

RESEARCH ARTICLE (ORIGINAL) 

# Incidence of symptoms of musculoskeletal disorders among health professionals in a Portuguese emergency service: A correlational study

*Incidência de sintomatologia musculoesquelética em profissionais de saúde num serviço de urgência em Portugal: Estudo correlacional*

*Incidencia de sintomatología musculoesquelética en profesionales sanitarios de un servicio de urgencias de Portugal: Estudio correlacional*


Joana Antunes Castanheira <sup>1</sup>

 <https://orcid.org/0009-0000-0008-6033>

Hugo Miguel Santos Duarte <sup>2,3,4</sup>

 <https://orcid.org/0000-0002-9692-6398>

Ana Sofia Ferreira Pereira <sup>5</sup>

 <https://orcid.org/0009-0004-2071-2950>

Ângela Marina da Costa Pragosa <sup>6,7</sup>

 <https://orcid.org/0000-0002-5999-5431>

Edna Tatiana Prazeres Santos <sup>6</sup>

 <https://orcid.org/0009-0003-5350-2979>

Maria Clara Amado Apóstolo Ventura <sup>8</sup>

 <https://orcid.org/0000-0002-3617-0779>

<sup>1</sup> Local Health Unit of Médio Tejo, Internal Medicine Service, Torres Novas, Portugal

<sup>2</sup> Polytechnic Institute of Leiria, School of Health of Leiria, Leiria, Portugal

<sup>3</sup> ciTehCare - Center for Innovative Care and Health Technology, Leiria, Polytechnic Institute of Leiria, Portugal

<sup>4</sup> Health Sciences Research Unit: Nursing (UICISA: E), Nursing School of Coimbra, Coimbra, Portugal

<sup>5</sup> Local Health Unit of the Leiria Region, Central Operating Room, Leiria, Portugal

<sup>6</sup> Local Health Unit of the Region of Leiria, General Emergency Service, Leiria, Portugal

<sup>7</sup> Universidade Católica Portuguesa, Faculty of Health Sciences and Nursing, Porto, Portugal

<sup>8</sup> Nursing School of Coimbra, Coimbra, Portugal

## Corresponding author

Joana Antunes Castanheira

E-mail: [joanacastanheira0@gmail.com](mailto:joanacastanheira0@gmail.com)

Received: 18.01.24

Accepted: 25.07.24

## Abstract

**Background:** Health professionals working in an emergency setting are vulnerable to the development of musculoskeletal disorders. These conditions reduce productivity and increase costs for healthcare institutions.

**Objective:** To determine the incidence of symptoms of musculoskeletal disorders among health professionals in a Portuguese emergency service.

**Methodology:** A quantitative, descriptive, and correlational study was conducted with a sample of 109 participants, through the self-administration of the Nordic Musculoskeletal Questionnaire. The instrument collected data on the sample's personal, educational, and professional description, perceptions of general health status, and symptoms of musculoskeletal disorders.

**Results:** The results showed that 84.40% of health professionals reported having symptoms of musculoskeletal disorders, with the lower back being the most commonly identified body region, and nurses being the professional group with the highest percentage (41.18%).

**Conclusion:** The high incidence of health professionals with symptoms of musculoskeletal disorders indicates a need for interventions by nurse specialists in rehabilitation nursing.

**Keywords:** emergency service, hospital; healthcare providers; injuries; musculoskeletal symptoms; rehabilitation nursing

## Resumo

**Enquadramento:** Os profissionais de saúde que desempenham funções num serviço de urgência são suscetíveis à presença de sintomatologia musculoesquelética, traduzindo-se numa diminuição da produtividade e custos para as instituições.

**Objetivo:** Identificar a incidência de sintomatologia musculoesquelética nos profissionais de saúde de um serviço de urgência português.

**Metodologia:** Foi realizado um estudo quantitativo, descritivo e correlacional, utilizando uma amostra de 109 participantes, através da aplicação de um questionário constituído por: caracterização pessoal, académica e profissional; caracterização da percepção do estado geral de saúde; e caracterização da sintomatologia musculoesquelética, através do preenchimento do Questionário Nórdico Musculoesquelético.

**Resultados:** Os resultados revelaram que 84,40% dos profissionais de saúde referem sintomatologia musculoesquelética, sendo a região lombar a mais enunciada e o grupo profissional que referiu maior percentagem foram os Enfermeiros (41,18%).

