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REVIEW ARTICLE
Health Sciences

Ambulance Services in the Context of Occupational Health and Safety and Risks Faced by Ambulance Attendants

İş Sağlığı ve Güvenliği Bağlamında Ambulans Hizmetleri ve Ambulans Görevlilerin Karşılaştıkları Riskler

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ABSTRACT

The contemporary world has witnessed accelerated technological developments. While these advancements offer effective solutions to prevalent challenges in private and business sectors, they concomitantly introduce new issues, hazards, and risks. Among these, those employed in ambulance services face heightened exposure to hazards and risks due to their involvement in emergency situations and the ambience of the ambulance environment, which is frequently characterized by the presence of individuals. In the context of occupational health and safety, these employees are exposed to a range of risks, including physical (e.g., noise, vibration, radiation), chemical (e.g., latex allergy, anaphylactic shock), biological (e.g., needle stick, diseases caused by contact with blood and body fluids), ergonomic (e.g., forceful repetitive movements, inappropriate load carrying), psychosocial (e.g., violence, burnout, depression). Moreover, these individuals may encounter secondary accidents, such as falling, slipping while departing the station to reach the incident location, and lacking sufficient information about the scene, which can lead to exposure to secondary accidents, including electric shock and fire hazards. In light of the aforementioned risks and dangers, it is imperative to examine the occupational risks faced by ambulance services employees in terms of occupational health and safety. To ensure the optimal well-being of these employees, it is imperative to implement adequate staffing levels, enhance working conditions, provide access to psychological support without the concern of stigmatization, educate personnel on how to prevent violence from patients and/or their relatives, ensure regular occupational health and safety training, and optimize work schedules and shift systems to minimize undue stress.

Keywords: ambulance services, ambulance, risk, hazard

ÖZET

Çağımız dünyası toplumlarında gerçekleşen hızlı teknoloji değişiklikleri sonucunda toplumsal düzeyde özel hayat ve iş hayatında mevcut sorunlara çözüm getirirken ek olarak yeni sorunlar, tehlikeler ve riskleri beraberinde getirmektedir. Ambulans hizmetleri çalışanları genellikle bireylerin çoğunlukta olduğu yerlerde acil vakalara olay yerinde ve/veya ambulans ortamında müdahale etmelerinden dolayı bu tehlike ve risklere daha fazla maruz kalmaktadır. Bu çalışanlar iş sağlığı ve güvenliği açısından da fiziksel (gürültü, titreşim, radyasyon vb.), kimyasal (lateks alerjisi, anaflaktik şok vb.), biyolojik (iğne batması, kan ve vücut sıvıları teması sonucu gerçekleşen hastalıklar vb.), ergonomik (zorlayıcı tekrarlı hareketler, uygun olmayan şekilde yük taşıma vb.) ve psikososyal (şiddet, tükenmişlik, depresyon vb.) anlamda diğer meslek gruplarına göre daha fazla risklere maruz kalmaktadırlar. Ayrıca olay yerine intikal etmek için istasyondan çıkarken düşme, kayma gibi ve olay yeri hakkında yeterli bilgiye sahip olmadıkları zaman elektrik çarpması, yangın çıkması gibi ikincil kazalara maruz kalabilmektedirler. Belirtilen riskler ve tehlikelerden dolayı ambulans hizmetleri çalışanlarının karşılaştıkları mesleki risklerin iş sağlığı ve güvenliği açısından incelenmesi önemli bir konu haline geldiği düşünülmektedir. Bu meslek grubuna mensup çalışanların tam iyilik hallerinin korunması, iş ve özel hayatlarını daha verimli sürdürebilmeleri için yeterli sayıda personel istihdamına, çalışma koşullarının iyileştirilmesine, damgalanma korkusu yaşamadan psikolojik destek almalarının sağlanması, hasta ve/veya hasta yakınları tarafından yaşadıkları şiddet olaylarının önlenmesi için bireylerin eğitilmesi, çalışanların iş sağlığı ve güvenliği kapsamında eğitimlerinin düzenli alınması, çalışma saatlerinin ve nöbet sistemlerinin aşırı yük getirmeyecek şekilde düzenlenmesinin uygun olacağı düşünülmektedir.

Anahtar Kelimeler: ambulans hizmetleri, ambulans, risk, tehlike

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INTRODUCTION

In contemporary times, humanity faces considerable material and moral losses on both a national and global scale. These losses are attributable to natural disasters, global epidemics, wars, and accidents in various sectors, including industry, mining, and construction. The aforementioned losses are not limited to the loss of life; they also manifest in other forms, including capital losses, labor losses, and social damage. Individuals engaged in various sectors are

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susceptible to occupational accidents due to deficiencies in the workplace, environmental factors, or personal reasons (e.g., fatigue, lack of attention, or inexperience).

In today's complex and challenging environment, the prevention of occupational accidents and the enhancement of occupational health and safety standards are of paramount importance.In this context, measures such as employee training and awareness programs, the strict implementation of safety measures in workplaces, regular risk analysis and assessment, and other pertinent actions should be implemented. The implementation and monitoring of effective occupational health and safety policies and legislation is crucial. Technological advancements, automation of hazardous tasks, and ergonomic modifications in workplaces can also contribute to the reduction of occupational accidents. Work environments present a variety of risks, which can be classified as physical, chemical, biological, and ergonomic. For instance, workers engaged in physically demanding tasks may face an elevated risk of injury. Those working with chemical substances may face toxic effects, and biological risks may arise from the presence of microorganisms or other substances that pose a risk of infection. Ergonomic risks may involve physical strain on workers arising from their working position. Each risk has the potential to produce serious negative consequences for both the worker and the workplace. In addition to these factors that can directly harm the physical health of workers, there are also psycho-social risks. Psycho-social risks are of particular concern due to their potential to adversely impact a wide range of employee well-being.

Psychosocial risks emerge from a multitude of factors, including stress, mobbing, excessive workload, and imbalanced work distribution. These factors can have a detrimental impact on employees' mental well-being and professional performance.

Employees who are affected by physical, biological, and psycho-social factors in their working life may require emergency assistance when experiencing health problems. This emergency assistance is typically provided by ambulance services, which face a range of risks and dangers in their work environment. The scope and content of ambulance services, along with the diverse settings and situations in which service providers operate, expose them to a higher risk of occupational injuries and hazards compared to other sectors. Consequently, it is imperative to implement comprehensive occupational health and safety measures and develop effective strategies to mitigate these risks.

