions per week, corresponding to a global average of 11.66±7.80. From the participants in this study, 62.4% ate less than 14 doses of fruit per day (corresponding to one at each of the main meals) and 25,7% ate less than 7 (one dose of fruit per day). The differences in the amounts of fruit ingested were not statistically significant between rural or urban people, or even between people showing different levels of education. However, significant differences were found for age ($p = 0.000$) or for gender ($p = 0.028$), being the consumption of fruit higher for senior adults (14.06±8.63) and for women (11.67±7.62), being this last in accordance with what was previously seen for vegetables.

Table 3. Consumption of meals including fruits per week.

| **Variable** | | **(Min;Max)** | **Mean±St. Dev.** | **p-value** |
|---|---|---|---|---|
| Age | Young adults (19-30) | (0;48) | 9.01±7.15 | 0.000[a] |
| | Average adults (31-50) | (1;50) | 12.17±7.50 | |
| | Senior adults (51-65) | (3;49) | 14.06±8.63 | |
| Gender | Female | (0;49) | 11.67±7.62 | 0.028[b] |
| | Male | (1;50) | 10.21±8.00 | |
| Level of Education | Secondary school | (0;48) | 9.93±7.26 | 0.655[b] |
| | University degree | (0;50) | 11.97±7.83 | |
| Living Environment | Rural | (0;49) | 10.97±9.13 | 0.061[b] |
| | Urban | (0;50) | 11.74±7.39 | |
| | Total | (0;50) | 11.66±7.80 | |

[a] Kruskal-Wallis test

[b] U-Mann Whitney test

The results for the weekly intake of whole cereals are shown in Table 4, corresponding to a global average of 3.11±0.38, thus corresponding to approximately once every two days, being therefore low. There are many studies that corroborate the thesis that increased ingestion of whole grains reduces the risk of developing chronic diseases like type 2 diabetes or cardiovascular diseases (Giacco et al., 2014; Ye et al., 2012)2014; Ye et al., 2012. Whole grain foods have a much higher nutritional value when compared to refined cereals, being important sources of DF, as well as numerous micronutrients, minerals, and phytochemicals (Wu et al., 2015).

Again the results in table 4 reveal that the living environment did not significantly influence the ingestion of meals including whole cereals (p = 0.575), and the same was observed for age (p = 0.359). However, variables like gender or level of education produced significant differences regarding the consumption of whole cereals. In this way, the consumption of whole cereals was higher for women (3.63±3.58) and for people with more education (3.32±3.47).

Table 4. Consumption of meals including whole cereals per week.

| Variable | | (Min;Max) | Mean±St. Dev. | p-value |
|---|---|---|---|---|
| Age | Young adults (19-30) | (0;12) | 2.90±2.86 | 0.359[a] |
| | Average adults (31-50) | (0;21) | 3.12±3.60 | |
| | Senior adults (51-65) | (0;14) | 3.56±3.45 | |
| Gender | Female | (0;21) | 3.63±3.58 | 0.000[b] |
| | Male | (0;14) | 2.30±2.87 | |
| Level of Education | Secondary school | (0;8) | 2.26±2.86 | 0.010[b] |
| | University degree | (0;21) | 3.32±3.47 | |
| Living Environment | Rural | (0;14) | 3.37±3.60 | 0.575[b] |
| | Urban | (0;21) | 3.06±3.33 | |
| | Total | (0;21) | 3.11±0.38 | |

[a] Kruskal-Wallis test; [b] U-Mann Whitney test

Eating out of home is at times associated with a lower quality of the meals, and this is the reason why this particular aspect was also investigated in this study. The results in Table 5 show that, on average, the participants ate out of home 2.80±2.86 times per week (Table 5), which corresponds to a low incidence of meals out of home. The results further indicate that only gender is significantly related to the frequency of eating out (p = 0.000), so that men eat out more times per week (3.52±3.56). This might be related to the fact that still more women like to prepare the meals at home than men, although this is clearly changing over the last years, with an increasing number of men interested in cooking their own meals. The differences between age groups, level of education or living environment were not statistically significant (p = 0.431, p = 0.420 and p = 0.627, respectively).

Table 5. Number of meals out of home per week.

| Variable | | (Min;Max) | Mean±St. Dev. | p-value |
|---|---|---|---|---|
| Age | Young adults (19-30) | (0;10) | 2.47±2.28 | 0.431[a] |
| | Average adults (31-50) | (0;36) | 3.01±3.19 | |
| | Senior adults (51-65) | (0;10) | 2.85±2.51 | |
| Gender | Female | (0;10) | 2.41±2.27 | 0.000[b] |
| | Male | (0;36) | 3.52±3.56 | |
| Level of Education | Secondary school | (0;8) | 2.59±2.40 | 0.420[b] |
| | University degree | (0;36) | 2.90±2.98 | |
| Living Environment | Rural | (0;10) | 2.96±2.59 | 0.627[b] |
| | Urban | (0;36) | 2.81±2.95 | |
| | Total | (0;36) | 2.80±2.86 | |

[a] Kruskal-Wallis test; [b] U-Mann Whitney test

In Table 6 are presented the results for the number of meals of fast food eaten over a period of 7 days. On average, the consumption of fast food meals was very low (0.62±1.00), thus indicating that the inquired revealed a tendency for more healthy eating habits. The results were significantly different among age groups (p = 0.001), with the young adults eating fast food more frequently (0.76±0.91) than the other age groups. Still, even for that age group the number of times they eat fast food per week is less than once, thus indicating some concern for a healthy eating.

Table 6. Number of fast food meals per week.

| Variable | | **(Min;Max)** | **Mean±St. Dev.** | **p-value** |
|---|---|---|---|---|
| Age | Young adults (19-30) | (0;5) | 0.76±0.91 | 0.001[a] |
| | Average adults (31-50) | (0;6) | 0.59±0.93 | |
| | Senior adults (51-65) | (0;10) | 0.46±1.42 | |
| Gender | Female | (0;6) | 0.57±0.90 | 0.388[b] |
| | Male | (0;10) | 0.69±1.17 | |
| Level of Education | Secondary school | (0;6) | 0.79±1.31 | 0.665[b] |
| | University degree | (0;10) | 0.58±0.93 | |
| Living Environment | Rural | (0;2) | 0.56±0.62 | 0.342[b] |
| | Urban | (0;10) | 0.63±1.09 | |
| | Total | (0;10) | 0.62±1.00 | |

[a] Kruskal-Wallis test; [b] U-Mann Whitney test

### 2.2. Attitudes towards food labelling

Food labels include information relating to both safety and nutritional content of the foods, and therefore, they have proven increasingly important for consumer protection (Rimpeekool et al., 2015). Table 7 reveals that globally the participants consider the consultation of the food label as a mildly important issue (average score of 3.52±0.96, on a scale from 1=never to 5=always look at the label). Although the differences between age groups or living environments were not significant (p = 0.301 and p = 0.657, respectively), variables like gender or level of education were associated with the consultation of the label. Statistically significant differences were found between gender and levels of education (p = 0.000 in both cases) with the highest score for consultation of the food labels occurring for women (3.68±0.92) and more educated people (3.63±0.89).

Table 7. Statistics for the consultation of the label.

| | | Statement evaluated:<br>*"When I buy a food I usually consult the label"*<br>(scale from 1=never to 5=always) | |
|---|---|---|---|
| **Variable** | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 3.44±1.05 | 0.301[a] |
| | Average adults (31-50) | 3.53±0.88 | |
| | Senior adults (51-65) | 3.68±1.05 | |
| Gender | Female | 3.68±0.92 | 0.000[b] |
| | Male | 3.28±0.96 | |
| Level of Education | Secondary school | 3.07±1.09 | 0.000[b] |
| | University degree | 3.63±0.89 | |
| Living Environment | Rural | 3.47±0.97 | 0.657[b] |
| | Urban | 3.54±0.95 | |
| | Total | 3.52±0.96 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

Although according to Kim et al. (2016) the nutrition information in the food label constitutes an easy way to help people making healthier food choices and therefore improving their nutrients intake, it was observed in the present study that the participants did not reveal a very marked tendency to look for nutritional information in the label of foods (average score of 3.40±1.05) (Table 8). The differences between age groups or living environments were not significant (p = 0.604 and p = 0.318, respectively) but between genders or levels of education were significant (p = 0.000 in both cases). Again, being a women or having a higher level of education proved to influence the behaviour towards a more pronounced interest in the nutritional information about the food consumed.

Table 8. Statistics for consultation of the nutrition information in the label.

| Statement evaluated: *"In the label I look for nutritional composition"* (scale from 1=never to 5=always) | | | |
|---|---|---|---|
| **Variable** | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 3.61±1.17 | 0.604[a] |
| | Average adults (31-50) | 3.39±0.95 | |
| | Senior adults (51-65) | 3.46±1.19 | |
| Gender | Female | 3.60±1.00 | 0.000[b] |
| | Male | 3.06±1.04 | |
| Level of Education | Secondary school | 2.87±1.14 | 0.000[b] |
| | University degree | 3.51±0.99 | |
| Living Environment | Rural | 3.30±0.98 | 0.318[b] |
| | Urban | 3.42±1.07 | |
| | Total | 3.40±1.05 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

Presently there are several food products marketed as fibre rich, however, it is important to have an attitude towards confirming this content. It is, therefore, important to guarantee that the claims are true and help consumers making better choices to improving their diet (Ruffell, 2016). Table 9 refers to the results obtained for the frequency with which the participants look for the amount of fibres in the food labels. Globally, the score obtained was 2.84±1.10, corresponding to a low interest in knowing the amount of fibres present in the foods that people buy. The differences between people living in urban or rural environments were not statistically significant (p = 0.740). Nevertheless, in the case of age, gender or level of education, the differences were significant (p = 0.021, p = 0.000 and p = 0.000, respectively). People who tend to look more at the label to get information about dietary fibre are senior adults (3.20±1.17), of the female gender (3.03±1.06) and with higher education level (2.94±1.06).

Table 9. Statistics for the consultation of the fibre content in the label.

| Statement evaluated: *"In the label I look for the amount of fibres"* (scale from 1=never to 5=always) | | | |
|---|---|---|---|
| **Variable** | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 2.66±1.08 | 0.021[a] |
| | Average adults (31-50) | 2.82±1.06 | |
| | Senior adults (51-65) | 3.20±1.17 | |
| Gender | Female | 3.03±1.06 | 0.000[b] |
| | Male | 2.52±1.07 | |
| Level of Education | Secondary school | 2.37±1.13 | 0.000[b] |
| | University degree | 2.94±1.06 | |

| | | | |
|---|---|---|---|
| Living Environment | Rural | 2.85±1.02 | 0.740[b] |
| | Urban | 2.83±1.11 | |
| | Total | 2.84±1.10 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

In the past years consumers have become more preoccupied with a healthy diet and so the wholegrain-based and fibre-rich products have become more popular (Van der Kamp and Lupton, 2013)and have consequently (re. Nevertheless, in this study, the participants gave little importance to DF as being a reason to influence their buying options (average score 2.88±1.06) (Table 10). In this case, only the differences according to age or gender were significant (p = 0.001) and (p = 0.002), respectively. Senior adults and women seemed to be more influenced by the amount of fibres when buying food (average scores of 3.28±1.12 and 3.02±1.02, respectively).

Table 10. Statistics for the influence of fibre in the food choice.

| Statement evaluated: *"The quantity of fibres influences my food choices"* (scale from 1=never to 5=always) | | | |
|---|---|---|---|
| **Variable** | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 2.62±1.03 | 0.001[a] |
| | Average adults (31-50) | 2.90±1.02 | |
| | Senior adults (51-65) | 3.28±1.12 | |
| Gender | Female | 3.02±1.02 | 0.002[b] |
| | Male | 2.65±1.08 | |
| Level of Education | Secondary school | 2.73±1.18 | 0.256[b] |
| | University degree | 2.91±1.02 | |
| Living Environment | Rural | 2.97±0.97 | 0.376[b] |
| | Urban | 2.86±1.08 | |
| | Total | 2.88±1.06 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

It is important to ensure that the advertised claims about fibre rich foods are is accordance with the food's composition (Viebke et al., 2014). The frequency with which the participants in this study confirm the claims about fibre rich foods through the label was low (2.86±1.17) (Table 11), which confirms some lack of interest by the matters relating to food labelling. The differences between gender and level of education were statistically significant (p = 0.001 for both), so that women (3.02±1.17) and people with higher education (2.97±1.15) showed more interest to confirm the claims about fibre-rich foods.

Table 11. Statistics for confirmation of the alleged fibre rich content.

| Statement evaluated: *"When I buy a food stating fibre-rich, I check what is the amount present"* (scale from 1=never to 5=always) | | | |
|---|---|---|---|
| Variable | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 2.81±1.26 | 0.169[a] |
| | Average adults (31-50) | 2.82±1.12 | |
| | Senior adults (51-65) | 3.15±1.16 | |

| | | | |
|---|---|---|---|
| Gender | Female | 3.02±1.17 | 0.001[b] |
| | Male | 2.61±1.12 | |
| Level of Education | Secondary school | 2.42±1.16 | 0.001[b] |
| | University degree | 2.97±1.15 | |
| Living Environment | Rural | 2.85±1.11 | 0.950[b] |
| | Urban | 2.87±1.18 | |
| | Total | **2.86±1.17** | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

### 2.3. Knowledge about dietary fibres and variety of foods

DF is original from plant foods (Macagnan et al., 2015)2015 and therefore the statement analysed in Table 12 is true. The results showed that the participants had a low level of knowledge about the origin of DF, with an average score of 3.04±1.35. While the differences between genders and living environments were not statistically significant, those between age groups or levels of education were significant (p = 0.026 and p = 0.012, respectively). The highest knowledge about this fact was shown by average adults (3.19±1.36) and by more educated people (3.13±1.37).

Table 12. Statistics for vegetable nature of dietary fibre.

| Statement evaluated: *"Dietary fibres are original from plant foods"* (scale from 1= totally disagree to 5= totally agree) | | | |
|---|---|---|---|
| Variable | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 2.73±1.35 | 0.026[a] |
| | Average adults (31-50) | 3.19±1.36 | |
| | Senior adults (51-65) | 3.02±1.25 | |
| Gender | Female | 3.01±1.39 | 0.827[b] |
| | Male | 3.08±1.28 | |
| Level of Education | Secondary school | 2.65±1.17 | 0.012[b] |
| | University degree | 3.13±1.37 | |
| Living Environment | Rural | 2.99±1.34 | 0.701[b] |
| | Urban | 3.05±1.36 | |
| | Total | 3.04±1.35 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

The question evaluated next, whose results are shown in Table 13, was false, as it was previously stated that DF comes from vegetable sources, exclusively. Despite the fact that people were not so sure about the plant nature of DF, it was interesting to observe that when the question was opposite a relatively strong disagreement occurred, as demonstrated by the low score (1.69±0.74). The differences were significant among genders (p = 0.035) and among levels of education (p = 0.000), being the senior adults and women more informed about this (lower scores of 1.60±0.60 and 1.62±0.67, correspondingly).

Table 13. Statistics for animal nature of dietary fibre.

| Statement evaluated: *"Dietary fibres are original from animal foods"* (scale from 1= totally disagree to 5= totally agree) | | | |
|---|---|---|---|
| Variable | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 1.69±0.81 | 0.652[a] |
| | Average adults (31-50) | 1.73±0.76 | |
| | Senior adults (51-65) | 1.60±0.60 | |
| Gender | Female | 1.62±0.67 | 0.035[b] |
| | Male | 1.82±0.83 | |
| Level of Education | Secondary school | 1.95±0.67 | 0.000[b] |
| | University degree | 1.64±0.76 | |
| Living Environment | Rural | 1.77±0.77 | 0.284[b] |
| | Urban | 1.68±0.75 | |
| | Total | 1.69±0.74 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

Fibres provide calories when ingested: 2 kcal/g (8 kJ/g) (Reg. EU Nº 1169/2011), so the statement analysed was true. Still, the agreement of the participants with this statement was not noticeable (2.95±1.27) (Table 14), because many people have the wrong and outdated idea that fibre does not have calories. In this case, only the differences between levels of education were statistically significant (p = 0.015) and interestingly, it was among the people with secondary school that the knowledge about this fact was higher (3.31±1.05).

Table 14. Statistics for calories in dietary fibre.

| Statement evaluated: *"Dietary fibres have calories"* (scale from 1= totally disagree to 5= totally agree) | | | |
|---|---|---|---|
| Variable | | **Mean ± St. Dev.** | **p-value** |
| Age | Young adults (19-30) | 2.86±1.30 | 0.515[a] |
| | Average adults (31-50) | 2.99±1.26 | |
| | Senior adults (51-65) | 3.09±1.26 | |
| Gender | Female | 2.98±1.32 | 0.670[b] |
| | Male | 2.95±1.20 | |
| Level of Education | Secondary school | 3.31±1.05 | 0.015[b] |
| | University degree | 2.89±1.31 | |
| Living Environment | Rural | 3.15±1.13 | 0.161[b] |
| | Urban | 2.92±1.30 | |
| | Total | 2.95±1.27 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

A diet rich in fruit and vegetables has been pointed as vital for a healthy lifestyle, being these particularly important also for their content in DF (O'Shea et al., 2012). Table 15 demonstrated that most of the participants actually know what types of food are rich in DF (4.13±0.87). The differences were statistically significant only for gender (p = 0.001), with women getting a higher mean score (4.27±0.76).

Table 15. Statistics for fibre rich foods.

| Variable | Statement evaluated: *"Legumes, cereals and fruits are foods rich in dietary fibre"* (scale from 1= totally disagree to 5= totally agree) | **Mean ± St. Dev.** | **p-value** |
|---|---|---|---|
| Age | Young adults (19-30) | 4.11±0.77 | 0.645[a] |
| | Average adults (31-50) | 4.16±0.88 | |
| | Senior adults (51-65) | 4.06±1.01 | |
| Gender | Female | 4.27±0.76 | 0.001[b] |
| | Male | 3.92±0.99 | |
| Level of Education | Secondary school | 3.96±0.94 | 0.071[b] |
| | University degree | 4.17±0.85 | |
| Living Environment | Rural | 4.17±0.76 | 0.812[b] |
| | Urban | 4.12±0.90 | |
| | Total | 4.13±0.87 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

To measure the global degree of knowledge about DF, a new variable was created as the average value considering the four statements, but after inverting the scores for the statement that was false (animal origin of DF). The newly created variable varied from 1, corresponding to the lowest degree of knowledge, to 5, corresponding to the highest degree of knowledge. The results in Table 16 showed that the average global knowledge was relatively low, 3.38±0.65. The global knowledge varied significantly only according to age group (p = 0.008), being the average adults those who showed a higher score (3.46±0.66).

Table 16. Measurement of the general level of knowledge.

| Variable | **General Level of Knowledge** (scale from 1= totally disagree to 5= totally agree) | **Mean ± St. Dev.** | p-value |
|---|---|---|---|
| Age | Young adults (19-30) | 3.23±0.61 | 0.008[a] |
| | Average adults (31-50) | 3.46±0.66 | |
| | Senior adults (51-65) | 3.39±0.63 | |
| Gender | Female | 3.43±0.63 | 0.054[b] |
| | Male | 3.32±0.66 | |
| Level of Education | Secondary school | 3.31±0.63 | 0.197[b] |
| | University degree | 3.40±0.65 | |
| Living Environment | Rural | 3.44±0.61 | 0.550[b] |
| | Urban | 3.37±0.66 | |
| | Total | 3.38±0.65 | |

[a] U-Mann Whitney test; [b] Kruskal-Wallis test

## CONCLUSIONS

This work allowed important conclusions relating to the ingestion of fruits, vegetables and whole grains among a sample of the Portuguese population, which was much below the recommendations. In this way, further actions are necessary so as to better inform the general population about the benefits of a diet rich in DF. The level of knowledge about dietary fibre was in general not satisfactory, and therefore also this is a field for improvements so as to better being able to communicate the nutritional importance of DF. Although the meals are made essentially at home, few foods rich in DF are cooked and/or consumed, which may

be related precisely with the low knowledge of the nutritional value of DF.

This study further revealed that the attitudes of Portuguese people towards food labelling are inadequate and show a lack of interest for the nutritional information as helping to make adequate food choices. Also in this area further educational efforts should be implemented.

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# SITUAÇÃO DE RISCO COM IMPACTO EM TODA A FAMÍLIA: GRAVIDEZ NA ADOLESCÊNCIA

# A RISKY SITUATION WITH IMPACT ON THE WHOLE FAMILY: TEENAGE PREGNANCY

# SITUACION DE RIESGO CON IMPACTO EN TODA LA FAMILIA: EMBARAZO EN LA ADOLESCENCIA

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## RESUMO

Introdução: A gravidez na adolescência constitui uma situação de risco com impacto em toda a família, podendo gerar crises não apenas na jovem que engravida - em virtude da inexperiência e consequente dificuldade que surge para cuidar de um filho - , como do ponto de vista transgeracional.

Objetivos: Aplicar o Modelo Dinâmico de Avaliação e Intervenção Familiar (MDAIF) Figueiredo (2009) e avaliar o impacto dos cuidados de enfermagem numa família em contexto clínico.

Métodos: Estudo de caso qualitativo realizado com base no MDAIF em contexto clínico nos Cuidados de Saúde Primários. Este estudo focou-se no processo de intervenção familiar desenvolvido com uma família de uma adolescente de 16 anos que engravida, fruto de uma relação fugaz com um rapaz 9 anos mais velho que conheceu através das redes sociais (Facebook). Instrumentos: Genograma, Ecomapa, Apgar familiar e Escala de Graffar.

Resultados: Família extensa, com diferentes subsistemas e limites rígidos. A família encontra-se na etapa do ciclo vital – família com filhos adolescentes, segundo Duvall (1977). Família de classe média. Com a gravidez não desejada da adoelscente, e apesar da relação conflituosa com a sua mãe, esta torna-se um apoio importante no percurso da vida da adolescente e no desenvolvimento do recém-nascido.

Conclusões: A utilização do MDAIF permitiu o desenvolvimento das habilidades dos enfermeiros para uma abordagem familiar, contribuindo assim para dar resposta às necessidades da família, enquanto unidade alvo de cuidados. Além disto, permitiu à adolescente prosseguir com a realização do seu projeto de vida, com o apoio familiar e social. Sugere-se a continuidade da utilização do MDAIF.


**Palavras-chave:** adolescente; gravidez; família; avaliação familiar.


## ABSTRACT

Introduction: Teenage pregnancy is a risky situation with impact on the whole family, which may cause crisis both in the teenager who gets pregnant – due to the inexperience and consequent difficulty in taking care of a child – and in the transgerational perspective.

Objectives: Applying the Dynamic Model of Family Assessment and Intervention (MDAIF) by Figueiredo (2009) and assessing the impact of nursing care in a family in clinical and community context.

Methods: Qualitative case study based on MDAIF in clinical context in Primary Health Care. This study was focused on family intervention process developed within a family of a 16-year-old who gets pregnant from a casual encounter with a 25-year-old boy she met on social networks (Facebook). Instruments: Genogram, Ecomap, Family Apgar and Graffar Scale.

Results: Middle-class extended family with different subsystems and strict limits. According to Duvall (1977), the family is at the life cycle stage - Family with teenage children. Despite the unplanned pregnancy and the fact that the young woman and her mother have a controversial relationship, her mother became an important support in the teenager’s life path and the newborn’s development.

Conclusions: The MDAIF’s use allowed the development of nurses’ skills for a family approach, contributing to meet the family’s needs, seen as care unit. In addition, it allowed the teenager to keep accomplishing her life project. It is suggested the continued use of MDAIF.


**Keywords:** teenager; pregnancy; family; family assessment.


## RESUMEN

Introducción: El embarazo em la adolescencia es una situación de riesgo con impacto en toda la familia, por lo que puede provocar una crisis no sólo en el adolescente embarazada – debido a la inexperiencia y a consiguiente dificultad que es cuidar de un niño – y en la perspectiva transgerational.

Objetivos: Aplicación de Modelo Dinámico de Evaluación Familiar e Intervención (MDAIF) por Figueiredo (2009) y la evaluación del impacto de los cuidados de enfermería en una familia en el contexto clinico y comunitario.

Metodos: Estudio de caso cualitativo basado en MDAIF en el contexto clinico en la atención primaria. Este estudio se entró en processo de intervención familiar elaborado con una familia de una joven de 16 años de edad, que queda embarazada de un encuentro casual con un niño de 25 años de edad, se encontró en las redes sociales (Facebook). Instrumentos: genograma, ecomapa, Apgar Familiar y Escala de Graffaar.

Resultados: Familia extensa de clase media con diferentes subsistemas y limites estrictos. De acuerdo com Duvall (1977), la familia está en la etapa de ciclo de vida – Familia con hijos. A pesar de que el embarazo no planificado y el hecho de que la joven y su madre tienen una relación adversatial, su madre llegó a ser una ayuda importante en la ruta de la vida del adolescente y en el desarrollo del recién nacido.

Conclusiones: El uso de MDAIF permitió el desarrollo de las habilidades de las enfermeras para un enfoque familiar, lo que contribuye a satisfacer las necesidades de la familia, considerada como unidad de cuidados. Además, permitió que el adolescente a mantener el cumplimiento de su proyecto de vida. Se sugiere el uso continuado de MDAIF.

**Palabras clave:** adolescente; embarazo; familia; evaluación de la familia.

## INTRODUCTION

Adolescence can be defined as a period of cycle of life that occurs between childhood and adulthood (between 11-12 years old to the young independent adult), during which occurs physical, psychological, social and cognitive changes occur.

Adolescence is often experienced as a difficult period, in which teenagers look for an emotional detachment from parents (even if it means rejecting their opinions and rebelling against them) and the formation of their identity (understanding who they are and how they integrate in the society where they live).

However, there are many teenagers who experience risk behaviors such as substance use like tobacco, alcohol and drugs; accidents (mainly road accidents); teenage pregnancy and sexually transmitted infections. (Simões, 2005, p.1). The adoption of these risk behaviors can have devastating consequences at various levels (personal and social). For example, experiencing an early sexuality with risks, rather than an active and safe sexuality, with consequences like occurrence of a pregnancy, has obstetric complications in a short, medium and long-term in teenager and newborn's health. Apart from these, teenage pregnancy has repercussions at family and social level.

Initially, at family level, teenage pregnancy has negative effects on the structure of the family, since it is an unexpected situation. The lack of communication between parents and children or the lack of openness to discuss issues that affect life in general, seem to be the main reasons for the occurrence of these situations. However, over time and the family's adaptation to this situation, teenage pregnancy ends up being accepted by them. Despite this, it may happen that newborn's father does not intend to take the paternity of the baby or, instead of that, he may respond positively to the news.

Socially, being adolescence a period of great changes that affects the teenager who idealizes his/her life project, the birth of a newborn can put on stand-by the fulfillment of that dream (by interrupting school life). In addition, teenage pregnancy is seen by many people as irresponsibility because of the easy access to information, free prevention means for free and the increased awareness of young people.

Once this is a topic that needs some research, reflection and debate, it is considered pertinent to expose this study, which is an accurate portrayal of this issue and its implications on family and social level.

For this study, a family with teenage children, who had recently experienced the daughter's pregnancy was chosen. The search for different experiences characteristic of this period (adolescence), for his or her identity and the affirmation of his or her role in the family, in addition to the different biological changes, may result in an alarming period of adolescent health, especially if this period isn't lived in security.

This is a study of a 16-year-old's family, who met a boy nine years older on social networks (Facebook). From this encounter an unplanned and unsupervised pregnancy until 22 weeks of gestation resulted.

With this study, it is intended to apply the Dynamic Model of Family Assessment and Intervention (MDAIF) by Figueiredo (2009) and assess the impact of nursing care in this family in a clinical and community context. It also seeks to provide the reader with an overview about the studied family, as well as their main needs.

## 1. THEORETICAL FRAMEWORK

According to World Health Organization (WHO, 1994, cit. in Rodrigues, et. al, 2007), "The concept of family cannot be limited to ties of blood, marriage, sexual partnership or adoption. Family is the group whose relations are based on trust, mutual support and common destiny."

It has long been recognized the importance of the family to the health of its members. However, in recent decades, recognizing

that the family is also a resource for their own health it has become the focus of interest and research. (Bomar, 2004; Denham, 2003; Friedman, Bowden & Jones, 2003; Hanson et al, 2005; Wright & Bell, 2009; Wright & Leahey, 2009 cit in. Santos, 2012, p.31). Thus, the individual shouldn't be seen lonely, but as someone who interacts with different contexts (social, familiar, environmental, ...). When the family is seen as a system (which means, as the unit of care), it is noticed that it interacts differently with the environment that surrounds it at different times. So, in a systemic perspective, the individual shouldn't be separated from his family, because it is within it that he develops, learns and grows. Furthermore, it's within the family that he acquires specific beliefs and traditions that characterize and distinguish that family from others.

Using the Dynamic Model of Family Assessment and intervention (MDAIF) as theoretical framework, its assumptions are taken as truths and as a guide in decision-making with the family by providing all necessary resources to enable it.

Adolescence is a developmental stage that occurs between puberty and adulthood, which means, from the time that biological and psychological changes undergo maturation until the age at which a system of values and beliefs fit in established identity (Ferreira & Nelas, 2006, p.145). At this stage, it is usual the appearance of irreverent behaviors and the questioning of models and children's patterns that are necessary for proper growth. (Ferreira & Nelas, 2006, p. 142).

One of the parents' major difficulties with teenage children is intercommunication with them, since they prefer to communicate with peer groups. The growth of peer influence and emotional detachment as a way of asserting its autonomy and the subsequent experiment of risky behaviors are factors that increase the parental stress levels and hinder their ability to deal with their children.

In addition, the lack of knowledge, understanding and capacity to deal with this phase so characteristic of adolescents, leads to constant imposition of rules that as they are imposed, are also disobeyed.

According to Simões (2005), the main risk behaviors of adolescents are substance use (alcohol, tobacco, drugs and medicines), violence, suicide, accidents, eating disorders, teenage pregnancy and infections sexually transmitted.

An unwanted pregnancy can cause major changes in a person's life. When it reaches a teenager, it becomes a problem, which can lead to a crisis. Adolescence is a period of great biological, emotional and social immaturity. When a pregnancy during this life stage occurs, it is more often associated with maternal and fetal complications such as anemia, preterm delivery, instrumented delivery, postpartum hemorrhage, depression and neonatal and post-neonatal mortality. A risky situation like this requires monitoring and close supervision by health professionals.

## 2. METHODS

The case study is an appropriate method to investigate a contemporary phenomenon within a real life context. The study was developed by applying the Dynamic Model of Family Assessment and Intervention (MDAIF) for the assessment of a family in a clinical context. This model mentions three main categories: structural, functional and developmental. (Wright & Leahey, 2002 cit. In Figueiredo, 2009, p.173-174). From this model, the health team has the possibility to know the family and its context, allowing to identify their needs and planning the nursing interventions.

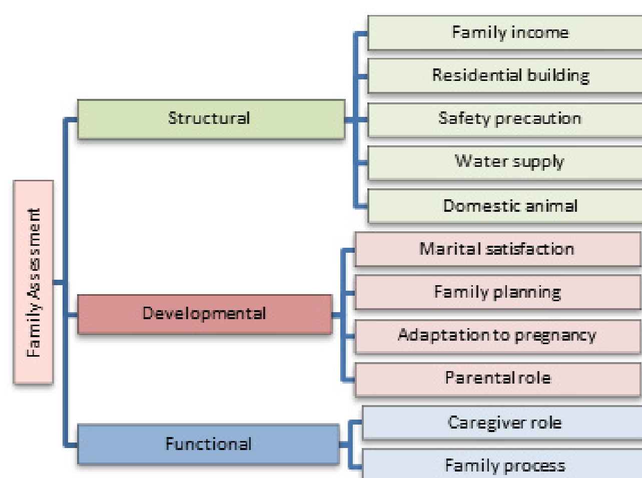


Figure 1 - Dynamic Model of Family Assessment and Intervention. Available at: Figueiredo (2012). *Modelo Dinâmico de Avaliação e Intervenção Familiar: Uma Abordagem colaborativa de Enfermagem de Família.* Loures: Lusociência, p. 104.

The data obtained in this study are confidential and the anonymity is guaranteed through the use of fictitious names. All data will only be used in a research context. The family members agreed to participate freely. After the necessary clarifications, they signed the informed consent, free and clear. The data were acquired through a semi-structured interview with the teenager in the study and her mother, as well as non-verbal behaviour and home visits.

### 2.1 Sample

The Fernandes family is composed by the teenager in the study, Mary (M.F., female, 16 years), by her son Simon (S.F., male, 19 days), by her brothers Peter (P.F., male, 21 years) and Charles (C.F., male, 15 years) and their parents Paul (P.F., male, 47 years) and Rita (R.F., female, 43 years).

### 2.2 Data Collection Instruments

As data collection instruments for evaluating the internal and external structure of the family were used the Genogram and Ecomap.

Through genogram analysis it is possible to glimpse the family members and realize the links existing between them. It is used for the collection of family data, providing a view of the family structure as well as its current problems, perspective of the family's past, potential problems in the future, information about development and family functioning. (Figueiredo, 2009, p.149).

While the genogram focuses on relationships and connections in the multi and intergenerational system of the family, the ecomap explores the relationships and connections with the external environment, portraying the social and family relationships. (Rempel, Neufeld & Kushner, 2007 cit. In Figueiredo, 2009, p. 150).

The ecomap shows the balance between the needs and the family resources through the identification of people and the reference Institutions. Integrating relations with community services, social groups, work, significant personal relationships and other specific of the family, for each of these links three different dimensions can be highlighted: the strength of the bond; impact link and link quality. (Agostinho, 2007 cit. In Figueiredo, 2009, p. 150).

For the assessment of family functionality, it was used the Family Apgar Scale of Smilkstein (1978) that allows the understanding of important aspects of family functioning, including its cohesion, adaptability and its members' perception about its functionality. This scale assesses parameters related to Mary's satisfaction, particularly on the aid she receives from her family, the time she has with it, affection and reaction to her feelings, the way her family discusses issues and regards the adoption of new and different activities and lifestyles.

The result of this Scale varies between a score from 0 to 10, in which 0 to 3 is considered "severe dysfunction", 4 to 6 "mild impairment 'and 7 to 10" highly functional ".

For the social classification of the family the Graffar Scale was used (Graffar, 1956).

## RESULTS

*Structural Dimension*

By using the Graffar Scale (1956), the Fernandes family is located socially at grade 3 (middle class). The household is composed by Paul, 47 years old; Rita, 43 years old (parents of the studied teenager), Peter, 21 years old; Charles, 15 years old (siblings of the studied teenager) and Mary, 16 years (studied teenager). Currently, Mary did not have any kind of relationship with the newborn's father (not identified with initials), since he did not accept or provide any kind of support after the discovery of pregnancy. (Figure 2).

The family is dependent only from the male parent income (Paul), mechanical, and the eldest son (Peter – 21 years), also mechanical, since R.S. is recently unemployed. (Figure 2).

All family individuals have a low educational level (9th grade). The vaccination status of all elements is duly updated. To date, there are no history of associated pathologies of the different members of the family Fernandes (Figure 2).

The studied teenager finds some support structure in the community, like at School (at Support Office and Adolescent Psychologist School) and some classmates (although it is a superficial relationship) (Figure 3).

Every week, the teenager is visited by the nursing team of the Community Care Unit to support her in the experience of motherhood and answering questions about it. During this period, a home visit was made by a nurse specialized in Maternal Health, Obstetric

and Gynecology for breastfeeding support and initiation of milk extraction, to help in bath technique and provision of hygiene and comfort to newborn (Figure 3).

She often moves to the Personalized Health Care Unit for monitoring the growth and development of the newborn, as well as monitoring their postnatal development and initiation of contraception (in the context of reproductive health and family planning). To this end, eight Nursing consultations were made (Figure 3).

The newborn is referenced, since birth, to the Committee for the Protection of Children and Young People because he is the son of a teenage mother without satisfactory support structures and whose father did not cooperate in parenting and parenting process (therefore, there is no effective family support). Moreover, the fact that it was an unsupervised pregnancy, it contributes to an indicator of social risk, so the family is also referred to Social Services. (Figure 3).

The teenager finds on her parents an important support to meet her needs as well as the needs of her baby. Despite the conflicting relationship she has with her mother, it is in the family that the young woman sees herself comforted and supported. (Figure 3).

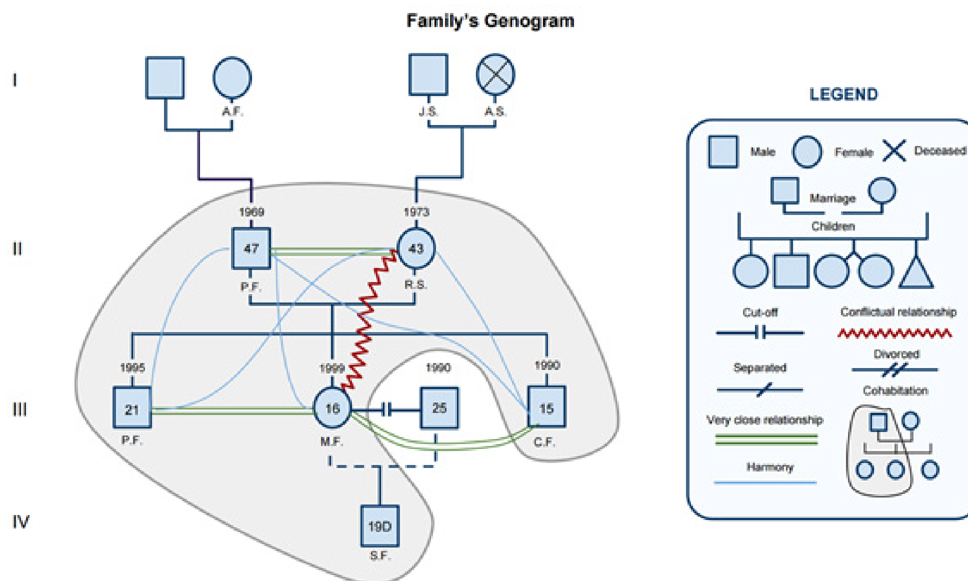


Figure 2 - Family's Genogram. Portugal, 2016.

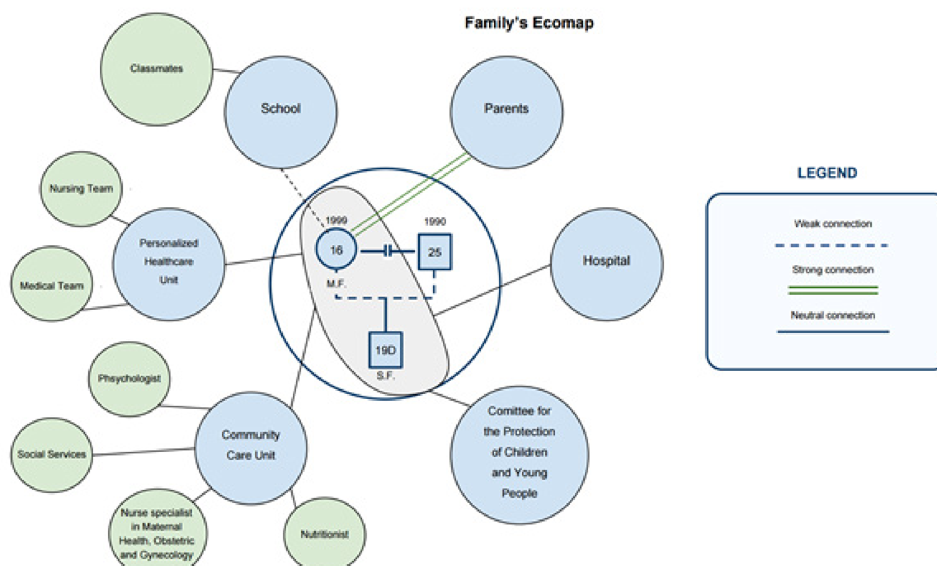


Figure 3 - Family's Ecomap. Portugal, 2016.

The studied family lives in its own house, whose main characteristics and attributes are described in Table 1. The semi-detached house has five rooms intended for sleep and rest, social/leisure, for meals confection and also two toilets. The house is heated by a fireplace. All rooms have natural and electric light. The home water supply is made by a water well that exists near the house. The collection of solid waste is done by the municipal services twice a week. Regarding to safety precaution, the family demonstrates knowledge about the use of household appliances and fireplace.