**Conclusão:** Contactou-se uma elevada incidência de profissionais de saúde com sintomatologia musculoesquelética, identificando-se assim uma necessidade de intervenção do enfermeiro de reabilitação.

**Palavras-chave:** enfermagem em reabilitação; lesões; profissionais de saúde; serviço hospitalar de emergência; sintomatologia musculoesquelética

## Resumen

**Marco contextual:** Los profesionales sanitarios que trabajan en un servicio de urgencias son susceptibles de padecer síntomas musculoesqueléticos, lo que se traduce en una reducción de la productividad y en costes para las instituciones.

**Objetivo:** Identificar la incidencia de síntomas musculoesqueléticos entre los profesionales sanitarios de un servicio de urgencias portugués.

**Metodología:** Se realizó un estudio cuantitativo, descriptivo y correlacional, a partir de una muestra de 109 participantes, mediante la aplicación de un cuestionario compuesto por: caracterización personal, académica y profesional; caracterización de la percepción del estado de salud general, y caracterización de los síntomas musculoesqueléticos, mediante la cumplimentación del Cuestionario Musculoesquelético Nórdico.

**Resultados:** Los resultados mostraron que el 84,40% de los profesionales sanitarios señalaron síntomas musculoesqueléticos, de los cuales la región lumbar fue la más mencionada y el grupo profesional que notificó el porcentaje más elevado fue el de los enfermeros (41,18%).

**Conclusión:** Se observó una elevada incidencia de profesionales sanitarios con síntomas musculoesqueléticos, que puso de manifiesto la necesidad de una intervención del enfermero de rehabilitación.

**Palabras clave:** enfermería en rehabilitación; lesiones; profesionales sanitarios; servicio de urgencia en hospital; sintomatología musculoesquelética



**Como citar este artigo:** Castanheira, J. A., Duarte, H. M., Pereira, A. S., Pragosa, A. M., Santos, E. T., & Ventura, M. A. (2024). Incidência de sintomatologia musculoesquelética em profissionais de saúde num serviço de urgência em Portugal: Estudo correlacional. *Revista de Enfermagem Referência*, 6(3), e33958. <https://doi.org/10.12707/RVI23.149.33958>



## Introduction

Musculoskeletal disorders (MSDs) are changes in the musculoskeletal system that can result in pain, discomfort, fatigue, paresthesia, edema, and decreased muscle strength and joint amplitude, often without any visible injury (Direção-Geral da Saúde, 2008; European Agency for Safety and Health at Work [EU-OSHA], 2019; Moura et al., 2019). Health professionals are particularly vulnerable to experiencing symptoms of MSDs because they are exposed to a wide range of risk factors in their workplace (Pleho et al., 2021; Rezaei et al., 2021). The manifestation of symptoms of MSDs often leads to functional incapacity and absenteeism and has an impact on the costs and organizational management of healthcare institutions (EU-OSHA, 2020). Nurse specialists in rehabilitation nursing possess specific skills that allow them to diagnose injury risks, plan and implement injury prevention programs, and intervene to alleviate existing symptoms, thus preventing their progression and promoting recovery (Moura et al., 2019). Magalhães et al. (2021) demonstrated the benefits of a program of physical activity in the workplace implemented by nurse specialists in rehabilitation nursing and targeted to health professionals. The implementation of this program led to an increase in motivation, promotion of well-being, and pain relief. Given the impact of MSDs on the health of health professionals and the organization of healthcare institutions, studying the incidence of this type of disorder and associated symptoms and injuries is essential to promote primary prevention, early diagnosis, and identification of symptoms of MSDs. Therefore, the question arises: “What is the incidence of symptoms of MSDs among health professionals at a Medical-Surgical Emergency Service in a hospital in central Portugal?” Based on this research question, the general objective of our study was to determine the incidence of symptoms of MSDs among health professionals in a Medical-Surgical Emergency Service in Portugal. More specifically, it aimed to determine the relationships between the personal, educational, and professional characteristics of health professionals and symptoms of MSDs, to identify the body regions described by health professionals as most affected by pain, discomfort, or numbness, and to explore the relationship of personal, educational, and professional variables and perceptions of general health status with the incidence of symptoms of MSDs per body region in health professionals.