Research conducted in the emergency services sector indicates that emergency service workers exhibit a higher incidence of injuries and accidents compared to individuals employed in other sectors. This phenomenon can be attributed to the nature of the work environment and the demands imposed by the occupation. The adverse effects of the working environment on the biological, physiological, and psychological well-being of employees, compounded by prolonged exposure to these conditions, have a deleterious impact on the employee's health and well-being. For instance, prolonged exposure to loud noise has been associated with health complications, including hearing loss, cardiovascular maladies, and an increased risk of violent incidents. Similarly, operating in densely populated or high-traffic environments can result in accidents due to the potential for sudden and unexpected events. Additionally, violence in the service environment represents a grave threat to emergency service workers, and an excessively demanding workload can induce fatigue, thereby increasing the likelihood of occupational accidents. These findings are based on data obtained from various sources. For example, Alacahan's(2023) study, NIOSH's(2017) (National Institute for Occupational Safety and Health) 2017 report, Reichard et al's(2017) study and the US Fire Administration's(2022) report contain important findings on the risks that emergency service workers are exposed to.

The findings of the extant studies in the literature reveal the necessity of taking into account the needs of emergency service employees in terms of occupational health and safety and the risks they face. Relevant institutions and employers should take appropriate, necessary, and sufficient measures to protect the health and safety of their employees and provide additional support to increase service efficiency. The measures to be taken and the support to be provided are important both to protect the health of employees and to ensure work efficiency and sustainability. This paper explores the occupational risks faced by ambulance personnel, identifies key challenges, and suggests interventions to improve safety and well-being.

CONCEPTUAL FRAMEWORK

The World Health Organization (WHO) defines health as a state of complete mental, physical, and social well-being, emphasizing that the assessment of an individual's health should encompass not only the absence of disease and disability, but also the social and mental aspects of well-being. The WHO asserts that health is a fundamental right for all individuals, irrespective of factors such as race, religion, economic status, social class, or political beliefs (WHO, 2024).

First aid, defined as the initial intervention, assistance, and care provided to individuals experiencing injury or acute illness in emergency situations, is regarded as a set of practical skills that can be applied by anyone at any time. First aid is regarded as a fundamental set of knowledge and skills for all segments of society, as it can function as a life-saving mechanism in emergencies (Singletary et al., 2015).

These definitions underscore the notion that health is not confined to the physical dimension but also encompasses social and mental aspects. Consequently, equal access to health services is recognized as a fundamental right for all individuals. The accessibility of first aid training, coupled with its ease of mastery, has the potential to enhance public engagement in health services and contribute to the preservation of lives through effective intervention in emergency situations. Consequently, the promotion and dissemination of first aid training, awareness initiatives, and skill-building activities within the broader community is imperative.

It is imperative to acknowledge that throughout one's lifetime, the potential for illness or injury, whether accidental or otherwise, is a constant presence. Various natural disasters and accidents have resulted in significant injuries, disability, and even fatalities. In the context of these events, the availability of a health officer to provide emergency intervention is not a feasible option. Consequently, the initial intervention of the victims of the incident, either to themselves or other individuals present at the scene, assumes paramount importance. The rapid decision-making and intervention of individuals present at the scene who possess first aid knowledge contributes significantly to reducing victimization and accelerating recovery. Research indicates that the effective application of first aid can prevent half of the injuries and deaths caused by accidents. However, it is imperative to note that first aid is not a therapeutic intervention and aims to provide temporary assistance until full-fledged medical support is provided. Consequently, an effective first aid practice can positively influence the planning and implementation of subsequent treatment, ensuring that the affected individual receives the necessary medical care.In essence, the primary objectives of first aid are the alleviation of pain, the prevention of further illness or injury, the acceleration of existing condition healing, and the preservation of life (Singletary et al., 2015). Consequently, individuals who have undergone first aid training have the capacity to prevent fatalities, mitigate suffering, and expedite recovery by implementing effective and accurate interventions in emergency situations. First aid is of paramount importance in delivering urgent and effective assistance to victims when access to healthcare services is limited due to geographical or logistical factors. As Alacahan (2023) asserts, in cases involving individuals with training and experience in first aid, the implementation of rapid and effective interventions can contribute to a reduction in the adverse consequences experienced by victims.

The Development Process of Ambulance Services

Human beings are born into a state of constant internal conflict, driven by their fundamental need to survive. This struggle, which can be understood as a form of interaction with the natural world, has often resulted in significant injuries, including maiming and even fatalities. The practice of providing first aid to victims of health problems has been a long-standing tradition, though the reasons for its emergence are not fully understood. It is noteworthy that the instruments utilized in these interventions were initially employed during wartime. In the earliest conflicts, intervention was impractical for the majority of wounded combatants, who were often left behind on the battlefields to succumb to thirst, extreme cold, or severe injuries over the course of several days, or were killed by opposing forces. Those who were rescued from the wounded were transported to medical facilities, utilizing the available vehicles; however, due to the protracted nature of the transportation process, some individuals perished (Bell, 2009; Pollock, 2015). This demonstrates that the provision of medical assistance in war zones, when not administered in a timely and effective manner, results in the loss of numerous lives that are potentially salvageable. Consequently, the organization and accessibility of health services in a timely manner is imperative, and the necessity of prompt and effective responses underscores the significance of first aid.

The utilization of personnel and equipment to provide first aid in an effective and timely manner can be traced back to military conflicts. Throughout history, various practices have emerged concerning the medical assistance of wounded soldiers in battlefields. For instance, Philip II (382-336 BC), the father of Alexander the Great, allocated doctors and surgeons to the battlefields and also recognized the contributions of stretcher bearers who transported soldiers wounded in battle. The Roman armies also exhibited a similar approach, collecting and treating their wounded in battle.

In the medieval era, horse-drawn detachments within the armies of the Byzantine emperor Mauricius carried the wounded to tents for treatment. Similarly, in the 11th century, the Crusaders established tents for first aid before transporting wounded and sick soldiers to hospitals in Jerusalem. Queen Isabella of Spain adopted a similar approach around 1476. She mandated the construction of specialized wagons for the transportation and treatment of wounded soldiers, a practice that would subsequently be adopted by numerous European armies.

Such historical precedents underscore the significance accorded to the medical care of wounded soldiers during wartime, exemplifying the integration of humanitarian values and military strategies in the provision of medical services. The management of these services has been subject to scrutiny as a humanitarian and moral issue, as well as a measure of military efficiency for the combatant forces. The evolution of modern medical assistance has been profoundly influenced by these historical practices, leading to significant advancements in the treatment and survival rates of wounded soldiers during war.

By the mid-18th century, significant advancements were made in the organization of medical services within European armies. Most armies were equipped with various types of fixed and mobile hospitals, staffed by medical professionals such as doctors and surgeons. However, there was an absence of organized ambulance services to facilitate the timely transportation of wounded soldiers from these hospitals to the field. Dominique-Jean Larrey, a French surgeon serving in Napoleon's army, observed delays in the evacuation of wounded soldiers from the battlefield during the Battle of Limbourg. This experience motivated Larrey to devise a comprehensive ambulance system design in 1792, with the objective of enhancing ambulance services, preventing delays, and ensuring the timely treatment of the wounded. This innovation entailed the utilization of specially designed vehicles for transporting the wounded from the battlefield to medical facilities for treatment. A similar practice emerged during the American Civil War, coinciding with the accelerated development of hospital-based ambulance services and other medical aid initiatives. The expansion of civilian ambulance services in London, beginning in 1878, exemplifies the evolution of these practices, leading to the establishment of regular and continuous service in subsequent years. The historical development of ambulance services and the critical importance of emergency medical treatment of the wounded in times of war are evident. The ambulance system developed by Larrey served as a foundational model for modern emergency medicine practice, which subsequently spread worldwide.

