

## Teams and working conditions in mobile pre-hospital care services: an integrative review\*

### Equipes e condições de trabalho nos serviços de atendimento pré-hospitalar móvel: revisão integrativa

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#### ABSTRACT

Study to identify, analyze and summarize the findings available in the literature on the composition of teams and working conditions in Mobile Pre-Hospital Care Services (PHC). Integrative review to search the Base de Dados de Enfermagem [Nursing Database] (BDEnf), the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the Latin American and Caribbean Health Sciences Literature (LILACS), PubMed, SCOPUS, Web of Science and the portal of journals from the Scientific Electronic Library Online (SciELO). Eighteen articles met the inclusion criteria and were selected. The composition of the teams for PHC services is diversified on the international stage, with the increase in responsibilities assumed by paramedics and the benefits of the specialized nurse's and doctor's presence in the teams being portrayed, which are scarce in some countries. Working conditions reveal risky places of work, intense psychological demands, work overload, dissatisfaction and inadequate resources in most services.

**Descriptors:** Emergency Nursing; Emergency Medical Services; Working Conditions.

#### RESUMO

Estudo com objetivo de identificar, analisar e sintetizar os achados disponíveis na literatura sobre a composição das equipes e das condições de trabalho nos serviços de Atendimento Pré-Hospitalar (APH) móvel. Revisão integrativa com buscas na Base de Dados de Enfermagem (BDEnf), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), PubMed, SCOPUS, Web of Science e o portal de periódicos Scientific Eletronic Library Online (SciELO). Foram selecionados 18 artigos que atenderam aos critérios de inclusão. A composição das equipes dos serviços de APH é diversificada no cenário internacional, sendo retratado o acréscimo de responsabilidades assumidas por paramédicos, os benefícios da presença do enfermeiro e do médico especializado nas equipes, os quais são escassos em alguns países. As condições de trabalho revelam locais arriscados de atuação, demandas psicológicas intensas, sobrecarga de trabalho, insatisfação e recursos insuficientes na maioria dos serviços.

**Descritores:** Enfermagem em Emergência; Serviços Médicos de Emergência; Condições de Trabalho.

## INTRODUCTION

Mobile pre-hospital care services (PHC) are an important component of the healthcare network for emergencies. The purpose of PHC is to attend individuals with various health conditions at the location of the occurrence. In addition to providing immediate care, PHC services have the potential to regulate user access to the health system, ensuring care, transportation and referrals according to the needs of the population<sup>(1)</sup>.

In Brazil, as in many countries, the incorporation of mobile PHC services in health systems are incipient. Globally, there are several different organizational models applied to these services, with different teams in which different professionals from different backgrounds perform functions that vary according to the PHC models adopted, which are influenced mainly by the American and French models<sup>(2)</sup>.

In the French model, ambulances are regulated by medical professionals who coordinate the response to the demands of the population from a central call system, shared with the Fire Department, with medical care being provided since the location where the victim was first assisted until their transportation and arrival at the hospital. In the United States, the mobile PHC system, expanded from 1960, offers agility in the service performed by trained professionals according to American regulations, which perform transportation of the victim safely and quickly, but without offering medical treatment<sup>(1)</sup>.

In Brazil, mobile PHC is a mixture of these two models. The on-land basic life support (BLS) units are manned by the driver of the ambulance and at least one technician or nursing assistant, who perform the first care and determine the demands, ensuring that severe victims are taken to the hospital service. Besides the driver, the advanced life support (ALS) units are manned by at least one physician and one nurse, who have autonomy to make decisions about the treatment and qualification for performing invasive procedures, which can occur at the scene and/or during the transportation. With a view to

carrying out rescue maneuvers during the route, ALS ambulances have resources for intensive medical care, which does not occur with the BLS vehicles<sup>(3-4)</sup>.

Despite the recommendation that there should be a minimum of 1 ALS unit for every 400,000 to 450,000 inhabitants and 1 BLS unit for every 100,000 to 150,000<sup>(3)</sup>, there are regional differences regarding the composition of the teams and the distribution of resources for support in emergencies in the country.