## Background

MSDs are defined as changes in the structures of the musculoskeletal system, namely joints, tendons, ligaments, nerves, cartilage, and bones. When these are associated with, aggravated by, or influenced by occupational activities or working conditions, they are called Work-related MSDs (Direção-Geral da Saúde, 2008; EU-OSHA, 2019). Work-related MSDs may result from a single

traumatic event or from cumulative injuries associated with repetitive or excessive use of certain muscle groups. They are a common health and work-related problem, are often associated with increased costs for institutions, and lead to reduced productivity, absenteeism, and early retirement (Direção-Geral de Saúde, 2008; EU-OSHA, 2019, 2020). A study conducted in Brazil found that nurses are the professional group most exposed to the main causes of absenteeism due to respiratory diseases and MSDs (Inocêncio & Silva, 2021). Moreover, Dong et al. (2019) and Mahajan et al. (2023) found a high percentage of health professionals with symptoms of MSDs in at least one body region, 91.2% and 73%, respectively. In Portugal, Moura et al. (2019) described that 67.31% of the nurses in their sample had experienced symptoms of MSDs in the previous 12 months. Once identified, it is crucial to avoid exposure to risk factors and even try to eliminate them. However, it should be highlighted that there are risk factors that cannot be modified. Therefore, it is important to focus on interventions that address physical workload and psychosocial and organizational factors (EU-OSHA, 2020). Regarding the implementation of prevention programs for Work-related MSDs, Abreu et al. (2020) concluded that these programs, regardless of the level of prevention in which they are implemented, have beneficial effects on nurses, thus increasing the productivity of institutions and contributing to patient safety. Adopting a healthy lifestyle, in particular the practice of physical activity in the workplace, is also a factor that contributes to preventing and reducing the incidence of symptoms of MSDs in health professionals (EU-OSHA, 2020).

Nurse specialists in rehabilitation nursing play a fundamental role in promoting health and preventing complications through early diagnosis and preventive measures and treatment and rehabilitation, based on differentiated rehabilitation care plans (Ordem dos Enfermeiros, 2019). These health professionals can provide early diagnosis of the risk of injury and develop measures for preventing MSDs, as well as plan and implement interventions to treat or alleviate symptoms. They also promote training in the workplace, raise awareness of risk factors among health professionals, and conduct sessions on physical activity in the workplace and postural correction (Moura et al., 2019). Research conducted in Portugal suggests the benefits of implementing a rehabilitation nursing program to prevent MSDs, particularly in terms of the increase in motivation, well-being, and pain relief (Magalhães et al., 2021), as well as the reduction of informal caregiver burden, the incidence of symptoms of MSDs (Rodrigues, 2018), and pain intensity (Gonçalves, 2020; Rodrigues, 2018).

## Research Question

What is the incidence of symptoms of MSDs among health professionals at a Medical-Surgical Emergency Service in a hospital in central Portugal?



## Methodology

This quantitative, descriptive, and correlational study was conducted on a sample of 109 health professionals working in a Medical-Surgical Emergency Service located at a hospital in central Portugal (equivalent to a response rate of 52.40% of the accessible population). The sample was selected using a non-probability convenience sampling method. Inclusion criteria were to be at least 18 years old and to have worked in the Medical-Surgical Emergency Service for a minimum of 12 months. The exclusion criterion was to be absent from work due to temporary disability. The data collection instrument was provided in paper form by the principal investigator and made available from March 8 to August 31, 2021. Data were collected on the participants' descriptions, specifically their personal, educational, and professional characterization as well as their perceptions of general health status using a five-point Likert-type scale ("poor", "reasonable", "good", "very good", "excellent"). The quantification of symptoms of MSDs per body region was done using the Nordic Musculoskeletal Questionnaire (NMQ; Mesquita et al., 2010). The NMQ is a self-administered instrument consisting of yes-no questions that allow the identification of symptoms of MSDs in nine body regions in the past 12 months and the past seven days. In addition, it allows the quantification of pain using a numerical pain scale by body region. The Portuguese version of the NMQ has a reliability coefficient of 0.855, suggesting good internal consistency. Our study was approved by the Ethics Committee (Opinion No. 14/21) and the Board of Directors of the hospital where the research took place. Approval was also obtained from the author of the NMQ, which was translated and validated for the Portuguese population. Informed consent was provided by all participants, and the confidentiality and anonymity of the data collected were guaranteed. Data were processed using IBM SPSS Statistics software, version 28.0, and were subjected to descriptive and inferential statistical analyses. For the inferential analysis, non-parametric tests were used, namely the Chi-square test ( $Q^2$ ) or Fisher's exact test ( $F$ ) and the Mann-Whitney test ( $U$ ), since the assumptions of normal distribution were not met and the sample was not homogeneous. Significance levels of  $p \leq 0.05$  were considered statistically significant.