Table 1 - Property Type and characteristics

| Property Type | Own semi-detached house |
|---|---|
| Number of divisions | Seven rooms – 3 furnished rooms; 1 living room (equipped with TV, DVD player and radio); 1 kitchen with stove, refrigerator, water heater and adequate furniture to space. |
| Sanitary Facilities | 2 bathrooms |
| Floor Type | Floor tiles |
| Natural Light | Yes, in all divisions. |
| Artificial Light | Yes, in all divisions (electricity). |
| Heating System | Fireplace and heat recovery |
| Home Appliances | Stove, refrigerator, water heater, vacum cleaner, iron, heater, radio/ CD, TV/DVD, phone and washing machine. |
| Water/ Sanitation | Private network – water well / Cesspool |
| House Conservation | Suitable |
| Property Hygiene | Suitable |

*Developmental Family Dimension*

The family in study is located in two stages described by Duvall - Stage II - Families with newborn and Stage V - families with teenage children. At this stage, it is proposed, as a development task, the existence of a balance between responsibility and freedom, as well as the establishment of post-parenting concerns.

At Table 2, it will be proposed some areas that deserve health care team to better prepare and empower the family to solve these problems.

Table 2 –*Proposed interventions on parental role, family attitude and family knowledge about different areas.*

<table>
<tr><th colspan="2">Diagnosis</th><th rowspan="2">Intervention(s)</th><th rowspan="2">Evaluation</th></tr>
<tr><th>Focus</th><th>Judgment</th></tr>
<tr><td>Parental role</td><td>Not shown</td><td rowspan="2">- Encouraging the teenage mother to take care of the newborn;<br>- Explaining child development and the importance of having rules and healthy habits for the newborn;<br>- Promoting responsibility and interest of the young mother to her newborn.</td><td rowspan="2">Eight health surveillance consultations were held to newborn, in Primary Health Care.<br>The weight was measured during the first days showing a decrease of 6% considered as physiological within the first 10 days of life.<br>From the 8th day, the newborn began to have a positive weight gain of 35grams per day.</td></tr>
<tr><td colspan="2">Parental role not shown</td></tr>
</table>

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| Diagnosis | | Intervention(s) | Evaluation |
|---|---|---|---|
| Focus | **Judgment** | | |
| Knowledge about contraception | Not shown | - Teaching about the existing contraceptive methods as well as the main advantages and disadvantages of each of them and adjust the best method to the person and his/her choice;<br>- Validating all the information given;<br>- Monitoring the chosen method adaptation;<br>- Encouraging the postpartum woman to attend family planning consultations. | It was given indications to the teenager, that she should still suckled milk and extracted breast milk every three hours (in average), to start the progestational pill, Azalia.<br>It was also suggested the collaboration of the mother's teenager (Rita) in order to draw attention of her daughter to the daily dose of the pill. It was explained when she should start to take the pill and also all the situations that interfere with the effectiveness of it. |
| Knowledge about contraceptive methods not shown | | | |
| Parents' knowledge about adolescence | Not shown | - Clarifying the importance of conducting surveillance consultations in accordance teen age;<br>- Promoting a close relationship between parents and children;<br>- Emphasizing the importance of socialization for adolescents;<br>- Clarifying the importance of structuring rules for the formation of adolescents;<br>- Understanding the project life and life goals in the short, medium and long-term of adolescents Mary, Peter and Charles. | It was explained to the young teenager's family the importance of accomplishing the National Child Health and Youth Plan as a way to raise awareness and inform adolescents at the development key ages and his/her training as a person. In addition, it was explained the importance, during adolescence, of having prospect of a life project, as a thread of his/her growth and development. The relevance of the education of young people about adopting safe behavior rather than risky behaviors; socialization; the dangers of the Internet and the importance of reference adults are considered key points to be spoken in the different consultations during adolescence. |
| Parents' knowledge about adolescence not shown | | | |
| Parental knowledge of the binding process | Not shown | - Promoting the mother-baby bonding;<br>- Reinforcing the importance of affection for mother and baby;<br>- Explaining the importance of communicating with the newborn to establish a connection/ bond;<br>- Encouraging breastfeeding to strengthen the mother-baby bonding;<br>- Promoting mother's autonomy to take care of her child. | Despite the teachings and comprehension by Mary, she has not shown the initiative to perform the parental role, resulting in poor bonding. |
| Parental knowledge of the binding process not shown | | | |
| Accession to health monitoring of newborn | Not shown | - Teaching the family about the characteristics and skills of the newborn;<br>- Teaching the family about the warning signs in the first months of life;<br>- Explaining to the family the precautions for the prevention of Sudden Infant Death Syndrome;<br>- Explaining to the family the position recommended to sleep;<br>- Clarifying the family about the importance of carrying the infant safely in own chair, inside and outside the home (which already includes the car);<br>- Clarifying the importance of weighing the newborn every week until complete the first month of life (to check newborn weight gain) and schedule the 1st consultation at 1st week (for the Guthrie test and monitoring anthropometric parameters) and at 28th day of life of baby;<br>- Tracking and comparing anthropometric parameters of the newborn with average percentiles. | It was explained to Mary (mother of the newborn) the importance of newborn health surveillance, as well as the characteristics and skills of the baby in the 1st month of life.<br>There was concern in explaining the warning signs of newborn in the first month of life (such as fever > 38°C, prostration, persistent crying, moaning and refusal to eat) and the importance of going to the Hospital urgently if that happens.<br>There was some difficulty in validating the information obtained, so the teachings were being reinforced over time. |
| Accession to health monitoring of newborn not shown | | | |

| Diagnosis | | Intervention(s) | Evaluation |
|---|---|---|---|
| Focus | **Judgment** | | |
| Knowledge about postpartum | Not shown | - Advising the puerperal woman to not have sex until the Puerperal Review Consultation (4 to 6 weeks after delivery);<br>- Clarifying the importance of healthy eating, including adequate fluid intake and the avoidance of spicy food, caffeine, drugs and tobacco);<br>- Explicating warning signs that need urgent medical evaluation (heavy vaginal bleeding, fever> 38°C, vaginal discharge with foul smell, pain, heat and redness in the legs and breasts).<br>- Emphasizing the importance of adopting certain care for the prevention of puerperal infection (daily bath; careful partial hygiene, from front to back, whenever she goes to the bathroom; replacing the sanitary napkin also whenever she goes to the toilet and washing hands with frequency). | It was given all recommendations and explanations necessary for the experience of a safe postpartum.<br>Since pregnancy has not been monitored until 22 weeks of gestation, all the recommendations relating to healthy eating were unknown by the young woman.<br>She understood all the information provided. |
| Knowledge about postpartum not shown | | | |
| Family Attitude | Difficult | - Assessing family support;<br>- Facilitating communication between the members of the family;<br>- Providing emotional support. | Since there is overlapping of roles between the grandmother and the young mother of the newborn, the family's attitude remains difficult and not promoting the mother-baby bond. |
| Difficult Family Attitude | | | |

| | |
|---|---|
| Evaluation | - Not suitable parental role;<br>- Knowledge of contraception shown;<br>- Parents' knowledge about adolescence shown;<br>- Parental knowledge of the binding process shown;<br>- Adherence to health surveillance about newborn shown;<br>- Knowledge about the demonstrated postpartum shown;<br>- Difficult family attitude. |

*Functional Dimension*

To perform the evaluation of family functionality the Family Apgar Scale Smilkstein was used (1978), in order to understand the fundamental aspects of family functioning, such as cohesion, family adaptability and the perception of its members on the functionality of it. The girl in the study considered her family as highly functional (score 8), stating that it is almost always satisfied at all points that this scale refers.

## 4. DISCUSSION

The young woman (M.F, Mary) met a boy, nine years older than her, through social networking. This has led to a physical encounter with consenting sexual involvement between both, which resulted in an unplanned and unsupervised pregnancy until 22 weeks of gestation. Therefore, no prevention was made, concerning the prevention of neural tube defects (folic acid) or prevention of abnormalities in fetal cognitive development (iodine) or supplements to aid the development of the fetal nervous system and important functions in energy metabolism (iron). Despite that, with the support of her parents, the young girl was followed at high risk consultations at the Hospital in the remaining pregnancy time.

In this particular case, the pregnancy caused a family impact with changes in its dynamics, overlapping contradictory feelings and causing a major failure of communication between its members.

The existence of strict limits associated with a communication failure (and a worsening of it with the pregnancy's discovery) make the situation more difficult to overcome. However, Mary classifies her family as "highly functional" (score 8 in the Family Apgar Scale) resulting from the support that she eventually got from her parents during the pregnancy and the growth and development of the newborn. It should be noted that the newborn's father, after the discovery of the pregnancy, did not want to be involved in parenting and the parenting process.

Although Mary is the mother of the newborn, the role of care provider decays on Rita (the newborn grandmother), by her own will. It is also perceptible a weak bond between Mary and his son, perhaps by the protector role of her mother to his grandson, preventing, in a way, the establishment of the mother-baby bonding. Therefore, the role of newborn care provider is not set to the mother of the newborn (M.F., Mary) but the grandmother of him (Rita), whether for lack of Mary's experience or knowledge or even overlapping by Rita. The family relationship is considered satisfactory, despite the emotional bond with Mary being weak

Bica, I., Esteves, I., Cruz, S. & Andrade, A. (2016). A Risky Situation with Impact on the Whole Family: Teenage Pregnancy. *Millenium, 2*(1), 65-75.



or absent, but being replaced by Rita.

However, the newborn is well cared, not verifying any food negligence, hygiene, emotional or in overall health.

There is a work to be done in communion with the family by the nursing team and the rest of the multidisciplinary team in order to support the whole family to their needs. Arising from the analysis of the data areas in need of nursing intervention to meet the family's needs were proposed, while care unit. Among these, in the context of maternal and child health, the importance of a close watch on the physical and emotional point of view of a teenager who recently gave birth and the need to go monitoring the growth and development of the newborn, as well as its bonding with the respective family, so that he can grow and develop in a home in harmony.

## CONCLUSIONS

The utilization of MDAIF for family assessment allows better knowledge of the family and explores the points that require further intervention in different areas. Also concerning such method, it was possible to find some difficulties encountered by the family with regard to knowledge about adolescence, about the bonding process, contraception and living an active and safe sexuality and intervening to solve the problems/needs identified.

The use of instruments such as genogram and ecomap allowed to understand the family and its dynamics as well as the entire support structure around them. They also have become important instruments for raising awareness of the importance of the family system in the health-disease process, since the health of an individual affects his family.

Thus, it can be concluded that the assessment and family intervention were effective, allowing not only to meet the needs of the family as a unit, but also helping the teen to continue with the fulfilment of her life project, linking with the Community Care Unit (for intervention in the school context) and the Committee for the Protection of Children and Young People.

The continued use of MDAIF in future investigations is suggested.

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millenium 77

Millenium, 2(1), 77-84.

# DETERMINANTES DE SAÚDE NUMA AMOSTRA DE CRIANÇAS PORTUGUESAS

# HEALTH DETERMINANTS AMONG A SAMPLE OF PORTUGUESE CHILDREN

# DETERMINANTES DE LA SALUD EN NIÑOS PORTUGUESES

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## RESUMO

Introdução: Os estilos de vida actuais podem estar associados a comportamentos de risco que estão na base do perfil de saúde de um país.

Objetivos: O objectivo do estudo consiste na avaliação dos determinantes da saúde e sua associação com variáveis sócio-demográficas numa amostra de crianças portuguesas dos 3 aos 10 anos de idade.

Métodos: Foi realizado um estudo transversal desenhado com um total de 1617 crianças de escolas públicas, a partir dos dois principais grupos escolares de Tondela e Vouzela, Portugal. A amostra final do estudo foi construído com um total de 1365 crianças com idades compreendidas entre os 3 e 10 anos de idade. A recolha de dados foi realizada através da distribuição de um questionário auto-administrado aos pais e cuidadores das crianças.

Resultados: Verificou-se que as crianças mais velhas tinham uma menor adesão a hábitos alimentares saudáveis e uma maior prevalência de atividade física. Os meninos tinham níveis mais elevados de atividade física e maior prevalência de sedentarismo, em comparação com as meninas. A área de residência das crianças foi associada a uma maior prevalência de consumo de fastfood e comportamentos sedentários. Torna-se evidente a necessidade de realizar intervenção sobre os grupos sociais mais vulneráveis para obter a igualdade em saúde de forma mais eficaz. A definição de estratégias de promoção da saúde deve ser seriamente considerada nas comunidades, a fim de melhorar os estilos de vida saudáveis entre as crianças portuguesas e as suas famílias.

**Palavras-chave:** crianças; estilos de vida; aspectos sócio-demográficos; atividade sedentária.

## ABSTRACT

Introduction: The current lifestyles suggest risk behaviors that are the basis of a country's health profile.

Objectives: The objective of this study was the assessment of health determinants and its association with socio-demographic variables among a sample of Portuguese children from 3 to 10 years old.

Methods: A cross-sectional study was designed with a total of 1617 children from public schools, from the two main school groups of Tondela and Vouzela, Portugal. The final study sample was built with a total of 1365 children aged between 3 and 10 years old. Data collection was accomplished by the distribution of a self-administered questionnaire to the parents and caregivers of the children.

Results: It was found that the older children had a lower adherence to healthy eating habits and a higher prevalence of physical activity. The boys had higher levels of physical activity and higher prevalence of sedentary behaviors, in comparison with girls. The residence area of the children was associated with a higher prevalence of fastfood consumption and sedentary behaviors.

Conclusions: It becomes noticeable the need to make an intervention on the most vulnerable social groups to obtain more effective health equality. Health promotion strategies should be seriously considered in communities in order to improve healthy lifestyles among Portuguese children and their families.

**Keywords:** children; lifestyles; socio-demographic aspects; sedentary activity.

## RESUMEN

Introducción: Los estilos de vida actuales pueden estar asociados con comportamientos de riesgo que subyacen en el perfil de salud de un país.

Objetivos: El objetivo del estudio es evaluar los determinantes de la salud y su asociación con variables sociodemográficas en una muestra de niños portugueses de 3 a 10 años de edad.

Métodos: Un estudio transversal diseñado con un total de 1617 niños de las escuelas públicas, a partir de los dos grupos principales de la escuela y Tondela Vouzela, Portugal. La muestra final fue construido con un total de 1365 niños de edades comprendidas entre los 3 y 10 años de edad. La recolección de datos se realizó mediante la distribución de un cuestionario autoadministrado a los padres y cuidadores.

Resultados: Se encontró que los niños mayores tenían una menor adhesión a los hábitos alimentarios saludables y una mayor prevalencia de actividad física. Los niños tenían niveles más altos de actividad física y una mayor prevalencia de inactividad física en comparación con las niñas. área de residencia de los niños se asoció con una mayor prevalencia de consumo de comida rápida y los comportamientos sedentarios.

Conclusiones: Es evidente la necesidad de intervención de los grupos sociales más vulnerables de la igualdad en la salud de manera más eficaz. La definición de las estrategias de promoción de la salud debe considerarse seriamente en las comunidades con el fin de mejorar los estilos de vida saludables entre los niños y sus familias portuguesas.

**Palabras clave:** niños; estilos de vida; aspectos sociodemográficos; actividad sedentaria.

## INTRODUCTION

The World Health Organization (WHO) consideres chronic noncommunicable diseases as a serious public health issue that represent a significant threat to health and human development (WHO, 2002). Studies do demonstrate that the socially vulnerable population groups seem to be more exposed to the development of certain diseases associated with obesity/overweight and inadequate food intake. (General Health Directory of Portugal, 2015).

## 1. THEORETICAL FRAMEWORK

The report on "Noncommunicable Diseases Country Profiles 2014" presented at the United Nations General Assembly reveals that, worldwide, 38 million people (28 million in developing countries) die annually due to chronic diseases, and it is estimated that they are responsible for nearly 86% of premature deaths, mainly associated with cardiovascular diseases (WHO, 2014). Among the determinants of health, lifestyles and daily habits occupy an important role due to the risk factors associated and the impact on the quality of life, well-being, morbidity and mortality, since they are primarily responsible for the development of chronic diseases. (Regional Health Administration of Algarve, 2016; General Health Directory of Portugal, 2015).

Worldwide, WHO data indicate that after smoking, obesity is currently considered as the second main cause of preventable death and if no urgent measures are taken to prevent and treat this issue, over 50% of the world population will be obese by 2025 (General Health Directory of Portugal, 2005). According to the Childhood Obesity Surveillance Initiative Portugal 2010 project data, one in three children in the European Union aged between 6 and 9 years, were overweight or obese (Rito et al., 2010). The number of children from 0 to 5 years, overweight or obese, increased from 31 million in 1990 to 44 million in 2012 (Ng et al., 2014).

In Portugal, in recent years, the country achieved significant health gains due to socio-economic improvement. However, modernization has also led to strong changes in lifestyle and unhealthy behaviors that are the basis of the country's health profile. The results of the "Portugal Healthy Eating Report" of 2014, indicates a high prevalence of obesity among the Portuguese population (about 1 million obese and 3.5 million pre-obese adults) (General Health Directory of Portugal, 2015).

Scientific evidence shows a direct association between physical inactivity and favoring conditions for obesity and overweight (Rito et al., 2010). There is strong evidence that inequalities in health among different population groups result from differences in the factors that influence health such as the health-related behavior, employment status, educational level and monthly income (Mantziki et al., 2014).

This study aims to determine dietary habits, physical activity and sedentary behavior practices and analyze their association with sociodemographic data in a sample of Portuguese children from 3 to 10 years old.

## 2. METHODS

A cross-sectional observational epidemiological study was designed. The study population consisted of all children attending in the 2012-2013 school year, in the pre-school and the 1st cycle (1st to 4th grades) of the School Groups of Tondela and Vouzela, Portugal, totaling 1617 children.

### 2.1. Sample

The type of sampling was non-probabilistic, by convenience technique where all the students of the schools in question were eligible to participate in the study. The sample included all collected and completed questionnaires. The questionnaires without information for gender and age were excluded, leaving a final sample consisted of 1385 children (52% male gender), of whom 1118 (80.7%) belonged to the school groups of Tondela and 267 (19.3%) to the school groups of Vouzela. In the age distribution in both genders, the group aged 3-5 years showed a proportion of 26.4%, 50.5% aged 6-8 years and 23.1% aged ≥9 years old. Most of the children lived in rural areas (68.5%) and 31.5% in urban areas. With regard to professional status of the parents, 86.2% fathers and 74.7% mothers were employed, while 12.6% fathers and 25.3% of mothers were in the condition of unemployed.

### 2.2. Data collection

Data collection was accomplished using a self-administered questionnaire distributed between February and March of 2013 to all parents and / or guardians of the study population. The measuring instrument used was divided into two main parts: the first addressed the data identification/characterization and the second was dedicated to providing data on the child's lifestyle and daily habits (Appendix 1).

For the variables, we considered the lifestyles (eating habits, physical activity and sedentary behaviors) as the dependent variables and sociodemographic background (gender, age, residential area, parents´ educational level and the families´ monthly household income) as independent variables.

### 2.3. Statistical Methods

Statistical analysis was performed using the software Statistical Package Statistical for Social Sciences (SPSS) version 21.0 for Windows. Descriptive statistics with the presentation of frequencies and percentages for nominal variables were used, and the qualitative variables were presented in the form of proportion and compared using the chi-square test. The statistical interpretation of tests was carried out using a significance level of p=0.05 with 95% confidence intervals.

### 2.4. Legal Proceedings

Authorization for data collection was requested to the school boards under study, by registered letter. Subsequently, a meeting was held with the directors of the respective school groups, where the objectives and purposes of the research were explained and requested the collaboration for the distribution and collection of the questionnaires. It was also guaranteed anonymity and confidentiality of the data collected, which served only to carry out this study, without any economic or commercial interests.

## RESULTS

The results showed that children usually have breakfast (98.5%) and dinner (98.9%) at home, and lunch mostly is taken in the cafeteria or school canteen (88.6%). It was found that the foods consumed at breakfast were mostly: milk (92.8%), cereals (85%) and yogurts (81.9%). Fruit was one of the foods least consumed during breakfast (8.4%). When questioned about the frequency of consumption of sweets, 74.2% of parents reported that their children “sometimes” ate sweet snacks, 13% said they “never or rarely” consumed sweets, and 9.5% consumed sweets “every day “or” almost every day “. Results showed a pattern of association between age and the consumption of milk and dairy products (p=0.02) as well as the monthly income of parents and consumption of milk and dairy products (p=0.01). Assessing the prevalence of consumption of dairy products by age it was found that children under the age of 7 years old have a higher consumption when compared with the children with the same age or over 7 years old (p=0.02).

Table 1 - Association between the consumption of fastfood and socio-demographic factors.

| | Fastfood consumption | | | | | | |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | p | OR | 95%CI |
| | N | % | N | % | | | |
| Gender | | | | | | | |
| Male | 572 | 80.2 | 141 | 19.8 | 0.193 | 1 | 0.67-1.15 |
| Female | 545 | 82.2 | 118 | 17.8 | | 0.88 | |
| Age | | | | | | | |
| < 7 years | 470 | 85.1 | 82 | 14.9 | 0.001 | 1 | 1.17-2.07 |
| ≥ 7 years | 645 | 78.7 | 175 | 21.3 | | 1.56 | |
| Residential area | | | | | | | |
| Rural | 778 | 83.4 | 155 | 16.6 | 0.001 | 1 | 1.20-2.09 |
| Urban | 330 | 76.0 | 104 | 24.0 | | 1.58 | |
| Parents´ educational level | | | | | | | |
| ≤ 9 years | 606 | 84.9 | 108 | 15.1 | <0.001 | 1 | 1.29-2.27 |
| > 9 years | 427 | 76.7 | 130 | 23.3 | | 1.71 | |
| Monthly income | | | | | | | |
| ≤ 1000 euros | 590 | 84.4 | 109 | 15.6 | <0.001 | 1 | 1.26-2.21 |
| > 1000 euros | 429 | 76.5 | 132 | 23.5 | | 1.67 | |

The results of Table 1 demonstrate a pattern of association between the consumption of fastfood and age of the children (p=0.001; OR=1.56, 95%CI 1.17 to 2.07), residence area (p=0.001; OR = 1.58, 95%CI 1.20 to 2.09), parents´educational

level (p<0.001; OR=1.71, 95%CI 1.29 to 2.27), and monthly income (p<0.001; OR=1.67, 95%CI 1.26 to 2.21). As for gender, the data show that the consumption of fastfood was 19.8% in boys and 17.8% in girls. Regarding the consumption of fastfood, depending on age, children under 7 years of age have a lower prevalence of fastfood consumption when compared with children ages 7 years or higher (14.9% vs 21.3% p=0.001; OR=1.56, 95%CI 1.17 to 2.07). It was also found that children living in urban areas have a higher prevalence of fastfood consumption than those living in rural areas (16.6% vs 24 0% p=0.001; OR=1.58, 95%CI 1.20 to 2.09). With regard to the parents educationl level, there is a higher prevalence of fastfood consumption among children whose parents have a higher educational level compared with children with parents of lower qualifications (15.1% vs 23.3% p<0.001; OR=1.71, 95%CI 1.29 to 2.27). As for the monthly household income, a higher prevalence of consumption of fastfood was found among children from higher monthly household incomes in comparision with children from families with lower households incomes (23.5% vs 15.6% p<0.001; OR=1.67, 95%CI 1.26 to 2.21).

Table 2 - Association between the performance of physical activity and socio-demographic factors.

| | Physical activity | | | | | | |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | p | OR | 95%CI |
| | N | % | N | % | | | |
| Gender | | | | | | | |
| Male | 207 | 48.4 | 221 | 51.6 | <0.001 | 1 | 0.35-0.62 |
| Female | 253 | 66.9 | 125 | 33.1 | | 0.46 | |
| Age | | | | | | | |
| < 7 years | 217 | 66.6 | 109 | 33.4 | <0.001 | 1 | 1.44-2.58 |
| ≥ 7 years | 243 | 50.8 | 235 | 49.2 | | 1.93 | |
| Residential area | | | | | | | |
| Rural | 318 | 57.3 | 237 | 42.7 | 0.47 | 1 | 0.76-1.39 |
| Urban | 139 | 56.7 | 106 | 43.3 | | 1.02 | |
| Parents´educational level | | | | | | | |
| ≤ 9 anos | 257 | 61.6 | 160 | 38.4 | 0.003 | 1 | 1.13-2.01 |
| > 9 anos | 176 | 51.6 | 165 | 48.4 | | 1.51 | |
| Monthly income | | | | | | | |
| ≤ 1000 euros | 245 | 60.6 | 159 | 39.4 | 0.02 | 1 | 1.03-1.84 |
| > 1000 euros | 185 | 52.9 | 165 | 47.1 | | 1.38 | |

The prevalence of physical activity (sporting activities: swimming, cycling and soccer) is only 43.0% of the total sample. According to the results of Table 2, there is a pattern of association between physical activity and gender (p<0.001; OR=0.46, 95%CI 0.35 to 0.62), child´s age (p<0.001; OR=1.93, 95%CI 1.44 to 2.58), parents´ educational level (p=0.003; OR=1.51, 95%CI 1.13 to 2.01) and monthly income (p=0.02, OR=1.38, 95%CI 1.03 to 1.84).

Regarding the practice of physical activity by gender, the boys presented a higher prevalence of the practice of physical activity compared to girls (51.6% vs 33.1 % p<0.001; OR=0.46; 95%CI 0.35 to 0.62). As for physical activity according to age, children younger than 7 years have lower prevalence compared with children older than 7 years (33.4% vs 49.2% p<0.001; OR=1.93, 95%CI 1.44 to 2.58). Regarding the child's residential area, the prevalence of physical activity practice is 42.7% among rural children and 43.3% among the children living in urban areas. Regarding the parents´ educational background, we could verify that the practice of physical activity is lower among children whose parents have lower educational qualifications in comparision to children whose parents have higher qualifications ( 38.4% vs 48.4% p<0.003; OR=1.51, 95%CI 1.13 to 2.01). With regard to the monthly household incomes, it was found that in families with incomes below or equal to 1000 euros, the children had a lower prevalence of physical activity when compared to children from families with more than 1000 euros of monthly household incomes (39.4% vs 47.1% p<0.02; OR=1.38, 95%CI 1.03 to 1.84).

Table 3 - Association between sedentary behaviors and sociodemographic factors.

| | Sedentary behaviors | | | | | | |
|---|---|---|---|---|---|---|---|
| | No | | Yes | | p | OR | 95%CI |
| | N | % | N | % | | | |
| Gender | | | | | | | |
| Male | 497 | 71.4 | 199 | 28.6 | <0.001 | 1 | 0.37-0.64 |
| Female | 528 | 83.7 | 103 | 16.3 | | 0.49 | |
| Age | | | | | | | |
| < 7 years | 444 | 84.1 | 84 | 15.9 | <0.001 | 1 | 1.49-2.61 |
| ≥ 7 years | 580 | 72.9 | 216 | 27.1 | | 1.97 | |
| Residential area | | | | | | | |
| Rural | 706 | 78.7 | 191 | 21.3 | 0.03 | 1 | 1.02-1.71 |
| Urban | 311 | 73.9 | 110 | 26.1 | | 1.31 | |
| Parents´ educational level | | | | | | | |
| ≤ 9 years | 539 | 78.5 | 148 | 21.5 | 0.16 | 1 | 0.89-1.51 |
| > 9 years | 412 | 75.9 | 131 | 24.1 | | 1.16 | |
| Monthly income | | | | | | | |
| ≤ 1000 euros | 530 | 78.8 | 143 | 21.2 | 0.04 | 1 | 1.01-1.66 |
| > 1000 euros | 411 | 74.5 | 141 | 25.5 | | 1.27 | |

In the context assessing sedentary behaviors, the results of table 3 demonstrate a pattern of association between sedentary behaviors and gender (p<0.001; OR=0.49, 95%CI 0.37 to 0.64), the child´s age (p<0.001; OR=1.97, 95%CI 1.49 to 2.61), the residential area (p=0.03, OR=1.31, 95%CI 1.02 to 1, 71) and the monthly income (p=0.04, OR=1.27, 95%CI 1.01 to 1.66). With regard to sedentary behaviors by gender, the boys showed a higher prevalence compared to girls (28.6% vs 16.3% p<0.001; OR=0,49, 95%CI 0.37 to 0.64). After analysis of sedentary behaviors in relation with age, it was found that children under 7 years have lower prevalence in comparision with children older than 7 years (15.9% vs 27.1% p<0.001; OR=1.97, 95%CI 1.49 to 2.61). With regard to the residential area, children living in rural areas have a lower prevalence of sedentary behaviors when compared with children living in urban areas (21.3% vs 26.1% p<0.03; OR=1.31, 95%CI 1.02 to 1.71). Regarding the parents´ educational level, there was a prevalence of sedentary behaviors of 21.5% in children whose parents have educational qualifications below the 9th grade and 24.1% in children with parents with higher qualifications. Regarding the monthly household income, it was found that in families with incomes below or equal to 1000 euros, the children had a lower prevalence of sedentary behaviors when compared with children whose families presented more than 1000 euros of monthly household incomes (21.2% vs 25.5% p<0.04; OR=1.27, 95%CI 1.01 to 1.66).

## DISCUSSION

The present study revealed that a high prevalence of children present daily sedentary behaviors in which 85.8% of the children every day. These results or similar to those obtained in the Epode for the Promotion of Health Equity project that showed that, in average, children spent a considerable part of their time in front of a computer (half an hour a day during the week and about one a day over the weekend) (Mantziki et al., 2014). This behavior also highlights the WHO data, collected between 2009 and 2010, where Portugal is one of the European Union countries with higher physical inactivity rates (WHO, 2014). This reality is expressed in the same way in the Special Eurobarometer statistics of the European Commission: Sport and Physical Activity, published in March 2014. Following Bulgaria and Malta, Portugal was considered the 3rd European Union country where respondents said they never engaged in physical activity (TNS Opinion & Social, 2014).

When we associate eating habits, physical activity and sedentary behaviors to sociodemographic data the present study shows that:
- In older children, the consumption of dairy products decreases while the consumption of fastfood increases.
- The older children showed the highest prevalence of physical activity, however, are also those with the highest prevalence of sedentary behaviors.

- In relation to gender, the boys do more physical activity but are also those with higher prevalence of sedentary behaviors.
- In regard to residential area, children who live in the countryside consumed less vegetables when compared to children who lived in urban areas, although also presented lower prevalence of consumption of fastfood and sedentary behaviors.

- With regard to parents' educational level, children whose parents possessed more qualifications, consumed more vegetables and practiced more physical activity, even though they are the same who consumed more fastfood.
- Children of families with more favorable monthly household incomes consumed more dairy products, vegetables and practiced more physical activity. However, they also had a higher prevalence of fastfood consumption and sedentary behaviors.

The advancing of age is associated with the decrease in the adherence to healthy eating habits and a greater rate of sedentary activities. With regard to gender, compared to girls, boys had higher levels of physical activity, but also reported higher levels of sedentary behaviors. Scientific evidence demonstrates the possible combination between physical activity (play football, por example) with sedentary behaviors (watching TV), where the most important goal is to ensure that the consumption is equal to the total daily energy expense. However it is conceivable that the reduced levels of physical inactivity observed in children may predispose to obesity (Sousa, 2011).

Regarding the residence area, easy access to food seems to be on the basis of higher consumption of vegetables and fastfood in urban areas compared to rural areas. These results may be associated with a real decrease in rates of the family sustainablity of agriculture that characterized the Portuguese countryside. In this study it was shown that the literary level of parents do influence the behavior of children. In this field, the Epode for the Promotion of Health Equity project states that the vegetable and fruit consumption by the Portuguese children is low, however, almost 30% of households with lower educational level indicated that children ate vegetable salads "less than once a week." This project also states that children whose families have a lower educational level spend an average of 3.5 hours watching television, which is higher in comparision with children from families with a higher educational level (Mantziki et al., 2014).

This study showed that children belonging to a more favourable socioeconomic status consume more dairy products and vegetables and also praticed more physical activity. However, they also had a higher prevalence of fastfood consumption and sedentary behaviors. These results are in line with the conclusions of some authors, that state that the literary levels assume relevance in regard to the definition of rules on the time of exposure to television and in the field of nutritional education, playing a very important role in the healthy eating patterns of children (Mantziki et al., 2014).

## CONCLUSIONS

The study demonstrates the need to intervene in the most vulnerable groups in order to obtain more effective health equality. Policies and strategic programs for the promotion of health should be specifically targeted to this population segment. However, this research also concluded that better social and economic family patterns does not justify, by itself, healthier behaviors, since higher levels of fastfood consumption and sedentary behaviors are among those with higher socioeconomic status. This analysis reflects the importance that should be given to health literacy among parents, particularly investing in the capacity of becoming models for healthy behaviors for their children. This field is also relevant in school programming, because the role of the school is essential for the acquistion of knowledge about healthy behaviors and lifestyles. In this sense, the school must also commit to ensure quality meals, at a nutritional, food hygiene and safety levels. Future research should be developed in order to understand the health behaviors of children, adolescents and families that live in various portuguese regions in order to show the real needs, in a national scale, of healthy lifestyles promotion programs and the constant development of adequate strategic health policies.

## CONFLICT OF INTERESTS

The authors have no conflicts of interest.

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## APPENDIX 1

Table 4 – Main questions applied in data collection (Mantziki et al., 2014).

| Group 1: Identification/Characterization |
|---|
| 1.1. Gender: Male or female? |
| 1.2. Child´s age: ____________ years. |
| 1.3. Child´s residence area: village or town/city? |
| 1.4. Parents´ educational level: <4 grade; 4-6 grade; 7-9 grade; 10-12 grade; bachelor level; licenced degree; masters degree; PhD degree? |
| 1.5. Family monthly income: <500 euros; 500 to 1000 euros; 1000 to 1500 euros; ≥ 1500 euros? |
| 1.6. Parents´ professional status: employed; unemployed; retired? |
| Group 2: Child´s lifestyle and daily habits |
| 2.1. Does your child practice any daily physical activity: Yes or no? If yes, which sports or physical exercise does your child practice and how many days a week? |
| 2.2. Does your child have daily sedentary activities such as watching television or playing computer/videogames? Yes or no? If yes, during how many hours/day? |
| 2.3. Does your child eat fastfood: Yes or no? |
| 2.4. Which are the daily meals of your child: breakfast; lunch; brunch; dinner? |
| 2.5. Which are the main foods consumed during breakfast? |
| 2.6. Does your child consume sweet snacks: never; rarely; sometimes; almost every day; every day? |
| 2.7. Does your child consume milk and/or dairy products on a daily basis: Yes or no? |
| 2.8. Does your child consume fruits and vegetables on a daily basis: Yes or no? |

millenium 87

*Millenium, 2*(1), 87-93.

# VALIDAÇÃO DO QUESTIONÁRIO ROMA III PARA O DIAGNÓSTICO DE DISPEPSIA FUNCIONAL EM ADULTOS PORTUGUESES

# VALIDATION OF THE PORTUGUESE ROME III QUESTIONNAIRE FOR DIAGNOSIS OF FUNCTIONAL DYSPEPSIA IN ADULTS

# VALIDACIÓN DEL CUESTIONARIO III ROMA DE PORTUGAL PARA EL DIAGNÓSTICO DE DISPEPSIA FUNCIONAL EN LOS ADULTOS

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## RESUMO

Introdução: A validação de instrumentos é essencial na investigação epidemiológica, especialmente para a definição consensual de caso e comparação de resultados. Atualmente, o instrumento mais utilizado para identificar a dispepsia funcional é o questionário Roma III, o qual não se encontra validado para a população portuguesa.

Objetivos: Validar o questionário Roma III para dispepsia funcional em adultos Portugueses.

Métodos: O questionário foi traduzido seguindo as recomendações de Roma III. Um total de 166 indivíduos responderam ao questionário. A identificação da categoria dispepsia funcional em adultos baseou-se em um ou mais sintomas dos 4 sintomas que a escala permite avaliar através de 6 itens. A consistência interna, reprodutibilidade e análise de conteúdo foram avaliados com recurso ao SPSS 23.0.

Resultados: O coeficiente de alfa de Cronbach no total dos 18 itens avaliados foi de 0.89. Para a categoria dispepsia funcional (avaliada através de 6 itens) foi de 0.76 e o alfa de Cronbach com base em itens padronizados foi de 0.85.

Conclusões: validamos, para Portugal, o Questionário Roma III para o diagnóstico de doenças gastrointestinais funcionais, designadamente para a categoria dispepsia funcional em adultos. Estes resultados sugerem que este instrumento será útil para a investigação na população Portuguesa.

**Palavras-chave:** dispepsia; adulto; estudos de validação; Portugal.

## ABSTRACT

Introduction: The validation tools are essential in epidemiological research, especially for the consensus case definition and comparison of results. Currently, the instrument most commonly used to identify functional dyspepsia is the Rome III questionnaire, which is not validated for the Portuguese population.

Objectives: To validate the Rome III questionnaire for the assessment of functional dyspepsia in Portuguese adults.

Methods: The questionnaire was translated following the recommendations of Rome III. A total of 166 adults completed the questionnaire. The identification of the category of functional dyspepsia among adults was based on the presence of one or more symptoms from the total of 4 symptoms that the scale allows to assess from a total of 6 items. The internal consistency, reproducibility and contents analysis were evaluated using the program SPSS 23.0.

Results: Alpha Cronbach coefficient from the total of 18 items measured was 0.89. For functional dyspepsia category (assessed by 6 items) was 0.76 and the alpha Cronbach's based on standardized items was 0.85.

Conclusions: We validated, for Portugal, the Rome III questionnaire for the diagnosis of functional gastrointestinal disorders, particularly for functional dyspepsia among adults. These results suggest that this tool will be useful for research in the Portuguese population.

**Keywords:** dyspepsia; adult; validation studies; Portugal.

## RESUMEN

Introducción: Las herramientas de validación es esencial en la investigación epidemiológica, especialmente para la definición de caso consenso y la comparación de los resultados. En la actualidad, el instrumento más utilizado para identificar la dispepsia funcional es el cuestionario de Roma III, que no está validado para la población portuguesa.

Objetivos: validar el cuestionario para la dispepsia funcional Roma III en los adultos portugueses.

Métodos: El cuestionario fue traducido siguiendo las recomendaciones de Roma III. Un total de 166 individuos completaron el cuestionario. La identificación de la categoría dispepsia funcional de adultos basada en uno o más síntomas de los 4 síntomas que la escala permite evaluar de um total de 6 artículos. El análisis de consistencia, reproducibilidad y contenido interno se evaluaron con el programa SPSS 23.0.

Resultados: El coeficiente alfa de Cronbach del total de 18 artículos medido fue de 0,89. Para la categoría de dispepsia funcional (evaluado por 6 artículos) fue de 0,76 y de basada en los puntos estandarizados alfa de Cronbach fue de 0,85.

Conclusiones: Hemos validado para Portugal, el cuestionario Roma III para el diagnóstico de trastornos gastrointestinales funcionales, sobre todo para la dispepsia funcional en adultos. Estos resultados sugieren que esta herramienta será útil para la investigación en la población portuguesa.

**Palabras Clave:** dispepsia; adulto; estudios de validación; Portugal.

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## INTRODUCTION

Dyspepsia is a very common gastrointestinal syndrome in the general population. The prevalence of dyspepsia, worldwide, ranges between 8.5% and 56%. This variation in the prevalence rates may be related to differences in the definition of dyspepsia and in the various populations studied (Grainger, Klass, Rake, & Williams, 1994; Yazdanpanah et al., 2012). A consensual definition and validation for a number of countries allows comparison of results. Currently, the criteria most used in epidemiological investigation to identify individuals with functional dyspepsia is the Rome III questionnaire, published in 2006. The Rome Foundation developed the questionnaire for the Rome III diagnostic criteria for functional gastrointestinal disorders.

Several dyspepsia and functional dyspepsia definitions have been proposed. Earlier definitions considered dyspepsia as the presence of all abdominal and upper retrosternal sensations. Currently, dyspepsia settings has evolved to become narrower and more focused on the symptoms of the gastroduodenal area. Dyspepsia is defined as a persistent or recurrent pain or discomfort, localized in the upper abdomen, which may or may not be related to type of food consumption or stress. The appearance of dyspepsia or gastrointestinal symptoms can be associated with other upper gastrointestinal disorders such as peptic ulcer disease, gastrointestinal reflux, gastritis, upper gastrointestinal cancer, biliary tract disease and functional dyspepsia (Tack & Lee, 2005). Functional dyspepsia may also be associated with the use of various drugs, self-medication, absenteeism and lost of productivity. Functional dyspepsia is a clinical syndrome characterized by chronic and recurrent gastroduodenal symptoms in the absence of any organic or metabolic disease that is likely to explain the symptoms (Tack et al., 2006; Zagari et al., 2010).