An examination of the extant literature reveals that throughout history, various means of transportation, not previously employed in emergency response, have been utilized for the purpose of rescuing wounded and patient individuals. Contemporary evidence indicates that these vehicles are employed for patient and injured transportation during periods when ambulances are not readily available. The selection of vehicles is determined by various factors, including the number of patients and injured people, as well as the environmental conditions present. In instances where the number of patients or the environment is such that ambulances are impractical, alternative means of transportation are utilized. These include cars, trains, ships, and airplanes, which are employed when the volume of patients or the geographical expanse necessitates their use. The utilization of these vehicles is particularly pronounced during periods of global or regional wars and natural disasters.

Concurrently with technological advancements, there has been a corresponding evolution in the design and application of patient transportation vehicles. The advent of two-way radio communication after World War I facilitated the effective deployment of ambulances to numerous regions, a development that coincided with the evacuation of the sick and wounded, accelerated efforts to perform efficient and rapid surgeries, and contributed to a decline in mortality rates. Subsequent wars, including Korea and Vietnam, witnessed further advancements in patient transportation, such as air evacuation and the establishment of advanced field hospitals.

The historical evolution of emergency medical interventions and the importance of different means of transportation used in different periods can be highlighted by examining historical examples. The effective management of wartime emergencies has been made possible by the advancement of medical knowledge and technology and has significantly reduced the death toll in wars. Consequently, the evolution of emergency medicine practices and transportation resources is of paramount importance in safeguarding human life and ensuring equitable access to healthcare services.

Towards the conclusion of the 1960s, a substantial change and transformation occurred in emergency health services. This was marked by the integration of paramedics and physicians into ambulance services in the USA and France. The augmentation of personnel within ambulances, coupled with their enhanced qualifications, guaranteed the provision of expeditious and superior emergency health services.These advancements contributed to the fortification of the infrastructure and the effective administration of emergency medical services.

The establishment of the first emergency medicine department at the University of Cincinnati in 1970 marked a pivotal moment in this evolution, providing a formal framework for academic and practical studies in the field. This development enabled the systematic organization of educational, research, and practical activities in emergency medicine, contributing to the advancement of the discipline and the improvement of healthcare outcomes.

The importance of these developments is parallel to the increasing importance given to emergencies in healthcare services. Studies by Altuntaş(2015) , Bell(2009) , Pollock(2015) , Sanjay & Abhilash(2019) , Sullivan et al.(2013)

and Yenal(2010) similarly emphasize the importance of this transformation and development in emergency medicine services. These studies shed light on efforts to increase the quality of emergency health services and improve the quality of life of patients.

Development Process of Ambulance Services in Türkiye

A division of the historical development of health services in our country into two separate phases is possible: the pre-republican period and the republican period. A thorough examination of the pre-republican era, a time period characterized by the dominance of the Seljuk and Ottoman States, illuminates this issue.

During the Seljuk period, the Seljuk army maintained mobile hospitals that accompanied the army and met the medical needs of soldiers. During the reign of Sultan Malik Shah, the army was staffed with surgeons, ophthalmologists, orderlies, and mobile hospital tents, which enabled effective emergency medical interventions on the battlefield. These mobile hospitals, along with the medical personnel, medicines, and medical supplies, were transported by approximately 200 camels, ensuring rapid deployment to any area where the army's presence was required. In summary, health services during this period were provided through civil society institutions established to address the diverse needs of society (Kesik, 2020).

In the Ottoman Empire, the health services exhibited a more intricate structure compared to that in preceding periods. Until the close of the 19th century, institutional health services were predominantly available to members of the palace and the army, while the public met its health needs from physicians who practiced their profession freely. During this period, the official institution responsible for the regulation of health services was known as "Reis'ul Etıbba" or Hekimbaşı. This official held the authority to employ and assign physicians, surgeons, and other health personnel.

However, by the close of the 19th century, a paradigm shift occurred, marked by the emergence of the notion that the provision of health services should be regarded as the primary responsibility of the state and a service that encompassed the entire population. Consequently, the institution of Hekimbaşı was abolished, and the Nezaret of Tıbbiye was established as its successor. Concurrently, institutions such as Sanitary Inspectorates and Hometown Medical Departments were founded to ensure the organization and continuity of health services (Alacahan, 2023).

In 1992, the "Green Card" initiative was implemented to ensure that individuals lacking sufficient income and social security to cover health services were covered by the state at no cost. This constituted a significant step in enhancing the accessibility of health services and addressing the health needs of the population (Çavmak & Çavmak, 2017).

Subsequently, in 2003, the Health Transformation Program was initiated, signifying the onset of a radical transformation and enhancement in Türkiye's health sector. The program's primary objectives included the restructuring of the Ministry of Health, the unification of the Social Security Institution under a single roof, the establishment of a general health insurance system, and the separation of health services and financing.

As stated by Çavmak and Çavmak (2017) , another significant objective of the Health Transformation Program is to grant autonomy to hospitals. This objective aimed to establish a more effective and flexible structure for hospital management and to enhance the quality of services provided. Furthermore, steps have been taken to expand the scope of family medicine services and to prioritize preventive health activities, with the aim of more effectively addressing the health needs of the population.

The Health Transformation Program has been identified as a pivotal transformation in Türkiye's healthcare services, with its implementation resulting in substantial improvements and advancements across numerous domains of the health sector.

An examination of the evolution of ambulance services in Türkiye reveals that the initial steps were taken during the Ottoman Empire. Towards the close of the 18th century, a series of endeavors were undertaken to organize and systematize health services within the Ottoman army. To facilitate the transportation of wounded soldiers, the use of carriages was widely adopted, and in addition to physicians and surgeons, orderlies were also appointed. To incentivize doctors working in the army, those demonstrating exceptional success in treating patients were promoted in rank.

