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Editorial | Editorial | Editorial |

Inicia-se o ano de 2021 com a edição regular número 14 da Millenium - Journal of Education, Technologies. O ano de 2020 foi complexo para o mundo inteiro, desde logo no domínio da saúde, mas também, nos aspetos sociais, económicos e financeiros decorrentes da pandemia Covid 19 ainda em curso. A produtividade científica manteve-se, contudo, dinâmica no seu desenvolvimento, aqui corroborada pelos 9 artigos que esta edição apresenta.

Este número inicia-se com a secção das ciências da vida e saúde. Dos cinco artigos que a compõem, o primeiro, *Infrared thermography for risk reduction of nosocomial cross infections during the COVID-19 pandemic: potential application in healthcare facilities,* apresenta como objetivo discutir o uso de termografia infravermelha para redução de infeções virais cruzadas em instituições de saúde, nomeadamente nos doentes infetados com Covid-19 e com outras comorbilidades. De seguida, analisa-se a *Relevância da informação no regresso a casa do idoso após cirurgia da catarata: perspetiva dos enfermeiros*, identificando-se os fatores facilitadores/ inibidores relevantes na preparação do regresso a casa destes doentes. Em terceiro, surge o artigo *Qualidade de vida e a auto perceção da saúde relacionada com a saúde oral: o caso particular de idosos institucionalizados,* no qual é analisado o impacto das situações com fragilidades na qualidade do processo de alimentação na saúde oral. No quarto, *Moderação e mediação na análise do padrão de sucção não nutritiva em recém-nascidos prematuros,* conclui da relevância clínica na elaboração de programas de intervenção na estimulação da sucção dos recém-nascidos prematuros. No último artigo desta secção, *Estratégias de supervisão clínica: análise crítico-reflexiva das práticas*, salienta-se a importância desta avaliação crítica das práticas, considerando-a determinante para o conhecimento, o pensamento crítico e a tomada de decisão, preconizando, ainda, a ideia de que esta e outras estratégias de reflexão devam integrar as políticas de supervisão clínica, em contexto de cuidados de saúde primários.

No setor da educação e desenvolvimento social, o artigo *Retenção escolar: pode o envolvimento afetivo dos alunos com a escola contribuir para a sua prevenção?* propõe-se averiguar se os alunos com retenções revelam menos envolvimento afetivo na escola, concluindo da importância deste envolvimento no sucesso académico.

Na área das engenharias, tecnologias e gestão é apresentado um artigo *em que* é feita uma revisão da literatura relativa a *Low-income people and pro-environmental behavior: beyond money issues***.**

Nas ciências agrárias e alimentares publica-se *Freshness Index Determination in Sardina pilchardus,* apontando para um nível satisfatório de frescura para consumo, independentemente da sua origem comercial. Por fim, no artigo *Biological control of Dryocosmus kuriphilus Yasumatsu with the parasitoid Torymus sinensis Kamijo*, demonstra-se que as *T. sinensis* provaram serem capazes de estabelecer novas populações em poucos anos, revelando-se como um bom candidato para o controlo das vespa-das-galhas-do-castanheiro.

A Equipa Editorial
Madalena Cunha, José Luís Abrantes,
Maria João Amante, Paula Correia, Paula Santos

The year 2021 begins with the regular edition number 14 of the Millennium - Journal of Education, Technologies. 2020 was a complex year for the entire world, right from the start in the field of health, but also in the social, economic, and financial aspects resulting from the COVID-19 pandemic still underway. Scientific productivity, however, remained dynamic in its development, here corroborated by the 9 articles that this edition presents.

This issue begins with the life sciences and health section. Of the five articles that compose it, the first, *Infrared thermography for risk reduction of nosocomial cross infections during the COVID-19 pandemic: potential application in healthcare facilities*, aims to discuss the use of infrared thermography to reduce cross-infection in healthcare institutions, namely in patients infected with COVID-19 and with other comorbidities. Next, the relevance of information on the elderly's homecoming after cataract surgery is analyzed: nurses 'perspective, showing the relevant facilitating / inhibiting factors in the preparation of these patients' homecoming. Third, there is the article Quality of life and self-perceived health-related to oral health: the case of institutionalized elderly, in which the impact of situations with weaknesses on the quality of the eating process on oral health is analyzed. In the fourth, Moderation and mediation in the analysis of the pattern of non-nutritive sucking in premature newborns, concludes of the clinical relevance in the elaboration of intervention programs in the stimulation of the sucking of premature newborns. In the last article of this section, Strategies for clinical supervision: critical-reflexive analysis of practices, the importance of this critical assessment of practices is emphasized, considering it as a determining factor for knowledge, critical thinking, and decision-making, also advocating the idea that this and other reflection strategies should integrate clinical supervision policies, in the context of primary health care.

In the education and social development sector, the article School retention: can the affective involvement of students with the school contribute to its prevention? it is proposed to find out if students with retentions reveal less affective involvement in the school, concluding on the importance of this involvement in academic success.

In the area of engineering, technology and management, the article appears where a review of the literature on *Low-income people and pro-environmental behavior is carried out: beyond monetary issues.*

In the agrarian and food sciences, *Freshness Index Determination in Sardina pilchardus* is published, pointing to a satisfactory level of freshness for consumption, regardless of its commercial origin. Finally, in the article *Biological control of Dryocosmus kuriphilus Yasumatsu with the parasitoid Torymus sinensis Kamijo*, it is showed that T. sinensis proved to be able to set up new populations in a few years, revealing itself as a viable candidate for the control of wasps, of chestnut-tree galls.

The Editorial Board
Madalena Cunha, José Luís Abrantes,
Maria João Amante, Paula Correia, Paula Santos

El año 2021 comienza con la edición regular número 14 del Millennium - Journal of Education, Technologies. 2020 fue un año complejo para todo el mundo, desde sus inicios en el campo de la salud, pero también en los aspectos sociales, económicos y financieros derivados de la pandemia de COVID-19 aún en curso. La productividad científica, sin embargo, se mantuvo dinámica en su desarrollo, corroborado aquí por los 9 artículos que presenta esta edición.

Este número comienza con la sección de ciencias de la vida y salud. De los cinco artículos que lo componen, el primero, *Termografía infrarroja para la reducción del riesgo de infecciones cruzadas nosocomiales durante la pandemia COVID-19: aplicación potencial en establecimientos de salud*, tiene como objetivo discutir el uso de termografía infrarroja para reducir la infección cruzada en instituciones de salud, concretamente en pacientes infectados con COVID-19 y con otras comorbilidades. A continuación, se analiza la relevancia de la información sobre el regreso a casa de los ancianos después de la cirugía de cataratas: la perspectiva del enfermero, mostrando los factores facilitadores / inhibidores relevantes en la preparación del regreso a casa de estos pacientes. En tercer lugar, se encuentra el artículo Calidad de vida y salud auto percibida relacionada con la salud bucal: el caso del anciano institucionalizado, en el que se analiza el impacto de situaciones con debilidades en la calidad del proceso de alimentación en la salud bucal. En el cuarto, Moderación y mediación en el análisis del patrón de succión no nutritiva en recién nacidos prematuros, se concluye de la relevancia clínica en la elaboración de programas de intervención en la estimulación de la succión de recién nacidos prematuros. En el último artículo de esta sección, Estrategias para la supervisión clínica: análisis crítico reflexiva de las prácticas, se enfatiza la importancia de esta valoración crítica de las prácticas, considerándola como factor determinante para el conocimiento, el pensamiento crítico y la toma de decisiones, abogando también la idea de que esta y otras estrategias de reflexión deben integrar las políticas de supervisión clínica, en el contexto de la atención primaria de salud.

En el sector de la educación y el desarrollo social, el artículo Retención escolar: ¿puede la implicación afectiva de los alumnos con la escuela contribuir a su prevención? Se propone conocer si los alumnos con retenciones manifiestan una menor implicación afectiva en la escuela, concluyendo sobre la importancia de esta implicación en el éxito académico.

En el área de ingeniería, tecnología y gestión, se presenta un artículo en el que se realiza una revisión de la literatura sobre las personas de bajos ingresos y el comportamiento proambiental: más allá de las cuestiones monetarias.

En el área de ingeniería, tecnología y gestión, aparece lo artículo donde se hace una revisión de la literatura sobre *Low-income people and pro-environmental behavior: beyond money issues.*

En las ciencias agrarias y alimentarias se publica la *Determinación del Índice de Frescura en Sardina pilchardus,* que apunta a un nivel satisfactorio de frescura para el consumo, independientemente de su origen comercial. Finalmente, en el artículo Control biológico de Dryocosmus kuriphilus Yasumatsu con el parasitoide Torymus sinensis Kamijo, se muestra que T.sinensis demostró ser capaz de establecer nuevas poblaciones en pocos años, revelándose como un candidato viable para el control de avispas, de agallas de castaño.

El Equipo Editorial
Madalena Cunha, José Luís Abrantes,
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USO DA TERMOGRAFIA INFRAVERMELHA PARA REDUÇÃO DO RISCO DE INFECÇÕES NOSOCOMIAIS CRUZADAS DURANTE A PANDEMIA DE COVID-19: APLICAÇÃO POTENCIAL EM INSTITUIÇÕES DE CUIDADO À SAÚDE 51

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RESUMO

Introdução: Entre milhões de pessoas que podem estar infetadas pelo COVID-19, os pacientes com doenças cardiovasculares e oncológicas apresentam os maiores riscos de ter piores resultados. Esses pacientes estão sujeitos à descompensação crônica da doença e à infeção cruzada enquanto visitam unidades de saúde que cuidam de pacientes infetados com COVID-19.
Objetivo: Apresentar as evidências científicas e propor o uso de termografia infravermelha para redução de infeções virais cruzadas em instituições de saúde.
Métodos: Ensaio teórico
Resultados: Experiências em pandemias prévias sugerem resultados favoráveis com o uso de termografia infravermelha na identificação de pacientes infetados e redução da possibilidade de infeção cruzada.
Conclusão: A termografia por infravermelho é uma tecnologia sem radiação, relativamente barata, sem contato e não invasiva que pode ser usada para triagem em massa de pacientes e visitantes com febre, especialmente em serviços onde pacientes com doença cardiovascular buscam atendimento médico, reduzindo o risco de infeção cruzada.

Palavras-chave: termografia infravermelha; Covid-19; pandemia; doença cardiovascular; infecção cruzada

ABSTRACT

Introduction: Among millions of people who may be infected with COVID-19, patients with cardiovascular and oncologic diseases exhibit the highest risks of having worse outcomes. These patients are subject to chronic disease decompensation and may be subjected to cross-infection while visiting health facilities that are taking care of COVID-19 infected patients.
Objective: To present scientific evidence and propose the use of infrared thermography for the reduction of viral cross-infection in healthcare facilities.
Methods: Theoretical essay
Results: Previous experience in pandemic show favorable results with the use of infrared thermography identifying infected patients and reducing the possibility of cross infections.
Conclusion: Infrared thermography is a radiation-free, relatively inexpensive, noncontact, and noninvasive technology that could be used for mass-screening of patients and visitors with fever, especially in services where patients with cardiovascular disease seek for medical care, reducing the risk of cross-infection.

Keywords: infrared thermography; Covid-19; pandemic; cardiovascular disease; cross-infection

RESUMEN

Introducción: Entre millones de personas que pueden estar infectadas con COVID-19, los pacientes con enfermedad cardiovascular y oncologica exhiben los mayores riesgos de tener peores resultados. Estos pacientes están sujetos a descompensación de enfermedades crónicas y pueden estar sujetos a infección cruzada mientras visitan los centros de salud que atienden a pacientes infectados con COVID-19.
Objetivo: Presentar evidencia científica y proponer el uso de la termografía infrarroja para la reducción de infecciones virales cruzadas en instalaciones de salud.
Métodos: Ensaio teórico
Resultados: La experiencia previa en pandemia muestra resultados favorables con el uso de termografía infrarroja que identifica a pacientes infectados y reduce la posibilidad de infecciones cruzadas.
Conclusión: La termografía infrarroja es una tecnología libre de radiación, relativamente barata, sin contacto y no invasiva que podría usarse para el cribado masivo de pacientes y visitantes con fiebre, especialmente en servicios donde los pacientes con enfermedades cardiovasculares buscan atención médica, reduciendo el riesgo de infección cruzada.

Palabras Clave: Termografía infrarroja; Covid-19; Pandemia; Enfermedad cardiovascular; Infección cruzada

INTRODUCTION

Knowledge about COVID-19 increases every day, while the novel coronavirus spreads across the globe. Among millions of people who may be affected, patients with cardiovascular and oncologic diseases exhibit the highest risks of having worse outcomes (Liu et al., 2020; Yang et al., 2020; Zhou et al., 2020).

The American Heart Association, in conjunction with the United States´ National Institutes of Health, has just published the annual report annually on the most up-to-date statistics related to heart disease, stroke, and cardiovascular risk factors(Virani et al., 2020). This report shows that according to the 2017 National Health Interview Survey, the age-adjusted prevalence of all types of heart disease was 10.6% in the United States(Virani et al., 2020). The aging and growth of populations all over the world contribute to cardiovascular disease prevalence. In fact, almost a third of all deaths globally were due to cardiovascular disease in 2017 (Collaborators, 2018). This is not different in Brazil, where cardiovascular diseases are the major cause of death, accounting for nearly 20% of all deaths in adults(Mansur & Favarato, 2012).

Most cardiovascular diseases are chronic and need continuous care with frequent visits to medical facilities. In fact, cardiovascular ambulatory care has a pivotal role in reducing cardiovascular deaths(Tu et al., 2017). Aristizábal et al(Aristizábal et al., 2015), found a 40% reduction in emergency room visits and rehospitalizations related to new cardiovascular and coronary events in patients with a previous acute coronary event who received care under a comprehensive ambulatory care model. In Brazil, not only ambulatory services, but also the family medicine program(Silva et al., 2019) reduced hospitalizations due to cardiovascular disease(Lentsck & Mathias, 2015).

When the World Health Organization upgraded COVID-19 to pandemic status, most countries urged to promote social distancing, which means shutting down schools, prohibiting group gatherings and public events, working from home (as much as possible) and staying away from each other as much as possible. Social distancing instructions also closed many health facilities considered non-essential. Although there is no universal definition for “essential health care”(Monekosso, 1984), social distancing policies and the shortage of health staff and medical supplies resulted in closing or reducing operating hours of most public and private ambulatory general practice services.

With this scenario, we can anticipate that soon, patients with COVID-19 infection symptoms and patients with acute decompensation of cardiovascular diseases will be sharing seats in emergency waiting rooms. Thus, screening measures that can identify and isolate potential COVID-19 cases, could prevent disease transmission in health facilities.

Jiang et al. (Jiang et al., 2020) published a brief review summarizing published studies as of late February 2020 on the clinical features, symptoms, complications, and treatments of COVID-19 and found that the main clinical manifestations are fever (90% or more), cough (around 75%), and dyspnea (up to 50%). As fever is the most prevalent symptom, it seems reasonable that this vital sign should be screened as soon as patients arrive to health facilities. Most health facilities use probe electronic thermometers, which must be in contact with patient´s skin or mucosa for some minutes before temperature can be taken. After that, they should be properly disinfected before the next use. This would limit screening speed.

OBJECTIVE

The aim of this paper is to discuss the potential use of infrared thermography for early detection of patients infected with COVID-19 in health facilities, proposing its use for risk reduction of cross infection.

METHODS

We have performed an integrative review searching in Pubmed about the following MESH terms: infrared thermography, viral, pandemic. This review was used to the proposition of this theoretical essay.

LITERATURE REVIEW

Infrared thermography

Infrared thermal imaging, or thermography, is a noncontact and noninvasive approach that has been used in medicine since the early 1960s(Ghassemi et al., 2018). Infrared thermal imaging does not require irradiation as it uses infrared radiation emitted from biological tissues to calculate temperature distributions(Usamentiaga et al., 2014). The last five decades witnessed the increase in the utility of thermal imaging cameras to correlate skin temperature and thermal physiology(Jiang et al., 2005; Merla & Romani, 2006; Ring & Ammer, 2012; Ring et al., 2010) and they are currently being used in oncologic imaging(Arora et al., 2008; Lee et al., 2010; Wishart et al., 2010), ischemic monitoring(Bagavathiappan et al., 2009; Peleki & da Silva, 2016), sports medicine(Moreira et al., 2017) and also fever screening(Childs, 2018; Dagdanpurev et al., 2018; Ghassemi et al., 2018) (figure 1).

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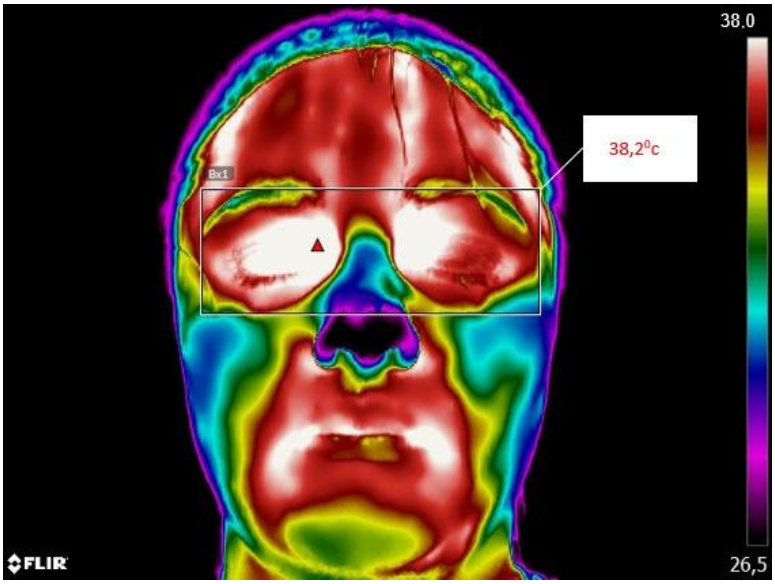
Figure 1. Infrared thermography image of a patient with fever.



All objects or bodies with temperature above absolute zero emit electromagnetic radiation, which is known as infrared radiation or thermal radiation(Jones, 1998). The infrared energy emitted from an object or person is directly proportional to its temperature. Infrared cameras create an image by converting radiant heat energy into a signal that can be displayed on a monitor. Therefore, temperatures are accurately measured by the infrared camera, where pixels are the data acquisition points for thermal temperature.

Infrared thermography for fever screening in individuals

Comparison of infrared temperature readings and oral temperatures has shown high sensitivity and specificity in different studies (Chan et al., 2004; Ng et al., 2004; Nguyen et al., 2010). Chamberlain et al.(Chamberlain et al., 1995) evaluated 2447 subjects aged 12 to 103 years who denied recent potentially febrile illness and ingestion of medications that affect normal body temperature. The mean ear infrared emission temperature was 36.51 ± 0.46°C. The reproducibility was better than that of electronic thermometer at the oral and axillary sites. Based on this study, the 99th percentile was 37,6°C, which the authors(Chamberlain et al., 1995) considered the appropriate cutoff for fever screening using infrared ear thermometers.

International organizations, as the International Eletrotechnical Commission(IEC/ISO, 2017) and the European Association of Thermology(Mercer & Ring, 2009) conducted clinical studies that proved the accuracy of infrared thermometers for fever screening, as far as appropriate procedures are applied. Noteworthy, there are standard and technical reports recommending best practices for thermographic fever screening(Ghassemi et al., 2018; IEC/ISO, 2017; ISO, 2009).

Since ambient temperature influences body temperature, the deployment of these systems could be more challenging in hot climates, either in tropical or subtropical regions or temperate countries during summer months. Nevertheless, Tay et al(Tay et al., 2015) found high sensitivity and specificity for fever detection using and infrared thermal detection system in a tropical healthcare setting. Also, Suzuki et al.(Suzuki et al., 2010), found that measurement of body temperature with infrared thermometer was effective for mass body temperature screening even in warm environment. Most studies analyzing feasibility of medical infrared imaging took thermal pictures in climatized rooms. Nevertheless, a practical and feasible protocol for its use in emergency rooms, where temperature is not easily controlled, is available(Coats et al., 2018).

Infrared thermography for mass detection of fever in travelers

The first studies describing infrared thermography use for mass fever screening in airports were published in 2004 (Chan et al., 2004; Ng et al., 2004). Infrared thermal cameras and noncontact infrared thermometers are the only viable temperature measurement approaches for mass screening of infectious disease pandemic(Ghassemi et al., 2018) like the current COVID-19 outbreak.

Diverse national efforts implemented the use of infrared thermography for mass detection of fever at boarders and quarantine stations. After WHO´s global alert for H1N1 pandemic in 2009 many national health agencies start to screen travelers to delay

local transmission. Cowling et al (Cowling et al., 2010). reviewed these screening policies and found that they could delay local transmissions for 1-2 weeks. This period could be used to better planning and preparation for local epidemics.
Cho & Yoon(Cho & Yoon, 2014) retrieved data from arrivals' health declaration forms and questionnaires for febrile arrivals at an international airport collected by a Korean quarantine station during 2012 and found that thermal camera temperature and tympanic (or ear) temperature was not statistically significant. Despite low fever prevalence, this manuscript suggests that self-reported questionnaires and thermal camera scanning may serve as effective tool for mass detection of fever.
During the Ebola virus disease outbreak (2014 to 2016) in Sierra Leone all people (n=166,242) passing through their International airport underwent screening with fixed infrared thermal scanners and five individuals were denied air travel from Sierra Leone(Wickramage, 2019). Since 2006, the Taiwan Notifiable Diseases Surveillance System for dengue fever has been using remote-sensing infrared thermography and quarantine stations of all harbors and international airports to detect febrile passengers(McKerr et al., 2015). This simple and robust system enabled timely and accurate reporting of dengue fever cases.
Studies that evaluated the implementation of mass fever detection in airports faced the same limitation: there were very few patients with fever (table 1) (Cho & Yoon, 2014; Priest et al., 2011; St John et al., 2005; Wickramage, 2019). Thus, it is difficult to justify the implementation of a screening system that uses new technology and personnel efforts to detect a rare condition (fever in airports).

Table 1 - Summary of studies that analyzed infrared thermography for mass detection of fever in airports

Reference	Design	Main results
St. John RK, et al.(St John et al., 2005)	The manuscript describes Canadian experience to detect passengers at selected airports for symptoms and signs of severe acute respiratory syndrome (SARS). Methods of detection included information, questionnaire response and the use of infrared thermal scanning machines.	As the prevalence of SARS was extremely low, the positive predictive value of screening was zero.
Cho KS & Yoon J (Cho & Yoon, 2014)	Observational study that compared the results of health declaration forms and thermal camera scanning of 584,323 passengers who arrived at an airport in Korea. Patients with fever or symptoms were double-checked with conventional ear temperature measurement.	Fever prevalence was 0.002%. Authors suggest that self-reported questionnaires and thermal camera scanning may serve as effective tool for mass detection of fever.
Priest PC, et al. (Priest et al., 2011)	Observational study that used infrared thermal scanners to measured cutaneous temperature in 1275 airline travelers who agreed to respiratory sampling for influenza infection detection and tympanic temperature measurement.	Infrared temperature scanning had 86% sensitivity and 71% specificity for fever detection.
Wickramage K (Wickramage, 2019)	Observational study that screened infrared temperature in all 166,242 people passing through Sierra Leone´s International airport during the Ebola virus disease outbreak.	Five individuals were detected with fever

Infrared thermography for detection of fever in health facilities
As prevalence of fever is expected to be higher in medical facilities, mass screening of individuals entering hospitals should be detect more people with fever in hospitals than in airports. A prospective observational study(Holm et al., 2018) included 198 medical patients admitted to the Emergency Department. Researchers took standardized thermal picture and temperatures of the inner canthus (central temperature) and three peripheral temperatures (earlobe, nose tip, and tip of the third finger). Gradients between central and peripheral temperatures showed a significant association with 30-day mortality, suggesting prognostic value.
During the severe acute respiratory syndrome (SARS) epidemics in 2003, Taiwan implemented a protocol where all patients and visitors should be screened for fever at the entrance of every hospital building, aiming to reduce the risk of nosocomial cross infections. The infrared thermal imaging system screened 72,327 outpatients and visitors at the Taipei Medical University-Wan Fang Hospital and detected 305 febrile patients(Chiu et al., 2005), three of them with SARS.

Reducing cross-infection of patients with cardiovascular disease in medical facilities
During pandemics medical services are overwhelmed and patient triage is of paramount importance. Unfortunately, healthcare resources are limited, and patients are facing long waiting times in medical facilities. It is important to identify and prioritize patients who requires urgent attention and intervention (Tam et al., 2018). In pandemic times, proper and fast patient triage can also guide right-hospital allocation accordingly to possible infective status. If fast triages strategies are not implemented, patients with cardiac decompensation and with COVID-19 infection will be sharing the same waiting rooms, increasing the risk of cross-

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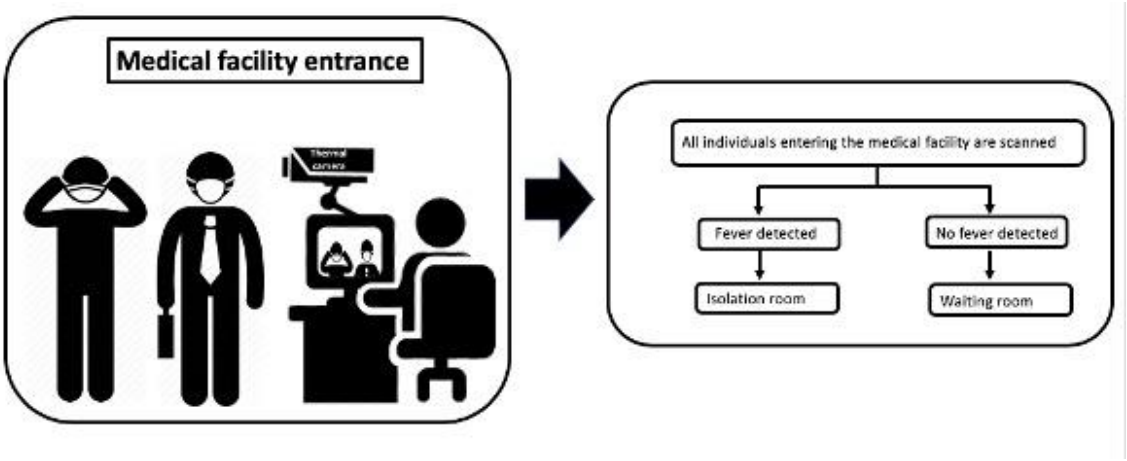
infection. Noteworthy, symptoms-focused triage evaluation may not be effective in identifying infected patients, as patients with cardiovascular decompensation and the ones infected with COVID-19 share symptoms (breathlessness, fatigue and chest pain).
As temperature readings obtained by infrared thermal imaging system could be used to screen patients and visitors in medical facilities(Ataş Berksoy et al., 2018; Chiang et al., 2008) we propose a flowchart (Figure 2) to guide the thermal screening of everyone entering medical facilities. Each person with high temperature should be rapidly isolated and evaluated. This relatively simple flowchart could potentially reduce cross-infection risk at waiting rooms.

Figure 2 - Suggested flowchart for thermal scanning of people entering medical facilities



Limitations of infrared thermography implementation in medical facilities

Despite the promising results of infrared thermography use in emergency rooms, there are some limitations that must be considered. Asymptomatic patients may transmit the virus (Wei et al., 2020). While thermography is useful to identify patients with elevated central temperature, it would not be able to identify those asymptomatic patients with temperature values within the normal range. Nevertheless, asymptomatic patients would seldom, if ever, seek medical assistance during pandemics. Noteworthy, taking of an antifebrile drug results in body temperature reduction, which can affect thermography efficacy (Chiang et al., 2008; Nishiura & Kamiya, 2011).
Currently available infrared cameras show high sensitivity, excellent time resolution and should be calibrated according to heat emissivity, room temperature, humidity, and distance to the object of interest. Most published studies lack complete and detailed descriptions of how the camera and/or the software were calibrated and what settings have been used, limiting their reproducibility (KJ et al., 2020; Shterenshis, 2017).
Finally, normative range of surface skin temperature is still not established(Shterenshis, 2017) and accuracy of fever detection by infrared thermography is determined by the selected fever temperature cutoff. Noteworthy, the use of different cutoff values would impact in method´s sensitivity and specificity. In fact, maximizing accuracy by choosing highest specificity may not be desirable in a real-world pandemic setting, where secondary evaluation is available. By the other hand, setting thermo scanners to high sensitivity would increase the demand to secondary evaluation.

CONCLUSION

Patients with comorbidities and chronic disease, especially the ones with cardiologic or oncologic diseases, are at increased risk of bad prognosis when infected by COVID-19(Liu et al., 2020; Yang et al., 2020; Zhou et al., 2020). Despite social isolation policies, these patients must keep continuous healthcare to reduce disease decompensation, emergency room visits and rehospitalizations. Limiting contact between infected and non-infected patients is pivotal to reduce nosocomial cross infections during the COVID-19 pandemic. Previous experiences show that infrared thermography is a radiation-free, relatively inexpensive, noncontact, and noninvasive technology that could be used for mass-screening of patients and visitors in health care facilities. Implementation of thermography use in healthcare facilities entrance can detect and rapidly isolate people with fever, providing them appropriate care and reducing nosocomial cross-infection.

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RELEVÂNCIA DA INFORMAÇÃO NO REGRESSO A CASA DO IDOSO APÓS CIRURGIA DA CATARATA: PERSPETIVA DOS ENFERMEIROS

RELEVANCE OF INFORMATION WHEN ELDERLY RETURNING HOME AFTER CATARACT SURGERY: NURSES' PERSPECTIVE

RELEVANCIA DE LA INFORMACIÓN SOBRE EL REGRESO DE LOS ANCIANOS A CASA DESPUÉS DE LA CIRUGÍA DE CATARATAS: PERSPECTIVA DE LAS ENFERMEIRAS

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RESUMO

Introdução: A catarata, associada ao processo de senescência, conduz a alterações visuais que condicionam a vida diária. Sendo o tratamento cirúrgico, é fundamental que os enfermeiros estejam capacitados para identificar as potencialidades e as dificuldades do idoso, no sentido de facilitar a sua transição saúde/doença no regresso a casa.
Objetivo: Explorar a informação que os enfermeiros relevam na preparação do regresso a casa da pessoa idosa submetida a cirurgia de catarata.
Métodos: Estudo de investigação qualitativo; colheita de dados com recurso à técnica de focus group, com base numa amostra intencional composta por 6 enfermeiros; análise de dados efetuada com categorização à posteriori de acordo com Bardin (2015).
Resultados: Emergiram três categorias: "Fatores facilitadores/inibidores" (idade, capacidade cognitiva, consciencialização da situação clínica e socioeconómicos), "Gestão do regime terapêutico" (regime medicamentoso e preparação prévia) e "Promoção do potencial de autonomia" (capacitação e gestão organizacional).
Conclusão: O reconhecimento da informação relevante, na preparação do regresso a casa, permite a definição de roteiros clínicos tendo em vista a melhor tomada de decisão, em prol da garantia da qualidade e continuidade dos cuidados.

Palavras-chave: idoso; regresso a casa; extração de catarata; enfermeiras e enfermeiros

ABSTRACT

Introduction: Cataracts, associated with the senescence process, lead to visual changes that condition daily life. A surgical procedure is the standard treatment, which makes nurses a privileged professional group to identify both the potential and difficulties of these patients so as to facilitate their health/illness transition when they return home.
Objetive: To explore the information that nurses provide in preparing the return home of elderly patients after cataract surgery.
Methods: Qualitative research study, with data collection using the focus group technique, based on an intentional sample composed of six nurses. Data analysis was performed with *a posteriori* categorization according to Bardin (2015).
Results: Three categories of relevant topics were found: "Facilitating/inhibiting factors" (age, cognitive ability, awareness of their clinical and socioeconomic situation); "Management of the post-operative therapeutic regimen" (medication regimen and prior preparation); "Promotion of the potential for autonomy" (empowerment and organizational management).
Conclusion: The recognition of relevant information in preparing for homecoming allows clinical pathways to be defined with a view to better decision making, in favour of guaranteeing the quality and continuity of care.

Keywords: aged; homecoming; cataract extraction; nurses

RESUMEN

Introducción: La catarata, asociada al proceso de senescencia, conduce a cambios visuales que condicionan la vida diaria. Dado que su tratamiento es quirúrgico, es esencial que las enfermeras estén capacitadas para identificar las potencialidades y dificultades de los ancianos, para facilitar su transición salud/enfermedad al regresar a casa.
Objetivo: Explorar que información consideran más relevante las enfermeras al preparar el regreso a casa de los ancianos sometidos a cirugía de cataratas.
Métodos: Estudio de investigación cualitativa, con recolección de datos utilizando la técnica de grupos focales, basada en una muestra intencional compuesta por seis enfermeras. El análisis de los datos se realizó con una categorización a posteriori según Bardin (2015).
Resultados: Surgieron tres categorías: "Factores inhibidores / facilitadores" (edad, capacidad cognitiva, conciencia del estado clínico y socioeconómico), "Gestión del régimen terapéutico" (régimen farmacológico y preparación previa) y "Promoción del potencial de autonomía" (capacitación y gestión organizacional).
Conclusión: El reconocimiento de información relevante en la preparación del regresso a casa permite la definición de guiones clínicos con miras a una mejor toma de decisiones, a favor de garantizar la calidad y la continuidad de la atención.

Palabras clave: anciano; regreso a casa; extracción de catarata; enfermeiras y enfermeiros

INTRODUCTION

The increase in average life expectancy translates into an increase in the number of elderly people. In addition to a deep reflection on Portuguese and world social geography, this requires a reorganization of how health care and particularly nursing is provided, due to the particularities associated with this age group. As a result of aging, there is an increase in chronic diseases, including ocular

pathologies. According to the National Program for the Health of the Elderly (Directorate General for Health (DGS, 2006), in Portugal, visual impairments are not valued in the context of chronic pathology.

Changes to vision, namely the formation of cataracts, which opacify the lens of the eye is common and very disabling. In most people aged 80 and over, cataracts are responsible for 50% of cases of total loss of vision, with 85% of cataracts being senile (considered a normal aging process), for which surgery is the only treatment option to recover visual capacity (Almança, Jardim & Duarte, 2018).

In treating cataracts, phacoemulsification is the most widely used surgical technique, due to the rapid visual recovery and reduced rate of intraoperative complications associated with it. It is a surgical procedure performed on an outpatient basis, which makes it possible to return home on the same day of surgery (or by midnight following surgery), and recovery from surgery may occur in a family environment.

Preparation for the patient's homecoming is complex, due to the very constraints that an outpatient surgery imposes and the imperative need to promote the patient's autonomy potential for surgical success. When changing from one health condition to another, the patient must assume the centrality of the care process (Mota, 2018). Since surgery, as a life event leads to change, it requires a differentiated intervention by nurses in facilitating the transitional course (Meleis, 2010). he preparation of the elderly person's homecoming after cataract surgery is thereby essential, and nurses should assume their role as facilitators in this health/disease transition process. For this purpose, in the actual planning of care for the elderly, aging should not only be considered a biological phenomenon, but also a dynamic transactional process (Carvalho & Hennington, 2015).

It is important that nurses are able to understand the meaning of that experience for the patient, to assess their physical, emotional state and environmental conditions towards a healthy transition (Mota, Rodrigues & Pereira, 2011). Due to the high proximity of nurses to patients experiencing the transition process, they must be heedful to changes and demands, preparing and helping them to develop skills to deal with this situation. In order to promote self-management of health, nurses should assist patients in acquiring knowledge, skills and facilitate support (Mota, 2018). This has an impact on greater patient adherence and satisfaction, guaranteeing quality of care and impact in health gains affected by nursing care. In this context, this study intends to explore the information that nurses reveal in preparing the elderly person undergoing cataract surgery to return home. Identifying potentialities and difficulties should lead to implementing nursing therapies that meet the real needs of the elderly in their context of life.

1. METHODS

Qualitative research study, data collection using the focus group technique.

1.1 Sample

Intentional sample consisting of six nurses from the same hospital unit in the central region of Portugal, with at least five years of professional experience in ophthalmic surgery (in accordance with point a) of paragraph 1 of Article 4 of Regulation No. 556/2017 of the Order of Nurses, which establishes that to recognise an increased area of competence, the nurse must have at least five years of proven professional practice).

1.2 Data collection instrument and technique

Informed of the objectives and methodological procedures of the study, six nurses were invited to participate by email. Initially, we expected to have a group of ten nurses, but four were prevented from participating for professional reasons. The focus group meeting lasted 75 minutes and was based on a scripted semi-structured discussion taking place in April 2019 in a classroom at the Northern Portuguese Red Cross Health School. The focus group was moderated by one of the researchers based on the research question and guided by discussion topics centred on self-care (hygiene, positioning, activities of daily living and management of the therapeutic regime). The focus group was recorded on audio and later transcribed in order to prepare the corpus for analysis.

1.3 Procedures

In order to guarantee anonymity, the name of the participants was replaced by a code consisting of a letter and a number (E1 to E6). After the text was transcribed, it was subjected to thematic categorical analysis according to Bardin (2015), with the categorization being carried out *a posteriori*, according to the categories resulting from the discussion, with categories, subcategories and sub-subcategories, to which the registration units were associated.

Participation in the study was voluntary with each participant signing an informed consent document. The study was approved by the Board of Directors and Ethics Committee of the Northern Portuguese Red Cross Health School under reference number 07/2019.

2. RESULTS

The focus group consisted of six nurses from outpatient surgery, with an average time of professional practice in the area of ophthalmic surgery of 12.8 ± 4.9 years (maximum of 21 and minimum of 7 years). From the analysis of the results obtained, three categories emerged based on the nurses' perspective on the elderly person's homecoming after cataract surgery: "Facilitating/inhibiting factors," "Management of the therapeutic regime" and "Promoting the potential for autonomy." The

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categories emerged from a semantic aggregation, based on their relationship with the subcategories and the registration units. In the content analysis tables, only the registration units that best represent this unit are presented, so as to better understand them.

- **Facilitating/inhibiting factors**

The "facilitating/inhibiting factors" in preparing for the homecoming that were identified by the nurses were: age, cognitive ability, awareness of their clinical situation and socioeconomic factors, as shown in Table 1.

Table 1 - Category: Facilitating/inhibiting factors

CATEGORY	SUB-CATEGORY	Registration unit
Facilitating/inhibiting factors	Age	E2: "with people at this age we cannot do much" E5: "Sharp decrease in hearing"
	Cognitive ability	E6: "by their expression, or because of the questions they ask right away: we say one thing and they question it." E6: "if we are dealing with a person that we are even realizing that he is assimilating and that they will actually fulfil what we are saying, the reinforcement will not be the same as a person who I am sure will not comply with the what has been laid out" E5: "hey bring high-necked sweaters. . .at the consultation they are told they have to bring easy things [clothes]"
	Awareness of their clinical situation	E1: "we usually see who are the ones who will hear better than others" E2: "He didn't understand anything that we were saying"
	Socioeconomic	E2: "the taxi driver. . .who passes on the information to the neighbour who is going to put in the [eye] drops" E3: "The fact they are living alone. . .the wife or husband also has some difficulty. . . or they do not know how to read" E4: "Sometimes those who accompany them that day are not the same ones who care for them" E2: "having a taxi driver waiting, the monetary factor. . .they do not listen because they are concerned with leaving. Or if there is a neighbour because she hasn't eaten"

- **Therapeutic regimen management**

"Therapeutic regimen management" (Table 2) The "Management of the therapeutic regimen" (Table 2), contains the questions centred on the medication regimen and the prior preparation.

Table 2 - Category: Therapeutic regimen management

CATEGORY	SUBCATEGORY	SUB-SUBCATEGORY	Registration unit
Therapeutic regimen management	Medication regimen	Escalation therapy	E1: "however much we explain that they have to reduce the number of [eye] drops they are taking. . .it goes completely over their heads" E4: "I really warn them about corticosteroid and explain. . .that it cannot stop"
		Dose	E6: "if one drop falls in, it is enough and two drops are okay, or if they don't go into their eye, put another one in; the bottle has many." E1: "there will always be a tear. . .the drop falls into the eye and goes out, it is like that"
		Schedule	E2: "it is from the time they wake up until they go to bed" E6: "there must be a one-minute interval" E5: "we would relate it to meals"
		Strategies	E5: "we try to group the largest number of [eye] drops at the same time" E2: "we show where that is on the prescription" E1: "my treatment guide is always totally scribbled. . .I draw arrows" E5: "I put a colour on each bottle and then I coloured the chart and it worked" E1: "the man at the pharmacy will explain"
		Complexity	E1: "we only taught for the first week of [eye] drops" E2: "the medication is the most complicated part" E6: "the medication schedule. . .is the most important"
	Prior preparation		E6: "they use [eye] drops in the preoperative period, they are already prepared" E4: "I do this prevention in the preoperative consultation itself." E1: "if the preoperative consultation were provided for all patients. . . understanding what we would now be saying to the now would be different" E1: "During the preparation we already realize if they are anxious"

To manage the medication regimen well, nurses consider the information centred on the dose, schedule, and strategies relevant to manage the medication regimen, escalation therapy and their complexity.

- **Promoting the potential for autonomy**

"Promoting the potential for autonomy" as an emerging category in this study, includes factors related to empowerment and organizational management, as shown in Table 3.

Table 3 - Category: Promoting the potential for autonomy

CATEGORY	SUBCATEGORY	SUB-SUBCATEGORY	Registration unit
Promoting the potential for autonomy	Empowerment	Warning signs	E1: "if you think you've seen better than what you can see now. . .come to us, do not wait for the consultation"
		Positioning	E1: "You cannot sleep on the side that was operated on, you cannot lower your head" E2: "I also tell them that there is no problem if they wake up and are on the operated side. . .preferably they shouldn't fall asleep on that side" E1: "I sometimes advise them to place a small pillow because when they turn, they won't turn over completely" E5: "you can't bend down. . .even if you find a 500 euro note on the ground, you can't pick it up, you can call me and I'll go and get it. . .I think they'll remember it better with some humour"
		Hygiene	E6: "hand hygiene before putting the [eye] drop or even opening the bottle. . .you should not touch the eye with the tip of the bottle" E1: ". . .the only thing that you have to be careful with is not to let soap get into your eyes. You do not need to bend down to wash your feet: rub one foot with the other"
		Activities of Daily Living	E1: "if they suffer from constipation to take the syrup to go to the bathroom, because they cannot strain themselves" E2: "be careful with the heat, steam, sleeping, positioning, being careful not to go out to the garden" E2: "the younger ones. . .as they cannot go to the cooker, they leave their food ready"
	Organizational management	Availability	E2: "within five minutes, which is our discharge appointment. . .then they have our phone number to call later"
		Physical structure	E6: "We close the door and stay inside. But the last thing I do is hand them a key." E3: "the patient does not leave the recovery room without a companion at the door, until they both go to the discharge office"

With a view to promoting the potential for autonomy, nurses in empowering patients focus information on warning signs, positioning, hygiene and activities of daily living. Regarding organizational management, with a significant impact on nurses' clinical practice, their availability to inform the patient and the physical structure of the outpatient surgery service emerges.

3. DISCUSSION

In preparing for the homecoming of the elderly person who underwent cataract surgery, the nurses who participated in the study highlighted the fundamentals of the information centred on "Facilitating/inhibiting factors," "Therapeutic regimen Management" and "Promoting the potential for autonomy."

In the domain of "Facilitating/inhibiting factors," nurses consider it relevant to take into account age, cognitive ability, awareness of their clinical situation and socioeconomic factors. For nurses to be truly significant in helping to experience healthy health/disease transition processes (Meleis, 2010), it is essential to recognize these factors in identifying real needs, but also the patients' potential. Petronilho (2013) admits that the changes that occur in the aging process make people more vulnerable, increasing their exposure to risks, and nurses must identify their needs and develop strategies to facilitate the transition process. As a result of aging, it is essential that the assessment of the patient is multidimensional, including multiple comorbidities, (reduced) mobility, cognitive impairment, hearing, anxiety, literacy and family support, which can condition or hinder their recovery (Torrado, 2016).

As a result, the participants consider that the intervention in these patients is complex, stating that "with people at this age we cannot do much" (E2), and therefore, they recognize the need to identify an informal caregiver in order to guarantee surgical

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success. It is common for patients to show changes in their cognitive ability, which can affect their ability to circulate, as well as their memory, attention and evocation. As Nunes (2017) points out, factors related to aging itself can affect concentration and reasoning. Cognitive ability has a significant impact on the therapeutic regimen management (Moretti, Ruy & Saccomann, 2018). All of these factors can have significant repercussions on the person's ability to take care of themselves, so it is essential to make the person aware of the changes that need to be made (Mota, 2018).

Moreover, the transition process is conditioned by socioeconomic factors, since the social and economic context is a factor with great impact on the way the person deals with the disease and recovery process, given that there are discrepancies when there are family support networks and/or other social agents or scarcity of support (Silva, 2016). Moreover, the transition process is conditioned by socioeconomic factors, since the social and economic context is a factor with great impact on the way the person deals with the disease and recovery process, given that there are discrepancies when there are family support networks and/or other social agents or scarcity of support (Silva, 2016). It is especially when the support system is compromised, that the nurse demonstrates their qualities and knowledge, acting as a resource, sometimes providing the elderly and the caregiver with means and strategies to deal with the health/disease process, and sometimes articulating with other members of the multidisciplinary team in order to jointly find the best solution.

