

## An Assessment of Occupational Accidents and Diseases Among Female Healthcare Personnel in Human Health Services

Sağlık Hizmetlerinde Çalışan Kadın Sağlık Personelinde  
İş Kazaları ve Meslek Hastalıkları Üzerine Bir Değerlendirme

Elif İŞIK DEMİRARSLAN , Kazım Onur DEMİRARSLAN 

### ABSTRACT

This study was designed as a cross-sectional descriptive investigation with the objective of referencing previous research by disclosing the incidence of occupational accidents and occupational diseases among female personnel employed in human health services in Turkey. The study analyzed data from the Social Security Institution of the Republic of Turkey spanning the years 2013 to 2020. The research findings indicate that female healthcare workers experience a greater incidence of occupational accidents and illnesses compared to their male counterparts. Nevertheless, male healthcare workers exhibit a higher mortality rate resulting from work-related accidents. In contemporary times, there has been a decline in work-related accidents and fatalities, as well as occupational illnesses, among women employed in various industries. However, there has been a notable rise in work-related accidents and fatalities, as well as occupational illnesses, among female healthcare professionals.

**Keywords:** Female Health Personnel, Occupational Accidents, Occupational Diseases.

### ÖZET

Bu çalışmada, Türkiye'de insan sağlığı hizmetlerinde çalışan kadın personeller arasında iş kazaları ve meslek hastalıklarının görülme sıklığı ele alınmış ve kesitsel tanımlayıcı bir araştırma olarak tasarlanmıştır. Çalışmada, Türkiye Cumhuriyeti Sosyal Güvenlik Kurumu'nun 2013-2020 yıllarını kapsayan verileri analiz edilmiştir. Araştırma bulguları, kadın sağlık çalışanlarının erkek meslektaşlarına kıyasla daha fazla iş kazası ve meslek hastalığı vakası yaşadığını göstermektedir. Bununla birlikte, erkek sağlık çalışanları iş kazalarından kaynaklanan daha yüksek bir ölüm oranı sergilemektedir. Günümüzde, çeşitli sektörlerde çalışan kadınlar arasında işle ilgili kazalar ve ölümlerin yanı sıra meslek hastalıklarında da bir düşüş yaşanmıştır. Ancak, kadın sağlık çalışanları arasında işle ilgili kaza ve ölümlerin yanı sıra meslek hastalıklarında da kayda değer bir artış olmuştur.

**Anahtar Kelimeler:** Kadın Sağlık Personeli, İş Kazası, Meslek Hastalığı.

Elif İŞIK DEMİRARSLAN | elif\_syo@artvin.edu.tr  
Artvin Çoruh Üniversitesi, Sağlık Bilimleri Fakültesi, Artvin, Türkiye  
Artvin Coruh University, Faculty of Health Sciences, Artvin, Turkey

Kazım Onur DEMİRARSLAN | onurdemirarslan@artvin.edu.tr  
Artvin Çoruh Üniversitesi, Mühendislik Fakültesi, Artvin, Türkiye  
Artvin Coruh University, Faculty of Engineering, Artvin, Turkey

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## I. INTRODUCTION

Occupational Health and Safety (OHS) science is a multidisciplinary field that focuses on protecting the physical and mental health, safety, and general well-being of individuals in the workplace. This discipline aims to protect the mental and physical well-being of all workers in the workplace against potential harm, such as injury or illness [1]. However, from the past to the present, women have been subjected to gender-based discrimination and exclusion in the labor market. Although women are an essential part of the production process, they face discriminatory practices in working life. They are confronted with gender-based occupational stratification, the leading cause of gender-based discrimination in the labor market [2]. Gender inequality and gender-based division of labor cause different roles to be assigned to men and women, which still exist in many societies [3]. This situation may also be practical in terms of occupational health and safety.