The Rome I and II Consensus Committees considered that dyspep sia should bedefined as pain or discomfort centered in the upper abdomen (Talley et al., 1999; Kumar, Patel, & Sawant, 2012). Rome III, a more recent consensus, has defined dyspepsia as the presence of symptoms considered by the physician that originates from the gastroduodenal region and consideres the presence of only four possible symptoms (Kumar Patel & Sawant, 2012). The symptoms defined are pain, burning sensation, postprandial fullness and early satiety thst are now considered to be specific for the gastroduodenal rather than the ambiguous term discomfort used in the previous Rome I and II (Tack et al., 2006; Perveen Rahman, Saha, Rahman & Hasan, 2014). The sensitivity and specificity of the Rome III classification of functional gastrointestinal disorders showed fairly high values (Perveen Rahman, Saha, Rahman & Hasan, 2014).

There were major changes in the Rome III version - changes in chronological criteria for diagnosis of functional gastrointestinal disorders from 12 months to 6 months for the onset, and from 6 months to 3 months for the activity of the symptoms; subtypes of changes in functional dyspepsia, postprandial distress syndrome and epigastric pain syndromes; more strict criteria for functional disorders of the gallbladder and sphincter of Oddi; and revision of the irritable bowel syndrome subtyping using stool consistency (Park et al., 2011).

Thus, bearing in mind the criteria defined in the Rome III, dyspepsia is defined to be the presence of one or more dyspepsia symptoms (last 3 months with symptom onset at least 6 months before diagnosis) que are considered to originate from the gastroduodenal region, in the absence of any organic, systemic, or metabolic disease that is likely to explain the symptoms (Tack et al., 2006) (Table 1).

Table 1 – Rome III Diagnostic Criteria for Functional Dyspepsia.

| Diagnostic Criteria* for Functional Dyspepsia |
|---|
| 1.One or more of symptoms: |
| a. Bothersome postprandial fullness |
| Uncomfortably full after regular sized meal, more than 1 day/week (question 3>4)<br>Onset more than 6 months ago (question 4=1) |
| b. Early satiation |
| Unable to finish regular sized meal, more than 1 day/week (question 5 >4)<br>Onset more than 6 months ago. Yes. (question 6=1) |
| c. Epigastric pain |
| Pain or burning in middle of abdomen, at least 1 day/week (question 7>3)<br>Onset more than 6 months ago. Yes. (question 8=1) |
| d. Epigastric burning |
| This criterion is incorporated in the same question as epigastric pain |
| AND |
| **2. No evidence of structural disease (including at upper endoscopy) that is likely to explain the symptoms**<br>***No question*.** |
| *** Criteria fulfilled for the last 3 months with symptom onset at least 6 months before diagnosis**<br>**Yes. (question 8=1)** |

Fonte: Tack, J., Talley, N.J., Camilleri, M., Holtmann, G., Hu, P., Malagelada, J.R., & Stanghellini, V. (2006). Functional gastroduodenal disorders. Gastroenterology, 130(5),1466-1479.

Assessment of the category of functional dyspepsia is based on an estimate of 4 symptoms from six questionnaire items related to the last three months.

As mentioned, the ROME III questionnaire is used in several countries for the definition of functional dyspepsia. It has also been validated for Brazil, Korea, Italy, Norway, England and other countries (Song et al, 2013;. Perveen Rahman, Saha, Rahman & Hasan, 2014).

In a study designed in Bangladesh, with a sample of 3000 subjects with a mean age of 33.9 ± 16.4 years and using the Rome III questionnaire, the prevalence estimated of functional dyspepsia was 8.3% (Perveen Rahman, Saha, Rahman & Hasan, 2014; Seyedmirzaei, Haghdoost , Afshari, & Dehghani, 2014; Chang et al., 2012).

Another study conducted in Iran, with a sample of 2320 subjects with a mean age of 43.4±16.3 years revealed a prevalence of functional dyspepsia (based on ROME III criteria) of 16.1%, more common among the female gender (17.1% vs.15.2%, $p=0.03$) (Seyedmirzaei, Haghdoost, Afshari, & Dehghani, 2014). In Taiwan, a study with a final sample of 4275 adults showed a prevalence of gastrointestinal functional disorders of 26.2%, unspecified functional bowel disorder was the most prevalent (8.9%) and the second was functional dyspepsia (5.3%). In the same study, women had a greater prevalence than men (33.2% compared to 22.4%, $p<0.05$) regarding overall gastrointestinal functional disorders (Chang et al., 2012).

We can see that it is essential to define a correct definition in order to allow the development of knowledge about the prevalence, geographic distribution and the comparison of dysfunctional dyspepsia between countries. Most studies presented were based on the identification of individuals with functional dyspepsia through the Rome III criteria, once the clinical diagnosis of functional dyspepsia after the identification of individuals is carried out through a complementary diagnostic test - endoscopy. The difficulty facing epidemiologic studies of functional dyspepsia is creating the necessary conditions to establish a correct diagnosis (Zagari et al., 2010). In this sense, several population-based studies have shown data on the prevalence and risk factors for functional dyspepsia based on symptoms, but the diagnosis of functional dyspepsia based on criteria defined by symptoms and endoscopy are very scarce (Zagari et al., 2010). The Rome III Diagnostic Questionnaire, of which the Diagnostic Questionnaire for Functional Dyspepsia is included, is a valid and reliable instrument for making provisional diagnoses of all functional gastrointestinal disorders with the exception of unspecified functional bowel disorder. It can be used in clinical, epidemiological, or basic research purposes, but to confirm the diagnosis some additional diagnostic tests are needed (Reisswitz, Mazzoleni, Sander & Francisconi, 2010).

The aim of this study was to develop and validate the cross-cultural adaptation of the Rome III questionnaire for diagnosis of functional gastrointestinal disorders in Portugal.

## 1. METHODS

The systematic translation and the cross-cultural adaptation process are indispensable for research questionnaires.

The research was approved by the Ethics Committee of the Health School and Research Centre for Education, Technology and Health Studies of the Polytechnic Institute of Viseu, Portugal (CI&DETS).

For the translation, adaptation and validation of the Rome III two complementary phases were followed - translation and cultural adaptation of the questionnaire and the statistical validation. The cultural adaptation was performed in order to obtain an equivalent to the questionnaire developed in the original country in order to ensure equivalence of contents and semantics. For this adaptation translation-retroversion method for bilingual people was applied.

The translation process began with two translations from the original questionnaire by two translators, native of Portugal and fluent in English. The translated version was reviewed by a native doctor in Portugal. This was followed retroversion by an independent translator, not knowing the original version in English. Confronting the versions (original and retranslated) to assess the content of items and finally realized the correction of technical terms by a doctor. The end of Portuguese version of the Rome III questionnaire was produced.

The total sample consisted of 166 subjects (56.6% female), aged over 18 years (mean of 46.96 ± 03.17 years). Most of the subjects were married (60.8%), employees (69.7%); 33.2% possessed the 1st or 2nd cycles of school education; 22.9% 3rd cycle or secondary and 43.9% had higher education. The sample was selected at random from the center of Portugal.

### 1.1. Data collection

Data were collected through a questionnaire between the months of January and March of 2013. The researchers presented the objectives to the research participants and the informed consent and the questionnaire were filled out by each participant

and then returned in a sealed envelope. The ROME III questionnaire consists of 20 questions and the items 3 to 8 assesses the functional dyspepsia category. According to the Rome Foundation, the proposed frequency of symptoms is different for functional dyspepsia and other subtypes that the Rome III questionnaire allows identification. The Rome Foundation also recommends the answer "at least" for weekly symptoms in the definition of functional dyspepsia.

### 1.2. Statistical Methods

After data collection, statistical analysis was performed using the SPSS software (version 23.0). The majority of the Rome III-Portuguese question items were categorical or dichotomous items, and the test-retest reliability of the Rome III-Portuguese was assessed by determination of the alpha of Cronbach coefficient and Pearson correlation. A coefficient higher than 0.7 Indicates acceptable consistency. The coefficient for each item is presented as a median with a 95% confidence interval.

## 2. RESULTS

When we conduct a descriptive analysis of items that match assessment of functional dyspepsia, we found that the number of respondents in all items is the same, however the maximum number of response options is different for each item, in which there were differences in corresponding the maximum value of each item. The mean values are low (Table 2).

Table 2 - Descriptive values of Rome III questionnaire items for evaluation of functional dyspepsia.

| Items | n | Minimum | Maximum | Mean | Standard deviation |
|---|---|---|---|---|---|
| 3 | 166 | 0 | 6 | 1.46 | 1.76 |
| 4 | 166 | 0 | 1 | 0.45 | 0.50 |
| 5 | 166 | 0 | 5 | 0.64 | 1.32 |
| 6 | 166 | 0 | 1 | 0.20 | 0.40 |
| 7 | 166 | 0 | 6 | 0.89 | 1.43 |
| 8 | 166 | 0 | 1 | 0.36 | 0.48 |

The alpha of Cronbach coefficient for the 18 items of the questionnaire answered was 0.87 for patients. According to the ROME III questionnaire and considering the six items for identification of the functional dyspepsia category the alpha of Cronbach coefficient was 0.76 and the alpha of Cronbach based on standardized items was 0.85.

Analyzing the bivariate Pearson correlation between the items we found that the correlation between items that assess each symptom is good (ranging between 0.702 and 0.771). For the symptom "bothersome postprandial fullness" - rated by items 3 and 4 correlations was 0.702; for the symptom "early satiation" - rated by items 5 and 6 the correlation was 0.769 and to assess the symptoms "epigastric pain" and "epigastric burning" the Pearson correlation for items 7 and 8 was 0.771.

According to table 3, the most interesting analysis are the correlation between the scores of the item and the total range (R), the coefficient of multiple determination (R2) between the item and the other items of the scale and the value of alpha of Cronbach if an item was eliminated from the scale. By the alpha of Cronbach, the items are rated as acceptable, with identical value of alpha in all items (ranging between 0.70 and 0.74) and as no alpha of Cronbach is higher than the general alpha, this suggests that no item should be excluded. The item that has worse R is the item "5" and the item that has a lower correlation with the other items is "4".

Table 3 - Internal consistency of the ROME III questionnaire items for the category of functional dyspepsia.

| Item number | Mean ± Standard Deviation | R | $R^2$ | α without item |
|---|---|---|---|---|
| 3 | 2.53±10.13 | 0.64 | 0.57 | 0.70 |
| 4 | 3.55±17.40 | 0.66 | 0.54 | 0.73 |
| 5 | 3.36±13.47 | 0.54 | 0.61 | 0.71 |
| 6 | 3.80±18.01 | 0.65 | 0.64 | 0.74 |
| 7 | 3.10±12.36 | 0.59 | 0.64 | 0.70 |
| 8 | 3.64±17.69 | 0.61 | 0.60 | 0.74 |

After calculation and analysis of the split-half, we found that the 1st half of the alpha of Cronbach scale was 0.65 and the second half was 0.61. The split-half procedure related to the correlation between the measurements provided by the two halves of the scale is high, the range is consistent with the pattern as a whole and present internal consistency: the two halves test measures the same construct.

## 3. DISCUSSION

This study aimed to carry out cross-cultural validation, translation into Portuguese and cultural adaptation of the dyspepsia functional category of the Rome III questionnaire. Data was collected by a group of researchers, team members of the "Helicoviseu Project."

In Portugal, the prevalence of gastrointestinal functional disorders is high. With this gradual public health issue and, given the importance of evaluation of functional dyspepsia in the general population, it is important to assess the case definition. The studies in the field of gastrointestinal functional disorder assessment, in particular of the category functional dyspepsia, in different countries through a common and culturally adapted questionnaire, is key. The Rome III criteria for functional dyspepsia were published in 2006. This is the first validation of one of the Rome III Modulated Questionnaires in Portugal. The Rome III Diagnostic Questionnaire for Functional Dyspepsia was successfully validated, showing good psychometric properties.

A validated questionnaire related to the diagnosis of gastrointestinal functional disorders is crucial to assess the prevalence of these specific diseases and respective categories (including functional dyspepsia) and subscales / symptoms in epidemiological research.

The alfa of Cronbach, which measures internal consistency (that is the extent to which an item is related to other items) was 0.87, within the range considered ideal (0.80-0.90). According to the Rome III questionnaire to identify functional dyspepsia and considering the corresponding items the alpha of Cronbach coefficient was 0.76 and the the alpha of Cronbach based on standardized items was 0.85. The minimum acceptable value for alpha is 0.70; however, the usually preferred alpha values are between 0.80 and 0.90. We can see that the Rome III questionnaire to identify the functional dyspepsia in adults presents an acceptable internal consistency. In the questionnaire validation study ROME III in Korea, the functional dyspepsia scale showed a alpha of Cronbach of 0.84 (range, 0.60-0.86) (Song et al., 2013).

One of the limitations of our study is the fact that the questionnaire was applied in a sample of individuals in a community without a group of cases with clinical diagnosis of functional dyspepsia, and a control group. The small sample size in the validation study may be the limitation.

Still, we note that the epidemiological data of functional dyspepsia in the general population are scarce (Zagari et al., 2010).

The validation of this questionnaire for Portugal is important for a definition of functional dyspepsia criteria and allows the determination of functional dyspepsia prevalences based on criteria and symptoms and not in clinical diagnosis, this done by exclusion through endoscopy (Talley, Vakil, & Moayyedi, 2005; Tack et al., 2006). The underlying difficulty epidemiological studies of functional dyspepsia is that the diagnosis of this condition is essentially a diagnosis of exclusion after endoscopy. Some population-based studies have provided data on the prevalence and risk factors for functional dyspepsia, but clinical diagnosis of functional dyspepsia, based on endoscopy was not performed. The difficulty considered in epidemiological studies of functional dyspepsia is that the diagnosis of this condition is essentially a diagnosis of exclusion after endoscopy, which is very difficult in population-based studies (Piessevaux et al., 2009; Talley, Vakil, & Moayyedi, 2005; Tack et al., 2006).

## CONCLUSIONS

We can see that the Rome III questionnaire to identify the functional dyspepsia in adults presents an acceptable internal consistency. The Rome III proved to be a reliable and valid tool, self-reported to identify cases of functional dyspepsia. A validated questionnaire to assess the prevalence of functional dyspepsia in epidemiological studies is crucial. The questionnaire has illustrations to minimize anatomical misunderstandings and increase reliability.

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## CONFLICT OF INTERESTS

The authors have no conflicts of interest.

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# A INFORMAÇÃO COMO SUPORTE À SUPERVISÃO DE PARES EM ENFERMAGEM

# INFORMATION AS SUPPORT FOR PEER SUPERVISION IN NURSING

# LA INFORMACIÓN COMO SOPORTE DE SUPERVISIÓN DE PARES EN ENFERMERÍA

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## RESUMO

Introdução: A qualidade dos cuidados é atualmente um foco de atenção de todos os profissionais de saúde, nomeadamente dos enfermeiros. A evidência tem vindo a demonstrar que a implementação de processos supervisivos entre pares é promotora do desenvolvimento de competências profissionais, permitindo aos enfermeiros exercer uma prática profissional adequada e critico-reflexiva, o que consequentemente terá repercussões positivas na qualidade dos cuidados de enfermagem. Decorrente das alterações demográficas, tecnológicas e científicas, a informação integra na atualidade o discurso dos profissionais de saúde.

Desenvolvimento: a informação é uma ferramenta essencial na orientação dos cuidados de enfermagem, pelo que importa averiguar qual a informação que sustenta a tomada de decisão dos enfermeiros. Esta indagação auxilia também a identificação das necessidades de formação destes profissionais, visando o desenvolvimento pessoal e de competências profissionais. Com a presente revisão narrativa pretende-se refletir sobre a pertinência da implementação de processos supervisivo de pares em enfermagem, bem como do suporte que a informação constitui para a identificação de áreas do conhecimento necessárias à transformação das práticas.

Conclusões: Como limitação na concretização deste artigo, evidenciamos a pouca bibliografia disponível principalmente no que respeita à evidência acerca da utilização da informação enquanto suporte à SC de pares em enfermagem, o que nos faz acreditar ser necessário o desenvolvimento de investigação que combine estas duas áreas.

**Palavras-chave:** supervisão clínica; cuidados de enfermagem; informação em saúde; qualidade da assistência à saúde; competência profissional.

## ABSTRACT

Introduction: Quality of care is currently a focus of attention for all health professionals including nurses. Evidence has shown that implementing a supervisory process between peers, promotes the development of professional skills, allowing nurses to provide an appropriate professional and critical-reflexive practice, which in turn, will have positive impact on the quality of nursing care. Resulting from the demographic, technological and scientific changes today information integrates the discourse of health professionals.

Development: It is a fact that information is an essential tool in guiding nursing care and it is important to find out what information will be the basis for nurses' decision-making. This question also helps to identify of these professionals' training needs, in order to enhance personal development and professional skills and consequently to improve the quality of nursing care.

With this narrative review, we intend to reflect on the relevance of implementing a peer supervision process in nursing, as well as, the support that information provides to identify areas of knowledge that need to be addressed with a view to transforming practices.

Conclusions: It is worth noting that the dearth of literature available regarding evidence about the use of information, especially with respect to its support of peer CS in nursing is a limitation in implementing this article. This makes us believe that it is necessary to develop research that combines these two areas.

**Keywords:** clinical supervision; nursing care, health information; quality of health care; professional competence.

## RESUMEN

Introducción: La calidad de los cuidados es actualmente un foco de atención de todos los profesionales de la salud, incluidas las enfermeras. La evidencia ha demostrado que la aplicación de los procesos de supervisión entre pares está promoviendo el desarrollo de las habilidades profesionales, permitiendo que las enfermeras ejercen la práctica profesional adecuada y crítica-reflexiva, que por lo tanto tiene impacto positivo en la calidad de los cuidados de enfermería. Derivada de los cambios demográficos, tecnológicos y científicos, la información incluye el discurso actual de los profesionales de la salud.

Desarrollo: la información es una herramienta esencial en la orientación de la atención de enfermería, y que debe averiguar cuál es la información para apoyar la toma de decisiones de las enfermeras. Esta pregunta también ayuda a identificar la formación de estas necesidades de los profesionales, la orientación del desarrollo personal y habilidades profesionales. Con esta revisión narrativa tiene como objetivo reflexionar sobre la pertinencia de la aplicación de los procesos de supervisión de pares en enfermería, así como el apoyo que la información da para identificar áreas de conocimiento necesarias para transformar las prácticas.

Conclusiones: Es destacable que la escasez de la literatura disponible a respecto de la prueba sobre el uso de la información, sobre todo con respecto a su apoyo entre pares CS en enfermaría es una limitación en la aplicación de este artículo. Esto nos hace creer que es necesario desarrollar la investigación que combina estas áreas.

**Palabras clave:** supervisión clínica; atención de enfermería; información en la salud; calidad de la atención de salud; competencia profesional

## INTRODUCTION

We live in an age of permanent change, with constant changes at the social, human and technological level, where knowledge has reached a provisional character. This represents a challenge for the individual because of the need to have to be prepared for the unexpected and thus, to keep up with change and to learn to change with those very changes (Alarcão & Canha, 2013).

Under this assumption, we can see the idea of a solid initial training being sufficient to ensure good performance of professionals throughout their career being abandoned. Moreover, this idea has been replaced by the assumption that living and practicing a profession implies personal involvement in a continuous process of personal and professional development, enabling the individual to build and reconstruct their knowledge and their behaviour throughout life (Alarcão & Canha, 2013).

Continuous training provides the updating of knowledge and practices, which nurses should follow throughout their careers, contributing to constructing/reconstructing their knowledge, training and professional development (Pires et al., 2004).

Indeed, it is ever more urgent the need to learn throughout life, particularly along professional life; so, it is also urgent to define new paradigms and training strategies. However, it is important that these are defined based on the training needs of the population for which it is intended, taking into account not only each nurse's individual needs, but also the collective needs of the group and the context in which they are found. Thus, we understand that this is the current challenge to professionals and health organisations in the field of clinical supervision in nursing (CSN).

Integrating nursing in higher education has been subjecting the profession to profound changes, whether by the need to expand the body of knowledge of this science through research or by the need to prepare more analytical and critical-reflective professionals (Pires et al, 2004; Pereira, 2009).

It is intended that nurses develop an analytical and reflective practice based on evidence, approaching the theory of practice and promoting the highest quality of nursing care in order to achieve gains in health. These professionals have therefore been called to participate more actively, not only in the training of future nurses, but also their peers' acquiring knowledge and skills (Silva, Pires & Vilela, 2011).

Clinical supervision (CS) of peers enhances improvement of care, providing nurses with the development of skills and knowledge and consequently the improvement of clinical practice. The large and rapid technological and scientific changes and the increased mobility of people due to globalisation, have been forerunners to new health needs, implying that professionals must constantly adapt to work contexts. In this sense, it is crucial that nurses continually reflect on their practices, seeking for continuous professional development.

It has been shown that in-service training has a positive impact on changing the attitudes of professionals in clinical practice (Cunha, 2008) as it emerges from the needs felt by them. At a time when Information Systems (IS) exist in Portugal, we believe that the information contained therein should be put to good use by peers in each context, and in particular by nurse managers, as a contribution to identifying target areas of specific training. In other words, we believe that the existence of clinical documentation systems, which contain information coming from the documentation of nursing processes, favour reflection regarding their actions and consequently identify areas of intervention. This is due to the fact that this documentation translates each nurse's knowledge, thought process and conception of care. It should therefore be understood by clinical supervisors to support identifying training needs, thereby supporting CS of peers in nursing.

With a view to maximising the professional development of nurses as well as the safety and quality of nursing care, peer supervision is clearly a necessity, perceived by health organisations, and included in their strategies (Rocha, 2014).

The aim of this narrative review is to reflect on the relevance of implementing peer supervision processes in nursing, as well as on the importance that the information provided to nurses from the IS, in identifying areas of knowledge that need to be addressed so as to transform practices.

## 1. CLINICAL SUPERVISION IN NURSING

Despite Clinical Supervision in Nursing (CSN) as a concept having recently emerged in the literature, its origin dates back to earlier times and it was Florence Nightingale who first opened its path (Abreu, 2002). However, and despite its origins in the past, this is an increasingly relevant and current topic, it is based on changes in education towards reflective practice (Garrido, Simões & Pires, 2008). This is a dynamic concept that has been changing in order to adapt to modifications occurring in society and to meet the needs of nursing students and professionals (Abreu, 2002).

In Portugal operationalising this concept in science of nursing, emerged in an attempt to meet new training demands to be more reflective at a time when this discipline began to assert itself as science and build up its own body of knowledge (Pires et al., 2004).

Hyrkäs et al. (1999), cited by Silva et al. (2011) describe CS as a method of work and consulting, guidance, management, leadership and focused therapy in the development of clinical practice through reflection, guidance and professional support. Another definition by the UK Department of Health defines CS as a formal process of professional support and learning, which allows professionals to develop knowledge and skills in order to assume responsibilities for performance itself (Department of Health, 1993, cited by Lyth, 2000).

Transposing these definitions for nursing, it is understood that Abreu et al. (2015) argue that the CSN is a collaborative process and at the same time a support process between two or more nurses, to promote the development of their professional skills and naturally to promote and improve quality of practice standards in order to improve the quality and safety of nursing care. Moreover, the Portuguese Council of Nurses (OE) defines CSN as a formal practice of monitoring of nurses whose goal is to promote the effective decision-making through reflection and analysis of the practice of care (OE, 2009).

Thus, with the above definitions in mind, it is assumed that the CS, and CSN in particular, is oriented to the processes of peer supervision, relating to certification processes, quality and safety of care and nursing education (Silva et al., 2011).

Several authors cited by Abreu (2007) reinforce the nature of the CS as a process oriented to peers, a process of continuous training and professional development in adulthood, a supervisory process focusing on clinical practice and a process capable of creating the conditions necessary for professionals to discuss a variety of situations related to professional practice. This contextualisation is corroborated by Abreu (2007) describing the CS as a broad concept, because it is intended not only for the supervision of students, but also for training, professional development and to ensure quality of care provided by nurses. Thus, according to this broader view, CSN is "...a sustained formal process in the practice which allows professionals to develop skills and awareness of the responsibility of and related to the practice in a process of steady maturing and development" (Alarcão & Canha, 2013, p. 35).

For these reasons, it appears that this type of supervision proposes the construction of knowledge, which should be traced and threshed individually in the course of working life, given the constant need for redefinition, implying motivation, integration and orientation for this process (Garrido et al., 2008).

In this sense, and since it is consensual that the idea that CSN be oriented towards developing skills, knowledge and professional values, thereby promoting nurses' autonomy and conscious, responsible, supported, reflected and effective decision-making, we may conclude that peer supervision is a key aspect of nursing culture and life in environments of clinical practice, asserting itself as a tool to improve nursing care.

In fact, several benefits are associated with implementing this type of horizontal supervision, reflected in multiple studies highlighting in particular the willingness of nurses to reflect on the care provided to their clients, as well as promoting a sense of equality among themselves as a consequence of sharing and acquiring knowledge.

Walker (2009) validates this reflection indicating that this process allows nurses to perceive that they are not alone, feeling supported personally and professionally. Chilvers & Ramsey (2009) showed that the decrease in stress, the incentive for reflection on individual practice, improvement in quality of services and greater professional satisfaction and confidence are some of the advantages of peer supervision.

Brunero & Stein-Parbury (2008) assessed the effectiveness of CSN, concluding that its benefits relate to support from peers, to the relief of stress levels, promoting professional responsibility and to developing professionals' skills and knowledge. The authors categorised the findings according to the three functions defined by the Proctor CS Model. This model is characterised as developmental, focused on the functions of clinical supervision and centred on developing of the supervision relationship. For this model these functions are aggregated into three main functions: training, aimed at developing skills, understanding and knowledge; regulatory, promoting the development of a consistent practice among nurses, essential for the development of strategies to manage professional responsibility as well as quality management; and restorative, fostering colleagues' support each other, playing an active role managing emotions (Brunero & Stein-Parbury, 2008; Garrido et al., 2008; Lakeman & Glasgow 2009; Walker, 2009).

From the study by Brunero & Stein-Parbury (2008), several advantages for peer supervision were found. These were categorised according to the functions of the Proctor Model (Table 1).

Table 1- Benefits related to peer supervision

| Function of the Proctor Model | Benefits of Peer Supervision |
|---|---|
| Training | Acquisition of new learning and knowledge; Development of creative capacity and innovation |
| Regulatory | Identifying and solving problems; Improving clinical practice; Development of professional identity; Organisation of care; Greater job satisfaction; Increased security for the client developed by improving the quality of nursing care |
| Restorative | Decreased anxiety levels; Ability to express thoughts; Reduction of conflict; Development of interpersonal relationships; Improved Coping Strategies |

Source: Brunero & Stein-Parbury, 2008

Garrido (2004) also describes peer supervision in nursing as a structural condition of nurses, continuous learning process, providing continuous improvement to quality as well as effective risk management and performance. This author reinforces the conviction that the supervision contributes to efficiency and professional effectiveness by strengthening fundamental attributes, such as reflection and constructive critical analysis of practices.

In short, the above allows us to surmise that implementing peer supervision in nursing, provides support to the quality of clinical practice, encouraging self-assessment and the development of analytical and reflective skills.

## 2. CLINICAL SUPERVISION AND QUALITY OF CARE

The concept of "quality" has been gaining ground in the discourse of organisations, particularly when associated with health care. In fact, there is a growing appreciation on the part of healthcare organisations on issues associated with this concept, assuming that the quality of care, including nursing care, not only undergoes scientific and technological progress, but also transforms the very nurse as a person and the opportunity to reflect on the care provided.

The quality of health services is considered a goal to achieve by health organisations, attesting that the implementation of quality systems is now formally taken over by international organisations such as the World Health Organisation (WHO) and national organisations, such as the General Health Directorate (DGS). In Portugal, the basis of this concern by government entities was the need to establish strategic guidelines and implement interventions aimed at improving the quality of health services. Currently, at the national level quality is recognised in the 2012-2016 National Health Plan as a foundation for care, as one of its structural axes, with a view to obtaining health gains in the health care provided (DGS, 2012).

It is worth noting that despite the multiplicity of approaches to this issue, particularly with regard to its assessment, what is found is "...a common denominator which is the fact that these issues are inextricably linked in an explicit quality policy whose aim is to improve the performance of health services overall and, consequently, the results from the clinical and economic point of view as well as that perceived by patients (degree of satisfaction, preferences and expectations)" (Cunha, Eiras, & Teixeira, 2011, p.3).

Nursing has also been looking into this concept, which despite its current relevance, Florence Nightingale had argued about the need to analyse statistical results so as to be able to ascertain the quality of nursing practices (Cunha et al., 2011).

In 2001 the OE assumed a central role in indicating the creation of quality in health systems as a priority, defining quality nursing standards, categorised relative "...to customer satisfaction, the promotion of health, preventing complications , well-being and customer self-care, functional rehabilitation and the organisation of nursing services." (p.13). These are aimed at developing skills and are intended to clarify the social role of the nursing profession, establishing itself as a tool to help nurses to define their role with respect to their clients, other professionals and government agencies.

The aim of these standards is promote professional practice in terms of the highest standards of quality, thereby becoming a fundamental, essential and indispensable benchmark for the development of quality in nursing care. Its operation is linked to the achievement of continuous improvement in the quality of nursing care. It is not enough to just implement it, but it is necessary to identify problems and determine solutions a structured and systematic way (OE, 2009).

One of the most widely used mechanisms to operationalise the "continuous quality improvement" is the PDCA cycle which is comprised of four stages: ***Plan*** – analyse and define the areas/processes to improve; ***Do*** – implement the improvement/change; ***Check*** – monitor improvement/change; ***Act*** – assess the impact of the improvement/change in the quality improvement process (Deming, 1986, cited by Walley & Gowland, 2004).

It is interesting to note the parallels between this tool and the process steps of supervision recommended by Nicklin (1997), cited by Sloan (1999). According to this author, the process takes place in a cycle comprising six stages. They are: **Analysis**, practice of the objective, i.e. assessment of problem situations; **Identification** of the problem; **Contextualisation**, by defining the objectives of the interventions to be implemented to solve the problems; **Planning** an appropriate intervention for the problem situation identified; **Implementation** of the planned actions; and **Assessment** of results.

Analysing these steps and taking the definition of supervision by Alarcão & Tavares (2003), cited by Cunha (2008, p. 54) into account, it is a "...multifaceted, phased, continuous and cyclical action capable of contributing to developing knowledge, set of values and attitudes, as well as the capabilities and skills..." It appears that the supervisory process may fit into the PDCA cycle, and can be considered a strategy to be adopted in a process of continuous quality improvement.

In line with this idea, for some years healthcare organisations in Portugal have adopted processes to accredit institutions for quality. These processes include specific references to the need for CS in nursing in the rules (Abreu, 2007). To this end, the supervisory process must be effectively implemented and achieved with necessary recourse to critical reflection.

In short, we may infer from the literature that the peer CS in nursing supported by reflective critical analysis of practice, seems to promote nurses' personal and professional skills of with a view to continuous quality improvement. According to Alarcão (1996), "...the supervisor is the facilitator of reflection, raising trainees' awareness of their performance, helping to identify problems and planning strategies to solve them based on...responsibility for decisions that affect their professional practice" (p. 97).

This definition leads to a reflexive professional practice encompassing the need to: reflect on actions, that is, reflection occurs at the time of executing the action, resulting in reformulating it; reflect on the action, making a mental *a posteriori* reconstruction of the action; and reflecting on the reflection in action, promoting a meta-reflection developing new arguments, new ways of thinking, acting and identifying problems. Thus, "a reflective practice leads to (re)constructing knowledge, attenuating the separation between theory and practice and is based on building a circularity in which theory illuminates practice and practice equates theory" (Alarcão, 1996 , p.98).

Thus it is clear that peer CS develops a harmonious, dynamic and collaborative interaction between the various participants in the supervisory process, in which the concept of reflection is central, making it essential that those who are supervised reflect on the role they play in the action and with regard to the quality of their practices (Henriques & Oliveira, 2011).

For these reasons, it appears that the horizontal supervision is a valuable contribution for the quality of nursing care and consequently to obtain its respective health gains. However, for this end appropriate strategies should be defined for contexts, the people involved and the intended goals.

Based on the awareness that the supervisory process is a dynamic and interpersonal process grounded on the interaction between the professional and the action and among the professionals themselves, and with a view to its effective achievement, the need to include different strategies that provide an opportunity to examine, question and critically evaluate the practice is worth noting. Assistance, guidance, monitoring and reflection strategies are highlighted (Alarcão, 1996; Abreu, 2007; Alarcão & Canha, 2013).

Alarcão (1996) refers to reflection as a systematic investigation of practice. It can be seen as a means of supervision to enable identifying and understanding problems and needs that arise during the path of supervision. For this, and with a view to solving problems so as to improve the quality of care, it is essential that the reflective critical reflection of the practice happen by the supervisor and the supervised.

The evidence has shown that mobilising different areas of knowledge fosters the development of problem-solving, reasoning and reflective skills in nurses. A study by Serrano, Costa & Costa (2011), conducted in order to understand how nurses develop the skills of nursing care, concluded that this is a continuous interaction between three dimensions: actors, context and knowledge. These are affected by characteristics such as teamwork, reflection on practice, questioning, problem-solving, socialisation, CS, standards and health organisation procedures, organisation/working method, WHO guidelines and the institution's policies, values and mission.

Also along this line of thought, Fradique & Mendes (2013) concluded that leadership is key to continuous quality improvement, to promoting the development of skills and competencies of nurses, with a view the potential of each one.

These results reveal the idea that organisational knowledge "emerges out of active participation and the daily experience of work, which is conducive to a learning process," which occurs "informally," "is produced within the limits of each service" and "encompasses communication in many different ways – records, computerisation of data and interpersonal communication" (Serrano et al., 2011, p.21).

Currently, considering that nursing is a science with its own body of knowledge, it is undeniable that, associated with solid training, nurses should be facilitated in developing the skills of critical and reflective analysis and innovation founded on new CS strategies

(Henriques & Oliveira, 2011).

Aware that technological advances have introduced changes in health organisations in terms of the care process (Serrano et al., 2011), in addition to the fact that nursing information systems (NIS) are now a reality, we believe we have a support tool for peer CS. This stems from the fact that the use of IS enables the supervisor to make judgments about the training needs of supervised nurses. Finally, it reinforces the concept of supervision based on a collaborative and supportive relationship between the supervisor and the supervised, with the goal of the personal and professional development of the latter, moving away from the traditional concept based on a power relationship which is usually associated with a punitive/penalising character.

## 3. TRAINING AND INFORMATION

In clinical practice, nurses collect data daily, making decisions based on these and on their own clinical judgment. However, it is emphasised that these can only be consistent when they are compiled and organised, thus becoming useful information for decision making. Only after being processed, organised and interpreted in each situation/context, do they take on meaning, guiding the nurse's decision-making. It is from the systematic collection of data that the remaining steps of the nursing process arise and are structured, with the objectives defined, health needs diagnosed, interventions planned and their impact on individuals' health assessed (Pereira, 2009; Jesus & Sousa, 2011).

Evidence has shown that when the data is organised in a structure that guides decision-making and are collected properly and in timely fashion for a particular purpose, the information derived from those data enables and develops the nurse for a given action in a given context, assisting in identifying needs. This organisation is usually achieved with recourse to an IS (Pereira, 2009; Jesus & Sousa, 2011), in particular from decision-making structures, known as decision-making support systems in nursing.

These support structures are intended to assist nurses in proper decision-making based on an organisation of data grounded in theoretical assumptions. From these, they can continuously scrutinise practices which is essential to transforming tacit knowledge into explicit knowledge (Teixeira, Soares, Ferreira & Pinto, 2012). Systematic literature review conducted by these authors, in order to analyse and reflect on the contributions of these structures, revealed that reflecting on the content and its suitability to each individual's health condition alerts nurses to aspects not normally perceived, thereby influencing the implementation of specific interventions. This study also indicates that nurses perceive that this information complements areas where their knowledge and expertise is scarce, increasing diagnostic accuracy.

Guimarães & Évora (2004), cited by Cunha Ferreira & Rodrigues (2010), also reinforce these assumptions to indicate that organised data structures are generating structured and accessible information, increasing efficiency in the process of care and support to effective decision-making. Analysis of this information facilitates scientific research and guides the production of new "knowledge."

Pereira (2009) corroborates these authors revealing that in recent decades the concept of "information" has evolved from a vision focused on documenting care, whose purpose was only to serve as documentary evidence indicating what had been executed, to a more analytical and critical-reflective view, where the information is understood as contributing to improving professional practice, revealing individuals' needs and focused on managing the quality of nursing care.

In fact, it is undeniable that "information is a central element in clinical decision-making and a key requirement for managing care." It should therefore be understood as enhancing quality care and managed as a resource (Marin et al., 2001, cited by Pereira, 2009, p. 32).

In short, in our view these conjectures justify the urgency of a structured peer supervision process, based on analysis of the information produced by nurses since it is thus possible to make inferences about nurses' real learning needs in each context from the critical reflection on practice.

For this, it is germane that from analysis and reflection of professional activities, health organisations create structures in order to support nurses (Cunha, 2008). Considering nurse managers are particularly important in leading the work team to guiding interventions to improve the practice of care, in institutions it is essential to identify which practices, when and how they should be targets for intervention (Fradique & Mendes, 2013).

In this sense, the improvement of clinical practice stemming from the specific training geared to the needs of each context is part of the concept of in service training, whose aim is excellence in nursing practice. Its definition refers to "...a planned process comprising preparation, guidance, updating and betterment for professionals in order to achieve and maintain the institution's effective and efficient standard" (Cunha, 2008, p. 68).

By way of CSN it is possible to improve clinical expertise, and the supervision processes allow nurses to reflect and modify their practice, discuss cases, review clinical guidelines and continuously update knowledge (Rocha, 2014). Thus, it is understood that it

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is not possible to separate the concept of CS from the concept of continuing education, since in both supervisor and supervised "...engage in a collaborative process of analysis and assessment of practices, which forms the basis for change and for the reconstruction of context, attitudes and behaviour" (Cunha, 2008, p.70), implying a commitment on the part of both the clinical supervisor and the supervised to the process.

To sum up, we may infer from the above that the aim of continuous training is to continually improve quality of care, and for this purpose to be achieved, it up to health institutions to promote the conditions for the professional development of nurses. This is provided for in the definition and implementation of a training plan geared towards attitudinal changes in practices (Cunha, 2008).

Based on the fact that information is no more than a set of data organised from a given pattern of reading and that knowledge comes from analysis performed on this information (Pereira, 2009), it is vital that peer CS is based on the analysis of available information, in terms of identifying relevant operating areas for training. Thus, in our view, identifying training needs can and should emerge from the analysis of clinical documentation produced by nurses, since this information is a great pretext for both supervisors and the supervised to reflect on their practices (Rocha, 2014), thus defining an in-service training project for the development of these professionals.

## CONCLUSIONS

The role of nurses should be guided by rigour and competence in order make it possible to obtain health gains arising from nursing care for individuals and populations. To that end, and with a view to changing behaviours, it is essential to perform systematic, structured and appropriate work for the target population. It is also necessary to raise the awareness of nurses and health organisations for their need to improve their professional performance progressively. In this sense, monitoring and continuous guidance throughout their working lives are essential aspects to achieving positive changes in practices, justifying, in our view, the need for continuing education in nursing.

In his study, Rocha (2014) found that nurses highlight the dimension of lifelong learning, considering it essential to the professional development of any nurse. However, it is emphasised that the areas proposed for intervention should emerge from reliable data and not from mere perceptions. They should arise from identifying a given population's true training needs. After that, it is necessary to define priority areas and intervention strategies. The aim of this strategy is nurses' personal and skills development, the assurance of quality health care and security in clinical practice.

However, as exposed here, inclusion of peer CS in daily practice implies not only the personal commitment of all professionals, but also on the part of health organisations. Only in this way can it provide and capitalise on the variety of experiences in different contexts, originating new practices, interactions and transitions, which are steps in personal and professional development.

Given the growing value by the health organisations regarding quality policies and continuous technological advances, peer CS is an instrument to promote skills development in nursing. In this context, we understand that in order to achieve excellence in care, a critical and reflective analysis of practices should be performed by both the supervisor and the supervised from the information produced by clinical documentation of nursing care, drawn from nursing information systems (NIS). Since this portrays these professionals' conception of care and their thought processes in decision-making, it is intended to be a reflection on their action.