Thus, care for the elderly in a surgical situation is a challenge, given that the changes resulting from the aging process and the presence of associated pathologies can compromise the functional balance and increase their vulnerability to the appearance of postoperative complications. However, when nurses are experts in the field of the aging process, the implementation of preventive measures has the potential to positively influence the patient's surgical evolution (Silva, 2016). The overall assessment of the elderly person/family is essential for nurses to understand the person's real needs, thereby making it possible to prepare them properly for the return home. The facilitating/inhibiting factors to the transition process may condition the way patients are able to manage his therapeutic regimen, as an activity they themselves perform and for their own benefit, to maintain their health and well-being (Oliveira, 2015).

For the patient undergoing cataract surgery, the medication regimen is a very relevant dimension in the area of therapeutic regimen management and is highly influenced by the patient's prior preparation. It is important that nurses promote patients' empowerment in order to promote their potential autonomy. It is therefore essential to create an atmosphere of involvement, answering questions and clarifying doubts, behaviours and attitudes, given that confidence in the health professional will be reflected in the way he adheres to the therapeutic regimen (Mota et al., 2011). The way in which the health/disease transition process is experienced influences the results. The dimensions that comprise the medication regimen are escalation therapy, the dose, the schedule, the complexity and the strategies used. With regard to escalation therapy, one of the concerns is related to the use of ophthalmic corticosteroids, prescribed to control the inflammatory process associated with cataract surgery (Branco, Bisneto & Moreira, 2017), due to their impact on the effectiveness of the treatment. The administration of eye drops every 2 hours increases the complexity of the medication regimen. This complexity is made even greater by the fact that the patients targeted by the care have impaired visual acuity, both in the eye submitted to surgery, and often in the other eye, as a result of aging itself. Oliveira (2015) mentions that the ineffectiveness in the management of the medication regimen is often associated with its complexity, lack of knowledge on how to integrate the therapeutic indications in daily life, the excessive demands on the person and the delay in or absence of positive results. In this sense, it is essential that the nurse recognizes the individuality of each person in order to implement appropriate nursing therapies for each individual.

Prior preparation was also identified in this study, as an important factor in preparing each of the elderly people to return home after cataract surgery, closely related to the preoperative consultation, in order to anticipate the needs of patients. For Silva (2016), the aim of the preoperative consultation is to decrease the levels of anxiety and includes aspects of physical preparation. The preoperative teaching to the elderly which must be adapted, given the speed of information processing is slower, which interferes with attention span, influences learning and can increase anxiety. When specific recommendations about preoperative care are provided, promoting the potential for autonomy to prepare for homecoming begins. Simultaneously, potentialities and possible difficulties of the patient family are evaluated, in order to outline strategies to facilitate self-care and favour this transition process.

With regard to "Promoting the potential for autonomy", this includes factors related to empowerment and organizational management. Aging requires action at the level of changing behaviours and attitudes according to the ". . .social and family realities that accompany individual and demographic aging and an adjustment of the environment to the weaknesses that, more often, accompany old age." (DGS, 2006, p.6). Regarding empowering patients to return home, Silva (2016) mentions that the great challenge facing nurses in the preoperative phase is to combine the principles and practice of surgical nursing with the unique characteristics of the elderly, as it requires capacity for perceptual assessment, careful identification of real and potential problems and meticulous planning of care tailored to their needs. In this context, nurses highlight warning signs, hygiene, activities of daily living and positioning as crucial information. Torrado (2016) warns of the fact that, although compliance with both movement restrictions and positioning is important, changing the person's ability to retain the information transmitted may be the cause of surgical complications. In this adaptation process, the nurse must develop interventions that allow the elderly person to make the

transition successfully. Valcarenghi, Lourenço, Siewert & Alvarez (2015) say that it is about empowering the elderly, so that they can take care of themselves.

The availability to promote the potential for autonomy and the physical structure of the facilities, led to the subcategory "Organizational management." In view of patient-centred care provision, it is essential that the care time is the patient's time, and the nurse must demonstrate availability in accordance with the patient's care needs. Time management is one of the areas where organizations try to intervene ". . . seeking to adapt the procedures to the individual and collective performance of professionals, in order to influence their levels of productivity. . ." (Ribeiro, Vieira, Cunha, Dias & Martins, 2016, p. 8). However, when providing health care, it is necessary to balance the patient's time with the time that health organizations allow nurses to have to perform their duties. For Ribeiro and collaborators (2016) for an adequate performance of functions, professionals should be provided with the necessary resources and means taking into account their purpose. The physical structure of health organizations influences the entire process of promoting the patient's autonomy potential in preparation for their return home. In his study, Dias (2014), attentive to the adequacy of the physical space while preparing for the return home, mentioned that nurses consider it important that this space provides privacy and comfort both to the person undergoing surgery and to their family. The physical structure has thus proved to be important for nurses, since in order to promote the potential for autonomy not only is privacy essential, but the transmission of information must also be carried out with tranquillity, allowing doubts and concerns that can hinder the transition to be clarified and compromise surgical success.

CONCLUSION

Aging with health, autonomy and independence, represents a huge challenge and responsibility for society, through the definition of interventions that meet the real needs of the elderly in their life context. On the other hand, health policies emphasize the responsibility, involvement and empowerment of the person in order to facilitate the transition processes throughout the life cycle. In this context, it is up to nurses to collaborate, communicate effectively and prepare the elderly for care to be sustained on returning home. After conducting the study, we can say that nurses consider facilitating/inhibiting factors (age, cognitive ability, awareness of the clinical and socioeconomic situation), therapeutic regimen management (medication regimen and prior preparation) and promoting the potential for autonomy (empowerment and organizational management), relevant in preparation for the homecoming of the elderly person who has undergone cataract surgery, whose treatment for the recovery of visual capacity is carried out mostly under outpatient surgery, using the phacoemulsification technique.

The recognition of the information that nurses emphasize in preparing the elderly person for homecoming having undergone cataract surgery is essential for their therapeutic intervention, since it allows the clinical areas to be considered in favour of providing care that meets the real needs of the elderly, favouring a healthy transition taking into account their contexts, resources and life projects. It is thus possible to define clinical guidelines with a view to better decision making, in order to guarantee quality and continuity of care.

As for limitations of this study, we highlight the low number of nurses who agreed to participate in the focus group, as such, the discussion group was smaller than initially planned.

Future studies in this area are suggested, so as to continuously provide more adequate answers to the needs of the elderly, in an increasingly aging society.

In terms of implications for practice, this study denotes the need for nursing care to be carried out in partnership and in close proximity to the elderly and their caregivers.

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RELEVÂNCIA DA INFORMAÇÃO NO REGRESSO A CASA DO IDOSO APÓS CIRURGIA DA CATARATA: PERSPETIVA DOS ENFERMEIROS

RELEVANCE OF INFORMATION WHEN ELDERLY RETURNING HOME AFTER CATARACT SURGERY: NURSES' PERSPECTIVE

RELEVANCIA DE LA INFORMACIÓN SOBRE EL REGRESO DE LOS ANCIANOS A CASA DESPUÉS DE LA CIRUGÍA DE CATARATAS: PERSPECTIVA DE LAS ENFERMEIRAS

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RESUMO

Introdução: A catarata, associada ao processo de senescência, conduz a alterações visuais que condicionam a vida diária. Sendo o tratamento cirúrgico, é fundamental que os enfermeiros estejam capacitados para identificar as potencialidades e as dificuldades do idoso, no sentido de facilitar a sua transição saúde/doença no regresso a casa.
Objetivo: Explorar a informação que os enfermeiros relevam na preparação do regresso a casa da pessoa idosa submetida a cirurgia de catarata.
Métodos: Estudo de investigação qualitativo; colheita de dados com recurso à técnica de focus group, com base numa amostra intencional composta por 6 enfermeiros; análise de dados efetuada com categorização à posteriori de acordo com Bardin (2015).
Resultados: Emergiram três categorias: "Fatores facilitadores/inibidores" (idade, capacidade cognitiva, consciencialização da situação clínica e socioeconómicos), "Gestão do regime terapêutico" (regime medicamentoso e preparação prévia) e "Promoção do potencial de autonomia" (capacitação e gestão organizacional).
Conclusão: O reconhecimento da informação relevante, na preparação do regresso a casa, permite a definição de roteiros clínicos tendo em vista a melhor tomada de decisão, em prol da garantia da qualidade e continuidade dos cuidados.

Palavras-chave: idoso; regresso a casa; extração de catarata; enfermeiras e enfermeiros

ABSTRACT

Introduction: Cataracts, associated with the senescence process, lead to visual changes that condition daily life. Being the standard treatment a surgical procedure, which makes nurses a privileged professional group to identify the potential and difficulties of these patients, in order to facilitate their health/illness transition when they return home.
Objetive: To explore the information that nurses provide in preparing the return home of the elderly patients after cataract surgery.
Methods: Qualitative research study, with data collection using the focus group technique, based on an intentional sample composed of six nurses. Data analysis was performed with a posteriori categorization according to Bardin (2015).
Results: Three categories of relevant topics were found: "Facilitating/inhibiting factors" (age, cognitive ability, responses of clinical and socioeconomic situation); "Management of the post-operative therapeutic regimen" (medication regimen and previous preparation); "Promotion of the potential for autonomy" (training and organizational management).
Conclusion: The recognition of relevant information in the preparation of the homecoming allows the definition of clinical pathways with a view to better decision making, in favor of guaranteeing the quality and continuity of care.

Keywords: aged; homecoming; cataract extraction; nurses

RESUMEN

Introducción: La catarata, asociada al proceso de senescencia, conduce a cambios visuales que condicionan la vida diaria. Dado que su tratamiento es quirúrgico, es esencial que las enfermeras estén capacitadas para identificar las potencialidades y dificultades de los ancianos, para facilitar su transición salud/enfermedad al regresar a casa.
Objetivo: Explorar que información consideran más relevante las enfermeras al preparar el regreso a casa de los ancianos sometidos a cirugía de cataratas.
Métodos: Estudio de investigación cualitativa, con recolección de datos utilizando la técnica de grupos focales, basada en una muestra intencional compuesta por seis enfermeras. El análisis de los datos se realizó con una categorización a posteriori según Bardin (2015).
Resultados: Surgieron tres categorías: "Factores inhibidores / facilitadores" (edad, capacidad cognitiva, conciencia del estado clínico y socioeconómico), "Gestión del régimen terapéutico" (régimen farmacológico y preparación previa) y " Promoción del potencial de autonomía" (capacitación y gestión organizacional).
Conclusión: El reconocimiento de información relevante en la preparación del regresso a casa permite la definición de guiones clínicos con miras a una mejor toma de decisiones, a favor de garantizar la calidad y la continuidad de la atención.

Palabras clave: anciano; regreso a casa; extracción de catarata; enfermeiras y enfermeiros

INTRODUÇÃO

O aumento da esperança média de vida traduz-se num aumento do número de pessoas idosas, o que exige, além de uma profunda reflexão sobre a geografia social portuguesa e mundial, uma reorganização dos cuidados de saúde e muito particularmente de enfermagem, pelas singularidades associadas a esta faixa etária. Decorrente do envelhecimento surge o aumento das doenças crónicas, entre as quais as patologias oculares. Contudo, de acordo com o Programa Nacional para a Saúde das Pessoas Idosas (Direção Geral da Saúde (DGS, 2006), em Portugal, as deficiências visuais não são valorizadas no contexto da patologia crónica.

As alterações visuais, nomeadamente a formação de cataratas, que correspondem à opacificação do cristalino do olho, são comuns e muito incapacitantes. Na maioria das pessoas com idade igual ou superior a 80 anos, a catarata é responsável por 50% dos casos de perda total de visão, sendo que, 85% das cataratas são senis (consideradas um processo normal de envelhecimento), em que para a recuperação da capacidade visual a cirurgia é a única opção de tratamento (Almança, Jardim & Duarte, 2018).
No tratamento da catarata a facoemulsificação é a técnica cirúrgica mais utilizada, pela rápida recuperação visual e reduzido índice de complicações intraoperatórias. É um procedimento cirúrgico realizado em regime de ambulatório, o que possibilita o regresso a casa no próprio dia da cirurgia (ou até às 24h a seguir à cirurgia), podendo a recuperação da cirurgia ocorrer em ambiente familiar.
A preparação do regresso a casa deste doente é complexa, pelos próprios condicionalismos que uma cirurgia de ambulatório impõe e pela necessidade imperiosa de promover o potencial de autonomia do doente em prol do sucesso cirúrgico. Na passagem de uma condição de saúde para outra, o doente deve assumir a centralidade do processo assistencial (Mota, 2018). Uma vez que a cirurgia, enquanto acontecimento de vida conduz à mudança, requer uma intervenção diferenciada dos enfermeiros na facilitação do percurso transicional (Meleis, 2010). A preparação do regresso a casa da pessoa idosa após a cirurgia de catarata torna-se fundamental, devendo o enfermeiro assumir-se como facilitador neste processo de transição saúde/doença. Para o efeito, no planeamento adequado de cuidados aos idosos, o envelhecimento não deve ser considerado apenas um fenómeno biológico, mas também um processo transacional dinâmico (Carvalho & Hennington, 2015).
É importante que os enfermeiros consigam perceber o significado daquela experiência para o doente, avaliar o seu estado físico, emocional e as condições ambientais no sentido de uma transição saudável (Mota, Rodrigues & Pereira, 2011). Pela elevada proximidade do enfermeiro ao doente que vivencia o processo de transição, deve estar atento às mudanças e exigências impostas, preparando-o e ajudando-o a desenvolver competências para lidar com essa situação. No sentido da promoção da autogestão da saúde, o enfermeiro deve assistir o doente na aquisição de conhecimentos, competências e facilitar o suporte (Mota, 2018), o que se repercute numa maior adesão e satisfação do doente, garantia da qualidade dos cuidados e impacte nos ganhos em saúde sensíveis aos cuidados de enfermagem. Neste âmbito, o presente estudo pretende explorar a informação que os enfermeiros relevam na preparação do regresso a casa da pessoa idosa submetida a cirurgia de catarata. A identificação das potencialidades e dificuldades deve conduzir à implementação das terapêuticas de enfermagem que vão ao encontro das reais necessidades da pessoa idosa no seu contexto de vida.

1. MÉTODOS

Estudo de investigação qualitativo, recolha de dados com recurso à técnica de focus group.

1.1 Amostra

Amostra intencional constituída por seis enfermeiros da mesma unidade hospitalar da região centro de Portugal, com pelo menos cinco anos de experiência profissional em cirurgia oftalmológica (em concordância com a alínea a) do nº1 do Art.º 4º do Regulamento nº 556/2017 da Ordem dos Enfermeiros, que estabelece que para o reconhecimento de uma área de competência acrescida, o enfermeiro deve ter, pelo menos, cinco anos de exercício profissional comprovado).

1.2 Instrumento e técnica de recolha de dados

Seis enfermeiros foram convidados a participar por correio eletrónico, sendo esclarecidos dos objetivos e dos procedimentos metodológicos do estudo. Inicialmente foi prevista a constituição do grupo com dez enfermeiros, mas quatro viram-se impossibilitados por questões profissionais. A reunião do focus group teve a duração de 75 minutos, tendo por base um guião de discussão semiestruturado e decorreu em abril de 2019 numa sala de aula da Escola Superior de Saúde Norte da Cruz Vermelha Portuguesa. O focus group foi moderado por um dos investigadores responsáveis tendo por base a questão de investigação e orientado por tópicos de discussão centrados no autocuidado (higiene, posicionamento, atividades de vida diária e gestão do regime terapêutico). O focus group foi áudio gravado e posteriormente transcrito de modo a preparar o corpus para análise.

1.3 Procedimentos

No sentido de garantir o anonimato, o nome dos participantes foi substituído por um código, constituído por uma letra e um número (E1 a E6). Após a transcrição do texto, este foi sujeito a análise categorial temática segundo Bardin (2015), sendo a categorização efetuada à posteriori, de acordo com as categorias resultantes da discussão, tendo emergido categorias, sub categorias e sub-sub-categorias, às quais se associaram as unidades de registo.
A participação no estudo foi voluntária tendo cada participante assinado um consentimento informado. O estudo foi aprovado pelo Conselho de Direção e Comissão de Ética da Escola Superior de Saúde Norte da Cruz Vermelha Portuguesa sobre a referência número 07/2019.

2. RESULTADOS

O focus group foi constituído por seis enfermeiros da cirurgia de ambulatório, com um tempo médio de exercício profissional na área de cirurgia oftalmológica de 12,8 ± 4,9 anos (máximo de 21 e mínimo de 7 anos). Da análise dos resultados obtidos, emergiram três

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categorias baseadas na perspetiva dos enfermeiros acerca do regresso a casa da pessoa idosa após a cirurgia de catarata: "Fatores facilitadores/inibidores", "Gestão do regime terapêutico" e "Promoção do potencial de autonomia". As categorias emergiram de uma agregação semântica, tendo por base a sua relação com as subcategorias e as unidades de registo. Nas tabelas de análise de conteúdo são apresentadas apenas as unidades de registo que melhor representam essa unidade, no sentido de uma melhor compreensão dos mesmos.

- **Fatores facilitadores/inibidores**

Os "Fatores facilitadores/inibidores" da preparação do regresso a casa que foram identificados pelos enfermeiros foram: a idade, a capacidade cognitiva, a consciencialização da sua situação clínica e os fatores socioeconómicos, como é apresentado na Tabela 1.

Tabela 1 - Categoria: Fatores facilitadores/Inibidores

CATEGORIA	SUB-CATEGORIA	Unidade de Registo
Fatores facilitadores/inibidores	Idade	E2: "com pessoas com esta idade também não podemos fazer muito" E5: "Diminuição acentuada da audição"
	Capacidade cognitiva	E6: "pela expressão, ou então pelas questões que eles fazem logo a seguir: nós dizemos uma coisa e eles questionam a mesma." E6: "se nós estivermos perante uma pessoa que até estamos a perceber que ela está a assimilar e que até vai cumprir o que estamos a dizer, o reforço não vai ser igual a uma pessoa que eu tenho a certeza que não vai cumprir o esquema" E5: "trazem camisolas de gola alta (…) na consulta é dito que têm que trazer coisas fáceis " [roupas]
	Consciencialização da sua situação clínica	E1: " costumamos ver logo quem é que são os que vão ouvir melhor do que outros" E2: "Não percebeu nada daquilo que nós estivemos a dizer"
	Socioeconómicos	E2: "vem o taxista (…) que passa a informação à vizinha que é quem vai colocar a gota" E3: "O facto de viver sozinho (…) a esposa ou o marido terem também alguma dificuldade (…) ou não sabem ler" E4: "Às vezes quem acompanha nesse dia não é a mesma pessoa que cuida" E2: " ter um taxista à espera, o fator monetário (…) não ouvem porque a preocupação é ir embora. Ou se está uma vizinha porque não comeu"

- **Gestão do regime terapêutico**

A "Gestão do regime terapêutico" (Tabela 2), encerra em si as questões centradas no regime medicamentoso e na preparação prévia.

Tabela 2 - Categoria: Gestão do regime terapêutico

CATEGORIA	SUB-CATEGORIA	SUB-SUB-CATEGORIA	Unidade de registo
Gestão do Regime Terapêutico	Regime medicamentoso	Escalonamento da terapêutica	E1: "por mais que nós expliquemos que têm que fazer uma redução das gotas (…) aquilo passa completamente ao lado" E4: "faço o alerta realmente para o corticosteroide e explico (…) que não pode parar"
		Dose	E6: "se cair uma gota basta e se cair duas não faz mal, ou se cair fora do olho põe outra que o frasco tem muitas." E1: "vai sair sempre uma lágrima (…) a gota cai no olho e sai, é mesmo assim"
		Horário	E2: "é desde que acordam até que se deitam" E6: "tem que ter um minuto de intervalo" E5: " relacionávamos é com as refeições"
		Estratégias	E5: " tentamos agrupar à mesma hora o maior número de gotas" E2: "mostramos na receita onde é que isso está" E1: "o meu guia de tratamento vai sempre todo riscado (…) faço setas" E5: "cada frasco eu pus uma cor e então pintei na carta as cores e resultou" E1: "o senhor da farmácia explica"
		Complexidade	E1: "nós fazemos só o ensino para a primeira semana de gotas" E2: " a medicação é a parte mais complicada" E6: "o esquema da medicação (…) é o mais importante"
	Preparação prévia		E6: "eles fazem gotas no pré-operatório, já estão preparados" E4: "faço já essa prevenção na própria consulta pré-operatória." E1: " se a consulta pré-operatória fosse feita aos doentes todos (…) a compreensão daquilo que nós iríamos estar a falar agora ao doente era completamente diferente" E1: " Na preparação já nos apercebemos se são ansiosos"

Para bem gerir o regime medicamentoso os enfermeiros consideram relevante a informação centrada na dose, horário, estratégias para gerir o regime medicamentoso, o escalonamento da terapêutica e a sua complexidade.

- **Promoção do potencial de autonomia**

A "Promoção do potencial de autonomia" enquanto categoria emergente do estudo, inclui fatores relacionados com a capacitação e com a gestão organizacional, como se apresenta na Tabela 3.

Tabela 3 - Categoria: Promoção do potencial de autonomia

CATEGORIA	SUB-CATEGORIA	SUB-SUB-CATEGORIA	Unidade de registo
Promoção do potencial de autonomia	Capacitação	Sinais de alerta	E1: "se achar que já viu melhor do que aquilo que está a ver (…) venha ter connosco, não espere pela consulta"
		Posicionamento	E1: "não podem dormir para o lado que foi operado, não podem baixar a cabeça" E2: " também lhes digo que não há problema nenhum se acordarem e estão do lado operado (…) de preferência não devem adormecer para aquele lado" E1: "costumo às vezes aconselhar é a pôr uma almofadinha porque quando virarem, não viram por completo" E5: " não se pode baixar (…) mesmo se encontrar uma nota de 500 euros no chão, não pode apanhá-la, você chame que eu vou lá apanhá-la (…) eu acho que eles aí fixam melhor com qualquer coisa de humor"
		Higiene	E6: "a higiene das mãos antes de colocar a gota ou de abrir até o frasco (…) não deve tocar com a ponta do frasco no olho" E1: "(…) a única coisa que tem que ter cuidado é não deixar entrar o sabão para dentro dos olhos. Lavar os pés não precisa de se baixar: esfrega um pé no outro"
		Atividades de Vida Diária	E1: " se sofrerem de prisão de ventre para tomarem o xarope para irem à casa de banho, porque não podem fazer esforço" E2: "cuidado com os calores, os vapores, o dormir, o posicionamento, o ter cuidado em não ir para o quintal" E2: " os mais novos (…) como não podem ir para o fogão, já deixam a comida preparada"
	Gestão organizacional	Disponibilidade	E2: "no espaço de cinco minutos, que é a nossa consulta da alta (…) depois têm o nosso telefone para ligar mais tarde"
		Estrutura física	E6: "Fechamos a porta e ficamos lá dentro. Mas a última coisa que eu faço é dar a chave para a mão deles." E3: " o doente não sai do recobro sem ter um acompanhante à porta, até irem os dois para o gabinete da alta"

Tendo em vista a promoção do potencial de autonomia, os enfermeiros na capacitação do doente centram a informação nos sinais de alerta, posicionamento, higiene e atividades de vida diária. Relativamente à gestão organizacional, com impacte significativo na prática clínica dos enfermeiros, emerge a disponibilidade para informar o doente e a própria estrutura física do serviço de cirurgia de ambulatório.

3. DISCUSSÃO

Na preparação do regresso a casa da pessoa idosa submetida a cirurgia da catarata os enfermeiros que participaram no estudo relevam como fundamental a informação centrada nos "Fatores facilitadores/inibidores", "Gestão do regime terapêutico" e "Promoção do potencial de autonomia".

No domínio dos "Fatores facilitadores/inibidores" os enfermeiros consideram relevante ter em consideração a idade, a capacidade cognitiva, a consciencialização da sua situação clínica e os fatores socioeconómicos. Para que os enfermeiros sejam verdadeiramente significativos na ajuda à vivência de processos de transição saúde/doença saudáveis (Meleis, 2010) é fundamental o reconhecimento destes fatores na identificação das reais necessidades, mas também potencialidades, dos doentes. Petronilho (2013) admite que as mudanças que ocorrem no processo de envelhecimento tornam as pessoas mais vulneráveis, aumentando a sua exposição a riscos, devendo os enfermeiros identificar as suas necessidades e desenvolver estratégias no sentido de facilitar o processo de transição. Fruto do envelhecimento é fundamental que a avaliação do doente seja multidimensional contemplando as múltiplas comorbilidades, a mobilidade (reduzida), défice cognitivo, audição, ansiedade, literacia e suporte familiar, que podem condicionar ou dificultar a sua recuperação (Torrado, 2016). Em resultado, os participantes consideram que a intervenção nestes doentes é complexa afirmando que "com pessoas com esta idade também não podemos fazer muito" (E2), e por isso, reconhecem a necessidade de identificar um cuidador informal em prol da garantia do sucesso

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cirúrgico. É comum, os doentes evidenciarem alterações da sua capacidade cognitiva, o que pode condicionar a sua capacidade de orientação, memória, atenção e evocação. Como refere Nunes (2017) os fatores relacionados com o próprio envelhecimento podem afetar a concentração e raciocínio. A capacidade cognitiva tem impacte significativo na gestão do regime terapêutico (Moretti, Ruy & Saccomann, 2018). Todos estes fatores podem ter repercussões significativas na capacidade da pessoa para cuidar de si, pelo que é fundamental a consciencialização da pessoa para as mudanças que é necessário operar (Mota, 2018). Todavia, o processo de transição é condicionado pelos fatores socioeconómicos, uma vez que o contexto social e económico constitui um fator com grande impacte na forma como a pessoa lida com o processo de doença e recuperação, dado que existem discrepâncias quando há redes de suporte familiar-e/ou de outros agentes sociais ou escassez de apoios (Silva, 2016). É sobretudo quando o sistema de apoio está comprometido, que o enfermeiro demonstra as suas qualidades e conhecimentos, atuando como recurso, ora proporcionando ao idoso e ao cuidador meios e estratégias para lidar com o processo de saúde/doença, ora articulando-se com outros elemento das equipa multidisciplinar no sentido de, em conjunto, encontrarem a melhor solução. Desta forma, os cuidados ao idoso em situação cirúrgica constituem um desafio, dado que as mudanças decorrentes do processo de envelhecimento e a presença de patologias associadas podem comprometer o equilíbrio funcional e aumentar a vulnerabilidade ao aparecimento de complicações pós-operatórias. Contudo, quando os enfermeiros são peritos no domínio do processo de envelhecimento, a implementação de medidas preventivas antecipatórias tem o potencial de influenciar positivamente a evolução cirúrgica do doente (Silva, 2016). A avaliação global da pessoa idosa/família é indispensável para que os enfermeiros compreendam as reais necessidades da pessoa, possibilitando desta forma uma adequada a preparação para o regresso a casa. Os fatores facilitadores/inibidores ao processo de transição podem condicionar a forma como o doente é capaz de gerir o seu regime terapêutico, enquanto atividade executada pelo próprio e em seu próprio benefício, para manter a sua saúde e o seu bem-estar (Oliveira, 2015).

No doente submetido a cirurgia da catarata o regime medicamentoso é uma dimensão muito relevante na área da gestão do regime terapêutico e é muito influenciada pela preparação prévia do doente. É importante que os enfermeiros promovam o empowerment dos doentes no sentido da promoção do seu potencial de autonomia. É por isso, essencial, criar um clima de envolvência, respondendo e clarificando dúvidas, comportamentos e atitudes, dado que a confiança no profissional de saúde terá reflexo na forma como adere ao regime terapêutico (Mota et al., 2011). O modo como se vivencia o processo de transição saúde/doença influencia os resultados. As dimensões que encerram o regime medicamentoso são o escalonamento da terapêutica, a dose, o horário, a complexidade e as estratégias utilizadas. No que diz respeito ao escalonamento da terapêutica, uma das preocupações é relativa ao uso dos corticosteroides oftálmicos, prescritos para controlar o processo inflamatório associado à cirurgia de catarata (Branco, Bisneto & Moreira, 2017), pelo seu impacte na eficácia do tratamento. A administração de colírios de 2 em 2 horas aumenta a complexidade do regime medicamentoso. Esta complexidade torna-se ainda maior pelo facto dos doentes alvo dos cuidados apresentarem compromisso da acuidade visual, quer no olho submetido à cirurgia, quer muitas vezes no outro olho, fruto do próprio envelhecimento. Oliveira (2015) menciona que a ineficácia na gestão do regime medicamentoso está muitas vezes associada à sua complexidade, défice de conhecimentos sobre a forma de integrar as indicações terapêuticas no dia-a-dia, às exigências excessivas sobre a pessoa e à demora ou ausência de resultados positivos. Neste sentido, é fundamental que o enfermeiro reconheça a individualidade de cada pessoa de forma a que implemente terapêuticas de enfermagem adequadas a cada um em particular.

A preparação prévia foi também identificada neste estudo, como fator importante na preparação do regresso a cada da pessoa idosa após cirurgia de catarata, muito relacionada com a consulta pré-operatória, tendo em vista a antecipação das necessidades dos doentes. Para Silva (2016), a consulta pré-operatória visa diminuir os níveis de ansiedade e inclui aspetos da preparação física, sendo que o ensino pré-operatório ao idoso deve ser adaptado, dada a velocidade de processamento da informação ser mais reduzida, o que interfere com a capacidade de atenção, influencia a aprendizagem e pode aumentar a ansiedade. Ao serem fornecidas as recomendações específicas acerca dos cuidados pré-operatórios, inicia-se a promoção do potencial de autonomia para a preparação do regresso a casa. Simultaneamente, avaliam-se potencialidades e eventuais dificuldades do doente/família, no sentido de delinear estratégias para facilitar o autocuidado e favorecer este processo de transição.

No que concerne à "Promoção do potencial de autonomia", esta inclui fatores relacionados com a capacitação e com a gestão organizacional. O envelhecimento requer uma ação ao nível da mudança de comportamentos e atitudes de acordo com as "(…) realidades sociais e familiares que acompanham o envelhecimento individual e demográfico e um ajustamento do ambiente às fragilidades que, mais frequentemente, acompanham a idade avançada." (DGS, 2006, p.6). A respeito da capacitação para o regresso a casa, Silva (2016) menciona que o grande desafio que se coloca aos enfermeiros na fase pré-operatória é combinar os princípios e a prática de enfermagem cirúrgica com as caraterísticas únicas da pessoa idosa, dado que exige capacidade de avaliação percetiva, identificação cuidadosa dos problemas reais e potenciais e um meticuloso planeamento de cuidados adequados às suas necessidades. Neste contexto, os enfermeiros destacam como informação crucial os sinais de alerta, a higiene, as atividades de vida diária e o posicionamento. Torrado (2016) alerta para o facto de que, apesar de ser importante o cumprimento, quer das restrições de movimentos, quer do posicionamento, a alteração da capacidade da pessoa para reter a informação transmitida pode estar na origem de complicações cirúrgicas. Neste processo de adaptação, o enfermeiro deve

desenvolver intervenções que permitam à pessoa idosa realizar a transição com sucesso. Valcarenghi, Lourenço, Siewert & Alvarez (2015) dizem que se trata de empoderar a pessoa idosa, para que possa cuidar de si.

A disponibilidade para a promoção do potencial de autonomia e a estrutura física das instalações, conduziram à subcategoria "Gestão organizacional". Tendo em vista a prestação de cuidados centrada no doente é fundamental que o tempo de cuidados seja o tempo do doente, devendo o enfermeiro demonstrar disponibilidade na medida das necessidades de cuidados do doente. A gestão do tempo é uma das áreas onde as organizações tentam intervir "(…) procurando adequar os procedimentos aos desempenhos individuais e coletivos dos profissionais, de modo a influenciar os seus níveis de produtividade (…)" (Ribeiro, Vieira, Cunha, Dias & Martins, 2016, p. 8). Todavia, na prestação de cuidados de saúde é necessário equilíbrio entre o tempo do doente e o tempo que as organizações de saúde permitem que o enfermeiro tenha para o desempenho das suas funções. Para Ribeiro e colaboradores (2016) para um adequado desempenho de funções devem ser providenciados aos profissionais os recursos e os meios necessários tendo em conta a sua finalidade. A estrutura física das organizações de saúde influencia todo o processo de promoção de potencial de autonomia do doente na preparação do seu regresso a casa. Dias (2014) no seu estudo, atenta na adequação do espaço físico no momento da preparação para o regresso a casa, referindo que os enfermeiros consideram importante que esse espaço proporcione privacidade e conforto quer à pessoa submetida a cirurgia, quer ao seu familiar. A estrutura física revelou-se assim importante para os enfermeiros, uma vez que tendo em vista a promoção do potencial de autonomia é fundamental não só privacidade, mas também que a transmissão da informação seja realizada com tranquilidade, permitindo a explanação de dúvidas e inquietações, que podem dificultar a transição e comprometer o sucesso cirúrgico

CONCLUSÃO

Envelhecer com saúde, autonomia e independência, representa um enorme desafio e responsabilidade para a sociedade, através da definição de intervenções que vão ao encontro das reais necessidades da pessoa idosa no seu contexto de vida. Por outro lado, as políticas de saúde enfatizam a responsabilização, o envolvimento e a capacitação da pessoa no sentido de facilitar os processos de transição ao longo do ciclo de vida. Neste contexto, compete aos enfermeiros colaborar, comunicar com eficácia e preparar a pessoa idosa para os cuidados a manter no regresso a casa. Após a realização do estudo podemos afirmar que os enfermeiros consideram os fatores facilitadores/ inibidores (idade, capacidade cognitiva, consciencialização da situação clínica e socioeconómicos), a gestão do regime terapêutico (regime medicamentoso e preparação prévia) e a promoção do potencial de autonomia (capacitação e gestão organizacional), como relevantes na preparação do regresso a casa da pessoa idosa submetida a cirurgia de catarata, cujo tratamento para recuperação da capacidade visual é realizado maioritariamente em regime de cirurgia de ambulatório, através da técnica de facoemulsificação.

O reconhecimento da informação que os enfermeiros salientam na preparação do regresso a casa da pessoa idosa submetida a cirurgia da catarata é fundamental para a sua intervenção terapêutica, uma vez que permite o reconhecimento das áreas clínicas a considerar em prol de uma prestação de cuidados que vá ao encontro das reais necessidades da pessoa idosa, favorecendo uma transição saudável tendo em conta os seus contextos, recursos e projetos de vida. É assim possível a definição de roteiros clínicos tendo em vista a melhor tomada de decisão, em prol da garantia da qualidade e continuidade dos cuidados.

Como limitações do estudo, salienta-se o baixo número de enfermeiros que aceitaram participar no focus group, como tal, o grupo de discussão ser inferior ao inicialmente previsto.

Sugerem-se estudos futuros nesta área, no sentido de continuamente dar respostas mais adequadas às necessidades das pessoas idosas, numa sociedade cada vez mais envelhecida.

Como implicações para a prática o estudo denota a necessidade dos cuidados de enfermagem serem realizados em regime de parceria e com grande proximidade com a pessoa idosa e seus cuidadores.

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QUALIDADE DE VIDA E A AUTOPERCEÇÃO DA SAÚDE RELACIONADA COM A SAÚDE ORAL: O CASO PARTICULAR DE IDOSOS INSTITUCIONALIZADOS

QUALITY OF LIFE AND SELF-PERCEPTION OF HEALTH RELATED TO ORAL HEALTH: THE PARTICULAR CASE OF INSTITUTIONALIZED ELDERLY

CALIDAD DE VIDA Y AUTO PERCEPCIÓN DE SALUD RELACIONADA CON LA SALUD BUCAL: EL CASO PARTICULAR DEL ANCIANO INSTITUCIONALIZADO

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RESUMO

Introdução: A Organização Mundial da saúde (WHO) inclui a saúde oral (SO) no conceito global de saúde e considera-a essencial para a qualidade de vida (QdV). Avaliar a qualidade de vida relacionada com a saúde oral (QdVRSO) contribui para a aferição efetiva das necessidades.
Objetivos: Caraterizar as variáveis sociodemográficas, clínicas e comportamentais da amostra. Analisar a relação entre estas e a QdVRSO.
Métodos: Estudo quantitativo, transversal e correlacional. Realizaram-se entrevistas estruturadas fundamentadas num questionário sociodemográfico construído para o efeito e na versão traduzida e adaptada para a população portuguesa do *Oral Health Impact Profile* (OHIP-14-PT) a 151 idosos de 9 Estruturas Residenciais para Pessoas Idosas (ERPI).
Resultados: Predomínio do género feminino e viúvos. A média da idade é de 84.4 ± 6.4 anos. A quase totalidade dos inquiridos tem antecedentes patológicos e toma medicação.
A maioria tem dentes naturais (65.6%), mas 31.8% nunca escovam os dentes e a boca.
O *score* médio do OHIP-14-PT é de 18.22. Os itens mais pontuados foram a *Sensação de desconforto no ato de comer* e a *Necessidade de interromper as refeições*. Há diferenças estatisticamente significativas entre o *score* total do OHIP-14-PT e a literacia dos inquiridos.
Conclusão: A amostra autorrelatou um nível moderado de QdVRSO. O edentulismo e a ausência de uso de prótese dentária predizem pior QdVRSO. Há dificuldade no acesso dos idosos aos cuidados de saúde oral.

Palavras-chaves: saúde bucal; qualidade de vida; idoso; instituição de longa permanência para idosos; enfermagem em saúde comunitária;

ABSTRACT

Introduction: The World Health Organization (WHO) includes oral health (OH) in the global concept of health and considers it essential for the quality of life (QoL). Assessing the quality of life related to oral health (QofLROH) contributes to the effective measurement of needs.
Objectives: To characterize the sociodemographic, clinical and behavioral variables of the sample. Analyze the relationship between these and the QofLROH.
Methods: Quantitative, cross-sectional and correlational study. Structured interviews were conducted based on a sociodemographic questionnaire built for the purpose and in the translated and adapted version for the Portuguese population of the Oral Health Impact Profile (OHIP-14-PT) to 151 elderly people from 9 Residential Structures for the Elderly (RSfE).
Results: Predominance of the female gender and widowers. The average age is 84.4 ± 6.4 years. Almost all respondents have a pathological history and take medication.
Most of them have natural teeth (65.6%), but 31.8% of them never brush their teeth and mouth.
The average OHIP-14-PT score is 18.22. The most scored items were the feeling of discomfort in the act of eating and the need to interrupt meals. There are statistically significant differences between the total OHIP-14-PT score and the literacy of respondents.
Conclusion: The sample self-reported a moderate level of QofLROH. Edentulism and the absence of use of dental prosthesis predict worse QofLROH. There is a great difficulty in the elderly's access to oral health care.

Keywords: oral health; quality of life; old person; long-stay institution for the elderly; community health nursing

RESUMEN

Introducción: La Organización Mundial de la Salud (WHO) incluye la salud oral (SO) como concepto global de salud y la considera esencial para la calidad de vida (CdV). Evaluar la calidad de vida relacionada con la salud oral (CdVRSO) contribuye para constatar las necesidades efectivas.
Objetivos: Caracterizar las variables socio-demográficas, clínicas y comportamentales de la muestra. Analizar la relación entre estas y la CdVRSO.
Métodos: Estudio cuantitativo, transversal y correlacional. Se realizaron entrevistas estructuradas, fundamentadas en un cuestionario socio-demográfico construido para tal efecto en la versión traducida y adaptada para la población portuguesa del *Oral Health Impact Profile* (OHIP-14-PT) en 151 ancianos de 9 Centros Residenciales para ancianos.
Resultados: Predominio del sexo femenino y viudos. La media de edad es de 84.4 ± 6.4 años. Casi el total de los encuestados tiene antecedentes patológicos y toma medicación.
La mayoría tiene dientes naturales (65.6%), pero 31.8% nunca cepillan los dientes y la boca.
El score medio del OHIP-14-PT es de 18.22. Los ítems más puntuados fueron la *Sensación de molestia al comer y* la *Necesidad de parar las comidas*. Hay diferencias estadísticamente significativas entre el *score* total del OHIP-14-PT y la literacidad de los encuestados.
Conclusión: La muestra auto relató un nivel moderado de QdVRSO. El edentulismo y la falta del uso de la prótesis dentaria predicen un peor QdVRSO. Hay dificultad de los ancianos al acceso para los cuidados de la salud oral.

Palabras clave: salud bucal; calidad de vida; anciano; centros de larga estancia para ancianos; enfermería en salud comunitaria

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INTRODUCTION

Although unevenly and at a slower pace, the world population continues to grow. Nowadays, due to the evidenced demographic changes and the inherent biopsychosocial characteristics, the elderly present themselves as a challenge for health professionals and services, and those who have greater health needs tend to be those who have less access to health care. Thus, the development of policies that overcome inequalities and that promote equity in the access to resources and services that enhance the health and the QoL of populations is emerging.

Oral Health (OH) is a fundamental human right that integrates health in general. Although, for decades, it has not been considered a matter of priority interest for political agendas, OH has significance in the physical and psychological dimensions, so that assessing health-related quality of life through the impact of oral condition contributes to the improvement of prevention and intervention strategies in OH. (Zucoloto, Maroco, & Campos, 2016; Dallasta, Medina, & Dallepiane, 2019).

The objective was to characterize the sociodemographic, clinical and behavioral variables and their relationship with QofLROH.

1. LITERATURE REVIEW

Aging reflects the socioeconomic development of public health of each nation, representing, at the same time, the enrichment of individuals. However, a new aging paradigm emerges that makes it imperative to guarantee the best possible health in old age in order to achieve sustainable development (WHO, 2017), as it, *if the extra years are dominated by the decline in physical and mental ability, the implications for older people and for society are much more negative* (WHO, 2015, p. 5). Thus, aging with health, autonomy and independence is an individual, collective and multisectoral challenge that translates itself into the countries' economies, as it is a progressive and continuous process throughout the individual's life cycle with changes in his biological, psychological and social structure.

A WHO (1999) defines the elderly as the individual aged 65 years old or over for developed countries, with this cutoff point being reduced to 60 years old when the population analysis concerns developing countries.

Likewise, it considers very elderly people to be chronologically aged 80 years old or more. However, more than a temporal definition of the elderly, it is imperative that society and policymakers have a critical and directed eye to the needs of this population setting and the challenges that are inherent to it.

As a result of the functional changes inherent to the progression of chronological age, there is a change in the skills of the elderly with regard to the response to external stimuli, which is why, throughout the life cycle, it is important to promote active and healthy aging based on positive experiences, so that the extension of life reflects opportunities for health, participation and safety instead of the social segregation of the elderly (Penetro, 2017).

Health in the elderly results from experiences lived throughout life and is influenced by a set of factors that define the level of health of the person in old age, encompassing areas as distinct as genetics and molecular changes, but also the economic, technological and cultural aspects. Although, in isolation, none of these variables can be enunciated as an etiological cause of the aging process or of the health and well-being status of the elderly, its multidimensional analysis predicts the way the individual and communities age.

In view of the above, it is permissible to affirm that health and aging are social and cultural constructions with biological determination and with repercussions on the self-perception of health. This is a relevant aspect to consider when assessing people's health level, since self-perception demonstrates, through an integral sphere perceived by the individual, their true health level. Román, Toffoleto, Sepulveda, Salfate and Grandon (2017) point out that the main component of satisfaction with the life of the elderly is self-perceived health, and a positive perception of the health conditions in which the elderly is essential for the balance and the maintenance of social roles and interaction with the family and society. Dichotomizing the health condition of the Human Being in health and disease is a complex process and permeable to a set of multidimensional factors, so it is important to interpret health as a positive concept, sensitive to the individual's personal, social and environmental resources and that integrates the measuring QoL and self-definition of health status (Zucoloto et al., 2016).

Watt, Heilmann, Listl and Peres (2016) highlight the relevance of the role of social determinants in inequalities in OH and add that it is the biological, socio-behavioral, psychosocial and political factors that dictate the contexts where the individual is born, grows, lives, works and finally ages. The association between these factors is continuous throughout the life cycle and transversal to different countries, regardless of their degree of development, which results in inequality and social injustice. In 2012, the International Dental Federation reflected on the future of OH in the world and set a goal for 2020 to adopt a more salutogenic model based on the prevention of disease and the promotion of a high OH index to the detriment of the traditional curative model. At the same time, it aims for a more targeted and comprehensive approach that includes all actors that can contribute to the improvement of the population's OH (FDI, 2015). Thus, governments and non-governmental organizations must join forces in order to find constructive solutions that aim to reduce social inequalities in the OH and that respond to the growing need and demand for OH care, guaranteeing access guided by equity and opportunity (FDI, 2015; WHO, 2019).