The negative impacts of occupational accidents, injuries, and diseases on human, social, and economic aspects have been a matter of apprehension across various levels, ranging from individuals to national and international authorities [4]. In spite of the notable advancements made by OSH in mitigating workplace injuries and illnesses, several organizations continue to encounter obstacles in this regard [5]. The healthcare sector is among the sectors that encounter these challenges. According to Gul et al. [6], the sector in question is considered highly impacted due to its numerous distinctive hazards that have the potential to adversely impact the health of workers. Furthermore, the management of OSH in this sector is deemed inadequate. In the study by Almost et al. [7], healthcare professionals are susceptible to various types of risks, including physical, chemical, and biological hazards, as well

as psychosocial stressors and violent incidents, as they carry out their duties of safeguarding public health and aiding in the recovery of the ill on a daily basis. Sharp object injuries represent a prevalent form of occupational accident within the healthcare industry, as evidenced by various studies [8]. Percutaneous injuries pose a significant risk to healthcare workers, as they may become exposed to the blood and bodily fluids of patients or contaminated sharps, as noted by Suntur and Uğurbekler [9]. Furthermore, healthcare workers are acknowledged to be susceptible to infectious diseases as occupational diseases. As per the World Health Organization, there is an annual occurrence of 385,000 injuries that involve penetration and cutting in the health sector. Moreover, Çağlar Özer et al. [10] reported an incidence of approximately 30 needle injuries per 100 beds per year. Research conducted in Turkey has indicated that individuals who sustain injuries from sharp objects, particularly injector needles, experience such incidents at a minimum frequency of once per year, with a prevalence rate ranging between 36-42%.

In Turkey, there exists a gender-based disparity in labor force participation rates, with women being at a disadvantage. The labor force participation rate for men stands at 71.5 per 100, whereas for women, the rate is only 32%. Over the past few years, there has been a notable rise in the level of female involvement in the labor force. The provision of health services is crucial to safeguarding, enhancing, and advancing the well-being of individuals. According to Orhan and Yücel [11], the healthcare industry is characterized by high labor intensity and a significant proportion of female workers. According to Şen and Tunç's [12] assertion, women are classified as a separate group in terms of occupational health and safety.

The health and care sector is one of the primary sources of employment worldwide, especially for women. The

health and care workforce accounts for about 3.4 % of global employment, 10 % in high-income countries, and just over 1 % in low- and middle-income countries [13]. One of the defining characteristics of employment in this sector worldwide is the high level of female employment. Women account for 67% of global employment in the sector, and gender segregation is significant. In low- and middle-income countries, 63.8% of the sectoral workforce is female, while in high-income countries, 75.3 % is female [14]. Historically, The health sector has been predominantly female and is becoming increasingly feminized. Women constitute an overwhelming majority in primary health care, such as preventive health care and hospital services, where treatment services are concentrated. This sector also contains typical examples of occupational gender discrimination and gender-based segregation [15]. Gender discrimination results in women and men facing different workplace environments and hazards, even in the same sector or performing the same tasks. Women are at higher risk of psychosocial hazards such as bullying, discrimination, and sexual harassment [16; 17]. This leads to increased work-related stress. Women often work in low-paid, low-status, stressful jobs with high demands and little control [18]. They may face the risk of violence as they work in face-to-face jobs. Other psychosocial hazards include work factors such as excessive working hours, unreasonable demands, and inflexible working hours [19]. Women, especially those working in the health and social care sectors, are at higher risk of manual handling injuries due to manual handling of heavy loads in the workplace, working in demanding positions and in jobs requiring high static muscular effort [20]. This study investigated the incidence of work-related accidents and occupational diseases among female healthcare professionals employed in institutions that offer human health services. The study utilized data sourced

from the archives of the Republic of Turkey, the Ministry of Labor and Social Security, and the Social Security Institution (SSI), spanning the period from 2013 to 2020. The "Classification of Economic Activity (Nomenclature des Activités Economiques dans la Communauté Européenne-NACE)" classified the Turkish economy's "Human Health Services" sector as the source of the data used in this study. The study initially examined the annual rates of occupational accidents among female healthcare professionals. The study aimed to ascertain the rates of occupational accidents among female health workers in comparison to those in other industries. According to data from SSI, the current study aims to determine the incidence rates of work-related illnesses and accidents among female staff members working in the human health services sector in Turkey.