In the 19th century, as part of the broader modernization efforts within the Ottoman army, there was an initiative to enhance health services. This was followed by the establishment of Tıbhane-i Âmire in 1827, which was created to address the physician shortage within the army. Subsequently, in late 1838, Mekteb-i Tıbbiyye-i Şâhâne, a contemporary military medical school, was founded and initiated its educational operations in March 1839. Concurrently, the establishment of the Mekteb-i Tıbbiyye Nezâreti led to the transfer of certain responsibilities

formerly held by the chief physician to this institution. However, as the chief physician concurrently served as the ministry's head during the institution's inception, the transition of authority was gradual. Following 1850, a distinction was drawn between civilian and military health services within the Ottoman Empire, leading to the adoption of distinct management approaches. Thereafter, the oversight of military and civilian health services was transitioned to the jurisdiction of the Mekteb-i Tıbbiyye-i Şâhâne and Umûr-i Tıbbiyye-i Mülkiyye Nezâreti. This transition was formalized with the establishment of the Department of Military Health in 1862, which led to the transfer of authorizations related to military health services to this newly established institution (Şimşek, 2018).

The "Ottoman Wounded Soldiers Aid Society," established in 1868, was the first organization to provide emergency intervention and transportation services to wounded soldiers. This society was later named the "Ottoman Hilal-i Ahmer Society," and it introduced horse-drawn ambulances to facilitate the transportation of wounded soldiers (Alacahan, 2023). During the 1897 war, the organization expanded its role, and not only doctors were assigned to treat wounded soldiers, but mobile hospitals were also established to minimize casualties. This initiative enabled the provision of medical intervention to be carried out more effectively under wartime conditions (Şimşek, 2018). Until 1935, the society that provided these services was named the Turkish Red Crescent Society.

In 1871, doctors were appointed to address the urgent health problems of the people in the provinces. The provision of free, and when necessary, home health services by these physicians can be considered as the first steps of pre-hospital health services. The delivery and dissemination of pre-hospital health services to the entire population of the country was realized during the Republican period (Alacahan, 2023).

The studies by Altuntaş (2015), Şimşek (2018), Şimşek et al. (2019) and Kesik (2020) provide important information about the history and development process of ambulance services in Türkiye. These studies can be considered as an important source to understand the development phases of ambulance services until today and to draw a roadmap for future improvements. These studies inform that after the establishment of the Medical Aid and Assistance Organization, the dispatch and management of pre-hospital health services were transferred to municipalities within the context of the Law on Public Health, but the services could not reach the desired level due to the lack of resources such as finance and materials of the municipalities.

In the late 1980s, important developments were observed in the field of ambulance services in Türkiye. Within this framework, in 1986, ambulance services were started to be provided under the name of "Hızır Emergency Service" in Ankara, İzmir and İstanbul for patient transportation. Subsequently, a new system called "112 Emergency Aid and Rescue" was put into service in 1994. As a result of these practices, health personnel such as physicians, nurses and drivers started to work in ambulances. In the process, health professionals such as emergency medical technicians and paramedics trained in pre-hospital emergency health services were also assigned to these services. Again in 1994, the Ministry of Health put new emergency health services stations, call centers and ambulances equipped for the service into service and updated radio systems.

Administrative structures were reconsidered and in 1997 the Department of First Aid and Emergency Health Services was reorganized, while in 2000 the "Department of Emergency Services" was established within the General Directorate of Primary Health Care Services. In 2003, this department was organized as a general directorate with the addition of departments and branch directorates. With these steps, the organization and management of emergency health and ambulance services have become more effective.

In today's Türkiye, ambulance services are carried out by the Provincial Ambulance Service Command Control Center and 112 Emergency Health Services Stations within the Provincial Health Directorates (Alacahan, 2023).

It is evident that vehicles and equipment play a pivotal role in the delivery of health services, and ambulances are among the most critical tools in this regard. In Türkiye, there has been a substantial increase in the number of ambulances put into service between 2002 and 2021. In 2002, the total number of ambulances in Türkiye was 2,963, of which 618 were classified as Emergency Aid ambulances and 2,345 were of other types. However, by 2021, this figure had increased significantly, reaching a total of 6,446, including 5,801 Emergency Aid ambulances and 977 other ambulances. Within Türkiye's emergency medical services, a diverse fleet of ambulances is strategically deployed to address distinct operational demands. A comprehensive study by Başara Bora et al. (2023) delves into the characteristics and operational dynamics of private ambulances and the patient transportation data in 2021. The findings, presented in Table 1, offer valuable insights into the composition and functionality of Türkiye's emergency medical services infrastructure.

Table 1: Ambulance Types, Number and Number of Patients Served (Başara Bora et al., 2023)

Ambulance Types	Number of Vehicles (Number)	Number of Patients Receiving Services (Person)
Snow Crawler Ambulance	237	6691
Intensive Care and Obese Ambulance	92	9080
Ambulance with 4 Stretcher	62	2289
Motorcycle Ambulance	61	11040
Yenidogan Ambulance	50	24488
Snow track Ambulance	21	20
Helicopter Ambulance	12	2980
Sea Ambulance	6	3954
Airplane Ambulance *	3	1204
*Except for this type of ambulances, other ambulances are added to the number of Emergency Ambulances.		

Ambulance Services Implementation Models

Since 1970, two divergent schools of thought have emerged in the provision of ambulance services. These schools are generally referred to as the British-American and French-German models. However, various models from these two models have been implemented in emergency medicine systems in different countries worldwide. (Alacahan, 2023)

British – American (B-A) Ecole

In the British/American model, the objective is to provide patients with less pre-hospital intervention and to facilitate their swift transportation to a health unit. In this regard, it functions in an integrated manner with the police or fire department in emergency situations. The provision of ambulance services is overseen by clinical professionals, specifically emergency medical technicians and paramedics. This model is predominantly implemented in developed countries where emergency services are regarded as a distinct medical specialty. In nations adopting this system, patients are frequently directed to emergency departments under the supervision of paramedics, ensuring the effective and efficient delivery of services. This model has been successfully implemented in numerous countries, including the USA, Canada, New Zealand, Australia, as well as many countries in Asia, Europe, and Africa (Paksoy, 2016; Şimşek et al., 2019).

French – German (F-G) Ecole

The model under discussion has been shown to facilitate more efficient access to emergency health services by ensuring that patients' emergencies are identified promptly and appropriate treatment is initiated without delay. The model involves the relocation of hospital facilities to the scene of the emergency, where care is provided by emergency physicians, who are typically anesthesiologists and trauma specialists. This approach has been adopted in a number of countries, including France, Germany, Greece, Russia, Austria, Malta, Portugal, and several Scandinavian countries (Paksoy, 2016; Şimşek et al., 2019; Tanrıverdi & Köksal, 2018).

The most salient distinction between the models pertains to the manner in which patients are transferred and the subsequent delivery of care. The B-A system prioritizes expeditious transport to a medical facility for treatment, whereas the F-G system emphasizes the provision of hospital infrastructure at the patient's location, thereby facilitating on-site treatment. A notable difference is the utilization of a reduced number of ambulances and a concomitant reduction in costs within the F-G system (Dick, 2003; Tanrıverdi & Köksal, 2018)

A comparison of these two systems is presented in Table 2. Throughout the world, the main objective of pre-hospital emergency health systems is to save human lives through rapid and effective intervention (Alacahan, 2023) . In this context, the efficiency and accessibility of emergency health services can be increased by choosing the most appropriate system for each country's own needs and conditions.