Although there are no legal requirements, the presence of nurses in BLS teams has been observed in some locations, encouraging inquiries and debates among the population, professionals and professional entities. The same discussion can also be found in the international context, as revealed by studies examining the differences in care interventions that count on, or not, with professional nurses in the care provided by ambulance service<sup>(5-6)</sup>.

In addition to the composition of the team, there is an emphasis on the interest in the working conditions for the implementation of mobile PHC services, a fundamental interference factor on the work dynamic and the quality of the services provided. Long working hours, various employment contracts and high exposure to occupational accidents and accidents on the way to work are aspects described in the literature as important inconsistencies in the Brazilian mobile PHC services<sup>(7)</sup>.

Thus, this study aimed to identify, analyze and summarize the findings available in the literature on the composition of teams and the working conditions in mobile Pre-Hospital Care (PHC) services. The search for the systematization of knowledge produced on this theme aims to support the development of the Study and Research Program "Technical healthcare modeling and healthcare delivery in emergencies and for critically ill patients: integrated studies in the perspective of comprehensiveness".

## METHOD

Integrative literature review, conducted in five stages: identification of the problem, literature search, data evaluation, data analysis and presentation of the integrative review or synthesis of knowledge<sup>(8)</sup>. The main question of the study was: "What is the composition of the mobile pre-hospital care teams and their respective working conditions?"

Considering the question asked, the following were defined as variables of interest: composition of the mobile PHC teams, as regards the professional categories, training and socio-demographic profile; working conditions in the mobile PHC scenario, whose definition is guided by labor factors that influence the health and safety of workers, as well as the performance of their activities.

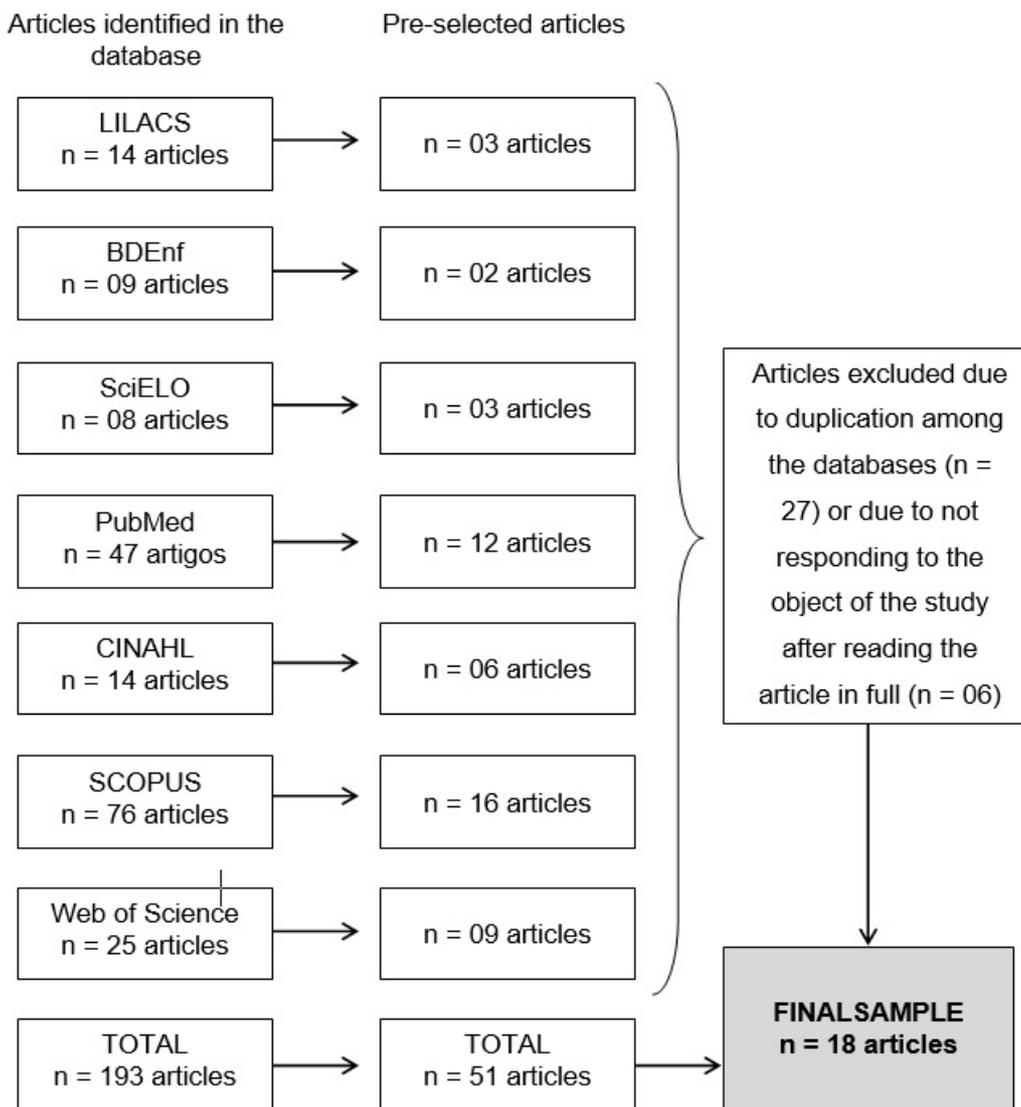
To search for articles, on-line access was used in the following databases: Base de Dados de Enfermagem [Nursing Database] (BDEnf) Cumulative Index to Nursing and Allied Health Literature (CINAHL), Literatura Latino-Americana e do Caribe em Ciências da Saúde [Latin American and Caribbean Health Sciences Literature] (LILACS), PubMed, SCOPUS, Web of Science and the portal for journals from the Scientific Electronic Library Online (SciELO). The controlled descriptors selected in the Descriptors list of Health Sciences (DeCS) were: Ambulance; "Emergency Medical Services"; "Health Manpower"; "Nursing, Team"; "Working Conditions". Based on Medical Subject Headings (MeSH), the following keywords were also used: Ambulance; "Emergency Medical Services"; "Health Manpower"; "Nursing, Team". The Boolean operator AND was used.