## II. MATERIAL AND METHOD

This research was carried out in the form of a cross-sectional descriptive study. The present investigation aimed to analyze the incidence of work-related injuries and illnesses among female healthcare workers in Turkey. The data utilized in this study were sourced as secondary data from the archives available on the official website of SSI, spanning the period between 2013 and 2020 [21]. The present study analyzed the data pertaining to work-related accidents, occupational illnesses, and fatalities among female healthcare professionals employed in the field of human health services, categorized by years of service.

The categorization of occupational accidents and occupational diseases in SSI data is based on sector classification, which includes the human health and services sectors. The SSI dataset is categorized based on the duration of incapacity, taking into account the daily count of insured individuals who have experienced a workplace injury. These services are hospital services (short- and long-term

Table 1: Health personnel in Turkey from 2007 to 2019 [28]

Year	Doctor	Dentist	Nurse	Other health personnel	Midwife	Pharmacist	Other personnel and service recruitment
2007	108 402	19 278	94 661	79 441	47 175	23 977	-
2008	113 151	19 959	99 910	89 540	47 673	24 778	-
2009	118 641	20 589	105 176	93 550	49 357	25 201	-
2010	123 447	21 432	114 772	99 302	50 343	26 506	-
2011	126 029	21 099	124 982	110 862	51 905	26 089	260 693
2012	129 772	21 404	134 906	122 663	53 466	26 571	273 616
2013	133 775	22 295	139 544	131 652	53 427	27 012	290 363
2014	135 616	22 996	142 432	138 878	52 838	27 199	303 110
2015	141 259	24 834	152 803	145 943	53 086	27 530	311 337
2016	144 827	26 674	152 952	144 609	52 456	27 864	321 952
2017	149 997	27 889	166 142	155 417	53 741	28 512	339 241
2018	153 128	30 615	190 499	177 409	56 351	32 032	376 367
2019	160 810	32 925	198 103	182 456	55 972	33 841	369 660

hospital activities and medical, diagnostic, and treatment activities of specialized hospitals; services of medical doctors and paramedical health personnel; laboratory and technical services, including radiology and anesthesia services; emergency services; operating rooms) since 2013, services of family planning centers that provide medical services such as inpatient sterilization and termination of labor) [22], general medicine practice activities (medical counseling and treatment [23], practice activities related to specialist medicine (medical consultation and treatment performed by specialist physicians and operators in the field of specialized medicine) [24], practice activities related to dentistry (general or specialized dental activities, e.g., including dentistry, endodontics, and pedodontics; oral pathology, orthodontic activities) [25], other services related to human health (activities for human health not performed by hospitals or medical doctors or dentists: nurses, midwives, physiotherapists or optometry (eye examination), hydrotherapy, medical activities of other paramedical practitioners in massage, occupational therapy, speech

therapy, podiatry, homeopathy, chiropractic, acupuncture, and similar fields) [26].

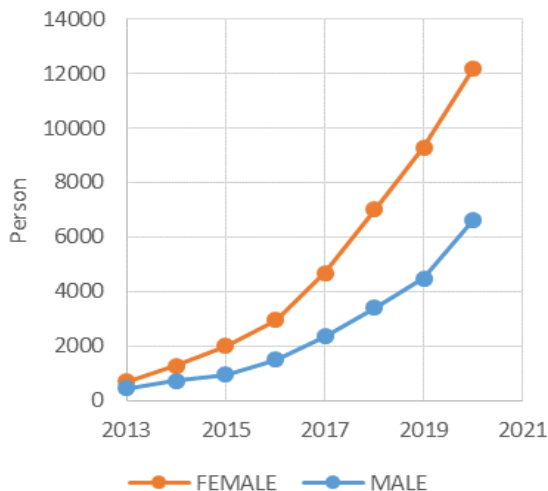
#### A. Scope of Research

The demographic composition of Turkey exhibits a dynamic pattern, with a consistent upward trend in population growth over time. According to the source [27] in 2022, the current population will stand at 84,680,273 individuals. According to [28], Table 1 presents data on the number of healthcare professionals in Turkey from 2007 to 2019.