Table 2: Comparison of British - American and French - German Ecole's (Alacahan, 2023)

Ecole	B - A (British - American)	F - G (French - German)
Target	The patient is taken to hospital.	Hospital facilities are brought to the patient.
Scope	Public safety organization	Public health organization
Emergency case care service	Intervening at the scene until the patient's condition is stable and taking him/her to the relevant service	Continuing the intervention started at the scene during transportation and taking the patient to the emergency room
Service provider	Paramedic and emergency medical technician	Doctor and paramedic
Transport Unit	To the relevant unit	To the emergency unit

The Turkish ambulance service system exhibits characteristics that are a hybrid of the British-American and French-German systems, yet it also displays unique features that are indicative of various factors. For instance, the composition of the medical personnel on board some ambulances includes not only doctors but also other health professionals, thereby approximating the French-German model. Conversely, in scenarios where the necessity for immediate medical intervention is not as pressing, the "grab and go" approach aligns more closely with the British-American system.

A distinctive feature of Türkiye's emergency medical services is the centralization of coordination. Unlike European countries, where local governments are involved in the management of emergency health services, Türkiye's Ministry of Health has a more centralized approach. However, there is flexibility in the operational aspects, and cooperation with other emergency services, such as the police and fire departments, is possible. This collaboration is driven by the needs and initiatives of the respective ambulance units (Şimşek et al., 2019; Yaman, 2015)

The current mixed structure of ambulance services in our country is the result of various factors, including the general structure of health services, economic conditions, and societal needs. This structure has been developed in accordance with the unique conditions of the country, thereby allowing for the effective and efficient provision of emergency health services. In this framework, continuous improvement and updating are important for the protection of public health and the rapid response to emergencies.

FINDINGS AND DISCUSSION

Those engaged in the provision of ambulance services are frequently confronted with exigent circumstances due to the nature of their duties, compelling them to respond expeditiously to these situations. However, concomitantly with these rapid and efficacious interventions, they encounter a myriad of risks that jeopardize their physical and mental well-being. Notably, the risk of traffic accidents while enroute to or from the incident or during patient transport to the ambulance or hospital is a salient concern. These risks, inherent to the service process, have the potential to culminate in accidents, jeopardizing the safety of emergency health workers and patients.

Emergency health workers may also be required to lift heavy loads during patient interventions, which can lead to physical problems in the long term. Constant performance of strenuous and repetitive physical movements while working in the ambulance can lead to various muscle and joint problems, such as lower back pain. In addition, intense work tempo and long shifts can be counted among the important risks faced by emergency health workers, which can lead to psychological problems such as burnout and decreased work performance.

Failure to implement personal protective measures and utilize appropriate equipment during patient interventions can result in health complications and potential diseases due to patient blood contamination or lacerations from sharp instruments. Furthermore, the risk of exposure to violence by patients or their relatives during interventions is a significant concern, as it can lead to physical and psychological harm, thereby hindering the ability to perform the duties of the profession.

Given the prevalence of potential hazards, it becomes imperative for emergency health workers to exercise caution in their professional practice and adopt safe working methods by implementing the requisite precautionary measures. Moreover, in an effort to address these risks and safeguard the well-being of personnel, organizations are obliged to offer pertinent training and support. This approach will facilitate the delivery of efficient emergency health services, thereby ensuring the health and safety of employees.

Occupational Risks of Ambulance Service Workers

Due to the nature of their profession, ambulance service personnel have to respond quickly to emergencies. However, they may face a number of occupational risks during these rapid interventions. NIOSH's "Guidelines for Protecting the Health and Safety of Healthcare Workers" is an important resource that addresses the risks to which ambulance service personnel may be exposed (NIOSH, 1998).

In the studies conducted on the subject in the literature, it is seen that these risks are listed and examined in detail based on NIOSH guidelines to understand and determine the occupational risks of ambulance services personnel (Arsal Yıldırım & Gerdan, 2017; Bulut, 2016; Salar, 2022; Yenal, 2010) . It can be said that these studies make a serious contribution to the scientific explanation of the subject by pointing out the measures to be taken to protect the health and safety of ambulance services personnel. Table 3 shows occupational risks, their causes and risk levels (Alacahan, 2023).

Table 3: NIOSH Occupational Risks of Ambulance Service Workers (Alacahan, 2023)

Occupational Risks	Main cause	Degree Low Risk (DDR)	Rating Moderate Risk (DOR	Rating High Risk (DYR)
Physical	Inadequate thermal comfort, inadequate lighting, high temperature or coldness, vibration, noise, etc.	-	Injuries as a result of slipping and falling due to hot or cold weather stress, lack of lighting	Permanent hearing loss
Biological	Inhalation of airborne droplets during patient intervention, contact with blood and body fluids, injector sticks, sharps injuries, etc.	Temporary incapacity to work due to illness	Being a carrier of an infectious disease.	Hepatitis, SARS, MERS, AIDS, Catching COVID-19, Influenza, etc.
Chemical	Allergic reaction as a result of the use of chemicals and materials, latex-derived gloves and materials, antiseptics and disinfectants used in the ambulance	Allergy at a simple level	-	Anaphylactic shock, asthma attack
Psychosocial	Intense and stressful working conditions, long working hours and shifts, short leave periods and insufficient leave time, harassment and violence against employees by patients and/or their relatives	Use or increased use of addictive substances (smoking, alcohol, drugs, etc.), emotional distress such as anxiety, anxiety, depression	Substance abuse	Compassion fatigue, burnout syndrome
Ergonomic	Lifting heavy loads, lifting loads in an inappropriate position, continuous and repetitive forceful movements	Musculoskeletal disorders, temporary incapacity for work	Temporary disabilities	Permanent injuries
Environmental	Ambulance accidents, violent incidents, sabotage, terrorist attacks, natural disasters, electric shocks, fires, etc. and situations such as time pressure and lack of proper communication.			Temporary/permanent disability, death
Other	Inadequate and unhealthy nutrition of employees, problems in case registration and notification, deficiencies in ensuring hygiene conditions at stations, lack of auxiliary personnel at stations	Obesity, accidents during cleaning operations	Infections caused by unhygienic environment	

A brief summary of the risks is given in Table 3;

The adverse environmental conditions faced by paramedics during emergency interventions and their continuous physically demanding and repetitive movements are the most prominent risks. In addition, the physical strain of lifting the stretcher and handling the patient is also a significant risk. Accidents such as falling or slipping can cause problems such as muscle and joint damage.

Ambulance workers can be exposed to the risk of infection during patient interventions. One of these risks is the risk of contracting infectious diseases through the respiratory tract, bloodstream or sharps if appropriate personal protective equipment is not used.