The literature search was carried out from February to April 2013 and in May 2015. The inclusion criteria were: complete articles that address the characteristics of the teams and working conditions in the pre-hospital care services, arising from research, published in the period 2005-2014, in Portuguese, Spanish and English. Studies were excluded if they did not answer the main question, theoretical essays, reflections, reviews, reports on

experience, theses and dissertations, and those that were not available in full.

For more accuracy in the results, two evaluators carried out the search independently and, at the end of each search, the articles were compared. When there was disagreement among researchers about the number of articles identified in each base, the search procedures were reviewed. They initially identified 193 articles, with 18 remaining in the final sample, as can be seen in Figure 1.

An evaluation of the selected items was performed, identifying relevant information to be extracted from each study: year of publication, authors, objective, country where the study was conducted, language, methodological outline and results. This information contributed to the elucidation of the main question of the review and it was analyzed and summarized. An exhaustive reading of the articles was carried out with further categorization by thematic content.

**Figure 1:** Flow diagram of the selection and inclusion of articles in the integrative review of the literature.

## RESULTS

Of the articles analyzed (n=18), most were published in Brazil (n=8), with a predominance of the English language (n=10). The year of 2005 stands out with most articles (n=4) and a variation from one to two publications in other years, except for 2006 and 2013, wherein no articles were identified. It was observed that the Brazilian production is subsequent to 2009.

As regards the methodology employed, 12 articles used a quantitative approach (only one is longitudinal), six used a qualitative approach. As regards the techniques employed in the data collection for quantitative studies, most of them used questionnaires<sup>(7,9-16)</sup> and/or scales/inventories<sup>(9,16-18)</sup>. As regards the sampling process, the use of a census was reported<sup>(7,9,12-13,16-18)</sup>,

random samples<sup>(10-11,14)</sup> or convenience samples<sup>(15)</sup>. In studies of a qualitative nature, the collection of information took place through individual interviews<sup>(19-24)</sup>. Only one research used a mixed approach (quantitative and qualitative)<sup>(5)</sup>, developed through individual interviews, focus groups and a questionnaire.