Considering the specific characteristics of the aged person, it is understood that there is an added set of barriers in the care of OH for the elderly, and WHO (2019) values the mobility deficit as a factor that hinders access to OH care essentially in residents in

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rural areas, the financial difficulties resulting from the transition to retirement aggravated by the costs of OH care, the precarious behaviors related to the surveillance and care of teeth and mouth and the solitary residence without support from friends, family or caretakers who are responsible for this need. Thus, it is essential to recognize the importance of maintaining OH throughout the entire life cycle in order to guarantee a growing and healthy life expectancy, so that, in the case of dependent or institutionalized elderly, caretakers assume an epicentric role in surveillance and provision of oral care (Zanesco, Bordin, Santos, Muller, & Fadel, 2018).

According to Cardoso (2014), there is a growing demand for OH professionals by individuals over 65 years of age. However, with regard to institutionalized elderly, there is a prevalence of a worse state of OH, which is associated with reduced oral hygiene care and the restriction of medical and dental care to urgent situations, with dental hygiene not being assumed. as a priority (Cardoso, 2014; Rekhi & et al., 2016). The evidence reported in the aforementioned studies contributes to the institutionalized elderly referring to low self-perception of health with the inevitable repercussion in the different dimensions while being holistic and in their QoL (Jerez-Roig & et al., 2016). In this way, it is important to ensure that RSfE managers establish plans and actions that promote and protect the OH of residents and raise awareness among caretakers, family members and the elderly themselves about the OH needs of these individuals.

2. METHODS

In order to observe the relationship between the variables resulting from or influencing the self-perception of QofLROH of elderly people institutionalized in RSfE, an empirical, cross-sectional and correlational study was undertaken, with a quantitative approach.

2.1 Sample

Among the elderly in the municipality of Bragança - Portugal, in January 2019, about 800 were institutionalized in the 22 RSfE available. The final sample of the research carried out includes 151 individuals, which represents 31.8% of the institutionalized elderly in the RSfE that integrate it and 18.7% of the institutionalized elderly in the municipality of Bragança.

2.2 Data collection

Data collection, which took place in the period from December 2019 to January 2020, was achieved by conducting, by a single researcher, a survey in the form of a structured interview based on the data collection instrument, taking place at the premises. the RSfE where the elderly person lives. On site, the identification of the elderly candidates to be part of the study was carried out by the technical director or person indicated by him, and the moment of data collection started by confirming the fulfillment of the inclusion criteria and signing the informed, free and clarified consent. The data collection instrument included a sociodemographic questionnaire built for this purpose and the OHIP-14-PT, this version being translated and adapted for the Portuguese population by Afonso (2014) of the Oral Health Impact Profile developed by Slade (1997). The OHIP-14-PT scores were interpreted based on the addition method for all items and dimensions, justifying this option as this is a method with better performance compared to the simple counting method.

The OHIP-14-PT includes two questions for each of the seven dimensions of the original version and has similar psychometric properties (Rodrigues, 2015).

2.3 Inclusion criteria

The following criteria were defined for the standardization of the analysis units: To be able to understand and sign the informed, free and clarified consent; to be 65 years of age or older; to have Portuguese nationality; to be institutionalized in RSfE in the municipality of Bragança.

All individuals who answered incorrectly to at least one question were excluded from the assessment of the orientation related to time, space and person included in the data collection instrument.

2.4 Procedures

In order to carry out the study, a favorable decision was obtained from the Ethics Committee of the Health Sciences Research Unit: Nursing at the Escola Superior de Enfermagem de Coimbra, according to Opinion nº P624 / 11-2019.

The integration of RSfE in the study was preceded by a request for authorization to perform the same addressed to the technical director.

Participants were asked to read, reflect and sign the informed, free and clarified consent that is attached. Anonymity, data confidentiality and the possibility of giving up at any time during the study were guaranteed, and the data collected will only be used in the present investigation and were destroyed at the end.

The use of OHIP-14-PT was preceded by the author's authorization.

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The statistical treatment of the data was processed in the Statistical Package for the Social Sciences® version 23 software, and the analysis of the use of descriptive and inferential statistical measures emerged. For statistical inference, non-parametric tests were used with a significance level of 0.05. The Chi-Square Adjustment Test was chosen to analyze the association of nominal and ordinal variables and Pearson's Correlation Coefficient to measure the degree of association between two quantitative variables.

3. RESULTS

The carried out investigation focused on 9 RSfE with a 100% occupancy rate at the date of data collection. Regarding the oral health of residents, this is a variable of concern for the leaders of all participating institutions, although only 3 regularly assess the oral condition of the elderly.

151 elderly people participated in the study, the youngest was 65 years old and the oldest was 99 years old, with an average age of 84.4 years (± 6.4 years). It was found that the median is 85.0 years, which allows us to affirm that it is a very aging population according to the definition adopted by WHO (1999). By age distribution according to gender, it was found that, on average, female participants are older than male participants (84.8 years, ± 0.64 years and 83.7 years, ± 0.89 years, respectively). When age groups are established according to the percentiles, 46.4% of the elderly respondents (n = 70) are between 86 and 99 years old and 27.2% (n = 41) are between 82 and 85 years old.

By analyzing the sociodemographic variables, it was confirmed that all participants are currently retired, that the vast majority are widowed (70.2%, n = 106) and have attended education up to the 1st Cycle of Basic Education (53.6%, n = 81) . With regard to the place of residence prior to institutionalization, 79.5% of the elderly (n = 120) lived in rural areas, which supports the type of activity performed by individuals, insofar as agriculture was the professional activity mentioned as occupation during active life for 43.7% of the sample (n = 66), followed by the profession of domestic worker (29.8%, n = 45), which makes the primary sector of activity the most representative (74.8%, n = 113).

Among the units of analysis, 96.0% (n = 145) reported having at least one pathology and 94.0% (n = 142) habitually taking some type of medication, with diseases of the circulatory system prevailing (71.5%, n = 108) and endocrine, nutritional and metabolic diseases (60.9%, n = 92).

With regard to addiction habits, it was aimed that 83.4% of the individuals (n = 126) never smoked and 13.3% (n = 20) smoked, but refer to no longer smoking while, in relation to alcohol consumption, 42.4% respondents (n = 64) never drank alcohol and 33.1% (n = 50) did so in the past.

Edentulism is present in 97.8% of respondents (n = 149), of which 34.4% (n = 52) have no teeth. Of the individuals with edentulous zones, the majority (53.7%, n = 80) do not use dental prosthesis.

Although the majority of respondents are in the habit of brushing their teeth and mouth (68.2%, n = 103), 31.8% (n = 48) never do so, and of the individuals who clean the oral cavity, 50.5% (n = 52) do it in the morning and 17.5% (n = 18) before bedtime. The remaining 32.0% (n = 33) brush their teeth and mouth more than once a day. Among the elderly who use dental prosthesis (45.7%, n = 69), 53.6% (n = 37) clean it more than once a day and 2.9% (n = 2) never do it.

At the time of data collection, 45.7% of respondents (n = 69) answered Yes to the question *Do you have a problem with your mouth or dental prosthesis that make you think you need an appointment with an oral health professional*?, but 55.0% (n = 83) reported not having the habit of attending consultations with oral health professionals. Of those who have this habit, the majority (91.2%, n = 62) do it only when necessary and, of the total of elderly people, only 4.0% (n = 6) do it regularly. With regard to the date of the last appointment with an oral health professional, it was shown that 17.2% of the participants (n = 26) never went to an appointment with these professionals and 25.8% (n = 39) did it more than 3 years ago.

The respondents' QofLROH self-report was assessed using OHIP-14-PT, obtaining an average score, according to the addition method, of 18.22, with a Minimum of 0.00 and a Maximum of 50.00 (±10.66). Most of the respondents never had the perception of inability to carry out their activities (86.8%, n = 131) and difficulty to perform them (75.5%, n = 114) due to problems related to teeth, mouth or dental prosthesis. Likewise, 76.8% of participants (n = 116) reported that oral condition has no meaning in the interaction with others and 56.3% (n = 85) that it has never prevented them from relaxing.

The most scored items were *the need to interrupt meals and the feeling of discomfort in the act of eating* due to problems related to the mouth, the teeth or the dental prosthesis, and for the first 39.7% reported discomfort sometimes (n = 60) and for the second, 35.1% (n = 53) attributed the same answer. Thus, the vast majority of the sample considers that the feeling of discomfort during eating (62.3%, n = 94) and the need to interrupt meals (60.9%, n = 92) have an impact on QoL. The remaining items of OHIP-14-PT were assessed by most respondents as having no impact on their QoL.

It was found that there is statistical significance between gender and tobacco use (p = 0.000), alcohol consumption (p = 0.000), the presence of natural dentition (p = 0.040), edentulous areas (p = 0.029) and the use of dental prosthesis (p = 0.019).

In the correlation between sociodemographic variables and OHIP-14-PT, it was found that there is an association between education level and Dimension 7 (p = 0.001) and the total score (p = 0.003) of OHIP-14-PT, showing that a higher level of literacy results in better QofLROH.

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In the correlation of clinical variables with the self-report of QofLROH, there are statistically significant differences between individuals with and without pathological history in Dimension 2 (p = 0.044) and Dimension 4 (p = 0.011) of the OHIP-14-PT. In respondents with natural dentition there are differences with statistical significance in Dimensions 2 (p = 0.035) and 5 (p = 0.015). Paradoxically, there was no statistical association between total or partial edentulism and self-reported QofLROH. The study of the statistical relationship between behavioral variables and QofLROH shows that there are no statistically significant differences between the dimensions of OHIP-14-PT and brushing of teeth and mouth and brushing of dental prosthesis, but there are between Dimensions 6 (p = 0.040) and 7 (p = 0.032) and the behavior of seeking appointments of oral health professionals.

4. DISCUSSION

The investigation of QofLROH in the elderly translates into contributions that guarantee the best possible health in old age, allowing the achievement of sustainable development goals.

In the present study, the institutionalization of elderly people in RSfE based in rural areas prevails. The preference for this location may come from the offer, but also from the fact that the majority of participants come from rural areas maintaining their residence in contexts close to those that characterized their life path. As recommended by the Directorate-General for Health (2017), it is expected that the individual, although elderly, will participate in the social, economic, cultural, spiritual and civic life of the community in which he / she operates, with the institutionalization in contexts close to those experienced during adult life contributing to active and healthy aging.

The female participants reported worse QofLROH, which overlaps what was evidenced by Gomes, Teixeira and Paçô (2015) and Beldiman et al. (2017) but does not reflect what was found by Castrejón-Pérez, Borges-Yáñez, Irigoyen-Camacho and Cruz-Hervert (2017) and by Umniyati, Surachmin and Ambarsati (2018) who evidenced the absence of differences in OHIP-14 scores according to gender. The attitude of women towards OH and health in general, resulting from their role as an element that assumes family care, can contribute to this giving greater meaning to the subjective aspects of OH and the repercussions it translates on health in general.

In the correlation of sociodemographic variables with OHIP-14-PT, there was an association with statistical significance between the level of literacy in the sample and the total score of OHIP-14-PT obtained by the addition method. These data mirror those found by Gomes et al. (2015), Beldiman, et al. (2017), Castrejón-Pérez et al. (2017) and Dallasta et al. (2019), it should be noted that a higher level of literacy is a protective factor in the holistic paradigm of the concept of health in general and can be associated with increasing demand and better access to information on health promotion and prevention of oral disease, which has significance in the condition of OH and, consequently, in the QofLROH.

Among the study participants, individuals with pathology of the circulatory system or endocrine, metabolic or nutritional disease reported worse QofLROH. Although, in isolation, the association between the pathological history and the therapeutic regimen of individuals allows only a restrictive and directed inference, the data under analysis can be justified by the fact that the occurrence of oral disorders may be dependent on the pathophysiology or drug treatment of patients. referred pathologies. Mata, Allen, McKenna, Hayes and Kashan (2019) corroborate this position based on the study they developed where they concluded that elderly people with comorbidities have worse QofLROH and that the use of certain groups of drugs, such as antihypertensives, increases the risk of the individual of developing oral disease.

The oral condition of the respondents is characterized by precariousness and reflects what was found in the population-based study carried out by the “Ordem dos Médicos Dentistas” (2019) and in the study carried out on institutionalized elderly in Barcelona by Cornejo, Pérez, Lima, Casals-Peidro and Borrell (2013) that showed the high prevalence of OH problems in residents, associating them with low QofLROH.

Bearing in mind that the research carried out was directed at a specific population setting, it is essential to bear in mind that the oral condition of the elderly results from the health course during the individual's life cycle. Among biological factors, age is a variable with significance in health in general and in OR, and advancing age is synonymous with a decrease in the level of OH (Umniyati, Surachmin et al., 2018; WHO, 2019). At the same time, the chronological perspective of the definition of strategies related to disease prevention and promotion of OH reveals the segregation of the elderly as the target group for the intervention, adding the fact that many individuals depend on the caregiver for access to OH care. In this context, the results measured in the developed study should be read and interpreted with special interest, as 73.6% of the participants (n = 111) are 82 years old or more and, in Portugal, like in the rest of Europe and the worldwide, access to OH is characterized by the difficulty and inadequacy of resources in face of population demands, namely with regard to the response given by the National Health Service. However, there is an evolution in policies that favor equity and access to healthcare.

In the elderly, self-assessment of OH is a complex variable that links beliefs, life path, access to OH care and behaviors acquired from oral hygiene habits, with this set of factors being represented in the elderly's self-perception of OH. Thus, the awareness of caretakers and the individual is urgent to adopt protective behaviors and to seek OH care as vehicles for improving QofLROH.

With regard to the specificity of the sample studied, institutionalization in RSfE can be understood as a facilitating and promoting factor for health care seeking behaviors, as well as for appropriate oral hygiene habits. However, the importance of the caretaker's

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role is emphasized, since, in the case of a very elderly population and with some functional limitations, it is essential to guarantee the individual's motivation and education, without neglecting the supervision of care. As a professional who is part of the multidisciplinary team of individual care, the Specialist Nurse in Community Health assumes a prominent position in the prevention of disease and in the promotion of OH, and, basing his performance on the methodology of health planning, he must make a concise state of health assessment of the most vulnerable settings and promote the empowerment of the individual and caretakers through awareness and instruction actions. According to Cunha, et al. (2014), in the OH, the nurse's performance must be evident in primary prevention, and the predictors of QofLROH may support the structuring of a program to promote OH in the elderly.

CONCLUSION

The sociodemographic characterization of the studied sample is representative of the regional and national population indicators, with no statistical significance between the sociodemographic variables and the level of self-reported QofLROH.
It was concluded that chronic diseases with significance in QofLROH predominate and that edentulism and the absence of use of dental prosthesis represent a worse level of self-reported QofLROH.
The nurse, due to the inherent skills and as a health professional close to the individual, assumes a prominent position with regard to primary prevention. Thus, it is suggested that, based on the knowledge they have regarding the predictors of QofLROH, nurses structure programs to promote OR in the elderly, and it is pertinent to define an interdisciplinary plan that aims to improve QofLROH, promoting active aging.
The limitations of the study are recognized as the sample size that does not allow the generalization of the results to the population of institutionalized elderly in RSfE, the scarcity of previous studies in institutionalized elderly and the time horizon defined by not allowing the design of a longitudinal study that would allow the determination of a causal ratio between the variables studied and the QofLROH.

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QUALIDADE DE VIDA E A AUTOPERCEÇÃO DA SAÚDE RELACIONADA COM A SAÚDE ORAL: O CASO PARTICULAR DE IDOSOS INSTITUCIONALIZADOS

QUALITY OF LIFE AND SELF-PERCEPTION OF HEALTH RELATED TO ORAL HEALTH: THE PARTICULAR CASE OF INSTITUTIONALIZED ELDERLY

CALIDAD DE VIDA Y AUTO PERCEPCIÓN DE SALUD RELACIONADA CON LA SALUD BUCAL: EL CASO PARTICULAR DEL ANCIANO INSTITUCIONALIZADO

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RESUMO

Introdução: A Organização Mundial da saúde (WHO) inclui a saúde oral (SO) no conceito global de saúde e considera-a essencial para a qualidade de vida (QdV). Avaliar a qualidade de vida relacionada com a saúde oral (QdVRSO) contribui para a aferição efetiva das necessidades.
Objetivos: Caraterizar as variáveis sociodemográficas, clínicas e comportamentais da amostra. Analisar a relação entre estas e a QdVRSO.
Métodos: Estudo quantitativo, transversal e correlacional. Realizaram-se entrevistas estruturadas fundamentadas num questionário sociodemográfico construído para o efeito e na versão traduzida e adaptada para a população portuguesa do *Oral Health Impact Profile* (OHIP-14-PT) a 151 idosos de 9 Estruturas Residenciais para Pessoas Idosas (ERPI).
Resultados: Predomínio do género feminino e viúvos. A média da idade é de 84.4 ± 6.4 anos. A quase totalidade dos inquiridos tem antecedentes patológicos e toma medicação.
A maioria tem dentes naturais (65.6%), mas 31.8% nunca escovam os dentes e a boca.
O *score* médio do OHIP-14-PT é de 18.22. Os itens mais pontuados foram a *Sensação de desconforto no ato de comer* e a *Necessidade de interromper as refeições*. Há diferenças estatisticamente significativas entre o *score* total do OHIP-14-PT e a literacia dos inquiridos.
Conclusão: A amostra autorrelatou um nível moderado de QdVRSO. O edentulismo e a ausência de uso de prótese dentária predizem pior QdVRSO. Há dificuldade no acesso dos idosos aos cuidados de saúde oral.

Palavras-chaves: saúde bucal; qualidade de vida; idoso; instituição de longa permanência para idosos; enfermagem em saúde comunitária;

ABSTRACT

Introduction: The World Health Organization (WHO) includes oral health (OH) in the global concept of health and considers it essential for the quality of life (QoL). Assessing the quality of life related to oral health (QofLROH) contributes to the effective measurement of needs.
Objectives: To characterize the sociodemographic, clinical and behavioral variables of the sample. Analyze the relationship between these and the QofLROH.
Methods: Quantitative, cross-sectional and correlational study. Structured interviews were conducted based on a sociodemographic questionnaire built for the purpose and in the translated and adapted version for the Portuguese population of the Oral Health Impact Profile (OHIP-14-PT) to 151 elderly people from 9 Residential Structures for the Elderly (RSfE).
Results: Predominance of the female gender and widowers. The average age is 84.4 ± 6.4 years. Almost all respondents have a pathological history and take medication.
Most of them have natural teeth (65.6%), but 31.8% of them never brush their teeth and mouth.
The average OHIP-14-PT score is 18.22. The most scored items were the feeling of discomfort in the act of eating and the need to interrupt meals. There are statistically significant differences between the total OHIP-14-PT score and the literacy of respondents.
Conclusion: The sample self-reported a moderate level of QofLROH. Edentulism and the absence of use of dental prosthesis predict worse QofLROH. There is a great difficulty in the elderly's access to oral health care.

Keywords: oral health; quality of life; old person; long-stay institution for the elderly; community health nursing

RESUMEN

Introducción: La Organización Mundial de la Salud (WHO) incluye la salud oral (SO) como concepto global de salud y la considera esencial para la calidad de vida (CdV). Evaluar la calidad de vida relacionada con la salud oral (CdVRSO) contribuye para constatar las necesidades efectivas.
Objetivos: Caracterizar las variables socio-demográficas, clínicas y comportamentales de la muestra. Analizar la relación entre estas y la CdVRSO.
Métodos: Estudio cuantitativo, transversal y correlacional. Se realizaron entrevistas estructuradas, fundamentadas en un cuestionario socio-demográfico construido para tal efecto en la versión traducida y adaptada para la población portuguesa del *Oral Health Impact Profile* (OHIP-14-PT) en 151 ancianos de 9 Centros Residenciales para ancianos.
Resultados: Predominio del sexo femenino y viudos. La media de edad es de 84.4 ± 6.4 años. Casi el total de los encuestados tiene antecedentes patológicos y toma medicación.
La mayoría tiene dientes naturales (65.6%), pero 31.8% nunca cepillan los dientes y la boca.
El score medio del OHIP-14-PT es de 18.22. Los ítems más puntuados fueron la *Sensación de molestia al comer y* la *Necesidad de parar las comidas*. Hay diferencias estadísticamente significativas entre el *score* total del OHIP-14-PT y la literacidad de los encuestados.
Conclusión: La muestra auto relató un nivel moderado de QdVRSO. El edentulismo y la falta del uso de la prótesis dentaria predicen un peor QdVRSO. Hay dificultad de los ancianos al acceso para los cuidados de la salud oral.

Palabras clave: salud bucal; calidad de vida; anciano; centros de larga estancia para ancianos; enfermería en salud comunitaria

INTRODUÇÃO

Ainda que de forma desigual e a um ritmo mais lento, a população mundial continua a crescer. Atualmente, pelas alterações demográficas evidenciadas e pelas caraterísticas biopsicossociais inerentes, os idosos apresentam-se como um desafio para os profissionais e serviços de saúde, sendo que, aqueles que têm maiores necessidades de saúde tendem a ser aqueles que detêm menor acesso aos cuidados de saúde. Assim, torna-se emergente o desenvolvimento de políticas que superem as desigualdades e que promovam a equidade no acesso a recursos e serviços que potenciem a saúde e a QdV das populações.
A Saúde Oral (SO) é um direito humano fundamental que integra a saúde em geral. Apesar de, durante décadas, não ter sido considerada um assunto de interesse prioritário para as agendas políticas, a SO tem significado nas dimensões física e psicológica, pelo que, avaliar a qualidade de vida relacionada com a saúde através do impacto da condição oral contribui para a melhoria das estratégias de prevenção e intervenção em SO (Zucoloto, Maroco, & Campos, 2016; Dallasta, Medina, & Dallepiane, 2019).
Objetivou-se a caraterização das variáveis sociodemográficas, clínicas e comportamentais e a relação destas com a QdVRSO.

1. REVISÃO DA LITERATURA

O envelhecimento traduz o desenvolvimento socioeconómico das nações da saúde pública, representando, paralelamente, o enriquecimento dos indivíduos. Contudo, emerge um novo paradigma de envelhecimento que torna premente garantir a melhor saúde possível na velhice por forma a alcançar o desenvolvimento sustentável (WHO, 2017), na medida em que, se os *anos a mais são dominados por declínios na capacidade física e mental, as implicações para as pessoas mais velhas e para a sociedade são muito mais negativas* (WHO, 2015, p. 5). Assim, envelhecer com saúde, autonomia e independência é um desafio individual, coletivo e multissetorial com tradução na economia dos países, dado que é um processo progressivo e contínuo ao longo do ciclo vital do indivíduo com mudanças na sua estrutura biológica, psicológica e social.
A WHO (1999) define idoso como o indivíduo com 65 ou mais anos para os países desenvolvidos, sendo este ponto de corte reduzido para os 60 anos quando a análise populacional é concernente aos países em desenvolvimento. Da mesma forma, considera pessoas muito idosas as que têm idade cronológica de 80 ou mais anos. No entanto, mais do que uma definição temporal de idoso, é imperioso que a sociedade e os responsáveis políticos tenham um olhar crítico e direcionado para as necessidades deste *setting* populacional e para os desafios que lhe estão inerentes.
Decorrente das alterações funcionais inerentes à progressão da idade cronológica, surge a alteração das competências do idoso no que respeita à resposta aos estímulos externos pelo que, ao longo do ciclo vital, importa a promoção de um envelhecimento ativo e saudável e fundamentado em experiências positivas, por forma a que o prolongamento da vida traduza oportunidades de saúde, participação e segurança ao invés da segregação social da pessoa idosa (Penetro, 2017).
A saúde no idoso resulta das experiências vivenciadas ao longo da vida e é influenciada por um conjunto de fatores que definem o nível de saúde da pessoa na velhice, englobando áreas tão distintas como a genética e as alterações moleculares, mas também os aspetos económicos, tecnológicos e culturais. Ainda que isoladamente nenhuma destas variáveis possa ser enunciada como causa etiológica do processo de envelhecimento ou do status de saúde e bem-estar do idoso, a sua análise multidimensional prediz a forma como o indivíduo e as comunidades envelhecem.
Atendendo ao referido, é lícito afirmar que saúde e envelhecimento são construções sociais e culturais com determinação biológica e com repercussão na autoperceção da saúde. Este é um aspeto relevante a considerar quando se avalia o nível de saúde de pessoas, uma vez que a autoperceção demonstra, através de uma esfera integral percebida pelo indivíduo, o seu verdadeiro nível de saúde. Román, Toffoleto, Sepulveda, Salfate e Grandon (2017) salientam que o principal componente de satisfação com a vida dos idosos é a autoperceção da saúde, sendo que a perceção positiva perante as condições de saúde em que os idosos se encontram é essencial para o equilíbrio e para a manutenção dos papéis sociais e de interação com a família e a sociedade. Dicotomizar a condição de saúde do Ser Humano em saúde e doença é um processo complexo e permeável a um conjunto de fatores multidimensionais, pelo que importa interpretar a saúde como um conceito positivo, sensível aos recursos pessoais, sociais e ambientais do indivíduo e que integre a mensuração da QdV e a autodefinição do nível de saúde (Zucoloto et al., 2016).
Watt, Heilmann, Listl e Peres (2016) salientam a relevância do papel dos determinantes sociais nas desigualdades em SO e acrescentam que são os fatores biológicos, sociocomportamentais, psicossociais e políticos que ditam os contextos onde o indivíduo nasce, cresce, vive, trabalha e envelhece. A associação entre estes fatores é contínua ao longo do ciclo vital e transversal aos diferentes países, independentemente do seu grau de desenvolvimento, o que resulta em desigualdade e injustiça social. Em 2012, a Federação Dentária Internacional refletiu sobre o futuro da SO no mundo e estabeleceu como objetivo para 2020 a adoção de um modelo mais salutogénico e fundamentado na prevenção da doença e na promoção de um índice de SO elevado em detrimento do tradicional modelo curativo. Paralelamente, almeja uma abordagem mais direcionada e abrangente que inclua todos os atores que possam contribuir para a melhoria da SO das populações (FDI, 2015). Assim, governos e organizações não governamentais devem unir esforços no sentido de encontrar soluções construtivas que visem a redução das desigualdades sociais na SO e que respondam à crescente necessidade e procura de cuidados de SO, garantindo um acesso pautado pela equidade e oportunidade (FDI, 2015; WHO, 2019).

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Considerando as caraterísticas específicas da pessoa envelhecida, entende-se que haja um conjunto acrescido de barreiras nos cuidados de SO dos idosos, sendo que a WHO (2019) valoriza o défice de mobilidade enquanto fator dificultador do acesso aos cuidados de SO essencialmente nos residentes em áreas rurais, as dificuldades financeiras decorrentes da transição para a reforma agravadas pelos custos dos cuidados de SO, a precaridade de comportamentos concernentes à vigilância e cuidados aos dentes e boca e a residência solitária sem apoio de amigos, familiares ou cuidadores que se responsabilizem por esta necessidade. Assim, é fundamental reconhecer a importância da manutenção da SO ao longo de todo o ciclo vital por forma a garantir uma esperança de vida crescente e saudável pelo que, no caso dos idosos dependentes ou institucionalizados, os prestadores de cuidados assumem um papel epicêntrico na vigilância e prestação de cuidados orais (Zanesco, Bordin, Santos, Muller, & Fadel, 2018).
Segundo Cardoso (2014), há uma procura crescente de profissionais de SO por indivíduos com mais de 65 anos. No entanto, no que respeita aos idosos institucionalizados, verifica-se a prevalência de um pior estado de SO estando este associado a cuidados de higiene oral diminuídos e à restrição dos cuidados médico-dentários às situações urgentes, sendo que a higienização dentária não é assumida como prioridade (Cardoso, 2014; Rekhi & et al., 2016). A evidência relatada nos estudos referidos contribui para que os idosos institucionalizados refiram uma autoperceção da saúde baixa com a inevitável repercussão nas diferentes dimensões enquanto ser holístico e na sua QdV (Jerez-Roig & et al., 2016). Desta forma, importa garantir que os dirigentes das ERPI estabeleçam planos e ações que promovam e protejam a SO dos residentes e sensibilizem os cuidadores, os familiares e os próprios idosos para as necessidades em SO destes indivíduos.

2. MÉTODOS

Com o propósito de observar a relação entre as variáveis decorrentes ou influenciadoras da autoperceção da QdVRSO de idosos institucionalizados em ERPI, encetou-se um estudo empírico, transversal e correlacional, com abordagem quantitativa.

2.1 Amostra

De entre os idosos do concelho de Bragança - Portugal, em janeiro de 2019, cerca de 800 encontravam-se institucionalizados nas 22 ERPI disponíveis. A amostra final da investigação realizada inclui 151 indivíduos, o que representa 31,8% dos idosos institucionalizados nas ERPI que a integram e 18,7% dos idosos institucionalizados no concelho de Bragança.

2.2 Recolha de dados

A recolha de dados, que aconteceu no período temporal de dezembro de 2019 a janeiro de 2020, foi conseguida através da realização, por uma única investigadora, de um inquérito na forma de entrevista estruturada fundamentada no instrumento de recolha de dados, decorrendo esta nas instalações da ERPI onde o idoso reside. No local, a identificação dos idosos candidatos a integrar o estudo foi realizada pelo diretor técnico ou pessoa indicada por este, sendo que o momento de recolha de dados se iniciou pela confirmação do cumprimento dos critérios de inclusão e assinatura do consentimento informado, livre e esclarecido.
O instrumento de recolha de dados englobou um questionário sociodemográfico construído para o efeito e o OHIP-14-PT, sendo esta a versão traduzida e adaptada para a população portuguesa por Afonso (2014) do Oral Health Impact Profile desenvolvido por Slade (1997). As pontuações do OHIP-14-PT foram interpretadas com base no método de adição para a totalidade dos itens e para as dimensões, justificando-se esta opção com o facto deste ser um método com melhor desempenho comparativamente ao método de contagem simples.
O OHIP-14-PT integra duas perguntas para cada uma das sete dimensões da versão original e apresenta propriedades psicométricas semelhantes (Rodrigues, 2015).

2.3 Critérios de inclusão

Definiram como critérios de uniformização das unidades de análises: Ter capacidade para compreender e assinar o consentimento informado, livre e esclarecido; Ter idade igual ou superior a 65 anos; Ter nacionalidade portuguesa; Estar institucionalizado em ERPI do concelho de Bragança.
Foram excluídos todos os indivíduos que responderam incorretamente a pelo menos uma questão da avaliação da orientação relativa ao tempo, espaço e pessoa constante no instrumento de recolha de dados.

2.4 Procedimentos

Para a realização do estudo obteve-se decisão favorável da Comissão de Ética da Unidade de Investigação em Ciências da Saúde: Enfermagem da Escola Superior de Enfermagem de Coimbra, conforme Parecer nº P624/11-2019.
A integração das ERPI no estudo foi precedida de um pedido de autorização para realização do mesmo dirigido ao diretor técnico. Aos participantes, foi solicitada a leitura, reflexão e assinatura do consentimento informado, livre e esclarecido que se anexa. Foram garantidos o anonimato, a confidencialidade de dados e a possibilidade de desistir em qualquer momento do estudo, sendo que os dados recolhidos apenas serão utilizados na presente investigação e foram destruídos no seu término.
A utilização do OHIP-14-PT foi precedida da autorização por parte da autora.

O tratamento estatístico dos dados foi processado no software *Statistical Package for the Social Sciences®* versão 23, emergindo a análise do recurso a medidas de estatística descritiva e inferencial. Para a inferência estatística recorreu-se a testes não paramétricos com um nível de significância de 0,05. Elegeu-se o Teste de Ajustamento do Qui-Quadrado para a análise da associação de variáveis nominais e ordinais e o Coeficiente de Correlação de *Pearson* para a medição do grau de associação entre duas variáveis quantitativas.

3. RESULTADOS

A investigação realizada incidiu em 9 ERPI com taxa de ocupação de 100% à data de recolha de dados. No que concerne à saúde oral dos residentes, esta é uma variável de preocupação para os dirigentes de todas as instituições participantes, ainda que apenas 3 avaliem a condição oral dos idosos com regularidade.

Participaram no estudo 151 idosos, tendo o mais novo 65 anos e o mais velho 99 anos de idade, com idade média de 84.4 anos ($\pm$ 6.4 anos). Constatou-se que a mediana é de 85.0 anos, o que permite afirmar que se trata de uma população muito envelhecida de acordo com a definição adotada pela WHO (1999). Pela distribuição da idade segundo o género verificou-se que, em média, os participantes do género feminino são mais velhos que os do género masculino (84.8 anos, $\pm$ 0.64 anos e 83.7 anos, $\pm$ 0.89 anos, respetivamente). Quando são estabelecidos grupos etários em função dos percentis, 46.4% dos idosos inquiridos (n = 70) têm entre 86 e 99 anos e 27.2% (n = 41) têm entre 82 e 85 anos.

Pela análise das variáveis sociodemográficas confirmou-se que atualmente todos os participantes são reformados, que a grande maioria é viúvo (70.2%, n = 106) e que frequentou o ensino até ao 1º Ciclo do Ensino Básico (53.6%, n = 81). No que respeita ao local de residência anterior à institucionalização, 79.5% dos idosos (n = 120) residiam em meio rural, facto que sustenta o tipo de atividade exercida pelos indivíduos, na medida em que a agricultura foi a atividade profissional mencionada como ocupação durante a vida ativa por 43.7% da amostra (n = 66), seguindo-se a profissão de doméstica (29.8%, n = 45), o que faz com que o setor primário de atividade seja o que tem maior representatividade (74.8%, n = 113).

De entre as unidades de análise, 96.0% (n = 145) referiram ter pelo menos uma patologia e 94.0% (n = 142) tomar, habitualmente, algum tipo de medicação, prevalecendo as doenças do aparelho circulatório (71.5%, n = 108) e as doenças endócrinas, nutricionais e metabólicas (60.9%, n=92).

No que concerne aos hábitos de adição, objetivou-se que 83.4% dos indivíduos (n = 126) nunca fumaram e 13.3% (n = 20) fumaram, mas referem já não fumar enquanto que, relativamente ao consumo de álcool, 42.4% dos inquiridos (n = 64) nunca ingeriram bebidas alcoólicas e 33.1% (n = 50) fizeram-no no passado.

O edentulismo está presente em 97.8% dos inquiridos (n=149), sendo que destes, 34.4% (n = 52) não têm dentição. Dos indivíduos com zonas edêntulas, a maioria (53.7%, n = 80) não usa prótese dentária.

Apesar da maioria dos inquiridos ter o hábito de escovar os dentes e a boca (68.2%, n = 103), 31.8% (n = 48) nunca o fazem, sendo que, dos indivíduos que higienizam a cavidade oral, 50.5% (n = 52) fazem-no de manhã e 17.5% (n = 18) antes de deitar. Os restantes 32.0% (n = 33) escovam os dentes e a boca mais do que uma vez por dia. De entre os idosos que usam prótese dentária (45.7%, n = 69), 53.6% (n = 37) procede à sua higienização mais do que uma vez por dia e 2.9% (n = 2) nunca o faz.

No momento da recolha de dados, 45.7% dos inquiridos (n = 69) respondeu *Sim* à questão *Tem algum problema com a boca ou prótese dentária que o façam pensar que necessita de uma consulta com um profissional de saúde oral?*, mas 55.0% (n = 83) referiu não ter o hábito de frequentar consultas de profissionais de saúde oral. Dos que têm este hábito, a maioria (91.2%, n = 62) fá-lo apenas quando é necessário e, do total de idosos, apenas 4.0% (n = 6) o fazem com regularidade. No que respeita à data da última consulta com um profissional de saúde oral, evidenciou-se que 17.2% dos participantes (n = 26) nunca foram a uma consulta com estes profissionais e 25.8% (n = 39) fê-lo há mais de 3 anos.

O autorrelato da QdVRSO dos inquiridos foi avaliado com recurso ao OHIP-14-PT, obtendo-se uma pontuação média, de acordo com o método da adição, de 18.22, com um Mínimo de 0.00 e um Máximo de 50.00 ($\pm$10.66). A maioria dos inquiridos nunca teve a perceção de incapacidade para desenvolver as suas atividades (86.8%, n = 131) e dificuldade para as realizar (75.5%, n = 114) devido a problemas relacionados com os dentes, boca ou prótese dentária. Da mesma forma, 76.8% dos participantes (n = 116) referiram que a condição oral não tem significado na interação com os outros e 56.3% (n = 85) que esta nunca os impediu de relaxar. Os itens mais pontuados foram a *Necessidade de interromper as refeições* e a *Sensação de desconforto no ato de comer* devido a problemas relacionados com a boca os dentes ou a prótese dentária, sendo que para o primeiro 39.7% referiu desconforto algumas vezes (n = 60) e para o segundo 35.1% (n = 53) atribuiu a mesma resposta. Assim, a grande maioria da amostra considera que a sensação de desconforto durante a alimentação (62.3%, n = 94) e a necessidade de interromper as refeições (60.9%, n = 92) têm impacto na QdV. Os restantes itens do OHIP-14-PT foram avaliados pela maioria dos inquiridos como não tendo impacto na sua QdV.

Verificou-se que há significado estatístico entre o género e o uso de tabaco (p = 0.000), o consumo de álcool (p = 0.000), a presença de dentição natural (p = 0.040), de zonas edentulas (p = 0.029) e o uso de prótese dentária (p = 0.019).

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Na correlação entre as variáveis sociodemográficas e o OHIP-14-PT, verificou-se que há associação entre o nível de escolaridade e a Dimensão 7 (p = 0.001) e o score total (p = 0.003) do OHIP-14-PT, evidenciando-se que um nível superior de literacia verte em melhor QdVRSO.
Na correlação das variáveis clínicas com o autorrelato da QdVRSO, há diferenças estatisticamente significativas entre os indivíduos com e sem antecedentes patológicos na Dimensão 2 (p = 0.044) e na Dimensão 4 (p = 0.011) do OHIP-14-PT. Nos inquiridos com dentição natural há diferenças com significado estatístico nas Dimensões 2 (p = 0.035) e 5 (p = 0.015). Paradoxalmente, não se verificou qualquer associação estatística entre o edentulismo total ou parcial e a QdVRSO autorrelatada.
O estudo da relação estatística entre as variáveis comportamentais e a QdVRSO evidencia que não há diferenças estatisticamente significativas entre as dimensões do OHIP-14-PT e a escovagem dos dentes e da boca e a escovagem da prótese dentária, mas há entre as Dimensões 6 (p = 0.040) e 7 (p = 0.032) e o comportamento de procura de consultas de profissionais de saúde oral.

4. DISCUSSÃO

A investigação da QdVRSO no idoso traduz-se em contributos que garantem a melhor saúde possível na velhice, permitindo o alcance dos objetivos de desenvolvimento sustentável.
No presente estudo, prevalece a institucionalização de idosos em ERPI sediadas em meio rural. A preferência por esta localização pode advir da oferta, mas também do facto da maioria dos participantes provir de meio rural mantendo a residência em contextos próximos dos que caraterizaram o seu percurso de vida. Tal como preconizado pela Direção-Geral da Saúde (2017) é expectável que o indivíduo, ainda que idoso, participe na vida social, económica, cultural, espiritual e cívica da comunidade onde se insere, sendo que a institucionalização em contextos próximos dos vivenciados durante a vida adulta contribui para o envelhecimento ativo e saudável.
As participantes do género feminino relataram pior QdVRSO o que sobrepõe o evidenciado por Gomes, Teixeira e Paçô (2015) e Beldiman et al. (2017), mas não reflete o encontrado por Castrejón-Pérez, Borges-Yáñez, Irigoyen-Camacho e Cruz-Hervert (2017) e por Umniyati, Surachmin e Ambarsati (2018) que evidenciaram a ausência de diferenças nas pontuações do OHIP-14 segundo o género. A atitude da mulher perante a SO e a saúde em geral decorrente do seu papel enquanto elemento que assume os cuidados à família, pode contribuir para que esta atribua maior significado aos aspetos subjetivos da SO e às repercussões que traduz na saúde em geral.
Na correlação das variáveis sociodemográficas com o OHIP-14-PT verificou-se existir associação com significado estatístico entre o nível de literacia da amostra e o *score* total do OHIP-14-PT obtido pelo método de adição. Estes dados espelham os encontrados por Gomes et al. (2015), Beldiman, et al. (2017), Castrejón-Pérez et al. (2017) e Dallasta et al. (2019), sendo de referir que um nível superior de literacia é um fator protetor no paradigma holístico do conceito de saúde em geral, podendo ser associado ao aumento da procura e ao melhor acesso à informação relativa à promoção da saúde e prevenção da doença oral, o que tem significado na condição de SO e, consequentemente, na QdVRSO.
De entre os participantes em estudo, os indivíduos com patologia do aparelho circulatório ou doença endócrina, metabólica ou nutricional relataram pior QdVRSO. Ainda que, isoladamente, a associação entre os antecedentes patológicos e o regime terapêutico dos indivíduos permita apenas a inferência restritiva e dirigida, os dados em análise podem ser justificados pelo facto da ocorrência de agravos orais poder estar na dependência da fisiopatologia ou do tratamento medicamentoso das referidas patologias. Mata, Allen, McKenna, Hayes e Kashan (2019) corroboram esta posição baseando-a no estudo que desenvolveram onde concluíram que idosos com comorbilidades apresentam pior QdVRSO sendo que o uso de determinados grupos de medicamentos, como os antihipertensores, incrementam no indivíduo o risco de desenvolvimento de doença oral.
A condição oral dos inquiridos carateriza-se pela precaridade e reflete o encontrado no estudo de base populacional realizado pela Ordem dos Médicos Dentistas (2019) e no estudo desenvolvido em idosos institucionalizados de Barcelona por Cornejo, Pérez, Lima, Casals-Peidro e Borrell (2013) que evidenciaram a elevada prevalência de problemas de SO nos residentes, associando-os à baixa QdVRSO.
Atendendo a que a investigação realizada foi dirigida a um *setting* populacional específico, é essencial ter presente que a condição oral do idoso resulta do percurso de saúde durante o ciclo de vida do indivíduo. De entre os fatores biológicos, a idade é uma variável com significado na saúde em geral e na SO, sendo que o avançar da idade é sinónimo de diminuição do nível de SO (Umniyati, Surachmin et al., 2018; WHO, 2019). Paralelamente, a perspetiva cronológica da definição de estratégias relativas à prevenção da doença e promoção da SO revela a segregação dos idosos enquanto grupo alvo da intervenção, acrescendo o facto de muitos indivíduos dependerem do cuidador no acesso aos cuidados de SO. Neste contexto, os resultados aferidos no estudo desenvolvido devem ser lidos e interpretados com especial interesse, na medida em que 73,6% dos participantes (n = 111) têm 82 ou mais anos e, em Portugal, à semelhança da restante Europa e do mundo, o acesso à SO carateriza-se pela dificuldade e inadequação dos recursos face às exigências populacionais, nomeadamente no que respeita à resposta dada pelo Serviço Nacional de Saúde. Contudo, assiste-se à evolução das políticas favorecedoras da equidade e acesso aos cuidados de SO.
Nos idosos, a autoavaliação da SO é uma variável complexa que vincula crenças, percurso de vida, acesso aos cuidados de SO e comportamentos adquiridos de hábitos de higiene oral, estando este conjunto de fatores representado na autoperceção da SO

do idoso. Desta forma, é premente a sensibilização dos cuidadores e do próprio indivíduo para a adoção de comportamentos protetores e para a procura de cuidados de SO enquanto veículos para a melhoria da QdVRSO.
No que respeita à especificidade da amostra estudada, a institucionalização em ERPI pode ser entendida como um fator facilitador e promotor de comportamentos de procura de cuidados de saúde, assim como de hábitos de higiene oral adequados. Contudo, ressalva-se a importância do papel do cuidador, na medida em que, tratando-se de uma população muito idosa e com algumas limitações funcionais, é fundamental garantir a motivação e a instrução do indivíduo, sem descurar a supervisão dos cuidados. Enquanto profissional que integra a equipa multidisciplinar de cuidados ao indivíduo, o Enfermeiro Especialista em Saúde Comunitária assume uma posição de destaque na prevenção da doença e na promoção da SO sendo que, fundamentando a sua atuação na metodologia do planeamento em saúde, deve fazer uma avaliação concisa do estado de saúde de *settings* mais vulneráveis e promover o empoderamento do indivíduo e dos cuidadores através de ações de sensibilização e de instrução. De acordo com Cunha, et al. (2014), na SO, o desempenho do enfermeiro deve evidenciar-se na prevenção primária, podendo os preditores da QdVRSO fundamentar a estruturação de um programa de promoção de SO nos idosos.