It is worth noting that the dearth of literature available regarding evidence about the use of information, especially with respect to its support of peer CS in nursing is a limitation in implementing this article. This makes us believe that it is necessary to develop research that combines these two areas.

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# COMUNICAÇAO INTERNA NAS ORGANIZAÇÕES: INSTRUMENTO PRÁTICO DE AUXILIO À PASSAGEM DE TURNO

# INTERNAL COMMUNICATION IN ORGANIZATIONS: PRACTICAL INSTRUMENTS TO HELP THE SHIFT CHANGE

# COMUNICACIÓN INTERNA EN LAS INSTITUCIONES: HERRAMIENTA PRÁCTICA DE AYUDA AL CAMBIO DE TURNO

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## RESUMO

Introdução: A comunicação interna dentro da organização, seja ela interpessoal, grupal ou intergrupal, deve envolver todos os colaboradores de forma a pôr em comum a missão, os valores, os princípios operativos e os padrões de comportamento que geram o desenvolvimento organizacional e a motivação.

Desenvolvimento: A passagem de turno em enfermagem é um momento fundamental de aprendizagem e de transmissão de informações relativas ao doente. A informação fornecida na passagem de turno deve ser objetiva e atualizada, tendo sempre em conta os princípios ético-deontológicos e uma linguagem técnica sobre os cuidados prestados ao doente, resultantes da aplicação de uma metodologia científica e de estratégias de reflexão.

De forma a facilitar a transmissão de informação, pretendemos com este trabalho realizar um instrumento prático, neste caso escrito, de auxílio á passagem de turno. Para tal foi realizado um estudo junto de uma amostra de enfermeiros aos quais foi aplicado um Questionário de Colheita de Dados.

Conclusões: A utilização de um instrumento de suporte à passagem de turno constitui um dos pilares do aperfeiçoamento dos cuidados de enfermagem.

**Palavras-chave:** passagem de turno; comunicação, informação.

## ABSTRACT

Introduction: The internal communication inside the organization, whether is interpersonal, group or intergroup, must involve all the collaborators in order the mission, values, operative principles and the behaviour patterns be common, to generate the organizational development and motivation.

Development: The shift change in nursing is a fundamental moment of learning and information transmission regarding the patient. The information given on the shift change must be objective and updated, always considering the ethical-deontological principles and a technical language about the care given to the patient, resulting of the application of a scientific methodology and reflexion strategies.

In order to ease the information transmission, we intent, with this work, to do a practical instrument, in this case a written one, to aid the shift changing. For this, it was performed a study in a sample of nurses to whom was applied a Data Collection Questionnaire.

Conclusions: The use of a support tool for the shift change is one of the pillars of the improvement of nursing care.

**Keywords:** shift change; communication; information.

## RESUMEN

Introducion: La comunicación interna dentro de una organización, ya sea interpersonal, de grupo o entre grupos, debe involucrar a todos los colaboradores con el fin de tener en común la misma misión, valores, principios de funcionamiento y patrones de comportamiento que generan un adecuado  desarrollo de la organización y una adecuada motivación.

Desarrollo: El cambio de turno en enfermería es un momento crítico del aprendizaje y la transmisión de información relacionada con el paciente. La información proporcionada en el cambio de turno debe ser objetiva y actualizada, teniendo en cuenta los principios éticos y deontológicos y el lenguaje técnico de la atención prestada al paciente, fruto de la estrategia y metodología científica realizada.

Con el fin de facilitar la transmisión de información, con este trabajo pretendemos crear una herramienta práctica, en este caso escrita, que ayude en el cambio de turno. Para ello, fue realizado un estudio con un número de enfermeras a las que se les dio un Cuestionario de Recogida de Datos.

Conclusiones: El uso de una herramienta de apoyo para el cambio de turno es uno de los pilares de la mejora de la atención de enfermería.

**Palabras clave:** cambio de turno; comunicación, información.

## INTRODUCTION

The way as a society member relates with other members is of a major or minor efficacy due his ability to communicate. No one can abdicate of the art of communication, because communication is a way of survival. A big part of our life, about 75% of the average time is spending relatig with other people (Fachadas, 1998). The communication is one of the components of the human structure, because it is present at an intellectual, emotional and behavioural level is part of the structuring basis of society, once it established the intra and interpersonal relationships and ensures the evolution of the human life.

All the communicational interactions are the result of some form of passing values, principles, attitudes and several life experiences that are projected for the current behaviour. The communication emerges from a social-cultural past in which the interlocutors are inserted and that from learning, is an integrant part of their life, being able to be adapted in order to face the several situations that they are confronted with.

When one interacts with the environment, through a communicational process, it is intended to give a meaning to the stimulus and signals that come from it. As it is impossible to respond to all the stimulus, it is done a selection of the ones that are the most interesting, they are organized and classified.

In order to understand the problematics of the internal communication in organizations it is important to consider the Watzlawick axiom (1993), it is unthinkable not to communicate, the impossibility of not communicate results from the fact that all the behaviour is communication and if doesn't exist a non-behaviour, this is, people cannot have a behaviour, anytime that exists a behaviour in interactional situation, this has the value of message. Any behaviour that might be apprehended by a receptor can be understood as a meaning, being like this, a way of communication. Even if someone is inactive or in silence, it still communicating.

It is therefore important, in the communication process to consider not only the meaning that is given to things, gestures, words and expressions, but also to the possible meaning given by the other intervenient, as well as the relational context.

In the organizations, the performance of each collaborator shows the reality perceived of the learning that was done about the organization, and his way of performing translated the construction of their interpretative map. One collaborator thinks that what the organization wants from him is a certain behaviour, then it will be that behaviour that the collaborator is going to try to have and the manager, by verifying that behaviour, if he doesn't give a positive or negative feedback about it, makes that there is a consolidation of the interpretative map, producing reinforcement of the repetition sense of the behaviour that was interpreted.

In this context, the organization will be what all the collaborators interpret about what it should be.

It is through the process of internal communication that the organizations become what they should be. It would be an organizational chaos the existence of several interpretative maps, or if there were very divergent interpretative maps from collaborator to collaborator. Thus, the management of the internal communication should be the guarantee that since the entrance of a new collaborator, this must incorporate the interpretative map of the organization, the most coincident as possible with the already existing collaborators.

According to Rego (1999), in the continuous relationship with all the elements of the organization, with the settlement of communicational processes with chiefs, colleagues, clients, providers, etc., the new collaborator must realize the values, identity and action assumptions that characterize the organization; thus it is extremely important the constant disclosure of the mission, the culture, the operational principles and patterns of the behaviour that rules the organization, in order to ease the socialization of their collaborators, aiming the organizational development.

It is the core role of the internal communication to develop common reference frames to all the collaborators of an organization, not encircling the simple transmission of information through pre-established channels, being perceived as a meaning confluence system that by being disseminated allows the understanding of what the organization should be.

## 1. THEORETICAL FRAMEWORK

### 1.1 Information vs Communication

The communication is an imperative of personal inter-relationship inside the organizations; being impossible not to communicate, the internal communication must be well developed, be open and transparent.

In a humanist perspective and strategically faced to the qualification of all the collaborators as internal clients of the organizations, the share of information in the several levels is essential for the success in the performance of the organizational objectives.

Most of the times, there is the tendency to mistake the information and communication contexts, thinking that by managing the information system, it is being managed the internal communication. This tendency leads to circumstances illusions, despite the

importance of the information management, the internal communication goes beyond that, through the response to the natural need that all the collaborators have to communicate, pool and share information and ideas.

In the normal information process, the message issuers don't receive feedback of the receivers; the message is unidirectional, being the receiver unable to give an answer. In the communicational process, as it was previously referred, the receiver always gives feedback, became then an issuer and vice-versa, starting a continuous interaction process that allows the initial issuer to understand if, in fact, his message was well received and understood.

The internal communication in the organizations has as assumption the fact of only be efficient if the issuer and the receiver share something in common, that is, both must give the same meaning to the message issued. Sometimes, even existing feedback from the receiver, the communication is not effective, standing by an intention communication process, translating an ineffective information process.

The communication it's only effective when there is a meaning share, when the behaviour of the receptor is really towards the issuer behaviour. This behaviour is directly related with each one experience, the relationship between the intervenient sans the context that involves their relationship; it is on this triad that it is developed the shared signification and only after this can exist communication.

Manage this process, aiming to optimize the share of common meaning, it's the function of the internal communication, quite distinctive of the simple information systems management, which allows saying that internal communication, assumes currently, an indispensable role in the organizational development, satisfying the human need to communicate.

## 1.2 Shift change

The shift change in nursing, in hospital context is a fundamental moment of learning and information transmission regarding the user. Traditionally done in a work room, the shift change is an important moment in the nursing professional activities.

According the Nurses Order (2001, p.9), "The shift change is presented as a reunion moment of the nurses team, having as objective to ensure the care continuity, through the verbal transmission of information, aiming to promote a continuous improvement of the care quality, while analysis moment of the practices and training in service/situation".

In this follow-up, Guimarães (1999), considers that the shift change of the nurses is a determinant moment in their professional quotidian, because it represents a time of significant symbolism, by the evaluation of the work done in a shift, by the organization of the following shift and by the discussion of the subjects and problems that appeared in the infirmary. Indeed, the shift change is a moment of great complicity, in which the nurses can reflect about the practices, originating behaviour and attitudes changing, sometimes not conscious, that promote the personal and professional development. Thus, while moments exclusively reserved to the nurses and of particular professional autonomy, the shift change of the nurses is potentially generator of learning between pairs.

The shift changes in nursing are moments of transmission of verbal and/or written information, respecting ethical-deontological principles, using a technical language about the care given to the user, resulting of the application of a scientific methodology and reflexion strategies.

Considering the shift change one of the most traditional and dominant ways of communication applied to the nursing practice, it would be expected that it was given to it a bigger appreciation, proportional to his importance in the care quality. However, in the course of time, it seems that that moment where is addressed the care, became a routine where are transmitted some information and that must be fulfilled. It is evident that the shift change cannot be only a mere words transmission, but one of the foundations of the constant improvement of the nursing care given.

## 1.3 Contextualization of the shift change

Right after the 2nd World War, the shift changes in companies were operationalized, mainly in Germany, as a way of fulfilling the Marshall plan, aiming the production of necessary goods to the reconstruction of the Federal Germany. It can be observed that the workers that worked by shift felt the need to inform constantly the colleagues about what was done in their working shift and, on the other hand, the workers that were going to initiate their shift needed information to improve their performance. (Azevedo, 2005)

Concerning the nursing practice, there is also the need of sharing information with the colleagues that are going to begin a new shift, aiming to improve their performance. In 1969 Clair and Trussel defined the shift change as the verbal communication of the

pertinent information about the patients. The objectives of this type of communication are to ease the care continuity, transfer information and also serve as teaching instrument. (Teixeira, 2007)

Only in a space like this it is possible to transmit, beyond the documented information, the non-documented information. On the other hand, becomes clear the selection or triage phenomena performed by the nurses, aiming to optimize their practice.

The nurse that performs his profession in a hospital ambit has two moments of shift change: one when gets in and another when he gets out. These are moments of strong group interaction in which the nursing team elements discuss between them the evaluations done to each in-patient, their clinical state in the beginning, their evolution in the shift hours and after systematized interventions, as well as the planning of the actions to do based in a scientific work methodology. (Teixeira, 2007)

### 1.4 Information quality

Nowadays, the information is diversified, being necessary some care to select the one that is considered the most pertinent. Being nursing an activity which is essentially based in the human interaction, it is characterized by a remarkable informative richness. The nurses give nursing care through the permanent communication between their patients, family and the rest of the health team, switching information frequently. The relevance or value that the information assumes leads to a particular meaning based in the cultural, social and formative perspective of each one. The concept of information relevance presupposes that not all the information produced, processed and managed in the dynamic of the care has the same importance, on the nurse's perspective, to continuity care effects. In this context, the continuity refers to the existence, availability and switch of relevant information about the concrete situation of each patient between nurses throughout the different shifts. (Teixeira, 2007)

The methodology used to do the information transmission, assumes an important role once the majority of the gaps in the care continuity is due to deficiency in the quality information. Due to the numerous responsibilities that the nurse assumes, it is important that the shift change report be done in a quick and efficient way. By being effective, describes the health state of each patient and allows to the nurses that are initiating the shift know which are the care indicated to each one of their patients. It should not consist solely in the reading of data pre-fulfilled but must also give significate data about the patient evolution. The information given in the shift change must be objective, updated and concise. (Teixeira, 2007)

The shift change must be organized according a logic sequence and always assuming a professional behaviour. In the following charts are exposed the steps to follow in the organization of the shift change and the type of information that is considered correct and less correct, to be used.

Chart 1 – Organization of the information to the shift change

| PLANNING | FOUNDATION |
|---|---|
| 1- Develop an organized way of transmit the information in order to ensure a description of the needs and concerns of the user. | Organizes the data based in the priorities and is individualized by the nurse that transmits the information. |
| 2- For each user include:<br>**Previous information:** include name, gender, age, main reason of the internment and a brief history. Include also known allergies, special instructions (for example, the one of non-resuscitation) and special needs as the ones related with some physical alterations (blindness, hearing impairment, amputation). | It may be necessary to deepen the previous history if the nurse that is going to begin the following shift is new on the service or inexperienced. |
| **Data of initial evaluation:** give objective observation and measures done by the nurse in the previous shift. Describe the state of the patient and highlight the recent alterations. Include the relevant information given by the patient, family or other members of the team, such as the results of analysis or diagnosis complementary exams. | During his shift, the nurse that starts will use that information as comparison basis. |
| **Nursing diagnosis:** Explicit clearly the nursing diagnosis adequate to the patient. | |

| | |
|---|---|
| Interventions and evaluation:<br>• Refer the medication or the care that were given during the shift and which results to expect (for example, therapeutic alterations, analysis results, medical visits).<br>• Describe the instruction given in the teaching plan and which learning ability shown by the patient. | Clarifies the current answers of the patient to the health problems.<br>The staff starts knowing the effects that the interventions have in the recovery and progress of the patient.<br><br>Ensures the continuity of teaching and minimizes the repetitions, at the same time that communicates what needs to the reinforced. |
| **Information to the family:** talk about the visitation and the family involvement, mainly in the influence that has to the patient. Explain if the relatives were involved in the execution or orientation of the care. | Informs the personal about the involvement level that the family assumed in the care to the patient. |
| **Discharge plan:** the evolution of the patient for the discharge is continuously re-evaluated in each shift change. Discuss the evolution of the patient's learning, the contact with other institutions and the preparation of the family for the discharge. This plan also identifies the roles and responsibilities of other members of the multidisciplinary team and the follow-up consultation.<br><br>**Current priorities:** explain clearly which are the priorities that the nurse that starts must attend:<br>• Inform about the immediate care planned for each patient recently admitted;<br>• Explain in which phase of the preparation for the exams or treatments the patient is;<br>• Describe the current physical situation of the patients submitted to exams or surgeries. | The team members collaborate in the application of the care plan that promotes the discharge. The discharge plan identifies the interventions and results necessary in order for the patient to have a smooth transition from the hospital or health institution to home. |

**Source:** Elkyn, M. Perry, A. Potter, P. (2005). Nursing Interventions and Clinical Procedures, 2nd edition, Lusociência.

The information to be transmitted in the shift change besides being well organized must also consider the relevance of the information content and the language character. It must be used technical language and have special attention in the choice of the terms in use in the common language.

Chart 2 – The right and wrong in a shift change

| RIGHT | WRONG |
|---|---|
| Give only essential information about the patient (name, gender, age, clinical diagnosis and medical history). | Don't repeat all the procedures of routine care or tasks (bath, schedule change). |
| Identify the nursing diagnosis of the patient or health problems and the related causes. | Don't repeat all the biographic information already available in written. |
| Describe the measures or observations about the patient condition and the answer to the health problem, emphasizing the recent alterations. | Don't use comments with judgments about the behaviour of the patient, with words as demanding, impatient, etc. |
| Share significant information about relatives if they are related with the problem. | Don't do assumptions about the relationship between the relatives. |

| | |
|---|---|
| Continuously review the discharge plan (for example, in terms of resources needs, the preparation level of the patient to go home).<br>Report to the nurses, significant alterations in the way that the therapies are given (for example, different position to relief the pain, new remedies). | Don't take the risk of being considered curious and indiscrete.<br><br>Don't describe the basic steps of a procedure. |
| Describe instructions given in the teaching plan and the answer of the patient. | Don't explain in detail the content of a teaching procedure unless the team members ask for clarification. |
| Evaluate the results related to the nursing care or medical treatment (example: effects of a massage or analgesic administration) | Don't describe results simply as "good" or "bad"; one has to specify and/or quantify. |
| Be clear about the priorities for the nurses of the following shifts. | Don't "oblige" the nurses of the next shift to guess the care priorities. |

Source: Potter, P. & Perry. A. (2006) Nursing Fundamentals, 6th edition, Mosby.

## 1.4 Shift change in the infirmary vs Work room: legal perspective

For years, the shift change was done in closed spaces (meeting rooms,) where the patient ignored what was happening. This practice was transferred to the infirmary or next to the patient bed. Currently, the shift change by the nurses next to the patient bed is a phenomenon more or less generalized. The main justification is that it allows a care more centred in the patient, allows a bigger change of information. However, many times the terminology used is ignored and are revealed, in a random way, clinical data that the patient doesn't know and that might evoke anxiety. The health professional transmits information that is selected but some of this hidden to the patient, whereby there must be a moment to complement the transmission of information, in favour of an assertive communication and that allows the care continuity.

Considering the patient perspective, with the shift change in the infirmaries, the patient becomes exposed: becomes public what belongs to him, what it is personal. The right of the person regarding his private life in what concerns information about his health may be compromised if there isn't a careful selection of the information to be transmitted next to the patient's bed.

All the health professional, when begins his activity, compromises with the deontological code. The nurses, in their deontological code, article 84th, assume the duty to inform the individual and the family in what concerns the nursing care. However, also assumes the duty of professional secrecy (article 85th) where is implicit that must "share pertinent information only with those that are implicated in the therapeutic plan, using as orientation criteria, the well-being, the physical, emotional and social safety of the individual and family as well as the his rights". If many times there are leaks under the informal ambit, the gravity increases when that leak occurs in a formal shift change.

Many of the information transmitted results from clinical data of the patient and of the own inherence of the job, that leads to important results for the care of that person. The patient, many times, doesn't know the language used which leads to frustration and humiliation feelings. In an occult way, it is put in question the 1st article of the Universal Declaration of Human Rights that says "all the human beings born free and equal in dignity and in rights. Gifted with reason and consciousness, must act ones for each other's in fraternity spirit".

Besides the objective of the shift change next to the patient intents a bigger participation of him, often occurs the contrary; the person about whom falls on the attention becomes stripped from his autonomy and privacy.

It can't also be forgotten the express will of a person that doesn't want to be informed. The person might not want to know; each one of us has the right of not wanting to be informed. The patient, in this type of communication, is a passive receiver of the information. The personal freedom is being called into question because the information should only be transmitted with the patient's consent, which in most cases doesn't happen.

The professionals that reflect about their practice understand that there is information that cannot or shouldn't be revealed next to the patient.

The opinions about the ideal type of shift change isn't consensual, however, there are no reports about the shift change next to the patient has improved the care given and are few the evidences that suggest that this allows an approach from the personal to the holistic care.

In conclusion, one may say that the key to maintain the quality of care passes through the adoption, from the nurse, of a responsible personal and ethical behaviour, respecting the patient's rights and interests legally protected. This behaviour cannot be forgotten during the shift change.

## 2. METHODS

In order to ease the information transmission, for an effective internal communication and a better structure of shift change, whether this is performed on the infirmary, whether in the work room, we thought about creating a written instrument, a sheet of shift change where we could put the items that the nurses most value in the information transmission. For such, we held a small study next to the nurses, on which was applied a Data Collection Questionnaire

Knowing that one of the first stages to accomplish, to respond to these questions, would be to better understand what the nurses think about the shift change, we developed an exploratory-descriptive study, aiming to describe the opinions of the Nurses regarding the shift changing. The intentional sample of this study was constituted by 50 Nurses. After the authorization given by the hierarchic responsible of the services selected, we proceeded to the application of a type questionnaire instrument in which we tried to understand the opinion of the Nurses about the content, the importance and the structure of the shift change. Previously was performed a pre-test with four Nurses (two from each service). The analysis of the questionnaires was done using the content analysis; the formulation of the averages was made as statistical indicator in order to better describe the opinions of the participating Nurses.

## 3. RESULTS

After gathering information, through the application of questionnaires elaborated for the effect, the analysis of the information obtained was done, which is exposed below.

Table 1 – Questions done and results obtained.

| QUESTION DONE | RESULTS OBTAINED |
|---|---|
| 1. Do you think it's important the shift change for the care planning? | It was found that 100% of the respondents considered the shift change important for the care planning. |
| 2. Place where the shift change should be done? | • 76% of the respondents considers the Nursing room as the ideal place for the performance of the shift change;<br>• 14% chose the Mixed method, that is, infirmary and Nursing room;<br>• 10% of the respondents give more importance to the infirmary. |
| 3. Is there a pertinent information transmission? | • 86% of the respondents consider the information transmission in the shift change as pertinent;<br>• 14% don't consider it pertinent. |
| 4. The time available for the shift change is enough? | • 68% of the respondents consider the time available for the shift change as being enough;<br>• 32% consider as not being enough (of these, 87% refer that the time available should be superior to the one stipulated, while 13% mentions that it should be inferior). |
| 5. Other relevant items for the elaboration of an orientating form for the shift change | • 88% considers the presence of the Diagnosis;<br>• 78% invasive manoeuvres;<br>• 76% altered vital signs;<br>• 72% perfusions;<br>• 60% dependency level;<br>• The less important refer the disease perception (46%) and the patient fears regarding the future disease implications (40%). |

## FORM FOR SHIFT CHANGE

After the results obtained interpretation through the questionnaire, the following form was done containing the information that the respondents consider important.

| C ___ AGE______<br>NAME:__________<br>________________ | | | | DIAG:<br>Lives with | Doctor: | |
|---|---|---|---|---|---|---|
| Appealed | | | | Respiration | Food | Elimination |
| | | | | $O_2$ | ORAL _____<br>NGT ___<br>____/____<br>By:<br>DIET: | Urinal ______WC _______<br>Disp.U.______<br>Diaper_____<br>UC __ _______ ___/___<br>By:<br>DEJ: |
| H | N | M | E | $OP_2$ $CDP_2$ | | |
| I | I | I | I | $OP_2$ $CDP_2$ | | |
| AP | AP | AP | AP | $OP_2$ $CDP_2$ | | |
| AT | AT | AT | AT | $OP_2$ $CDP_2$ | | |
| CE | SNG | AT | SV | $OP_2$ $CDP_2$ | | |
| Temperature | | | | BP/HR | Diagnosis Complementary Exams | |
| DRESSINGS | | | | | | |
| | | | | | ANALYSIS | |

Figure 1– Form for shift change.

## CONCLUSIONS

The human communication process results from the relationship of interdependency between the issuer and the receiver. This interdependency obliges the intervenient of the essential communicational skills development process for the effectuation of the process to understand and be understood.

The skills of clinical communication pass by the attributes of empathy, respect, pay attention, show interest, be flexible towards the knowing how to listen or even better hear. The effective hearing is an emphatic audition that requires not only ability of understand the words but also the feelings; the skills also pass through the ability of observation as well as by a correct reading of the body language. The non-verbal communication is more valued than the verbal communication whereby we should learn to understand the behaviours to better communicate.

In the organizations, the communication process endues some complexity, starting from the basic principle that it is impossible not to communicate, because any behaviour is communication and there is no such thing as ”non-behaviour”, the internal communication assumes a preponderant function in the organizational development. Couldn’t be seen as an informative system, the communication assumes before everybody, the functions of information, persuasion, motivation, education, socialization and

distraction, allowing to the organizations, involvement mechanisms, in order to create clear reference boards, in order for the collaborator to have an interpretative map of the organization according with what is intended.

In this sense, the shift change becomes fundamental, they are moments of verbal and/or written information transmission, respecting the ethical-deontological principles, using a technical language about the care given to the patient, resulting of the application of a scientific methodology and reflexion strategies.

Considering the shift change one of the most traditional and dominant forms of communication applied to the nursing practice, it would be expected that was given a bigger value proportional to his importance in the care quality. It is evident that the shift change cannot be only a mere words transmission, but one of the foundations of the constant improvement of the nursing care given.

It was also concluded that the aspects considered important and that should be part of a shift change form would be aspects like: diagnosis (88%), invasive manoeuvres (78%), altered vital signs (76%), perfusions (72%), dependency levels (60%), while the less important refer to the perception of the disease (46%) and to the patient fears regarding the future disease implications (40%).

By finishing this work about the internal communication – elaboration of an instrument to the shift change, there is no doubt about the perception that the communication world is a vector reality apparently simple, surrounded by an enormous complexity.

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# COMUNICAÇÃO CLÍNICA (HANDOVER) E SEGURANÇA DOS CUIDADOS DE ENFERMAGEM: REVISÃO DA LITERATURA

# CLINICAL COMMUNICATION (HANDOVER) AND SAFETY OF NURSING CARE: A LITERATURE REVIEW

# COMUNICACIÓN CLÍNICA (HANDOVER) Y SEGURIDAD DE LOS CUIDADOS DE ENFERMERÍA: REVISIÓN DE LA LITERATURA

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## RESUMO

Introdução: O *handover* enquanto processo de transferência de responsabilidades é considerado um momento crucial na prestação de cuidados de enfermagem de qualidade. Os problemas na comunicação são causas major de erros que ocorrem durante situações de *handover*.

Objetivos: Propomo-nos identificar a evidência da relação da comunicação clínica (*handover*) e segurança dos cuidados de enfermagem.

Métodos: Realizámos uma revisão integrativa da literatura usando as bases de dados Pubmed, Web of Science, Scopus e CINAHL. Foi efetuada uma pesquisa com os descritores: "Patient Handoff", "Segurança do Doente", "Comunicação Clinica", "Enfermagem". Mediante a pesquisa bibliográfica nas bases de dados emergiram 137 artigos. Foram selecionados 8 artigos que responderam ao objetivo deste estudo. Estabeleceram-se como critérios de inclusão, estudos publicados entre janeiro de 2010 e março de 2016, disponíveis em Português e Inglês.

Resultados: A análise dos artigos através de convergências críticas permitiu o seguinte agrupamento por temas: *handover* como processo de transferência de responsabilidade, barreiras à comunicação efetiva e estratégias promotoras de um *handover* de qualidade.

Conclusões: A qualidade da informação durante o *handover* permite que os enfermeiros organizem intervenções antecipando riscos. É fundamental identificar barreiras que interferem no processo de *handover* para implementação de estratégias que estruturem o processo de comunicação e promovam a segurança do utente.


**Palavras-chave:** comunicação clinica; *Handover*; segurança do doente; enfermagem.


## ABSTRACT

Introduction: The handover as a process of transference of responsibilities is considered a crucial moment in the provision of nursing quality care. Problems in communication are the major causes of errors that occur during situations of handover.

Objectives: We propose to identify the evidence of the relationship of clinical communication (handover) and safety of nursing care.

Methods: We accomplished an integrative literature review using Pubmed, Web of Science, Scopus, CINAHL data bases. A research across the terms: "Patient Handoff", "Patient Safety", "Clinical Communication", "Nursing" was realized. In studies for research strategy emerged 137 articles. We selected 8 articles that responded to the purpose of this study. As inclusion criteria, studies published between January 2010 and March 2016 were established, available in Portuguese and English.

Results: The analysis of the articles through critical identified convergences allowing the following grouping by themes: handoveras a process of the transference of responsibility, barriers to effective communication and strategies promoting a handover withquality.

Conclusions: The quality of information during the handover allows nurses to organize interventions anticipating risks. It is essential to identify barriers that interfere with the handover process, for being able to implement strategies that constitute an effective communication process and promote the safety of the patient.


**Keywords:** clinical communication; Patient Handoff; patient safety; nursing.


## RESUMEN

Introducción: Como proceso de transferencia de responsabilidades el "handover" se considera un momento crucial en la provisión de cuidados de enfermería de calidad. Los problemas de comunicación son las causas principales de errores que ocurren en situaciones del "handover".

Objetivos: Nos proponemos a identificar pruebas de la relación de la comunicación clínica (handover) y la seguridad de los cuidados de enfermería.

Métodos: Llevamos a cabo una revisión integrativa de la literatura utilizando las bases de datos Pubmed, Web of Science, Scopus y CINAHL. Se realizó una búsqueda con las palabras clave: "Patient Handoff", "Seguridad del Paciente", "Comunicación clínica", "Enfermería". Mediante la investigación bibliográfica en bases de datos surgieron 137 artículos. Se seleccionaron 8 artículos que responden al objetivo de este estudio. Se establecieron como criterios de inclusión, los estudios publicados entre enero de 2010 y marzo de 2016, disponibles en portugués e inglés.

Resultados: El análisis de los artículos a través de convergencia crítica y cualitativa de lectura identificada, permitiendo la siguiente agrupación por temas: handover como proceso de transferencia de responsabilidad, las barreras a la comunicación efectiva y es

trategias de promoción de un handover de calidad.

Conclusiones: La calidad de la información durante el handover permite a los enfermeros conocer a los pacientes, organizar intervenciones, anticipando los riesgos. Es esencial identificar las barreras que interfieren con el proceso de handover para la aplicación de estrategias que fomentan el proceso de comunicación efectiva y así se promuebe la seguridad del paciente.

**Palabras Clave:** comunicación clínica; Handover; seguridad del paciente; enfermería.

## INTRODUCTION

Currently, in healthcare, the large volume of scientific information points to the need for summaries, conclusions and guidelines based on a combination of results from multiple studies and can contribute to the consistency for the reasons for a clinical decision that is to evidence-based practice, and consequent improvement of practices (Pereira, Gaspar, Reis, Barradas & Nobre, 2012).

Every day, nurses are challenged with the taking of decisions that are directly related to the safety of the patient being in need of updated scientific evidence and it is in this sense that the systematic review of the literature identifies, evaluates and summarizes the findings of several empirical studies. The nurses are the professional group that establish an interaction with the patients, that boosts their safety in all aspects of care, including the reporting of risks and the possibility of these being reduced.

The International Council of Nurses (2012) also recognizes that although care has aimed to generate benefits for patients, the complex combination of processes, technologies and human factors in the provision of health care can lead to adverse events.

The Joint Commission on Accreditation of Healthcare Organizations, observed that 65% of the events are associated to miscommunication and reported that in the first months of 2013, miscommunications were the second cause of sentinel events (Fay Hillier, Regan & Gallagher, 2012). Communication between nursing professionals, has exposed numerous shortcomings over the years, concerning the difficulties of dialogue between the various health team professionals, the lack of written records related to patients that are incomplete, inaccurate, or even hidden. Failures in communication are the cause of a decreased quality in care, errors in the treatment and a potential harm to patients (Quirino, Collet & Neves, 2010).

The passing over of shifts designated in the literature by 'handover', are particularly vulnerable times for the occurrence of errors. Despite being an ancient practice in the nursing care process, there continue to be failures in the organization and structuring of information and its content (Azevedo & Sousa, 2012).

The purpose of this study is to identify the evidence of the relationship of clinical communication (handover) and safety of nursing care.

## 1. METHODS

We accomplished an integrative literature review defined as a method that aims to summarize results that are obtained in research in a topic, in a systematically, orderly and comprehensive way. It is called integrative because it provides further information on a problem, therefor constituting a body of knowledge. Thus, the researcher can develop an integrative review for different purposes and can be directed to the definition of concepts, review of theories and methodological analysis of the included studies of a particular topic.

For the construction of the integrative review it is necessary to go through six distinct stages, namely: identification of the research question; establishment of criteria for inclusion; definition of information to be extracted from selected studies; assessment of included studies; interpretation of results and presentation of the review (Mendes, Silveira & Galvão, 2008).

Following this approach, it was possible to identify the main studies to answer the purpose of this study: identify the evidence of the relationship of clinical communication (handover) and safety of nursing care. A research was executed across the terms: "Patient Handoff", "Patient Safety", "Clinical Communication", "Nursing", obtaining as a result the following MeSH terms shown in Table 1.

Table 1 - MeSH Terms

| Health Communication | Patient Safety | Patient Handoff | Nursing |
|---|---|---|---|
| MeSH Terms<br>"Health Communication"[Mesh] AND "Patient Safety"[Mesh] AND "Patient Handoff" [Mesh] AND "Nursing" [Mesh] | | | |

As inclusion criteria, studies, to answer the question of research published between January 2010 and March 2016, were established, available in Portuguese and English, from scientific databases. The scientific databases were PubMed, Web of Science, Scopus and CINAHL, identified as A1, A2, A3 and A4 respectively, as outlined in Table 2.

Table 2 - Studies that have been recognized since the introduction of descriptors

| CODE | DATA BASE | KEYWORDS | RESULTS |
|---|---|---|---|
| A1 | PubMed | "Patient Handoff"[Mesh] AND ("Patient Safety"[Mesh] AND "Nursing"[Mesh]) AND "Health Communication"[Mesh]) | 33 |
| A2 | Web of Science | (handoff) *AND* (patient safety) *AND* (nursing) *AND* (communication) | 76 |
| A3 | Scopus | ( title-abs-key ( handoff ) and title-abs-key ( patient safety ) and title-abs-key ( nursing ) and title-abs-key ( communication ) ) and doctype ( review ) and pubyear | 10 |
| A4 | CINAHL | handoff AND patient safety AND nursing AND communication year_cluster:("2011" OR "2012" OR "2013" OR "2014" OR "2015" | 18 |

In studies for research strategy emerged 137 articles. After reading the titles, 43 articles were selected. These articles were part of the criteria for analysis and after reading the summaries 32 articles were selected, for their content was of interest to this review. We obtained 15 articles that met the pre-established criteria, but we were only able to include 8 articles in the study, of which one we had access to the full text, presented in Table 3.

Table 3 - Results of studies in analysis

| REFERÊNCE | DOCUMENT TYPE | ABSTRACT |
|---|---|---|
| (Birmingham et al., 2015) United States | Research Paper | A qualitative study with 21 nurses of a public hospital in the United States, using grounded theory to explore the perspective of nurses on the handoff processes and identify situations that create risks to patient's safety. |
| (Streeter et al., 2015) United States | Research Paper | Quantitative study with 286 nurses who used the Nursing Handoff Communication Competence Scale, to evaluate the experiences and perceptions that constitute a competent handoff of nurses. |
| (Drach-Zahavy et al., 2014) Israel | Research Paper | Study of qualitative character with 18 nurses of a hospital in Central Israel, conducted during a 10-month period from 2011 to 2012, which enabled us to understand how the nurses were managing the time of handover and identifying working strategies they used to promote patient safety. |

| | | |
|---|---|---|
| (Sand-Jecklin & Sherman, 2014) United States | Research Paper | Quasi-experimental study in seven medical-surgical units in a university hospital in West Virginia, with a sample of 250 patients during the pre-implementation of an intervention program and 250 patients during the post implementation of the program, in order to quantify the results of a change of practice moments of handover. |
| (Gonçalves et al., 2016) Brasil | Research Paper | Quantitative, descriptive and exploratory study with 70 nurses 3 neonatal intensive care units, in order to identify the factors related to the patient safety with regard to communication in the Nurses shift change process. |
| (Street et al., 2011) Austrália | Research Paper | Quantitative study with 259 nurses of an Australian Public Hospital in the 3 shift changes during a day to identify the strengths and limitations in current handover practices and implement a new process of handover in order to improve the patient safety. |
| (Johnson & Cowin , 2012) Austrália | Research Paper | A qualitative study with 6 focus groups in 3 major hospitals in Sydney, with the objective of exploring the perspectives of nurses on the handover from patients and the use of written notes during the handover. |
| (Holly & Poletick, 2013) United States | Review article | Systematic review of study consists in 29 qualitative studies between 1988 and 2012, which describe the qualitative evidence on the dynamics of knowledge transfer during the handover process. |

## 2. RESULTS

The analysis of the articles through critical and qualitative reading identified convergences allowing the following grouping by themes: handover as a process of the transference of responsibility, barriers to effective communication and strategies promoting a handover with quality.

*Handover as a process of the transference of responsibility*

One of the crucial moments of communication between nurses happens during the handover, which is constituted as a process of care responsibility transfer and transmission of information on aspects related to the patient (Johnson & Cowin, 2013). This process calls for an interactive communication function as a triad: the patient, the nurse who finishes the shift and the nursing team that starts the new shift (Johnson & Cowin, 2012).

It is a process of interaction that puts a huge responsibility on the nurse as holder of information of decisions to be transmitted to continuity of care (Holly & Poletick, 2013). If we refer to Kerr (2002), it references the handover as having three main functions: to express communication, which includes information about aspects essential objectives care; covert information that integrates the psychological and social elements of care and cultural integration that aims the construction of the professional identity.

During the handover there are three types of exchanges of information: the information given by the nurse who ends the shift, the information requested by the nurse who starts the shift and verified information, which consist in a brief repetition of information (Streeter, Harrington, & Lane, 2015). The informations that were considered important to the nurses during the shift change were: the clinical condition of the patient and the complications during the shift, reported by 55% and 50% of nurses, respectively (Gonçalves, Rock, Anders, Kusahara & Tomazoni, 2016).

There are several methods for the handover, these include written, oral and face-to-face communication with the patient or the location away from the patient (Birmingham, Buffum, Blegen, & Lyndon, 2015). Most nurses of research of Gonçalves et al. (2016), state that the method that is most commonly used to pass the shift is the verbal type, but they find weaknesses in this type of method when used isolated due to the large amount of data that is transmitted, making it difficult to hold all the information. Street et al. (2011), mentions another study that nurses recognize that the most effective method of handover is the use of verbal and written communication to convey information.

Although the main purpose of the handover is to be provided accurate, complete and timely information, this process also gives nurses the opportunity to socialize, discuss feelings and concerns related to the organization of care to increase the cohesion and professionalism. This current discovery about the importance of socio-emotional handover process observed in the study Streeter et al. (2015), is in line with other studies that analyzed the relational value of the handover in nursing. According to Holly & Poletick (2013), nurses used the time during the change of shift to discuss the difficulties that caused discomfort due to their difficult resolution and considered this process as a facilitator of staff cohesion and orientation of new nurses to the

institutional culture and care procedures. The relational aspects linked to the handover, the complexity of the type of information to be transmitted, the adopted media and the characteristics of the various caregivers impacts the effectiveness and efficiency of this process and, consequently, safety and quality of care of the patient (Santos, Andrade, Guimarães & Gomes, 2010).

*Barriers to effective communication*

The passing of shifts is often described as informal, unstructured, with discrepancies between the information transmitted by the nurse that is leaving the shift and the actual conditions of the patients, resulting in errors (Streeter et al., 2015). A large group of nurses reported in a study that the way that the information was presented during the handover was not easy to be understood, and that there were inconsistencies between the written records and verbal information that was transmitted. The written data has more information than the one that is transmitted during the handover, however during this process we have to consider important situations as i.e. emotional state, family dynamics, which usually are not registered in the nursing process (Holly & Poletick, 2013). According to Welsh (2010), about 9% of the shared information is irrelevant and only about 6% of the information refers to the patients continuing care.

The main handover problems are related to the lack of structure, cohesion and clarity in oral information that is shared, inconsistent and / or insufficient, distractions, noises, illegible records, time constraints and the use of confusing language or jargon (Gonçalves et al., 2016). In the method of written handover, the use of descriptors poorly defined as “good”, “okay”, or abbreviations is common, and recent studies have shown that these inaccuracies can lead to problems of interpretation (Santos et al., 2010).

Many of the nurses reported that interruptions in the practice room and during the handover, prevented them from retaining full information and made it impossible to clarify the information, thus bringing risk to the continuity of care (Birmingham et al., 2015). According to a study of Street et al. (2011) the average time of handover per patient had an average time of 5.5 minutes in daytime shifts. A significant percentage of nurses said that the period of the handover was too long. This sometimes happens due to the delay of nurses when entering the shift, 34.8% of nurses mentioned this as a barrier to effective clinical communication, delays between colleagues (Gonçalves et al, 2016).

Another situation that is considered as a barrier is the place where the handover is held. Nurses consider that the handover of the patient, does not allow the necessary silence to interpret the information received, because it is not a private place for there are other patients in the infirmary and the standing position in the room is not a comfortable position to be able to make written notes (Johnson & Cowin, 2012; Sand-Jecklin & Sherman, 2014; Birmingham et al, 2015.).