## Results

In total, 109 health professionals participated in our study, including nurses, physicians, and support and administrative staff members. Nurses represented the majority of participants (48.62%). The sample had an

overall mean age of 39 years ( $38.44 \pm 10.23$ ), was predominantly female (72.50%), and had a mean body mass index (BMI) of  $24 \text{ kg/m}^2$  ( $24.05 \pm 3.37$ ). In terms of education, 27.52% of the participants had a bachelor's degree, 23.90% had a master's degree, and 23.90% had completed secondary school. Overall, the health professionals in the sample had a mean of 13 years in the profession ( $12.67 \pm 8.77$ ) and a mean of seven years and five months ( $7.41 \pm 6.83$ ) in their current service. Looking at the activities that each professional group performed daily, the overall most frequently performed activities were positioning patients (73.40%), providing hygiene and comfort care (69.70%), and transferring patients from stretcher to stretcher (63.30%). However, there were significant differences in the activities performed by each professional group. Nurses and support staff performed more physically demanding activities, while physicians performed less physically demanding activities. Overall, 33.00% of the sample perceived their general health as "good" or "very good". The professional group of physicians reported the highest percentage at the "excellent" level (26.70%), while nurses reported a higher percentage at the "very good" level (52.80%) and support staff reported a higher percentage at the "reasonable" level (59.40%). Regarding the presence of pain, numbness, or discomfort in the past 12 months per body region, the overall highest percentages were found in the neck (56.00%), shoulders (50.50%), and most significantly in the lower back region (66.10%). These same body regions contributed to participants' temporary disability. Support staff and nurses were the professional groups with the highest percentage of symptoms in the lower back region (43.80% and 32.10%, respectively). On the other hand, 42.90% of administrative staff identified shoulders as the most problematic area that prevented them from performing their normal activities in the last 12 months. When quantifying pain on a numerical scale, the most affected body regions were the lower back (median of 3) and the neck (median of 2), with support staff having the highest median (5) for pain complaints in the lower back region. When analyzing the relationship between the variable "symptoms of MSDs" and the various independent variables of the study, per body region and professional group, our study found that there were statistically significant differences between the length of service of nurses ( $U = 234.000$ ;  $p = 0.038$ ) and the presence of symptoms of MSDs in the neck region, and between the length of service of support staff and the presence of symptoms of MSDs in the elbow region ( $U = 54.500$ ;  $p = 0.039$ ). There were also statistically significant associations with some nominal variables and the presence of symptoms of MSDs in these two body regions, as well as in the wrist/hand regions, which are described in Table 1.

**Table 1**

*Association between nominal variables and symptoms of MSDs in the neck, elbow, and wrist/hand regions in health professionals in the past 12 months*

Professional group		Variable	Symptoms of MSDs in the neck region	
			<i>Q</i> <sup>2</sup>	<i>p</i>
Nurse		Transfer of patients from stretcher to wheelchair (or vice versa)	4.012	0.045*

Professional group		Variable	Symptoms of MSDs in the neck region	
			<i>F</i>	<i>p</i>
SS		Use of medication for pain management	7.619	0.006*

Professional group		Variable	Symptoms of MSDs in the elbow regions	
			<i>F</i>	<i>p</i>
SS		Use of medication for pain management	12.617	0.001*
Nurse		Use of medication for pain management	20.897	0.001*
AS		Dependent family members	7.000	0.048*

Professional group		Variable	Symptoms of MSDs in the wrist/ hand regions	
			<i>F</i>	<i>p</i>
Nurse		Presence of chronic diseases	13.894	0.001*
		Use of medication for pain management	12.592	0.003*
		Dependent family members	7.936	0.040*

*Note.* MSDs = musculoskeletal disorders; SS = Support staff; AS =Administrative staff; *Q*<sup>2</sup> = Chi-Square statistical test; *F* = Fisher’s statistical test; *p* = significance level equal to or less than 0.05.

Concerning the presence of symptoms of MSDs in the thoracic region, statistically significant differences were found between this variable and the BMI variable of support staff members (*U* = 25.000; *p* = 0.010). In addition, our study identified statistically significant associations between nurses’ hygiene and comfort care provision (*F* =

5.247; *p* = 0.049) and transfer of patients from stretcher to stretcher (*F* = 7.272; *p* = 0.010) and the presence of symptoms of MSDs in the lower back region. Statistically significant associations were also observed between some nominal variables and the presence of symptoms of MSDs in the hips/thighs and knees (Table 2).