CONCLUSÃO

A caraterização sociodemográfica da amostra estudada é representativa dos indicadores populacionais regionais e nacionais, não havendo significado estatístico entre as variáveis sociodemográficas e o nível de QdVRSO autorrelatado.
Concluiu-se que predominam as doenças crónicas com significado na QdVRSO e que o edentulismo e a ausência de uso de prótese dentária representam pior nível de QdVRSO autorreferida.
O enfermeiro, pelas competências que lhe são inerentes e enquanto profissional de saúde de proximidade com o indivíduo, assume uma posição de destaque no que respeita à prevenção primária. Assim, sugere-se que, com fundamento no conhecimento que detêm relativamente aos preditores da QdVRSO, os enfermeiros estruturem programas de promoção da SO no idoso, sendo pertinente a definição de um plano interdisciplinar que objetive a melhoria da QdVRSO, promovendo o envelhecimento ativo.
Reconhecem-se como limitações do estudo o tamanho da amostra que não permite a generalização dos resultados à população de idosos institucionalizados em ERPI, a escassez de estudos prévios em idosos institucionalizados e o horizonte temporal definido por não permitir o desenho de um estudo longitudinal que permitisse a determinação de uma razão causal entre as variáveis estudadas e a QdVRSO.

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MODERAÇÃO E MEDIAÇÃO NA ANÁLISE DO PADRÃO DE SUCÇÃO NÃO NUTRITIVA EM RECÉM-NASCIDOS PREMATUROS

MODERATION AND MODERATED MEDIATION IN THE ANALYSIS OF NON-NUTRITIVE SUCKING PATTERN OF PRETERM NEWBORNS

MODERACIÓN Y MEDIACIÓN EN EL ANÁLISIS DEL PATRÓN DE SUCCIÓN NUTRICIONAL EN RECIÉN NACIDOS PREMATUROS

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RESUMO

Introdução: A estimulação da sucção não nutritiva mostrou influenciar o processo de maturação da sucção nutritiva.
Objetivo: Analisar o efeito da maturação sobre o padrão de sucção, mediado pelo tempo de experiência.
Métodos: Amostra constituída por 34 recém-nascidos com idade gestacional média de 33,2 semanas e tempo médio de experiência de 14,7 dias. Utilizámos o padrão de sucção como modelo de moderação. A variável dependente é o número médio de sucções, e as variáveis independentes consideradas são a idade gestacional (maturação) e o tempo de experiência (moderador).
Resultados: Foi encontrada uma relação positiva da experiência sobre o padrão de sucção, variável com o tempo de prática e mais evidente a partir das 32 semanas de idade gestacional.
Conclusão: A evidência estatística encontrada tem relevância clínica na elaboração de programas de intervenção na estimulação da sucção dos recém-nascidos prematuros, e interessa a profissionais de saúde com intervenção no domínio.

Palavras-chave: sucção; recém-nascido; estimulação; maturação; mediação; moderação

ABSTRACT

Introduction: Stimulation of non-nutritive suction has been shown to influence the maturation process of nutritive suction.
Objective: Analyze the effect of maturation on the suction pattern, mediated by the time of experience.
Methods: Sample consisting of 34 newborns with an average gestational age of 33.2 weeks and an average experience time of 14.7 days. We used the suction pattern as a moderation model. The dependent variable is the average number of sucks, and the independent variables considered are gestational age (maturation) and length of experience (moderator).
Results: A positive relationship between experience and suction pattern was found, variable with time of practice and more evident after 32 weeks of gestational age.
Conclusion: The statistical evidence found has clinical relevance in the design of intervention programs to stimulate the sucking of premature newborns, and is of interest to health professionals with intervention in the field.

Keywords: suction; newborn; stimulation; maturation; mediation; moderation

RESUMEN

Introducción: Se ha demostrado que la estimulación de la succión no nutritiva influye en el proceso de maduración de la succión nutritiva.
Objetivo: Analizar el efecto de la maduración sobre el patrón de succión, mediado por el tiempo de experiencia.
Métodos: Muestra compuesta por 34 recién nacidos con una edad gestacional promedio de 33.2 semanas y un tiempo de experiencia promedio de 14.7 días. Usamos el patrón de succión como modelo de moderación. La variable dependiente es el promedio de succiones y las variables independientes consideradas son la edad gestacional (maduración) y la duración de la experiencia (moderador).
Resultados: Se encontró una relación positiva entre experiencia y patrón de succión, variable con el tiempo de práctica y más evidente después de las 32 semanas de edad gestacional.
Conclusión: La evidencia estadística encontrada tiene relevancia clínica en el diseño de programas de intervención para estimular la succión de recién nacidos prematuros, y es de interés para los profesionales de la salud con intervención en el campo.

Palabras clave: succión; recién nacido; estimulación; maduración; mediación; moderación

INTRODUTION

About 1% of Portuguese newborns (NB's) are premature with less than 32 weeks of gestational age and / or birth weight below 1500g, that is, very low birth weight (VLBW), approximately 1000 VLBW per year (Peixoto, Guimarães, Machado, et al., 2002). The growth and development of these newborns occurs largely outside the maternal womb, in intensive care units, with a high risk of sequelae, both from the nutritional point of view (Moreira, Matos, Rebelo Pacheco , Cunha, 2020) as from the neurodevelopment (Matos, Costa, Rebelo Pacheco, Moreira, Cunha, Barroso, 2019).
The sucking capacity has a direct effect on growth and development and may be considered an indicator of the appropriate neurodevelopment outcome (Medoff-Cooper, Mcgrath, Bilker, 2000).

The effectiveness of suction depends not only on maturation but also on training or experience, and is also influenced by other variables such as weight (Cunha, Barreiros, Gonçalves, Figueiredo, 2009). The stimulation of this essential competence plays an important role in the development of the VLBW.

During the neonatal period the success of oral feeding depends on the coordination of sucking, swallowing and breathing, and also on the newborn's alertness (Finan and Barlow, 1998; Fucile, Gisel, and Lau, 2005; Lundqvist and Hafström, 1999). The sucking rhythm and the suction intensity are good indicators of the suction competence and have clinical relevance because, providing indirect information about the neuromuscular activity and the maturation of the sucking pattern (Finan and Barlow, 1998; Barlow, Finan, Lee and Chu, 2008).

There is a controversy about the effects of maturation (gestational age) and experience in the formation and evolution of the sucking rhythm, and it is recognized that experience and practice improve motor skills and suction-swallowing-breathing coordination. The maturation of the suction behavior seems to follow a caudo-cephalic progression, that is, the stabilization of the swallowing rhythm seems to precede the stabilization of the sucking rhythm (Finan and Barlow, 1998; Barlow et al., 2008; Cunha et al., 2009), and is influenced by stimulation, as demonstrated by research that shows that non-nutritive sucking stimulation programs influence the maturation process of nutritive sucking (Cunha et al, 2009; Fucile et al, 2005; Rocha, Moreira, Pimenta, Ramos, Lucena, 2007).

The direct observation of an experimental intervention or of a natural variation in behavior carries ethical and methodological limitations. If the results indicate a no stimulation effect it is not possible to understand why a given intervention was not effective. On the contrary, in the presence of a positive effect of stimulation there is no way to identify the key components of the stimulation program since the stimulation program is usually designed as a unit. In fact, many experimental interventions may have only indirect effects or produce effects through other nearby or intermediate variables. To overcome these limitations it is recommended to investigate the "third" variables that influence or interfere in the mechanisms that operate between the intervention and the final result (Bauman, Sallis, Dzewaltowski and Owen, 2002). This model, known as: stimulus - organism – response, states that the effect of a certain stimulus on behavior is mediated by the various internal processes of the organism, but other models based on the direct stimulus-response relationship do not consider the interventional role of the organism. Ecological models of human development consider that, in addition to the direct effect of a variable, it is also necessary to consider the effects of mediating (or moderating) variables on such effect (Muller, Judd, Yzerbyt, 2005).

The aim of the present study is to apply the moderation model to observe the effect of maturation on suction, mediated by experience. This method was notapplied to the development of the suction pattern in NB and VLBW, so far.

1. METHODS

This is a non-experimental study of a moderation statistical model, about the interaction effects of maturation and experience in non-nutritive sucking, using a convenience sample of premature newborns. The hypothesis under investigation is that the suction rhythm depends on maturation, observed by gestational age, but it is influenced by the NB's experience in sucking.

A device with a pressure sensor pneumatically connected to a pacifier was used, ensuring non-invasive measurement through galvanic isolation, and connected to a Biopac A/D to convert analog data to digital data (ADC). The temporal structure and the sucking pressure were collected. The variables used to characterize the sucking pattern were the interval between sucks, the number of burst, the interval between bursts, the number of suctions per burst, the minimum and maximum pressure and the amplitude of each suction. Periods of 10 minutes of non-nutritive sucking were measured before a newborn's breastfeeding with a sampling frequency of 10 Hz (Cunha et al. 2009; Cunha, Barreiros, Pereira et al. 2019).

Data collection was approved by the hospital's ethics committee and informed consent was individually obtained from the parents.

Statistical analysis

The average number of sucks as considered a dependent variable, and the independent variables were gestational age (maturation) and time of intervention (experience), as a moderating variable.

Mediation

Mediation can be defined as an indirect effect that occurs when there is an effect of a given independent variable (predictor) on a dependent variable (result) that is transmitted by a mediator. We term this three-variable system *simple mediation*. Simple mediation is illustrated in the path diagram in Figure 1 (Muller, et al. , 2005). Mediation models take into consideration the sum of direct effects, indirect effects and spurious effects. In the figure, *a* refers to the (unstandardized) slope coefficient of M (mediator) regressed on X (independent predictor variable), and *b* and *c'* denote the conditional coefficients of Y (dependent variable) regressed on M and X, respectively, when both are included as simultaneous predictors of Y . Letting *c* represent the effect of X on Y in the absence of M (time of experience), the indirect effect is traditionally quantified as *c – c'*, which is ordinarily equivalent to *axb* ((Preacher, Rucker and Hayes, 2007; Fairchild and MacKinnon, 2009; Muller, et al., 2005))

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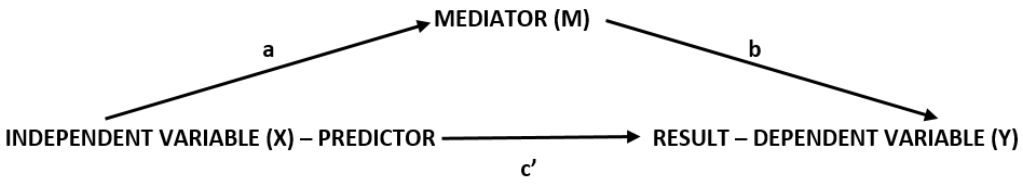

Figure 1 - mediation example: independent variable (preditor x); dependent variable (result y); mediator (m) (adapted from muller, et al., 2005).

Mediator

The mediator, or causal variable of the intervention, acts between the exposure to the intervention and the final outcome (Bauman et al., 2002). There may be simultaneously one or more mediators in this causal relationship. The mediating variable answers the question of "how" or "why" the variable X causes the effect Y, that is, the mediator explains the relationship between the predictor and the outcome.

Moderation

When the strength of the relationship between two variables is dependent on a third variable, *moderation* is said to be occurring. The third variable, or *moderator* (M), interacts with X in predicting Y if the regression weight of Y on X varies as a function of W, see example in figure 2. (Preacher et al ., 2007; Fairchild and MacKinnon, 2009; Muller, et al., 2005). Moderation is also popularly known as *interaction.* Interaction or moderation hypotheses can be tested with regression analysis without requiring that *X* and *W* are categorical. (Hayes & Rockwood, 2016)

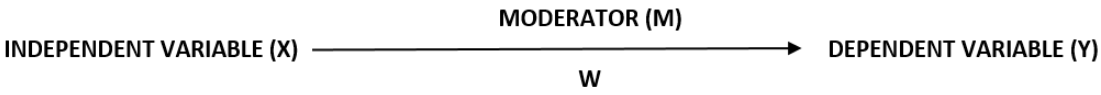

Figure 2 - moderation example: moderator (m); independent variable (x); dependent variable (y); influence of y regression on variable x as a moderator (w) (adapted from muller, et al., 2005).

Moderator

The moderating variable reduces or increases the strength of the relationship between the predictor and the dependent variable, modifying the relationship between the predictor or independent variable and the dependent variable. But it can also change the direction of the relationship between the two variables, acting as a "mediator" which influences the final result (Bauman et al., 2002). When a correlation between two variables is observed it is reasonable to question what other variables can interfere in such relationship. In the present case, there is a positive correlation between gestational age, time of experience and suction efficiency, that is, suction efficiency increases with gestational age, but on the other hand, more experienced babies have better suction efficiency (Cunha, et al., 2009). If the time of experience is a moderator then the sucking effectiveness will be greater with longer experience time but it will also vary with the gestational age.

Studies of the effects of interaction applying this model with continuous variables recommended the use of moderate hierarchical regression (Markland, 1999). Alternatively, it is possible to dichotomize the moderating variable and then compare its correlations between the predictor and the dependent variable at different levels of the moderator, or more commonly, dichotomize the two independent variables and then perform a two-way ANOVA analysis. However, it has been shown that this procedure leads to a great loss of information, which can be avoided using a regression method (Markland, 1999; Palmeira, Markland, Silva, et al., 2009).

2. RESULTS

The sample consists of 34 newborns (NB) with an average gestational age of 29.3 weeks, in the majority males (61%), with an average birth weight of 1237.3 g. At the time of assessment the group had an average corrected age of 33.3 weeks and an average experience time (ET) of 14.7 days. Other variables are described in Table 1.

Table 1 - Descriptive statistics of the sample characteristics

	N = 34	Minimum	Maximum	Mean	Standard deviation
Gestational Age (weeks)		26	35	29,4	2,1
Birth Weight (g)		700	2310	1237,5	320,1
Gender (Male / Female)	21/13				
Apgar Score (median)		6	10	(8,5)	
Corrected Gestational Age at evaluation		28	40,6	33,3	2,4
Chronological Age at evaluation (days)		7	77	27,7	13,6
Weight at evaluation (g)		729	2420	1503,2	362,7
Experience Time (days)		0	67	14,7	13,5
Average of Bursts		3	88	30	17,7
Average of Sucks per Burst		2	12	6,5	2,3
Suck Amplitude (mmHg)		2,6	20,5	10,9	4,8

A positive and significant linear correlation was found between each of the independent variables and the dependent variable (Table 2).

Table 2 - Linear correlation between the dependent variable and the independent variables

	N = 34	CorrA	TExp	MNSuc	ZCorrA	ZTExp
TExp	Pearson' Correlation	0,772**				
	Sig. (bilateral)	0,000				
MNSuc	Pearson' Correlation	0,477**	0,412*			
	Sig. (bilateral)	0,004	0,015			
ZCorrA	Pearson' Correlation	1,000**	0,772**	0,477**		
	Sig. (bilateral)	0,000	0,000	0,004		
ZTExp	Pearson' Correlation	0,772**	1,000**	0,412*	0,772**	
	Sig. (bilateral)	0,000	0,000	0,015	0,000	
PZCorrATExp	Pearson' Correlation	0,769**	0,988**	0,421*	0,769**	0,988**
	Sig. (bilateral)	0,000	0,000	0,013	0,000	0,000

**. Coorelation is significant at level 0,01 (bilateral). *. Correlation is significant at level 0,05 (bilateral). CorrA: corrected gestational age; TExp: Time of experience; MNSuc: mean Number of Sucks per Burst; ZCorrA: Standardized Corrected gestational age; ZTexp: Standardized Time of experience; PZCorrATExp: Product of ZCorrA and ZTExp.

Since the independent variables have very different scales and dispersions, we standardized them to obtain zero averages and unitary standard deviations. For this purpose we determined the mean and standard deviation of each variable and using the formula (value X - mean X / standard deviation X) new standardized variables were obtained (variable Z) (Table 2).
The new standardized variables are also correlated (in Table 2, variable Z) and their product was calculated in order to obtain a new variable that expresses the interaction of the independent variable and the moderator (in Table 2, variable PZ).
The standardization procedure allows to directly compare the relative influence (parameter estimates) of various variables with different scales and dispersions. Then, the results of a multiple linear regression indicated that the independent variables, as well as their standardized versions, do not significantly explain the effect of the dependent variable - average number of suctions. More specifically, the determination coefficient obtained for the multiple linear regression models was r2 = 0.232 (23.2% of explained variation) and the regression coefficients associated with the independent variables were not significantly significant (p> 0.05) (Table 3).

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Table 3 - multiple linear regression between independent variables and dependent variable

Model summary [b]				
Model	R	R square	R square adjusted	Estimated Standard error
1 e 2	,482[a]	0,232	0,183	2,149
a. Predictor's: (Constant), TExp, CoorA; ZCorrA				
b. Dependent Variable: MNSucks				

Coeficient's[a]								
		Nonstandard coefficients		Standard coefficients			95.0% B Confidence interval	
Model		B	Standard Error	Beta	t	Sig.	Lower Limit	Upper Limit
1	(Constant)	-6,495	7,564		-0,859	0,397	-21,921	8,931
	CORRECTED AGE	0,384	0,241	0,394	1,591	0,122	-0,108	0,876
	TIME OF EXPERIENCE	0,019	0,044	0,108	0,434	0,667	-0,070	0,108
	(Constant)	-1,233	4,319		-0,286	0,777	-10,042	7,576
2	ZCorrA	0,384	0,241	0,394	1,591	0,122	-0,108	0,876
	ZTExp	0,019	0,044	0,108	0,434	0,667	-0,070	0,108

Using Hayes' methodology (Hayes and Rockwood, 2016), by applying the PROCESS macro to SPSS®, we obtained the graph shown in figure 3. The curves obtained through the "slope graphs" or "plot slopes" show a dichotomous interaction between maturation and experience in what refers to the number of sucks (Figure 3). According to the model the cut-off value for the time of experience was: low value of experience time = 1.2 days, average value = 14.2 days, and the high value = 28.4 days. In the lower gestational ages (≤ 30 weeks GA), greater experience shows a tendency to have fewer sucks. On the other hand, in higher gestational ages individuals (≥35 weeks GA), a longer time of experience clearly increased the number of suctions. The cutoff occurs at 32 weeks of corrected gestational age (Figure 3). However, this trend did not show statistically significant differences, as can be observed by the difference between the slopes (z score) (Table 4). For a low, medium or high ET value, the moderating effect obtained through the application of PROCESS by the z score found was not statistically significant for any level of significance (Table 4).

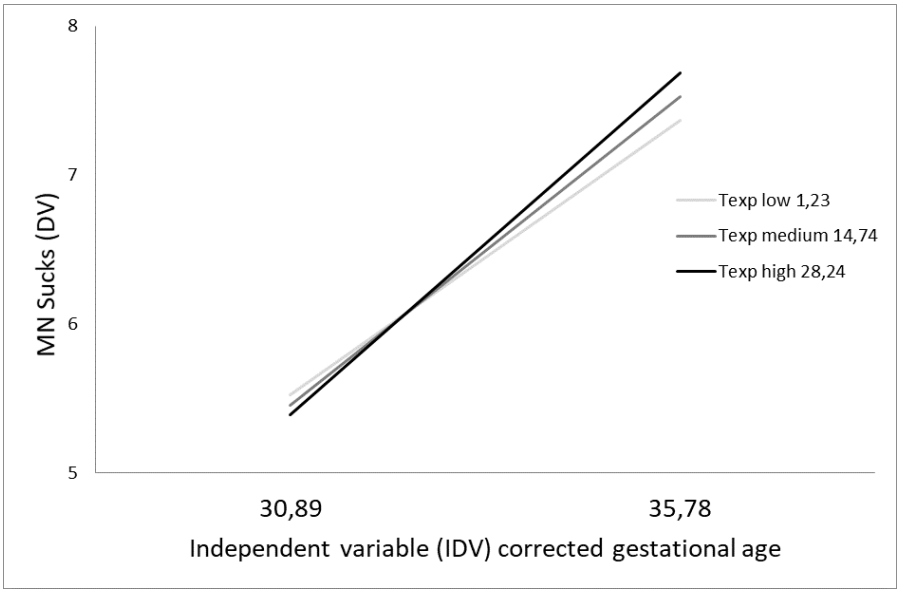

Figure 3 - variation of the average number of sucks with low (≤30s) or high (≥35s) gestational age and according to the low, medium or high experience time (moderator). intersection point 32.3 weeks ga.

Table 4 - Differences between slopes

	raw (b)	Standard error (s.e.)	Value t	Critical value of Z
Mod*=TE low	0,378	0,245	1,546	(+/-) 1.96 p < 0.05
Mod=TE medium	0,424	0,259	1,638	(+/-) 2.58 p < 0.01
Mod= TE high	0,470	0,307	1,532	(+/-) 3.29 p < 0.001
Low vs medium				
b low	s.e b low	b medium	s.e. b medium	Z-score
0,378	0,245	0,424	0,259	-0,129
Low vs high				
b low	s.e. b low	b high	s.e. b high	Z-score
0,378	0,245	0,470	0,307	-0,235
Medium vs high				
b medium	s.e. b medium	b high	s.e. b high	Z-score
0,424	0,259	0,470	0,307	-0,115

*Mod= TE (Moderator Time of Experience)

3. DISCUSSION

The influence of maturation and experience in the suction of the newborn is a topic of debate and research but there is no consensus about the role of several variables under investigation (Qureshi, Vice and Taciak, 2002; Mizuno and Ueda, 2006; Taki, Mizuno, Murase, et al., 2010). In addition, other variables, such as weight, may also play an influence on the behavior of the suction pattern (Cunha et al., 2009; Wrotniak, Stettler and Medoff-Cooper, 2009). Therefore it is important to apply a model that takes into consideration the active role of the organism and that may clarify the complex nature of the maturation/experience relationship in the development of suction competence in newborns. The application of classical statistical models does not allow to effectively assess the mediation of the sucking experience on maturation. The use of PROCESS points out that this influence manifests itself, as in other biological phenomena, through a dichotomy of moderation in which; in the first phase, there seems to be a disorganization of the movement pattern in order to subsequently achieve equilibrium, as demonstrated in the present study.

The most recent development theories suggest that experience or practice play an important role in the development of a better response (Hadders-Algra, 2000a; Chervyakov, Sinitsyn and Piradov, 2016). However, the existence of several neurons with the same function and the possibility of several neuronal synapses that stimulate the same movement lead to a greater variability in the first phase of development until an equilibrium point is reached with best performance and the lowest energy expenditure (Hadders-Algra, 2000a; Chervyakov et al., 2016; Hadders-Algra, 2000b). Spontaneous activity and experience seem to play an important role in the selection of neuronal circuits that are initially defined by maturation for a given movement or set of movements (Chervyakov et al., 2016) and this mechanism seems to occur in the suction of the newborn. Suction is a highly differentiated movement that depends on central pattern generators and neuronal circuits located in the brain stem. Their relationship with other central pattern generators such as swallowing and breathing depends on experience (Finan and Barlow, 1998; Fucile et al., 2005; Lundqvist and Hafström, 1999).

Our results using the non-nutritive sucking pattern in a moderation model, which considers the average number of sucks as dependent variable, and gestational age (maturation) and time of experience (moderator) as independent variables, show that there is a positive association to experience on the suction pattern, which varies with time of practice. This effect is more evident after 32 weeks of corrected gestational age, however without statistical significance. The positive effect of the experience (training) has been demonstrated by different authors (Cunha, et al., 2009; Fucile, et al., 2005; Mizuno and Ueda, 2006; Qureshi, Vice and Taciak, 2002; Rocha, et al. , 2007; Taki, et al., 2010).

3.1 Limitations

The sample studied is small and, perhaps for that reason, without the statistical power necessary to obtain a significant result. The use of non-nutritive suction, which is more accessible from the point of view of movement quantification, can be considered another limitation since it only allows an inference about the competence development of nutritive suction.

CONCLUSION

The use of the moderation model allows to confirm the positive association of experience in the evolution of the suction pattern. Although our study did not obtain a statistically significant result it points to the positive role of prolonged intervention time. In addition, the conclusion that the gestational age of 32 weeks is the age at which intervention programs will be most effective was corroborated. This hypothesis calls for further research oriented to the investigation of nutritive sucking, with larger samples, and it must be taken into account by clinicians and speech therapists, who participate in suction of premature newborns intervention programs.

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MODERAÇÃO E MEDIAÇÃO NA ANÁLISE DO PADRÃO DE SUCÇÃO NÃO NUTRITIVA EM RECÉM-NASCIDOS PREMATUROS

MODERATION AND MODERATED MEDIATION IN THE ANALYSIS OF NON-NUTRITIVE SUCKING PATTERN OF PRETERM NEWBORNS

MODERACIÓN Y MEDIACIÓN EN EL ANÁLISIS DEL PATRÓN DE SUCCIÓN NUTRICIONAL EN RECIÉN NACIDOS PREMATUROS

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RESUMO

Introdução: A estimulação da sucção não nutritiva mostrou influenciar o processo de maturação da sucção nutritiva.
Objetivo: Analisar o efeito da maturação sobre o padrão de sucção, mediado pelo tempo de experiência.
Métodos: Amostra constituída por 34 recém-nascidos com idade gestacional média de 33,2 semanas e tempo médio de experiência de 14,7 dias. Utilizámos o padrão de sucção como modelo de moderação. A variável dependente é o número médio de sucções, e as variáveis independentes consideradas são a idade gestacional (maturação) e o tempo de experiência (moderador).
Resultados: Foi encontrada uma relação positiva da experiência sobre o padrão de sucção, variável com o tempo de prática e mais evidente a partir das 32 semanas de idade gestacional.
Conclusão: A evidência estatística encontrada tem relevância clínica na elaboração de programas de intervenção na estimulação da sucção dos recém-nascidos prematuros, e interessa a profissionais de saúde com intervenção no domínio.

Palavras-chave: sucção; recém-nascido; estimulação; maturação; mediação; moderação

ABSTRACT

Introduction: Stimulation of non-nutritive suction has been shown to influence the maturation process of nutritive suction.
Objective: Analyze the effect of maturation on the suction pattern, mediated by the time of experience.
Methods: Sample consisting of 34 newborns with an average gestational age of 33.2 weeks and an average experience time of 14.7 days. We used the suction pattern as a moderation model. The dependent variable is the average number of sucks, and the independent variables considered are gestational age (maturation) and length of experience (moderator).
Results: A positive relationship between experience and suction pattern was found, variable with time of practice and more evident after 32 weeks of gestational age.
Conclusion: The statistical evidence found has clinical relevance in the design of intervention programs to stimulate the sucking of premature newborns, and is of interest to health professionals with intervention in the field.

Keywords: suction; newborn; stimulation; maturation; mediation; moderation

RESUMEN

Introducción: Se ha demostrado que la estimulación de la succión no nutritiva influye en el proceso de maduración de la succión nutritiva.
Objetivo: Analizar el efecto de la maduración sobre el patrón de succión, mediado por el tiempo de experiencia.
Métodos: Muestra compuesta por 34 recién nacidos con una edad gestacional promedio de 33.2 semanas y un tiempo de experiencia promedio de 14.7 días. Usamos el patrón de succión como modelo de moderación. La variable dependiente es el promedio de succiones y las variables independientes consideradas son la edad gestacional (maduración) y la duración de la experiencia (moderador).
Resultados: Se encontró una relación positiva entre experiencia y patrón de succión, variable con el tiempo de práctica y más evidente después de las 32 semanas de edad gestacional.
Conclusión: La evidencia estadística encontrada tiene relevancia clínica en el diseño de programas de intervención para estimular la succión de recién nacidos prematuros, y es de interés para los profesionales de la salud con intervención en el campo.

Palabras clave: succión; recién nacido; estimulación; maduración; mediación; moderación

INTRODUÇÃO

Em Portugal cerca de 1% dos recém-nascidos (RN) são prematuros com menos de 32 semanas de idade gestacional e/ou peso de nascimento inferior a 1500g isto é, recém-nascidos de muito baixo peso (RNMBP); este número é de aproximadamente 1000 RNMBP por ano (Peixoto, Guimarães, Machado, et al., 2002). O crescimento e desenvolvimento destes recém-nascidos ocorre em grande parte fora do útero materno, nas unidades de cuidados intensivos, com elevado risco de sequelas, tanto do ponto de vista nutricional, ou seja, desnutrição pós-natal (Moreira, Matos, Rebelo Pacheco, Cunha, 2020) como do ponto de vista do neurodesenvolvimento (Matos, Costa, Rebelo Pacheco, Moreira, Cunha, Barroso, 2019).
A capacidade de sucção tem efeito direto sobre o crescimento e desenvolvimento, e pode ser considerada um indicador da evolução adequada do neurodesenvolvimento (Medoff-Cooper, Mcgrath, Bilker, 2000).

A eficácia da sucção depende não só da maturação, mas também do treino ou experiência, sendo ainda influenciado por outras variáveis como o peso (Cunha, Barreiros, Gonçalves, Figueiredo, 2009). A estimulação desta competência essencial pode desempenar um papel importante no desenvolvimento do RNMBP.

No período neonatal, o sucesso da alimentação oral depende da coordenação da sucção, deglutição e respiração, mas também do estado de alerta do recém-nascido (Finan e Barlow, 1998; Fucile, Gisel, e Lau, 2005; Lundqvist e Hafström, 1999). O ritmo de sucção é um bom indicador da competência de sucção, tal como a intensidade de sucção, e tem relevância clínica pois oferece informação indireta sobre a atividade neuromuscular e a maturação do padrão de sucção (Finan e Barlow, 1998; Barlow, Finan, Lee e Chu, 2008). Existe atualmente controvérsia sobre os efeitos da maturação (idade gestacional) e da experiência na formação e evolução do ritmo de sucção, sendo reconhecido que a experiência e a prática melhoram as capacidades motoras e a coordenação sucção-deglutição-respiração. A maturação da sucção parece ter uma progressão caudo-cefálica, uma vez que a estabilização do ritmo de deglutição parece preceder a estabilização do ritmo de sucção (Finan e Barlow, 1998; Barlow et al., 2008; Cunha et al., 2009), e é influenciável por estimulação. Por exemplo, foi observado que programas de estimulação da sucção não nutritiva influenciam o processo de maturação da sucção nutritiva (Cunha et al, 2009; Fucile et al, 2005; Rocha, Moreira, Pimenta, Ramos, Lucena, 2007).

O estudo direto do resultado de uma intervenção ou de uma variação natural no comportamento, tem limitações éticas e metodológicas. Se não houver qualquer efeito da estimulação não é possível entender porque é que determinada intervenção não foi eficaz, mas se ocorrer efeito, uma vez que o programa de estimulação é normalmente concebido como uma unidade, não há forma de identificar quais os componentes do programa de intervenção que são ou não eficazes ou eventualmente prejudiciais. De facto, muitas intervenções comportamentais podem ser apenas efeitos indiretos ou produzir efeitos através de outras variáveis próximas ou intermediárias. Para ultrapassar estas limitações, pode estudar-se estas "terceiras" variáveis que influenciam ou interferem nos mecanismos entre a intervenção e o resultado final (Bauman, Sallis, Dzewaltowski e Owen, 2002). Este modelo que, de forma simples, pode ser enunciado como: estímulo – organismo – resposta; propõe que os efeitos de um estímulo no comportamento são mediados pelos vários processos internos do organismo, ao invés de modelos baseados na relação direta estímulo-resposta, que não consideram as possíveis formas de interferência do organismo. Os modelos ecológicos de desenvolvimento são um exemplo desta aplicação: além do efeito direto de uma variável temos também que considerar o efeito de variáveis mediadoras ou moderadoras desse mesmo efeito (Muller, Judd, Yzerbyt, 2005).

O objetivo do presente estudo é o de analisar o efeito da maturação sobre a sucção, mediado pela experiência, aplicando o modelo de moderação. Este objetivo não foi, até ao momento, aplicado ao desenvolvimento do padrão de sucção em RN e RNMBP.

1. MÉTODOS

Trata-se de um estudo não experimental de análise de modelo estatístico de moderação, que questiona os efeitos de interação maturação e experiência, na sucção não nutritiva, em amostra de conveniência de recém-nascidos prematuros. A hipótese colocada é de que o ritmo de sucção depende da maturação (idade gestacional), mas é influenciado pelo tempo de experiência em sucção do RN.

Foi utilizado um dispositivo com um sensor de pressão ligado de forma pneumática a uma chupeta, assegurando uma medição não invasiva através de isolamento galvânico. Este dispositivo foi ligado a um Biopac A/D para converter dados analógicos em dados digitais (ADC). Foram observadas a estrutura temporal e a pressão de sucção. As variáveis utilizadas para caracterizar o padrão de sucção foram: intervalo entre sucções, número de surtos, intervalo entre os surtos, número de sucções por surto, pressão mínima e máxima e amplitude de cada sucção. Foram medidos períodos de 10 minutos de sucção não nutritiva antes de uma mamada do RN com uma frequência de amostragem de 10 ciclos por segundo (Cunha et al. 2009; Cunha, Barreiros, Pereira et al. 2019).

A colheita de dados foi aprovada pela comissão de ética do hospital e foi obtido consentimento informado dos pais de cada recém-nascido.

Análise estatística

Para responder à questão colocada na hipótese, utilizámos o número médio de sucções como variável dependente e como variáveis independentes a idade gestacional (maturação) e o tempo de intervenção (experiência) como variável moderadora.

Mediação

A mediação pode ser definida como um efeito indireto e ocorre quando existe um efeito de uma determinada variável independente (preditor) sobre uma variável dependente (resultado) que é transmitido por um mediador, ver forma esquemática simples na figura 1 (Muller, et al., 2005). Os modelos de mediação resultam do somatório dos efeitos directos, efeitos indirectos e efeitos espúricos. O efeito total (c) da variável independente preditora (X), sobre a variável dependente (Y), o resultado é decomposto no efeito indireto de X sobre Y quantificado pelo produto axb e no efeito directo de X sobre Y com o efeito do mediador (tempo de experiência) removido quantificado por c' (c= ab + c') (Preacher, Rucker e Hayes, 2007; Fairchild e MacKinnon, 2009; Muller, et al., 2005).

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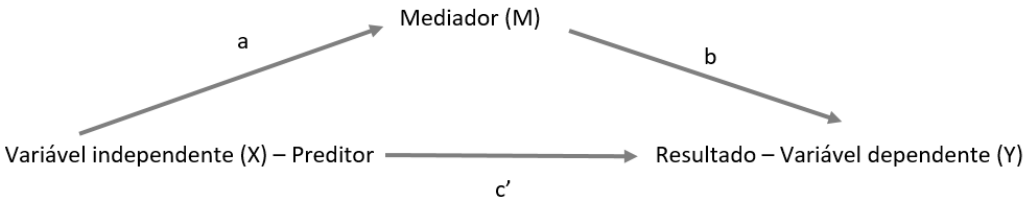

Figura 1 - Exemplo de Mediação: variável independente (preditor X); variável dependente (resultado Y); mediador (M) (adaptado de Muller, et al., 2005).

Mediador

O mediador, ou variável causal da intervenção, interfere na relação entre a exposição à intervenção e o resultado final (Bauman et al., 2002). Podem existir simultaneamente um ou mais mediadores nesta relação causal. Habitualmente a variável mediadora responde à questão de "como" ou "porquê" a variável X causa o efeito Y, ou seja, o mediador explica a relação entre o preditor e o resultado final.

Moderação

Quando a força da relação entre duas variáveis está dependente de uma terceira variável falamos em moderação. A terceira variável, o moderador (M) interage com a variável independente (X) para predizer a variável dependente (Y) se o peso de regressão de Y na variável X variar em função de W, ver exemplo da figura 2 (Preacher et al., 2007; Fairchild e MacKinnon, 2009; Muller, et al., 2005). O modelo de moderação estatisticamente obtém-se através dos efeitos diretos e da interação entre as variáveis.

Figura 2 - Exemplo de Moderação: moderador (M); variável independente (X); variável dependente (Y); influência da regressão de Y na variável X em função do Moderador (W) (adaptado de Muller, et al., 2005).

Moderador

A variável moderadora modifica a relação entre o preditor ou variável independente e a variável dependente. Esta pode reduzir ou aumentar a força da relação entre o preditor e a variável dependente, ou, pode ainda alterar a direção da relação entre as duas variáveis, tratando-se assim de um "mediador" com efeito no resultado final (Bauman et al., 2002). Quando encontramos uma correlação entre duas variáveis, podemos questionar que outras variáveis podem interferir nesta relação. No caso presente há uma correlação positiva entre a idade gestacional, o tempo de experiência e a eficácia de sucção, ou seja, a eficácia de sucção aumenta com a idade gestacional mas, por outro lado, bebés com mais experiência têm melhor eficácia de sucção (Cunha, et al., 2009). Se o tempo de experiência for um moderador então a eficácia será tanto maior quanto maior for o tempo de experiência, mas também variará com a idade gestacional.

Em estudos dos efeitos de interação com variáveis contínuas, a metodologia recomendada para aplicação deste modelo é a utilização da regressão moderada hierarquizada (Markland, 1999). Em alternativa, pode dicotomizar-se a variável moderadora e depois comparar as suas correlações entre o preditor e a variável dependente em diferentes níveis do moderador, ou de forma mais comum, dicotomizar as duas variáveis independentes e seguidamente efetuar uma análise bidirecional ANOVA. Contudo, foi demonstrado que este procedimento leva a grande perda de informação, o que pode ser evitado utilizando a regressão (Markland, 1999; Palmeira, Markland, Silva, et al., 2009).

2. RESULTADOS

A amostra é constituída por 34 recém-nascidos (RN) com idade gestacional média de 29,3 semanas, peso de nascimento médio de 1237,3 g, a maioria (61%) eram do sexo masculino. No momento de avaliação tinham idade corrigida média de 33,3 semanas e tempo médio de experiência de 14,7 dias. Outras variáveis estão descritas na Tabela 1.

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Tabela 1 - Estatística descritiva das características da amostra

	N = 34	Mínimo	Máximo	Média	Desvio Padrão
Idade gestacional (semanas)		26	35	29,4	2,1
Peso nascimento (g)		700	2310	1237,5	320,1
Sexo (Masculino / Feminino)	21/13				
Índice de Apgar (mediana)		6	10	(8,5)	
Idade gestacional corrigida na avaliação		28	40,6	33,3	2,4
Idade cronológica na avaliação (dias)		7	77	27,7	13,6
Peso na avaliação (g)		729	2420	1503,2	362,7
Tempo de experiência (dias)		0	67	14,7	13,5
Numero Médio de surtos		3	88	30	17,7
Numero Médio de sucções por surto		2	12	6,5	2,3
Amplitude de cada sucção (mmHg)		2,6	20,5	10,9	4,8

Foi encontrada uma correlação linear positiva e significativa entre cada uma das variáveis independentes e a variável dependente (Tabela 2).

Tabela 2 - Correlação linear entre a variável dependente e as variáveis independentes

N = 34		Idcorr	Texp	NMSuc	ZIdcorr	ZTexp
Texp	Correlação de Pearson	0,772**				
	Sig. (bilateral)	0,000				
NMSuc	Correlação de Pearson	0,477**	0,412*			
	Sig. (bilateral)	0,004	0,015			
ZIdcorr	Correlação de Pearson	1,000**	0,772**	0,477**		
	Sig. (bilateral)	0,000	0,000	0,004		
ZTexp	Correlação de Pearson	0,772**	1,000**	0,412*	0,772**	
	Sig. (bilateral)	0,000	0,000	0,015	0,000	
PZIdcorrTexp	Correlação de Pearson	0,769**	0,988**	0,421*	0,769**	0,988**
	Sig. (bilateral)	0,000	0,000	0,013	0,000	0,000

**. A correlação é significativa no nível 0,01 (bilateral). *. A correlação é significativa no nível 0,05 (bilateral). Idcorr: idade gestacional corrigida; Texp: tempo de experiência; NMSuc: número médio de sucções por surto; ZIdcorr: Idade gestacional corrigida estandardizada; ZTexp: tempo de experiência estandardizado; PZIdcorrTexp: produto entre ZIdcoor e ZTexp.

Uma vez que as variáveis independentes têm escalas e dispersões muito diferentes, procedemos à sua estandardização de modo a obter médias nulas e desvios padrões unitários. Para tal determinámos a média e o desvio padrão de cada variável e, utilizando a fórmula (valor X - média X / desvio padrão X), obtivemos as novas variáveis estandardizadas (variável Z) (Tabela 2).
Estas novas variáveis estandardizadas são também correlacionadas (na Tabela 2, variável Z) e foi calculado o seu produto de modo a obter uma variável da interação da variável independente e do moderador (na Tabela 2, variável PZ).
O procedimento de estandardização possibilita a comparação direta da influência relativa (estimativas de parâmetros) de várias variáveis com escalas e dispersões diferentes. Recorrendo então à regressão linear múltipla, verificámos que as variáveis independentes, assim como as suas versões estandardizadas, não explicam de forma significativa o resultado da variável dependente - número médio de sucções. Mais concretamente, o coeficiente de determinação obtido para os modelos de regressão linear múltipla foi $r^2 = 0,232$ (i.e., cerca de 23,2% de variação explicada) e os coeficientes de regressão associados às variáveis independentes não se revelaram significativamente diferentes de 0 (i.e., $p > 0,05$) (Tabelas 3).

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Tabela 3 - Regressão linear múltipla entre as variáveis independentes e a variável dependente

Sumarização do modelo[b]

Modelo	R	R quadrado	R quadrado ajustado	Erro padrão da estimativa
1 e 2	,482[a]	0,232	0,183	2,149

a. Preditores: (Constante), TEMPEXP, IDADECORRIG; Zidcorr

b. Variável Dependente: NMSucções

Coeficientes[a]

Modelo		Coeficientes não padronizados		Coeficientes padronizados			95,0% Intervalo de Confiança para B	
		B	Erro Padrão	Beta	t	Sig.	Limite inferior	Limite superior
1	(Constante)	-6,495	7,564		-0,859	0,397	-21,921	8,931
	IDADECORRIG	0,384	0,241	0,394	1,591	0,122	-0,108	0,876
	TEMPOEXP	0,019	0,044	0,108	0,434	0,667	-0,070	0,108
2	(Constante)	-1,233	4,319		-0,286	0,777	-10,042	7,576
	Zidcorr	0,384	0,241	0,394	1,591	0,122	-0,108	0,876
	ZTexp	0,019	0,044	0,108	0,434	0,667	-0,070	0,108

Com utilização da metodologia de Hayes (Hayes e Rockwood, 2016), pela aplicação da macro PROCESS para o SPSS®, obtivemos o gráfico apresentado na figura 3. As curvas obtidas através dos "gráficos de declive" ou "plot slopes" mostram uma interação dicotómica entre a maturação e a experiência no número de sucções (Figura 3). De acordo com o modelo, e na amostra estudada, os valores de corte para o tempo de experiência foram: valor baixo de tempo de experiência 1,2 dias, o valor médio de 14,2 dias e o valor alto de 28,4 dias. Em idades gestacionais mais baixas (≤ 30 semanas IG), uma maior experiência mostra tendência para haver um menor número de sucções. Por outro lado, em idades gestacionais mais altas (≥35 semanas IG), um maior tempo de experiência aumenta o número de sucções de forma mais evidente. O ponto de corte ocorre pelas 32 semanas de idade gestacional corrigida (Figura 3). Contudo, esta tendência não mostrou diferenças estatisticamente significativas como se pode ver pela análise da diferença entre a inclinação das linhas (z score) (Tabela 4). Para um valor de TE baixo, médio ou alto, o efeito moderador obtido através da aplicação do PROCESS pelo z score encontrado, não foi estatisticamente significativo para qualquer um nível de significância (Tabela 4).

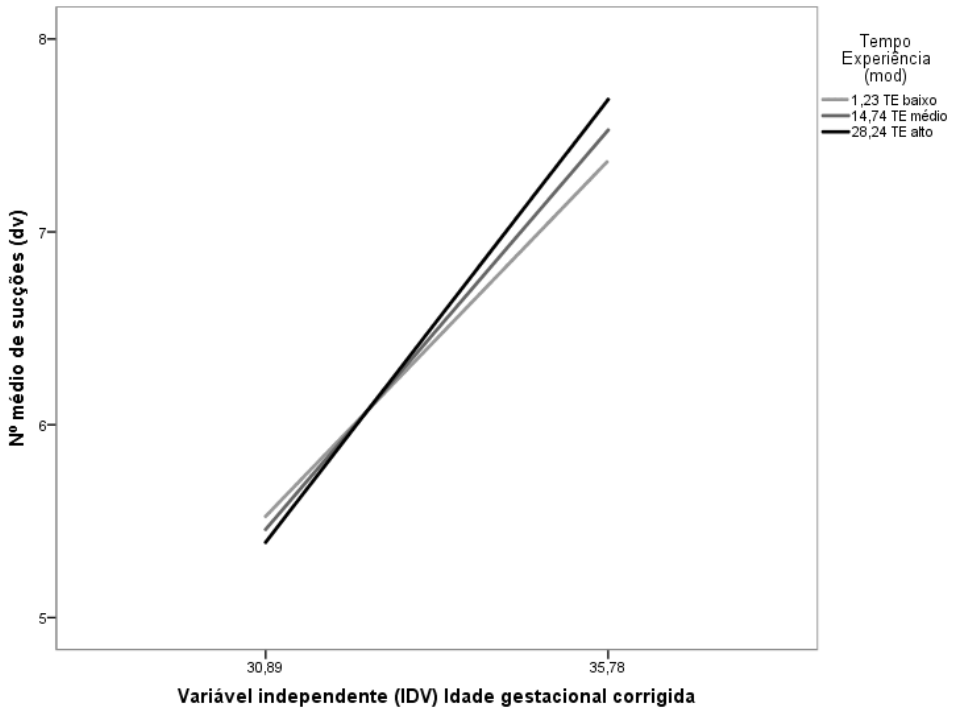

Figura 3 - Variação do número médio de sucções com a idade gestacional baixa (≤30s) ou alta (≥35s) e de acordo com o tempo de experiência baixo, médio ou alto. Ponto de intersecção 32,3 semanas IG.