In addition, paramedics must move quickly and safely in heavy traffic when responding to emergencies. This situation increases the risk of ambulances being involved in traffic accidents and life-threatening situations. They may also be exposed to violence from patients or their relatives while responding. This can cause physical and psychological harm to ambulance workers. By its very nature, the profession involves an intense pace of work, long shifts and working under constant stress. This situation can lead to occupational burnout in ambulance workers.

These occupational hazards can threaten the safety, health and well-being of EMS workers. It is imperative that protective measures are taken to minimize these risks and mitigate their effects. Therefore, health care institutions and authorities will protect workers by taking measures such as training workers, providing appropriate equipment and implementing safety protocols. Protecting workers will improve the quality and efficiency of their services.

A detailed examination of the occupational hazards faced by emergency services personnel, as summarized above, will help to understand the issue.

Physical-Ergonomic Risks

The working conditions of ambulance service personnel may expose them to physical risk factors. These risk factors include noise, dust, radiation, insufficient or excessive temperature and lighting of the working

environment. These physical risk factors may cause temporary or permanent disorders in healthcare workers (TTB, 2008).

Especially prehospital emergency health workers face various physical risks while working in the intervention environment and ambulance. It is very difficult to manage factors such as temperature control, noise levels, lighting conditions and hygiene in these environments (Şenol, 2018).

In the response environment, ambulance service workers face various challenges in obtaining a working environment that is whether appropriate due to the nature of their work. Processes such as regulating thermal conditions, reducing inadequate lighting and controlling noise level may often not be possible for ambulance workers in the performance of their duties. Particularly in relation to heat and temperature, ambulance workers may be exposed to various thermal risks. These conditions include heat cramps, heat exhaustion, heat exhaustion, heat strain, heat stress, heat stroke and hyperthermia (Jacklitsch et al., 2016).

Ambulance workers may develop various health problems as a result of exposure to physical risks. Especially problems such as hearing and performance loss, hypertension and sleep disorders can be associated with these risk factors (TTB, 2008) . Therefore, it is important to take necessary and adequate measures to protect the health of ambulance services personnel and to ensure that they perform their services appropriately and safely. These measures can be in various dimensions, such as improving the working environment, the use of equipment and the provision of personal protective equipment.

According to NIOSH, more than 22,000 emergency health care workers present to health care facilities with service-related injuries. It has been determined that most of the applicants are workers with little working experience (<10 years). At the same time, it was found that the most common injuries to workers' bodies were strains and sprains in the back and neck. These injuries are mostly seen to occur during transportation to the scene after the call or during intervention to the emergency (NIOSH, 2017). These findings point to the importance of the risks that emergency healthcare workers are exposed to while performing their profession and the consequences of these risks. Therefore, improving working conditions and taking safety measures are critical to protect the health and safety of this professional group.

Ambulance service workers may suffer from discomforts such as hernias and muscle injuries in body parts such as arms, neck, back and waist due to factors such as long working hours, repetitive repetitive strenuous movements and heavy lifting in unsuitable positions (Friedenberg et al., 2022). In a study conducted by Weaver and colleagues (2015), it was determined that there was a positive correlation between the increase in occupational injuries and illnesses and the increase in shift length of prehospital emergency health workers. Furthermore, Hansen and colleagues (2012) reported that 40% of ambulance workers experienced low back pain and 42% experienced arm, shoulder and neck pain. These findings show that ambulance service workers are exposed to physical difficulties due to the nature of their work and that these difficulties may lead to occupational health problems. Therefore, taking appropriate ergonomic measures and improving working conditions is an important step to protect the health and well-being of this occupational group.

In a study by Maguire and Smith (2013) , accident reports of ambulance service workers between 2003 and 2007 were analyzed. According to these reports, 17% of the injuries (3710 cases) were found to cause long-term labor loss. In addition, sprains and strains occurred in 67% of the cases (14,470 cases) and back injuries in 43% (9290 cases). In addition, it was determined that 86% of the 59 professionals died as a result of transportation accidents, 8% as a result of attacks and 33% as a result of multiple traumatic injuries. Tahernejad et al. (2024) stated in their study that the prevalence of musculoskeletal disorders in ambulance service workers is very high. These findings point to the importance of various risks that ambulance service workers are exposed to and the importance of these risks. Therefore, it is important to take effective measures and provide appropriate training for the safety of ambulance service workers.

Chemical Risks

Ambulance service workers are exposed to a variety of chemical risks in the course of their duties. These risks include the potential for exposure to chemicals during the intervention process in the event of a chemical accident, during the disinfection of ambulances and equipment, and while ensuring personal hygiene. It is important to note that chemicals can enter the body through four primary avenues (Alacahan, 2023).

Inhalation refers to the process of introducing chemicals into the body through the respiratory system. EMS workers are susceptible to inhalation of chemical vapors or aerosols during their line of work.

Ingestion is defined as the process by which chemicals enter the body, whether intentionally or unintentionally. This phenomenon can occur when chemicals are transferred into the oral cavity through direct contact with contaminated surfaces or through the transfer of chemicals from the hands to the mouth.

The potential exists for the entry of injection chemicals into the body through an open wound or a puncture in the skin. Consequently, ambulance service workers may be susceptible to direct entry of chemicals into the skin as a result of sharps injuries from accidents.

Absorption is defined as the direct transfer of a chemical substance into the body through the skin or eyes. Ambulance service workers are susceptible to such risks when their skin or eyes come into contact with chemicals.

These entry routes are of critical importance in evaluating the risk of exposure to chemicals for ambulance service workers and in implementing the requisite safety precautions. These measures should primarily consist of the use of appropriate personal protective equipment, the organization of cleaning and disinfection procedures, and the provision of training.

It has been established that approximately 300 distinct chemical compounds and substances utilized in healthcare organizations present a multitude of potential hazards to the well-being of healthcare personnel. For instance, latex-derived gloves employed by healthcare workers have been associated with the development of skin allergies. Additionally, the inhalation of latex dust has been linked to the occurrence of asthma attacks or anaphylactic reactions. Furthermore, the utilization of hand sanitizers and surface disinfectants can result in the onset of allergic reactions. Moreover, the improper disposal of medical waste following drug administration has been demonstrated to potentially induce health complications (Goulart et al., 2020; Gyllencreutz et al., 2024; Larson et al., 2016; Şenol, 2018).

In a study conducted by Gonczaryk et al. (2022), it was examined how ambulance workers perceive occupational risks. According to the results of the study, it was determined that biological factors constitute the most important risk group in the risk perception of 47% of the employees. In addition, psychophysical factors (41%) ranked second, chemical factors (7%) ranked third and physical factors (5%) were perceived as the least important risk group. These results show that ambulance workers generally associate the risks caused by chemical substances with biological and psychophysical factors. Healthcare workers may experience injuries due to these risks if they do not use appropriate and necessary personal protective equipment. Therefore, it is extremely important for ambulance service workers to use appropriate protective equipment and take necessary precautions to reduce the risks of exposure to chemical substances.