Most nurses in the analyzed studies identify the importance of involving the patient in the handover, because he is the only one who has information about himself. However, they consider the patient in this type of process as an interference, as it prolongs the time of passing the shift, because they want to share much information with the nurses and the fact that the nurses may use technical language to limit evidence of patients and leave them confused (Drach-Zahavy et al., 2014). However, from the observation of Nurses in Birmingham et al research. (2015), during the handover in several shifts, it was notorious, that there were tiny existing interruptions when this process is carried out with the patient, in opposition to the interruptions that existed when this process took place in the nursing room. The perception of an effective handover is different depending on the experience of the nurses, and some report that, when they do not trust colleagues, when they begin the shift they re-evaluate information immediately (Drach-Zahavy et al., 2014).

*Strategies promoting a handover with quality*

The nursing teams become more cohesive as a result of exposure to the same rules and procedures that lead to shared meaning for the development of a group identity (Holly & Poletick, 2013). Thus it is important to standardize the information content of the clinical communication times using specific tools in order to anticipate the risks of the patient, recognize and detect unexpected changes.

The standardization, repeatability and routines, the use of checklists and mnemonic allow better moments of handover (Drach-Zahavy et al., 2014). One of these mnemonic is the SBAR communication technique (Situation, Background, Avaliation, Recommendation). This technique provides a standardized framework with a logical sequence of issues to be addressed, it structures the information to be transmitted to not have to remember everything only by memory and facilitates the establishment of dialogue. It allows to set expectations for what will be communicated and how it will be communicated, which is essential for the development of teamwork (Holly & Poletick, 2013; Birmingham et al, 2015.). However, there seems to be no evidence to suggest that SBAR is more effective than any other handover tool (Streeter et al., 2015).

The notes written by nurses were considered as a structured approach to help retain large amounts of information (Birmingham et al., 2015). A multimodal approach, combining verbal and written elements (shift change sheets or information sheets summaries),

was also reported by other nurses' groups as a tool to maximize the effectiveness of the transmission of information (Johnson & Cowin, 2012; Streeter et al, 2015).

Another strategy that studies analyzed is how the shift change affect the patients. Some nurses prefer to perform the handover from patients directly, referring thus improving their confidence in them (Birmingham et al., 2015). This can be beneficial, because the nurse joins verbal information within the view of the patient, thus improving the memory of the information transmitted (Drach-Zahavy et al., 2014). The issues related to information gaps are minimized when the handover is performed with the patient, because the family will be present at this time (Gonçalves et al., 2016). In the study by Street et al. (2011), changes were mentioned in the handover process after an intervention project that aimed to make the change of shifts with patients. Nurses found a marked and steady improvement in time and of clinical communication process after using this method.

To provide clinical communication quality, the nurses mentioned how important continuity of care with the same patients in multiple shifts is, positive working relationships, open dialogue among professionals, human resources that are adequate to the ratio of patients and continuous training (Birmingham et al., 2015). In the study of Sand-Jecklin & Sherman (2014) professionals bet on training using educational videos that included guidelines and examples of the changes of shifts of nurses with the patients. The perceptions of these nurses together with the views of the patients, allowed to verify that there was greater patient satisfaction by the fact that he could participate in the care and know at the beginning of the new shift who his reference nurse is, better nurse-patient relationship and better results in terms of reduction in communication-related errors.

## CONCLUSIONS

Communication is the key in promoting continuity of nursing care and it is the basis of care and requires a high performance by the nurses. In order for nursing care to have a safe development and to be valued it is essential to value the wealth of information and documentation options in practice contexts. The quality of the information transmitted during the handover depends on the competence of the professionals, team cohesion, the chosen mode and on your time. According to the reviewed studies, an effective handover allows the promotion of patient safety and continuity of care, improves communication and teamwork and thus improves work performance.

Studies have shown that there are limitations that may compromise the safety and continuity of care: missing or incomplete information, frequent interruptions, lack of involvement of the patient, delays and early departures, noise and time limits.

The results of this research alert us to the need to: create communication tools to standardize the information to be transmitted producing a structured handover, providing a continuous update on the topic in health institutions encouraging multidisciplinary work and allow schools and universities to provide a theoretical and practical support on the issue of patient safety and communication skills. In this way we can make safer health care both for patients and for professionals.

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# DESAFIOS À INVESTIGAÇÃO EM CUIDADOS PALIATIVOS: CONTRIBUTO DO MESTRADO EM CUIDADOS PALIATIVOS DA FACULDADE DE MEDICINA DA UNIVERSIDADE DE LISBOA

# CHALLENGES OF CONDUCTING RESEARCH IN PALLIATIVE CARE: CONTRIBUTION OF THE MASTER'S DEGREE IN PALLIATIVE CARE BY THE FACULTY OF MEDICINE, UNIVERSITY OF LISBON

# DESAFÍOS A LA INVESTIGACIÓN EN CUIDADOS PALIATIVOS: APORTACIÓN DEL MÁSTER EN CUIDADOS PALIATIVOS DE LA FACULTAD DE MEDICINA DE LA UNIVERSIDADE DE LISBOA

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## RESUMO

Introdução: Os cuidados paliativos centram-se no controlo de perturbações funcionais e sintomatologia complexa e assumem-se como um elemento essencial dos cuidados de saúde.

Objectivos e métodos: O objetivo deste estudo é o de analisar a totalidade das 108 dissertações do mestrado em cuidados paliativos discutidas e aprovadas na Faculdade de Medicina da Universidade de Lisboa entre 2004 e 2016 quanto às caraterísticas temáticas, logísticas, metodológicas, tipo e número de participantes e investigadores ao longo de dois períodos sequenciais. Não se observaram diferenças significativas em todas as variáveis analisadas comparando esses dois períodos.

Resultados: Verificou-se, na autoria das dissertações, um predomínio do grupo de enfermeiros em relação a outros grupos profissionais e a colaboração de cerca de 8.000 participantes, na sua maioria doentes com patologias diversas de acentuado predomínio oncológico e que foram avaliados em contexto predominantemente hospitalar por todo o País.

Nas principais temáticas abordadas distinguem-se por grau decrescente de representação a avaliação das necessidades gerais em cuidados paliativos, a qualidade de vida e a satisfação de cuidadores informais e atitudes, vivências, conhecimentos e competências sobretudo dos profissionais de saúde. Surgem também como temáticas relevantes a avaliação sintomática geral e específica de doentes, estudos de intervenção em cuidados paliativos e de problemas existenciais, espirituais e éticos, mas também de comunicação e de luto, cobrindo todo o espectro das áreas essenciais da prática dos cuidados paliativos.

As metodologias quantitativas foram as mais representadas, com uma forte componente de estudos retrospetivos, utilizando escalas, e das qualitativas, a mais utilizada foi a análise de conteúdo, a partir de entrevistas semiestruturadas.

Conclusões: Da análise das limitações encontradas propõem-se quatro linhas estratégicas para o desenvolvimento da investigação em cuidados paliativos em Portugal.

**Palavras-chave:** cuidados paliativos; investigação; metodologia; mestrado.

## ABSTRACT

Introduction: Palliative care focus on the control of functional disorders and complex symptomatology and are assumed as an essential element of health care.

Objectives and methods: The aim of this study is to provide an analysis of all the 108 dissertations of the master's degree in palliative care which were discussed and approved at the Faculty of Medicine of the University of Lisbon, between the years of 2004 and 2016, according to their thematic characteristics, logistics, methodology, type and number of participants and researchers over the two sequential periods. There were no significant differences in all the analyzed variables when comparing these two periods.

Results: It was verified, in the authorship of dissertations, a predominance of the nurses group when compared to other professional groups and the collaboration of nearly 8,000 participants, mostly patients with several diseases of severe oncological prevalence and that were evaluated in the hospital context all over the country.

The main addressed themes are distinguished by a decreasing representation degree of the assessment of the general needs in palliative care, the quality of life and satisfaction of informal caregivers as well as their attitudes, experiences, knowledge and skills, especially those of the healthcare professionals. It also appears as a relevant thematic the general and specific symptomatic assessment of patients, the intervention studies in palliative care along with existential, spiritual and ethical problems, communication and grief, covering, this way, an entire spectrum of key areas that are essential to the practice of palliative care.

Quantitative methods were the most used ones, with a strong component on the retrospective studies, using scales. According to the qualitative methods used, there is a focus on the content analysis, from semi-structured interviews.

Conclusions: Analysing the limitations that were found, this study suggests four strategic lines for the development of research in palliative care in Portugal.

**Keywords:** palliative care; research; methodology; master's degree.

## RESUMEN

Introducción: Los cuidados paliativos se centra en lo controlo de los trastornos funcionales y la sintomatología compleja y se asume como un elemento esencial de la atención de la salud.

Objetivos e métodos: El objetivo de este estudio es analizar la totalidad de las 108 disertaciones del máster en cuidados paliativos discutidas y aprobadas en la Facultad de Medicina de la Universidad de Lisboa entre 2004 y 2006 relativamente a las características temáticas, logísticas, metodológicas, tipo y número de participantes e investigadores a lo largo de dos periodos secuenciales. No se

han observado diferencias significativas en todas las variables analizadas comparando esos dos periodos.

Resultados: Se ha verificado, en la autoría de las disertaciones, una preponderancia del grupo de enfermeros respecto a otros grupos profesionales y la colaboración de cerca de 8.000 participantes, la mayoría de los cuales enfermos con patologías diversas de acentuado predominio oncológico y que han sido evaluados en contexto predominantemente hospitalario por todo el país.

En las principales temáticas abordadas se distinguen en grado decreciente de representación la evaluación de las necessidades generales en cuidados paliativos, la calidad de vida y la satisfacción de cuidadores informales y actitudes, vivencias, conocimientos y competencias sobre todo de los profesionales de salud. Surgen también como temáticas relevantes la evaluación sintomática general y específica de enfermos, estudios de intervención en cuidados paliativos y de problemas existenciales, espirituales y éticos, incluso de comunicación y de luto, cubriendo todo el espectro de las áreas esenciales de la práctica de los cuidados paliativos.

Las metodologías cuantitativas han sido las más representadas, con una fuerte componente de estudios retrospectivos utilizado escalas, y de las cualitativas la más utilizada ha sido el análisis de contenido, a partir de entrevistas semiestructuradas.

Conclusiones: Del análisis de las limitaciones encontradas se proponen cuatro líneas estratégicas para el desarrollo de la investigación en cuidados paliativos en Portugal.

**Palabras clave:** cuidados paliativos; investigación; metodologia; master.

## INTRODUCTION

According to the complex, multidimensional and dynamic nature of progressive and incurable diseases, palliative care have been developing an intervention model that integrates the physical, psychosocial and spiritual factors responsible for the disturbs caused in the patient's quality o f life from the moment of diagnosis until his death, with the single aim to promote a better quality of life for the patient and his family.

Palliative care focuses on the control of functional disorders and complex symptomatology. So its recognition, as an essential element in the health care process and as a specialized area, holds increasingly with the promotion of its scientific basis. It is important to clarify healthcare professionals about the findings of empirical research connecting basic research and clinical practice, over an integrated and translational approach for the best results.

Therefore it is important to find a capacity in clinical research, which is a defective area in Portugal, in order to develop evidence for clinical practice, based on careful studies, whether in the field of pharmacological intervention either in the non-pharmacological area, which can provide diversified answers and formulate effective and validated strategies for the clinical management of symptoms and that can reduce the great amount of work in all the systems which are involved, specifically those that support the basic needs of the families responsible for these patients in the path of their chronic progressive and incurable diseases.

It is important, in this context, to have specific psychometric and suitable instruments for the patients and the stadium of their disease, which can be relevant and correct in the assessment of their quality of life, and other results' patterns that can allow the monitoring of symptoms and people's concerns as well as the evaluation of the differential effects of specific interventions.

On the other hand, it is essential to assess the needs in palliative care at several systemic levels, set certain quality parameters that can support the planning and the organization of services at different levels and that can contribute to the creation of health policies in palliative care topic. In addition to quantitative methods, qualitative ones have been gaining increasing acceptance in many areas of health research in the most informed and attentive academies. For their accuracy and specific methodology these methods provide unique elements in the field of subjective experience with the purpose of understanding certain issues, including the identification, explanation and appreciation of underlying social processes, their connection to their social contexts and the development of high-level analytical categories. They seek to go beyond the surface of subjects, beyond the visible aspects of reality, to deepen the knowledge of experiences and the meanings of patients.

These results, along with the "objective" results, may desirably have an impact on the development of certain policies and practices in the palliative care field but they also have a theoretical value once they open the possibility of new ways of understanding and thinking about a certain theme and a way to challenge the traditional ways of thinking and research for a particular phenomenon.

It is in this context that the Master's degree in palliative care at the Faculty of Medicine, University of Lisbon (pioneer in Portugal in 2002 after holding some multidisciplinary post-graduation courses in our department on the same subject), had a concern, since its early beginning, and it was to make a contribution to the research in this area setting priorities in the themes and aiming to follow the embryonic movement in the delivery of services and teams in the country.

This paper attempts to account for this path as well as its results providing, at the same time, an easy opportunity to connect with a collection of 108 master's theses in palliative care. This study is the result of 15 years of hard working and it launches some

challenges for the future research and courses.

## 1. METHODS

It is a descriptive and analytical study about the thematic, logistics, methodological and professional characteristics of the total master's theses discussed and approved at the Faculty of Medicine from June 2004 to June 2016: a total of 108 theses which comprise and compare two periods. They were used statistical, descriptive and analytical techniques.

## 2. RESULTS

The studies were divided into the same number (54) for the two periods into consideration (2004-2010 and 2011-2016) and there were no statistically significant differences in all the used variables (participants, location, subject and research method, job of the researcher) for the assessment of these two periods.

The studies involved 7.963 participants (Table 1) mainly patients (67.0%) corresponding to 56 studies, followed by nurses (22.2%), family caregivers (12.6%) and doctors (10.5 %), the last ones with a smaller number of studies.

Table 1 - Type of participants in the researches and number of theses according the type of participant*

| | **Number of studies** | **Number of participants** |
|---|---|---|
| Patients | 56 | 5333 |
| Nurses | 27 | 1769 |
| Family Caregivers | 18 | 1005 |
| Doctors | 14 | 816 |
| Psychologists | 2 | 15 |
| Social Service members | 1 | 14 |
| Others | 3 | 9 |

*In near about fourteen studies, there was more than one type of participants

The places where the studies (Figure 1) were carried out mainly in the hospital context (62.8%) followed by the patient's home (14.2%) and the palliative care unit (12.4%).

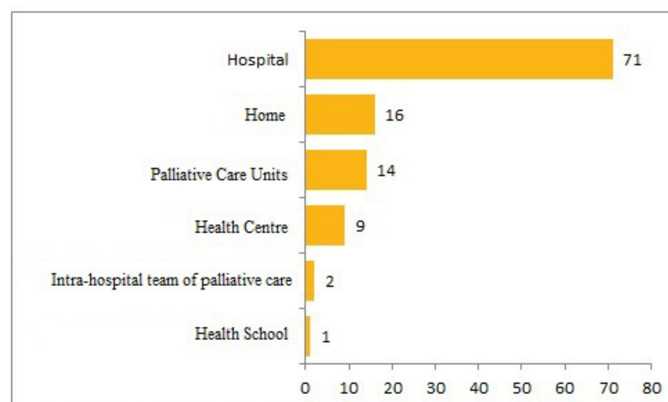


Figure 1 - Context of the production of the dissertations.

As for the research's methodologies (Figure 2), it was preferred the quantitative method's use (61.6%) and, according to its total, a large representation of retrospective studies (63.7%) with a predominant use of scales (Figure 3) and only three studies prospective were carried out.

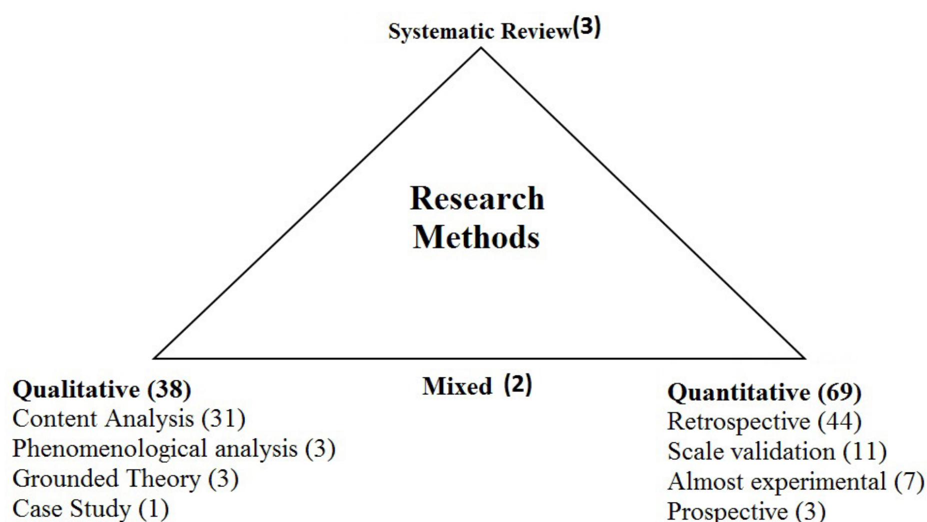


Figure 2 - Research methods used in dissertations.

It should be noted, in this context, a relevant number of scales' validation (Table 2) to the Portuguese context (n = 11), seven intervention studies (almost-experimental type) and the reference to two systematic bibliography reviews, which were particularly relevant on the quality of the research in palliative care.

Table 2 - Validated scales for the Portuguese population through the master's degree theses in the palliative care topic.

| Scale | Author of the validation |
|---|---|
| EORTC IN-PATSAT32 (satisfaction level of the patients) | Georgiana Marques da Gama |
| DOLOPLUS 2 (pain) | Hirondina Guarda |
| Herth Hope Index (assessment of caregiving hope) | Andreia Viana |
| PG-13: (assessment of prolonged grief) | Mayra Delalibera |
| EORTC QLQ-INFO26 (information to the oncologic patient) | Amélia Matos |
| Liverpool Care Pathway | Flávia Sousa |
| FAMCARE (satisfaction of the patient's family in palliative care process) | Antónia Almeida |
| NEST (Tracking of the needs in palliative care context in ventilated patients at home) | Paula Pamplona |
| NOSE-Numerical Opioid Side Effect (Numeric scale of the adverse effects of opioid substances) | Marina Fonseca |
| QOL-AD (Quality of life of the patients with dementia and their caregivers) | Helena Bárrios |
| EORTC QLQ BM22 (Quality of life in patients with bone metastases) | Ana Mendes |

Regarding the qualitative methodologies, it prevailed a content analysis (mostly with the Bardin's technique) in 81.7% of those analyzes, with the predominant use of semi-structured interviews.

Barbosa, A. (2016). Challenges of Conducting Research in Palliative Care: Contribution of The Master's Degree In Palliative Care by the Faculty Of Medicine, University Of Lisbon. *Millenium, 2*(1), 127-139.



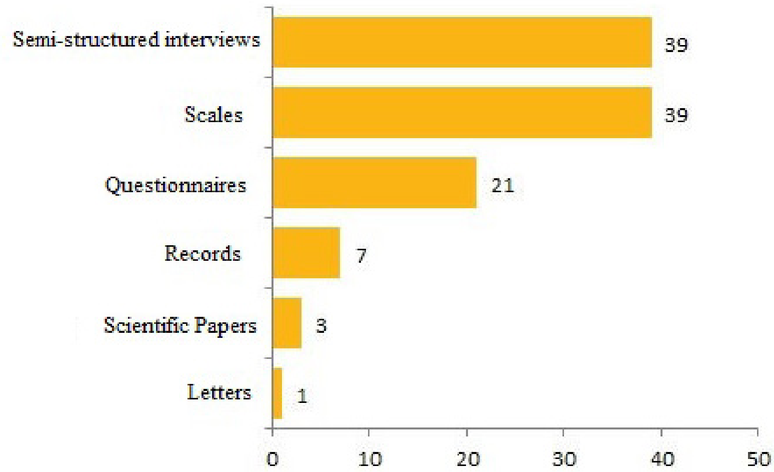


Figure 3 - Data collection instruments used in the dissertations.

According to the research's topics they were grouped into eight main themes (Table 3). The most investigated theme integrates the needs, in palliative care context (24.1%) - general (69.2%) and specific, of the caregivers but also the need of professional training (nurses and social workers).

Table 3 - Thematic groups of the theses

| | n | | n |
|---|---|---|---|
| Needs in palliative care | 26 | Symptomatic assessment | 14 |
| Needs | | Pain[15,17,22,55] | 4 |
| General[4,11,24,28,40,53,61,74,75,80-82,88,96,97,100,105,108] | 18 | General[7,36,84,106] | 4 |
| Needs of the family caregivers[1,10,23] | | Feeding care[42] | 1 |
| Needs of training | 3 | *Delirium*[76] | 1 |
| Nursing[16,41,71,73] | | Depression and e anxiety[103] | 1 |
| Social Services[93] | | Agony[29] | 1 |
| | 4 | Constipation[101] | 1 |
| | 1 | Prognostic[58] | 1 |
| Life's quality and satisfaction | 21 | Existential, spiritual and ethical | 10 |
| patients | 15 | problems[2,3,18,27,37,56,72,86,98,104] | |
| Oncology[31,38,45,51,59,91,102] | 7 | | |
| Neurology[19,49,79,83,90] | 5 | Intervention in palliative care | 8 |
| General[89] | 2 | Psychossocial[44,52,77] | |
| Pain[94] | 1 | Nursing[43,47] | 3 |
| Caregivers | 6 | Physiotherapy[57] | 2 |
| Family | | Occupational therapy [99] | 1 |
| Overload[14,33,66] | 3 | Medical[5] | 1 |
| Satisfaction[25,30] | 2 | | 1 |
| Professionals | | | |
| *Burnout* [60] | 1 | | |
| Attitudes, experiences, knowledge and skills | 17 | Communication[8,13,26,32,35,48] | 6 |
| Healthcare Professionals | | | |
| Nurses[20,21,34,54,65,67,69,70,78,87,107] | | Grief[12,39,50,64,85,95] | 6 |
| Doctors[6,9,62] | 11 | | |
| Psychologists[92] | 3 | | |
| Family[46,63] | 1 | | |
| | 2 | | |

The quality of life and satisfaction in palliative care 19.4%) were primarily evaluated in general patients but also in particular patient's groups (oncology and neurology) and in the family and informal caregivers groups as well as the overload and their satisfaction with the given care It has also been studied the burnout in healthcare professionals.

The third theme of this research refers to the attitudes, experiences, knowledge and skills of healthcare professionals (15.7%), mainly in the nurses (64.7%) but also in the family (only two studies).

The evaluation of symptoms (13.0%), another key area in the practice of palliative caregiving, received the interest of researchers not only in the field of general symptoms (28.6%) and pain (28.6%) but also on specific aspects such as agony, feeding care, delirium, constipation, depression and anxiety, and an impressive study on prognosis was also carried out.

Eight intervention studies in palliative care were also presented, predominantly those in pedagogical intervention in groups of informal caregivers and about specific interventions in certain professional groups (physiotherapy, occupational therapy, nursing).

The existential and spiritual problems are represented in nine studies in different populations (oncology, fibrocystic disease, AIDS) and also in healthcare professionals. It can be a pointed out as well a study on ethical decisions at the end of life.

The communication practices (intrafamily, intrateam, health professional/patient in different contexts: Transition of caregiving, satisfaction with communication...) are displayed in six different studies and the grief disorder, one of the key components in palliative care context, is studied both in the family context and in professional's one, also in its formative component.

In short, all the essential areas of palliative care practice are integrated in this set of dissertations that have been developed throughout the national territory (mainland and islands) in diverse caregiving settings and integrating all the typologies for the provision of palliative care, which involve all type of healthcare professionals and use assorted research methodologies. [109-110-111]

## 3. LIMITATIONS

Developing a qualified research in this area, there is a variety of difficulties which include the existence of a small number of hospital departments, palliative care units and community teams as well as a very limited number of beds in the academic centers, with an organizational culture that is not sensible to a palliative attitude. It can be denoted that even the health professionals, who were already motivated for this area, were more concerned with the care action than the research practice.

Further, there are a small number of specific instruments validated for the Portuguese population and the target population of palliative care, as well as some ethical and practical issues related to the research on end of life.

Many of these difficulties were overcome by the enthusiasm and the determination of the researchers and their mentors and also by the frankness and generosity of some institutions.

We can say that, in addition to the dissemination at national and international conferences[112], the publishing in books and the national and international scientific journals, the data, obtained from these studies, have already contributed to a better planning and organization of the services/teams and training courses activities. Almost all of them validated instruments that have been used in other investigations and some of these qualitative studies led to the creation of new data collection tools.

## CONCLUSIONS

It can be concluded that there was a sustained evolution of the development of master's theses in palliative care over the last years at the Faculty of Medicine, University of Lisbon, involving researchers, multidisciplinary groups of health professionals from all Portugal, especially nurses. 8,000 participants, for the most part patients, who gave their contribution to this study, and the participation of nurses who were the second most relevant participants. The studies were carried out markedly in a hospital, but also at home and in palliative care units, using diversified and mainly quantitative methodologies with a considerable number of validation tools. The main subjects studied were first related to the assessment of the overall needs in palliative care, quality and satisfaction with life as well as the healthcare professionals' attitudes, experiences and skills. It should be noted a significant representation of the intervention studies and a thematic scope integrating all the fundamental aspects of the practice in palliative care.

The critics - already formed with notorious international recognition -, the increasing usage of validated instruments in care practice, the quality of research implemented in palliative care in several fields - Medicine, Nursing, Psychology, Social Work, ... - and the increase of units and teams in Portugal bring out new challenges for research, which, from this point of view, will go through four strategic lines of research in the palliative care context:

Dissemination of research results in Palliative Care with marked increase in the number of national and international presentations in palliative care[112] and heterogeneous, but related, areas (internal medicine, oncology, cardiology, neurology, gastroenterology, pulmonology, nephrology, family medicine and other medical and surgical specialties) and increased publications in books and in palliative care reviews or similar. The Palliative Care Portuguese Association initiatives and the recent creation of the Portuguese Observatory of Palliative Care are important promotion factors, and it is indispensable the collaboration with the EAPC (European Association for Palliative Care) and other healthcare professionals, patients and family members associations, universities and other national and international institutions.

The creation of a minimum national database regarding the end of life caregiving with the regulation of methodologies and the creation of a significant and sustainable network of national research (collaborative and multi-centred),[113] and also integrating academic centres and university hospitals, highlighting the specificities of each centre, extending the process beyond the "pioneers", pilot projects in sustainable programs with great impact and creating synergies and integration with international projects, thus facilitating the access to the financial support.

The enlargement of research areas over the biological basis of complex symptoms clusters, projects focused on clinical practice with intervention studies (pharmacology, psychology, socio-pedagogy, nursing, ...), the understanding and response to transitions, the evaluation of patients' caregiving with the elaboration of clear indicators of services effectiveness and efficiency results, health economics analysis, mapping the different clinical trajectories of the main situations related to end of life process in Portugal, identifying resource needs in order to generate questions in controversial areas.

The presentation of "activator" research's results, expressing that the end of life caregiving is important and it needs to be included in the educational activities and clinical care, so to inform future health policies, to advise and create a proactive collaboration with the Ministry of Health in order to develop a clearly defined national strategy for end of life care.

The recent creation of the first National Commission for Palliative Care (to develop a strategic plan for this area) will surely give new direction and boost to this effort in research.

The publication of this work aims, on one hand, to widespread recognition for pioneering research in our country in the area of palliative care and the respective investigators and advisors (all doctorates) and, on the other hand, to justify the generous collaborative effort of thousands of patients, caregivers and healthcare professionals who agreed (with their time, experience and knowledge) to participate in these investigations that are, now, accessible to everyone, hoping to have effects and value for people and institutions.

What is known about this subject?

Scattered quotes on this research work in palliative care.

What is new about this study?

In the absence of any publication that brings together all this scientific production in a systematic way, this analysis of the theses developed in the Faculty of Medicine, University of Lisbon, during 15 years facilitates the access and relevant information crossing and draws attention to evolutionary lines, opening also an easier consultation possibility.

## CONFLICT OF INTEREST

The author declares that there is no conflict of interest

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(*) Exceptionally, considering the type of paper, the editorial board authorized the use of Vancouver system and a bibliographic list of 113 authors.

## EDUCAÇÃO E DESENVOLVIMENTO SOCIAL
## EDUCATION AND SOCIAL DEVELOPMENT
## EDUCACIÓN Y DESAROLLO SOCIAL

millenium


FUNDAMENTOS DO AGIR ÉTICO EM ESTUDANTES DO ENSINO SUPERIOR 143
FUNDAMENTS OF THE ETHICAL ACTING IN HIGHER EDUCATION STUDENTS 143
FUNDAMENTOS DE LA ACCIÓN ÉTICA EN LOS ESTUDIANTES DE EDUCACIÓN SUPERIOR 143

*Millenium, 2*(1), 143-155.

# FUNDAMENTOS DO AGIR ÉTICO EM ESTUDANTES DO ENSINO SUPERIOR

# FUNDAMENTS OF THE ETHICAL ACTING IN HIGHER EDUCATION STUDENTS

# FUNDAMENTOS DE LA ACCIÓN ÉTICA EN LOS ESTUDIANTES DE EDUCACIÓN SUPERIOR

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## RESUMO

Introdução: Urge que o ensino superior na área da saúde desenvolva nos estudantes um compromisso ético-moral pró-ativo e valores socioprofissionais promotores de uma cultura de proximidade que fomente sentimentos de cidadania ativa criadora de vínculos de pertença.

Objetivos: Avaliar os fundamentos éticos que suportam a moralidade das ações em estudantes do ensino superior.

Métodos: Estudo descritivo em corte transversal, realizado com 345 estudantes do IPV, 80% mulheres, com média de idades de 20,82 anos. Aplicou-se o "Questionário de Cidadania Ativa e Modo de Agir Ético" (CiAMAE) de Cunha (2015).

Resultados: 74.8% dos estudantes revelaram um modo de agir ético, positivo/adequado, (sendo 45.8% adequado e 29% muito adequado) e 25.2% um modo de agir ético inadequado. A moralidade das ações dos estudantes centrou-se no individualismo e assentou nos seguintes princípios éticos: 68.7% Subjetivismo Ético (69.1% ♂e 68.6%♀); 56.5% Relativismo (56.5%♂ e 56.7%♀); 53.9% Ética Deontológica (55.8%♂ e 47.0%♀); 11.3% Subjetivismo/ Egoísmo Ético, (7.4%♂ e 12.3%♀).

Conclusões: A maioria dos estudantes não usa a ponderação imparcial do bem. Maioritariamente manifestaram aceitar uma perspectiva ética subjetivista. Em oposição, aplicar o critério da imparcialidade ética implicaria considerar o bem supremo, em que todo e qualquer estudante esclarecido, escolheria para si e para os outros, esse bem supremo universal.

**Palavras-chave:** princípios éticos; moral; agir; ensino superior; estudantes.

## ABSTRACT

Introduction: It is urgent that higher education in health develop a proactive ethico-moral commitment in students which is translated into the creation of socio-professional values.

Objectives: To evaluate the ethical foundations which support morality in higher education students.

Methods: A descriptive, cross-sithectional study, performed in 345 ESSV/IPV students, 80% female, average age of 20.82 years old. The "Questionário de Cidadania Ativa e Modo de Agir Ético" (CiAMAE) by Cunha (2015) was applied.

Results: The results were 74.8% of the students showed a positive/adequate ethical method of acting; (with 45.8% adequate and 29% very adequate). In 25.2% the method of acting was ethically inadequate. The morality of the student's actions were focused mostly on individualism and were based on the following ethical principles: 68.7% ethical subjectivism (69.1%♂ and 68.6%♀); 56.5% Relativism ( 56.5%♂ and 56.7%♀); 53.9% Deontological Ethics (Kant) (55.8%♂ and 47.0%♀); 11.3% Subjectivism/Ethical Selfishness (7.4%♂ and 12.3%♀).

Conclusions: We may infer that the majority of the students do not have/ do not use an impartial consideration of good as criteria for morality of actions. They mostly manifested accepting an ethical subjectivist perspective, which means that good is not considered as a value for everyone. In contrast, applying the criteria of ethical impartiality would imply considering the greater good, and choosing/adopting the universal point of view in which any rational and enlightened student would choose for him/ herself and for others that universal greater good.

**Keywords:** ethical principles; morality; acting; higher education; students.

## RESUMEN

Introducción: Insta a la educación superior en salud a desarrollar en los estudiantes un compromiso ético-moral proactivo y valores socioprofesionales, promotores de una cultura de proximidad que fomenta sentimientos de ciudadanía activa, creativa de enlaces de pertenencia.

Objetivos: Evaluar los fundamentos éticos que apoyan la moralidad de las acciones en los estudiantes de educación superior.

Métodos: Estudio descriptivo transversal, realizado con 345 estudiantes del IPV, 80% mujeres, con una edad media de 20.82 años. Se ha aplicado el "Questionário de Cidadania Ativa e Modo de Agir Ético" (CiAMAE) de Cunha (2015).

Resultados: 74.8% de los estudiantes reveló un modo de actuación ético, positiva/adecuada (con el 45.8% adecuado y el 29% muy adecuado) y el 25.2% un modo de actuación éticamente inadecuado. La moralidad de las acciones de los estudiantes se centraron en el individualismo y en base a los siguientes principios éticos: 68.7% el Subjetivismo Ético (69.1% ♂ y 68.6%♀); el Relativismo 56.5% (56.5%♂ y 56.7%♀); 53.9% Ética Deontológica (55.8%♂ y ♀47.0%); 11.3% el Subjetivismo/el Egoísmo Ético (7.4%♂ y 12.3%♀).

Conclusiones: La mayoría de los estudiantes no utilizan el examen imparcial del bien. La mayoría de ellos expresaron aceptar una perspectiva ética subjetivista. Por el contrario, la aplicación del criterio de imparcialidad ética sería considerar el bien supremo en que cualquier estudiante inteligente elegiría para sí mismos y los demás, este supremo bien universal.

**Palabras Clave:** principios éticos; moralidad; actuación; educación superior; estudiantes.

## INTRODUCTION

Ethics, a word which comes from the ancient Greek word *ethos,* indicates the kind of person someone truly is, his/her character, his/her moral values and, above all, how he/she will behave, his/her human conduct. Ethics is also considered as a science that studies the values and the moral principles of a society and of its groups.

Through ethics, one can question what is good or bad to a certain kind of society and analyze the principles or values which will contribute to the common good. Ethics implies the existence of action and of the other, since it will manifest itself through one's responsible and conscious actions. This way, the action which Kant will consider as ethical will be the one that will show enough freedom , the one which will derive from practical reasoning and that can be considered as a universal law (Battestin, Bergamo & Gazzola, 2016, p.191;195;193).

Knowing the ethical course of action of higher education students is useful to diagnose their training needs as far as the proximity ethics principles are concerned. This knowledge will also be used to support the creation of different study plans which training methodologies and contents will help form critically-minded and active citizens who will think globally but who will act locally.

This way, the objective of this study was to evaluate the ethical principles that will support higher education students' course of action.

## 1. THEORETICAL FRAMEWORK

Acting in a way that doesn't endanger one's existence or someone else's existence is nowadays seen as a fundamental doctrinal and ethical imperative. However, assuming an ethical conduct implies a rational and critical reflection on the validity of the human conduct and will be evident, in people's every day actions, in the way the individuals and the community decide what is right and what is wrong and in the way they act to undo the existing inequalities and to promote common good (Cunha et al., 2015 March, p.7382). However, the Human Being isn't born ethical, he needs to develop this aspect as he grows up and that is why education is a powerful instrument in the construction of an ethical society, since it involves, not only the construction of knowledge, but also the construction and consolidation of a set of values which are essential to be grant people the capacity to live in society. To achieve this aim, education must incorporate ethical aspects, both in the conception of concepts and in the theoretical models upon which its practice is based (Rossato, 2015 as quoted in Battestin, Bergamo & Gazzola, 2016, p. 196).

Education institutions are places of excellence where the teaching- learning process that will accompany the individual over the years will occur (Vasconcelos, 2007; Fonseca, 2014), so academic training not only represents the transmission of knowledge but also encourages the use of that knowledge to better understand the reality while forming participative and proactive citizens (Araújo, 2008, p.89).

Therefore, education as a project focuses on the learning of an active, critical and responsible citizenship. To that extent, it is essential that "a commitment" to themselves and to society could be developed within the students in order to trigger an inner dialogue that would help them become aware of the existence of personal ethics which is characterized by a higher and better sense of autonomy and where free moral reasoning and questioning should be constant. It is then essential to favor the students' full and global training (Araújo, 2008, p.97). However, "science without a conscience is but the ruin of the soul" (Pires, 2007, p.25). That is to say that providing someone with the scientific and technical skills of a certain field is not enough, the goal we want to achieve is each and every student's integrated development, students who are viewed as informed, socially responsible and proactive citizens who want to get hold of a more critical and reflexive vision of the global world (Santos, Silva & Guedes, 2011, p. 2).

This way, the investigative work on ethical acting has been growing steadily and becoming more and more relevant within the academic field, as society expects education institutions to play a vital role in the training of future global citizens who will be able to understand the rules and standards required by the different ethnic societies and who will be capable of behaving in an inclusive and proactive way within different multicultural contexts (Stearns, 2009 as quoted in Cho & Chi, 2015, p.213).

## 2. METHODS

A descriptive and cross sectional study which purpose was to provide knowledge about the ethical principles upon which higher education students' courses of action are based and that was conceived to answer the following specific question: "Which ethical principles support higher education students' ethical acting?"

## 2.1 Sample

The sample was composed of 345 students who were attending the Polytechnic Institute of Viseu. 277 (80%) of those students were female and 68 were male. Their age ranged from 17 and 46 years old which gave us a 20.82 years old (±21 years old) average age. We used a non-probability convenience sampling method to select the participants.

## 2.2 Data collection instruments

The data collection instrument included the following measurement tools:

-Biographical and academic data questionnaire (it gathered information about gender and age, academic information regarding the students' course, the year they were attending, the specific training they got in Citizenship, Morality, Bioethics/Ethics, Law and Values, number of specific training hours, place where this specific training took place);

- Cunha's "Questionário de Cidadania Ativa e Modo de Agir Ético (Active Citizenship and Ethical Acting) (2015)" (CiAMAE). This questionnaire assesses the participants' ethical behavior. It is divided into 4 sections in which we want to identify the ethical criterion used by the respondent when facing a certain situation. Four ethical texts were presented, all of them intimately related to a given ethical dimension (Deontological Ethics; Ethical/Moral Subjectivism; Subjectivism/Relativism; Subjectivism; Objectivism; Relativism; Subjectivism/Ethical Selfishness; Utilitarianism). The respondent will have to select only one of the options he is given.

## 2.3 Procedures

The standards of conduct defined for scientific research were respected in order to safeguard the participants' rights and freedom, as well as their rights and ethical principles, through their informed consent. The study received a favorable opinion from the Ethics Committee at the Superior School of Health of Viseu and the data collection was previously authorized.

Statistical treatment was processed using the 21.0 version for Windows (2013) of the Statistical Package for the Social Sciences (SPSS). The statistical significance values adopted were $p< 0.05$.

## 3. RESULTS

Ethical Acting

Statistics regarding ethical acting scores reported a minimum of 7.00 and a maximum of 63.00, which gives us a 21.69 (± 8.863) mean value.