Tabela 4 - Diferenças entre *declives "slopes"*

	Valor bruto (b)	Erro padrão (s.e.)	Valor t	Valor crítico de Z
Mod*=TE baixo	0,378	0,245	1,546	(+/-) 1.96 p < 0.05
Mod=TE médio	0,424	0,259	1,638	(+/-) 2.58 p < 0.01
Mod= TE alto	0,470	0,307	1,532	(+/-) 3.29 p < 0.001
Baixo vs médio				
b baixo	s.e b baixo	b médio	s.e. b médio	Z-score
0,378	0,245	0,424	0,259	-0,129
Baixo vs alto				
b baixo	s.e. b baixo	b alto	s.e. b alto	Z-score
0,378	0,245	0,470	0,307	-0,235
Médio vs alto				
b médio	s.e. b médio	b alto	s.e. b alto	Z-score
0,424	0,259	0,470	0,307	-0,115

*Mod= TE (Tempo de Experiência)

3. DISCUSSÃO

A influência da maturação e da experiência na sucção do recém-nascido é tema de debate e de investigação, não existindo consenso sobre o papel e a influência de uma variável sobre a outra variável (Qureshi, Vice e Taciak, 2002; Mizuno e Ueda, 2006; Taki, Mizuno, Murase, et al., 2010). Acresce que outras variáveis, como o peso, podem também influenciar o padrão de sucção (Cunha et al., 2009; Wrotniak, Stettler e Medoff-Cooper, 2009). Assim, justifica-se a aplicação de um modelo que exprima o papel ativo de variáveis do organismo e que esclareça a natureza complexa da relação maturação/experiência, no desenvolvimento da competência de sucção em RN.

A aplicação dos modelos estatísticos clássicos não permite separar de forma eficaz a mediação da experiência sobre a maturação neste processo. A utilização do PROCESS aponta para que esta influência se manifeste tal como noutros fenómenos biológicos, por uma dicotomia de moderação em que numa primeira fase parece haver uma desorganização do padrão de movimento para posteriormente se atingir o equilíbrio, tal como demonstrado no presente estudo.

As teorias do desenvolvimento mais recentes apontam para um papel importante da experiência ou prática na obtenção de melhor capacidade de resposta (Hadders-Algra, 2000a; Chervyakov, Sinitsyn e Piradov, 2016). Contudo numa primeira fase pela grande variabilidade, existência de vários neurónios com a mesma função e da possibilidade de várias sinapses neuronais estimularem o mesmo movimento, este torna-se menos preciso, até atingir a melhor performance com o menor gasto de energia (Hadders-Algra, 2000a; Chervyakov et al., 2016; Hadders-Algra, 2000b), este será o ponto de equilíbrio. A atividade espontânea e a experiência parecem ter um papel importante na seleção dos circuitos neuronais que são inicialmente definidos pela maturação para um determinado movimento ou conjunto de movimentos (Chervyakov et al., 2016). O mesmo mecanismo parece ocorrer na sucção do recém-nascido. A sucção é um movimento altamente diferenciado e que depende de geradores centrais de padrão e de circuitos neuronais localizados no tronco cerebral. A sua relação com outros geradores centrais de padrão como a deglutição e a respiração dependem da experiência (Finan e Barlow, 1998; Fucile et al., 2005; Lundqvist e Hafström,1999).

Na amostra estudada e utilizando o padrão de sucção não nutritiva num modelo de moderação, que considera o número médio de sucções a variável dependente, e a idade gestacional (maturação) e o tempo de experiência (moderador) como variáveis independentes, há uma associação positiva da experiência sobre o padrão de sucção, que é variável com o tempo de prática. Este efeito é mais evidente a partir das 32 semanas de idade gestacional corrigida, contudo sem significância estatística. Este efeito positivo da experiência (treino) foi também demonstrado por diferentes autores (Cunha, et al., 2009; Fucile, et al., 2005; Mizuno e Ueda, 2006; Qureshi, Vice e Taciak, 2002; Rocha, et al., 2007; Taki, et al., 2010).

3.1 Limitações

A amostra estudada é pequena e, talvez por esse motivo, sem o poder necessário para obter um resultado estatisticamente significativo. A utilização da sucção não nutritiva, mais acessível do ponto de vista da sua quantificação, pode ser considerada outra limitação uma vez que apenas possibilita uma inferência sobre a competência da sucção nutritiva.

CONCLUSÃO

A utilização do modelo de moderação permite confirmar a associação positiva da experiência na evolução do padrão de sucção. Apesar de no estudo apresentado não termos obtido um resultado estatisticamente significativo, este dado é clinicamente importante, uma vez que aponta para o papel positivo de mais tempo de intervenção. Adicionalmente é corroborada a conclusão de que a a idade gestacional de 32 semanas é a idade a partir da qual os programas de intervenção serão mais eficazes. Esta indicação deve ser confirmada com outros estudos, com uma amostra mais alargada, e analisando a sucção nutritiva, mas deve ser tida em conta por clínicos e terapeutas da fala, que integrem programas de intervenção na área da sucção dos recém-nascidos prematuros.

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ESTRATÉGIAS DE SUPERVISÃO CLÍNICA: ANÁLISE CRÍTICO-REFLEXIVA DAS PRÁTICAS

CLINICAL SUPERVISION STRATEGIES: CRITICAL-REFLECTIVE ANALYSIS OF PRACTICES

ESTRATEGIAS DE SUPERVISIÓN CLÍNICA: ANÁLISIS CRÍTICO-REFLEXIVO DE PRÁCTICAS

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RESUMO

Introdução: A supervisão clínica em enfermagem é um processo formal de acompanhamento da prática clínica, que visa promover o desenvolvimento profissional, a proteção dos clientes e a segurança dos cuidados, através de processos de reflexão e análise das práticas.
Objetivo: Identificar estratégias de supervisão clínica em uso.
Métodos: Estudo qualitativo, exploratório. Os participantes foram 42 Enfermeiros de três Centros de Saúde da região norte de Portugal. Recolha dos dados através de entrevista semiestruturada e análise efetuada segundo os princípios do método da *grounded theory*.
Resultados: Da análise emergiu a categoria "Análise crítico-reflexiva das práticas" e respetivas dimensões e subcategorias. As dimensões identificadas foram: "Dimensão intrapessoal", da qual emergiram duas subcategorias; e a "Dimensão interpessoal", da qual emergiram dez subcategorias.
Conclusão: Concluiu-se que existia um conjunto de estratégias de supervisão em uso, promotoras do desenvolvimento profissional, nomeadamente, a análise crítico-reflexiva das práticas. Contudo, constatou-se que havia um conjunto de constrangimentos de natureza individual e contextual que podiam interferir com a operacionalização desta estratégia, que exige serem refletidos.

Palavras-chave: supervisão de enfermagem; pensamento crítico; estratégias; padrões de prática em enfermagem

ABSTRACT

Introduction: The clinical supervision in nursing is a formal process of monitoring clinical practice, which aims to promote professional development, client protection and safety of care, through processes of reflection and analysis of practices.
Objective: Identify current clinical supervision strategies.
Methods: Qualitative, exploratory study. A total of 42 nurses were recruited from three health centres in the north of Portugal. Data collection was carried out through semi-structured interviews and the analysis was performed according to the principles of the grounded theory method.
Results: From the analysis, the category critical-reflexive analysis of practices emerged and the respective dimensions and subcategories. The dimensions identified were: "Intrapersonal dimension", from which two subcategories emerged; and the "Interpersonal dimension", from which ten subcategories emerged.
Conclusion: Results identified a set of current supervisory strategies in use, promoting professional development, namely, the critical-reflexive analysis of practices. However, several constraints of individual and contextual nature were found to interfere with the operationalization of this strategy, meaning that further research is needed.

Keywords: nursing, supervisory; critical thinking; strategies; practice patterns, nurses

RESUMEN

Introducción: La supervisión clínica en enfermería es un proceso formal de seguimiento de la práctica clínica, que tiene como objetivo promover el desarrollo profesional, la protección del cliente y la seguridad del cuidado, a través de procesos de reflexión y análisis de las prácticas.
Objetivo: Identificar las estrategias de supervisión clínica en uso.
Methods Estudio exploratorio cualitativo. Participaron 42 enfermeras de tres centros de salud de la región norte de Portugal. Recolección de datos a través de entrevistas semiestructuradas y análisis realizados según los principios del método de teoría fundamentada.
Results: Del análisis surgió la categoría "Análisis crítico-reflexivo de prácticas" y sus respectivas dimensiones y subcategorías. Las dimensiones identificadas fueron: "Dimensión intrapersonal", de la cual surgieron dos subcategorías; y la "dimensión interpersonal", de la que surgieron diez subcategorías.
Conclusión: Se concluyó que existía un conjunto de estrategias de supervisión en uso, que promueven el desarrollo profesional, a saber, el análisis crítico-reflexivo de las prácticas. Sin embargo, se encontró que existe un conjunto de limitaciones de carácter individual y contextual que pueden interferir con la operacionalización de esta estrategia, lo cual requiere ser reflejado.

Palabras Clave: supervisión de enfermeira; pensamiento; estrategias; pautas de la práctica en enfermería

INTRODUCTION

Clinical supervision (CS) is a formal process involving a senior professional who supervises and guides the clinical practice of less experienced professionals, aiming at professional development, promotion of quality of practice, and client's safety and protection, through processes of reflection and analysis of practices (Snowdon, Leggat, & Taylor, 2017).

Evidence has shown that CS of health professionals is associated with the effectiveness of care, increased improvement in the care process and quality of care (Snowdon et al., 2017; Guy, Cranwell, Hitch, & McKinstry, 2020).

Improving the quality of care depends on individual growth and team development. Several strategies mobilised by CS in nursing are important contributors to achieving these goals, namely the reflexive practice, which involves a critical assessment process of learning and development needs, understanding of professionals' attitudes, beliefs and values, integrating learning and practical knowledge into clinical practice (Gates & Sendiack, 2017).

Despite current evidence suggesting the potential of CS in nursing to improving quality of care, this can only be attained through the professional reflexive and responsible attitudes. Hence, the relevance of the CS in nursing involving a structure and a process underpinned by the principles of reflexive practice, aiming to promote the critical capacity of the supervised. This is an important factor to master professional reasoning and decision-making skills (Gates & Sendiack, 2017; Guy et al., 2020).

This study is part of broader research aimed at identifying current CS practices.

1. REVIEW OF THE LITERATURE

The underlying importance of the reflexive processes in nursing was first developed by Florence Nightingale. Until then, nursing was more viewed as a form of art rather than science. The modern concept of the profession related to the technological and scientific advancements starts to materialize with the industrial revolution.

In nursing and other professions, the focus on technique has endured for centuries, struggling between the dominance of technical thinking to critical reflexive thinking. Importantly, the role of John Dewey and Donald Schön viewed as the main precursors of reflexive thinking, which ultimately led to a solid model beginning in the 1990s.

Dewey was one of the first authors to identify reflection as a specialised way of thinking, triggered by doubt, hesitation or perplexity when experiencing a situation leading to purposeful self-questioning and problem-solving. The author also argued that reflexive thinking leads people to think beyond routine/action guided by tradition or external authority (Dewey, 1933). However, his work was subject to some criticism since it was considered to be a linear and mechanistic approach, with no real understanding of reflection as an interactive or dialogical process, lacking attention to the way the "self" and individual references are also substantially important to dialogue (Cinnamond & Zimpher, 1990).

From the beginning of 1880s Schön's studies on the processes of training the "reflexive professional", influenced by Dewey, were already a reference, arguing that the training of the future professional should include reflection based on real practical situations. This is extremely important to develop professional abilities to face new and different challenges posed in real life and make the best decisions when dealing with uncertainty (Schön, 1987).

Other fundamental notions of Schön's work (1987) refer to knowing-in-action, reflection-in-action, reflection-on-action and reflection on reflection-in-action. Schön core assertions for vocational training also refer to the distinction between tacit knowledge, identified as reflection-in-action, and academic knowledge. Duarte (2003) problematizes the epistemological and pedagogical assumptions found in Schön opposite types of knowledge. Also, Duarte argues Schön adoption of a pedagogy that overlooks school knowledge and an epistemology approach that disregards theoretical/scientific/academic knowledge, referring "...the disregard for theoretical knowledge is present in several authors who have become a reference in the field of teacher training studies", also placing Dewey, Tardif and Perrenoud (Duarte, 2003, p. 602) at the centre of this debate.

Considering Zeichner (1993) assumption that reflection is the act of thinking in a critical-constructive way capable of building knowledge, it is important to understand that "learning is not attained through practice: it is through reflection on practice!". This exercise requires the mobilization of scientific knowledge to frame a learning environment so that professionals continue to learn and develop "within" and "through" practice.

Each stage of the reflection, reflection-for-action (before action, intended to planning), reflection-in-action (interactive, reflection by observing and discussing the situation), reflection-on-action (post-active, with a retrospective and prospective approach), or reflection on reflection-in-action, needs an underlying theoretical reference, an academic/scientific knowledge, a "lived history", in conceptual terms. These are important contributors to reflection for-, in- and on- action that help incorporate the retroactive (retrospective) and proactive (prospective) dimensions, allowing reflection on a new action, controlling the previous negative outcomes (Sá-Chaves, 2000).

The systematic conceptualizations related to health, social, scientific and technological advancements have demanded nurses' additional abilities to continue personal and professional adaptation and growth, with inherent reflexive processes. These processes are likely at the baseline of the recognition of nursing as a knowledge discipline, autonomous and with its field of intervention.

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Reflection is determinant for nurses' mastery, from beginners to experts, these later identified as expert reflexive, characterized by non-guided professional practices or models.
It is widely accepted that the challenges of the profession require responses that must consider reflexive processes and the (re)conceptualisation of practices. This is imperative to meet the need of implementing nursing CS policies with a strong reflexive component, considering the importance of providing opportunities for reflection among peers.
In particular, the policies of national and international bodies, namely the UK Department of Health and the Order of Nurses, are embedded with arguments for increased reflexive practice and professional development, highlighting the role of CS in nursing for ensuring high-quality care standards through reflexive processes.
Rocha (2013) concluded that the critical-reflexive analysis of practices was the fifth most implemented and most desired CS strategy in health services. Also, this was found the most relevant strategy in the study conducted by Pires, Pereira, Reis Santos & Rocha (2016), among the 16 CS analysed strategies.

2. METHODS

In line with the research goals, a qualitative, exploratory study was developed, anchored in the constructivist paradigm. The research was guided by the principles of action-research focused on the interaction between context and participants, allowing an in-depth analysis of the phenomenon CS in nursing, its complex nature and underlying processes, cardinal to the meaning, understanding and interpretation of this problem and relying on the participants' perceptions.

2.1 Sample

A convenience sample of 42 nurses recruited from three Health Centres (HC) of a Health Centre Grouping in the northern region of Portugal was used, intended to involve all nurses working in these health units.
All nurses from the Personalized Health Care Units of the health centres involved in this study were willing to participate. Participants were mainly women (85.71%; n=36), aged between 28 and 59 years (M=44.19; PD=7.43), time of professional experience between 6 and 40 years (M=20.27; PD=7.21). Graduate nurses and specialist nurses were the most prevalent professional categories found (42.86%; n=18).

2.2 Data collection

The data collection was carried out through a semi-structured interview including a script with five major themes: the first theme addressed ethical considerations and the study proposed objectives; the subsequent themes included questions related to the conceptions, representations and opinions of the participants about CS in nursing.

2.3 Data analysis

The interviews were recorded on audio and transcribed in full as they were conducted. The Nvivo10® program was used to codify each interview. Content analysis was carried out according to the principles of the grounded theory method (Strauss & Corbin, 2008). After the analysis of each interview, fieldwork was done whenever deemed necessary to validate the information.

2.4 Ethical considerations

Ethical consent was granted by the Ethics Committee for Health of the Northern Regional Health Administration and the Board of Directors of the Health Centre Grouping involved.
All participants signed informed consent, and anonymity and confidentiality were ensured in data analysis and processing.

3. RESULTS

From the analysis, the category "Critical-reflexive analysis of practices" emerged, which refers to one of the current CS strategies, with identified dimensions and subcategories (Figure 1).
The dimensions identified were the intrapersonal dimension - from which the subcategories low self-reflection, and absence of formal strategies of critical thinking development emerged -, and interpersonal dimension - from which emerged the subcategories occasional, lack of time for interpersonal reflection, organisation of work interferes with interpersonal reflection, the difficulty of interpersonal reflection in health units exposes areas of (not) knowledge, low predisposition to interpersonal reflection, head nurse facilitates interpersonal reflection, interpersonal reflection at service meetings, and reflection between supervisors of different services.

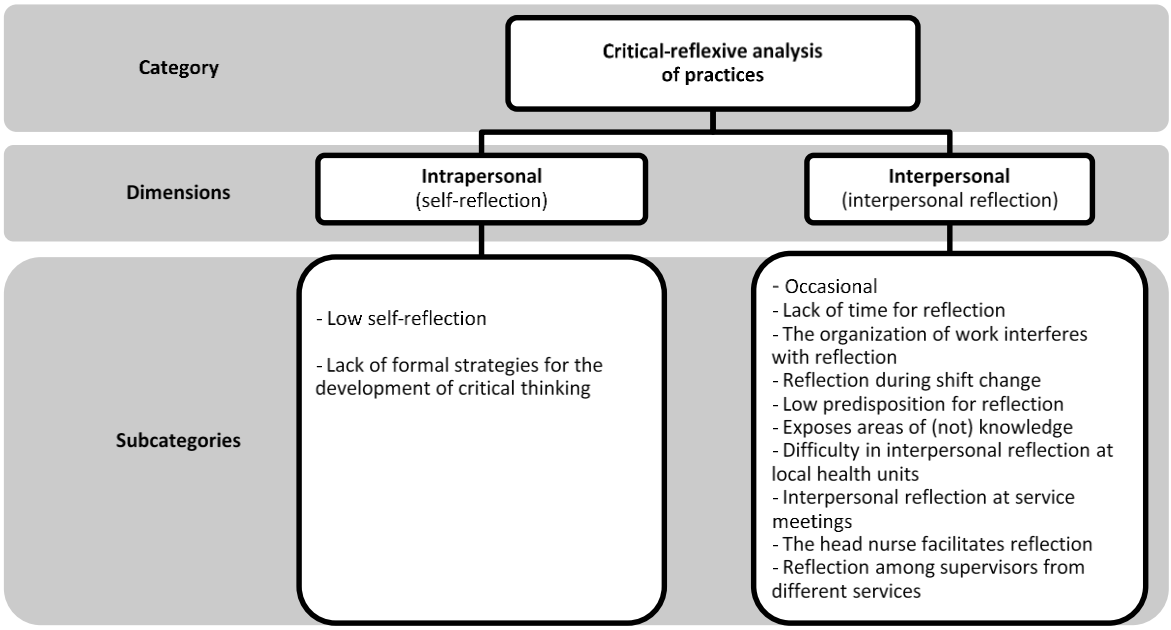

Figure 1 - Critical-reflexive analysis of current practices: dimensions and categories

4. DISCUSSION

Support on reflection facilitates the integration of knowledge, especially at the early stage of professional development, in which often nurses have not the necessary skills to engage in effective critical-reflexive thinking. It is crucial to access knowledge and peer experiences to deepen self-knowledge and thinking. Hence, the relevance of empirical knowledge and the sharing of practices of experienced professionals are highlighted. The clinical supervisor and experienced colleagues are the main responsible for providing this support.

4.1 Intrapersonal dimension

This critical-reflexive analysis dimension refers to individual reflection, consisting of an intra-personal component identified by Schön (1987) as the "silent game", a reflexive process compared to an individual "solitary game", of a dynamic feature that generates unpredictability, underlying the fascination for problem-solving. Contrarily to this dynamic is the opinion of one of the participants, who perceived some "routine" installed in the service likely related to the lack of intrapersonal reflection, questioning and problematization of practices, meaning little self-reflection:

> *(...) it turns out that the majority of us are already accustomed to current practices (...) we got used to the routine, to perform all those tasks without reflecting much on what we do. Is there anyone who at the end of the working day (...) reflects or questions his or her day-to-day work? Is there anyone? I don't believe so! E9CH*

This result corroborates the findings of Netto, Silva & Rua's (2018, p.2) that "technical reasoning mindset, normative curriculum, application of theory and technique derived from mainly systematic scientific knowledge, the epistemology of practice, and the still existing gap between teaching, research and practice, mostly in universities, leave no space for reflexive action and hinder professional competence".

This metacognitive capacity is vital since it allows nurses to become aware of the processes underlying their professional activity. Thus, the guided reflexive practice in CS promotes introspection, stimulating critical-reflexive thinking about clinical experiences and underlying scientific evidence (Gates & Sendiack, 2017). The reflexive practice is important because it is a specific working method, intended to allow the professional to build knowledge based on his/her practice. This method is defined as the "art of intrinsic growth" through reflection, with the purpose of finding a solution (Netto et al., 2018).

> Regarding the absence of formal strategies for the development of critical thinking
> *(...) there's a more informal strategy for the development of critical thinking. E16VP*

The study by Dubé & Ducharem (2015) showed that the working culture of some health units does not encourages reflexive nursing practices. Gates & Sendiack (2017) noted that a reflexive environment provides the opportunity to reflexive thinking within the supervisory context, allowing supervisors to meet both the supervised and the client's needs. It also provides a solid structure that facilitates reflexive practice, supports the development of technical skills and critical thinking, and ultimately

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encourages the development of personal and professional identity. The same authors argue that the existence of a formal reflexive environment within the organisation promotes a sense of conscious introspection of professionals allowing the development of mastery of practice over time, including ethical considerations and clinical wisdom.

4.2 Interpersonal dimension

The interpersonal dimension of critical-reflexive analysis refers to hetero-reflection, a dyad reflection carried out within groups, which Schön (1987) identified as the "interplay", implying an attitude of intellectual humility, recognizing that "the other" can substantially improve our knowledge.
The participants identified the presence of reflexive practices among peers:

> *We engage in reflection among colleagues! Well, some are more engaged than others! But we share information and knowledge (…) E2RP; (…) we discuss our patients' cases daily and the experienced difficulties. (...) not only with colleagues but with supervisors. It seems to me that we already do some supervision work. We talk about things that go well and those not that good, discuss situations where we could be more committed and why this doesn't happen sometimes. E5RP*

However, they consider that interpersonal reflection is occasional, non-formal:

> *(...) it happens occasionally. We have no specific moments for that. E13CH; Sometimes, when we're faced with a new situation, that someone else has already experienced, we sit down and discuss it informally. E14VP; I really think we already do that informally. E4RP*

Also, Tavares (2013) concluded that the nurses recognized the existence of critical-reflexive analysis practices in their services, despite its informal character. However, they considered that reflexive processes including the sharing of knowledge, experiences, and points of view among colleagues resulted in individual and collective enrichment, ultimately benefiting the client by developing action strategies discussed and reflected among peers. However, Süleyman & Bozkuş (2017) argue that being reflexive should constitute a vital component of daily life, not a separate and unrelated action from practices.
Despite the informality in implementing this CS strategy, Rocha (2013) concluded that this was the fifth most frequently implemented in health services. However, this strategy emerged in the sixth position concerning the willingness of frequency to adopt it.
In view of the difficulties expressed by participants in finding time for reflexive analysis of practices among peers, the subcategory lack of time for interpersonal reflection emerged:

> *(…) The problem is having time for that, (…). Lately, we haven't had the opportunity to share and reflect on our practices, and we used to have it (…). We have fewer opportunities for reflection among us. E8CH; I would really like to have more time! E5CH*

Time is a factor that can influence the conditions for reflexive analysis of practices, and informality seems also to hinder this factor, "leaving matters for a later discussion", and overlapping tasks considered "more important".
The studies conducted by Cross, Moore, Sampson, Kitch & Ockerby (2012) and Tavares (2013) also showed that the CS in nursing is particularly important in services where nurses are more affected by work overload, so time should be provided to reflect on their practices and professional issues.
CS is based on reflection since the whole supervisory process is only relevant because it integrates reflexive processes, so the provision of time for CS in nursing and related training must inevitably include time for reflection on practices and contexts (Dubé & Ducharem, 2015; Snowdon et al., 2017).
Another emerging aspect pertaining to reflection was the organisation of work, the subcategory - organisation of work interferes with interpersonal reflection, which somewhat relates to the previous one:

> *We often don't have the opportunity to reflect with each other on practices because we´re working isolated, in separate stations. E11CH; There is little sharing! (…) our organization of work doesn't help! E1CH; (…) it also depends on the department and schedules. There are days (…) we discuss some things. But then, this colleague works until seven, the other until five... or is alone on that shift (...). Meaning, we´re aware of what our closest colleague id doing, (...) and that's whom we talk with. (…) we would have to organize! (…). E2CH; (…) The organization of work doesn't leave much space to discuss things with all our colleagues. (…) I think this is mostly due to the organization of work. E4RP*

Süleyman & Bozkuş (2017) state that the reflection promoted by an organization's culture and structures affects and is affected by choices, policies, decisions and work.

The participants also referred to the shift change as a privileged moment for reflection on practices. They also consider that nurses highly benefit from the time provided by the organisation of work to engage in discussions about the client's condition and the provision of care, and thus a new subcategory emerged - reflection during a shift change:

> *We have less time to reflect. It's not like in the hospital, every day, during shift change (...). E1CH; (...) I know that in some hospital services and other health centres this is possible during shift change, but here we don't have that time. (…) we really need to talk more about care. (...) we haven't that kind of meetings. Sometimes we're not able to discuss things, and this is important. E4CH*

These perspectives corroborate the findings of Tavares' (2013), which identified daily practice situations conducive to reflection, individually or collectively, highlighting the importance attributed by participants to analysis, discussions, and reflections that took place during shift change considered cardinal for the development of reflexive practice. Shift change is highlighted as an important time to reflect on practice and assess the best strategy for a specific situation, emphasizing the shared and discussed information. Rocha, Reis Santos & Pires (2017) also concluded that hospital nurses reported more sharing opportunities, particularly at shift change.

Another identified sub-category points to the influence of individual characteristics that the participants recognised in some colleagues, which may condition reflection - low predisposition for interpersonal reflection:

> *Some colleagues make reflection more difficult. (...) it's no use... because then he insists that he's right. Some colleagues are not open to discussions, so they always think they're right! (…). I'm not sure they understand they're missing out the opportunity of learning with colleagues! They think they're always right. E1VP; Some find it more difficult to ask colleagues for an opinion about the provision of care! (…) some colleagues find reflection more difficult! (…) the most conservative colleagues find it more difficult to discuss provision of care among colleagues. E3VP; (…) there's always someone that doesn't enjoy doing it! Isn't it? E5CH*

According to Sá-Chaves (2000), the transition to the "solidarity self" is not easy. The difficulty of reflecting openly with the other can be rooted in personality traits/communicational skills, lack of time and other personal or organizational constraints. Despite the attenuating effects of the lack of a reflexive "culture" underpinned by paradigmatic issues, its marked influence until the 1980s somehow seems to linger.

In the study conducted by Pires (2004), reflection on practices among nurses was mentioned as one of the daily socio-clinical difficulties, namely some resistance to reflexive practice. Some professionals considered they had universal truth, unwilling to discuss it with their colleagues.

Also, the subcategory - exposes areas of (not) knowledge has also emerged. The participants perceived that the knowledge deficit could be identified through interpersonal reflection:

> *I ask for my colleague's opinion on knowledge, to see if I've got the correct information. They help me understand if I've sufficient knowledge. E13VP*

This finding is in line with the work developed by Süleyman & Bozkuş (2017), who considered interpersonal reflection a way of learning, and a "double-loop", a process of shared cognitive learning. The participants helped each other identify difficulties and find targeted strategies, thus broadening their perspectives on problem-solving (expanding knowledge) and acquiring new insights into behaviour (change of attitude).

The difficulty of interpersonal reflection in health units was also mentioned, which stems from the lack of discussion among peers, also due to the more isolated working characteristics:

> *(...) we're physically distant from the main services, so it's more difficult to engage in reflection with colleagues. E9VP*

The geographical distance between health units and the main unit was identified as one of the factors hampering CS and peer reflection, adding to working places with a single nurse. This finding corroborates the study by Rocha, Reis Santos & Pires (2016), suggesting the existence of contexts where direct contact between professionals is difficult due to geographical distance, particularly between colleagues and/or supervisor and supervised. This particular situation hinders the supervision process and reflection and often suggests implementing CS strategies at a distance.

Studies involving environmental, demographic characteristics showed significant differences in the organisation of CS in hospital and community contexts, precisely due to the greater dispersion of professionals in the second context (Lynch, Hancox, Happel & Parker, 2008).

Although the participants identified some difficulties and informal/occasional reflection of practices, they pointed out the benefits of service meetings, more formal programmed moments, thus emerging the subcategory - interpersonal reflection at service meetings:

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> *We all take advantage of service meetings to reflect on care provision and ask some questions. If we have some difficulties we share them with colleagues and try to clarify them (…). E11CH; We engage in reflection among us. We try to! Usually we go to meetings and take this opportunity to be with colleagues from the main unit and discuss strategies. E11VP; We share opinions and discuss care provision at our meetings. We already do that! (…) we have these meetings to share our doubts. Sometimes it´s good to disagree! E13VP; We always reflect on care and clinical records at monthly meetings. E15CH*

The relevance of reflection to the progressive improvement of nursing care provides nurses with the opportunity to reflect on their practices in meetings held exclusively for this purpose (Cross et al., 2012; Tavares, 2013).
Reflection among supervisors of different services was another identified subcategory.

> *There is some solidarity between colleagues, (from different CS) and peers with the same role [supervisor], we share and help each other. E7RP*

The study of Cruz (2012) also highlighted the reflection between supervisors of different services through "indirect supervision" through team meetings of clinical supervision, intending to share information and standardise their actions. Borges (2013) found that participants stressed the importance of supervisors' meetings as they provide a greater support level.
Another subcategory identified was - head nurse facilitates interpersonal reflection:

> *(...) the head nurse provides us with the opportunity to meet with each other and share experiences. E7VP; I always encourage interaction in meetings. (...) I encourage the team's reflection and critical thinking. E15CH*

The study by Pinto, Reis Santos & Pires (2017) showed that the supervisor plays a pivotal role in training reflexive professionals by mobilising targeted strategies. Since Portugal does not have formal CS programmes implemented in health services, it is assumed that the head nurse plays this role. In the study conducted by Tavares (2013), the head nurse was found to have a relevant role in stimulating the critical-reflexive analysis of practices, encouraging the nursing team to reflect for-, in-, and on-action, and in the performance as a supervisor, acting as a catalyst for reflexive practice, focusing on improving care. The nurses considered that the team mirrored their leadership, concerning reflection, because their demand impelled the team to become more demanding, making them accountable for self-development and encouraging professional accomplishments.
Süleyman & Bozkuş (2017) considered that reflection is a way of learning and that its management is an essential goal in creating reflexive teams, aiming to provide strong and equitable learning opportunities for everyone within the organisations, and encourage benefits from these opportunities. In this sense, they understand that managers can contribute by committing themselves to focus on learning, training professionals and developing ways of overcoming inquiring skills to develop mental behaviours for additional and autonomous learning.

CONCLUSION

This study allowed to identify a set of current supervisory strategies to promote professional development and quality of care, namely the critical-reflexive analysis of practices. Several important constraints of individual and contextual nature were identified that hinder the operationalization of this strategy, which need to be overcome.
Critical-reflexive analysis of practices is crucial to stimulate knowledge, critical thinking and decision-making, therefore, clinical supervision policies in the context of primary health care must integrate reflexive strategies.
Despite the similarities of these study findings with other contexts, this study is limited in the generalisability of data.
Thus, future research is encouraged in the scope of reflection, critical thinking and nursing decision-making, involving the individual and contextual factors that facilitate/hinder the development of reflection.

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ESTRATÉGIAS DE SUPERVISÃO CLÍNICA: ANÁLISE CRÍTICO-REFLEXIVA DAS PRÁTICAS

CLINICAL SUPERVISION STRATEGIES: CRITICAL-REFLECTIVE ANALYSIS OF PRACTICES

ESTRATEGIAS DE SUPERVISIÓN CLÍNICA: ANÁLISIS CRÍTICO-REFLEXIVO DE PRÁCTICAS

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RESUMO

Introdução: A supervisão clínica em enfermagem é um processo formal de acompanhamento da prática clínica, que visa promover o desenvolvimento profissional, a proteção dos clientes e a segurança dos cuidados, através de processos de reflexão e análise das práticas.
Objetivo: Identificar estratégias de supervisão clínica em uso.
Métodos: Estudo qualitativo, exploratório. Os participantes foram 42 Enfermeiros de três Centros de Saúde da região norte de Portugal. Recolha dos dados através de entrevista semiestruturada e análise efetuada segundo os princípios do método da *grounded theory*.
Resultados: Da análise emergiu a categoria "Análise crítico-reflexiva das práticas" e respetivas dimensões e subcategorias. As dimensões identificadas foram: "Dimensão intrapessoal", da qual emergiram duas subcategorias; e a "Dimensão interpessoal", da qual emergiram dez subcategorias.
Conclusão: Concluiu-se que existia um conjunto de estratégias de supervisão em uso, promotoras do desenvolvimento profissional, nomeadamente, a análise crítico-reflexiva das práticas. Contudo, constatou-se que havia um conjunto de constrangimentos de natureza individual e contextual que podiam interferir com a operacionalização desta estratégia, que exige serem refletidos.

Palavras-chave: supervisão de enfermagem; pensamento crítico; estratégias; padrões de prática em enfermagem

ABSTRACT

Introduction: The clinical supervision in nursing is a formal process of monitoring clinical practice, which aims to promote professional development, client protection and care safety, through processes of reflection and analysis of practices.
Objetive: Identify strategies of clinical supervision in use.
Methods: Qualitative, exploratory study. Participants were 42 nurses from three health centers in northern Portugal. Data collection through semi-structured interviews and analysis performed according to the principles of the grounded theory method.
Results: From the analysis emerged the category "Critical-reflective analysis of practices" and respective dimensions and subcategories. The dimensions identified were: "Intrapersonal dimension", from which two subcategories emerged; and the "Interpersonal dimension", from which ten subcategories emerged.
Conclusion: It was concluded that there was a set of supervisory strategies in use, promoting professional development, namely, the critical-reflexive analysis of practices. However, it was found that there is a set of constraints of an individual and contextual nature that can interfere with the operationalization of this strategy, which requires to be reflected.

Keywords: nursing, supervisory; critical thinking; strategies; practice patterns, nurses

RESUMEN

Introducción: La supervisión clínica en enfermería es un proceso formal de seguimiento de la práctica clínica, que tiene como objetivo promover el desarrollo profesional, la protección del cliente y la seguridad del cuidado, a través de procesos de reflexión y análisis de las prácticas.
Objetivo: Identificar las estrategias de supervisión clínica en uso.
Métodos: Estudio exploratorio cualitativo. Participaron 42 enfermeras de tres centros de salud de la región norte de Portugal. Recolección de datos a través de entrevistas semiestructuradas y análisis realizados según los principios del método de teoría fundamentada.
Resultados: Del análisis surgió la categoría "Análisis crítico-reflexivo de prácticas" y sus respectivas dimensiones y subcategorías. Las dimensiones identificadas fueron: "Dimensión intrapersonal", de la cual surgieron dos subcategorías; y la "dimensión interpersonal", de la que surgieron diez subcategorías.
Conclusión: Se concluyó que existía un conjunto de estrategias de supervisión en uso, que promueven el desarrollo profesional, a saber, el análisis crítico-reflexivo de las prácticas. Sin embargo, se encontró que existe un conjunto de limitaciones de carácter individual y contextual que pueden interferir con la operacionalización de esta estrategia, lo cual requiere ser reflejado.

Palabras Clave: supervisión de enfermeira; pensamiento; estrategias; pautas de la práctica en enfermería

INTRODUÇÃO

A supervisão clínica (SC) consiste num processo formal que envolve um profissional sénior que supervisiona e orienta a prática clínica de um profissional menos experiente, com vista ao desenvolvimento profissional, à promoção da qualidade das práticas, segurança e proteção do cliente, através de processos de reflexão e análise da prática (Snowdon, Leggat, & Taylor, 2017).

A evidência tem vindo a demonstrar que a SC dos profissionais de saúde está associada à eficácia do atendimento, ao incremento da melhoria no processo de atendimento e da qualidade dos cuidados (Snowdon et al., 2017; Guy, Cranwell, Hitch, & McKinstry, 2020).

A melhoria da qualidade dos cuidados depende do desenvolvimento e crescimento pessoal de cada membro da equipa, e da equipa em geral. As estratégias mobilizadas pela SCE, nomeadamente, a prática reflexiva, envolvendo um processo crítico de avaliação das necessidades de aprendizagem e desenvolvimento, compreensão de atitudes, crenças e valores dos profissionais, integrando a aprendizagem e conhecimento experiencial na prática clínica contribuem para esse fim (Gates & Sendiack, 2017).

Apesar da evidência apresentar argumentos relativos ao potencial da SCE para a melhoria da qualidade dos cuidados, este desiderato só é tangível se o profissional atuar de forma reflexiva e responsável. Daí a relevância da SCE envolver uma estrutura e um processo que devem revestir-se dos princípios da prática reflexiva, tendo por objetivo promover a capacidade crítica do supervisado, pois é através desta que eles podem otimizar as suas habilidades de raciocínio profissional e tomada de decisão (Gates & Sendiack, 2017; Guy et al., 2020).

O presente estudo faz parte de uma investigação mais ampla e teve por objetivo identificar as estratégias de SC em uso.

1. ENQUADRAMENTO TEÓRICO

A ideia da importância dos processos reflexivos em Enfermagem começa a desenvolver-se com Florence Nightingale, antes a Enfermagem baseava-se mais numa ideia de arte do que propiamente de ciência. O conceito moderno de profissão relacionada com o desenvolvimento tecnológico e científico começa a concretizar-se com a revolução industrial.

Na Enfermagem, assim como noutras profissões, o enfoque na técnica perdurou séculos (séc.), pois da dominância do paradigma da racionalidade técnica ao da reflexividade crítica o trajeto foi longo. Não podemos deixar de referenciar o papel de John Dewey e Donald Schön como grandes percursores da transição para o paradigma da reflexividade crítica, que só se solidificou a partir da década de 90 do séc. XX.

Dewey foi um dos primeiros autores a identificar a reflexão como uma forma especializada de pensar, considerando que resulta da dúvida, da hesitação ou perplexidade, relacionada a uma situação experimentada diretamente, consistindo no autoquestionamento propositado e resolução de problemas. Também argumentou que o pensamento reflexivo leva as pessoas a pensar para além da rotina/ação guiada pela tradição ou autoridade externa (Dewey, 1933). Porém, foram apontadas algumas críticas aos seus trabalhos, por serem considerados de abordagem linear e mecanicista, sem compreensão real da reflexão como um processo interativo ou dialógico, nomeadamente, com falta de atenção para a forma como o "*self*" e os referenciais individuais são formados em diálogo com os outros (Cinnamond & Zimpher, 1990).

A partir da década de 80 do séc. XX, os estudos de Schön, sobre os processos de formação do "profissional reflexivo", influenciados por Dewey, tornaram-se uma referência, defendendo que a formação do futuro profissional deve incluir uma forte componente de reflexão a partir de situações práticas reais, sendo esta a via possível para um profissional se sentir capaz de enfrentar as situações novas e diferentes com que se depara na vida real e de tomar as decisões apropriadas nas zonas de indefinição que a caracterizam (Schön, 1987).

Outras noções fundamentais da obra de Schön (1987) remetem-nos para o conhecimento na ação (*knowing-in-action*), a reflexão na ação (*reflection-in-action*), a reflexão sobre a ação (*reflection-on-action*), e a reflexão sobre a reflexão na ação (*reflection on reflection-in-action*). No centro das asserções de Schön para a formação profissional, encontra-se também a distinção entre o conhecimento tácito, que este denomina como "reflexão na ação", e o conhecimento escolar. Duarte (2003) problematiza os pressupostos epistemológicos e pedagógicos contidos na oposição que Schön estabelece entre esses dois tipos de conhecimento. E, argumenta que Schön adota uma pedagogia que desvaloriza o conhecimento escolar e uma epistemologia que desvaloriza o conhecimento teórico/científico/académico, referindo "…que a questão da desvalorização do saber teórico está presente em vários autores que se tornaram referência no campo dos estudos sobre formação de professores", colocando também no centro deste debate, Dewey, Tardif e Perrenoud (Duarte, 2003, p. 602).

Partindo do pressuposto que refletir é a ação de pensar sobre algo com um espírito crítico-construtivo que constrói conhecimento, partindo da acessão de Zeichner (1993), é importante a compreensão de que "não é a prática que ensina: é a reflexão sobre a prática!", exercício que exige a mobilização de conhecimento científico para que se constitua como situação de aprendizagem e para que os profissionais possam continuar a aprender e a desenvolver-se "em" e "através" da prática.

A qualquer das fases da reflexão, "reflexão para a ação" (prévia à ação, desenrola-se no sentido de a planificar), "reflexão na ação" (interativa, reflexão pela e na observação e diálogo com a situação), "reflexão sobre a ação" (pós-ativa, com faceta retrospetiva e prospetiva), ou na "reflexão sobre a reflexão na ação", deve estar subjacente um referencial teórico, um saber académico/científico, uma "história havida", em termos concetuais, que permita que a "reflexão para, na e sobre a ação" possa comportar as dimensões

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retroativa (retrospetiva) e proactiva (prospetiva), que permitam refletir para uma nova ação, controlando o que foi negativo (Sá-Chaves, 2000).
As reconceptualizações inerentes à ideia de saúde, os desenvolvimentos sociais, científicos e tecnológicos têm exigido por parte dos enfermeiros uma capacidade de constante reconstrução pessoal e profissional, o que pressupõe processos reflexivos, que acreditamos constituírem a base do processo da afirmação da enfermagem como disciplina, do conhecimento, autónoma e com campo de intervenção próprio.
A reflexão é determinante na progressão na proficiência dos enfermeiros, de iniciado a perito, fazendo parte das características deste último, o reflexivo *expert*, não guiar as suas práticas por regras ou passos descritos nos modelos.
Admite-se que as respostas adequadas aos desafios da profissão têm que passar, indubitavelmente, por processos de reflexão e (re)conceptualização das práticas, o que vai ao encontro da necessidade de se implementarem políticas de SCE com uma forte componente reflexiva, salvaguardando a importância da provisão de tempo para momentos mais formais para a reflexão entre os pares.
Nomeadamente, as políticas de organismos nacionais e internacionais, designadamente o Departamento de Saúde do Reino Unido e a Ordem dos Enfermeiros, são impregnadas de argumentos para o incremento da prática reflexiva e desenvolvimento profissional, e do papel que a SCE pode ter no sentido de garantir padrões de atendimento de alta qualidade, através de processos reflexivos.
Rocha (2013) concluiu que a análise crítico-reflexiva das práticas era a quinta estratégia de SC mais implementada e mais desejada nos serviços de saúde e no estudo de Pires, Pereira, Reis Santos & Rocha (2016), entre 16 estratégias de SC, esta foi considerada a mais relevante.

2. MÉTODOS

Face às características da investigação projetada foi desenvolvido um estudo qualitativo, exploratório, ancorado no paradigma construtivista. A investigação foi orientada pelos princípios da investigação-ação no que relevou para a interação com o contexto e os participantes, o que permitiu uma análise aprofundada do fenómeno SCE, sua natureza complexa e processos que lhe estão subjacentes, fundamental para a significação, compreensão e interpretação desta problemática, através da compreensão e interpretação do ponto de vista dos participantes.

2.1 Amostra

Participaram na investigação 42 Enfermeiros de três Centros de Saúde (CS) de um Agrupamento de Centros de Saúde (ACES) da região norte de Portugal. A amostra foi de conveniência, no sentido que todos os enfermeiros dos CS fossem envolvidos na investigação.
Todos os Enfermeiros das Unidades de Cuidados de Saúde Personalizadas (UCSP) dos CS em questão participaram no estudo. Eram predominantemente do sexo feminino (85.71%; n= 36), com idade entre 28 e 59 anos (M= 44.19; DP= 7.43), tempo de exercício profissional entre seis e 40 anos (M= 20.27; DP= 7.21). As categorias profissionais mais representativas foram, em igual percentagem, enfermeiro graduado e enfermeiro especialista (42.86%; n= 18).

2.2 Recolha de dados

Recolha dos dados efetuada através de entrevista semiestruturada cujo guião integrava cinco blocos temáticos: o primeiro incorporava a legitimação da entrevista e respetivos objetivos; os restantes incluíam questões relativas às conceções, representações e opiniões dos participantes sobre a temática da SCE.