**Table 2**

*Association between nominal variables and symptoms of MSDs in the hip/thigh and knee regions among health professionals in the last 12 months*

Professional group		Variable	Symptoms of MSDs in the hip/ thigh regions	
			$Q^2$	$p$
SS	Physical activity		5.783	0.016*
Professional group		Variable	$F$	$p$
Nurse	Sex		5.820	0.021*
Professional group		Variable	Symptoms of MSDs in the knee regions	
			$F$	$p$
Nurse	Transfer of patients from wheelchair to armchair (or vice versa)	4.660	0.041*	
	Performance of complementary diagnostic and therapeutic tests	5.149	0.037*	

*Note.* MSDs = musculoskeletal disorders; SS = Support staff;  $Q^2$  = Chi-Square statistical test;  $F$  = Fisher's statistical test;  $p$  = significance level equal to or less than 0.05.

Our study found no statistically significant differences between the quantitative variables studied and the presence of symptoms of MSDs in the shoulders and ankles and feet of health professionals, and no statistically significant associations between the nominal variables and the same body regions.

## Discussion

Our study involved 109 health professionals, most of whom were nurses, with a mean age of 39 years and predominantly female (72.50%). These figures were expected and similar to the description of the Portuguese National Health Service workforce, where 33.20% of health professionals are nurses, with a mean age of 44 years, and mostly female (76.50%) (Ministério da Saúde, 2019). According to the report of the Portuguese Ministry of Health (2019), 64% of its health professionals have a higher education degree, which is in line with our findings. In the professional group of nurses, in terms of activities performed, the highest percentages of responses were obtained in the areas of patient positioning and the provision of hygiene and comfort care, as well as the performance of invasive procedures. This contrasts with the data of Serranheira et al. (2012), where, in addition to the performance of invasive procedures, the higher percentages of activities carried out were obtained in computer-based work and administration of therapy. These results may be related to the fact that the study included professionals working in different services, among which inpatient services, primary health care services, emergency medical services, and nursing homes. Regarding our participants' perceptions of their general health status, most responses ranged from "good" to "very good," with percentages of 33% for both. This result is consistent with the findings of the Survey on Income and Living Conditions carried out in Portugal in 2021, where

50.20% of the population aged 16 and over rated their health as "good" or "very good" (Instituto Nacional de Estatística, 2022). However, our study found that 84.40% of the health professionals surveyed reported at least one body region affected by pain, discomfort, or numbness, which is in line with other studies, with percentages ranging from 51% to 91% in samples including different professional groups (Dong et al., 2019; Mahajan et al., 2023; Yasobant & Rajkumar, 2014). The professional group most affected by symptoms of MSDs was nurses (41.18%), a finding similar to that of Magalhães et al. (2021) and Yasobant and Rajkumar (2014). Overall, the health professionals involved in our study reported that the most affected body region was the lower back (66.10%), a finding supported by Hosseini et al. (2021), Mahajan et al. (2023) and Pleho et al. (2021) and Rezaei et al. (2021). This body region was followed by the neck (56.00%) and shoulders (50.50%), with results similar to those obtained by Dong et al. (2019). However, these results differ from Cardoso et al. (2022), whose sample reported a higher percentage of symptoms in the ankles and feet (48.8%). This contrast may be related to some of the variables studied, such as the mean age of the participants, which in the study by Cardoso et al. (2022) was mostly in the 40-59 age group. Concerning the neck region, statistically significant differences were found between nurses' current length of service and the presence of symptoms of MSDs, which was confirmed by Lin et al. (2020). Regarding the correlation between the variables studied and the presence of symptoms of MSDs in the shoulder region, our study observed no statistically significant differences, a finding corroborated by Moura et al. (2019) and Serranheira et al. (2015). In addition, statistically significant associations were found between the presence of symptoms of MSDs in the elbow regions and the use of medication for pain complaints by support staff and nurses. However, studies with samples of nurses show statistically significant differences with