### III. RESULTS

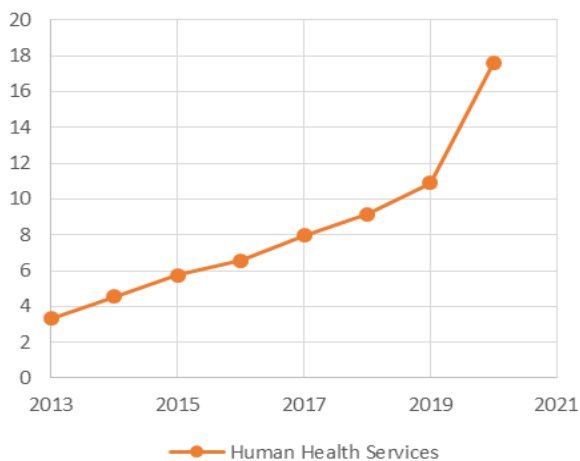
The SSI data analysis has revealed the incidence of occupational accidents and occupational diseases among male and female health workers over the years. Figure 1 presents the occupational accident rates of male and female health workers from 2013 to 2020. In 2020, the incidence of accidents was observed to be the greatest among females, with a recorded figure of 12197, while the corresponding figure for males was 6643.

**Figure 1:** Number of occupational accidents experienced by male and female healthcare workers by year



The data presented in Figure 2 illustrates the proportion of workplace injuries incurred by female healthcare professionals in relation to their female counterparts in alternative industries. The percentage value, which was recorded as 3.31% in 2013, exhibited an upward trend and reached 17.58% in 2020. Since 2013, there has been an increase in the incidence of occupational accidents among female workers in various sectors. Although a decline is noted in overall occupational accidents, there is a rising

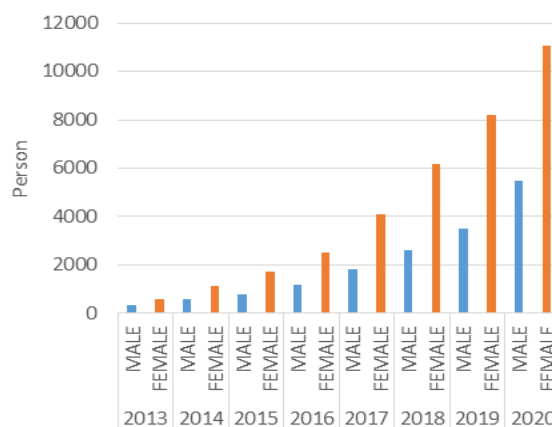
**Figure 2:** Occupational accident percentages of female health workers compared to female workers in other sectors



trend in the incidence of such accidents among female health workers.

The graphical representation presented in Figure 3 depicts the incidence of occupational accidents that occurred within hospital services during the period spanning from 2013 to 2020. Based on the recorded accident rates during the study period, it was found that the proportion of female employees who were exposed to accidents was 68.53%, whereas the proportion of male employees who were exposed to accidents was 31.46%. The COVID-19 pandemic of 2019 has resulted in a notable increase in occupational accidents among healthcare workers in comparison to their counterparts in other industries. Given that COVID-19 is not classified as a primary occupational hazard, it is plausible that the utilization of specialized attire, prolonged work hours without breaks, exhaustion, profuse perspiration, and other factors may contribute to occupational accidents resulting from increased physical burdens. The transmission of COVID-19 among healthcare workers is influenced by various factors, including insufficient knowledge regarding the pathogen's characteristics, inadequate provision of personal protective equipment, occupational hazards, insufficient training and