Biological Risks

Healthcare workers are considered to be at higher biological risk because of their constant exposure to blood and body fluids. Exposure to or accidental contact with blood and body fluids in the context of providing medical interventions increases the risk of exposure to infectious agents and health problems for all healthcare workers, including pre-hospital emergency medical service workers.

Exposure to infectious agents is considered the most important occupational risk factor for healthcare workers. Such exposure typically occurs through mucocutaneous injury (i.e., the splashing of blood and body fluids into the eyes, nose, or mouth); non-contact skin exposure; or percutaneous injury (i.e., injury from a needle stick contaminated with blood and body fluids or a skin cut caused by sharps). Consequently, the use of appropriate protective equipment and training, in conjunction with the implementation of safe working practices, is imperative to minimize exposure of healthcare workers to blood and body fluids.

A notable risk of exposure to such microorganisms is faced by ambulance service workers due to their frequent contact with bacterial and viral pathogens, including hepatitis (types B and C) and the human immunodeficiency virus (HIV). Emergency medical technicians and paramedics are at an increased risk of infection due to their role in providing prehospital emergency medical care, which involves direct contact with blood and body fluids (BBF). This increased risk is a result of the occupational exposure to potential pathogens that comes with providing care to patients in various medical settings (Corrao et al., 2012; Sarbaz et al., 2023).

Ambulance service workers are also susceptible to exposure to pathogens that cause respiratory diseases. Specifically, respiratory infections such as SARS, MERS, and SARS-CoV-2 pose a significant risk to ambulance crews in the course of their daily work (Alacahan, 2023; Gonczaryk et al., 2021).

It has been determined that the likelihood of infection is contingent upon the frequency with which personal protective equipment is utilized, the strict implementation and adherence to infection control protocols, and the meticulous execution of hygienic practices. Furthermore, the regular administration of in-service training and the

implementation of awareness-raising programs have been identified as effective measures for mitigating the risk of infection. This is achieved through the cultivation of a comprehensive understanding and proficiency in risk management among ambulance service employees.

In recent years, especially the COVID-19 pandemic that started in 2019 has been the most notable among the biological risks to which ambulance services workers are exposed. In their study Gonczaryk et al. (2021) stated that in 2020, out of 3020 paramedics, the number of those who contracted COVID-19 was quite high and 5 workers lost their lives in the process. Similarly, Javanmardi et al. (2023) examined the effects of occupational exposure to COVID-19 on burnout among ambulance service workers in Iran and found that 30.7% of ambulance workers with high exposure experienced high levels of burnout. Sarbaz and colleagues(2023) found that 31.5% of pre-hospital emergency health workers were exposed to contaminated needle sticks and 38.5% were exposed to contaminated scalpel sticks. Another study reported that female employees were more exposed to biological risks and had accidents than male employees (Usul et al., 2020). These findings suggest that ambulance service workers have high levels of exposure to infectious diseases such as COVID-19, which increases their occupational risks.

Psycho-social Risks

Mental health is defined as a state of well-being in which individuals possess the capacity to cope with life's challenges, actualize their potential, acquire knowledge, and contribute to society. It is a fundamental human right and is crucial for individual, social, and socio-economic development.

Mental health encompasses a wide range of conditions, including intellectual and functional disorders, psychosocial disabilities, and mental conditions that present a significant risk of serious distress or self-harm. While not universally applicable, individuals grappling with mental health challenges are predisposed to diminished mental well-being.

The influence on an individual's mental health is multifaceted, encompassing both personal and societal factors. These factors can either contribute to the reinforcement of mental health challenges or serve as catalysts for their alleviation. Psychological and biological elements, including an individual's emotional intelligence, genetic predispositions, and substance use patterns, can render some individuals more susceptible to mental health difficulties. Furthermore, exposure to adverse social, economic, geopolitical, and environmental conditions, such as poverty, violence, inequality, and environmental deprivation, has been demonstrated to increase the risk of mental health problems.

Risks may occur at any stage of life; however, those that occur during particularly developmentally sensitive periods, especially in early childhood, have the potential to be extremely harmful. For instance, harsh parenting and corporal punishment have been shown to negatively affect children's mental health. Notably, bullying is a leading risk factor for mental health problems (WHO, 2022).

In the contemporary business world, there is a predominant consensus that psychosocial risks are associated with the design and management of work, potentially resulting in physical or mental harm. In the intricate landscape of contemporary work, effective management and prioritization of psychosocial risks have become imperative. Work exerts a substantial influence on the physical and mental well-being of individuals. Psychosocial risks, such as job stress, emotional exhaustion, and work-related depression, have the potential to impact the productivity of employees and businesses. These factors have the potential to jeopardize the long-term viability of organizations and contribute to escalating health and social welfare expenditures in society at large. In many countries, where stress has emerged as a predominant cause of long-term absenteeism, there is an urgent need to effectively address psychosocial risks in the workplace (Langenhan et al., 2013). In this context, the development of effective policies and practices to identify, assess, and mitigate psychosocial risks in workplaces is critical to protect the health and well-being of employees.

OSHA (Occupational Safety and Health Administration) (2015) defines workplace violence as acts of violence, including physical assaults, verbal assaults (verbal harassment, threats, etc.) and threats of assaults, against people in the workplace and on the job.

Depression is characterized by a diminished interest and pleasure in activities, accompanied by a pervasive sense of unhappiness, sadness, hopelessness, and irritability (Angst & Doblek-Mikola, 1984).

Burnout syndrome is a condition that arises from unmanageable chronic stress in the workplace. The World Health Organization (WHO) offers a comprehensive definition of burnout, delineating its three dimensions (WHO, 2019).

- ✓ A feeling of energy depletion or exhaustion,

- ✓ Increased mental distance from work or feelings of negativity or cynicism about work,
- ✓ Decline in professional effectiveness.

The World Health Organization (WHO) has classified burnout as an occupational phenomenon; however, it has not recognized it as a medical condition.

The three-component burnout model developed by Maslach and Susan E. Jackson (1981)defines burnout as emotional exhaustion, depersonalization (emotional withdrawal from the people served) and a decreased sense of personal accomplishment.