2.3 Análise de dados

As entrevistas foram gravadas em áudio e transcritas, na íntegra, à medida que eram realizadas. De seguida foram inseridas no programa Nvivo10®, identificadas com um código, e efetuada análise de conteúdo segundo os princípios do método da *grounded theory* (Strauss & Corbin, 2008). Após a análise de cada entrevista voltou-se ao terreno, sempre que necessário, para efeitos da validação da informação.

2.4 Procedimentos éticos

O estudo obteve aprovação da Comissão de Ética para a Saúde da Administração Regional de Saúde do Norte e da Direção do ACES onde se desenvolveu.
Todos os participantes assinaram o modelo de consentimento informado e na análise e tratamento dos dados foram adotados procedimentos de proteção do anonimato e confidencialidade.

3. RESULTADOS

Da análise emergiu a categoria "Análise crítico-reflexiva das práticas", que remete para uma das estratégias de SC em uso, face à qual se identificaram dimensões e subcategorias (Figura 1).
As dimensões identificadas foram: a "Dimensão intrapessoal", da qual emergiram as subcategorias "Pouca autorreflexão" e "Ausência

de estratégias formais de desenvolvimento do pensamento crítico"; e "Dimensão interpessoal" de onde emergiram as subcategorias "Ocasional", "Falta de tempo para a reflexão interpessoal", "Organização do trabalho interfere com a reflexão interpessoal", "Dificuldade de reflexão interpessoal nas Extensões de Saúde", "Expõe zonas de (não) saber", "Pouca predisposição para a reflexão interpessoal", "Enfermeiro chefe facilita a reflexão interpessoal", "Reflexão interpessoal nas reuniões de serviço", e "Reflexão entre supervisores de diferentes serviços".

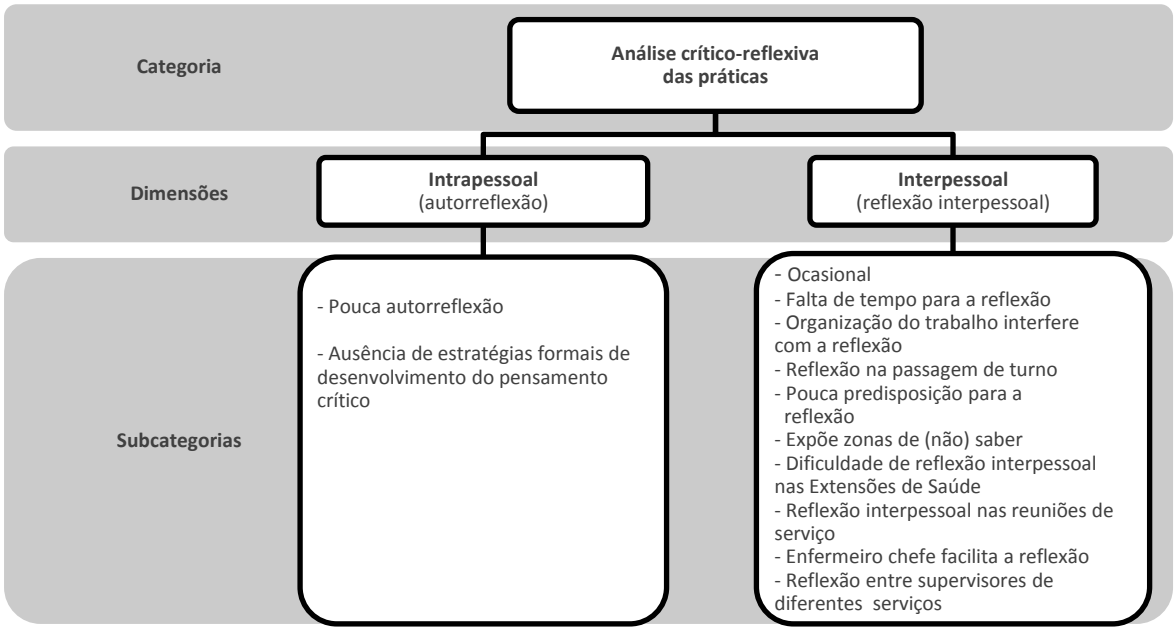

Figura 1 - Análise crítico-reflexiva das práticas em uso: dimensões e subcategorias

4. DISCUSSÃO

O apoio na reflexão facilita a integração do conhecimento, nomeadamente na fase mais precoce do desenvolvimento profissional, em que nem sempre os enfermeiros possuem as habilidades necessárias para realizar uma reflexão crítica eficaz. É importante ter acesso ao conhecimento e às experiências dos outros para aprofundar o nosso próprio conhecimento e pensamento, daí a relevância do acesso ao saber empírico e partilha das práticas de profissionais experientes. A responsabilidade por este apoio reside, sobretudo, no supervisor clínico e em colegas mais experientes.

4.1 Dimensão intrapessoal

Esta dimensão da análise crítico-reflexiva reporta-se à reflexão individual, que consiste numa componente intrapessoal a que Schön (1987) chamou de "silent game", processo reflexivo comparado a um "jogo solitário", individual, com caráter dinâmico que gera imprevisibilidade, subjacente ao fascínio da resolução de problemas. Adversa a esta dinâmica é a opinião de um dos participantes, que entendia ter-se instalado alguma "rotina" no serviço, relacionada com a escassez de reflexão intrapessoal, do questionamento e problematização das práticas, tradutora de "Pouca autorreflexão":

> *(…) verifica-se que quase todos nós temos uma prática acomodada (…) habituámo-nos à rotina, a fazer aquilo tudo no dia-a-dia, sem refletirmos muito sobre aquilo que fazemos. Quem é que ao fim do dia (…) faz uma autorreflexão ou uma autocrítica sobre o seu dia-a-dia de trabalho? Quem é que o faz? Ninguém! E9CH*

Este resultado vem corroborar o argumento de Netto, Silva & Rua (2018, p.2) de que "o culto à racionalidade técnica, ao currículo normativo, à aplicação da teoria e da técnica, derivadas do conhecimento sistemático, preferencialmente científico, à epistemologia da prática, além da separação entre ensino, pesquisa e a prática, ainda predominante nas universidades, não deixam espaço para a ação reflexiva e ameaçam a competência profissional".

Esta capacidade metacognitiva é extremamente importante, pois permite que os enfermeiros tomem consciência dos processos subjacentes à sua atividade profissional, pelo que a orientação da prática reflexiva fornecida na SC promove a introspeção, estimulando o pensamento crítico-reflexivo sobre as experiências clínicas e sobre a evidência científica que as sustentam (Gates & Sendiack, 2017). A prática reflexiva é importante por ser um método específico de trabalho, com o objetivo de permitir que o profissional construa conhecimentos com base na sua prática, sendo possível definir esse método como a "arte de crescimento intrínseco" por meio da reflexão, com o propósito de achar uma solução (Netto et al., 2018).

Pires, R., Santos, M. R., Pereira, F., & Pires, M. (2021).
Estratégias de supervisão clínica: análise crítico-reflexiva das práticas. *Millenium, 2*(14), 47-55.
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Quanto à "Ausência de estratégias formais de desenvolvimento do pensamento crítico":

> *(…) no desenvolvimento do pensamento crítico a estratégia é mais informal. E16VP*

O estudo de Dubé & Ducharem (2015) evidenciou que a cultura de determinadas unidades de saúde não promove práticas reflexivas em enfermagem. Gates & Sendiack (2017) referem que uma estrutura reflexiva ajuda a criar um espaço de pensamento dentro do contexto de supervisão, permitindo que os supervisores atendam às necessidades do supervisado e do cliente, fornece uma estrutura explícita que facilita a prática reflexiva e apoia o desenvolvimento de habilidades técnicas e pensamento crítico e, em última análise, incentiva o desenvolvimento da identidade pessoal e profissional. Os mesmos autores argumentam que a existência de uma cultura reflexiva formal, na organização, promove o senso de introspeção consciente nos profissionais e permite-lhes desenvolverem a maturidade na prática ao longo do tempo, incluindo considerações éticas e sabedoria clínica.

4.2 Dimensão interpessoal

A dimensão interpessoal da análise crítico-reflexiva reporta-se à heterorreflexão, reflexão realizada em díade ou em grupo, que Schön (1987) intitulou de "*interplay*", que implica uma atitude de humildade intelectual, no sentido de admitir que "o outro" pode ser iluminador do nosso conhecimento.

Os participantes identificaram a presença de práticas reflexivas entre os pares:

> *Entre colegas refletimos! Uns mais que outros, evidentemente! Mas, vai havendo partilha de informação, naturalmente, e de conhecimentos (…) E2RP; (…) discutimos os casos dos nossos doentes, o nosso dia-a-dia, as dificuldades que temos tido. (…) não só com os colegas, mas com as próprias chefias. Também acho que fazemos um bocadinho deste trabalho de supervisão. Até porque, vamos conversando sobre aquilo que tem corrido bem e aquilo que tem corrido menos bem, onde nos poderíamos empenhar mais, porquê é que não nos empenhamos. E5RP*

Contudo, consideraram que reflexão interpessoal é "Ocasional", não formal:

> *(…) acontece ocasionalmente. Não há momentos estipulados para isso. E13CH; Às vezes, quando nos surge uma situação nova, diferente, que é conhecida de um ou outro elemento, e os outros não sabem, acabamos por nos sentar e falar sobre isso, de forma informal. E14VP; Eu penso que até isso nós fazemos entre nós informalmente. E4RP*

Tavares (2013) também concluiu que os enfermeiros reconheceram a existência de práticas de análise crítico-reflexiva nos respetivos serviços, ainda que informais; contudo, consideraram que a partilha de conhecimentos, experiências, e pontos de vista entre colegas, levados a cabo por via da reflexão, traduziam-se no enriquecimento individual e coletivo, que era mobilizado em prol de benefícios para o cliente, na medida em que contribuem para delimitar estratégias de atuação discutidas e refletidas em conjunto. Contudo, Süleyman & Bozkuş (2017) referem que ser reflexivo não deve ser considerado um método que foi adquirido e ocasionalmente usado, mas uma componente vital da vida diária, não uma ação separada ou desconectada das práticas.

Apesar da informalidade na implementação desta estratégia de SC, Rocha (2013) concluiu que era a quinta mais frequentemente implementada nos serviços de saúde, porém, quanto ao desejo da frequência de utilização, esta estratégia surgiu na sexta posição.

Face às dificuldades manifestadas pelos participantes em encontrarem tempo para a análise reflexiva sobre as práticas, entre os pares, emergiu a subcategoria "Falta de tempo para reflexão interpessoal":

> *(…) O problema é tempo, ter tempo, (…). Ultimamente não temos tido tanto essa oportunidade para partilharmos e refletirmos sobre as nossas práticas, há uns anos atrás ainda tínhamos (…). Temos tido menos oportunidades para reflexão uns com os outros! E8CH; Gostava de ter mais tempo, gostava! E5CH*

O "tempo" é um fator que pode influenciar de forma indelével as ocasiões encontradas para o exercício da análise reflexiva sobre as práticas, tempo este que a informalidade de algum modo tende a subtrair, "deixando-se para depois", havendo sempre algo que se sobrepõe como "mais importante a fazer".

Os estudos de Cross, Moore, Sampson, Kitch & Ockerby (2012) e Tavares (2013) também demonstraram que a SCE é particularmente importante em serviços onde os enfermeiros se encontram mais sobrecarregados, devendo ser fornecido tempo para refletirem sobre as suas práticas e questões profissionais.

A SC radica na reflexão, pois todo o processo supervisivo só é relevante porque integra processos reflexivos, pelo que, a disponibilização de tempo para a SCE e respetivas sessões tem que contemplar, inevitavelmente, tempo próprio para a reflexão sobre as práticas e conjunturas envolventes (Dubé & Ducharem, 2015; Snowdon et al., 2017).

Outro aspeto que emergiu inerente à reflexão foi a organização do trabalho, destacando-se a subcategoria "Organização do trabalho interfere com a reflexão interpessoal", que, em certa medida, se relaciona com a anterior:

> *Muitas vezes não temos oportunidade de refletir uns com os outros sobre as práticas porque estamos a trabalhar muito isoladamente, cada um no seu módulo. E11CH; A partilha é pouca! (…) a nossa organização do trabalho não facilita! E1CH; (…) também depende do serviço e dos horários. Há dias que (…) falamos sobre algumas coisas. Mas depois, porque aquela tem um horário até às sete, a outra até às cinco, imaginemos… ou fica uma sozinha (…). Isto para dizer, que nos vamos*

> *apercebendo dos cuidados dos que estão mais perto, (…) e falamos com quem está mais perto. (…) teríamos que nos organizar! (…). E2CH; (…) A maneira como está organizado o trabalho não permite discutir com todos com a mesma frequência. (…) penso que é mais pela organização do trabalho. E4RP*

Süleyman & Bozkuş (2017) referem que a reflexão promovida pela cultura e estruturas de uma organização, afeta e é afetada pelas escolhas, políticas, decisões e pelo trabalho.

Os participantes também fizeram referência à passagem de turno como momento privilegiado de reflexão sobre as práticas. Entendem que é uma mais-valia para os enfermeiros quando a organização do trabalho possibilita a definição deste período de tempo/espaço para discutirem a condição do cliente e respetivos cuidados, emergindo a subcategoria "Reflexão na passagem de turno":

> *Aqui temos menos momentos para refletir. Não é como no hospital, todos os dias, na passagem de turno (…). E1CH; (…) eu sei que há serviços em hospitais e noutros centros de saúde onde se faz nas passagens de turno…, mas, nesse aspeto, aqui falta-nos um bocadinho isso. (…) faz-nos falta, falarmos mais sobre os cuidados. (…) não há reuniões desse tipo. Não temos, por vezes, tempo e momentos próprios para o fazer, e isso era importante. E4CH*

Estas perspetivas corroboram o estudo de Tavares (2013), que identificou situações da prática diária propícias à reflexão, tanto em grupo como individual, ficando evidente a importância atribuída pelos participantes às análises, discussões, e reflexões que ocorriam durante as "passagens de turno", entendidas como cruciais para o desenvolvimento da prática reflexiva. Valorizaram os momentos das passagens de turno para refletirem sobre a prática e aferirem a melhor forma de lidar com cada situação, atribuindo grande relevância e valorização à informação que é partilhada e discutida.

O estudo de Rocha, Reis Santos & Pires (2017) também sugere que os enfermeiros hospitalares apresentam mais momentos de compartilhamento, nomeadamente na passagem de turno.

Outra subcategoria identificada aponta para a influência das caraterísticas individuais que os participantes reconheceram em alguns colegas, passíveis de condicionar a reflexão "Pouca predisposição para a reflexão interpessoal":

> *Com alguns colegas têm-se mais dificuldade em fazer essa reflexão. (…) não adianta… porque depois insiste que o que ele está a dizer é que é correto. Há colegas que não são muito de discutir, acham que a opinião deles é que está certa! (…). Não sei se eles entendem que estão a perder a oportunidade de aprender com os colegas! Eles acham que estão sempre certos. E1VP; Alguns sentem mais dificuldade em pedir a opinião aos colegas sobre a prestação dos cuidados! (…) há colegas que têm mais dificuldade na reflexão! (…) aquelas pessoas mais fechadas têm mais dificuldade em discutir sobre os cuidados com os colegas. E3VP; (…) há sempre quem não goste! Não é? E5CH*

Segundo Sá-chaves (2000) a passagem ao "*eu solidário*" é uma transição difícil. A dificuldade para refletir abertamente com o outro pode, realmente, radicar em aspetos da personalidade/habilidades comunicacionais, na falta de tempo e outras dificuldades de natureza pessoal ou organizacional; ou na falta de uma "cultura" reflexiva, que está enraizada em questões paradigmáticas que, embora nas últimas décadas se tenham vindo a atenuar, sob elas sofremos marcada influência até cerca da década de 80 do séc. XX.

No estudo de Pires (2004), a reflexão sobre as práticas, entre enfermeiros, foi referida como uma das dificuldades socio-clínicas com que estes se defrontavam no seu dia-a-dia, nomeadamente, foi identificada alguma resistência à prática reflexiva, tendo sido referido que ainda prevalecia em alguns profissionais a ideia de que a sua verdade é universal, não se dispondo à discussão com os colegas.

Emergiu também a subcategoria "Expõe zonas de (não) saber". Os participantes percecionaram que por via da reflexão interpessoal pode identificar-se o défice de conhecimento:

> *Procuro a opinião do colega em termos de conhecimento, a ver se tenho o conhecimento ou não. Ajudam-me a perceber se tenho todo o conhecimento. E13VP*

Este achado vai ao encontro do trabalho de Süleyman & Bozkuş (2017), que considerou a reflexão interpessoal uma via de aprendizagem, vendo-a como um "duplo loop", um processo de aprendizagem cognitiva compartilhado. Os participantes entreajudavam-se na identificação de dificuldades e na busca de estratégias para lidar com elas, ampliando assim as suas perspetivas sobre os problemas (amplia o conhecimento) ajudando a adquirir novos *insights* sobre o comportamento (mudança de atitude).

A "Dificuldade de reflexão interpessoal nas Extensões de Saúde", que advém da falta de pares com quem discutir, foi um aspeto referido, na medida em que neste contexto se trabalhava mais isolado:

> *(…) nós estamos muito separados da Sede e isso dificulta a reflexão com os colegas. E9VP*

A distância entre Extensões de Saúde da Sede foi identificada como um dos fatores dificultadores da SC e da reflexão entre pares, havendo locais de trabalho com apenas um enfermeiro. Este achado corrobora o estudo de Rocha, Reis Santos & Pires (2016), que refere que há contextos onde o contacto direto entre profissionais é difícil devido à distância geográfica, nomeadamente entre colegas e/ou supervisor e supervisado, tornando mais difícil a supervisão e a reflexão, propondo, nestas circunstâncias, estratégias de SC a distância.

Estudos que envolveram características demográficas dos contextos mostraram diferenças significativas na organização da SCE em contexto hospitalar e comunitário, precisamente devido à maior dispersão dos profissionais no segundo contexto (Lynch, Hancox, Happel & Parker, 2008).

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Não obstante os participantes terem identificado algumas dificuldades e informalidade/ocasionalidade no exercício da análise e reflexão das práticas, salientaram que aproveitam as reuniões de serviço, momentos programados, mais formais, emergindo a subcategoria "Reflexão interpessoal nas reuniões de serviço":

> *Aproveitamos as reuniões de serviço para refletirmos todos sobre os cuidados que estamos a praticar e também para colocar algumas dúvidas. Se temos algumas dificuldades, colocamos ali e entre colegas elucidamo-nos (…). E11CH; Nós vamos fazendo reflexão uns com os outros. Vamos tentando! Porque, normalmente, fazemos reuniões e vamos aproveitando estar com os colegas na Sede e usando essas estratégias nas reuniões. E11VP; Nas reuniões de serviço trocamos opiniões e discutimos sobre a prestação de cuidados. Já se faz isso! (…) temos estas reuniões para partilhar as nossas dúvidas. Às vezes há discordâncias e isso é bom! E13VP; Nas reuniões mensais há sempre reflexão sobre os cuidados e sobre os registos. E15CH*

A relevância atribuída à reflexão na melhoria progressiva nos cuidados de enfermagem valoriza a oportunidade dos enfermeiros poderem refletir sobre as suas práticas, em reuniões organizadas exclusivamente para esse fim (Cross et al., 2012; Tavares, 2013).
Outra subcategoria identificada foi "Reflexão entre supervisores de diferentes serviços"

> *Acaba por haver alguma solidariedade entre colegas, [de diferentes CS] os pares com o mesmo papel [supervisor], partilhamos entre nós, discutimos entre nós e vamo-nos ajudando. E7RP*

O estudo de Cruz (2012) também evidenciou a reflexão entre supervisores de diferentes serviços através da "supervisão indireta" em reuniões das equipas supervisores clínicos, com o propósito de trocarem informações e normalizarem a sua atuação. Borges (2013) apurou que os participantes salientavam a importância das reuniões de supervisores por proporcionarem um maior nível de suporte e apoio.
Outra subcategoria identificada foi "Enfermeiro chefe facilita a reflexão interpessoal":

> *(…) a chefe facilita-nos essa oportunidade de estar um bocadinho uns com os outros e partilhar as experiências. E7VP; Nas reuniões dou sempre um estímulo. (…) estimulo a reflexão e o pensamento crítico da equipa. E15CH*

O estudo de Pinto, Reis Santos & Pires (2017) demonstrou que o supervisor desempenha um papel preponderante na formação de profissionais reflexivos, por via da mobilização de estratégias para o efeito. Visto que no nosso país não existem programas formais de SCE implementados nos serviços de saúde, admite-se que sejam os enfermeiros chefes a desempenhar este papel, como fica patente no estudo de Tavares (2013) que revelou que o enfermeiro chefe tinha um papel muito relevante no estímulo da análise crítico-reflexiva das práticas, incentivando a equipa de enfermagem a refletir para, na, e sobre a ação, e no desempenho das suas funções como supervisor, constituindo-se como agente catalisador da prática reflexiva, com enfoque na melhoria dos cuidados. Os enfermeiros consideraram que a equipa era o espelho da sua chefia, no que toca à reflexão, pois a sua exigência impelia a equipa a tornar-se mais exigente consigo própria, instigando em cada um a responsabilidade individual pelo seu próprio desenvolvimento e vontade de se tornar melhor profissional.
Süleyman & Bozkuş (2017) consideram que a reflexão é uma forma de aprendizagem e que a gestão desta é um objetivo essencial na criação de equipas reflexivas, que visam criar oportunidades fortes e justas de aprendizagem para todos na organização e incentivar para que se beneficiem dessas oportunidades. Neste sentido, entendem que os gestores podem contribuir comprometendo-se com o estabelecimento de foco na aprendizagem, com a formação dos profissionais e ajudar a desenvolver formas de superar habilidades inquiridoras para desenvolver hábitos mentais para a aprendizagem adicional e autónoma.

CONCLUSÃO

O estudo permitiu identificar um conjunto de estratégias de supervisão em uso, promotoras do desenvolvimento profissional e da qualidade dos cuidados, nomeadamente, a análise crítico-reflexiva das práticas. Constatou-se que há um conjunto de constrangimentos de natureza individual e contextual que são dificultadores da operacionalização desta estratégia, que urge serem ultrapassados.
A análise crítico-reflexiva das práticas é determinante para estimular o conhecimento, o pensamento crítico e a tomada de decisão, pelo que se considera fundamental que as políticas de supervisão clínica em contexto de cuidados de saúde primários integrem esta e outras estratégias de reflexão.
Uma limitação do estudo reside na produção de generalizações, porém, acredita-se que as conclusões obtidas encontram similitudes em ecologias e circunstâncias idênticas.
Sugere-se que sejam desenvolvidas futuras investigações no âmbito da problemática reflexão, pensamento crítico e tomada de decisão em enfermagem, envolvendo os fatores individuais e os fatores contextuais facilitadores/impeditivos do seu desenvolvimento.

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Retention in school: could student's affective engagement play an essential role in its prevention? *Millenium*, 2(14), 59-68.
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RESUMO

Introdução: A retenção escolar em Portugal assume valores preocupantes. A análise ao indicador "Percursos Diretos de Sucesso", criado pelo Ministério da Educação, permite perceber que a maioria dos alunos que deveria ter terminado o 3.º ciclo ou o ensino secundário em 2019 não o conseguiu fazer sem reprovar um ano ou ter negativa em, pelo menos, um dos exames nacionais: num universo de 456.368 estudantes, apenas 201.937 (44%) tiveram o chamado "percurso direto de sucesso". (Fonte: http://infoescolas.mec.pt/ 02/2019)
Objetivos: O objetivo do presente estudo foi averiguar se os alunos que reprovaram de ano foram os que revelaram no inicio do ano letivo menos envolvimento afetivo na escola quando comparados com os alunos que transitaram de ano
Métodos: A amostra é constituída por 330 alunos do 10º ano de uma escola secundária do distrito de Lisboa. Para a recolha dos dados foi utilizada a escala *Envolvimento dos Alunos na Escola (EAE-E4D),* elaborada por Veiga (2013, 2014, 2016), que foi passada no final do primeiro período.
Resultados: encontraram-se diferenças significativas entre os dois grupos em todos os itens da dimensão afetiva, tendo o grupo que reprovou piores resultados.
Conclusões: conclui-se assim que o envolvimento afetivo dos alunos na escola é importante para o sucesso académico e que a escola deve promover estratégias para promover esse envolvimento no sentido de proporcionar bem-estar aos alunos e prevenir a retenção escolar.

Palavras-chave: envolvimento afetivo dos alunos na escola; retenção escolar; sucesso académico

ABSTRACT

Introduction: In Portugal, the retention in school presents worrying figures. The indicator "Direct Paths to Success", created by the Ministry of Education, shows that the majority of students who did not finish secondary school in 2019 was because they failed a year or had a negative score in at least one of the national exams. Out of a universe of 456,368 students, only 201,937 (44%) had the so-called "direct success path". (Source: http://infoescolas.mec.pt/ 02/2019)
Objetives: The main goal of this study is to inquire if the students who had been held back were the ones who showed at the beginning of the school year less emotional commitment in comparison with students that moved forward.
Methods: The sample comprises 330 students from the 10th grade of a secondary school in Lisbon, and the data were collected using a scale proposed by Veiga (2013, 2014, 2016) – *Student's Engagement in School* (EAE-E4D), at the end of the first school term.
Results: Considerable differences emerged between the two groups in all the items of the affective dimension. The group retained had the worst results.
Conclusion: The students' affective engagement is crucial for academic success, and school should promote it through strategies that can provide their well-being and prevent retention.

Keywords: student's affective engagement; retention in school; academic achievement

RESUMEN

Introducción: En Portugal, la repetición escolar presenta cifras preocupantes. El análisis del indicador "Rutas directas del éxito", creado por el Ministerio de Educación, muestra que la mayoría de los estudiantes que deberían haber finalizado el tercer ciclo o la educación secundaria en 2019 no lo hace sin fallar un año o fallar en al menos uno de los exámenes nacionales: en un universo de 456.368 estudiantes, solo 201.937 (44%) tenían el llamado "camino directo del éxito". (Fuente: http://infoescolas.mec.pt/ 02/2019)
Objetivos: El objetivo principal de este estudio es determinar si los estudiantes que habían repetido curso fueron los que mostraron al principio del año escolar menos compromiso emocional en comparación con los estudiantes que promocionan.
Métodos: La muestra comprende estudiantes del décimo grado de una escuela secundaria en Lisboa, y los datos se recopilaron utilizando una escala propuesta por Veiga (2013, 2014, 2016). La participación del estudiante en la escuela (EAE-E4D) se produjo al final del primer trimestre.
Resultados: Surgieron diferencias considerables entre los dos grupos en todos los ítems de la dimensión afectiva. El grupo de repetidores tuvo los peores resultados.
Conclusión: El compromiso afectivo de los estudiantes es crucial para el éxito académico, y la escuela debe promoverlo a través de estrategias que puedan proporcionar su bienestar y evitar la repetición de curso en el ámbito escolar.

Palabras Clave: compromiso afectivo con la escuela; repetición escolar; rendimiento académico

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INTRODUCTION

School retention in Portugal is a serious issue, because of the high numbers and its consequence in school dropout**.** The Ministry of Education report includes the analysis of the indicator "Direct Paths to Sucess" of the last triennium (2017-2019). This indicator shows that the majority of secondary school students failed at least one school year or one of the national exams, more than 250 thousand young people. The majority of students who should have finished secondary school in 2019 could not do so without failing one year or at least one of the national exams. In a universe of 456,368 students, only 201,937 (44%) had the so-called "direct success path". The situation is more problematic in secondary education since only 41.22% managed to do so without fail.

Of the 180,317 students who entered the 10th year in 2016/2017, less than 75,000 (74,337) managed to finish high school without failing. However, the percentage of "successful pathways" rose by more than two percentage points (from 39% to 41.22%) in 2018. (Source: http://infoescolas.mec.pt/ 03/2019). It is therefore essential to find out which factors can prevent school retention and to see if the variable involvement of students with the school can prevent school retention. Some studies indicate that student involvement is a predictor of academic performance (Connel, Spencer & Aber 1994; DiPerna, Volpe & Elliot, 2005; Skinner & Belmonte, 1993; Wu, Hughes & Kwow, 2010). It is also interesting to see the influence of the various components of school involvement on academic performance. Lambdin (1996), Jordan (1999), Wilms (2003), Carbonaro (2005), found a positive relationship between the behavioural dimension of involvement and academic performance. Studies that used, in addition to the behavioural dimension, the emotional/affective dimension (Borman & Overman, 2004; Connell, Spencer, & Aber, 1994; Sirin & Rogers-Sirin, 2004) also found a positive relationship with academic performance.

Based on these postulates and using the the four-dimensional scale about Student's Engagement in School (EAE-E4D) written by Veiga (2013, 2014, 2016) the following objectives were established:

Determine in the sample the retention rate by gender and school career (humanistic and professional scientific courses).

Compare the students who failed the year and the students who did not fail in the results presented, at the beginning of the school year, in the cognitive, affective, agency and behavioral dimensions of the scale of involvement of students in school (EAE-E4D)

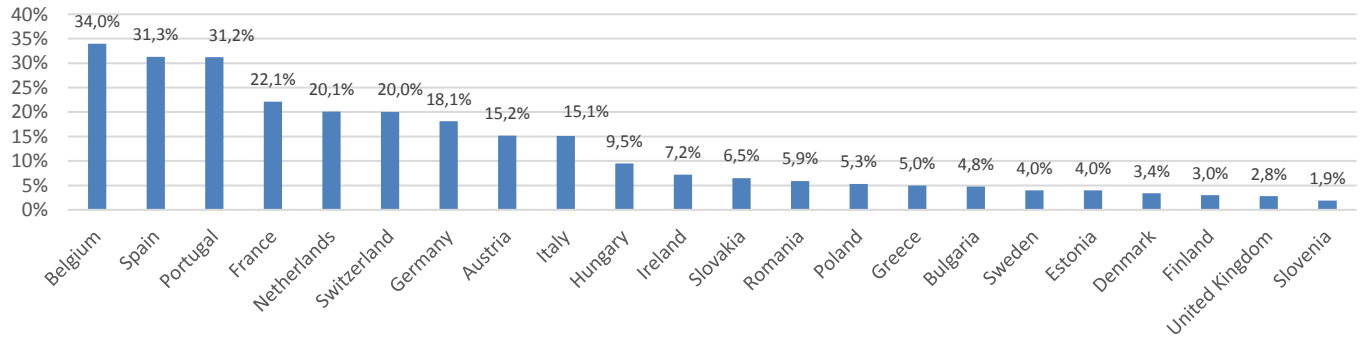
Compare the students who failed the year and the students who did not fail in the results presented, at the beginning of the school year, in the cognitive, affective, agency and behavioral dimensions of the scale of involvement of students in school (EAE-E4D)

Deepen the affective dimension of the scale (EAE-E4D) about the students who failed and students who did not fail.

1.1 Retention: Concept, Legal Background and Statistical Data

School retention means the student will stay in the same school year for an additional period, instead of moving on to a higher level together with his/her age peers (Brophy, 2006). In Portugal, the legal framework related to school year transition is like most European countries, which have lower retention rates. Therefore, the conclusion is that high retention rates are not a consequence of the legal framework (Perdigão, Rute & Ferreira, Antonieta & Félix, Paula,2015). Portuguese legislation (Decree 98-A/1992 of 20 June 1992) defines that in secondary education, in the scientific-humanistic courses, the student's approval in each subject depends on obtaining a final score equal or superior to 10. In the last year of multi-annual subjects, attendance score cannot be less than eight. Student's transition to the next school year happens whenever the final grade is not less than 10 for more than two subjects. In vocational courses (labor market-oriented), a student does not move forward, if he/she has more than ten modules in arrears. Although the evolution of retention and dropout rates have shown an improvement in the last decade in all school years, Portugal is among the three OECD countries with the highest retention rate (31.2%), only surpassed by Belgium (34%) and Spain (31.3%), with the OECD average rate being 12 (Graph 1)% . In cycle transitions, the retention values increased in the 7th and 10th grades, critical moments in a school career. In Portugal, this percentage is higher than 50% for young people aged 15 with a problematic socio-economical situation, compared with the OECD average of 20%. (Source: OECD, PISA, 2015). According to Duarte et al. (2008), a cycle transition can be a difficult phase in terms of students' adaptation and lead to a decrease in their academic performance.

Graph 1 - Percentage of 15-year-old students who have failed at least once.



Source: OECD, PISA, 2015

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Portugal has participated in all PISA cycles to date - 2000, 2003, 2006, 2009, 2012 and 2015. In 2015 the sample was 7325 students with 15-year-old from 246 school clusters throughout the country. Since 2000, Portugal's average results have consistently improved in three areas (Portuguese, Mathematics and Reading), approaching the OECD average scores. Between 2009 and 2012 there was some stagnation in the results, improving again in 2015. PISA 2015 edition showed that Portuguese students improved their grades in all areas (Mathematics, Reading and Science). Considering the 35 countries/economies included in the OECD, Portugal now reaches the following positions: 17th in Science with 501 points, 18th in Reading with 498 points and 22nd in Mathematics with 492 points, being above the OECD average in all areas. Despite the improvement, Portugal is in the top 3 of the percentage of 15-year-old students who have failed at least once. Retention and dropout rates (2012-2016) in secondary education (humanistic, scientific courses) tend to reduce, albeit small, in 11th/12th grades and remain stable in the 10th grade. (Source :OECD, PISA, 2015)
The average data on school retention (2003/04 to 2015/16), provided by the Ministry of Education (Table 1) shows that humanistic and scientific courses have a higher percentage than technological and vocational courses in the 11th grade (difference of 3.7%) and 12th grade (8.2%). In both, the retention rate is higher in the last year of high school 38.7% in humanistic science courses and 30.5% in technological and professional courses. Source: http://infoescolas.mec.pt

Table 1 - Average Retention Rate per Curriculum Orientation 2003-2016

2003/04 a 2015/16		Total
Humanistic Science Course	10º grade	19,4%
	11º grade	13,5%
	12º grade	38,7%
	Total	**23,9%**
Technological and Professional Course	10º grade	19,7%
	11º grade	9,8%
	12º grade	30,5%
	Total	**20,01%**

Source: http://infoescolas.mec.pt

A comparative analysis between women and men revealed a higher retention rate among boys compared to girls in primary and secondary Portuguese schools (Source: http://www.dgeec.mec.pt) . "The advantage of girls over boys in their environment is greater the more deprived that environment is" (Grácio & Sérgio, 1997, p.70). Statistical data proved that the differences in achievement between boys and girls are more significant in low-class families and lower in middle-class and high-class families.
Male retention rate is higher than the female retention rate in all cycles and worsens after the 2nd cycle: in the 1st cycle the difference between boys and girls is 1.4%, in the 2nd cycle 5.9%, in the 3rd cycle 6.3% and in secondary education 7.6%. (table 2) Source: http://infoescolas.mec.pt

Table 2 - Average Retention Rate for Girls and Boys 2003-2016

2003/04 - 2015/16	Girls	Boys
1º cycle	3,8%	5,2%
2º cycle	6,2%	12,1%
3º cycle	12,3%	18,6%
Secondary School	19,4%	27,0%

Source: http://www.dgeec.mec.pt

The students' percentage who moved forward until the 9th grade in 2016/2017 47% were girls, while 37% were boys. In the 9th grade, the success rate (zero retention in the 7th and 8th year and positive in the 9th year exams) was 51% for girls and 41% for boys.
In secondary education, the difference between boys and girls rose from seven percentage points in 2015/2016 to ten points in 2016/2017. In the 3rd cycle, the gap rose slightly in one year, from nine percentage points to ten (Source: http://www.dgeec.mec.pt).

1.2 Students' Engagement with school and its connection with school performance

Many studies show that student engagement is an indicator of school performance (Connell, Spencer, & Aber 1994, DiPerna, Volpe, & Elliot, 2005, Skinner & Belmont, 1993; Veiga et al. 2009). It can be defined by the degree of students' commitment to the school and their motivation to learn (Simons-Morton & Chen, 2009; Veiga et al., 2012). The multidimensionality of this engagement is recognized, regarding the following dimensions: behavioral, emotional/affective, cognitive, academic (Appleton, Christenson, & Furlong, 2008; Fredricks et al. 2004). Even though it is not consensual, which component is more critical, the

behavioral and emotional appeared in many studies as the most vital. The transition between educational levels can affect engagement and learning as it implies changes in the level of requirement and often forces the student to change school, which involves adaptation and new relationships with teachers and peers (Reschly & Christenson, 2006). Klem and Connell (2004) realized that students' involvement diminished as they progressed from primary school to junior high school and from junior high school to high school, while Anderson and Havsy, (2001) show a decline in attendance when changing school years. Some studies also point out the increase on substance use (Henry, Knight, & Thornberry, 2011; Li & Lerner, 2011; Simons-Morton, 2004) and mental health problems (Elias, Gara, & Ubriaco, 1985; Li & Lerner, 2011). In the international study PISA "Program for International Student Assessment", sponsored by the OECD in 2015, the results regarding the feeling of belonging to school showed that 17.7% of students do not feel integrated and 12.9% feel as "outsiders". Regarding the ease of making friends at school, 22.2% reported that they do not have this ability. Besides, 11.8% stated having already suffered some act of bullying, 6.7% said that other students mock them, and 2.3% were already hit or pushed by other students. Interest towards school is measured by delays and absences, especially interim absence. PISA 2015 data showed Portugal and Sweden are the countries where students are later to school: 21% in Sweden and 16% in Portugal showed occasional delays or even frequently. As for intermediate absences Portugal and Spain are where it happened the most, although the percentage of students who admit to frequent or occasional absences is residual. Another yardstick to measure students' interest in the school is disruptive behavior. OECD 2015 study found out that Portugal is one of the three countries where teachers spend the most time keeping the order in class (15.7%), alongside Iceland and behind Brazil (19.8%). A large percentage of teachers (38%) admit having more than 10% of undisciplined students in a class; this percentage is above the OECD average (32%). OECD 2015 study also found out an impact of the variable sense of belonging on academic results in sciences as well as on total life satisfaction. The higher the sense of belonging, the better sciences results and overall life satisfaction. They also compared students who feel outsiders and students who do not feel outsiders in the sciences scores with those who feel outsiders showing worse results (minus 29 points on average without controlling the socio-economic variable and - 23 points controlling that variable). In an ethnographic study (Finne, 1991) on school dropout, one of the main reasons was that students did not feel emotionally involved. Lee (2014) noticed that emotional engagement measured as a sense of belonging is a significant value of reading performance, i.e., students with higher levels of engagement achieved better reading outcomes than students with less. In the same study, the author found out that the effect of this variable on reading performance is partially mediated by behavioral involvement, i.e. students with high levels of emotional involvement show high levels of behavioral involvement and this leads to higher reading scores. The study by Lee (2014) thus verified a direct and indirect effect of the emotional dimension on school performance. Baumesteir and Leary (1995) state that the need to belong is an essential human motivation. Hence, it is natural that when students have a high sense of belonging to the school, this can translate into a more considerable effort in academic activities. Veiga (2016) studied the criteria validity of the EAE four-dimensional scale, comparing two types of students, students with one or more retentions and students without retentions. Both groups expressed a moderate level of agency and cognitive involvement. However, the group with one or more retentions revealed a considerable lower involvement in all dimensions; the most significant differences are in the behavioral and affective dimensions. Nobre and Janeiro (2010), in a study of 134 students from the 9th grade, discovered a positive and significant correlation between achievement and adaptation to school. They also showed a negative correlation between the number of failures and welfare at school. The authors concluded: "students involved feel more motivated, influencing their academic performance positively. Consequently, there is an adaptation in a cognitive, behavioral and emotional level" (p. 3027). In addition to the impact on school performance, there is also an impact on disruptive behavior. Henry, Knight and Thornberry (2011) studied the relationship between involvement and variables such as dropout, delinquency, offence and substance use and it was shown an inverse relationship between involvement and problematic behaviors both in early adolescence and early adulthood. Li and Lerner (2011) analysed the effects of school involvement (behavioral and emotional) on risk behaviors (delinquency and substance use), noting that high levels of involvement, both emotional and behavioral, projected a lower risk of disruptive behaviors and substance use. Hirschfield and Gasper (2011) considered that cognitive, in addition to emotional and behavioral involvement, also predicts a delinquency decrease, both in school and in general. Borowsky et al. (2002) also discovered that retention, the occurrence of school problems, absenteeism and low connection to school are predictors of violence one year after evaluation. Wentzel (2012) considers that learning takes place in a social context, so positive interactions influence students' emotionally and psychologically. Juvoven, Espinoza & Knifsend (2012) stress the importance of having at least one friend at school in a transition between cycles. Several authors highlight the role of the teacher in promoting student involvement at school (Wang and Holcombe 2010; Birch & Ladd, 1997; Furrer & Skinner, 2003; Ryan & Patrick, 2001), and can be preventive of disruptive behavior (Ryan & Patrick, 2001; Veiga, 2012).

2. METHODS

The study is quantitative, observational and comparative since it aims to compare two groups (students who failed the year vs students who did not) on the scale (EAE-E4D), and also has a longitudinal character, since data on student involvement in school are collected at the beginning of the first period, and data on school retention are collected at the end of the school year.

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2.1 Sample

The sample contains 330 students in the *10th grade* of a Secondary School of the Lisbon district. The sampling technique was a non-probability sample *of* convenience because of the easy access to the institution where it was done. There is a balance in the sample related to gender, 44.2% - 146 male individuals, and 55.8% - 184 female individuals. Students were from humanistic, scientific courses (80.6%) and professional courses (19.4%).

2.2 Data collection instruments and procedures

Instrument: the Four-dimensional scale about *Student's Engagement in School* (EAE-E4D*)*

The four-dimensional scale about *Student's Engagement in School* (EAE-E4D*)* written by Veiga (2013, 2014, 2016) is a survey of 20 items with the following dimensions: cognitive, affective, behavioral and agency. The response scale is from 1 to 6 (1 being Total Disagreement and 6 being Total Agreement). The author studied the validity of the scale with *confirmatory* and *exploratory factor analysis*, proving the existence of a structure of 4 factors related to cognitive, affective, behavioral and agency dimensions. Another study of the psychometric qualities of the scale (Silva, Ribas, & Veiga 2017), a confirmatory factor analysis using the AMOS software, confirmed the four-dimensional structure (X^2/df = 1.758; CFI =.941; TLI = 0,930; RMSEA =.051; PCFI = 0,797). The author also studied the accuracy of the scale related to internal consistency and obtained Cronbach alphas ranging from 0.701 to 0.870. The Cronbach alpha values found in the study (Silva, Ribas, & Veiga 2017) were like those found by the author, with the total alpha being 0.828, revealing a good internal consistency. The Cognitive Dimension evaluates the information process, related subjects, information management, drawing up work plans. The Affective Dimension evaluates the connection to the school, friendship received and practised, sense of inclusion and belonging to a school. The Behavioral Dimension analyses intentionally disrupting classes, being incorrect with teachers, being distracted in class and absent from class. Finally, the Agency Dimension evaluates the student as an agent of action, initiative of students, intervention in class, dialogue with the teacher (Table 3). In this study, the affective dimension was the only one used, with the same items to the questions posed in the PISA 2015 study which assess the sense of belonging and ease in making friends.

Table 3 - Scale of Students' Engagement (EAE-E4D) - Dimensions and their Items

Dimensions	Items
Cognitive dimension: Information processing, related matters, information management, drawing up work plans.	1 - When I write my papers, I start by making a plan.
	2 - I try to relate what I learn in one discipline to what I learn in others.
	3 - I spend a lot of my free time looking for more information on topics discussed in class.
	4 - When I am reading, I try to understand the meaning of what the author wants to convey.
	5 - I regularly review my notes, even if a test is not yet near.
Affective dimension: Connection to school, friendship received and practised, sense of inclusion and belonging to the school	6* - My school is a place where I feel excluded.
	7 - My school is a place where I make friends quickly.
	8 - My school is a place where I feel integrated.
	9 - My school is a place where I think others like me.
	10* - My school is a place where I feel lonely.
Behavioral Dimension: intentionally disrupting classes, being incorrect with teachers, being distracted in class, missing classes.	11* - Missing school without a valid reason.
	12* - Missing classes while at school.
	13* - I purposely disrupt the class.
	14* - I'm rude to the teacher.
	15* - I am distracted in class.
Annunciative Dimension - Student as an agent of action, students' initiative, intervention in class, dialogue with the teacher, questions raised and suggestions made to the teacher.	16 - During class, I ask questions to teachers.
	17 - I talk to my teachers about what I like and don't like.
	18 - I comment with my teachers when something interests me.
	19 - During class, I intervene to express my opinions.
	20 - I make suggestions to teachers to improve classes.

* The asterisk indicates that the item is reversed.