The results of the synthesis of the articles selected are shown in Table 1, with the studies being grouped into two categories: composition of the teams and the working conditions.

**Table 1:** Distribution of articles according to the year of publication, the author(s), place the research was carried out, objectives and results.

Author/Year/Place of Research	Objective	Outline/Sample	Main Results on the Composition of the Teams (CT) and the Working Conditions (WC)
Price et al. <sup>(19)</sup> 2005 United Kingdom	Know the attitudes of the paramedics in the administration of pre-hospital thrombolysis.	Qualitative/20 paramedics.	(CT) Paramedics experience increase in the assumed responsibilities (use of thrombolysis) by aggregating professional status. (WC) The increase in assignments raised the workload without salary improvements. The attitudes of not adhering to the use of thrombolysis were related to insecurity due to the risks of the treatment, as well as the remote and lonely working conditions, with sole responsibility for the decision.
Bennett et al. <sup>(9)</sup> 2005 United Kingdom	Assess the prevalence and correlations of post-traumatic stress disorder, anxiety and depression among emergency ambulance personnel.	Quantitative, cross-sectional/617 emergency technicians and paramedics.	(CT) Prevalence of paramedics, male, average age of 39.58 years. (WC) Related to post-traumatic stress: organizational stress, experience of potentially traumatic incidents and the time of service; to anxiety: wait for the next call for assistance, work fatigue, conflicts with colleagues, incidents involving children and unpredictability; to depression: age, work fatigue, conflicts with colleagues, unpredictability, attending family members and handling corpses.
Okada et al. <sup>(10)</sup> 2005 Japan	Assess working conditions and physical and mental stress of paramedics in Hyogo, Japan.	Quantitative, cross-sectional/1551 rescuers	(CT) Predominantly men (99.4%), average age of 35.4 years. Paramedics represented 36% of the sample and the average time of service was more than 10 years. The double work load was performed by 67.5% of firefighters. (WC) Emergency medical technicians were more affected physical stress on the lower back, neck and shoulders. Mental stress was reported more by older professionals or qualified paramedics.
Aasa et al. <sup>(11)</sup> 2005 Sweden	Investigate relations between psychosocial factors at work, working conditions and health complaints between male and female rescuers.	Quantitative, cross-sectional/187 nurses and ambulance technicians	(CT) Teams composed of nurses and, in greater number, ambulance technicians. Predominantly men with an average age of 38 years. For both sexes, the ambulance technicians have worked for longer as rescuers than the nurses. (WC) The prevalence of sleep problems, headaches and stomach symptoms were significantly associated with psychological demands between both sexes of rescuers. Concern over working conditions proved to be a risk factor for the complaints related to health, especially for women. Sleep disorders and gastric problems were prevalent in women nurses.
Machen et al. <sup>(5)</sup> 2007 United Kingdom	Know about the perceptions of patients and the team about a pilot service in which the nurse and the paramedic attend low-priority calls.	Quantitative and qualitative/64 patients and 11 paramedics and nurses.	(CT) Patients attended by the pilot service stay at home and patients that receive the standard service were transported to the emergency service, which represented less costs for the pilot, without interfering in the satisfaction of the patients. The presence of the nurse reflected in greater resolution by the ambulances and the experience of the pilot service was considered positive for paramedics, with teamwork standing out.