Emergency medical technicians (EMTs) and paramedics encounter a range of psychosocial risks as a result of the nature of their profession. The risks they face include, but are not limited to, extended work hours, demanding shifts, time pressure, and stress stemming from the work environment (Murray et al., 2020). Studies have shown that ambulance service workers are at risk of violence (Alacahan et al., 2023; McGuire et al., 2025), depression (Ferkai et al., 2024; Golding et al., 2017), posttraumatic stress disorder (Hruska & Barduhn, 2021), anxiety (Lawn et al., 2020), compassion fatigue (Clompus & Albarran, 2016; Eldemir, 2024), burnout (Liu et al., 2024; Thielmann et al., 2022), chronic fatigue/insomnia (Barger et al., 2018; Salami et al., 2023), family problems (Montero-Tejero et al., 2024; Roth & Moore, 2009), increased drug, alcohol and cigarette use and addiction (Donnelly, 2012; Karakaş et al., 2024; Şenol, 2018), and even suicide (Vigil et al., 2021; Witczak-Błoszyk et al., 2022).

For example, a study by Alacahan and colleagues (2023) reported that 60.3% of ambulance service workers have experienced cases of violence. Similarly, Donnelly and Siebert (2009) study reported that the increase in alcohol and drug use increased to 40%, Almutairi and ElMahalli's (2020) study reported that the rates of experiencing depersonalization and emotional burnout were 40% and 63% respectively, Aras and Gümüşsoy (2024) study reported that the increase in burnout level decreased job satisfaction and increased desire to leave the profession, and Butoi et al. (2025) study reported that men in emergency health services experience burnout more than women. These findings emphasize the importance of effective support and interventions to protect the psychosocial health and well-being of ambulance service workers.

CONCLUSIONS AND RECOMMENDATIONS

The literature frequently emphasizes the complex and stressful nature of the work environment for ambulance service workers, who are exposed to a multitude of risks due to their profession. Given their responsibility for providing medical assistance in emergency situations, the physical and mental health, resilience, and well-being of ambulance service workers are of paramount importance. The ability to make quick and effective decisions under sudden and uncertain conditions places significant demands on their stress coping skills and emotional resilience. To ensure optimal physical and psychosocial health and well-being, it is imperative to provide ambulance service workers with adequate support and resources. Regular training and counseling services are crucial for helping them cope with the challenges associated with their profession. By offering this comprehensive support, we can ensure that ambulance service workers can effectively fulfill their duties while maintaining a healthy mental state, thereby contributing significantly to the protection of public health.

In this context, the use of uniforms and personal protective equipment suitable for seasonal conditions can help ensure thermal comfort against the adverse effects of weather conditions. In addition, by using ergonomically designed equipment such as heat belts or vests, thermal comfort conditions can be improved without restricting the movement of employees. It is also important to reduce noise and vibration levels in the intervention environment inside the ambulance. For this purpose, noise and vibration risk can be minimized by placing acoustic insulation materials inside the ambulance. Furthermore, in scenarios where the lighting in the outdoor intervention environment is found to be inadequate, the installation of floodlights on the ambulance's ceiling can be considered to ensure optimal illumination of the surroundings. These measures have the potential to enhance the performance of ambulance service workers and safeguard their health by ensuring a safer and more comfortable working environment.

It is imperative that the lighting systems in the ambulance and at the scene of the incident are of appropriate color and intensity so as to prevent eye fatigue and distraction among workers. In order to mitigate the risk of injury, it is essential to acquire and employ proper lifting techniques to safeguard areas such as the waist, back, shoulders, and arms. Additionally, muscle strengthening exercises can serve as a means of reducing the risk of injury to workers. The development and implementation of equipment designed to distribute the weight borne by workers during stretcher lifting, along with the use of appropriate motors beneath the stretcher, have also been shown to reduce the risk of injury. The use of appropriate footwear and work surfaces is crucial for preventing slip injuries. Furthermore, it is imperative to minimize the physical and ergonomic risks associated with sudden movements

while the ambulance is in transit. These measures are of paramount importance for ensuring the safety and well-being of ambulance service workers.

The utilization of chemicals for the disinfection of ambulance surfaces and equipment without the proper Personal Protective Equipment (PPE) can result in the occurrence of allergies and skin disorders in workers. Specifically, the employment of latex-derived gloves has been associated with the development of latex-induced allergies and anaphylactic reactions. To mitigate these risks, it is advisable to opt for nitrile and vinyl-derived gloves over latex, as they have been shown to be more effective in preventing latex allergies. It is imperative for workers to utilize protective equipment, such as gloves and masks, during disinfection procedures to mitigate exposure to chemicals, thereby safeguarding their health and preventing adverse effects.

A variety of precautionary measures can be implemented to mitigate the risk of exposure to blood and body fluids during intervention procedures. The utilization of a proper mask is imperative to safeguard the respiratory tract, while the employment of a visor is crucial to protect the eyes. Additionally, the use of puncture and cut-resistant gloves on the hands is essential for hand hygiene. Furthermore, regular immunization of workers against infectious diseases, such as hepatitis and influenza, can augment protection against biological hazards. These measures collectively contribute to the reduction of infection risk and the facilitation of services in a safe working environment for ambulance service workers.

A variety of measures can be implemented to ensure the occupational safety and psychosocial well-being of ambulance service personnel. Among these measures, increasing the number of personnel to serve in this field and organizing working hours have been shown to help balance the workload. Additionally, training in communication techniques and organizing shift systems to facilitate effective collaboration among personnel and with service recipients can enhance their ability to cope with stress and engage in effective collaboration.

It is imperative to furnish legal and moral support to healthcare workers who are subjected to acts of violence, with the objective of ensuring their safety and enhancing their performance and motivation. Moreover, the imposition of deterrent penalties on perpetrators of violence will contribute to the prevention of future incidents of a similar nature.

The provision of psychological support programs for employees has been demonstrated to be an effective measure in facilitating the management of psychosocial risks. These programs have been shown to contribute to the preservation of mental well-being by preventing and ameliorating disorders such as burnout and depression. Consequently, the implementation of such programs has been identified as a pivotal strategy in the reduction of the impact of psychosocial risk factors, thereby fostering a more secure and conducive work environment for ambulance service personnel.

A review of the extant literature reveals that ambulance service workers in different geographical areas face similar challenges, with psychosocial risk factors being of particular significance. Excessive workload, exposure to violence, and psychological disorders following these incidents are prominent risk factors that employees in the sector frequently highlight.

The implementation of the proposed solutions for each risk factor will improve the health and well-being of employees in this sector. For example, measures such as increasing the number of staff or organizing shift systems to balance the workload will contribute to increasing the efficiency and quality of service and will contribute to significant gains for employees and health enterprises.Legal support and trainings on violence prevention can be provided to cope with violence incidents. The provision of psychological support programs is also recommended, as these have been shown to assist employees in coping with stress and protecting their mental health.

The implementation of these recommendations has the potential to enhance the well-being of ambulance service employees, thereby facilitating their ability to perform their duties in a more optimal manner. The risk-mitigating and preventive measures that are incorporated into the execution of the profession are expected to engender a sense of job satisfaction, which, in turn, is anticipated to have a positive impact on various aspects of employee performance, including increased productivity, reduced labor turnover, enhanced organizational commitment, and the sustainability of services.

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