*Ethical Acting according to people's gender*

The students' morality of actions focused essentially on individualism and was based on the following ethical principles: 68.7% Ethical Subjectivism (69.1% ♂ and 68.6%♀); 56.5% Relativism (56.5% ♂ and 56.7%♀); 53.9% Deontological Ethics (Kant) (55.8% ♂ and 47.0%♀); 11.3% Subjectivism/ Ethical Selfishness (7.4% ♂ and 12.3%♀). We concluded that most of the students don't have/ don't use the impartial weighting of everyone's good as a criterion for the morality of their actions, since they mostly accept a subjectivist ethical perspective (68.7%), which means that good isn't seen as a value for all of them (Table 1)

Table 1 – Statistics regarding Ethical behavior according to their gender

| Gender | Male | | Female | | Total | | Residual | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Texts/actions** | **n 68** | **% 19.7** | **n 277** | **% 80.3** | **n 345** | **% 100.0** | **1** | **2** | **$X^2$** | **p** |
| Deontological Ethics (Kant) | | | | | | | | | | |
| 0.00 | 30 | 44.1 | 129 | 46.6 | 159 | 46.1 | -.4 | .4 | | |
| 8.00 | 23 | 33.8 | 95 | 34.3 | 118 | 34.2 | -.1 | .1 | 1.472 | 0.689 |
| 16.00 | 12 | 17.6 | 35 | 12.6 | 47 | 13.6 | 1.1 | -1.1 | | |
| 24.00 | 3 | 4.4 | 18 | 6.5 | 21 | 6.1 | -.6 | .6 | | |
| Ethical acting based on Deontological Ethics (Kant) | 38 | 55.8 | 148 | 47.0 | 186 | 53.9 | | | 0.039 | 0.843 |
| Ethical /moral Subjectivism | | | | | | | | | | |
| 0.00 | 21 | 30.9 | 87 | 31.4 | 108 | 31.3 | -.1 | .1 | 4.664 | 0.097 |
| 7.00 | 19 | 27.9 | 110 | 39.7 | 129 | 37.4 | -1.8 | 1.8 | | |
| 14.00 | 28 | 41.2 | 80 | 28.9 | 108 | 31.3 | 2.0 | -2.0 | | |
| Ethical acting based on Ethical/Moral Subjectivism. | 47 | 69.1 | 190 | 68.6 | 237 | 68.7 | | | 0.001 | 0.971 |
| Subjectivism/relativism | | | | | | | | | | |
| 0.00 | 37 | 54.4 | 145 | 52.3 | 182 | 52.8 | .3 | -.3 | 0.093 | 0.760 |
| 6.00 | 31 | 45.6 | 132 | 47.7 | 163 | 47.2 | -.3 | .3 | | |
| Ethical acting based on Subjectivism / relativism | 31 | 45.6 | 132 | 47.7 | 163 | 47.2 | | | 0.034 | 0.854 |
| Subjectivism | | | | | | | | | | |
| 0.00 | 57 | 83.8 | 229 | 82.7 | 286 | 82.9 | .2 | -.2 | 0.051 | 0.821 |
| 5.00 | 11 | 16.2 | 48 | 17.3 | 59 | 17.1 | -.2 | .2 | | |
| Ethical acting based on Subjectivism | 11 | 16.2 | 48 | 17.3 | 59 | 17.1 | | | 0.036 | 0.849 |
| Objetivism | | | | | | | | | | |
| 0.00 | 57 | 54.4 | 176 | 63.5 | 213 | 61.7 | -1.4 | 1.4 | | |
| 8.00 | 24 | 35.3 | 81 | 29.2 | 105 | 30.4 | 1.0 | -1.0 | n.a. | n.a. |
| 4.00 | 6 | 8.8 | 16 | 6.9 | 25 | 7.2 | .6 | -.6 | | |
| 1200 | 1 | 1.5 | 1 | 0.4 | 2 | 0.6 | 1.1 | -1.1 | | |
| Ethical acting based on Objectivism | 31 | 45.6 | 98 | 36.5 | 132 | 38.2 | | | 1.061 | 0.303 |
| Relativism | | | | | | | | | | |
| 0.00 | 30 | 44.1 | 120 | 43.3 | 150 | 43.5 | .1 | -.1 | 0.014 | 0.906 |
| 3.00 | 38 | 55.9 | 157 | 56.7 | 195 | 56.5 | -.1 | .1 | | |
| Ethical acting based on Relativism | 38 | 55.9 | 157 | 56.7 | 195 | 56.5 | | | 0.004 | 0.950 |
| Subjectivism/Ethical selfishness | | | | | | | | | | |
| 0.00 | 63 | 92.6 | 243 | 87.7 | 306 | 88.7 | 1.1 | -1.1 | 1.319 | 0.251 |
| 2.00 | 5 | 7.4 | 34 | 12.3 | 39 | 11.3 | -1.1 | 1.1 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ethical acting based on Subjectivism / Ethical selfishness | 5 | 7.4 | 34 | 12.3 | 39 | 11.3 | | | 1.080 | 0.299 |
| Utilitarianism | | | | | | | | | | |
| 0.00 | 25 | 36.8 | 115 | 41.5 | 140 | 40.6 | -.7 | .7 | | |
| 1.00 | 26 | 38.2 | 102 | 36.8 | 128 | 37.1 | .2 | -.2 | 0.811 | 0.847 |
| 2.00 | 15 | 22.1 | 55 | 19.9 | 70 | 20.3 | .4 | -.4 | | |
| 3.00 | 2 | 2.9 | 5 | 1.8 | 7 | 2.0 | .6 | -.6 | | |
| Ethical acting based on Utilitarianism | 43 | 63.2 | 162 | 58.5 | 199 | 59.4 | | | 0.128 | 0.721 |

Ethical Acting according to people's age

Younger students (≤19 years old) show a higher ethical acting supported by Kant's Deontological Ethics (59.1%). As far as Ethical/moral Subjectivism is concerned, the highest percentage was obtained by the group of the youngest students and by those who were between 20 and 21 years old (70.1%, respectively). When it comes to Subjectivism/ relativism, the highest percentage was obtained by older students (>= 22 years old) with a 52.9% score, followed by the 20-21 year old students (49.1%). We also found out that older students show a higher ethical acting based on Subjectivism (18.3%). The participants who were 20-21 years old obtained a higher score in Relativism (63.2%). As for Subjectivism/ Ethical Selfishness, the highest percentage was obtained by the younger students (64.5%) (Table 2).

Table 2 - Statistics regarding Ethical behavior according to people's age

| **Age** | **≤ 19** | | **20-21** | | **≥ 22** | | **Total** | | **Residual** | | | **x²** | **p** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Texts/actions** | **n 127** | **% 36.80** | **n 114** | **% 33.0** | **n 104** | **% 30.1** | **n 345** | **% 100.0** | **1** | **2** | **3** | | |
| Deontological Ethics (Kant) | | | | | | | | | | | | | |
| 0.00 | 52 | 40.9 | 61 | 53.5 | 46 | 44.2 | 159 | 46.1 | -1.5 | 1.9 | -.5 | | |
| 8.00 | 43 | 33.9 | 38 | 33.3 | 37 | 35.6 | 118 | 34.2 | -.1 | -.2 | .4 | 7.541 | 0.274 |
| 16.00 | 21 | 16.5 | 12 | 10.5 | 14 | 13.5 | 47 | 13.6 | 1.2 | -1.2 | -.1 | | |
| 24.00 | 11 | 8.7 | 3 | 2.6 | 7 | 6.7 | 21 | 6.1 | 1.5 | -1.9 | .3 | | |
| Ethical acting based on Deontological Ethics (Kant) | 75 | 59.1 | 53 | 46.4 | 58 | 55.8 | 186 | 53.9 | | | | 1.173 | 0.279 |
| Ethical/moral Subjectivism | | | | | | | | | | | | | |
| 0.00 | 38 | 29.9 | 34 | 29.8 | 36 | 34.6 | 108 | 31.3 | -.4 | -.4 | .9 | | |
| 7.00 | 49 | 38.6 | 38 | 33.3 | 42 | 40.4 | 129 | 37.4 | .3 | -1.1 | .8 | 3.760 | 0.439 |
| 14.00 | 40 | 31.5 | 42 | 36.8 | 26 | 25.0 | 108 | 31.3 | .1 | 1.6 | -1.7 | | |
| Ethical acting based on Ethical / moral Subjectivism | 89 | 70.1 | 80 | 70.1 | 68 | 65.4 | 237 | 68.7 | | | | 0.000 | 0.995 |
| Subjectivism/relativism | | | | | | | | | | | | | |
| 0.00 | 75 | 59.1 | 58 | 50.9 | 49 | 47.1 | 182 | 52.8 | 1.8 | -.5 | -1.4 | 3.511 | 0.173 |
| 6.00 | 52 | 40.9 | 56 | 49.1 | 55 | 52.9 | 163 | 47.2 | -1.8 | .5 | 1.4 | | |
| Ethical acting based on Subjectivism / relativism | 52 | 40.9 | 56 | 49.1 | 55 | 52.9 | 163 | 47.2 | | | | 0.618 | 0.432 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Subjectivism | | | | | | | | | | | | | |
| 0.00 | 104 | 81.9 | 97 | 85.1 | 85 | 81.7 | 286 | 82.9 | -.4 | .8 | -.4 | 0.577 | 0.750 |
| 5.00 | 23 | 18.1 | 17 | 14.9 | 19 | 18.3 | 59 | 17.1 | .4 | -.8 | .4 | | |
| Ethical acting based on Subjectivism | 23 | 18.1 | 17 | 14.9 | 19 | 18.3 | 59 | 17.1 | | | | 0.318 | 0.573 |
| Objectivism | | | | | | | | | | | | | |
| 0.00 | 84 | 66.1 | 71 | 62.3 | 58 | 55.8 | 213 | 61.7 | 1.3 | .1 | -1.5 | | |
| 8.00 | 37 | 29.1 | 35 | 30.7 | 33 | 31.7 | 105 | 30.4 | -.4 | .1 | .3 | n.a. | n.a. |
| 4.00 | 5 | 3.9 | 8 | 7.0 | 12 | 11.5 | 25 | 7.2 | -1.8 | -.1 | 2.0 | | |
| 1200 | 1 | 0.8 | - | - | 1 | 1.0 | 2 | 0.6 | .4 | -1.0 | .6 | | |
| Ethical acting based on Objectivism | 43 | 40 | 43 | 37.7 | 46 | 44.2 | 132 | 38.2 | | | | 0.185 | 0.667 |
| Relativism | | | | | | | | | | | | | |
| 0.00 | 58 | 45.7 | 42 | 36.8 | 50 | 48.1 | 150 | 43.5 | .6 | -1.7 | 1.1 | 3.186 | 0.203 |
| 3.00 | 69 | 54.3 | 72 | 63.2 | 54 | 51.9 | 195 | 56.5 | -.6 | 1.7 | -1.1 | | |
| Ethical acting based on Relativism | 69 | 54.3 | 72 | 63.2 | 54 | 51.9 | 195 | 56.5 | | | | 0.504 | 0.478 |
| Subjectivism/ Ethical selfishness | | | | | | | | | | | | | |
| 0.00 | 109 | 85.8 | 101 | 88.6 | 96 | 92.3 | 306 | 88.7 | -1.3 | .0 | 1.4 | 2.397 | 0.302 |
| 2.00 | 18 | 14.2 | 13 | 11.4 | 8 | 7.7 | 39 | 11.3 | 1.3 | .0 | -1.4 | | |
| Ethical acting based on Subjectivism / Ethical selfishness | 18 | 14.2 | 13 | 11.4 | 8 | 7.7 | 39 | 11.3 | | | | 0.318 | 0.573 |
| Utilitarianism | | | | | | | | | | | | | |
| 0.00 | 45 | 35.4 | 44 | 38.6 | 51 | 49.0 | 140 | 40.6 | -1.5 | -.5 | 2.1 | | |
| 1.00 | 47 | 37.0 | 47 | 41.2 | 34 | 32.7 | 128 | 37.1 | .0 | 1.1 | -1.1 | n.a. | n.a. |
| 2.00 | 30 | 23.6 | 21 | 18.4 | 19 | 18.3 | 70 | 20.3 | 1.2 | -.6 | -.6 | | |
| 3.00 | 5 | 3.9 | 2 | 1.8 | - | - | 7 | 2.0 | 1.9 | -.3 | -1.8 | | |
| Ethical acting based on Utilitarianism | 82 | 64.5 | 70 | 61.4 | 53 | 51.0 | 205 | 25.4 | | | | 0.059 | 0.809 |

*Levels of Ethical Acting according to people's training*

67% of the participants in our study reported that they had already received training in Citizenship (84.8%), Morality (59.3%), Bioethics/Ethics (16.9%), Law (96.1%) and Values (96.1%). The average training time was 31.44 hours (±25.56), ranging between 1 and 150 hours. According to the participants' training time, three groups were created: <=19 hours, 20-38 hours and >= 40 hours. We found out that most students got 40 or more hours of active citizenship training (39.7%). This active citizenship training was obtained within the participants' families (26.0%), during their basic education (42.0%), during their secondary education (32.9%), in college (82.6%) and through lifelong learning opportunities (17.3%).

Students who got less training hours show an ethical acting based on Kant's Deontological Ethics (59.1%). These students are followed by those who received a longer training (55.8%). The highest percentage in Ethical/moral Subjectivism was obtained by students who got less training time (70.1%). We also found out that students who got more hours of training were those who obtained a higher score in Subjectivism/Relativism (52.9%) and in Subjectivism (18.3%). As for Subjectivism/Ethical Selfishness, the highest percentage was obtained by students who got less hours of training (64.5%) (Table 3).

Cunha, M., Figueiredo, J., Breia, J., Pina, J., Almeida, S., Oliveira, T., & Cunha, M. C. (2016). Fundaments of the ethical acting in higher education students. *Millenium, 2*(1), 143-155.



Table 3 – Statistics regarding Ethical behavior according to people's citizenship, moral, ethics, law and values training.

| Training time | ≤ 19 hours | | 20-38 hours | | ≥ 40 hours | | Total | | Residual | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Texts/actions | n 32 | % 23.5 | n 67 | % 49.3 | n 37 | % 27.2 | n 136 | % 100 | 1 | 2 | 3 | $x^2$ | p |
| Deontological Ethics (Kant) | | | | | | | | | | | | | |
| 0.00 | 52 | 40.9 | 61 | 53.5 | 46 | 44.2 | 159 | 46.1 | -1.5 | 1.9 | -.5 | | |
| 8.00 | 43 | 33.9 | 38 | 33.3 | 37 | 35.6 | 118 | 34.2 | -.1 | -.2 | .4 | 7.541 | 0.274 |
| 16.00 | 21 | 16.5 | 12 | 10.5 | 14 | 13.5 | 47 | 13.6 | 1.2 | -1.2 | -.1 | | |
| 24.00 | 11 | 8.7 | 3 | 2.6 | 7 | 6.7 | 21 | 6.1 | 1.5 | -1.9 | .3 | | |
| Ethical acting based on Deontological Ethics (Kant) | 75 | 59.1 | 53 | 46.4 | 58 | 55.8 | 186 | 53.9 | | | | 15.461 | 0.000 |
| Ethical/moral Subjectivism | | | | | | | | | | | | | |
| 0.00 | 38 | 29.9 | 34 | 29.8 | 36 | 34.6 | 108 | 31.3 | -.4 | -.4 | .9 | | |
| 7.00 | 49 | 38.6 | 38 | 33.3 | 42 | 40.4 | 129 | 37.4 | .3 | -1.1 | .8 | 3.760 | 0.439 |
| 14.00 | 40 | 31.5 | 42 | 36.8 | 26 | 25.0 | 108 | 31.3 | .1 | 1.6 | -1.7 | | |
| Ethical acting based on Ethical / moral Subjectivism | 89 | 70.1 | 80 | 70.1 | 68 | 65.4 | 236 | 68.7 | | | | 10.429 | 0.001 |
| Subjectivism/relativism | | | | | | | | | | | | | |
| 0.00 | 75 | 59.1 | 58 | 50.9 | 49 | 47.1 | 182 | 52.8 | 1.8 | -.5 | -1.4 | 3.511 | 0.173 |
| 6.00 | 52 | 40.9 | 56 | 49.1 | 55 | 52.9 | 163 | 47.2 | -1.8 | .5 | 1.4 | | |
| Ethical acting based on Subjectivism / relativism | 52 | 40.9 | 56 | 49.1 | 55 | 52.9 | 163 | 47.2 | | | | 5.364 | 0.021 |
| Subjectivism | | | | | | | | | | | | | |
| 0.00 | 104 | 81.9 | 97 | 85.1 | 85 | 81.7 | 286 | 82.9 | -.4 | .8 | -.4 | 0.577 | 0.750 |
| 5.00 | 23 | 18.1 | 17 | 14.9 | 19 | 18.3 | 59 | 17.1 | .4 | -.8 | .4 | | |
| Ethical acting based on Subjectivism | 23 | 18.1 | 17 | 14.9 | 19 | 18.3 | 59 | 17.1 | | | | 7.552 | 0.006 |
| Objectivism | | | | | | | | | | | | | |
| 0.00 | 84 | 66.1 | 71 | 62.3 | 58 | 55.8 | 213 | 61.7 | 1.3 | .1 | -1.5 | | |
| 8.00 | 37 | 29.1 | 35 | 30.7 | 33 | 31.7 | 105 | 30.4 | -.4 | .1 | .3 | n.a. | n.a. |
| 4.00 | 5 | 3.9 | 8 | 7.0 | 12 | 11.5 | 25 | 7.2 | -1.8 | -.1 | 2.0 | | |
| 1200 | 1 | 0.8 | - | - | 1 | 1.0 | 2 | 0.6 | .4 | -1.0 | .6 | | |
| Ethical acting based on Objectivism | 43 | 33.8 | 43 | 37.7 | 46 | 44.2 | 132 | 38.2 | | | | 5.966 | 0.015 |
| Relativism | | | | | | | | | | | | | |
| 0.00 | 58 | 45.7 | 42 | 36.8 | 50 | 48.1 | 150 | 43.5 | .6 | -1.7 | 1.1 | 3.186 | 0.203 |
| 3.00 | 69 | 54.3 | 72 | 63.2 | 54 | 51.9 | 195 | 56.5 | -.6 | 1.7 | -1.1 | | |
| Ethical acting based on Relativism | 69 | 54.3 | 72 | 63.2 | 54 | 51.9 | 195 | 56.5 | | | | 6.586 | 0.010 |
| Subjectivism/Ethical selfishness | | | | | | | | | | | | | |
| 0.00 | 109 | 85.8 | 101 | 88.6 | 96 | 92.3 | 306 | 88.7 | -1.3 | .0 | 1.4 | 2.397 | 0.302 |
| 2.00 | 18 | 14.2 | 13 | 11.4 | 8 | 7.7 | 39 | 11.3 | 1.3 | .0 | -1.4 | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ethical acting based on Subjectivism / Ethical selfishness | 18 | 14.2 | 13 | 11.4 | 8 | 7.7 | 39 | 11.3 | | | | 6.609 | 0.010 |
| Utilitarianism | | | | | | | | | | | | | |
| 0.00 | 45 | 35.4 | 44 | 38.6 | 51 | 49.0 | 140 | 40.6 | -1.5 | -.5 | 2.1 | | |
| 1.00 | 47 | 37.0 | 47 | 41.2 | 34 | 32.7 | 128 | 37.1 | .0 | 1.1 | -1.1 | n.a. | n.a. |
| 2.00 | 30 | 23.6 | 21 | 18.4 | 19 | 18.3 | 70 | 20.3 | 1.2 | -.6 | -.6 | | |
| 3.00 | 5 | 3.9 | 2 | 1.8 | - | - | 7 | 2.0 | 1.9 | -.3 | -1.8 | | |
| Ethical acting based on Utilitarianism | 82 | 64.5 | 70 | 61.4 | 53 | 51.0 | 205 | 59.4 | | | | 11.308 | 0.001 |

*Levels of Ethical Acting*

In order to determine the prevalence of ethical acting, three groups, according to the 25 and 75 percentile, were created based on the global scoring obtained: inappropriate ethical acting- participants who obtained a 16 or less score; appropriate ethical acting- for participants whose score was between 17 and 24; very appropriate ethical acting- for participants whose score was above 25. (Table 4)

We found out that 74.8% of the students show a positive ethical course of action, 45.8% of them showed an appropriate ethical acting and 29.0 showed a very appropriate ethical acting. 25.2% revealed an inappropriate ethical acting.

Table 4 – Ethical Acting Sample groups (Cunha, 2015)

| **Ethical acting** | **Score Items** | | **Category Global score** | |
|---|---|---|---|---|
| **Deontological ethics (Kant)** | **Min.** | **Max.** | **Min.** | **Max.** |
| In his action the individual must always fulfill his duty | 0 | 8 | | |
| When facing ethical-moral dilemma situations, people must choose to fulfill their duty | 0 | 8 | 8 | 24 |
| An action is ethically good if it is carried out with good intentions | 0 | 8 | | |
| Ethical/moral Subjectivism | | | | |
| In his action the individual must take his moral principles into account | 0 | 7 | 7 | 14 |
| When dealing with ethical-moral dilemma situations, people must act according to their conscience | 0 | 7 | | |
| Subjectivism/Relativism | | | | |
| An action is ethically good if it complies with morality | 0 | 6 | 6 | 6 |
| Subjectivism | | | | |
| Ethical- moral values are individual and subjective | 0 | 5 | 5 | 5 |
| Objectivism | | | | |
| In his action, the individual must act according to impartial and universal criteria | 0 | 4 | | |
| Ethical- moral values are universal and objective | 0 | 4 | 4 | 12 |
| Ethical- moral values imply impartiality and consensus | 0 | 4 | | |
| Relativism | | | | |
| Ethical-moral values are relative and vary from society to society | 0 | 3 | 3 | 3 |
| Subjectivism/Ethical selfishness | | | | |
| In his action, the individual must follow his inclinations and personal interests | 0 | 2 | 2 | 2 |

| | | | | |
|---|---|---|---|---|
| Utilitarianism | | | | |
| When dealing with ethical-moral dilemma situations, people must choose the actions that will have the best consequences for themselves | 0 | 1 | | |
| When dealing with ethical-moral dilemma situations, people must choose the actions that will have the best consequences for the greater number of people | 0 | 1 | 1 | 4 |
| An action is ethically good if it brings pleasure/happiness | 0 | 1 | | |
| An action is ethically good if it has good consequences | 0 | 1 | | |
| Ethical course of action scores | | | 36 | 70 |

*Levels of Ethical Acting and socio-demographic variables: gender and age*

Female students show higher percentages in all the ethical acting levels: 78.5% of them show an appropriate ethical behavior; 81.0% show a very appropriate ethical acting and 82,8% of them an inappropriate ethical behavior. As far as age groups are concerned, we found out that younger student (≤ 19 years old) show a higher percentage when it comes to show a very appropriate ethical acting (42.0%), while most of the 20-21 year old students (37.3%) mainly show an appropriate ethical acting. Most of the older students (33.0%) reveal a very appropriate ethical acting. We don't find significant statistical differences between those groups (Table 5)

Table 5 – Levels of Ethical Acting according to socio-demographic variables: Gender and age.

| **Ethical acting** | **Inappropriate** | | **Appropriate** | | **Very Appropriate** | | **Total** | | **Residual** | | | **$X^2$** | **p** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **n**<br>**87** | **%**<br>**25.2** | **n**<br>**158** | **%**<br>**45.8** | **n**<br>**100** | **%**<br>**29.0** | **n**<br>**345** | **%**<br>**100.0** | **1** | **2** | **3** | | |
| Gender | | | | | | | | | | | | | |
| Male | 15 | 17.2 | 34 | 21.5 | 19 | 19.0 | 68 | 19.7 | -.7 | .8 | -.2 | 0.694 | 0.707 |
| Female | 72 | 82.8 | 124 | 78.5 | 81 | 81.0 | 277 | 80.3 | .7 | -.8 | .2 | | |
| Age | | | | | | | | | | | | | |
| ≤ 19 | 34 | 39.1 | 51 | 32.3 | 42 | 42.0 | 127 | 36.8 | .5 | -1.6 | 1.3 | | |
| 20-21 | 30 | 34.5 | 59 | 37.3 | 25 | 25.0 | 114 | 33.0 | .3 | 1.6 | -2.0 | 5.301 | 0.258 |
| ≥ 22 | 23 | 26.4 | 48 | 30.4 | 33 | 33.0 | 104 | 30.1 | -.9 | .1 | .7 | | |

*Levels of Ethical Acting and academic variables*

Students who attended more hours of citizenship, morality, bioethics/ethics, law and values training show higher percentages when it comes to reveal an appropriate ethical acting (46.3%). Those whose training was obtained within their families revealed a higher appropriate ethical acting (28.2%). Among the students who received their training during their basic education, there was a prevalence of inappropriate ethical acting (45.6%; $X^2$=6.181, p=0.045). Students who received their formation through college show a higher percentage in appropriate ethical acting (87.2%). Finally, 25.0% of the students who told us they had got their training through lifelong learning experiences (17.3%) show a very appropriate ethical acting, followed by those who show an appropriate ethical acting  (18.2%; $X^2$=6,919, p=0.031) ( Table 6).

Table 6 – Levels of Ethical Acting according to academic variables

| **Ethical acting** | **Inappropriate** | | **Appropriate** | | **Very appropriate** | | **Total** | | **Residual** | | | **X²** | **p** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **n 32** | **% 23.5** | **n 67** | **% 49.3** | **n 37** | **% 27.2** | **n 136** | **% 100.0** | **1** | **2** | **3** | | |
| Hours of training | | | | | | | | | | | | | |
| ≤ 19 | 9 | 28.1 | 20 | 29.9 | 15 | 40.5 | 44 | 32.4 | -.6 | -.6 | 1.2 | 5.217 | 0.266 |
| 20-38 | 9 | 28.1 | 16 | 23.9 | 13 | 35.1 | 38 | 27.9 | .0 | -1.0 | 1.1 | | |
| ≥ 40 | 14 | 43.8 | 31 | 46.3 | 9 | 24.3 | 54 | 39.7 | .5 | 1.5 | -2.2 | | |
| Training context | 57 | 24.7 | 110 | 47.6 | 64 | 27.7 | 231 | 100.0 | | | | | |
| Family | | | | | | | | | | | | | |
| No | 41 | 71.9 | 79 | 71.8 | 51 | 79.7 | 171 | 74.0 | -.4 | -.7 | 1.2 | 1.476 | 0.478 |
| Yes | 16 | 28.1 | 31 | 28.2 | 13 | 20.3 | 60 | 26.0 | .4 | .7 | -1.2 | | |
| Primary education | | | | | | | | | | | | | |
| No | 31 | 54.4 | 66 | 60.0 | 37 | 57.8 | 134 | 58.0 | -.6 | .6 | .0 | 0.487 | 0.784 |
| yes | 26 | 45.6 | 44 | 40.0 | 27 | 42.2 | 97 | 42.0 | .6 | -.6 | .0 | | |
| Secondary education | | | | | | | | | | | | | |
| No | 31 | 54.4 | 76 | 69.1 | 48 | 75.0 | 155 | 67.1 | -2.4 | .6 | 1.6 | 6.181 | 0.045 |
| Yes | 26 | 45.6 | 34 | 30.9 | 16 | 25.0 | 76 | 32.9 | 2.4 | -.6 | -1.6 | | |
| College degree | | | | | | | | | | | | | |
| No | 12 | 21.1 | 14 | 12.8 | 14 | 21.9 | 40 | 17.4 | .8 | -1.7 | 1.1 | 2.996 | 2.224 |
| Yes | 45 | 78.9 | 95 | 87.2 | 50 | 78.1 | 190 | 82.6 | -.8 | 1.7 | -1.1 | | |
| Ongoing training | | | | | | | | | | | | | |
| No | 53 | 93.0 | 90 | 81.8 | 48 | 75.0 | 191 | 82.7 | 2.4 | -.3 | -1.9 | 6.919 | 0.031 |
| Yes | 4 | 7.0 | 20 | 18.2 | 16 | 25.0 | 40 | 17.3 | -2.4 | .3 | 1.9 | | |

## DISCUSSION

We found out that 74.8% of the students show a positive ethical acting, with 45.8% of them showing an appropriate ethical acting and 29.0% showing a very appropriate ethical acting. However, 25.2% of the participants show an inappropriate ethical course of action. Since there will be teaching practice implications, we are certain that School must encourage students to take decisions that will create consensus because they are based on universal values. Hence the increasing relevance given to bioethical education as part of the discussion of Morality's Trans-subjective Criteria like the Rationality criterion, for instance, (what anyone would do for himself and for the others) interconnected with Impartiality, among others (…).

To educate people about the morality of their actions implies educating them about the morality of their intentions, because the only way we can confirm whether an intention is good or not is to be sure that the course of action was ethical (Barata, 2008, p.7). In that context, literature shows that when citizens participate in social, political, civil and doctrinal life, they seek the construction of relevant answers to the social problems they witness and to the collective well-being. This way, they express both their moral judgment and the achievement of their intentions based on concrete actions that are influenced by ethical-moral principles. Through their commitment they become more responsible and more aware of the real contexts (Cordeiro, 2012, p. 32).

In this context, according to Nunes (2016, p. 9), we can stress out that the actions taken for the sake of society are a sort of controlling principle that encompasses the social and moral order of human affairs.

## CONCLUSIONS

Results demonstrate that the morality of the students' actions was mainly based on individualism and that the ethical principles upon which those actions were based were: 68.7% Ethical Subjectivism; 56.5% Relativism; 53.9% Deontological Ethics (Kant); 11.3% Subjectivism/Ethical Selfishness. We conclude that most students don't have/don't use the impartial weighting of the common good as a criterion for the morality of their actions, since they mostly seem to accept a subjectivist ethical perspective which means that good is not seen as a value for all of them, On the other hand, applying the ethical impartiality criterion would imply considering the existence of a supreme good and choosing/adopting a universal point of view in which any and every rational and enlightened subject would choose this supreme good for himself and for the others.

Keeping in mind the results we have obtained, we believe that school plays a vital role in promoting more ethical acting training, a training that will reinforce the ethical principles and values in order to help students develop and apply more sustained ethical-moral practices.

In this study, the fact that the veracity of the results we obtained depends on the respondents' level of sincerity and honesty (the risk of not expressing effective realities) can be considered as a limitation. This situation will eventually lead to the emergence of answers that are associated with desired conducts regarding the common good.

There is a knowledge gap when we deal with studies that approach ethical acting and there are few research works approaching this issue that had been conducted with higher education students. This way, there is a need to develop new studies in this field, especially studies that will help determine the existence of elements and/or factors that may contribute to the development of ethical courses of action that will favor a certain behavior or a way of living based on certain ethical-moral principles and that will stimulate responsible and inclusive decision-making that will serve the surrounding community's common good.

This way, educating people so that they can develop ethical/moral principles that will favor an ethical way of action which will help promote a supreme good for each one of them and for the others is an absolutely essential condition and it will undoubtedly contribute to the development of individuals who will carry, transmit and create a kind of behavior and way of being imbued with the right ethical-moral support that will serve the primacy of human dignity.

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ESTILOS DE LIDERANÇA DOS DIRETORES TÉCNICOS E SATISFAÇÃO DOS COLABORADORES: ESTUDO REALIZADO EM IPSS`S DOS DISTRITOS DA GUARDA E VISEU 159

LEADERSHIP STYLES OF TECHNICAL DIRECTORS AND JOB SATISFACTION OF EMPLOYEES: A STUDY CONDUCTED IN PSSI`S OF THE DISTRICTS OF GUARDA AND VISEU 159

ESTILOS DE LIDERAZGO DE LOS DIRECTORES TÉCNICOS Y LA SATISFACCIÓN DEL EMPLEADO: UN ESTUDIO REALIZADO EN IPSS`S EL DISTRITO DE GUARDA Y VISEU 159

PERCEÇÃO DO EMPOWERMENT DOS ENFERMEIROS NUMA ORGANIZAÇÃO DE SAÚDE 179

PERCEPTION OF NURSES' EMPOWERMENT IN HEALTHCARE ORGANIZATION SETTINGS 179

PERCEPCIÓN DEL EMPOWERMENT DE LOS ENFERMEROS EN UNA ORGANIZACIÓN DE SALUD 179

ENGENHARIAS, TECNOLOGIA, GESTÃO E TURISMO
ENGINEERING, TECHNOLOGY, MANAGEMENT AND TOURISM
INGENIERÍA, TECNOLOGÍA, ADMINISTRACIÓN Y TURISMO

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## RESUMO

Introdução: Este trabalho trata-se de um estudo quantitativo, transversal, descritivo e correlacional.

Objetivos: O presente estudo teve como principal objetivo conhecer, na perspetiva dos colaboradores, a relação entre os estilos de liderança utilizados pelos diretores técnicos e a satisfação dos colaboradores em nove IPSS`s dos distritos da Guarda e Viseu, atendendo ainda à relevância de variáveis sociodemográficas e profissionais no âmbito da satisfação no trabalho.

Métodos: A amostra é constituída por 85 colaboradores e o instrumento de recolha de dados agrega questões de caracterização sociodemográfica e profissional e duas escalas, já validadas para avaliar: i) o grau de satisfação nas várias dimensões do trabalho (elaborada pelo Instituto da Segurança Social, 2007) e ii) o estilo de liderança dos diretores técnicos (elaborada por Melo, 2004), segundo a perspetiva dos colaboradores.

Resultados: Os resultados obtidos indicam que o estilo de liderança relacional é o que promove maior satisfação e o estilo de liderança voltado para a tarefa menor satisfação.

Conclusões: O estudo das hipóteses permitiu observar que as variáveis: género, tipo de contrato, tempo de serviço e habilitações literárias interferem na satisfação dos colaboradores com o trabalho.

**Palavras-chave:** colaboradores de IPSS`s; diretor técnico; estilo de liderança; satisfação no trabalho.

## ABSTRACT

Introduction: This work is a quantitative, transversal, descriptive and correlational study.

Objectivos: The main purpose of the present study was to understand the collaborators perspective of the relationship between the leadership styles used by technical directors and job satisfaction of employees in nine Private Social Solidarity Institutions (PSSI,) in the districts of Guarda and Viseu, taking also into account the relevance of sociodemographic and professional variables in the field of job satisfaction.

Methods: The sample consists of 85 employees and the data collection instrument integrates questions of socio-demographic and professional characterization and two validated scales for assessing: i) the degree of job satisfaction in various dimensions (developed by Instituto da Segurança Social, 2007) and ii) the leadership style of the technical directors (developed by Melo, 2004), according to the perception of employees.

Results: The results indicate that the relational leadership style promotes greater satisfaction and the leadership focused on task induces lower satisfaction.

Conclusions: The hypothesis under study allows to conclude that variables: gender, type of work contract, service time and qualifications influence employee's job satisfaction.

**Keywords:** PSSI's employees; technical director; leadership style; job satisfaction.

## RESUMEN

Introducción: Esto trabajo es un estudio cuantitativo, transversal, descriptivo y correlacional.

Objetivos: Este estudio tuvo como principal objetivo conocer, desde la perspectiva de los empleados, la relación entre los estilos de liderazgo utilizados por los directores técnicos y la satisfacción de los empleados en nueve Instituciones Privadas de Solidaridad Social (IPSS) de los distritos de Guarda y Viseu, teniendo en cuenta también la relevancia de las variables sociodemográficas y profesionales en el campo de la satisfacción en el trabajo.

Métodos: La muestra se compone de 85 empleados y el instrumento de recolección de datos añade cuestiones sociodemográficas y profesionales y dos escalas, ya validadas, para evaluar: i) el grado de satisfacción en diversas dimensiones del trabajo (desarrollado por el Instituto da Segurança Social, 2007) y ii) el estilo de liderazgo de los directores técnicos (desarrollado por Melo, 2004), según la perspectiva de los empleados.

Resultados: Los resultados indican que el estilo relacional de liderazgo promueve una mayor satisfacción y el estilo de liderazgo direccionado por la tarea promueve menor satisfacción.

Conclusiones: Para las hipótesis del estudio se ha observado que las variables: sexo, tipo de contrato, tiempo de servicio y cualificación interfieren con la satisfacción de los empleados con el trabajo.

**Palabras clave:** empleados de IPSS; director técnico; estilo de liderazgo; satisfacción en el trabajo.

## INTRODUCTION

Both corporate or non-profit organizations aim to achieve goals and results, associated with employee's efficiency, attitude and performance levels. In this context, it is imperative that those responsible for the organizations feel the importance of the impact of their leadership on people management and commit themselves to find mechanisms that enable them to periodically analyze the degree of satisfaction of employees, because only in this way desired results can be achieved.

Given the above, this study aims to evaluate the relationship between the leadership styles used by technical directors and the satisfaction of employees in Private Social Solidarity Institutions (PSSI), in the districts of Guarda and Viseu, in Portugal, taking into account the relevance of socio-demographic and professional variables in the satisfaction at work.

## 1. THEORETICAL FRAMEWORK

### 1.1 Private Social Solidarity Institutions (PSSI)

The Portuguese Law No. 119/83 of 25 February, defines PSSI's as

Private Social Solidarity Institutions when constituted, with non-profit purpose, by the initiative of individuals, in order to give organized expression to the moral duty of solidarity and justice between individuals and provided they are not run by the state or a local government body, to pursue, among others, social policy objectives through the provision of goods and services (Article 1).

In Portugal, the PSSI's act in different domains: Social Security; Protection in Health; Education; and Housing. Usually PSSI's develop their activity in one center of activities, or else, its activities are concentrated geographically. They operate under the responsibility of a technical director, who assumes his duties (Portuguese Law No. 172-A / 2014, November 14).

Depending on the size of provided services and social responses that each PSSI develops, multidisciplinary teams may be established to collaborate in terms of work, including several professionals, namely, direct action assistants, educational action assistants, psychologists, doctors, nurses, social workers, physical therapists, early childhood educators, among others, being very common in this type of organizations that the technical director assumes the function of human resources management (Portuguese Law No. 172-a / 2014, November 14).

Cherrigton (1995, cit. by Fernandes, 2011) states that all managers with subordinates in charge, are to a greater or lesser extent leaders, because they have the difficult mission of leading a group of different people, which should become a team that generates results and which should be motivated, in order to their elements achieve the objectives set by the organization, in an ethical and positive way.

### 1.2 Leadership

The exercise of leadership includes several functions related to structuration, functions distribution, guidance, coordination, control, motivation, positive and negative reinforcement, strengthening, etc. However, the ability to generate energy in others, causing them to feel both motivated and enthusiastic, is the cornerstone for the skills of today's leaders (Cunha, Rego, Cunha, & Cabral-Cardoso, 2007).

The leader has to choose different behaviors that he can use, which can be grouped into several categories or styles, so leadership is included in a continuum between two extremes, one more oriented towards interpersonal relationships and the other more oriented to performing tasks. Thus, over time, authors have attempted to identify various leadership styles, which are presented below.

#### 1.2.1. Leadership styles in behavioral theories

The inability of the trait theory, which consists in the evaluation and selection of leaders based on their physical, psychological and social characteristics, to adequately explain the leadership process and the emergence of leaders, led researchers to look for other routes of analysis (Teixeira, 2013). Thus, the first studies on leadership styles within the behavioral approach took place in 1939 and were conducted by researchers Lewin, Lippitt and White (Chiavenato, 2004). Based on these studies, researchers were able to define three leadership styles: authoritarian leadership, the liberal leadership (laissez-faire) and democratic leadership.

According to Chiavenato (2004), the authoritarian leadership is related to the leader whose adopted posture is essentially directive, in which the leader provides specific instructions, leaving no room for the creativity of the led; it is impersonal, whether in praise or in criticism. In turn, the liberal leader (laissez-faire) does not impose on the group and therefore does not make decisions or divides

tasks. In the democratic leadership, the leader assists and encourages debate between all the elements, being the group, together, that outlines the measures and techniques to achieve the objectives. The group requests technical advice from the leader, that suggests several alternatives that the group can choose from.

One of Michigan researchers, Likert, developed its studies in this area and according to Nogueira (2012) identified a leadership style system that was presented in the book "The Human Organization" composed by four basic types: coercive authoritative, benevolent authoritarian, consultative and participatory: (1) in the coercive authoritarian style, the decision rests within the top of the organization, being characterized by a punishing environment; (2) in the benevolent authoritarian style, the decision is still centralized, however, there is some interaction and flexibility in the tasks performance; (3) in the consultative style, the leader decentralizes organizational decisions requesting some ideas and opinions from the employees; (4) in the participative style, the leader provides an environment for involvement, trust and participation of employees, using the ideas and suggestions in a constructive manner.

Also framed in behavioral theories, the leadership style based on Blake and Mouton's theory is based on a leadership grid consisting of a diagram showing: a production-related variable (the "x" axis) and other variable related to people (the "y" axis), arranged at intervals ordered from 1 to 9, forming a two-dimensional array, thus making the combination of task and relationship. The matrix comprises eighty one positions along which are distributed the types of leadership identified by the investigators, and this way, these combined dimensions result in different leading styles (Teixeira, 2013).

### 1.2.2. Leadership styles in situational or contingency theories

Situational theories have as a basic principle the absence of a single valid leadership style for all situations, on the contrary, each situation requires a different leadership style. According to these approaches, the effective leader is the one with the ability to adapt to groups of people with certain characteristics under extremely varied conditions. Thus, the fundamental variables to be considered in contingency theories of leadership are three: the leader, the group and the situation (Cunha et al., 2007).