Author/Year/Place of Research	Objective	Outline/Sample	Main Results on the Composition of the Teams (CT) and the Working Conditions (WC)
Studnek et al. <sup>(12)</sup> 2007 USA	Investigate the prevalence and incidence of illness or injury related to the work, related to absenteeism at work between a national cohort of professionals from emergency medical services.	Quantitative, longitudinal sample/5096 emergency medical technicians and paramedics	(WC) Based on the outcome of absence from work, there was prevalence of illness or injury related to the work, of 9.4%, while the incidence of 1 year was estimated at 8.1 per 100 professionals. The increased volume of calls (considered more important than total working hours), the urban environment and having had previous injuries were associated with reports of illness or injury.
Sterud et al. <sup>(17)</sup> 2008 Norway	Check the level of stress associated with specific factors of activity in the ambulance and organizational aspects in a national sample of ambulance staff	Quantitative, cross-sectional/1180 ambulance professionals	(WC) Stress factors: critical care, physical demands, action in populated areas, working overtime, lack of support from colleagues and lack of support after exposure to critical events.
Velloso et al. <sup>(13)</sup> 2009 Brazil	Describe sociodemographic, professional and operational variables of the different categories involved in the SAMU, as well as their perception as regards the adequacy of the service offered to the guidelines of National Policy for Emergency Care	Quantitative, cross-sectional/89 SAMU professionals	(CT) Males were prevalent (61.8%), aged between 31 and 40 years (54%), drivers (37.1%), followed by nursing technicians (33.7%), nurses (21.3%), and doctors (7.9%). The average for the time in the SAMU was 7.6 years. (WC) Issues were identified in the physical structure (60.7%); scarcity of materials (82.0%); incipency of human resources (37.1%); poor condition and insufficient number of ambulances (67.4%).
Perkins et al. <sup>(14)</sup> 2009 USA	Assess the potential factors associated with the retention of the workforce among the emergency medical technicians.	Quantitative, cross-sectional/1008 emergency medical technicians	(CT) Approximately one in four emergency medical technicians consider leaving the profession in the next five years. The most likely were those who were older, had more time in the profession and who were dissatisfied with the profession.
Campos et al. <sup>(18)</sup> 2009 Brazil	Identify the level of professional satisfaction of the nursing staff and the degree of importance assigned to each of the components of satisfaction.	Quantitative, cross-sectional/51 professionals in the nursing staff	(CT) Most of the participants were female (54.9%) and aged between 36 and 45 years (60.8%), 78.4% were nursing technicians and 21.6% were nurses, graduated between 11 and 15 years (27.5%). (WC) 96.1% report that they like and are satisfied in working at the SAMU, however, the Professional Satisfaction Index (PSI) was 8.6, indicating that the nursing staff at the SAMU/Natal are not very satisfied with their work environment. Autonomy was the most important component in professional satisfaction, followed by the remuneration component, interaction, work requirements, organizational standards and professional status.
Romanzini et al. <sup>(20)</sup> 2010 Brazil	Identify the feelings resulting from the actions and training of the nurses from the emergency mobile pre-hospital care service (PHC).	Qualitative/9 nurses	(WC) Feelings of satisfaction, personal and professional accomplishment, as well as valuation and recognition by patients/victims, family, population and and by themselves on their professional ability, general and specific knowledge, mastery over techniques, pathologies, protocols, ability for leadership, management and emotional balance. They feel like they are contributing to the actions of planning, organization and the managerial coordination of the SAMU.