other variables, such as weekly workload, current length of employment (Lin et al., 2020; Moura et al., 2019), age (Hosseini et al., 2021), length of employment in the current service, BMI, and exercise habits (Lin et al., 2020). Regarding symptoms of MSDs in the wrist/hand regions, there were no statistically significant associations with the activities performed by the nurses. This is contrary to the findings of Serranheira et al. (2015) regarding the performance of invasive procedures, administration of therapy, and patient positioning. In addition, other studies have shown statistically significant differences between the presence of symptoms of MSDs in this body region and BMI (Lin et al., 2020) and the age of the participant (Lin et al., 2020). This could be related to the type of service, which included emergency and inpatient services. Our study only found statistically significant differences between the presence of symptoms of MSDs in the thoracic region and the BMI variable of support staff. This is similar to what Moura et al. (2019) found in a sample of nurses, although these differences were also related to age (Hosseini et al., 2021), sex, current length of employment, and weekly workload. Regarding the lower back region, statistically significant associations were found between the provision of hygiene and comfort care and stretcher-to-stretcher patient transfer by nurses and the presence of symptoms of MSDs in this body region. This was confirmed by Moura et al. (2019), and Mahajan et al. (2023) also reported statistically significant differences with BMI. As for symptoms of MSDs in the knees of the health professionals in our sample, there were statistically significant associations observed in the following activities: patient transfer from wheelchair to armchair (or vice versa) and the performance of complementary diagnostic and therapeutic tests by nurses, which is contrary to the data obtained by Serranheira et al. (2015). Studies related to the knee region have also shown statistically significant differences with the variables of age (Mahajan et al., 2023), weekly workload (Dong et al., 2019), length of professional practice (Lin et al., 2020), BMI (Dong et al., 2019; Lin et al., 2020; Pereira, 2021), and sex (Hosseini et al., 2021). Additionally, no statistically significant differences or associations were found between the variables studied and the presence of symptoms in the ankles and feet, contrasting with the findings of Moura et al. (2019), who reported this association with the current length of service. Lin et al. (2020) also demonstrated an association with BMI and Hosseini et al. (2021) with sex. In light of the results obtained in our study, nurse specialists in rehabilitation nursing have a fundamental role to play in the planning and implementation of programs for physical activity in the workplace as they have skills and training in this area (Couto, et al., 2022). Similarly, Magalhães et al. (2021) found positive results related to a reduction in symptoms of MSDs and absenteeism, as well as increased motivation, satisfaction, and well-being at work in a study conducted in the medical department of a Portuguese hospital, where sessions of physical activity in the workplace were developed by nurse specialists in rehabilitation nursing. In their studies, Rodrigues (2018) and Gonçalves (2020)

also observed a decrease in pain intensity and a reduction in the incidence of symptoms of MSDs.

Our study was limited by the type of sampling method and sample size, the data collection in only one health service, and the specificities of Medical-Surgical Emergency Services, particularly in terms of unpredictability and patient influx. These need to be taken into account when interpreting our results and in future research on this topic.

## Conclusion

MSDs are a common problem in the healthcare sector, affecting healthcare organizations in terms of productivity, absenteeism, and organizational management. For this reason, it is important to promote the various levels of prevention and early diagnosis of MSDs among health professionals and to plan and implement treatment and rehabilitation programs.

Considering the results obtained about the symptoms of MSDs identified by health professionals, our study underscores the role of nurse specialists in rehabilitation nursing, as they have the knowledge and skills to promote the prevention, screening, and early diagnosis of MSDs, as well as to plan and implement training programs, including the practice of physical activities in the workplace, which contribute to the prevention and reduction of symptoms of MSDs.

In terms of implications for clinical practice, our study has diagnosed the situation and confirmed the need for interventions to prevent and manage the symptoms of MSDs in health professionals. It is clear that research in this area should be further developed with the aim of improving the health and motivation of professionals, and benefiting healthcare organizations and institutions. Therefore, further studies with larger samples of participants from different professional groups and different medical-surgical emergency services or other types of emergency services are recommended.

## Author contributions

Conceptualization: Castanheira, J. A., Ventura, M. A.

Data curation: Castanheira, J. A., Duarte, H. M.,

Formal analysis: Duarte, H. M., Pereira, A. S., Pragosa, A. M., Santos, E. T., Ventura, M. A.

Investigation: Castanheira, J. A., Duarte, H. M., Ventura, M. A.

Methodology: Castanheira, J. A., Duarte, H. M., Ventura, M. A.

Project administration: Castanheira, J. A.

Resources: Castanheira, J. A.,

Software: Castanheira, J. A.,

Supervision: Ventura, M. A.

Validation: Duarte, H. M., Ventura, M. A.

Visualization: Castanheira, J. A., Pereira, A. S., Pragosa, A. M., Santos, E. T., Ventura, M. A.

Writing – original draft: Castanheira, J. A.

Writing – review & editing: Duarte, H. M., Pereira, A. S., Pragosa, A. M., Santos, E. T., Ventura, M. A.



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