The Fiedler model was the first contingency model of leadership and states that the group's performance efficacy depends on the connection between the practiced leadership style and the degree of control and influence the leader has of the situation (Robbins, 1994, cit. by Navy, 2013).

Thus, to better understand the leadership, two behavioral dimensions (task orientation and guidance to the relationship) and three situational criteria (task structure, position of power and leader-member relationship) should be combined (Cunha & Rego, 2003).

Still framed in the situational or contingency theories emerges the leadership continuum model. This model assumes that the leadership style can be explained by a line consisting of seven possible attitudes for a leader. This same line combines the leader authority with the freedom of the subordinates, regarding to decision-making, thus suggesting a continuum in the leadership behaviors (Nogueira, 2012).

No less important and widely accepted in the scientific literature arise leadership styles based on the Theory of Hersey and Blanchard. This model is based on the premise that effective leadership "is a function of three variables: the leader style (L), the maturity of the led (l) and the situation (s), being the leadership efficacy (E) expressed by the formula E = f (L, L, s)" (Agostinho & Amaro, 2007, p. 5).

Hersey and Blanchard (1986) established four basic quadrants for the leader's behavior, depending on the emphasis given to production aspects (task) and to subordinate (relationship), from which the following four combinations arise: high task (much emphasis on task) and low relationship (little emphasis in the relationship); high task and high relationship; low task and low relationship; low task and high relationship.

After the analysis of the first variable, the behavior of the leader, authors Hersey and Blanchard (1986) analyze the second, the maturity of the followers, in which "maturity is the ability and willingness of people to take responsibility for directing their own behavior" (p. 187). This concept is divided into two components: the maturity at work (capacity) and psychological maturity (motivation).

Maturity at work is related to the ability to do something, referring to knowledge and understanding. People with high maturity at work in a particular field of knowledge have the ability and the experience necessary to perform certain tasks without the direction of the leader. Psychological maturity refers to the willingness or motivation to do something. It is linked to self-confidence, commitment and personal fulfillment. Individuals who have high psychological maturity believe that accountability is important, have confidence in themselves and feel good in that aspect of their work, not requiring great incentive to fulfill their tasks.

### 1.3. Job satisfaction

There are numerous definitions of job satisfaction. Among the most mentioned definitions in the scientific literature, the one provided by Locke (1976, cit. by Cunha et al., 2007) is distinguished, in which he considers the job satisfaction as a positive or pleasant emotional state, as a result of the value attributed by individuals to the their work, or their experiences with it.

#### 1.3.1. Causes of job satisfaction

Regarding the causes of job satisfaction, Spector (1997) and Cunha et al. (2007) report that these can be divided into two groups: personal causes and organizational causes.

The personal causes can, in turn, be divided into individual differences and demographic factors. At the level of individual differences, research suggests that individuals appear to be, by virtue of their levels of emotional intelligence, moderately predisposed to react in a certain way in their work. With regard to demographic variables, the most frequently studied are age and sex. With regard to age, studies show that younger workers tend to be less satisfied than their older counterparts (Cunha et al., 2007). Regarding the gender variable, the literature review suggests that women have higher levels of job satisfaction than men (Chaves, Ramos, & Figueiredo, 2011).

Regarding the organizational causes, Cunha et al. (2007) reported that the most frequently considered involve factors such as salary, the work itself, the development prospects in the career, leadership style, colleagues and the physical working conditions. Another variable pointed to by Cunha et al (2007) is the social information, influencing job satisfaction in the measure that it can be changed by social and contextual influence. Still in order to meet other variables that influence satisfaction, we looked at other prospects beyond the ones presented by these authors and found the following considerations.

Francés (1984, cit. by Figueiredo, 2012) states that worker participation in decision making in the organization can influence their job satisfaction. Peterson and Dunnagan (1998, cit. by Marquese & Moreno, 2005) ascertained that the level of education may have a positive relationship with job satisfaction. Cavanagh (1992) identified three aspects that influence job satisfaction: differences in personality, differences in work and differences in the values attributed to work. Korunka and Vitouch (1999, cit. by Marquese & Moreno, 2005) reported that job satisfaction is positively related to job security, wages and benefits, social relationships at work, positive relationship towards leaderships, the career prospects, the physical work environment and good terms for resolution of work processes.

According to the above, we note that the intervening factors in job satisfaction are diverse and that their presence or absence generates different responses in the individual.

Studies show some positive relationship between job satisfaction levels, performance and productivity. It seems, too, there is an inverse relationship between job satisfaction and absenteeism, in the sense that people more satisfied denote lower absenteeism (Cunha et al., 2007). Also burnout and turnover seem to decrease when the job satisfaction levels are higher. Job satisfaction may also be considered a good predictor of turnover intention (Figueiredo, 2012).

## 2. METHODS

The methodological option that guided this study was a quantitative, descriptive, cross-sectional and correlational approach, which was derived from the research question: “What is the relationship, from the perspective of employees, between the leadership styles used by the technical directors and the satisfaction of PSSI’s employees, taking into account also the relevance of socio-demographic and professional variables in the field of job satisfaction? “. This, in turn, gave rise to the following specific objectives:

1. Identify the dominant leadership style of technical directors, according to the perspective of employees;

2. Ascertain the degree of employee’s job satisfaction in different dimensions (facilities, professional and personal autonomy; financial compensation, other benefits, professional development and training, supervision, work internal relations, policy and strategy, change and innovation, quality management system, and safety);

3. Check if the degree of job satisfaction of employees in the different dimensions of work varies with the socio-demographic and professional variables (gender, age, type of contract, service time and qualifications);

4. Study the relation of leadership styles of the technical directors with the degree of employee’s job satisfaction, according to the perspective of employees.

From the objectives we also defined the following hypothesis:

H1: There are significant differences in employee's job satisfaction due to socio-demographic and professional variables (gender, age, type of contract, service time and qualifications).

H2: There is a significant relationship between the leadership style of the technical director and the employee's job satisfaction, according to the perspective of employees.

## 2.1. Sample

The sample consists of 85 subjects who carry out functions related to supporting the elderly, people with disabilities and children in nine PSSI's belonging to a county in the district of Guarda and a county in Viseu's district. All the institutions in the study have a technical director and only five are using the quality management system, which explains the reduction in the sample (n = 39) when studying the dimension "Satisfaction with the Quality Management System."

By analyzing the collected data, we find that there is a much greater number of female respondents (n = 82; 96%) compared to males (n = 3; 3.5%). Regarding age, most respondents are between 22 and 31 years (n = 23; 27.1%) and 43 to 53 years (n = 23; 27.1%); then, between 32 and 42 years (n = 21; 24.7%) and less represented, respondents aged between 54 and 65 years (n = 18; 21.2%). Globally, the ages range from 22 to 65 years (M = 42.3 years, SD = 12.8 years).

Regarding the type of contract with the institution, the majority of respondents have a permanent contract (n = 66; 77.6%) and another 12 (14.1%) were working through a temporary contract. Two respondents (2.4%) are doing an internship, three (3.5%) respondents are integrated into the institution by a measure to support employment, designated contract job insertion and, finally, two (2.4%) exercised their functions through a contract for services.

In relation to the service time, 30 (35.3%) respondents worked for over 10 years, 24 (28.2%) between one and five years, 15 (17.6%) between six and 10 years and 16 (18.8% ) were tied to the institution for less than a year.

With regard to qualifications, 25 respondents (29.4%) had the 1st cycle of basic education, 11 (12.9%) the 2nd cycle and 22 (25.9%) the 3rd cycle, there are 15 employees (17.6%) with secondary education and 12 (14.1%) with a university degree.

Concerning the social response to which employees are affected, five (5.9%) are at a day care center, six (7.1%) are on home support service, 32 (37.6%) work on a nursing home for elderly, eight (9.4%) are linked to a center of occupational activities and also eight employees (9.4%) are rebated to the nursery and center for leisure activities, finally, three (3.5%) reported to work at the social response of continuous care unit. The remaining 23 employees (27.1%) perform functions simultaneously in two or three social responses: affected to day care center, nursing home for elderly and home support service we have 15 (17.6%) employees; performing functions in the home support service and nursing home for elderly there are five (5.9%) elements, and finally affected to the nursing home for elderly and continuous care unit there are three (3.5%) employees.

## 2.2. Data collection tools

In order to gather the necessary information to achieve the objectives of this work, the data collection used an instrument composed by three parts: the first related to the socio-demographic and professional characterization of respondents, the second comprises a scale that assesses the degree of Job Satisfaction, consisting of 10 dimensions (facilities, professional and personal autonomy; financial compensation, other benefits, professional development and training, supervision, work internal relations, policy and strategy, change and innovation, quality management system, and safety), each of which is measured by the number of items shown in Table 1, in a Likert scale with five categories (from "1 totally dissatisfied" to "5-totally satisfied"), prepared by the "Instituto da Segurança Social" (2007). Finally, because our research question sought to know the relationship between Job Satisfaction and the variable Leadership Style, from the perspective of employees, a scale developed by Melo (2004) was also used, consisting of three dimensions (relationship, situational, task), each also measured by the number of items shown in Table 1, in a Likert scale with five categories (from "1-never act like this" to "5-always act like this") to assess the technical directors leadership style.

## 2.3. Identification and operationalization of variables

To study the hypothesis 1, were considered as dependent variables: the degree of job satisfaction for employees of PSSI's with the dimensions: the facilities, professional and personal autonomy; financial compensation, other benefits, professional development and training, supervision, policy and strategy, change and innovation, quality management system, and safety; and as independent variables: gender, age, type of contract with the institution, the time of service in the institution and qualifications.

For the analysis of hypothesis 2, the same dimensions already referred in the previous hypothesis for the degree of satisfaction with work were used as determinants of employee's job satisfaction and leadership style was operationalized by the relationship, situational and task dimensions measured by the scale cited above.

### 2.4. Procedures

After obtaining the necessary authorizations from the authors to the application of the scales that integrate our research instrument, we proceed to request official permission for data collection from the presidents of the directions of the institutions where we intended to apply the questionnaires. This request was made through a formal presentation, in which we referred the subject of our study, its purpose, and assured the confidentiality rules, anonymity and professional ethics. Authorization applications were accompanied by the instrument we planned to apply. Since all requests received acceptance by the presidents of the directions, we contacted the technical directors personally to request their collaboration in the distribution of questionnaires by all employees of the addressed institutions. This procedure facilitated the distribution of our data collection instrument, because at the time of contact with the institutions not all the employees were present. Of the 129 questionnaires distributed, 85 completed correctly were received.

### 2.5. Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.

In the descriptive statistics analysis for scales, the mean (M), standard deviation (SD), variation coefficient (VC), minimum (Min) and maximum (Max) were presented. The internal consistency analysis, to study how a set of variables represent adequately a certain dimension (Hill & Hill, 2002), was carried out by calculating Cronbach's Alpha, in which a coefficient of internal consistency higher than .80 is considered suitable for applications in Social Sciences and an internal consistency coefficient between .60 and .80 is considered acceptable, as referred, for example, by Muñiz (2003), Muñiz, Hidalgo, García-Cueto, Martinez, & Moreno (2005) and Nunnaly (1978). In inferential analysis (Maroco, 2011; Pestana & Gageiro, 2008), the relationship between quantitative and qualitative variables, always to a reference value for the proof value of 5%, we used nonparametric Mann-Whitney and Kruskal-Wallis tests, since there is no normality for the distribution of analyzed data, assumption needed to apply parametric tests, which was verified by the Kolmogorov-Smirnov test with the Lilliefors correction and the Shapiro-Wilk test for smaller groups. To correlate two quantitative variables we used the Pearson correlation coefficient, which can be used for the size of the sample under study, according to the Central Limit Theorem.

## 3. RESULTS

### 3.1. INTERNAL CONSISTENCY ANALYSIS

Analyzing the results in Table 1, the Cronbach's Alpha values are higher than the value of .80 for the dimensions of the scale that measures Job Satisfaction (with one exception, where the value is still higher than .70) and the dimensions of the Leadership Style Assessment scale, so we can consider that the dimensions studied by these scales are measured appropriately in this sample.

Table 1 - Internal consistency for the Job Satisfaction and Leadership Style Assessment Scales

| Scale | Dimension | Cronbach's Alpha | N Items |
|---|---|---|---|
| | Facilities | .73 | 6 |
| | Professional and Personal Autonomy | .88 | 7 |
| | Financial Compensation | .88 | 3 |
| | Other Benefits | .92 | 8 |
| | Professional Development and Training | .92 | 7 |
| Job Satisfaction | Supervision | .94 | 3 |
| | Work Internal Relations | .89 | 9 |
| | Policy and Strategy | .91 | 4 |
| | Change and Innovation | .85 | 3 |
| | Quality Management System | .88 | 6 |
| | Safety | .91 | 3 |

| | | | |
|---|---|---|---|
| | Relationship | .93 | 7 |
| Leadership Style Assessment | Situational | .88 | 3 |
| | Task | .87 | 4 |

## 3.2. Descriptive results

Table 2 presents the descriptive results for the scales used. For Job Satisfaction Scale, we found that the dimension were employees have higher levels of satisfaction is the "Quality Management System" (M = 4.24, SD = 0.50), whereas the dimension where employees have lower levels of satisfaction is the "Financial Compensation" (M = 3:53, SD = 0.86). Applying the Leadership Style Assessment Scale, we tried to identify which leadership style is dominant in the Technical Directors, from the viewpoint of employees, who identified themselves as dominant in their leaders styles "Situational" (M = 4.35 SD = 0.68) and "Relationship" (M = 4:34, SD = 0.72), and with a slightly lower value, the style directed towards the "Task" (M = 4.26, SD = 0.74). All dimensions have a mean value clearly above the midpoint of the measuring scale and close to its maximum value.

Table 2 - Descriptive statistics for the Job Satisfaction and Leadership Style Assessment Scales

| | N | M | SD | VC | Min | Max |
|---|---|---|---|---|---|---|
| Job Satisfaction Scale | | | | | | |
| Facilities | 85 | 4.22 | 0.51 | 12% | 2.83 | 5.00 |
| Professional and Personal Autonomy | 85 | 4.15 | 0.54 | 13% | 3.14 | 5.00 |
| Financial Compensation | 85 | 3.53 | 0.86 | 25% | 1.00 | 5.00 |
| Other Benefits | 85 | 4.08 | 0.60 | 15% | 2.88 | 5.00 |
| Professional Development and Training | 85 | 4.08 | 0.60 | 15% | 2.29 | 5.00 |
| Supervision | 85 | 4.00 | 0.79 | 20% | 1.67 | 5.00 |
| Work Internal Relations | 85 | 4.06 | 0.51 | 13% | 2.89 | 5.00 |
| Policy and Strategy | 84 | 4.04 | 0.57 | 14% | 3.00 | 5.00 |
| Change and Innovation | 85 | 3.95 | 0.60 | 15% | 2.33 | 5.00 |
| Quality Management System | 39 | 4.24 | 0.50 | 12% | 2.83 | 5.00 |
| Safety | 85 | 4.18 | 0.66 | 16% | 2.33 | 5.00 |
| Leadership Style Assessment Scale | | | | | | |
| Relationship | 85 | 4.34 | 0.72 | 17% | 2.29 | 5.00 |
| Situational | 85 | 4.35 | 0.68 | 16% | 2.67 | 5.00 |
| Task | 85 | 4.26 | 0.74 | 17% | 2.25 | 5.00 |

## 3.3. Hypotheses Analysis

**Hypothesis 1**: There are statistically significant differences in employee's job satisfaction due to socio-demographic and professional variables (gender, age, type of contract, service time and qualifications).

The results for the analysis of this hypothesis concerning gender are presented in Table 3.

Table 3 - Mann-Whitney U test: Differences in Job Satisfaction by gender

| | Gender | N | M | SD | U | p |
|---|---|---|---|---|---|---|
| Facilities | Female | 82 | 4.24 | 0.52 | 37.0 | * .039 |
| | Male | 3 | 3.78 | 0.10 | | |
| Professional and Personal Autonomy | Female | 82 | 4.17 | 0.55 | 54.0 | .099 |
| | Male | 3 | 3.76 | 0.08 | | |
| Financial Compensation | Female | 82 | 3.54 | 0.87 | 98.5 | .554 |
| | Male | 3 | 3.22 | 0.84 | | |
| Other Benefits | Female | 82 | 4.08 | 0.61 | 108.0 | .719 |
| | Male | 3 | 4.13 | 0.13 | | |
| Professional Development and Training | Female | 82 | 4.09 | 0.61 | 80.5 | .307 |
| | Male | 3 | 3.86 | 0.14 | | |
| Supervision | Female | 82 | 4.02 | 0.79 | 82.5 | .321 |
| | Male | 3 | 3.67 | 0.58 | | |
| Work Internal Relations | Female | 82 | 4.06 | 0.52 | 113.5 | .820 |
| | Male | 3 | 4.07 | 0.17 | | |
| Policy and Strategy | Female | 81 | 4.05 | 0.58 | 117.0 | .909 |
| | Male | 3 | 4.00 | 0.00 | | |
| Change and Innovation | Female | 82 | 3.96 | 0.61 | 99.5 | .548 |
| | Male | 3 | 3.78 | 0.39 | | |
| Quality Management System | Female | 39 | 4.24 | 0.50 | | |
| | Male | 0 | . | . | | |
| Safety | Female | 82 | 4.18 | 0.67 | 94.5 | .483 |
| | Male | 3 | 4.00 | 0.00 | | |

* p<.05

In Table 3, it appears that most of the dimensions of job satisfaction had higher values for females in the sample, so female gender employees are more satisfied at work than the male gender, with the exception of dimensions “Other benefits” and “Work Internal Relations”, however, the differences are only statistically significant for the dimension “Facilities” (p = .039). Thus, there is confirmation of the hypothesis only for the dimension “Facilities” for which satisfaction is significantly higher for females. However, it is important to note that there are only three male workers in the sample, so this analysis was carried out purely on an exploratory basis, with caution to the generalizations in this area.

The results in Table 4 permit to determinate whether the age variable influences the various dimensions of job satisfaction. It is verified that the observed variations are not enough to find statistically significant differences between the established age groups.

Table 4 - Kruskal-Wallis test: Differences in Job Satisfaction as a function of age

| | Age | N | M | SD | $\chi^2_3$ | p |
|---|---|---|---|---|---|---|
| Facilities | 22 to 31 | 23 | 4.16 | 0.63 | 0.63 | .890 |
| | 32 to 42 | 21 | 4.20 | 0.39 | | |
| | 43 to 53 | 22 | 4.31 | 0.45 | | |
| | 54 to 65 | 18 | 4.22 | 0.59 | | |
| Professional and Personal Autonomy | 22 to 31 | 23 | 4.12 | 0.52 | 1.44 | .697 |
| | 32 to 42 | 21 | 4.16 | 0.56 | | |
| | 43 to 53 | 22 | 4.27 | 0.56 | | |
| | 54 to 65 | 18 | 4.07 | 0.57 | | |
| Financial Compensation | 22 to 31 | 23 | 3.71 | 0.77 | 4.10 | .251 |
| | 32 to 42 | 21 | 3.33 | 0.91 | | |
| | 43 to 53 | 22 | 3.73 | 0.80 | | |
| | 54 to 65 | 18 | 3.28 | 0.97 | | |
| Other Benefits | 22 to 31 | 23 | 3.99 | 0.65 | 1.73 | .631 |
| | 32 to 42 | 21 | 4.04 | 0.56 | | |
| | 43 to 53 | 22 | 4.23 | 0.59 | | |
| | 54 to 65 | 18 | 4.06 | 0.63 | | |
| Professional Development and Training | 22 to 31 | 23 | 3.97 | 0.60 | 2.67 | .446 |
| | 32 to 42 | 21 | 4.18 | 0.51 | | |
| | 43 to 53 | 22 | 4.14 | 0.69 | | |
| | 54 to 65 | 18 | 4.03 | 0.61 | | |
| Supervision | 22 to 31 | 23 | 3.99 | 0.89 | 1.19 | .756 |
| | 32 to 42 | 21 | 3.86 | 0.88 | | |
| | 43 to 53 | 22 | 4.15 | 0.63 | | |
| | 54 to 65 | 18 | 4.02 | 0.76 | | |
| Work Internal Relations | 22 to 31 | 23 | 3.99 | 0.60 | 1.08 | .781 |
| | 32 to 42 | 21 | 4.07 | 0.47 | | |
| | 43 to 53 | 22 | 4.11 | 0.52 | | |
| | 54 to 65 | 18 | 4.07 | 0.46 | | |
| Policy and Strategy | 22 to 31 | 23 | 4.09 | 0.56 | 0.90 | .824 |
| | 32 to 42 | 20 | 4.08 | 0.58 | | |
| | 43 to 53 | 22 | 4.08 | 0.61 | | |
| | 54 to 65 | 18 | 3.92 | 0.55 | | |
| Change and Innovation | 22 to 31 | 23 | 3.96 | 0.67 | 3.08 | .380 |
| | 32 to 42 | 21 | 3.90 | 0.66 | | |
| | 43 to 53 | 22 | 4.12 | 0.54 | | |
| | 54 to 65 | 18 | 3.81 | 0.52 | | |
| Quality Management System | 22 to 31 | 9 | 4.19 | 0.41 | 1.12 | .773 |
| | 32 to 42 | 10 | 4.23 | 0.65 | | |
| | 43 to 53 | 10 | 4.20 | 0.58 | | |
| | 54 to 65 | 9 | 4.37 | 0.33 | | |
| Safety | 22 to 31 | 23 | 3.90 | 0.84 | 5.69 | .128 |
| | 32 to 42 | 21 | 4.24 | 0.49 | | |
| | 43 to 53 | 22 | 4.42 | 0.57 | | |
| | 54 to 65 | 18 | 4.17 | 0.59 | | |

For the analysis of the relationship between the type of contract of employees and the dimensions of job satisfaction, a category was defined by aggregating all types of contracts considered precarious (internship, job insertion and services contracts) by researchers. In Table 5, we observe that statistically significant differences occur in the dimensions “facilities”, “professional and personal autonomy”, “financial compensation”, “professional development and training”, “ work internal relations “, “policy and strategy” and “safety”, with higher satisfaction for those with temporary contract and lower satisfaction for employees with

precarious contracts.

Table 5 - Kruskal-Wallis test: Differences in Job Satisfaction as a function of type of contract

| | Type of contract | N | M | SD | $\chi^2_2$ | p |
|---|---|---|---|---|---|---|
| Facilities | permanent | 66 | 4.21 | 0.46 | 13.33 | ** .001 |
| | temporary | 12 | 4.57 | 0.64 | | |
| | precarious | 7 | 3.74 | 0.40 | | |
| Professional and Personal Autonomy | permanent | 66 | 4.17 | 0.54 | 9.14 | ** .010 |
| | temporary | 12 | 4.36 | 0.58 | | |
| | precarious | 7 | 3.65 | 0.25 | | |
| Financial Compensation | permanent | 66 | 3.46 | 0.88 | 12.54 | ** .002 |
| | temporary | 12 | 4.19 | 0.58 | | |
| | precarious | 7 | 3.00 | 0.47 | | |
| Other Benefits | permanent | 66 | 4.08 | 0.60 | 5.53 | .063 |
| | temporary | 12 | 4.31 | 0.66 | | |
| | precarious | 7 | 3.68 | 0.34 | | |
| Professional Development and Training | permanent | 66 | 4.07 | 0.60 | 7.51 | * .023 |
| | temporary | 12 | 4.37 | 0.60 | | |
| | precarious | 7 | 3.67 | 0.27 | | |
| Supervision | permanent | 66 | 4.02 | 0.81 | 5.35 | .069 |
| | temporary | 12 | 4.25 | 0.68 | | |
| | precarious | 7 | 3.48 | 0.50 | | |
| Work Internal Relations | permanent | 66 | 4.06 | 0.47 | 6.28 | * .043 |
| | temporary | 12 | 4.25 | 0.67 | | |
| | precarious | 7 | 3.67 | 0.39 | | |
| Policy and Strategy | permanent | 65 | 4.04 | 0.56 | 8.22 | * .016 |
| | temporary | 12 | 4.33 | 0.56 | | |
| | precarious | 7 | 3.57 | 0.43 | | |
| Change and Innovation | permanent | 66 | 3.95 | 0.57 | 5.77 | .056 |
| | temporary | 12 | 4.19 | 0.72 | | |
| | precarious | 7 | 3.55 | 0.46 | | |
| Quality Management System | permanent | 35 | 4.27 | 0.52 | 2.30 | .317 |
| | temporary | 2 | 4.00 | 0.00 | | |
| | precarious | 2 | 4.00 | 0.00 | | |
| Safety | permanent | 66 | 4.19 | 0.63 | 11.30 | ** .004 |
| | temporary | 12 | 4.47 | 0.70 | | |
| | precarious | 7 | 3.52 | 0.42 | | |

* p<.05; ** p<.01

With the purpose of testing if the service time in the institution significantly influences the employee's job satisfaction, analyzing Table 6, we conclude that there are statistically significant differences in the dimensions "professional and personal autonomy", "other benefits", "professional development and training", "supervision", "work internal relations" and "policy and strategy". For these dimensions there is a tendency to increased satisfaction with increased service time in the institution, except in the dimension

“professional and personal autonomy”, where individuals who work in the institution between 6 and 10 years feel more satisfied.

Table 6 - Kruskal-Wallis test: Differences in Job Satisfaction as a function of service time

| | **Service time** | **N** | **M** | **SD** | $\chi^2_3$ | **p** |
|---|---|---|---|---|---|---|
| Facilities | Less than 1 year | 16 | 4.05 | 0.50 | 2.88 | .410 |
| | 1 to 5 years | 24 | 4.22 | 0.59 | | |
| | 6 to 10 years | 15 | 4.19 | 0.56 | | |
| | More than 10 years | 30 | 4.33 | 0.42 | | |
| Professional and Personal Autonomy | Less than 1 year | 16 | 3.79 | 0.44 | 9.63 | * .022 |
| | 1 to 5 years | 24 | 4.17 | 0.61 | | |
| | 6 to 10 years | 15 | 4.33 | 0.51 | | |
| | More than 10 years | 30 | 4.24 | 0.49 | | |
| Financial Compensation | Less than 1 year | 16 | 3.19 | 0.71 | 4.32 | .229 |
| | 1 to 5 years | 24 | 3.60 | 0.92 | | |
| | 6 to 10 years | 15 | 3.69 | 1.14 | | |
| | More than 10 years | 30 | 3.57 | 0.72 | | |
| Other Benefits | Less than 1 year | 16 | 3.70 | 0.56 | 9.61 | * .022 |
| | 1 to 5 years | 24 | 4.04 | 0.70 | | |
| | 6 to 10 years | 15 | 4.22 | 0.57 | | |
| | More than 10 years | 30 | 4.24 | 0.47 | | |
| Professional Development and Training | Less than 1 year | 16 | 3.63 | 0.59 | 10.52 | * .015 |
| | 1 to 5 years | 24 | 4.10 | 0.68 | | |
| | 6 to 10 years | 15 | 4.20 | 0.52 | | |
| | More than 10 years | 30 | 4.24 | 0.46 | | |
| Supervision | Less than 1 year | 16 | 3.73 | 0.65 | 8.33 | * .040 |
| | 1 to 5 years | 24 | 3.83 | 0.91 | | |
| | 6 to 10 years | 15 | 3.96 | 0.87 | | |
| | More than 10 years | 30 | 4.31 | 0.63 | | |
| Work Internal Relations | Less than 1 year | 16 | 3.88 | 0.46 | 10.09 | * .018 |
| | 1 to 5 years | 24 | 4.02 | 0.59 | | |
| | 6 to 10 years | 15 | 3.90 | 0.49 | | |
| | More than 10 years | 30 | 4.26 | 0.42 | | |
| Policy and Strategy | Less than 1 year | 16 | 3.67 | 0.51 | 11.13 | * .011 |
| | 1 to 5 years | 24 | 4.05 | 0.65 | | |
| | 6 to 10 years | 15 | 4.03 | 0.44 | | |
| | More than 10 years | 29 | 4.25 | 0.50 | | |
| Change and Innovation | Less than 1 year | 16 | 3.64 | 0.50 | 7.42 | .060 |
| | 1 to 5 years | 24 | 3.92 | 0.75 | | |
| | 6 to 10 years | 15 | 3.93 | 0.66 | | |
| | More than 10 years | 30 | 4.16 | 0.41 | | |
| Quality Management System | Less than 1 year | 4 | 3.96 | 0.08 | 4.97 | .174 |
| | 1 to 5 years | 6 | 4.14 | 0.46 | | |
| | 6 to 10 years | 7 | 4.14 | 0.68 | | |
| | More than 10 years | 22 | 4.35 | 0.48 | | |
| Safety | Less than 1 year | 16 | 3.98 | 0.67 | 5.22 | .156 |
| | 1 to 5 years | 24 | 3.99 | 0.84 | | |
| | 6 to 10 years | 15 | 4.31 | 0.45 | | |
| | More than 10 years | 30 | 4.37 | 0.51 | | |

* p<.05; ** p<.01

Table 7 presents the results of the relationship between qualifications and job satisfaction for employees, that allow to verify the existence of statistically significant differences in the dimensions “financial compensation”, “other benefits”, “change and

innovation" and "safety". For the mentioned dimensions, employees who have the second and third cycle of basic education emerge as more satisfied and employees with a higher education are less satisfied, followed by the ones with secondary education.

Table 7 - Kruskal-Wallis test: Differences in Job Satisfaction as a function of qualifications

| | **Qualifications** | **N** | **M** | **SD** | **$\chi^2_4$** | **p** |
|---|---|---|---|---|---|---|
| Facilities | 1st cycle | 25 | 4.22 | 0.53 | 7.55 | .110 |
| | 2nd cycle | 11 | 4.21 | 0.50 | | |
| | 3rd cycle | 22 | 4.33 | 0.41 | | |
| | Secondary | 15 | 4.40 | 0.48 | | |
| | Higher | 12 | 3.81 | 0.56 | | |
| Professional and Personal Autonomy | 1st cycle | 25 | 4.13 | 0.52 | 3.59 | .464 |
| | 2nd cycle | 11 | 4.22 | 0.52 | | |
| | 3rd cycle | 22 | 4.26 | 0.61 | | |
| | Secondary | 15 | 4.14 | 0.52 | | |
| | Higher | 12 | 3.94 | 0.54 | | |
| Financial Compensation | 1st cycle | 25 | 3.41 | 0.78 | 11.09 | * .026 |
| | 2nd cycle | 11 | 4.03 | 0.66 | | |
| | 3rd cycle | 22 | 3.73 | 0.91 | | |
| | Secondary | 15 | 3.56 | 0.72 | | |
| | Higher | 12 | 2.89 | 0.98 | | |
| Other Benefits | 1st cycle | 25 | 4.17 | 0.54 | 10.29 | * .036 |
| | 2nd cycle | 11 | 4.26 | 0.49 | | |
| | 3rd cycle | 22 | 4.18 | 0.63 | | |
| | Secondary | 15 | 4.05 | 0.64 | | |
| | Higher | 12 | 3.58 | 0.55 | | |
| Professional Development and Training | 1st cycle | 25 | 4.13 | 0.51 | 9.03 | .060 |
| | 2nd cycle | 11 | 4.26 | 0.45 | | |
| | 3rd cycle | 22 | 4.16 | 0.73 | | |
| | Secondary | 15 | 4.10 | 0.57 | | |
| | Higher | 12 | 3.65 | 0.52 | | |
| Supervision | 1st cycle | 25 | 4.17 | 0.67 | 6.33 | .176 |
| | 2nd cycle | 11 | 4.27 | 0.42 | | |
| | 3rd cycle | 22 | 4.09 | 0.74 | | |
| | Secondary | 15 | 3.78 | 0.97 | | |
| | Higher | 12 | 3.53 | 0.95 | | |
| Work Internal Relations | 1st cycle | 25 | 4.15 | 0.45 | 8.53 | .074 |
| | 2nd cycle | 11 | 4.11 | 0.36 | | |
| | 3rd cycle | 22 | 4.11 | 0.53 | | |
| | Secondary | 15 | 4.08 | 0.53 | | |
| | Higher | 12 | 3.70 | 0.61 | | |
| Policy and Strategy | 1st cycle | 25 | 4.10 | 0.52 | 4.12 | .390 |
| | 2nd cycle | 11 | 4.09 | 0.32 | | |
| | 3rd cycle | 22 | 4.14 | 0.66 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Secondary | 14 | 4.00 | 0.62 | | |
| | Higher | 12 | 3.77 | 0.60 | | |
| Change and Innovation | 1st cycle | 25 | 3.97 | 0.46 | 9.74 | * .045 |
| | 2nd cycle | 11 | 4.18 | 0.43 | | |
| | 3rd cycle | 22 | 4.14 | 0.65 | | |
| | Secondary | 15 | 3.82 | 0.68 | | |
| | Higher | 12 | 3.53 | 0.63 | | |
| Quality Management System | 1st cycle | 16 | 4.28 | 0.35 | 5.13 | .274 |
| | 2nd cycle | 5 | 4.30 | 0.40 | | |
| | 3rd cycle | 6 | 4.53 | 0.27 | | |
| | Secondary | 7 | 3.86 | 0.74 | | |
| | Higher | 5 | 4.23 | 0.64 | | |
| Safety | 1st cycle | 25 | 4.29 | 0.51 | 19.17 | ** .001 |
| | 2nd cycle | 11 | 4.36 | 0.46 | | |
| | 3rd cycle | 22 | 4.44 | 0.56 | | |
| | Secondary | 15 | 4.13 | 0.63 | | |
| | Higher | 12 | 3.33 | 0.67 | | |

* p<.05; ** p<.01

So, overall, we can say that the H1 hypothesis is verified: for gender, where the dimensions of job satisfaction tend to be higher for females; for the type of contract, in which various dimensions of job satisfaction are higher for those with temporary contract and lower for employees with precarious contracts; for the service time, the satisfaction with various dimensions increase with increasing service time in institutions; and for the qualifications, higher values occur for certain dimensions of job satisfaction for employees with the second and third cycle of basic education and lower values are observed for employees with higher education, followed by those with secondary education.

**Hypothesis 2**: There is a significant relationship between the leadership style of the technical director and employee's job satisfaction, according to the perspective of employees.

In order to determine whether there is a significant relationship between the leadership style of the technical director and job satisfaction, according to the perspective of employees, in table 8, the dimensions of leadership style are related against the dimensions of job satisfaction. Analyzing the table, we find that most of the associations between the variables, measured by Pearson's correlation coefficient (r), stood at moderate level (.30 < r <.70), denoting that for higher values of r there is a stronger linear association between dimensions: the correlation is higher for the association between the dimension of job satisfaction "other benefits" and dimensions "task" and "relationship" of leadership styles, followed by "Situational" dimension and for the association between the dimension of job satisfaction "professional and personal autonomy" and the dimension "relationship" of leadership styles.

The proof values associated with the analyzed relationships indicate that all are statistically significant, and we can say that there is a positive relationship between all dimensions of job satisfaction and all the dimensions of leadership style, accepting thereby the H2 hypothesis.

Table 8 - Pearson correlation: Relationship between the leadership style dimensions and the job satisfaction dimensions

| | N = 85 | | Dimensions of Leadership Style Assessment | | |
|---|---|---|---|---|---|
| | | | **Relationship** | **Situational** | **Task** |
| Dimensions of Job Satisfaction | Facilities | r | ** .562 | **.438 | **.526 |
| | | p | .000 | .000 | .000 |
| | Professional and | r | **.639 | **.616 | **.590 |
| | Personal Autonomy | p | .000 | .000 | .000 |
| | Financial Compensation | r | **.346 | **.307 | **.325 |
| | | p | .001 | .004 | .002 |
| | Other Benefits | r | **.654 | **.637 | **.655 |
| | | p | .000 | .000 | .000 |
| | Professional Development | r | **.628 | **.613 | **.586 |
| | and Training | p | .000 | .000 | .000 |
| | Supervision | r | **.588 | **.566 | **.550 |
| | | p | .000 | .000 | .000 |
| | Work Internal Relations | r | **.578 | **.513 | **.524 |
| | | p | .000 | .000 | .000 |
| | Policy and Strategy | r | **.523 | **.548 | **.505 |
| | | p | .000 | .000 | .000 |
| | Change and Innovation | r | **.540 | **.464 | **.493 |
| | | p | .000 | .000 | .000 |
| | Quality Management | r | **.569 | **.570 | **.598 |
| | System | p | .000 | .000 | .000 |
| | Safety | r | **.535 | **.529 | **.605 |
| | | p | .000 | .000 | .000 |

** p<.01

## 4. DISCUSSION

This study aimed to understand the relationship between the leadership style used by technical directors serving in nine PSSI's of the districts of Guarda and Viseu and the degree of job satisfaction of its employees. It was also our intention to estimate the influence of socio-demographic and professional variables on job satisfaction.

From the empirical study, we concluded that the sample under study is mostly of female gender, aged between 22 and 65 years, mainly exerting functions for more than 10 years in institutions, with permanent contracts, which makes us believe that the PSSI's may be organizations responding to the most vulnerable populations in the labor market (on the one hand, very young individuals, in principle with little or no professional experience, and secondly, individuals with ages close to 65 years, who may have some difficulty in reentering the labor market) and at the same time PSSI's constitute a door to a job marked by security and contractual stability. In terms of qualifications, we highlight that the sample has low qualifications, since more than 50% of the respondents do not have more than the 3rd cycle of basic education. Concerning the social response in which the respondents work, it is observed that a majority works on nursing homes for elderly, values that can be explained by the regulatory requirements governing the staff of this social response (Decree No. 67/2012,March 21). Through the job satisfaction scale, we find that the dimension where employees said they feel less satisfied was the "financial compensation" and the dimension "quality management system" achieves higher levels of satisfaction.

In the next phase and by performing statistical tests, we concluded that the satisfaction of the sample under study varied according to certain socio-demographic and professional variables, having recorded the following summarized results.

For the gender variable, despite the limited number of male employees (n = 3), there was a statistically significant difference for

the “facilities” dimension, with better results for the females. Indeed, Peiró and Prieto (1996) found that job satisfaction depends on specific conditions, such as equipment and work tools, safety and location of the organization. Already Amaro (2007) found that job satisfaction in respect of professions providing care to the family and the community is higher in females. For the remaining dimensions there has been no significant differences.

Regarding the variable age, there were no significant differences. A result contrary to the opinion of Cunha et al. (2007), however, it meets the conclusions of other authors (Cordeiro & Pereira, 2006; Martineza, Paraguaya, & Latorreb, 2004) who have not found, in the researches carried out, any relationship between age and job satisfaction. Regarding the variable type of contract, there were significant differences in the dimensions: “facilities”, “professional and personal autonomy”, “financial compensation”, “professional development and training”, “work internal relations”, “policy and strategy” and “safety”, being the higher satisfaction for those with temporary contract and the lower satisfaction for employees with precarious contract. Already Lopes (2011) found a significant positive relationship between the perception of fulfillment of psychological contract and the involvement of employees with the organization and noted that in temporary workers, the perception of fulfillment of psychological contract explained further 2% of their emotional involvement when compared to permanent workers. The referred author justifies this result stating that for these employees a more restricted psychological contract is made, which may be the cause for better compliance.

Regarding the variable service time, there were significant differences in the dimensions “professional and personal autonomy”, “other benefits”, “professional development and training”, “supervision”, “work internal relations” and “policy and strategy”, were the employees who work for less than a year in the institution were those with lower levels of satisfaction and the most satisfied were those who worked for over 10 years in the institution. Vroom (1964, cit. by Ribeiro, 2005) helps us to explain these results, indicating that professionals with less experience in the integration period in the organization do not receive the respective reward in face of the results they consider having achieved, which makes that their expectations fall shorter than expected, resulting in a decrease in the degree of job satisfaction. Moreover, the same author confirms in his study the influence of service time in satisfaction, thus, according to the results obtained by the author, the greater the bonding time, the higher the employee satisfaction.

The variable qualifications is related with significant changes in the satisfaction of employees for the dimensions “financial compensation”, “other benefits”, “change and innovation” and “safety”, with higher satisfaction for employees with second and third cycle of primary education and lower satisfaction for employees with higher education, followed by those presenting secondary education. These results are in line with those presented by the National Observatory for Human Resources, in its report of 2011, who found that workers with lower qualifications are those that express a greater degree of satisfaction in the workplace, as opposed to workers holding higher qualifications. This can be explained in terms of expectations, because the less skilled are the most conformed with the work they perform. Vara (2007) states that individuals with higher academic levels have jobs with greater responsibility and greater stress and are more vulnerable when the expectations in relation to their work are not met. Pimentel (2011) adds that many graduates are performing poorly paid jobs, in relation to their expectations by having a university degree, causing this situation dissatisfaction.