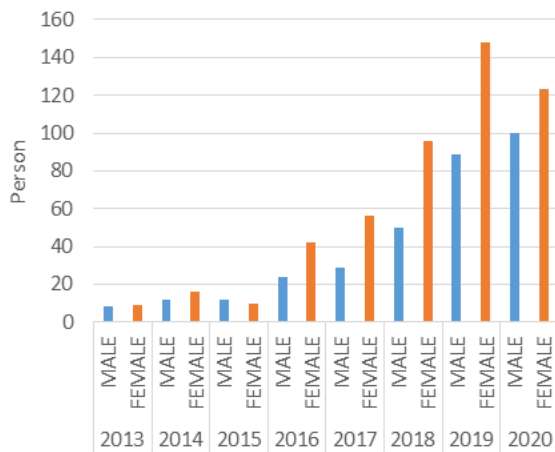
**Figure 3:** Number of occupational accidents in hospital services between 2013-2020



practices, inadequate supervision and guidance, prolonged working hours, and psychological factors such as fatigue, stress, and anxiety [29].

The graphical representation shown in Figure 4 illustrates the distribution of occupational accidents that occurred during general medical practice activities, categorized by gender. The resurgence of female health workers has become increasingly notable in contemporary times. Based on the analyzed accidents, the incidence of accidents among female healthcare professionals was 60.67%, whereas the incidence of accidents among male healthcare professionals was 39.32%.

**Figure 4:** Number of occupational accidents in general medicine practice activities between 2013-2020



The gender-based distribution of occupational accidents that occur during specialist medicine practices is depicted in Figure 5. In activities that are similar in nature, female health workers are more often exposed to occupational accidents compared to their male counterparts. Upon determining accident rates based on gender, it was found that the percentage of female employees involved in accidents was 64.29%, while the percentage of male employees involved in accidents was 35.70%.

**Figure 5:** Number of occupational accidents in practice activities related to specialist medicine between 2013-2020

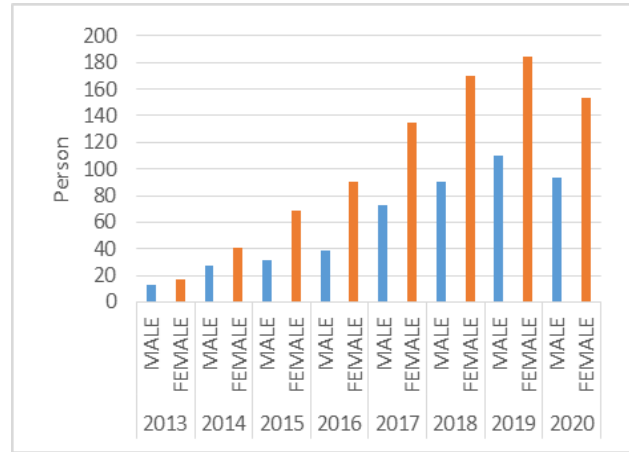


Figure 6 indicates the gender-based distribution of occupational accidents that occurred during dental procedures. According to data from 2013, male healthcare professionals had an occupational accident rate of 55.55%, while female employees had an accident rate of 44.45%. The analysis of data from 2013 reveals that the incidence of workplace accidents among male employees surpasses that of their female counterparts. Upon analyzing the aggregate occupational accident rates spanning from 2013 to 2020, it has been ascertained that the incidence of accidents among female healthcare professionals is 76.48%, whereas that among their male counterparts is 23.51%.