2.3 Ethical Procedures

We asked the permission to the scale's author (EAE-E4D) who, in addition to giving the authorization, agreed to collaborate in this study. We asked permission to the school's management to carry out the study and to pass over the scale (EAE-E4D) to all classes of the 10th grade at the end of the first term. The information was also requested at the end of the school year for those students who did not pass. After the favorable opinion of the school's management, we requested to the student's parents for informed consent and guaranteed the anonymity and confidentiality of individual results. The scale was applied with the collaboration of

the Psychology and Guidance Service (SPO) and it was done in group, in a classroom context, by the psychologist of the SPO at the end of the first period.

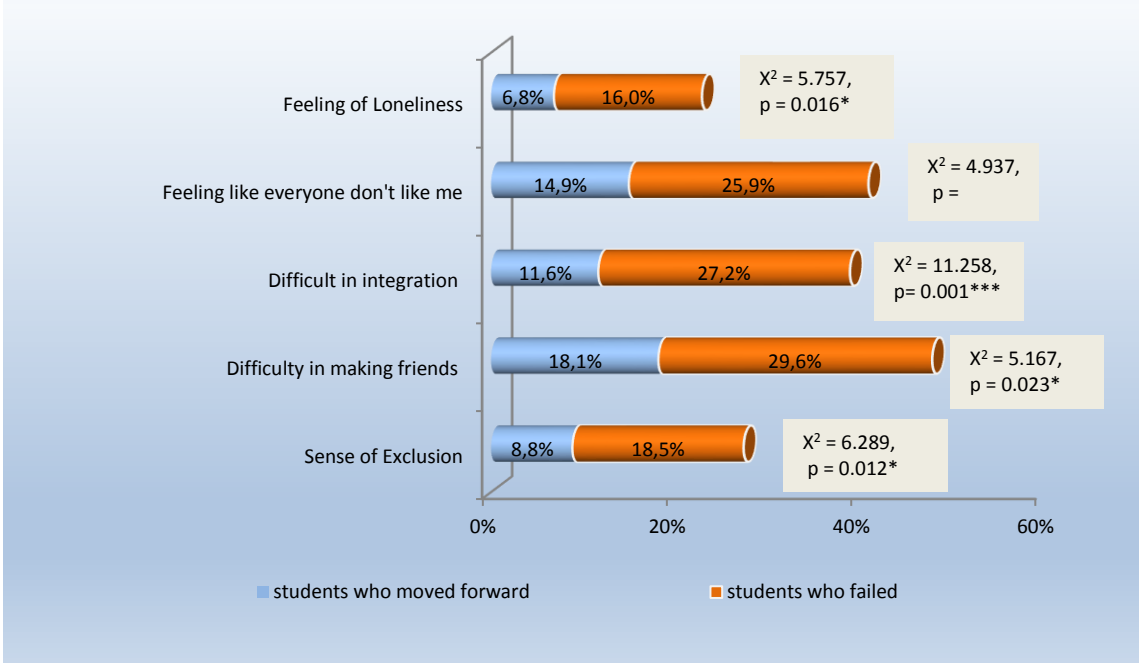
2.4 Statistical analysis

The statistical analysis was performed through IBM SPSS Statistics software version 24.0.
To analyze whether there were significant differences between the group that did not carry over from year to year (81 individuals) and the group that carried over from year to year (249 individuals) Chi-square was used in the in the four dimensions and in the five items of the affective dimension and the answers were polarized.
The Chi-square test was used when no more than 20% of cells with expected frequencies ("expected count less than five") below 5 were found, when this happened Fisher's test was used as an alternative.

3. RESULTS

By the end of the school year, retention was 24.6% (81 students), being higher for males (32.4%) than females (18.5%). Regarding the area, there was more retention in humanistic, scientific courses (28.9%) than in professional courses (6.3%).
Using the cutoff value of 17.5 (middle of the scale) for each dimension, we identified the percentage of students in each group who reveal low involvement and used the Chi-square and Fisher test to find out if there were significant differences. In the group that did not pass the year there is a significantly higher percentage of students that reveal low cognitive involvement (43.2%) and low affective involvement (16%), while in the group that passed the year these percentages are 27.3% and 7.6% respectively (X^2 = 7,197, p = 0,007** , X^2 = 4,947, p = 0,026*). In the agency dimension the difference is not significant, with a high percentage of students with low involvement in both groups (56.8% in the non-transit group and 54.6% in the transit group: X^2 = 0.117, p = 0.733). In the behavioural dimension there are also no significant differences between the two groups, with only two pupils in the total sample showing results below the middle of the scale (Fisher, p = 0.431). The results of the affective scale were then checked in detail by analyzing the responses to the items (polarizing the responses). The results showed that in the group of students who were held back, a higher percentage felt alone, at the beginning of the school year (16% in the group that failed and 6.8% in the group that did not fail; X^2 = 6.289, p = 0.012*) excluded (18.5% in the group that failed and 8.8% in the group that did not fail; X^2 = 5.757, p = 0.016*), with a difficult integration (27.2% in the group that failed e 11.6% in the group that did not fail X^2 = 4.937, p = 0.026*), difficulty in making friends (29.6% in the group that failed and 18.1% in the group that did not fail X^2 = 4.937, p = 0.026*) and felt that nobody liked them (25.9% in the group that failed e 14.9% in the group that did not fail X^2 = 5.167, p = 0.023*) Graph2.

Graph 2 - Comparison of the two groups in the Affective Dimension items



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4. DISCUSSION

There was a higher retention rate in males and humanistic, scientific courses, a coherent result with the Ministry of Education report (2003-2016). A higher percentage of low affective and cognitive involvement appeared in the group of students who did not pass the year. In the Veiga study (2016) it was found that the group of students who had already had at least one retention in their school career showed less involvement in the different dimensions of the EAE-E4D scale, compared to the group that has no retention. The most significant differences were found in the affective and behavioural dimensions. So the affective dimension emerged as a differentiating indicator for students with and without retention, in the Veiga study (2016) and in this study. In the present study, the results of the affective dimension were further elaborated, and it was found that students who failed were the ones who showed the worst results in all of the items of the affective dimension at the beginning of the school year (end of the first term). In this group, there was a higher percentage of students with feelings of loneliness, exclusion and integration compared to the group that moved forward. These results supported those obtained by the PISA 2015 study which had found a relationship between the sense of belonging and academic achievements, and those obtained by Nobre and Janeiro, 2010 which saw a positive correlation between results and adaptation to school. Therefore, teachers and psychologists should be particularly attentive to these aspects at the beginning of each school year, and the psychologist may use the *School's Engagement Scale* (EAE-E4D) to assess and screen at-risk students, especially students with low affective results. For flagged students, the psychologist should conduct additional interviews for further evaluation and afterwards should construct and implement individual intervention plans. These procedures are particularly important in school transitions since it is in the 7th and 10th grades that school involvement decreases, and retention increases. The teacher should pay attention to students with precarious lives and weaknesses, and to those who are shy and rejected by peers (Veiga 2007). It can be a difficult phase and lead to a decrease in their performance and increase school retention (Duarte et al., 2008), changes in psychological well-being and reduce school satisfaction (Rhodes, 2008). The revised literature (Juvoven, Espinoza & Knifsend, 2012) highlights in school transitions the importance of friendships' quality and their stability, pointing out that the presence of at least one friend can provide the emotional support necessary for adaptation. In addition to the vital role of detecting students at risk, the teacher has a crucial role in increasing students' school engagement by the way he or she conducts the class and relates to the students. Wang and Holcombe (2010) suggest that teachers can encourage students' participation and their connection with the school by giving positive praise, emphasizing effort rather than performance. Teacher support has been associated with several markers of student behavioral involvement, such as high participation in school-related activities (Birch & Ladd, 1997) and decreased disruptive behavior (Ryan & Patrick, 2001; Veiga, 2012). Students who have more support of teachers, have positive feelings towards school and participate more actively in-class activities (Furrer & Skinner, 2003; Ryan & Patrick, 2001).

CONCLUSIONS

It is crucial for students to feel that they can have the support of their teachers and the school psychologist and feel they can count on them, especially when arriving at a new school. At the beginning of the school year, the psychologist should introduce himself/herself to classes which start a new cycle. He/she should explain the inherent difficulties of an adaptation and mention the resources that the students have at their disposal to simplify this transition (school psychologist, support classes, study method sessions, peer tutoring, etc.). Besides, he/she should transmit to the students a feeling of optimism and belonging to a "new family". It is also essential to evaluate the school's engagement in the first months so that teachers and psychologists have time to draw up action plans to promote the integration of those who feel excluded and avoid their failure at the end of the school year. One of the limitations of this study was that the data was only collected in one school. It would be interesting in future studies to collect data with a greater geographical coverage.

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PERSONAS DE BAJOS INGRESOS Y COMPORTAMIENTO PROAMBIENTAL: MÁS ALLÁ DE LOS PROBLEMAS DE DINERO, UNA REVISIÓN DE LITERATURA

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RESUMO

Introdução: A pobreza e os problemas ambientais são duas das principais preocupações que a humanidade enfrenta na busca por uma melhor qualidade de vida.
Objetivo: Relacionar sob uma perspectiva da psicologia e da gestão ambiental, a pobreza com o comportamento pró-ambiental das pessoas de baixa renda.
Métodos: Foi realizada uma revisão de literatura. A busca dos artigos a serem revisados considerou três critérios principais: 1. os artigos foram relacionados com um determinado tipo de comportamento pró-ambiental em um contexto específico e possuem uma abordagem de gestão ambiental; 2. pessoas de baixa renda foram o foco central da pesquisa, não apenas mais um critério sociodemográfico; 3. os artigos foram baseados em uma das duas principais teorias psicológicas aplicadas à gestão ambiental e ao comportamento pró-ambiental, a teoria social cognitiva e a teoria do comportamento planeado.
Resultados: Os onze artigos analisados compartilham a conclusão de que fatores psicológicos - especialmente a autoeficácia - contribuem para uma melhor compreensão das possibilidades e impedimentos para pessoas de baixa renda praticarem comportamentos pró-ambientais.
Conclusão: Os artigos vão além da análise óbvia relacionada à renda, que reduz a problemática a uma questão de dinheiro/renda. Eles contribuem significativamente para o aprimoramento da gestão e políticas ambientais capazes de incluir pessoas de baixa renda na ação global em favor da natureza.

Palavras-chaves: baixa renda; comportamento pró-ambiental; autoeficácia

ABSTRACT

Introduction: Poverty and environmental problems are two major concerns humanity is facing in its pursuit for a better quality of life.
Objetive: Relate, from a perspective of psychology and environmental management, poverty with the pro-environmental behavior of low-income people.
Methods: A literature review was carried out. The search for articles to be reviewed considered three main criteria: 1. the articles are related to a certain kind of pro-environmental behavior in a specific context, and have an environmental management approach; 2. low-income people are the central focus of the research, not just another sociodemographic aspect; 3. the articles are based on one of the two main psychological theories applied to environmental management and pro-environmental behavior, Social Cognitive Theory and Theory of Planned Behavior.
Results: The eleven articles analyzed share the conclusion that psychological factors – especially self-efficacy – contribute to a better understanding of the possibilities and impediments for low-income people to practice pro-environmental behavior.
Conclusion: These articles go beyond the obvious income-related analysis that limits the problematic to a money/income issue. They significantly contribute to the improvement of environmental management and policies that are able to include low-income people in the common effort to preserve nature.

Key Words: low-income; pro-environmental behavior; self-efficacy

RESUMEN

Introducción: La pobreza y los problemas ambientales son dos preocupaciones principales que enfrenta la humanidad en su búsqueda de una mejor calidad de vida.
Objetivo: Relacionar estos dos temas al revisar la literatura sobre personas de bajos ingresos y su comportamiento pro ambiental desde una perspectiva psicológica y de gestión ambiental.
Métodos: En la búsqueda de los artículos que se iban a revisar se tuvieron en cuenta tres criterios principales: 1. los artículos están relacionados con un cierto tipo de comportamiento pro ambiental en un contexto específico y tienen un enfoque de gestión ambiental; 2. las personas de bajos ingresos son el foco central de la investigación, no solo otro aspecto sociodemográfico; 3. los artículos se basan en una de las dos principales teorías psicológicas aplicadas a la gestión ambiental y el comportamiento pro ambiental, la teoría cognitiva social y la teoría del comportamiento planificado.
Resultados: Los once artículos analizados comparten la conclusión de que los factores psicológicos, especialmente la autoeficacia, contribuyen a una mejor comprensión de las posibilidades e impedimentos para que las personas de bajos ingresos practiquen un comportamiento pro ambiental.
Conclusión: Los artículos van más allá del análisis relacionado con los ingresos, que socava la problemática de un problema de dinero. Ellos, contribuyen significativamente a la mejora de las políticas que pueden incluir a las personas de bajos ingresos en el esfuerzo por preservar la naturaleza.

Palabras Clave: bajos ingresos; comportamiento proambiental; autoeficacia

INTRODUCTION

The environmental degradation caused by human behavior has been an important concern to psychology science in recent years, especially in an interdisciplinary effort with management and policies approaches (Clayton et al., 2016). Another great concern for the human being is the fast-growing inequality and poverty related to environmental problems that harm mainly the poor and most vulnerable (Kibert, 2018). From a psychological viewpoint it is important to go beyond prejudice and to examine the relations between poverty and environmental impact, poor people's pro-environmental behavior, beyond money related issues. This also means to consider that poor people are the most vulnerable to environmental impact and with better management policies they are able to participate in the efforts to protect the environment, for themselves and for everybody else.

This article is a literature review about the psychology applied to low-income people and pro-environmental behavior (PEB). The articles reviewed are recent, from the last five years, and they are about field research relating PEB and low-income people. Low-income people are the sole subjects, the participants focused in the research, and the persons' income is not just one more sociodemographic variable. Besides, the articles base their research on Albert Bandura's Social Cognitive Theory (SCT), or on Ajzen's Theory of Planned Behavior (TPB). These two theories are different but share the use of the same self-efficacy construct as one of their bases for behavior prediction. Likewise, they have in common their focus on cognitive and behavioral aspects to explain and predict human behavior. The PEBs researched by the articles are in a variety of issues, such as energy conservation - that includes either saving energy overall or renewable energy, recycling, and green consumption.

The articles reviewed also conclude that psychological factors interfere in environmental behavior performance, and therefore should be used to develop and improve environmental management policies. They point out the importance of income but also the importance of psychological factors, especially self-efficacy, to the design of public policies that address environmental issues. Their perspective is to improve policies related to environmental issues, especially to look for approaches that go beyond revenue, targeting psychological aspects of pro-environmental behavior, their impediments and possibilities, not having a biased viewpoint. The analysis of the possibilities and impediments for low-income people to preserve nature is important because it has to do with both nature and its preservation and with social justice. Social justice here means finding ways not to burden low-income people more, understanding their struggles without neglecting the necessity and the possibilities for all to preserve nature and have a better quality of life.

1. REVIEW OF THE LITERATURE

This article reviews the literature, articles based on two core psychological theories commonly used in environmental management and psychology, the Social Cognitive Theory (SCT) by Albert Bandura and the Theory of Planned Behavior (TPB) by Ajzen. The articles must have been analyzing the determinants of the PEB using at least one construct of these theories. The two theories, SCT and TPB, were chosen because of their broad application in many different issues of environmental management, different kinds of pro-environmental behavior. They work with the prediction of behavior, in a cognitive and behavioral approach, and they also have in common the use of self-efficacy construct, that has a central role in the prediction of pro-environmental behavior.

Albert Bandura's Social Cognitive Theory is based on the triadic reciprocal model. This model states that human behavior, personal factors and environment, all three interact and influence each other (Bandura, 1986). Bandura's theory is based on the human agency concept. This concept asserts that human beings have power over what they do. The self-efficacy construct is pivotal to the human agency idea and means the belief of a person about his or her capability to drive a course of action in order to achieve certain results (Bandura, 1997).The SCT is widely used as a theory that can help understand pro-environmental behavior (Ardoin, Heimlich, Braus, & Merrick, 2013; M.-F. Chen, 2015).

The theory of Planned Behavior (TPB) works with three major constructs in order to predict human behavior: attitudes, social norms and perceived behavior control. The TPB first was called theory of Reasoned Action (RA), and with the addition of the perceived behavior control it received the new name TPB (Ajzen, 1991). But still, some authors use the two terms to refer to the same theory (Behbehani & Prokopy, 2017).

According to TPB, attitudes deal with the favourability or unfavourability of a certain behavior, the attachments, and the values that a person places in the behavior. The social norm is the value that society adds to a certain behavior and it comes to have importance for the person because of the social pressure to perform the behavior. Perceived Behavioral Control (PBC) is the perception that a person has about his or her capacity to perform a behavior in order to attain the desired outcome (Ajzen, 2002). As one can see the PBC has the same definition as self-efficacy, and Ajzen affirms he bases his understanding of self-efficacy on Bandura and his associates' research, and that the two constructs "are quite similar" at a certain point he uses both as the same (Ajzen, 1991). Most articles use self-efficacy, and also as the same as PBC, but four of them use these two constructs separately (Al Mamun, Fazal, et al., 2018; Al Mamun, Masud et al., 2019; Al Mamun, Mohamad, et al., 2018; Al Mamun, Mohiuddin, et al., 2018)

Similar to SCT, TPB is also applied in different issues and countries in environmental management. There are various examples of research articles and literature review that point out the use of TPB for predicting pro-environmental behavior (Ardoin et al., 2013; Ding et al., 2018; Yuriev, Dahmen, Paillé, Boiral, & Guillaumie, 2020).

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2. METHODS

The review was performed based on these three common scientific databases - Web of Science, Science Direct and APA PsycNet. The research was conducted first from November 2018 to May 2019, and as final period, in March and June 2020. The articles are peer reviewed and were published in the last five years. This review targeted only empirical studies. The studies must address all three different issues: low income people, pro-environmental behavior, and at least one of the two psychological theories, SCT or TPB. These are descriptors for search: (low income OR low class OR base of pyramid OR poverty OR social) AND (pro-environmental behavior OR sustainable OR environmental management OR energy OR water OR recycling OR environment) AND (self-efficacy OR perceived behavioral control OR Ajzen OR Bandura OR psycholog*/psychological).

The search is described in the Figure 1. Few articles (eleven) were found. Despite having many results, the articles did not precisely match the criteria for this analysis due to these reasons: either the low-income issue was not central to the article research, but rather just another socio-demographic factor, the theories were not exactly applied as pivotal to the article, or it was not about pro-environmental behavior specifically but about environmental policies in general. The final result was 11 articles (Al Mamun, Fazal, et al., 2018; Al Mamun et al., 2019; Al Mamun, Mohamad, et al., 2018; Al Mamun, Mohiuddin, et al., 2018; Behbehani & Prokopy, 2017; Boomsma, Jones, Pahl, & Fuertes, 2019; C. Chen, Xu, & Day, 2017; Hafner, Pahl, Jones, & Fuertes, 2020; Russell-Bennett, Mulcahy, Little, & Swinton, 2018; Wamuyu, 2018; Zhao, Cavusgil, & Zhao, 2016) that match exactly the criteria and are able to be analyzed in this review.

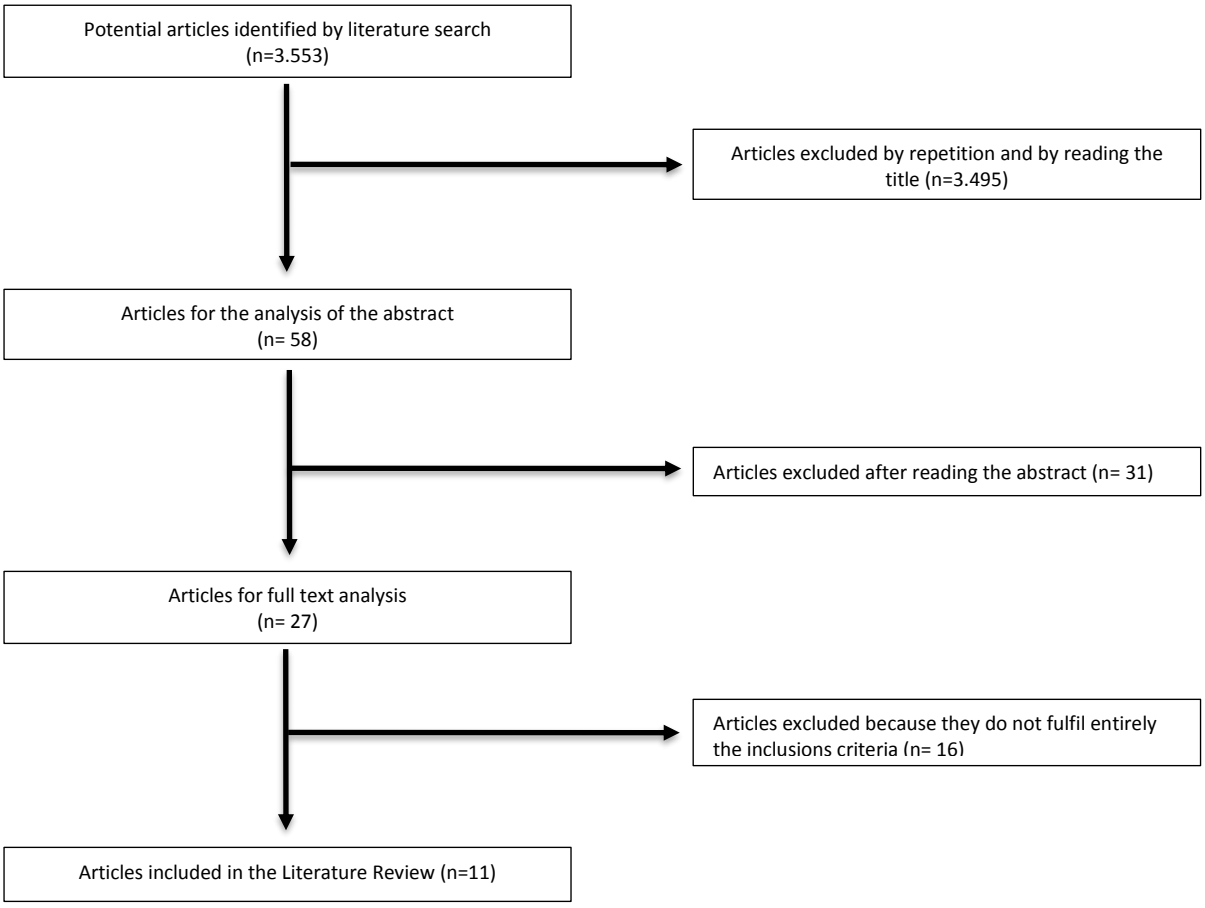

Figure 1 - Articles selection process, steps and numbers

3. RESULTS AND DISCUSSION

The use of the two theories SCT and TPB to predict PEB are spread throughout the world and in various kind of PEB, as discussed above. The point here is how these theories can help the understanding of PEB and low-income people, and this has been little discussed by research until now. This literature review is an attempt to fill this gap, considering the importance of these two issues, environment and poverty, and the necessity to have an analysis of the research in this field.

First, it is important to point out that money - the income related problems - is an important issue that affects low-income people's PEB**.** The eleven articles address this problematic and this is obvious. It is clear that certain kinds of activities that request more money are not available - or are more difficult to be practiced - by poor people. So, for example, PEB based in buying expensive products or that needs to spend more money than normally used for the compared behavior can represent an unsurmountable impediment for poor people to practice the PEB. Therefore, the money, the price of products or services, really affects a person's performance of a certain kind of PEB and sometimes in a stronger and very different way than somebody else's, depending on her or his income.

But the question that drives this article is the idea of going beyond those obvious money related problems, questioning whether there is anything else that can influence low-income people's PEB. There is some research that addresses this question and their findings are investigated here. The eleven articles are about different kinds of PEB - energy conservation, green products consumption, environmental civic engagement - in various countries. In common they point out that self-efficacy, or its similar - perceived behavioral control, or even the collective efficacy (that is the self-efficacy of a group of people) is the psychological construct that influences low-income people's PEB.

The importance of self-efficacy for environmental management is not new, and it has been pointed out in many different kinds of research, and in some literature reviews (Raath & Hay, 2016; Samaddar, Chatterjee, Misra, & Tatano, 2014; Tabernero & Hernández, 2011). However, in reference to low-income people, it is difficult to separate the self-efficacy and the money issue related to PEB. This is what these eleven articles point out and they have important findings and/or environmental policies suggestions based on the application of the self-efficacy construct in each PEB context.

Self-efficacy means the perceived capacity of a person, or a group, to conduct certain behavior and achieve the desired outcome. Therefore, what these articles find are about the application of this construct, understanding in each situation, in each PEB context, what are the kinds of impediments and possibilities to foster the person's or the group's self-efficacy. Each article finds the management or policy solution to elide the different kind of difficulties low-income people encounter in becoming able or perceiving their ability to practice each PEB.

The articles are based on field research, and most of them use a quantitative method. It is also important to point out that the articles analyzed intentions and/or behavior of PEB, but none of them focused on the relationship between intention and behavior. This is in line with the Yuriev, Dahmen, Paillé, Boiral, and Guillaumie (2020) findings that studies using TPB applied to PEB are not working to overcome the problem related to the intention-behavior gap, and their concern is more about understanding the elements that influence intention rather than what can influence actual behavior. Therefore, most of the articles indicate the need of further research in this matter – for example, longitudinal studies and research about the effectiveness of the actions suggested.

Al Mamun et al. have four articles (Al Mamun, Fazal, et al. 2018; Al Mamun, Masud, et al., 2019; Al Mamun, Mohamad, et al., 2018; Al Mamun, Mohiuddin, et al., 2018) analyzed here. The investigations are about green consumption in various aspects, also including recycling and green vehicles, and took place in coastal Peninsular Malaysia. The participants were from low-income households. These articles are founded in the TPB and they reach results about the effects of self-efficacy and PBC in influencing PEB. Al Mamun, Fazal, et al. (2018) concluded that the authorities should adopt policies and measures to enhance self-efficacy and PBC towards green products in order to foster their consumption. Al Mamun, Mohiuddin, et al., 2018 states that the improvement of consumers' PBC can happen through policies that promote environmental awareness and knowledge about green products, in order to increase the willingness to pay for them. Al Mamun, Mohamad, et al., 2018 indicates that basis in their findings the government and environmental organizations should evaluate the feasibility of recycling material and promote a supportive system to facilitate and enhance low-income households recycling activities. Al Mamun et al. (2019) indicates that government agencies and automobile organizations should emphasize enhancing low income buyers self-efficacy with policies, for example, that provide information about environmental benefits of green vehicles along with subsidiaries incentives.

Research by Behbehani and Prokopy (2017) explains how a Leadership in Energy and Environmental Design (LEED) certified historic building in the United States' Midwest is able to increase residents' self-efficacy and PBC towards PEB. Such PEB improvement, however, is limited due to residents' financial and health problems, lack of knowledge and lack of environmental interventions in the buildings.

Boomsma et al. (2019) conducted their research with English social housing residents. They found out that psychological factors, including perceived behavioral control (PBC), are influential in energy saving behaviors of these residents no matter what the characteristics of the house are – efficient or inefficient, or damp homes. However, there is an important role that the need for heating comfort plays in their energy saving behaviors. Therefore, energy conservation campaigns should pay attention to energy savings that can exacerbate the thermal discomfort for low-income households.

The Chen et al. (2017) study about low income households in the US reinforces the findings that the PBC is a strong predictor of their energy conservation intentions, along with attitudes, bill consciousness and thermal comfort. Hence the authors direct policymakers to incorporate theses aspects in designing campaigns.

Hafner et al. (2020) conducted their research about social housing energy use in the UK. Based on a governmental program that developed games for fostering the energy savings in social housings, they used the TPB to reach their results. Noticing the lack of

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PBC, they concluded that the games should be less time consuming and that non-technical approaches should be incorporated, such as social ambassadors.

Russell-Bennett et al. (2018) conducted their research with low-income earners in Australia and concluded that self-efficacy and financial factors share the most positive impacts on the intentions of energy-saving behavior. The complexity of electricity behavior demonstrates that social marketers should center their work on specific electricity-saving behaviors.

Wamuyu (2018) study in Nairobi Mathare slum (Kenya) demonstrated that collective efficacy positively relates to the resident's intentions on continuing to participate in community civic environmental initiatives. The recommendations are to stimulate the use of social media (Web 2.0) to foster civic environmental responsibilities and to enhance their collective efficacy. The authors suggest that policymakers should use the study in waste management issues in order to stimulate stronger responsibility and participation from householders.

Zhao et al. (2016) concluded in their study with Chinese base of pyramid (low income) consumers that self-efficacy holds a significant role in their low-cost household green behaviors. Managers must be aware that low income consumers are influenced by the positive outcomes of green products. Governments can offer financial incentives and awards for lost-cost behaviors, such as resource conservation and waste reduction.

Therefore, the eleven articles highlight the importance of self-efficacy and PBC to enhance low-income people's PEB, despite acknowledging that the monetary factor also plays an important role. The articles punctuate proposals or advice for policymakers to consider the psychological factors - their findings - in designing and implementing environmental policies as well.

CONCLUSION

The articles reviewed have addressed - in a psychological and management approach - these two major issues that nowadays concern humanity: environmental degradation and poverty. These articles fill the gap in previous research that in general simplifies the situation, dealing with the problems as they have only a money or income aspect. They have the contribution to open minds beyond biases, helping to improve the understanding about low-income people's PEB practices.

The research analyzed here can demonstrate that environmental management programs and policies may have a different approach for each context and each kind of PEB. The articles stress out the necessity of a psychological approach and its contribution to attain a better intervention to really help solving environmental problems, by fostering the PEB practices.

However, there are limitations, especially because the articles are more focused on what can influence intentions of behavior than actual behavior, and they do not analyze factors that can shed light on the problem of intention-behavior gap. Therefore, further research is necessary in order to analyze public policies and environmental management actual applications of the results reached and their effects in solving, or not, the environmental behavior challenges they were designed to address.

In conclusion, these articles research have important contributions to assist the development of environmental management policies that address poor people and their specificities in practicing PEBs, and consequently include a large part of the world population in the common effort of preserving nature. This unbiased psychological approach is able to see poor people without prejudice, understanding and addressing their special needs in order to have a better quality of life in a healthier environment, for them and all of humanity.

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CIÊNCIAS AGRÁRIAS, ALIMENTARES E VETERINÁRIAS

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DETERMINAÇÃO DO ÍNDICE DE FRESCURA EM SARDINA PILCHARDUS

FRESHNESS INDEX DETERMINATION IN SARDINA PILCHARDUS

DETERMINACIÓN DEL ÍNDICE DE FRESCURA EN SARDINA PILCHARDUS

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RESUMO

Introdução: A Sardinha (*Sardinha pilchardus*) é uma espécie pelágica, da família das Clupeidae, sendo um dos peixes mais abundante em todo o mundo. O termo qualidade em pescado referre-se ao índice de avaliação de frescura de acordo o Reg. (CE) nº 2406/96 do Conselho, de 26 de novembro, nomeadamente à aparência estética, frescura, e grau de alteração sofrido pelo pescado.
Objetivo: Avaliar o grau de frescura, qualidade higiénica e a composição bromatológica de sardinhas, em diferentes superfícies comerciais de Beja, Alentejo.
Métodos: Avaliaram-se 4 lotes diferentes de *Sardinha pilchardus* provenientes de 4 superfícies comerciais (20 sardinhas/lote), classificaram-se de acordo as tabelas do Reg. (CE) nº 2406/96. Efetuaram-se análises físico-químicas: Azoto básico volátil (ABVT), Índice de refração (IR) do humor aquoso, pH, cor, textura, composição bromatológica e parâmetros microbiológicos.
Resultados: Os valores de ABVT para as diferentes amostras apresentam valores abaixo de 14 mg/100g, segundo o Reg. (CE) 1022/2008 deve estar abaixo de 20 a 30mg/100g, pelo que os 4 lotes cumprem o critério. As análises microbiológicas apresentaram valores aceitáveis. As sardinhas apresentam valores médios de 161 Kcal/100g, ligeiramente abaixo dos valores da tabela alimentar do INSA (2007), dada a época do ano (Primavera) apresentaram gordura baixa.
Conclusão: As sardinhas apresentaram uma categoria de frescura de Extra e A, evidenciando um estado satisfatório para consumo. As determinações que se revelaram mais fiáveis para a determinação da frescura foram o ABVT, a textura instrumental e o IR.

Palavras-chave: textura; ABVT; índice de refração; valor nutricional

ABSTRACT

Introduction: Sardine (Sardinha pilchardus) is pelagic specie, from Clupeidae family, being one of the most abundant fishes all over the world. The term "quality" in fish refers to the index of freshness evaluation in accordance to the Regulation (EC) No. 2406/96 of November 26th, namely the esthetical appearance, freshness and degree of deterioration that the fish had suffered.
Objective: To evaluate the freshness index, hygienic quality and bromatological composition of sardines in different commercial shops in Beja, Alentejo.
Methods: Four different lots of Sardinha pilchardus were evaluated from the four commercial shops (20 sardines/lots), and classification was made of the category of each of the lots was carried out by the Reg. (EC) No. 2406/96 tables. Physical-chemical analysis was made: determination of Total Volatile Basic Nitrogen (TVB-N), refractive index of vitreous humor (RI), pH, colour, texture, bromatological analysis, and microbiological analysis.
Results: TVB-N values for the different samples was lower than 14 mg/100g, as mentioned in Reg. (EC) No 1022/2008 it should be lower than 20 to 30mg/100g, and therefore the 4 samples respected that criteria. Microbiological analysis showed that the samples were within the acceptable values. The sardines presented average nutritional values of 161 Kcal/100g, which are lower than reference values from INSA (2007) nutritional table, eventually due to the low fat content by this time of the year (Spring).
Conclusion: The sardines showed freshness categories of Extra and A, and hence emphasized a satisfactory state for consumption. The most expounding analyzes for the determination of freshness were the TVB-N, the instrumental texture and the Refraction Index.

Keywords: texture; TVB-N; refraction index; nutritional value

RESUMEN

Introducción: Sardina (Sardinha pilchardus) es una especie pelágico, das Clupeidae, siendo un dos peces más abundantes del mundo. El término "calidad" engloba el índice de evaluación de frescura según Reg. (CE) nº 2406/96 del Consejo, de 26 de noviembre, lo que se refiere a la apariencia estética y frescura, o al grado de deterioro que ha sufrido el pescado.
Objetivo: Evaluar el grado de frescura, calidad higiénica y composición bromatológica de las sardinas en diferentes superficies comerciales en Beja, Alentejo.
Métodos: Se llevaron a evaluación cuatro lotes diferentes de sardinas de las diferentes superficies comerciales (20 sardinas/lote), de acuerdo con las tablas de clasificación de frescura en el Reg. (CE) nº 2406/96 del Consejo, de 26 de noviembre. Se realizó análisis físico-químico: determinación de nitrógeno básico volátil (NBVT), de índice de refracción (IR) de humor acuoso, de pH, color, textura, composición bromatológico, y análisis microbiológicas.
Resultados: Los valores de NBVT para las muestras presentado valores abajo de 14 mg/100g, segundo Reg. (CE) 1022/2008 deben ser abajo de 20 - 30mg/100g, por lo que los 4 lotes cumplen los criterios de calidad. Los análisis microbiológicos se encontraban dentro de los parámetros aceptables de calidad microbiológica. Los valores nutricionales se presentaron de 161 Kcal/100g, ligeramente abajo de los valores de la tabla de referencia alimentar del INSA (2007), dada la época del año (Primavera) presentaron bajo contenido de grasa.
Conclusión: Las sardinas presentaron clasificación de frescura de Extra y A, evidenciando un estado satisfactorio para el consumo. Los análisis más aclaratorios para la determinación de la frescura fueron la cuantificación de NBVT así como la textura instrumental y la determinación del IR.

Palabras Clave: textura; NBVT; índice de refracción; valor nutricional

INTRODUCTION

Fish quality is due mostly to its freshness stage. There have been used several different techniques to evaluate the deterioration or the freshness of a lot of commercial species. These techniques can be sensory, chemical, physical and microbiological, and some of those were used in this study. Fish products are easily perishable along the distribution chain, since the capture until the consumption, thus it should be kept always in a safety state, and therefore assuring its freshness index.

The most significate methods to evaluate the fish freshness were TBV-N, refraction index of vitreous humor and texture analysis, which data well represented the samples grade of freshness, and it were coincident with the freshness parameters of the visual exam define in the Regulation (EC) No. 2406/96 of November 26th.

This study aims were to evaluate the freshness stage and hygienic quality of sardines from four different lots of distinct commercial shops in Beja. It was also studied its bromatological composition in order to know the four lots relative differences on its chemical composition and then compare the lots.

- *Sardine (Sardina pilchardus)*

Sardina pilchardus is a bone fish of small size, edible and much appreciated, which is found in East Atlantic Ocean, from North Sea to Senegal and in Mediterranean Sea. It is largely capture and it is always present in most of the markets. It has a huge commercial importance and therefore it is a fish well known.

Sardine (*Sardinha pilchardus*) is pelagic specie, from *Clupeidae* family and Cupleiforme Order, being one of the most abundant fishes all over the world.

Its fishing is very important from the economy perspective as well as for feeding. The biological average of biometry of the most important species for capture varies from 17 to 18 cm reached in the 2 to 3 years. It has a slim and long body, subcylindrical, with a rounded womb and with delicate scales; the back as a greenish-blueish colour and the lateral regions and womb have a bright silver colour. The head is pointed without scales with equal jaws with small or no teethes. It has a dorsal fin in the middle of the body, and in the womb region it has two abdominal fins. It is a fish that is usually in a huge shoal, always seeking for warm waters with a larger grade of salinity (Ababouch et al., 1996).

As it was mentioned by I.N.S.A (2007), that the sardine is a source of proteins of high biological level, with a total content of 18,4% and the lipids content of 16,4%, being an omega-3 fatty acids source, and thus presenting 221 kcal/100g of energy. The total amount of water is 63,4% and it is a huge phosphorous source, which is the majority trace element present, as well as a selenium source, which contributes to the hair and nails maintenance, and also has high levels of potassium. Among the vitamins, some of the B group vitamins, as B12, B6, niacin and riboflavin and folates. The sardines also contain large amounts of D vitamin, which contributes to the absorption and regular use of calcium and phosphorous (Ababouch et al., 1996).

- *Frehsness changes*

Some factors as the type of species or the storage conditions may contribute to the grade of species deterioration. The primary changes occur in the skin, eyes, gills and muscles characteristics. The first sensory changes of fish during the storage are related with its appearance and texture. The most evident change is the rigor mortis, since immediately after the muscle demise the fish is completely chilled out, the texture is flexible and elastic, persisting for a few hours but afterwards the muscle contracts. When the muscle contracts and became hard and tough, the all body is inflexible and so it is mention that the fish is in rigor mortis (FAO, 1998).

The fresh sardines are characterized by a bright iridescent colour, aqueous mucus and transparent, domed convex eyes with a black pupil and a convex cornea. The gills are red and with a characteristic odour to “seaweeds”. Along the deterioration, the pigmentation brightness is lost progressively until it becomes opaque.

The mucus loses transparency and becomes turve, milky and finally yellow. The pupils became misty and the eye convexity is lost and turns to flat. The gills lose its bright colour and the odour to “seaweeds” changes slowly to ammonia odour. These observations indicate the rigor mortis, both the colour and odour of the gills, the general aspect, the colour of the pupil and the eyes shape, as the showing up of blood spots surrounding the eyes and the adherence of the scales are valuable attributes to evaluate the sardine’s freshness (Ababouch et al., 1996).

- *Texture Changes*

The firmness is a very important factor to evaluate the fish quality and it is fundamental in the trading moment. The fish softness post-mortem is a quality factor directly influenced by the collagen characteristics present in each species. The collagen degradation is related with the phenomena that occur during storage both in chilling as in freezing storages. In the post-mortem stage, the fish muscle is soft and flexible. Afterwards the muscle contracts. When it becomes hard and the all body is inflexible, it is considered that the fish has reached the rigor mortis state. This state begins approximately 5 hours after demise and finishes 30 hours after when it is storage at 0ºC (Suárez-Mahecha et al., 2007). The sardine in fresh state, after rigor mortis, has a firm texture and elastic to the touch, but along time it became softer and less elastic.

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- *Chemical Changes*

After the fish demise several physical, chemical and biological changes began, which will led to its final deterioration. The pH of the muscular tissue in the live fish is around neutral and in the first days after post-mortem the pH decrease due to the formation of lactic acid. In the moment of its demise, the oxygen circulation is interrupt to the muscular tissue because the heart stops pumping blood and no blood reaches to the gills where should be enriched with oxygen. Therefore, and since it stops the aerobic respiration, the production of energy from the intake nutriments is limited. Thus for the energy production the tissue enzymes begin with the oxidation of the storage glycogen or from the fat, which leads to lactic acid production, and consequently to decrease of pH (FAO, 1998). The initial pH post-mortem may differ in function of the specie, of the fishing region, of the year season or even from the conditions of the fish when captured. In a study with Japanese loach (Chiba et al., 1991), it was showed that the exhaustion that the fishes were submitted minutes after the capture may difference in about 0.10 to 0.50 units less in the pH. According to Chiba *et al* (1998), the most relevant factor el factor for fish texture post-mortem is the pH, since the pH affects drastically the connective tissue properties even with minimal changes.

1. METHODS

1.1 Sampling

The sardines used were captured in Alentejana coast. Four different lots of *Sardinha pilchardus* were evaluated from the four commercial shops (20 sardines/lots) in the city of Beja, in the interior of Alentejo, Portugal.

1.2 Analytical Methods

From each lot were used 20 sardines, from each 5 were directly for microbiology, while the other 15 were evaluated for freshness grade, texture and moisture. Afterwards these samples were minced and frozen for posteriors' bromatological analysis.

1.2.1 Evaluation of freshness category

Classification of the category of the different sardine's lots was carried out by the Reg. (EC) No. 2406/96 tables. The sensory analysis of the 15 sardines of each lot had attended the tables of freshness category and the classification was from Extra, A, B and no admitted ones.

1.2.2 Evaluation of biometric parameters

The size classification was carried out by taking the weight of 15 sardines for each lot, and then the measurement of the sardine biometric parameters: thickness in the dorsal and womb, and the width from the operculum to the tail. The purpose of these measures was to determine the edible amount for each lot. By means of the standard NP 1083/1988 it was possible to classify the sardines by its size.

1.2.3 Physical-chemical Analysis

pH Determination

By means of a potentiometer 691 pH Meter and by the standard NP 3441/1990, the pH is determined in meat and meat products. The pH value was measured at 25ºC by a direct reading in the sardines with a punction electrode, and after an incision in the sardines' womb.

Refraction Index determination

The Refraction Index of the vitreous humor was measured by means of a Refractometer RFM 330. The vitreous humor was extracted with a needle in a syringe from the sclerocorneal region in direction to the bulb centre. It was made a mix sample from the two eyes with a volume of 0,5 ml. After the refractometer calibration with distillate water and a control temperature at 20,7ºC, the analysis were made with three replicates.

Colour determination

Colour is a sensory property which can be measured by instrumental methods. The human eye distinguish the colour, however it doesn't quantify it, thus there are equipment's – colorimeters, with a large sensitivity than the human eye, which measurements can be much reproducible and correctly adequate to be correlated with the human perception (Ferro Palma, 2006). For sardines colour determination it was used the Minolta CR 300 by the colour system CIE (L*-Brightness, a*- Red intensity y b*-Yellow intensity). Colour was measured in the dorsal and womb of the sardine in 15 samples per lot. Posteriors it was made a dorsal and womb measurement after removing the skin.

Total Basic Volatile Nitrogen (TBV-N) determination
TBV-N content was determined by the Conway Method by the NP 2930/1988.

Moisture determination
Moisture in fish and fish products concerns the weight lost in those products when submitted to drying by the standard NP 2282/1984. For each lot the assessment was made from an homogenised mix sample of 15 sardines, and it was made three replicates.

Instrumental Texture Evaluation
For texture analysis was used a texturometer TA.XT plus 100 (Stable Micro Systems) with a load cell of 25 kg, and it was made a one cycle test with a 20mm diameter probe. With the sample in the platform, the probe run 5mm each sardines in both the dorsal and womb part. The measured parameter was the muscle firmness (N), in order to compare with the sensory assessment made to each lot.

1.2.4 Bromatological Analysis
Protein determination
For protein content was made with the Kjeldahl method, by the ISO-937 (1978) for determination of total nitrogen in meat and meat products.
Fibre determination
Fibre determination was made by NP 2029/1994, and for each lot it was made three replicates.
Total Fat Content determination
Total Fat content was adapt from NP 1974/1986 for each of the different four lots, and previously was done an hydrolysis as mention the Soxhlet method.
Ash determination
Ash content expresses the samples' mineral content, and it was made by means of the NP 2032/1988. For each it was made three replicates for each lot from a mix of 15 sardines per lot.

1.2.5 Microbiological determination
Microbiological quality was evaluated with the determination of the total microorganism's count at 30ºC by the NP- 3278/1986 and with the *Enterobacteriaceae* count by NP 4137/1991 and ISO 6579 /2002. The microbiological analysis was made on the sardines 'muscle surface and deep in the muscle.