In addition to the results above, as a complement to this study, it was also performed an exploratory analysis for the satisfaction as a function of social response in which the employee performs his duties. An inferential analysis was not conducted because some of the social responses constituted small subgroups in the sample under study. Still, there was a trend to find less satisfied individuals in social responses nursing home for elderly and continuous care units. These results can be explained by the fact that these are the only two social responses that operate 24 hours a day, which means that employees have to work in shifts. In the study of Vara, Queiroz and Galvão (2010), the results showed that employees who work in shifts have higher levels of exhaustion and burnout and express less positive emotions. Also as a rule, these two types of social responses host a typology of users/ customers that is characterized by having high levels of dementia and dependence in relation to other social responses we contemplate in our study. Barbosa, Cruz, Figueiredo, Marques and Sousa (2011) report that the care for elderly people with dementia is associated with high levels of job dissatisfaction due to high dependency and frequent behavioral disorders that accompany the disease and cause physical and emotional stress in caregivers.

Regarding the leadership style of the technical directors, we found that the dominant styles are situational and relational, followed by the task style, in the view of the employees. Since the difference between the prevalence of situational and relational styles is reduced, this may mean that employees rated their directors as situational leaders, however, with a tendency towards a behavior more oriented to relationship than to task.

We have also sought to know whether there was an association between employee’s job satisfaction and leadership style of the technical directors, and we concluded that there is a relationship between all the dimensions of satisfaction and leadership styles dimensions: task, relationship and situation, and at this level it was identified that employees feel more satisfied when the leader has behaviors that meet the relationship style and less satisfied when leadership style shown by the technical director is more

focused on the task, results that are consistent with studies conducted by Almeida (2012), Acioly (2007) and Serrenho (2010).

Thus, our results seem to show that the leadership style that promotes greater satisfaction among employees is the one identified in the literature as the transformational leader, who inspire and promotes the subordinates satisfaction through the good relationship established with them.

## CONCLUSIONS

In view of the adverse conditions that organizations go through every day, people make the difference! The current context imposes numerous challenges to the management of human capital, more and more managers envisage the area of people management as complex, but also as strategic to achieve organizational goals (Lopes, 2011; Martinez, 2015).

On the other hand, job satisfaction is a key driver for productivity and increased job performance. It is in this context that emerges the importance of the leader, who should be able to generate changes at the level, for example, of the creation of strategies to promote and increase the job satisfaction of the team.

In the specific case of PSSI's, the challenges that currently arise are related to, among others, the need for a conduct based on a strong sense of professionalism, since the existence of a competent and motivated team is a success factor for these and other organizations. It is necessary that PSSI's, the same way as business organizations, increase the focus on the effective management of its human resources, opening a space for awareness and training of their technical directors in areas such as leadership, so that they can develop skills which will satisfy and motivate employees.

Finally, we highlight the main limitations of our study, related, on the one hand, with the small number of respondents, which makes it impossible to generalize the results, and, second, that the opinion of the technical directors was not contemplated, which certainly would give us additional and significant information about the investigated issues. It is thus as a proposal for future research.

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# PERCEÇÃO DO EMPOWERMENT DOS ENFERMEIROS NUMA ORGANIZAÇÃO DE SAÚDE

# PERCEPTION OF NURSES' EMPOWERMENT IN HEALTHCARE ORGANIZATION SETTINGS

# PERCEPCIÓN DEL EMPOWERMENT DE LOS ENFERMEROS EN UNA ORGANIZACIÓN DE SALUD

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## RESUMO

Introduction: O conceito de Empowerment na Enfermagem tem sido utilizado e analisado na literatura académica, conceito digno de exploração e interesse para os enfermeiros, chefes e gestores das organizações de saúde. A perceção dos Enfermeiros acerca do Empowerment é determinante nos resultados organizacionais, no aumento da autonomia profissional, no ganho do poder individual e coletivo e nos cuidados ao utente.

Objetivos: Avaliar a perceção dos Enfermeiros acerca do Empowerment (Psicológico e Estrutural), identificar os fatores que influenciam essa perceção e analisar e refletir sobre as consequências dessa perceção.

Métodos: Estudo quantitativo, numa amostra de 269 enfermeiros predominantemente o sexo feminino (76,6%), faixa etária entre os 21 e os 59 anos, cuja média das idades se situa nos 40,36 anos, 68,8% dos participantes licenciados, em exercício de funções num hospital da região da Beira Alta, Portugal.

Resultados: Nos enfermeiros, a perceção de Empowerment Psicológico está relacionado com a perceção de empowerment Estrutural. Os enfermeiros com mais idade e maior tempo de exercício profissional revelaram maior competência e menor oportunidade. Os enfermeiros com maior tempo no atual serviço, apresentam maior competência, mas menor oportunidade, informação, suporte e globalmente, Empowerment Estrutural. Na categoria profissional há diferenças na informação, recursos e poder informal dos Enfermeiros Especialistas.

Conclusão: Os Enfermeiros revelaram bons níveis de Empowerment Psicológico e baixos níveis de Empowerment Estrutural.

**Palavras-chaves:** Empowerment; perceção dos enfermeiros; organizações de saúde.

## ABSTRACT

Introduction: The concept of Empowerment in nursing has been increasingly used and analyzed in academic literature. It is a concept that nurses, leaders and managers of healthcare institutions should be interested in and should greatly explore.

The perception that nurses have of Empowerment plays a decisive role in the organizational results, in the increase in professional autonomy, in collective and individual power increment and in patients' healthcare providing.

Objectives: To evaluate nurses' perception of Empowerment (Psychological and Structural); to identify the factors that will influence this kind of perception and to reflect on the consequences of that perception.

Methods: Quantitative study, based on a sample composed of 269 nurses, mainly female (76,6%), aged between 21 and 59, with a 40,36 years old average age. 68.8% of the participants have a college degree and are working in a hospital in the Beira Alta region, in Portugal.

Results: In nurses, the perception of Psychological Empowerment is associated with the perception of Structural Empowerment. Older nurses and nurses who have a longer nursing career show higher competence and lower opportunity. Nurses who have spent a longer period of time in their current services show higher competence but less opportunity, information, support and, globally, a lower Structural Empowerment. In this professional category, specialist nurses' opinion about information, resources and informal power is quite different from the one felt by the other nurses.

Conclusion: Nurses show high levels of Psychological Empowerment and low levels of Structural Empowerment.

**Keywords:** Empowerment; nurses' perception; healthcare organizations.

## RESUMEN

Introducción: El concepto de Empowerment en la Enfermería ha sido utilizado y analizado en la literatura académica, es un concepto dignode exploración y de interese para los enfermeros, responsables y gestores de las organizaciones de salud. La percepción que los enfermeros tienen sobre el Empowerment es determinante en los resultados organizativos, en el incremento de la autonomía profesional, el aumento del poder individual y colectivo y en los cuidados prestados a los pacientes.

Objetivos: Evaluar la percepción de los enfermeros sobre el Empowerment (Psicológico y Estructural), identificar los factores que influyen en esa percepción y analizar y reflexionar sobre las consecuencias que puede tener esa percepción.

Métodos: Estudio cuantitativo basado en una muestra de 269 enfermeros, predominantemente del sexo femenino (76,6%), de edades comprendidas entre los 21 y los 59 años, con una media de edad es de 40.36 años. El 68.8% de los participantes tienen un diploma universitario y ejerzan su actividad en un hospital de la región de Beira Baixa, Portugal.

Resultados: En los enfermeros, la percepción del Empowerment Psicológico está relacionada con la percepción del Empowerment

Estructural. Los enfermeros de mayor edad y con una carrera profesional más larga revelan una mayor competencia y una menor oportunidad. Los enfermeros que llevan más tiempo en el servicio en el que trabajan actualmente presentan una mayor competencia, pero menos oportunidad, menos información, menos soporte y, globalmente, un menor Empowerment Estructural. En la categoría profesional, hay diferencias en la información, en los recursos y en el poder informal demostrado por los enfermeros especialistas.

Conclusiones: Los Enfermeros revelaron buenos niveles de Empowerment Psicológico y bajos niveles de Empowerment Estructural.

**Palabras Clave:** Empowerment; percepción de los enfermeros; organizaciones de salud.

## INTRODUCTION

The analysis of this article instills into the readers a reflexive thinking about this wide field of study that is the nursing activity. For a long time, no one really felt any concern about the definition of nursing or what its field of action really was. By the end of the 1950s little had been done about this science. From then on, there seems to have been an agreement among nurses that led to the search for the knowledge that was specific to this activity, knowledge that would then be organized and systematized in theories and structural models aimed at describing, explaining and predicting phenomena related to nursing.

Initially, nursing represented basically any healthcare provided by women who followed the Church's teachings, healthcare that were merely based on their own life experience. With the advance of scientific medicine, in the second half of the twentieth century, nursing went through a process of autonomy as a scientific discipline and as a profession. Several nursing theories were then developed and published, theories in which concepts that reflect the nature and the scope of nursing are selected and interrelate according to different philosophical perspectives (Cianciarullo, 2001).

In this context, there has been a growing interest in the phenomenon known as Empowerment in nursing, which is part of the Healthcare organizational system.

This concept of Empowerment has been more and more used and analyzed in academic literature and has been adapted over time in order to meet the needs of a variety of disciplines (Bartunek e Spreitzer, 2006). Nursing was no exception and, for this discipline, Empowerment is frequently referred (Bradbury-Jones, Sambrook, and Irvine, 2008). "Nursing is going through a state of change, extremely active in defining its theory, its practice, its investigation, its social and critical representation vis-à-vis its current status" (Filipe, 2003) . Studies suggest that, in nursing, Empowerment is frequently associated with lower evidence of burnout syndrome in nurses and to lower tension at work (Manojlovich, 2007). In fact, we are insistently looking for the best strategies that may contribute to show the added value of our profession in a context where the Healthcare system has to face certain challenges and has to meet the citizens' current and future needs. Hence, it becomes a concept worth exploring and that is of particular interest for nurses, leaders and managers of any healthcare organization.

Literature suggests that Empowerment is a product that comes from the interaction between some individual and organizational factors and the recognition of the power which exists in the relationships that are established during nursing practice. This is a central issue of this study and one which makes its clarification essential. We decided to keep the term "Empowerment" in its original form, that is to say, in English, and not use its translation in order to, according to Vasconcelos (2003), keep its reliability. To define Empowerment represents the first challenge we have to face in order to reflect upon this topic and to achieve a better clarification of the topic in itself. It will thus be a dynamic process that involves cognitive, affective and organizational aspects. It means an increase in power, in autonomy (personal and collective), in self-efficiency which will have effects on the improvement of interpersonal and organizational relationships. According to Amendoeira (2004), nurses have difficulties in developing and justifying their power/autonomy within the Healthcare organizations, despite feeling competent and capable. However, promoting Empowerment in nurses will have positive results, both at an individual/psychological level and at a structural/organizational level, namely in the increase in competence, in autonomy, in confidence, in satisfaction, in professional well-being and in the quality of healthcare provided. Since this issue has such a vast interest, the objectives we have defined were, not only to assess the perception nurses have about Psychological and Structural Empowerment, but also to identify the factors which influence its perception and to analyze and to reflect upon the consequences that such perception might have.

## 1. THEORETICAL FRAMEWORK

The construction of the Empowerment concept starts in the 1970s influenced by self-help movements. Then, in the 1980s, the influences came from the community psychology through social work and, in the 1990s, from the movements that were trying to consolidate the influence the citizenship rights were meant to have over the different social spheres, healthcare being one of those

spheres (Carvalho, 2004). The concept of Empowerment may be translated in Portuguese through some synonyms, empowering or emancipation, for instance, but there is no agreement on the translation and significance, so it was decided to keep its original English form.

According to some authors (Vasconcellos, 2003; Silva e Martínez, 2004; Oakley and Clayton, 2003), we could define Empowerment as a dynamic process which involves affective, cognitive and behavioral aspects and that means an increase in power, an increase in personal and even in collective autonomy of some individuals or social groups as far as interpersonal and organizational relationships are concerned. Kanter (1993) defines power as the capacity to mobilize the resources we need to accomplish what we want to accomplish.

Clinical knowledge is achieved over time and healthcare professionals are themselves often unaware of its acquisition. We need to create strategies that will make clinical knowledge visible so that it may be improved and refined and become an expert knowledge (Benner, 2001). Since the 1980s, nursing has been investigated in Europe, United State of America and in Canada (Sarmiento, Laschinger, 2004; Decicco, Laschinger, Kerr, 2006; Laschinger, Finegan, Shamian, 2001). In the last two decades, this scientific discipline has been widely studied by Heather K. Spencer Laschinger, a Canadian nurse who demonstrated the relationship that exists between the different elements we immediately associate with Empowerment and the different dimensions of nursing practice like teaching, public healthcare, nursing home services and, above all, the development of healthcare provided in hospitals. This way, this Empowerment perspective is essential for nursing, since it will build competences and a knowledge that will lead to an improvement in nurses' autonomy. This construct will be useful to implement intervention dynamics that will promote Healthcare.

We easily understand why the role played by Empowerment in nursing is gaining more and more visibility in healthcare. This reality is supported by a review of the literature about the relationships existing between the culture of nursing and the nurses' participation in their own work (Knol, J. and Linge, R. V., 2009). Structural and psychological Empowerment in nursing coexist in an individual's working setting. Structural Empowerment exists whenever people have access to the "information, support, resources and opportunities to learn and to grow" (Laschinger, 2004). Psychological Empowerment is a process that occurs when one is motivated to do his job (Manojlovich, 2007).

Rosabeth Moss Kanter's work about organizational Empowerment, which is responsible for the emphasis that the term Empowerment received in the 1970s and is an historical milestone in the field of organizational management, deserves our attention: for this author, Empowerment is seen as the result of social structures in the professional environment. This allows professionals to be more efficient and show higher satisfaction levels when they are given more autonomy and more responsibilities to make decisions.

The perception of Empowerment influences professional attitudes, organizational efficiency and productivity (Kanter, 1993). In her work place, she could identify six different structural conditions that will make our workplace stronger. She also stated that those characteristics, that depend on the workplace we are part of, have a greater influence on the employees' attitude and behaviors than personal characteristics themselves. The first structural condition is opportunity (a work situation which reflects the possibilities one has to learn and progress within the organization); access to information is another of those conditions (the knowledge one has about the objectives that have to be fulfilled, the organizational and even political decisions, the technical knowledge and expertise required to be a capable member in a vast organizational context); another of those conditions is the access one has to support (the feedback and guidance one gets from managers, superiors and peers, as well as all the useful advice, emotional support or any kind of help one can get from the other elements of the organization); then we have the access one has to resources (the ability one has to access materials, money, time and equipment required to enable us to meet the organizational objectives that had been set); access to organizational structures and power are the last of those conditions. Formal power derives from the high-visibility organizational processes which are essential to the organization and which require independent decisions, a kind of power that comes from an excellent performance in all the activities that are part of one's job and that makes this performance extraordinary, visible, a kind of action that will attract public attention and will play a relevant role in solving any organizational problems (Brown and Kanter, 1982). On the other hand, we also have to take into account informal power that comes from political or social alliances and from alliances made with peers and even with subordinates within an organization (Laschinger, 2004 and Wagner et. Al, 2010).

The objectives of a good organizational management would then have to be the creation of conditions that would lead to a higher working efficiency, that would allow nurses to have access to the information, support, resources and power they will need to fulfill their objectives and that will give them the opportunities they need to improve and develop their abilities.

The Empowerment provided by the working environment seems to predict the organizational Empowerment, which "(...) only reveals part of the story, but is not enough in itself "(Manojlovich, 2007). An explanation is, in a theoretical perspective, in order. Empowerment has to be seen from the individual's point of view (Kuokkanen and Leino-Kilpi, 2000) and as a psychological

experience (Manojlovich, 2007). In this context, Empowerment is seen as an individual development and growth process in which the individual's beliefs, values, opinions and perceptions are key factors (Kuokkanen and Leino-Kilpi, 2000). With the same purpose, Spreitzer (1995) developed the psychological version of Empowerment: a motivational construct that will find its expression in four different dimensions: competence, the individual's perception that he is capable of performing successfully a given task (Thomas e Velthouse, 1990); self-determination which reflects the autonomy one possesses to start and to carry on a given activity and to make the right decisions about one's own working methods (Manríquez, Ramírez, and Guerra, 2004); the meaning a task, work or specific project has for the individual and whether this meaning is in agreement with this person's beliefs, attitudes and values (Thomas and Velthouse, 1990); the impact that the personal feelings which are influenced by working environment have on the individual (Sommer, Nunes, Hipólito, Brites, Pires, and Pires, 2010).

The need for an alternative theoretical perspective to structural Empowerment is therefore evident, a perspective in which Empowerment will also exhibit a crucial psychological connotation.

Laschinger et al (2001) suggest that psychological Empowerment is associated with organizational commitment and that it may be a variable that stands halfway between structural Empowerment and the individual's behavior. The sense of belonging we can find in psychological Empowerment comes from environmental factors that can be found in the organizational structure. The perception one has of Empowerment derives from the interaction that takes place between those factors.

The concept of Empowerment is based on the assumption that the organizations' employees are resources that have the appropriate experience and knowledge and that share common interests within the context of an institution organizational development, since, in a constantly changing environment, all the organizations need motivated workers who will accept their responsibilities and pursue excellence.

The Empowerment construct in nursing is becoming an important factor in determining health and well-being standards in new reformed healthcare organizations. According to (Laschinger, Almost, Tuer-Hodes, 2003; Matthews, Laschinger, Spence, Johnstone, 2006; Laschinger, Finegan, 2005), in these organizations, the easy access to information, the participation in qualification activities and the use of Empowerment will influence nursing practice aiming at a professional performance that will reflect a higher autonomy and higher quality standards. This kind of professional performance will thus contribute to a higher quality when it comes to provide healthcare to the patients who need it and, consequently, will bring positive results to the organization.

In the organizations, structural Empowerment includes the access to information, to support and to all the resources that belong to the working environment and that will allow the organization's employees to carry out their work in the most expressive and efficient way. The opportunities that any organization' workers have to improve their own competences and to develop their knowledge within the organization itself is crucial for their efficiency and for their job satisfaction. On the other hand, when these opportunities are not available feelings like frustration, hostility, lack of motivation that will lead to a poor working performance and low levels of commitment with the organization are likely to be perceived (Kanter, 1993). The impossibility to access these Empowerment structures will create feelings of helplessness. This perspective is in total contrast with the higher levels of Empowerment that come from the major motivation felt by any organization's employees when they are directly involved in the achievement of personal and organizational objectives that will undoubtedly lead to a major feeling of autonomy (Kanter, 1993 and Laschinger, 1996).

Consequently, we perceive Empowerment as a process that was socially created, built on the individual relationships that it establishes with the environment and with one's peers. The individual's vision of what happens around him is essential, as well as is the individual's self-knowledge and willingness to act which will be expressed through concrete actions and behaviors and which will lead to a personal and professional improvement. This improvement will be based on an increase in autonomy, in power, on a greater motivation and visibility which will bring greater responsibilities.

## 2. METHODS

This is a study based on a quantitative research methodology, with correlational and cross-sectional methodologies. The population of our study is totally composed of the 400 nurses who work at the Sousa Martins Hospital (SMH) a medical institution which belongs to the Healthcare Local Unit from Guarda, EPE, in Portugal.

Based on the objectives of our study and on the theoretical framework presented, we formed the following research hypothesis: Hypothesis 1- The perception of psychological Empowerment is related to the perception of structural Empowerment; Hypothesis 2- The perception of Empowerment (Psychological and structural) is related to the nurses' age; Hypothesis 3- The perception of Empowerment (Psychological and structural) is different depending on the nurses' gender; Hypothesis 4- The perception of Empowerment (Psychological and structural) is different according to the nurse's academic degree; Hypothesis 5- The perception of Empowerment (Psychological and structural) is different depending on the nurse's professional category; Hypothesis 6 - The

perception of Empowerment (Psychological and structural) is influenced by the duration of his/her professional nursing career; Hypothesis 7 - The perception of Empowerment (Psychological and structural) is influenced by how long the nurse is working in his/her current service/specialty.

## 2.1 Sample

In our descriptive analysis we witnessed that, as far as socio-demographic and professional characteristics were concerned, the 269 nurses who have participated in our study were between 21 and 59 years old, which represents a 40.36 years old average age with a 9.04 years standard deviation. Most of the elements in our sample were female (76.6%). We have also confirmed that most nurses (68.8%) had a college degree.

As far as the professional characteristics were concerned, we observed that 69.5% of the participants were Nurses and that 26.4% of them were Specialist nurses. Their career duration ranged between 1 month (0.08 years) and 35.92 years. 17.07 years was the average career duration with a 8.92 years standard deviation. We also realized that 19.7% of the nurses referred they had been working for a period of time between 20 and 24 years. When it came to state the amount of time they have been working in their current service or specialty, we could observe values that ranged between 1 month (0.08 years) and 31.92 years. 9.62 years was the average time with a 8.12 years standard deviation. We observed that 34.2% of the nurses had been working in their current service for less than 5 years.

## 2.2 Data collection instruments

The Conditions of Work Effectiveness Questionnaire – II (CWEQ-II), developed by Laschinger et al (2001), was used to assess the perception of structural Empowerment in nurses. This questionnaire is based on Chandler's (1986) original CWEQ which included 36 items and on the "Job Activities Scale" (Lashinger, Sabistan and Kutzcher 1997) and the "Organizational Relationships Scale" (Lashinger, Sabistan and Kutzcher 1997). The adaptation of the original CWEQ, developed by Laschinger et al (2001), gave birth to the CWEQ – II, using a predictive and non-experimental study. The CWEQ-II instrument assesses the 6 components described by Kanter (1977) in her theory of structural Empowerment and each one of these components forms a subscale that includes 19 items: opportunity (3 items), information (3 items), support (3 items), resources (3 items), formal power (3 items) and informal power (4 items). It also includes a global Empowerment scale used to validate the construct (2 items) and where this evidence is based on the correlation between this scoring and the Empowerment total scoring. CWEQ-II uses a 5 point Likert Scale, with scorings that range from "none" to "a lot" in each item. Questions are asked in a positive form and a higher scoring means a higher level of structural Empowerment.

The Psychological Empowerment Instrument (PEI) was developed by Spreitzer (1995). It is a valid and reliable instrument to assess the employees' perception of psychological Empowerment at a certain work setting. This instrument is based on Thomas and Velthouse's (1990) model where four dimensions that may come to influence the perception of individual Empowerment were defined: meaning, competence, self-determination and impact. These four dimensions are represented by 16 items, in a 7 item Likert scale, ranging from 1( totally disagree) to 7 (totally agree). The intermediate value (4) is considered as neutral. Thus, the total scoring ranges between 16 and 112, between 4 and 28 in each subscale. We are capable of calculating an average and total scoring.

## 2.3 Inclusion criteria

We have defined a purpose sampling based on the following criteria: nurses belonging to the SMH and who were available to willingly participate in our study.

## 2.4 Procedures

The previous approval to use this instrument was given by its original author. Teixeira A. (2012), the researcher who validated and translated the scales so they could be used in Portugal, refers that Spreitzer, in the information he gave when he sent the validation of the scale, suggested that we could remove one item from each dimension. The scale would nonetheless keep its psychometric properties and the scoring would range from 12 to 84.

The reliability of the two instruments that were part of the questionnaire we developed was studied through the analysis of the internal consistency of the different dimensions and of the total scorings. The method we chose used Cronbach's alpha coefficient determination which value may range between 0 and 1. The results allow us to confirm that, for the dimensions observed in both

scales, the values were above 0.70 with a maximum 0.92 value. As for the total scorings, values above 0.85 were found: 0.85 for the PEI Scale and 0.83 for the CWEQ-II Scale. This way, we can conclude that both scale show a good or very good internal consistency and, consequently, consider that, for the current study, these instruments show a good reliability. Statistical treatment was processed using the version 22 (2015) of the SPSS (Statistical Package for the Social Science) programme. We chose non-parametric tests because the two central variables of this study (psychological and structural Empowerment) don't show a normal distribution in any of their dimensions.

In all the tests, 0.05 was set as the significance limit, that is to say that the null hypothesis was rejected when the probability (p) that was defined in the test was below the set value, or, in other words, when $p < 0.050$. We have accepted the research hypothesis when p value $< 0.050$.

## 3. RESULTS

Based on the data we have collected through the application of the PEI and CWEQ-II scales, we can confirm that nurses show a higher psychological Empowerment in the "meaning" and "competence" dimensions and a lower Empowerment in the "impact" and "self-determination" dimensions. We got total scorings that ranged from 3.00 to 82.00, which represents a 65.65 point mean value, with a 7.71 point standard deviation.

Half of the nurses obtained values of 66.00 points or above. Since the total of the evaluation scale could range between 12 and 84 points, the results we have obtained show that nurses exhibit good psychological Empowerment levels.

As far as structural Empowerment is concerned, which was assessed through the CWEQ-II scale, the results show that nurses reveal higher Empowerment levels in the "opportunity" and "informal power" dimensions. In contrast, nursing professionals show lower Empowerment levels when it comes to "formal power" and "information". We observed total scorings that ranged between 1.22 and 4.61 points which gives us a 2.89 points mean value with a 0.63 point standard deviation. Half of the nurses obtained a 2.89 score or above. Since the evaluation scale could range from 1 to 5 points, the results confirm that nurses have a certain tendency to show low structural Empowerment levels.

In the hypothesis 1, studying the correlation between psychological Empowerment (PEI) and structural Empowerment (CWEQ-II) allows us to confirm the existence of a positive and statistically significant correlation in most situations. Such results confirm that the data support the hypothesis we had defined and that nurses who show higher psychological Empowerment levels are prone to exhibit higher structural Empowerment levels (Table 1).

Table 1 – Study of the correlation between psychological *Empowerment* (PEI) and structural *Empowerment* (CWEQ-II).

| Structural Empowerment | | Psychological Empowerment | | | | |
|---|---|---|---|---|---|---|
| | | Meaning | Competence | Self-determination | Impact | Total |
| Opportunity | $r_s$ | +0.36 | +0.20 | +0.34 | +0.28 | +0.41 |
| | p | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Information | $r_s$ | +0.09 | +0.12 | +0.30 | +0.37 | +0.32 |
| | p | 0.125 | 0.053 | **0.000** | **0.000** | **0.000** |
| Support | $r_s$ | +0.15 | +0.07 | +0.37 | +0.32 | +0.34 |
| | p | **0.013** | 0.249 | **0.000** | **0.000** | **0.000** |
| Resources | $r_s$ | +0.04 | +0.14 | +0.27 | +0.28 | +0.26 |
| | p | 0.498 | **0.024** | **0.000** | **0.000** | **0.000** |
| Formal power | $r_s$ | +0.09 | +0.07 | +0.32 | +0.37 | +0.32 |
| | p | 0.155 | 0.231 | **0.000** | **0.000** | 0.000 |
| Informal power | $r_s$ | +0.26 | +0.26 | +0.29 | +0.29 | +0.38 |
| | p | **0.000** | **0.000** | **0.000** | **0.000** | **0.000** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total | $r_s$ | +0.22 | +0.19 | +0.42 | +0.44 | +0.45 |
| | p | **0.000** | **0.002** | **0.000** | **0.000** | **0.000** |

Studying the correlation between Empowerment (psychological and structural) and the nurses' age, hypothesis 2, the results we had obtained, showed that there is only a statistically significant correlation for the psychological Empowerment dimension "competence" and for the structural Empowerment dimension "opportunity". In the first case, the correlation is positive, while this correlation is negative in the second case. Therefore, we can conclude that older nurses are more likely to show higher levels of psychological Empowerment (competence) and lower levels of structural Empowerment (opportunity).

In the hypothesis 3, the results show that none of the differences we could observe may be considered as statistically significant. This fact led us to conclude that there is no statistical evidence to show that the perception of Empowerment in female nurses is different from the male nurses' perception.

In the hypothesis 4, the results obtained showed that there isn't any statistically significant difference. This fact leads to the conclusion that the perception of Empowerment (structural and psychological) does not differ according to the nurses' academic level.

To the hypothesis 5, only 2 categories were taken into account: nurse and specialist nurse, since the number in the remaining categories wasn't representative. The results (Comparison between psychological Empowerment (PEI) and structural Empowerment (CWEQ-II) according to the nurses' professional category) revealed that there is no statistically significant difference as far as psychological Empowerment is concerned. However, those differences are visible when it comes to some structural Empowerment dimensions, namely "information", "resources" and "informal power". In all these situations, specialist nurses tend to show higher levels of structural Empowerment (Table 2)

To the hypotheses 6 and 7, the results we obtained when we studied the correlation between psychological Empowerment (PEI) and structural Empowerment (CWEQ-II) and the duration of the nurses' professional practice and the amount of time they have been working in their current service/specialty showed that hypothesis 6 is confirmed as far as the psychological Empowerment's "competence" dimension and the structural Empowerment's "opportunity" dimension are concerned. In the first case, the correlation is positive, while, in the second case, we have a negative correlation. We can therefore conclude that nurses who have been working for a longer period of time are more likely to show higher levels of psychological Empowerment (competence) and lower levels of structural Empowerment (opportunity).

In the second case, the hypothesis is confirmed as far as the psychological Empowerment dimension "competence" and the structural Empowerment dimensions "opportunity", "information" and "support" are concerned, being in this case, confirmed in global terms as well.

Table 2 – Comparison between psychological Empowerment (PEI) and structural Empowerment (CWEQ-II) according to the nurses' professional category.

| Scale | Dimension / Professional Category | n | | | Md | z | p |
|---|---|---|---|---|---|---|---|
| PEI (Psychological *Empowerment*) | Meaning | | | | | | |
| | Nurse | 187 | 127.16 | 18.58 | 18.00 | -0.830 | 0.406 |
| | Specialist Nurse | 71 | 135.65 | 18.65 | 19.00 | | |
| | Competence | | | | | | |
| | Nurse | 187 | 124.33 | 17.92 | 18.00 | -1.825 | 0.068 |
| | Specialist Nurse | 71 | 143.11 | 18.30 | 18.00 | | |
| | Self-determination | | | | | | |
| | Nurse | 187 | 129.06 | 14.88 | 15.00 | -0.156 | 0.876 |
| | Specialist Nurse | 71 | 130.67 | 14.90 | 15.00 | | |
| | Impact | | | | | | |
| | Nurse | 187 | 125.38 | 13.71 | 14.00 | -1.447 | 0.148 |
| | Specialist Nurse | 71 | 140.35 | 14.39 | 14.00 | | |
| | Total | | | | | | |
| | Nurse | 187 | 125.69 | 65.09 | 65.00 | -1.331 | 0.183 |
| | Specialist Nurse | 71 | 139.53 | 66.24 | 67.00 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CWEQ-II (Structural *Empowerment*) | Opportunity | | | | | | |
| | Nurse | 187 | 130.57 | 3.60 | 3.67 | -0.378 | 0.705 |
| | Specialist Nurse | 71 | 126.68 | 3.54 | 3.67 | | |
| | Information | | | | | | |
| | Nurse | 187 | 121.88 | 2.34 | 2.33 | -2.701 | **0.007** |
| | Specialist Nurse | 71 | 149.58 | 2.71 | 3.00 | | |
| | Support | | | | | | |
| | Nurse | 187 | 126.98 | 2.68 | 3.00 | -0.891 | 0.373 |
| | Specialist Nurse | 71 | 136.13 | 2.79 | 3.00 | | |
| | Resources | | | | | | |
| | Nurse | 187 | 123.18 | 2.58 | 2.67 | -2.231 | **0.026** |
| | Specialist Nurse | 71 | 146.15 | 2.86 | 3.00 | | |
| | Formal Power | | | | | | |
| | Nurse | 187 | 127.27 | 2.38 | 2.33 | -0.788 | 0.431 |
| | Specialist Nurse | 71 | 135.38 | 2.47 | 2.67 | | |
| | Informal Power | | | | | | |
| | Nurse | 187 | 123.13 | 3.28 | 3.25 | -2.245 | **0.025** |
| | Specialist Nurse | 71 | 146.29 | 3.50 | 3.75 | | |
| | Total | | | | | | |
| | Nurse | 187 | 123.93 | 2.81 | 2.80 | -1.948 | 0.051 |
| | Specialist Nurse | 71 | 144.18 | 2.98 | 3.00 | | |

In the first situation, we can observe that the correlation is positive, but when it comes to structural Empowerment, all the correlations are negative. Based on these results, we can conclude that nurses who have been working longer in the same service/specialty are more likely to show higher levels of psychological Empowerment (competence) and lower levels of structural Empowerment (opportunity, information, support and global) (Table 3)

Table 3 - Correlation between psychological *Empowerment* (PEI) and structural *Empowerment* (CWEQ-II) with the duration of the nurses' career and the amount of time spent in the same service/specialty.

| Scale | Dimension | Duration of nursing career | | Amount of time in this service/ specialty | |
|---|---|---|---|---|---|
| | | $r_s$ | p | $r_s$ | p |
| PEI (Psychological *Empowerment*) | Meaning | -0.03 | 0.595 | -0.03 | 0.637 |
| | Competence | +0.19 | **0.002** | +0.22 | **0.000** |
| | Self-determination | -0.05 | 0.436 | -0.06 | 0.290 |
| | Impact | +0.08 | 0.208 | -0.06 | 0.330 |
| | Total | +0.05 | 0.412 | +0.01 | 0.964 |
| CWEQ-II (Structural *Empowerment*) | Opportunity | -0.17 | **0.005** | -0.25 | 0.000 |
| | Information | -0.06 | 0.303 | -0.15 | **0.015** |
| | Support | -0.08 | 0.201 | -0.15 | **0.017** |
| | Resources | +0.10 | 0.096 | -0.01 | 0.874 |
| | Formal power | -0.06 | 0.308 | -0.10 | 0.105 |
| | Informal power | +0.09 | 0.128 | +0.01 | 0.996 |
| | Total | -0.05 | 0.404 | -0.16 | **0.007** |

## DISCUSSION

More than ever, nursing workers must be recognized and appreciated for their knowledge, since this helps promote their professional autonomy and, at the same time, ensures a valuable contribution to the creation of a collaborative environment with other health workers, contributing to an interdisciplinary atmosphere. Analyzing and understanding our actions, we realize that Nursing is much more than a mere set of techniques, it is truly a creative process that involves sensibility and a reflexive attitude which will bring benefits to our professional performance and will contribute to its development and recognition. Healthcare practices cannot survive if they keep on being undervalued. It is up to nurses to make them visible through their competence and

professional autonomy.

As far as Empowerment in nursing is concerned, we can identify countless consequences, both for Nurses, with the improvement in nurses' competence, autonomy, confidence, satisfaction, professional well- being and with the decrease of feelings like frustration, failure, professional dissatisfaction, and for Healthcare organizations. In this case, those benefits will be visible in an increase in productivity and organizational efficiency; they will represent a motivational factor by promoting the sharing of common organizational goals. Ultimately, all these consequences will have positive effects on what really matters when we deal with nursing practice: the improvement in healthcare provided to patients. The results of our study support Kanter' workplace Empowerment theory (1993) which states that the Empowerment of working conditions has positive effects on the attitudes and behaviors of the individuals who are part of an institution's organizational structures. Psychological Empowerment is the individual answer to structural Empowerment, that is to say that it is the result of a structured working environment that will provide access to opportunity, information, support and resources which, when combined, are capable of shaping nurses' conduct and feelings.

## CONCLUSIONS

The results of this study, along with the support we got from literature, are particularly important to nursing management. All this will help develop this Empowerment process by creating conditions through which working relationships, organizational cooperation and support given to nurses can be improved. These improvements will lead to higher feelings of competence, autonomy, meaning and impact on the organization.

The review of the literature we carried out show that all the efforts made to improve nursing practice through Structural Empowerment are only part of the factors that facilitate nurses Empowerment. Changing merely the organizational practices is not enough to fully perceive Empowerment, since psychological Empowerment must also be considered in this construct. One of the objectives of the current study was to acquire a deeper knowledge about the factors involved in nurses' perception of Empowerment. As a result of the analysis of the PEI scale, we found out 4 factors: competence, meaning, self-determination and impact, in agreement with what is envisioned by Spreitzer (1995, 1996). The CWEQ-II scale shows the existence of 6 factors: opportunity, information, resources, support, formal and informal power, in agreement with those identified by Laschinger et al. (2001).

In this context, we can conclude that Empowerment is a process which is influenced by an interconnection of working factors (access to opportunity, information, resource, support, formal and informal power) and by values and efforts that are an integral part of any individual (competence, meaning, self-determination and impact).

Nurses show good Psychological Empowerment levels and low Structural Empowerment levels. They reveal a higher psychological Empowerment (assessed through PEI scale), namely in its "meaning" and "competence" dimensions, and a lower Empowerment in the "impact" and "self-determination" dimension. As far as structural Empowerment is concerned (a fact which was assessed through the CWEQ-II scale) the results show that nurses exhibit higher levels of Empowerment in its "opportunity" and "informal power" dimensions. On the other hand, nurses show lower levels in the "formal power" and "information" dimensions. Nurses that show higher levels of psychological Empowerment also show higher levels of structural Empowerment.

Although the research which explore the relationship between structural and psychological Empowerment are quite recent (Laschinger, 2008), the results of our research suggest a significant and positive relationship between structural and psychological Empowerment. We realized then, in agreement with the reviewed literature, that the increase in structural and psychological Empowerment is not only associated with the improvement in nurses' innovative strategies and with an increase in the way they perceive Empowerment, but also with the increase in nurses' professional satisfaction and autonomy. Older nurses and nurses who have a longer career show a higher psychological Empowerment and a lower structural Empowerment. They show , respectively, a higher competence resulting in a great ability to perform their medical duties, a perception that they have a greater control over the working environment and that they have enough autonomy and flexibility to perform their activities. This perception will have a great impact since nurses will feel a higher commitment and engagement with the organization (effective functioning) and because it will lead to an improvement in healthcare provided to their patients. Inversely, those nurses will show lower opportunity, which will provoke frustration, hostility, lower motivation to fulfill their work responsibilities and lower levels of commitment with the institution.

All the nurses who have participated in this study have a similar perception of Empowerment, regardless of their academic level.

In the professional category of Nurses, there is no statistically significant difference as far as psychological Empowerment is concerned; however there are significant differences in some dimensions associated with structural Empowerment: information, resources and informal power , namely. This means that, in all these situations, Specialist nurses are more likely to show higher

levels of (structural) Empowerment than the remaining nurses.

Informal power, strengthened by effective relationships, the support of managers, colleagues and other health workers, is very important to Specialist nurses and to their professional autonomy and contributes to the improvement of their ability to make decisions which will, in turn, help achieve and improve the objectives set by the organization. These improvements will also bring them greater visibility and a greater recognition of the position they hold in the organizational environment.

The perception nurses have of Empowerment is similar regardless of their gender, even though most of the nurses who have participated in our study were female.

Nurses who have been working longer in the same service/specialty show a higher psychological Empowerment and lower structural Empowerment. Those nurses denote higher competence and, on the other hand, a lower access to opportunity, less support, a lower access to information and, finally, lower global structural Empowerment. Therefore, we can conclude that the lack of access to these structures leads to a feeling of powerlessness which contrasts with a higher motivation felt to achieve personal and organizational goals. This evidence will lead to a higher feeling of autonomy, to a greater professional satisfaction, to a greater commitment and to successful organizational processes.

Empowerment is linguistically used frequently. Being able to reflect upon the range of this concept helps Nursing, as a scientific discipline, to approach Empowerment issues with a greater insight.

This research showed us the way in the development and promotion of a healthy and productive nursing body by showing that Empowerment may well be implemented. It gave us an appropriate reference framework about the research conducted on nursing professional development, thus becoming essential to organizational management.

As a final reflection, we want to believe that the next century will give nursing and its specialties the importance it deserves. This recognition will be based on its autonomy, its own conceptual basis that will determine which nursing problems will have to be solved and which are the phenomena that are of concern. This is the common basis upon which nurses will find a professional satisfaction which will be developed within a multidisciplinary team. This interdependence will be a crucial factor for all those who benefit from healthcare services.

Thus, we affirm that the challenge of being a nurse with Empowerment is worth accepting!

## CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest

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