**Figure 6:** Number of occupational accidents during dental practice activities between 2013-2020

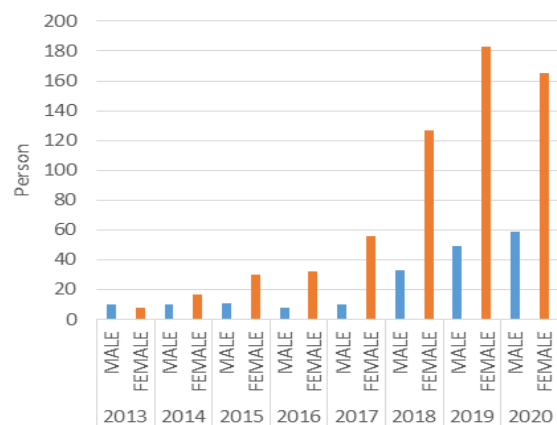
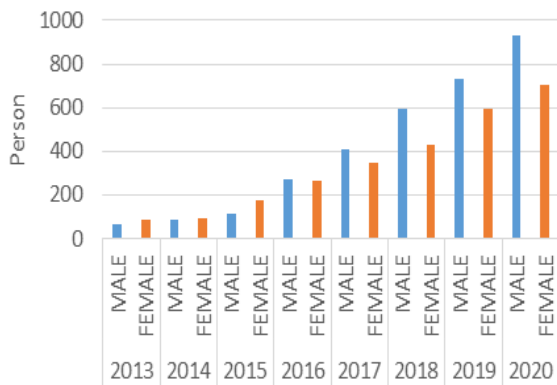


Figure 7 presents the gender-based distribution of occupational accidents in the healthcare sector. The data reveals that from 2013 to 2015, female healthcare workers experienced a higher incidence of accidents compared to their male counterparts, with 57.16% of accidents occurring among females and 42.83% among males.

Upon examining the rates of occupational accidents in other human health-related services, it was observed that male employees had a higher exposure rate of 54.28% compared to their female counterparts, who had an exposure rate of 45.71%.

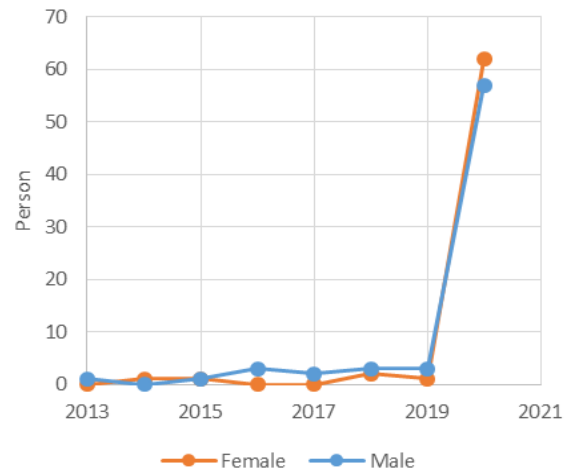
**Figure 7:** Number of occupational accidents in other services related to human health between 2013-2020



The incidence of occupational diseases among male and female health workers in the human health and services sector has been ascertained over a period of years and is depicted in Figure 8.

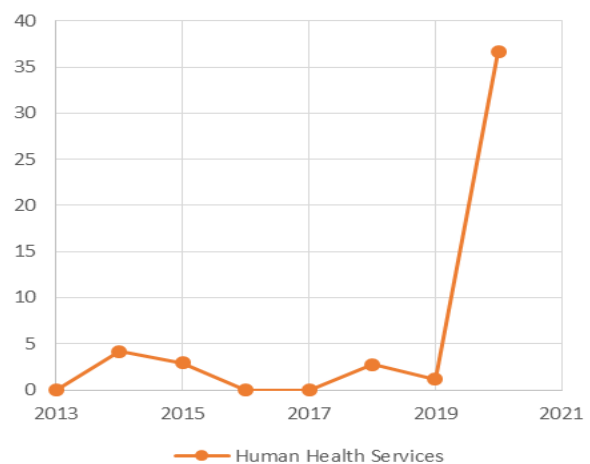
Based on the graphical representation, it can be observed that there were fluctuations in the incidence of occupational diseases among male and female health personnel across various years. However, it is notable that the reported cases of occupational diseases were comparatively limited. Until 2019, the incidence of occupational diseases among male and female personnel ranged from 0 to 5. However, in 2020, a total of 62 healthcare personnel, both