Author/Year/Place of Research	Objective	Outline/Sample	Main Results on the Composition of the Teams (CT) and the Working Conditions (WC)
Bueno et al. <sup>(21)</sup> 2010 Brazil	Characterize the management/supervision of the nurse in mobile pre-hospital care, according to the vision of the nursing staff.	Qualitative/3 nurses and 6 nursing aides	(WC) A distance relationship was found between the staff and the supervisor, with a lack of education in the service. Insufficient training results in insecurity and anxiety in relation to the caring process. They emphasize that the stressful situations require greater availability of the nursing supervisor.
Vegian et al. <sup>(7)</sup> 2011 Brazil	Characterize the sociodemographic profile of the workers and investigate the living and working conditions of the professionals.	Quantitative/197 SAMU workers	(CT) Most of the participants were male, aged between 30 and 39 years and having completed High School. Drivers were prevalent, followed by doctors and auxiliary nurses. The average time of working at the SAMU was 6.9 years. (WC) Most of them had a contract through a public tender and worked up to 36 hours a week, with 25.3% of professionals accumulating more than 70 hours worked in a week. Almost half of the participants had another job and performed overtime.
Hosoda et al. <sup>(15)</sup> 2011 Japan	Assess the working arrangements and effects on the health of the emergency medical transport staff.	Quantitative/58 emergency medical technicians	(WC) Those associated were: average of emergency transport per shift and total nap time per shift; average nightly emergency transport per shift and quality of sleep; increase in the number of emergency transport, decrease in nap time and quality of sleep. Only 13% had access to private rooms for napping purposes, with improvements being necessary for sleeping facilities.
Santana et al. <sup>(22)</sup> 2012 Brazil	Understand the daily work of the nursing staff in a mobile emergency care service and its implications on the quality of life.	Qualitative/10 nursing staff professionals	(WC) The quality of life of the nursing staff at the SAMU may be influenced by the impact of traumatic scenes and exposure to physical risks. Due to the complexity of the service and the difficulties encountered in everyday work, the professionals feel the need for action to promote worker health.
Blau et al. <sup>(16)</sup> 2012 USA	Test the impact of emotional work on the burnout in the work for samples of professionals from the emergency medical services.	Quantitative/Sample of 24,586 emergency medical technicians and paramedics	(WC) Burnout in the work is an occupational risk for professionals from the emergency medical services. Individuals considering this career should have realistic expectations and information about the rewards and challenges faced.
Velloso et al. <sup>(23)</sup> 2014 Brazil	Understand how the practices of power configure the relationships and professional limitations at the SAMU in the city of Belo Horizonte.	Qualitative/31 SAMU workers	(WC) From the perspective of professional limitations and territorial boundaries in the work at the SAMU, the difficulties in recognizing the group as a working team can be perceived, while their speeches reinforce the historical domination of medical profession over other professionals. For the professionals it is difficult to identify and understand the tenuous boundaries between their work space and that of others.
Velloso et al. <sup>(24)</sup> 2014 Brazil	Discuss how visibility is constituted in a construct of power in everyday practice at the SAMU.	Qualitative/31 SAMU workers	(WC) Despite the formally established hierarchical structure, relationships of power are formed in a network parallel to this structure. The visibility generated by communication, via radio, provides constant surveillance, which ends up causing tensions within the working team.

Reading and analysis of the articles permitted to observe that the professional categories that carry out activities related to mobile PHC services have configurations that vary according to the laws of the

countries where the studies came from. This variation refers to the nomenclature, but also the training required for professional roles assumed, as shown in Table 2.

**Table 2:** Professional categories of teams for the mobile pre-hospital services, the training required, and the country where the study was conducted

Nomenclature	Training	Country
Paramedic	Specific training for pre-hospital care of medium and high complexity	USA <sup>(12,14,16)</sup> , Japan <sup>(10,15)</sup> , United Kingdom <sup>(5,9,19)</sup> , Norway <sup>(17)</sup>
Emergency Medical Technician	Specific basic level of training for emergency care of low complexity	USA <sup>(12,14,16)</sup> , Japan <sup>(10,15)</sup> , United Kingdom <sup>(9)</sup> , Sweden <sup>(11)</sup> , Norway <sup>(17)</sup>
Military Firefighting Corps	Basic and specific training to aid victims of fire, situations of risk and catastrophes	USA <sup>(16)</sup> , Japan <sup>(15)</sup>
Nursing Technicians	Technical training in nursing, general training for performance in health services	Brazil <sup>(7,13,18,21-24)</sup> , Norway <sup>(17)</sup>
Nurses*	Degree in general nursing for performance in health services	Brazil <sup>(7,13,18,20-24)</sup> , Sweden <sup>(11)</sup> , Norway <sup>(17)</sup>
Doctors*	Degree in general medicine for performance in health services	Brazil <sup>(7,13,18,23-24)</sup>
Drivers**	No training for service in health or in emergencies	Brazil <sup>(7,13,18,23-24)</sup>

\* Nurses and doctors make up American teams for the care specific to disasters.

\*\* In Brazil, the ambulance driver receives training to assist the mobile PHC team.

## DISCUSSION

The analysis of the studies in the sample of the integrative review allowed to identify findings available in the literature on the composition of teams and the working conditions in the mobile PHC services.