1.3 Statistical determination
The data were analysed with Statistica 7, by means of ANOVA and with Scheffé test ($p < 0,05$).

2. RESULTS

2.1 Evaluation of Freshness category
The results concerning the sensory assessments to each lot (SA, SB, SC and SD) were classified by freshness category (NP 2406:1996) in: extra, A, B or no admitted. Thus sample SB was Extra, samples SA and SC were category A and sample SD was category B.

2.2 Evaluation of biometric parameters
Graph1 it can be observed samples different weight and measurements to 15 sardines of each of the 4 analysed lots. It was possible to observe a distinct difference in sample SA weight and the other samples, which can be due to the difference in width.

2.3 Physical-chemical Analysis
Determination of pH
Table 1 presented the pH values for each of the 4 different lots.
Determination of Refraction Index
Refraction Index (RI) of the vitreous humor increases with the fish deterioration, as it can be observed on the values of table 1.
Determination of Colour
The results concerning the sardines colour, in both the dorsal and womb regions with skin and without skin, can be observed in graph 2.
Total Basic Volatile Nitrogen (TBV-N) determination
Fish deterioration can be evaluated by different chemical index; the total volatiles basis, trimethylamine (TMA) or biogenic

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amines, lipid oxidation by means of peroxide quantification or by the TBARS index. Total volatiles basis determination (TBV-N) is one of the most used methods, and the results were presented on table 1.

Instrumental texture determination

Table 1 showed firmness (N) values obtained from the texturometer analysis to each lot.

Bromatological Analysis

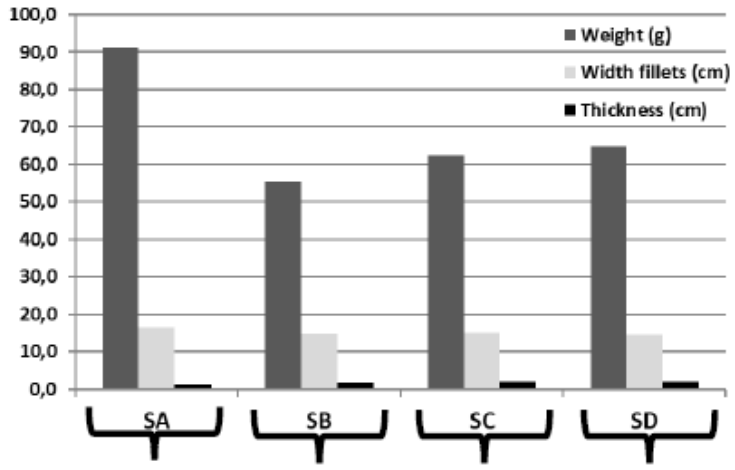
The results concerning nutritional composition for each lot were presented on graph 3.

Microbiological Analysis

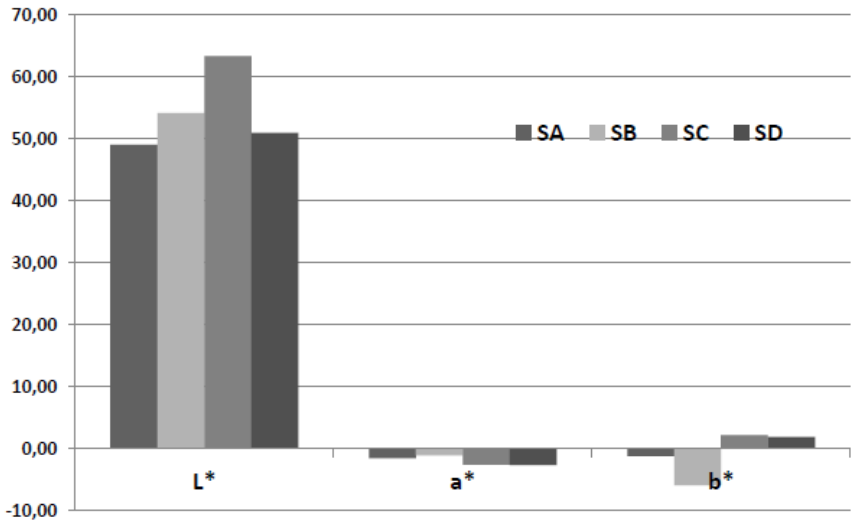
Microbiological analysis results were presented on graph 4 by means of the methods referred on 2.2.5.

Table 1 - Sardines Freshness Category

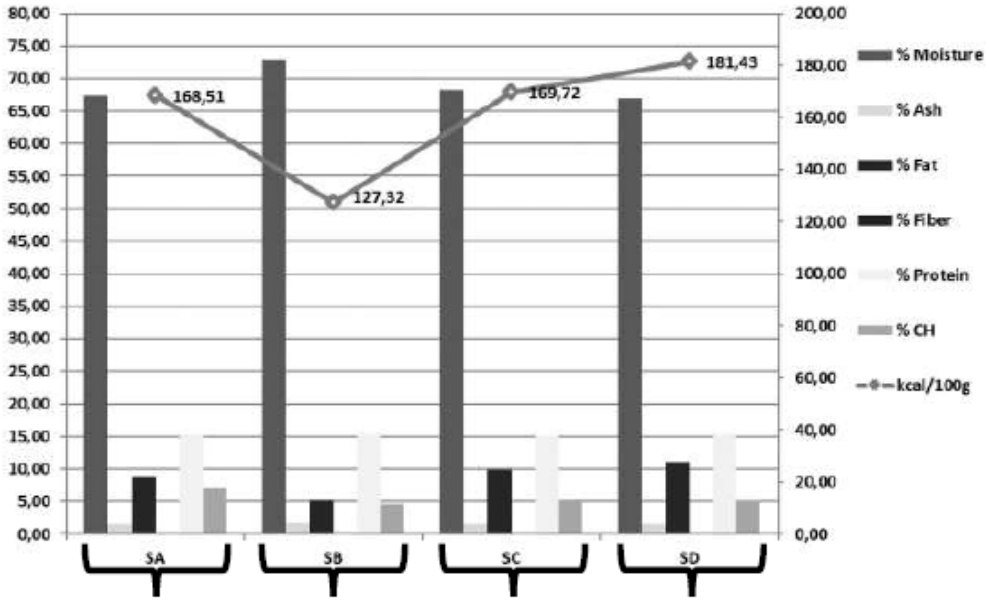
Amostra	pH	Refraction Index	TBV-N **mg/100g**	Firmness (N)
SA	5.70±0.11	1.3379±0.0005	13.45±0.69	3,35
SB	5.79±0.10	1.3358±0.0004	7.61±2.38	10,89
SC	5.73±0.11	1.3445±0.0029	11.02±0.00	9,10
SD	5.66±0.12	1.3451±0.0037	10.30±0.86	10,26



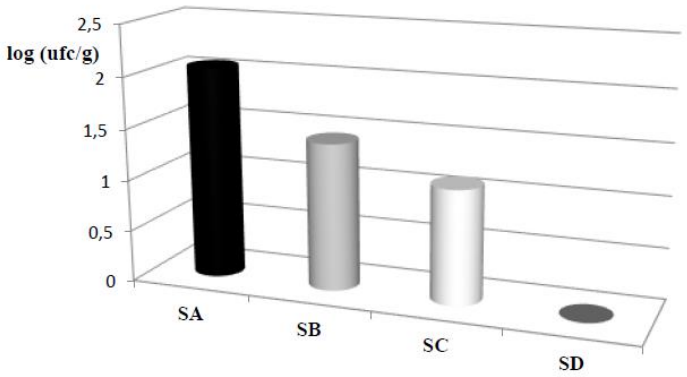
Graph 1 - Biometric parameters of each sardines lot (Weight, Width, Thickness)



Graph 2 - Colour determination the sardine's womb skin



Graph 3 - Nutritional composition of each sardines lot (Moisture, Ash, Fat, Fiber, Protein, Carbohydrates)



Graph 4 - Log (ufc/g) m.o. 30ºC for each lot

3. DISCUSSION

From the sensory analysis, it was on sample SA that some of the 15 sardines presented Extra quality, therefore and since in all 15 sardines per lot not all had reached extra quality, this sample had category A freshness quality. Sample SB had presented a remarkable lot since all 15 sardines had Extra category freshness, as its firmness, skin brightness and its colour difference between the dorsal and womb was its clear difference. Sample SC presented A category characteristics, and sample SD had the gills in an advance stage of deterioration with the mucus turve, without the characteristic marine odour, and therefore this lot was B category.

In terms of the biometric parameters, and by means of the Regulation (CE) 2406/96, all lots were in size 1, for exception of simple SA which was in size 2 for presenting a higher weight. In relations to the biometric measurements, it was possible to sign that all lots were very homogenous. Moreover, it was possible to highlight that it was sample SB the one that presented the smallest columns in the graph, since it was the lot with the smallest samples.

As it was mention by Oehlenschläger et al. (1997), the pH value in fresh fish should be less than 7,0. Therefore all samples were in the considerable acceptable limits of fresh fish. This low values could be an explanation for the rigor-mortis status that was showed by the sardines. In this state the decrease in pH value is due to a lactic acid production from storage glycogen in the muscle. However the pH decrease depends, among other factors, also from fishing conditions, and thus the fishing method will influence on the fish glycogen reserves. Therefore if the fish suffers from stress in the capture moment that for sure will affect the glycogen reserve (Soares et al., 1998).

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In agreement with the table related with freshness classification (Farber, 1965), the fish in optimal freshness conditions will have a refraction index between 1,3347 y 1,3366, and in good state will present values between 1,3367 and 1,3380, in satisfactory state will present values between 1,3381 and 1,3393, and in no admissible state will present values higher than 1,3394. Therefore, sample SB was the only one with an optimal freshness state, with an average value of 1.3358, which was in the optimal freshness values. Followed by sample SA, which was classified in the freshness values, with a value of 1.3379, and thus in the satisfactory state. However, samples SC and SD had both values with a range above the fresh fish range for consumption, with values between 1.3445 y 1.3451 respectively.

Concerning colour parameters, the L* (brightness) of the sardines womb region presented notable values close to 90, which highlight the brightness of this samples. Related with the dorsal region, it was the SC samples the ones with more remarkable values when compared with the other samples, which fact might be related with fish's feeding or with fish's origin. The parameter a* (red-green pigment) presented negative values for all samples, nevertheless not significate in all lots. Notice that this colour parameter in the sardine's skin had not presented a large relevance. The b* parameter (yellow-blue pigments) in the sardine's skin womb had presented positive values in all lots for exception of the lot SB where some sardines had presented blue pigments either in the womb regions or in the dorsal region. SB samples had been distinguished in b* parameter (yellow-blue pigments) which had presented negative values in graph 2, and that tendry was reflected only in this lot. Since this lot was remarkable on the other analysis, it might be related the blue pigment with the freshness index. The L* parameter in the muscle decreases when compared with the respective value in the skin, however all sardines had presented positive values and without significate values between lots. The a* parameter (red-green pigments) in muscle had presented positive values and with relevance, hence that the red colour had presented a more significant value in sardine's muscle, with higher values in the dorsal region and larger resemblance between lots. In the sardine's womb region, it was the SA lot that had presented a higher red tone.

In TBV-N determination the volatile compounds showed up in distinguish deterioration stages, and therefore this analysis was not the reliable one to evaluate the fish in the first stages, however this method was quite useful to detect more advanced deterioration levels. Its determination was expressed in low weight volatile basis content, and in sardines it was characterized by the formation of ammonium produced from amino acids and nucleotides catabolites deamination. TVB-N values for the different samples was lower than 14 mg/100g, as mentioned in Reg. (EC) No 1022/2008 it should be lower than 20 to 30mg/100g, and therefore the 4 samples respected that criteria. As all samples had presented an acceptable freshness quality, nevertheless it was the SB sample that had shown the lower TBV-N values, which might be related with the RI results, since the SB samples had also presented the lowest ones. In table 1, it was possible to observe that sample SA were the ones with TBV-N higher values, followed by SC sample, and thus these samples are the ones with values more close to deterioration level. However, and since all samples had been below the acceptable freshness values, that fact might had reflected that the samples were in the first stage of storage.

Therefore, this method could not be effective to compare all samples, and thus, in the first storage stage, and by FAO (1998), the TBV-N values could not be estimated.

The instrumental texture values were perfectly comparable with the sensory analysis previously done, in which it was possible to notice that SB sample had presented a very perceptible firmness to touch, followed by SA samples, and then by SD and SC lots, respectively , in the toughness decreasing order. Moreover between the SA and SD the differences were not considerable. However between samples SC and samples SA there was considerable differences. Samples SA had shown the lowest firmness values, which was verified previously in the sensory analysis, and thus it was possible to conclude that SA sample was the most soft and deformable sample to the touch. Accordingly it was possible to conclude in favour of the sensory analysis, that it was SB sample, the one with the highest firmness values.

In the bromatological analysis, all samples had shown high moisture content, mostly due to the fact that fish has a large amount of water in the muscle. As it was already mentioned, and by INSA (2007), sardine is a fish with a high protein content, which fact was possible to notice in all lots, since protein content had shown values of approximately 15%. However, where it was possible to appreciate significant differences was in fat content, which values were found between 5 to 10%. These values were lower than the ones mentioned in INSA (2007), which fact might be related with the season for fishing the sardines. Nonetheless this fact was also related with the moisture content, since when the fat content had presented a lower value than the moisture content was higher.

As a result, sample SB had presented low calories content due to its low fat content, and sample SD had shown a higher calorie content due to its higher fat content. Although the calories values had shown lower than the ones mentioned by INSA (2007) (221 Kcal/100g), it might be due to the also lower fat content values.

Microbiological values for SC and SD samples were coincident to the ones presented by Ababouch et al. (1996), who had registered $3,4x10^3$ and $1,2x10^3$ ufc/g for fresh sardines. Notice that the maximum admissible count of total microorganisms for fresh fish products is 10^6 ufc/g in accordance with the *Boletín Oficial del Estado* (B.O.E), which defines microbiological standards for fishing products by Royal Decree 1521/1984. Therefore it was possible to consider all lots with good microbiological quality and so with acceptable parameters. Concerning the *Enterobacteriaceae,* all lots were in the acceptable values in accordance to the B.O.E which stablish the maximum of 10^3 ufc/g.

CONCLUSION

The sardines had shown freshness categories of Extra and A, and hence emphasized a satisfactory state for consumption, independently of the commercial origin. Colour had presented significant differences between samples, possibly due to different capture origins. The pH values were acceptable. Microbiological analysis had shown that the samples were within the acceptable values, and therefore with microbiological quality. The sardines presented average nutritional values of 161 Kcal/100g, which are lower than reference values from INSA (2007) nutritional table, eventually due to the low fat content by this time of the year (Spring). The most expounding analyses for the determination of freshness were the TVB-N, the instrumental texture and the Refraction Index.

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BIOLOGICAL CONTROL OF DRYOCOSMUS KURIPHILUS YASUMATSU WITH THE PARASITOID TORYMUS SINENSIS KAMIJO

CONTROLO BIOLÓGICO DE DRYOCOSMUS KURIPHILUS YASUMATSU COM O PARASITOIDE TORYMUS SINENSIS KAMIJO

CONTROL BIOLÓGICO DE DRYOCOSMUS KURIPHILUS YASUMATSU CON EL PARASITOIDE TORYMUS SINENSIS KAMIJO

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Biological control of Dryocosmus Kuriphilus Yasumatsu with the parasitoid Torymus sinensis Kamijo. Millenium, 2(14), 91-99.
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RESUMO

Introdução: A vespa-das-galhas-do-castanheiro, *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae), é um inseto indutor de galhas originário da China que ataca espécies do género *Castanea* e que pode causar prejuízos significativos na produção de castanha. O método de controlo mais usado e eficaz é baseado em largadas de *Torymus sinensis* Kamijo (Hymenoptera: Torymidae), um parasitoide específico de *D. kuriphilus* e autóctone no seu habitat de origem (China).
Objetivo: Estudar a capacidade de *T. sinensis* estabelecer uma população, a sua capacidade de dispersão e o efeito da densidade de largada nas populações de *D. kuriphilus* existentes na região portuguesa do Minho.
Métodos: Foram realizadas largadas de *T. sinensis* em três locais distintos nos concelhos de Barcelos e Viana do Castelo.
Resultados: Registou-se a presença de *T. sinensis* nos três locais um ano após as largadas e em dois locais, dois anos após as largadas. Observamos igualmente a presença de *T. sinensis* a 200 metros do ponto de largada, o que revela a sua capacidade de dispersão.
Conclusão: As taxas de parasitismo situaram-se entre 1.3% e 3.9% no primeiro ano, e 0.8% e 13% no segundo ano, valores concordantes com o referido na bibliografia internacional.

Palavras-Chave: *Castanea*; espécies invasoras; *Dryocosmus kuriphilus*; controlo biológico; taxa de parasitismo

ABSTRACT

Introduction: The chestnut gall wasp, *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae), is a gall inducing insect original from China that attacks the *Castanea* genus and can significantly hinder production of chestnut trees. The most effective and used method of control of *D. kuriphilus* is based on the releases of *Torymus sinensis* Kamijo (Hymenoptera: Torymidae), a specific parasitoid of *D. kuriphilus* and native in its natural habitat of origin (China).
Objectives: To evaluate *T. sinensis* ability to establish a population, its dispersion ability and the effect of the release density on the populations of *D. kuriphilus* in the Portuguese region of Minho.
Methods: *T. sinensis* releases were made in three sites in the Barcelos and Viana do Castelo counties.
Results: The presence of *T. sinensis* was found in three sites of release one year after the releases and in two sites two years after the releases. Presence of *T. sinensis* was also found at 200 meters distance from the release sites.
Conclusion: The average parasitism rates found due to *T. sinensis* were between 1.3% and 3.9% in the first year, and 0.8% and 13% in the second year, which are within the range described in the international literature.

Keywords: *Castanea*; invasive species; *Dryocosmus kuriphilus*; biological control; parasitism rate

RESUMEN

Introducción: La avispilla del castaño *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae) es un insecto inductor de agallas original de China que ataca al género *Castanea* y puede causar pérdidas significativas en la producción de castañas. El método de biocontrol más eficaz y utilizado se basa en las liberaciones de *Torymus sinensis* Kamijo (Hymenoptera: Torymidae), un parasitoide específico de *D. kuriphilus* y nativo en su hábitat original (China).
Objetivo: Avaluar la capacidad de *T. sinensis* para establecer una población, su capacidad de dispersión y el efecto de la densidad de liberación en las poblaciones de *D. kuriphilus* en la región portuguesa del Minho.
Métodos: Se realizaron tres liberaciones de *T. sinensis* en tres sitios de los condados de Barcelos y Viana do Castelo.
Resultados: La presencia de *T. sinensis* se encontró en los tres sitios un año después de las sueltas y en dos sitios, dos años después de las sueltas. También observamos la presencia de *T. sinensis* a 200 metros del punto de suelta, lo que revela su capacidad de dispersión.
Conclusión: Las tasas de parasitismo estuvieron entre el 1.3% y el 3.9% en el primer año, y entre el 0.8% y el 13% en el segundo año, lo que está en línea con lo mencionado en la bibliografía internacional.

Palabras Clave: *Castanea*; especies invasivas; *Dryocosmus kuriphilus*; control biológico; tasa de parasitismo

INTRODUCTION

Dryocosmus kuriphilus Yasumatsu (Hymenoptera: Cynipidae, Cinipini), also known as chestnut gall wasp, is original from mainland China and has spread throughout all the main chestnut growing regions, being today one of the main pests that affect chestnut trees (Brussino *et al.*, 2002; Rieske, 2007; EFSA, 2010).

This insect's life cycle starts in early summer, with the adult's emergence, which, given their thelytoky nature do not require mating, and are able to immediately start oviposition. The oviposition occurs exclusively inside the chestnut tree's buds, which makes this parasitism obligatory for this insect to complete its life cycle (Everatt, 2015; Santos *et al.*, 2017). The adults have a short life span of approximately 10 days, during which they can lay as many as 100 eggs in groups of 3 to 5 per bud (EPPO, 2005). The eggs take about 30 to 40 days to hatch, but the larvae will stay dormant and inconspicuous during winter, in the buds of chestnut trees. In the beginning of the following spring, when the chestnut tree starts its vegetative activity, they wake up and start inducing the gall formation, of which they will feed and stay inside the gall for approximately 30 days. After that, pupation starts, which will last until the beginning of summer, when the insects emerge (Cooper & Rieske, 2010; Santos *et al.*, 2017).
D. kuriphilus can cause 50% to 70% loss of tree's chestnut and chestnut lumber yield and can reach a maximum of 80% in cases of extreme infestation (EPPO, 2005; Gehring *et al.*, 2018; Matošević *et al.*, 2016). As such, controlling *D. kuriphilus* populations is a serious challenge for chestnut growers around the world. The ecology of this insect makes the use of conventional pest control methods, like chemical pesticides useless, as it spends the majority of its life cycle (egg, larval and pupa phase) protected inside the buds and gall. Therefore, biological solutions must be found, the most promising ones involving the use of *D. kuriphilus* natural enemies, the parasitoid chalcid wasps. While various chalcid wasps found around the world proved capable of parasitizing *D. kuriphilus* galls, with various levels of success depending on region and species, their combined effort is usually not enough to contain the gall wasp's infestations (Moriya *et al.*, 1989). The exception is mainland China, where *D. kuriphilus* populations are usually kept low enough to allow for chestnut tree growth by the local parasitoid communities. Amongst them, *Torymus sinensis* Kamijo has shown the highest potential to be successfully used as a biocontrol agent for the chestnut gall wasp.
Torymus sinensis Kamijo is a parasitoid wasp from the Torymidae family (Hymenoptera: Chalcidoidea), specialized in parasitizing gall wasps, specially *D. kuriphilus*. *T. sinensis* is univoltine, with one generation per year, and haplodiploid, giving birth to haploid males from unfertilized eggs and diploid females from fertilized ones (Quacchia *et al.*, 2014a). Females lay their eggs in early spring, inside the larval chambers of recently formed *D. kuriphilus* galls, usually one egg per host larva. If multiple eggs are laid in the same chamber, only one of them will grow to adulthood due to cannibalism among the hatched larvae (Ferracini *et al.*, 2015). The larvae hatch quickly from the eggs and immediately start to feed from their host. At spring's end, they have already consumed the host, and entered a dormant state until late winter, when pupation starts. They finally emerge in early spring, synchronous with the sprouting of chestnut trees and the formation of *D. kuriphilus* galls (Ferracini *et al.*, 2015; Gibbs *et al.*, 2011; Matošević *et al.*, 2016).
T. sinensis is capable of prolonged diapause, meaning that a small percentage of individuals (< 5%) stay dormant for one year. This strategy is rarely found in oak gall parasitoids, presumably because most of them are polyphagous and have a vast array of host species, which makes oviposition a low risk, and representing a high success effort (Stone *et al.*, 2002). In contrast, *T. sinensis* has only one host, and if the availability of *D. kuriphilus* galls drops for one year and hinders the oviposition success of an entire generation, a small cohort of diapausing individuals will provide a demographic back up for the next year, increasing the likeness of these parasitoids surviving temporary extinctions of the host population. As *D. kuriphilus* populations fluctuate in its natural habitats in mainland China, it is common to observe heavy infestations for 2 to 3 years, followed by up to 10 years of small populations with mild infestation (Quacchia *et al.*, 2014a; Stone *et al.*, 2002). This cyclical fluctuation and the narrow host range are probably the major factors for the development of prolonged diapausing in *T. sinensis* (Quacchia *et al.*, 2014a).
Recent releases of *T. sinensis* in affected countries such as Japan, USA, and several European countries, proved to be effective in keeping *D. kuriphilus* populations below the economic loss threshold (< 30% branch infestation) after periods of 6 to 18 years, depending on the region (Matošević *et al.*, 2016; Moriya *et al.*, 1989; Murakami *et al.*, 2001; Quacchia *et al.*, 2008; Quacchia *et al.*, 2014b; Rieske, 2007). Data from 2010 showed that the time required to achieve this threshold can be reduced with successive *T. sinensis* releases, and by increasing its life cycle synchronization with that of *D. kuriphilus*. This can be achieved by keeping the *T. sinensis* individuals at lower temperatures when necessary, which also extends its longevity (Quacchia *et al.*, 2008; EFSA, 2010). Recognition of *T. sinensis* prolonged diapause is important for its use as biocontrol. While traditional management of chestnut orchards usually involves the removal and destruction of pruned shoots and fallen leaves in winter, this might be delayed for two years to allow parasitoid individuals having an extended diapause to complete their development (Quacchia *et al.*, 2014a).
To better understand the ecology of the parasitoid *T. sinensis* and to assess its potential of in the control of the chestnut gall wasp, this work aims to study *T. sinensis* ability to establish a population, it's dispersion ability and the effect of the release density on the populations of *D. kuriphilus* in the Portuguese region of Minho.

1. MATERIALS AND METHODS

Three orchards were selected to conduct the biological treatment in the Minho region, with chestnut trees seriously infected by the wasp (presence of galls in 51-80% of shoots), according to the "National Plan of Action for the Control of the insect *Dryocosmus kuriphilus* Yasumatsu Chestnut Gall Wasp". The chestnut trees present in each site were identified with the help of

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their respective owners and the guide for chestnut varieties from the Instituto Nacional dos Recursos Biológicos (INRB) (Costa *et al.*, 2008).
To evaluate the effect of the number of *T. sinensis* released in the parasitism rates and population establishment, different quantities of insects were released in each of the sites. The release of *T. sinensis* was divided in release units, each composed by a total of 120 females and 70 males, divided between 10 Falcon tubes. Each Falcon tube also contained a honey drop to provide the insects sustenance.
Three release units were applied in Vale do Neiva (T1), two release units in Cossourado (T2) and one in Fragoso (T3) (table 1).
The three release sites were regularly monitored to assess the phenological state of the chestnut trees, and establish when the phenological state "D" (when the leaves sprout and starts developing) was going to be present, as recommended by the "National Plan of Action for the Control of the insect *Dryocosmus kuriphilus* Yasumatsu Chestnut Gall Wasp" to be the most effective time to perform the releases, as to increase the chances of successful oviposition.
The releases were made on the 26th April 2018, when the chestnut trees were displaying the phenological state "D".

Table 1 - Location and general characteristics of the *Torymus sinensis* release sites (T1 - T3).

Site	Location	Coordinates	Area (Ha)	Adults released	Nº of trees	Chestnut species	Varieties
T1	Vale do Neiva, Viana do Castelo	41.6293º N; 8.5537º W	1.537	360♀ + 210♂	100	*C. sativa* and *C. sativa* x *C. crenata* hybrids	Marigoule
T2	Cossourado, Barcelos	41.6361º N; 8.6187º W	0.324	240♀ + 140♂	40	*C. sativa*	Amarelal and Longal
T3	Fragoso, Barcelos	41.6142º N; 8.7204º W	0.260	120♀ + 70♂	60	*C. sativa*	Unknown variety

The galls formed in the spring of 2018, which were potentially parasitized by the released *T. sinensis* were collected in January 2019. To evaluate the dispersion capacity of *T. sinensis*, galls were also collected from sites at approximately 200m distance from the original release sites. These secondary sites were comprised by a smaller group of chestnut trees (≈15) and each had a direct line of sight to their counterpart site, with trees from different species doting the way. In all the sites, all the chestnut trees present showed signs of *D. kuriphilus* infestation.
For each site and respective 200m site, 200 galls were collected and kept in labelled ziplock bags. The galls were then cleaned of leaves, branches and insects, and stored in emergence boxes. Two boxes per site were used, each one stored with 100 galls. The emergence boxes were stored at room temperature, out of direct sunlight. The adult emerging insects present in the Falcon tubes were regularly collected and stored in the laboratory, in Eppendorf tubes with 70% ethanol. The insects were then identified to species or genus level with a stereo microscope. After identification, the insects were quantified and again maintained in Eppendorf tubes with 70% ethanol and stored according to genus for future observation. The boxes were opened in July 2019 for gall cleaning and inspection, and to collect emergent insects which weren't able to reach the Falcon tubes. All collected data was recorded for later statistical analysis.

Assessment of the parasitism rates due to Torymus sinensis
To quantify the mortality rates caused by the action of *T. sinensis*, about 80 extra galls were collected along with the previous collections and kept separately in labelled ziplock bags. The galls were then brought to the laboratory and stored in closed glass jars to avoid the escape of emerging insects and mold growth. To assess the parasitism rates due to *T. sinensis*, 50 galls per sample and per site were dissected under a stereo microscope, and each larvae or adult of *T. sinensis* found was counted. Also, around 50 galls were taken from the emergence boxes to compliment the previous samples. The parasitism rates were calculated by relating the number of *T. sinensis* specimens found with the total number of chambers in the sample, as follows:

$$T.\,sinensis \text{ parasitism rate} = \frac{\text{nº of } T.\,sinensis}{\text{nº of total chambers}}$$

Parasitized chambers without *T. sinensis* were also counted to assess the natural parasitism rates (due to the native parasitoid species) in these sites. For each site, the dissected galls were given a number and grouped in groups of 10 galls, to create replicate values. Due to the different amounts of *T. sinensis* released in the different sites, another graph was made to remove this variable, where the average rates were divided by the number of releases made: T1/3, T2/2 and T3/1. All collected data was recorded for later statistical analysis.

Assessment of the parasitism rates due to T. sinensis on the second year after release (2019)
To quantify the mortality rates caused by the action of *T. sinensis* on the second year after release, new collection were made in

September of 2019. About 80 galls were collected on the 30th of September and kept in labelled ziplock bags. The galls were then brought to the laboratory and stored in closed glass jars to avoid the escape of emerging insects and mold growth. To assess the parasitism rates due to *T. sinensis*, 50 galls per site were dissected under a stereo microscope, and each chamber containing *T. sinensis* was counted. Due to the date of collections, all the *T. sinensis* found were still in their larval state. The number of chambers containing *T. sinensis* was divided by the total number of chambers in the sample to obtain the parasitism rates, using the same methods as with the previous year samples. Parasitized chambers without *T. sinensis* were also counted to assess the natural parasitism rates in these sites.
The statistical analysis of the collected data was carried out with the help of the software R (R Core Team 2018, version 1.1.442) and Graphpad (Graphpad Prism version 6.01). The data samples were subjected to the D'Agostino-Pearson and Shapiro-Wilk normality tests and transformed to $y = \sqrt{y}$ when the normality requisites weren't verified. The data was then subjected to analyses of variance, such as the parametric ANOVA, the Dunn's and the Sidak's multiple comparison tests and t-test.

2. RESULTS

For each site, two samples of 50 galls each were dissected (50 from the original collections and 50 from the emergence boxes), for a total of 100 galls per site. In the site T1, a total of 301 gall chambers were observed, 117 of which were classified as parasitized and 12 *T. sinensis* individuals were found. In site $T1_{200m}$ 330 gall chambers were analysed, 125 of which were parasitized and 11 *T. sinensis* individuals were found. A total of 367 gall chambers were analysed in site T2, 140 of which were classified as parasitized and 13 *T. sinensis* individuals were found. In site $T2_{200m}$ 358 gall chambers were analysed, 132 of which were parasitized and 15 *T. sinensis* individuals were found. In the site T3, 463 gall chambers were analysed, 166 of which were classified as parasitized and 6 *T. sinensis* individuals were found. Finally, in site $T3_{200m}$, 285 gall chambers were analysed, 108 of which were classified as parasitized, and only one *T. sinensis* specimen was found (Table 2).
The percentage of *T. sinensis* found was similar in sites T1 (3.89%), $T1_{200m}$ (3.52%), T2 (3.71%) and $T2_{200m}$ (4.19%), with only the sites T3 (1.3%) and $T3_{200m}$ (0.26%) showing the lowest parasitism rates. When divided by the number of release units applied to each site, the parasitism rates found were the highest in sites T2 (1.85%) and $T2_{200m}$ (2.10%), followed by sites T1 (1.30%), T3 (1.30%) and $T1_{200m}$ (1.20%), and with the lowest rate still sowing in site $T3_{200m}$ (0.26%).
The raw data sets of the parasitism rates (A) and of those rates divided by the respective release effort (B) were analysed by regular ANOVA (A: F = 3.372, P = 0.010; B: F = 2.172, P = 0.071) and Tukey's multiple comparison test, with significant differences found, in both analysis, between the 200m distance T2 site and the 200m distance T3 site (a: MD = 0.017; b: MD = 0.018) (figure 1).

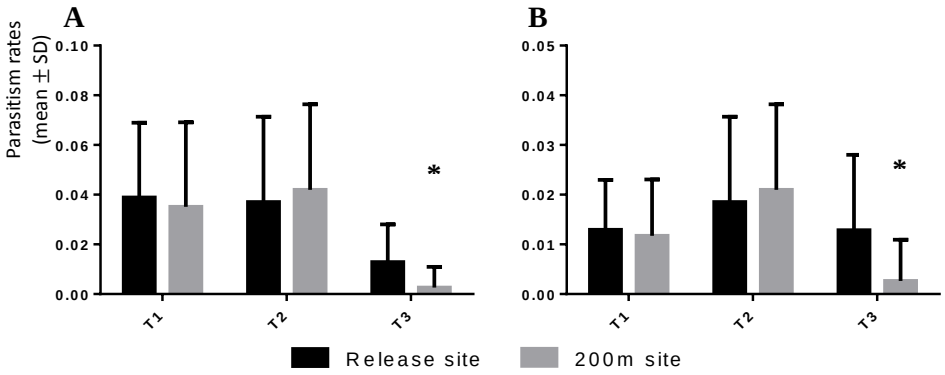

Figure 1 - Parasitism rate (average ± standard deviation) of *Torymus sinensis* in the release sites and at 200m distance. (A) Average parasitism rates; (B) the same rates divided by release effort (T1/3; T2/2; T3/1).

For the analysis of the parasitism rates in the second year after the releases (2019), 50 galls were dissected for each site. In site T1, 131 gall chambers were analysed, 46 of which were classified as parasitized and no *T. sinensis* individuals were found. In site $T1_{200m}$ 113 gall chambers were analysed, 42 of which were parasitized and also no *T. sinensis* individuals were found. Site T2 had a total of 105 gall chambers analysed, 42 of which were classified as parasitized and one *T. sinensis* was found. In site $T2_{200m}$ 127 gall chambers were analysed, 50 of which were parasitized and 16 *T. sinensis* individuals were found. In the site T3, 110 gall chambers were analysed, 33 of which were classified as parasitized and 3 *T. sinensis* individuals were found. Finally, in site $T3_{200m}$, 77 gall chambers were analysed, 29 of which were classified as parasitized, and 2 *T. sinensis* specimens were found (Table 2).
One year after the releases, the parasitism rates decreased in sites T1 (0%), $T1_{200m}$ (0%) and T2 (0.8%) but increased in sites $T2_{200m}$ (13%) T3 (2.49%) and $T3_{200m}$ (2.54%). The largest change occurred in site $T2_{200m}$, where the parasitism rate increased from

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4.19% to 13%, a change of almost 10%. When related with the number of releases, the site $T2_{200m}$ still showed by far the highest parasitism rates.

The parasitism rates from the second generation of galls collected in the release sites was calculated and analysed using the same methods from the previous year. The raw data sets of the parasitism rates (figure 2A) and of those rates divided by the respective release effort (figure 2B) were analysed by regular ANOVA (a: $F = 16.11$, $P < 0.001$; b: $F = 7.495$, $P < 0.001$). In the data set of figure 2A, the Tukey's multiple comparison test found significant differences between the 200m distance T2 site and all the other sites (Tukey's MDs: vs T1: -0.130; vs T1 200m: -0.130; vs T2: -0.122; vs T3: -0.105; vs T3 200m: 0.105). In the data set of figure 2B, the Tukey's multiple comparison test showed significant differences between the 200m distance T2 site and all the other sites except for the 200m distance T3 site (Tuckey's MDs: vs T1: -0.065; vs T1 200m: -0.065; vs T2: -0.061; vs T3: -0.040).

Table 2 - Number of gall chambers observed, parasitized chambers and *T. sinensis* found, and percentage of *T. sinensis* in the three release sites and their respective 200m site.

		T1	T2	T3	$T1_{200m}$	$T2_{200m}$	$T3_{200m}$
1st Year	Total gall chambers	301	367	463	330	358	285
	Nº of parasitized chambers	117	140	166	125	132	108
	Nº of *T. sinensis* chambers	12	13	6	11	15	1
	% of *T. sinensis* chambers	3.89%	3.71%	1.28%	3.52%	4.19%	0.26%
2nd Year	Total gall chambers	131	105	110	113	127	77
	Parasitized gall chambers	46	42	33	42	50	29
	Nº of *T. sinensis* chambers	0	1	3	0	16	2
	% of *T. sinensis* chambers	0	0.8%	2.49%	0	13%	2.54%

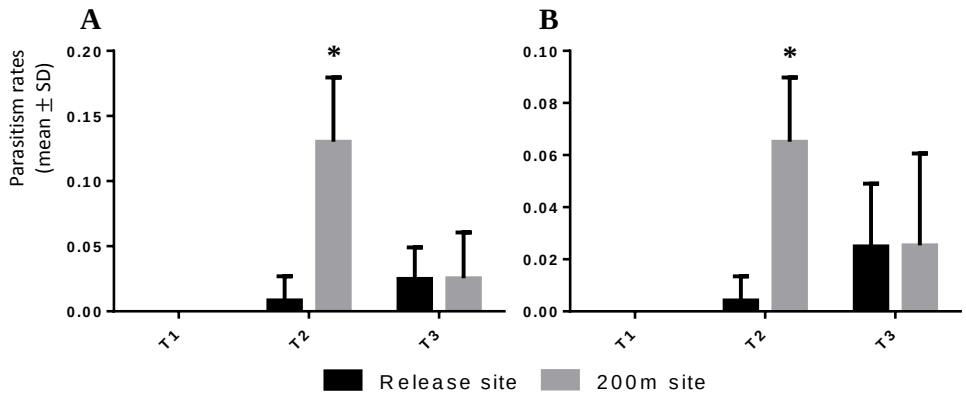

Figure 2 - Parasitism rate (average ± standard deviation) of *Torymus sinensis* in the release sites and at 200m distance, in the second year after the insect's releases; (A) Average parasitism rates; (B) the same rates divided by release effort (T1/3; T2/2; T3/1).

The total parasitism rates, caused by *T. sinensis* plus the native parasitoid communities, were calculated in the likeness of the previous ones. The chambers containing *T. sinensis* were classified as parasitized as well. The average parasitism rates varied between the lowest value of 35% in site T3 and the highest one of 38% in site $T1_{200m}$, in the first year after release (2018) (figure 3A). In the second year after release (2019), the average rates varied between 30% in site T3 and 40% in site T2 (figure 3B).

The raw data sets of the parasitism rates in the first (a) and in the second year (b) after the *T. sinensis* releases were analysed by regular ANOVA (a: $F = 0.109$, $P = 0.989$; b: $F = 0.731$, $P = 0.607$) and Tukey's multiple comparison test, with no significant differences found between the sites.

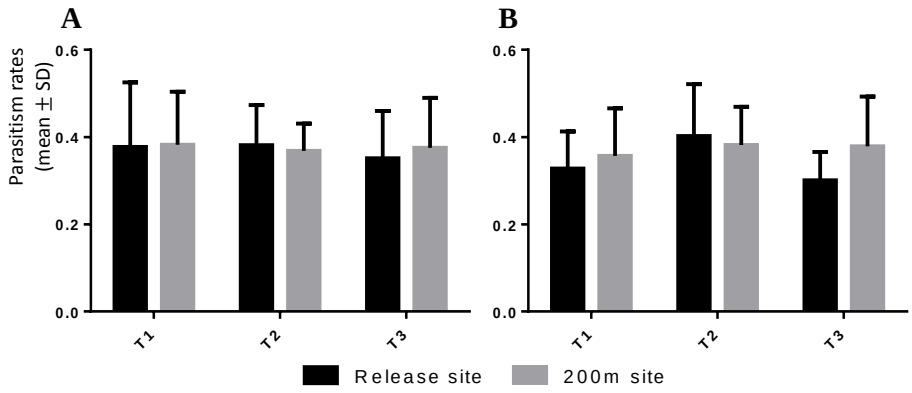

Figure 3 - Total parasitism rate (average ± standard deviation) due to *Torymus sinensis* and the native parasitoids, in the release sites and at 200m distance: (A) in the first year after release (2018); (B) in the second year after the releases (2019).

3. DISCUSSION

In the countries affected by the chestnut gall wasp, *D. kuriphilus*, the introduced parasitoid *T. sinensis* has proven multiple times to be an effective method of controlling the pest to manageable levels and so far, it seems to be the best method available to achieve this. In the three sites used for the experimental releases of *T. sinensis*, galls were collected to assess the efficiency of this parasitoid.

The parasitoid *T. sinensis* usually takes a minimum of 3 to 5 years since its first releases to develop a stable population in the sites where it is introduced (Quacchia *et al.*, 2008). Therefore, in the first year after the first releases, it is expected to find small populations and low parasitism rates (Borowiec *et al.*, 2018). In the 3 sites sampled in this study, the parasitism rates in the first year after release were inside the range described in literature for releases of the same size in other European countries, such as France, Italy, Slovenia, Hungary and Croatia. The number of insects released can also influence the population size in a direct way, but only in the first years. The most effective long term method seems to be annual releases of 100 to 200 females (Borowiec *et al.*, 2018; Cascone *et al.*, 2018; Matošević *et al.*, 2016; Quacchia *et al.*, 2008). Despite this relation between the number of insects released and the following populations in the early years, the opposite can also occur, as observed in sites T1 and $T1_{200m}$. In these sites, despite having shown high *T. sinensis'* parasitism rates in the first year and having the highest release effort, relatively with the other sites, no *T. sinensis* were found in the observed galls. This could mean that the original release was not enough to establish a population, or a lack of synchronism between *T. sinensis* and *D. kuriphilus* emergence, which could complicate the establishment of a steady population (Quacchia *et al.*, 2008). This site was the largest considering the area and also the one with the largest chestnut trees, which could also play a significant role in the collections made. Only galls up to 3 meters high were collected, so a smaller proportion of galls were sampled compared to the total in the site. In this way, it is possible that the parasitoid was still present in these sites but was not found in the collected samples. More extensive sampling would be required to properly access the evolution of *T. sinensis* population in both these sites.

In contrast, the sampling sites T2 and $T2_{200m}$ showed in the first year after release, the largest population of *T. sinensis* of all sites, with site $T2_{200m}$ showing the biggest growth between the first and second years. Similar results have already been found in France and Italy, where the smallest release produced the biggest population (Borowiec *et al.*, 2014, 2018; Colombari & Battisti, 2016). In this particular case, the smaller size of the chestnut trees and the higher relation between the number of *T. sinensis* released and trees in site T2, are possible explanations to the high parasitism rates found here. Despite such rapid growth observed in $T2_{200m}$, it is still well in the range described in France and Italy for a population of *T. sinensis* two years after the initial release (Borowiec *et al.*, 2018; Gehring *et al.*, 2018; Quacchia *et al.*, 2014b).

In the T3 and $T3_{200m}$, the area, relative age and size of trees sits between the other four sites, but T3 was the site which received the lowest release effort, which could be the reason for the low parasitism rates found here in the first year. However, in both these sites there was a increase of the parasitism rates observed in the second year. This growth means that under the right conditions, *T. sinensis* is able to successfully parasitize *D. kuriphilus* galls and develop a strong second generation capable of migrating at least up to 200m to other chestnut orchards in the span of one year.

When analysing the galls collected in each site for *T. sinensis*, the native parasitoid chalcid wasps found were also counted, to assess if some displacement had occurred. The parasitism rates due to the native parasitoids communities were between 35% and 38% in the first year, and 30% and 40% in the second one. Although these values show no observable effect in the native parasitoid communities caused by the introduction of *T. sinensis*, is important to note that its population is still in the early stages of development. According to Quacchia *et al.*, (2014a), *T. sinensis* females are extremely selective with oviposition, and almost only try to lay their eggs in *D. kuriphilus* galls. However, one case of mating was registered between *T. sinensis* and *T.*

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beneficus (Yara, 2014; Yara *et al.*, 2007, 2010). This shows that even with *T. sinensis* high specificity in host and mating choices, there is a risk of changing the ecosystems balance with its introduction.
As *T. sinensis* proves to be capable of establishing a new population, increase its abundance and expand to nearby orchards in a few years, it is a good candidate for the control of the chestnut gall wasp. However, for the same reasons and the possibility of either hybridization with local species or their displacement, caution must be taken when applying this agent. More information about *T. sinensis'* biology and ecology is needed in order to better understand its role in the Portuguese ecosystem and provide the most value in the management of *D. kuriphilus.*

CONCLUSION

The average parasitism rates found due to T. sinensis were between 1.3% and 3.9% in the first year, and 0.8% and 13% in the second year, which are within the range described in the international literature.

AUTHORSHIP CONTRIBUTION

João Cardoso: Investigation, Methodology, Visualization, Formal Analysis, Data curation, Writing – original draft. Albino Bento: Resources, Methodology, Supervision, Writing – review & editing. Maria Teresa Almeida: Supervision, Writing – review & editing.

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