### Composition of the mobile PHC teams

The studies analyzed showed that the questions about the composition of mobile PHC teams are not limited to the Brazilian reality, as international publications were found that had their object of investigation on this theme. Concern for the qualification and preparation of the workers appeared to be very similar between the countries involved in the research analyzed, even though the PHC models are distinct.

Despite this approach, it was not possible to suggest the use of any conclusions to justify the proposition of changes to the Brazilian context. Besides, it is possible to infer that the differences between the PHC models

adopted in the different scenarios, make it difficult to generalize the findings.

The results showed that specific training for the activity of rescuer is the criterion used in many countries to enable professionals to act in pre-hospital services, as occurs in the UK, the US and France. However, this reality differs in Brazil, whose legislation establishes that professional nurses, doctors, and technicians and/or nursing assistants, without the requirement of specific training, can act in this area.

In Sweden, all of the calls in the pre-hospital setting are performed by teams of different professions, but always with the participation of at least one nurse on the team<sup>(25)</sup>. However, as per the results presented, it is not possible to state conclusively that the presence of nurses in PHC ambulances makes an impact on the clinical outcomes.

The predominance of the age group of professionals working in PHC, described in the

results, resembled other research, in which the variation was from 28-48 years of age<sup>(26-28)</sup>. The prevalence of males in the teams that make up the services has often been reported in the literature<sup>(26,28)</sup>, and it suggests a possible tendency of men being allocated to this type of service, since the nursing staff is predominantly made up of women.

The investigations analyzed diverge in relation to the amount of experience of the professionals in the service. However, it is noteworthy that, in the Brazilian reality, the time of service in the Mobile Emergency Care Service has been described in a brief way<sup>(26-27)</sup>, which can be related to the recent implementation period of this type of service in the country.

### **Working conditions in the mobile PHC services**

As for working conditions, the results that deal with compensation, working hours and working relationship reveal that mobile PHC services are not immune to the challenges imposed by the demands of the contemporary work, which involve intensification of the work, with demand for accelerated rates of production, overwork and precariousness in labor relations. These improper conditions have added to the traditional risks of occupational exercise, emerging occupational hazards, which also impose new impacts on the health of workers, as well as on the professionals' permanence in the jobs<sup>(29)</sup>.

However, the results that attribute emphasis to mental illness and musculoskeletal diseases are nothing new when it comes to working in health. There is evidence suggesting that the prevalence of musculoskeletal diseases is a serious occupational health problem for pre-hospital care professionals and paramedics, requiring effective preventive measures<sup>(30)</sup>.

These events have often been associated with the work of nursing<sup>(31)</sup>, being justified by the exercise of activities that require physical strength and body posture that is to the movement of patients and also due to the inadequacy of physical space and with multiple challenges to mental health. These factors are also present in the

activity of rescuers, which are potentially compounded by the use of public space as the setting for the execution of professional duties. These occupational hazards have already been featured in Brazilian study<sup>(28)</sup>, in which exposure to violence was the occupational hazard prevalent among EMS workers.

### **CONCLUSION**

The publications included in this review, mostly present a descriptive character. The lack of studies with methodological designs that can provide conclusive results is inferred from this, with a view to modifying the profile of the teams and intervening on working conditions in the mobile PHC services.

The results demonstrated that the teams are composed of different professional categories, which vary according to the organization model for care adopted by the countries, but which also stand as a factor of concern and motivator for the investigations. The discussions proposed by the studies deal with the duties performed by workers with more or less training and qualifications for clinical intervention, but did not present any evidence on the benefits of the professional profile in the ambulances.

The working conditions were not presented as favorable to the implementation of the work tasks and health of the workers in the analyzed productions, which indicates that it is dealing with a globally recognized aspect as an investment requires. The findings suggest that studies that exploit the working conditions associated with different compositions of teams should be encouraged.

The gaps in the issue studied in the literature refer to the lack of evidence on the impact of the composition of the teams on the care results of the mobile PHC services, considering not only the effects of a professional, but the possible multidisciplinary arrangements. From this perspective, the gap in the literature on the impact of the quality and resolution of the nurse's performance in basic support teams stands out.

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