**Figure 8:** Number of occupational diseases of male and female health workers by years



male and female, reported cases of occupational diseases. This increase in 2020 may be related to COVID-19, but since COVID-19 is not recognized as an occupational disease, a link could not be established. The data presented in Figure 9 displays the proportion of occupational diseases to which female health workers are subjected in relation to their counterparts in other industries. With a recorded absence in 2013, a rise to 4.1% in 2014, and a subsequent increase to 36.6% in 2020, the rates in question demonstrated a significant shift over time.

**Figure 9:** Occupational disease percentages of female health workers compared to female workers in other sectors



According to the regulations of the Social Insurance and General Health Insurance Law (Law No. 5510), COVID-19 has not yet been acknowledged as an occupational disease. The reason for this is that healthcare professionals are unable to ascertain the origin of the disease, thereby leading to its potential transmission within the populace. However, as a result of the Izmir Medical Chamber's legal battle, a workplace doctor legally acknowledged that COVID-19-related death qualified as an occupational disease and granted his family his rights. Insufficient precautions were taken, and the number of deaths increased over time due to COVID-19 not being recognized as an occupational disease [30]. While COVID-19 is accepted as an occupational disease in many countries, no legal regulation has been made in Turkey. However, proving occupational infectious diseases through laboratory tests and work-related findings is possible. [31].

**Figure 10:** Percentage of female health workers who lost their lives due to work accidents compared to other sectors

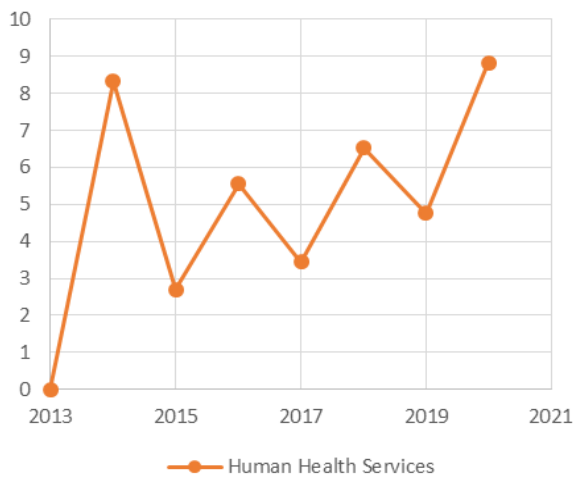
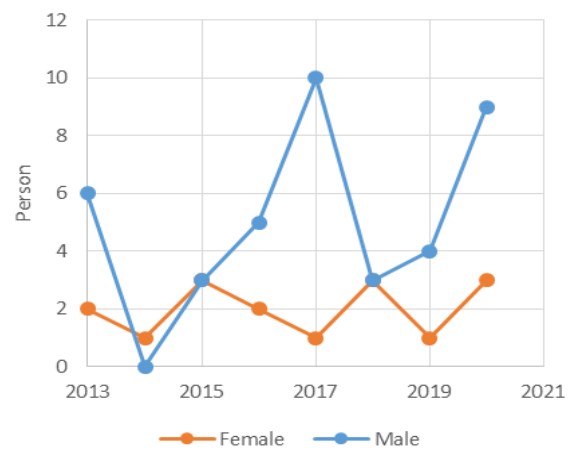


Figure 10 gives the proportion of female healthcare professionals who experienced fatal occupational injuries in comparison to their counterparts in other industries. As per the data, the mortality rate observed in the year 2013 was nil, whereas it escalated to 8.3% in 2014. In 2020, the

maximum rate was determined to be 8.82%. The data presented in Figure 11 illustrates the respective counts of male and female healthcare professionals who have suffered fatalities as a result of occupational accidents. Based on the available data, it can be inferred that the mortality rate among male healthcare professionals resulting from work-related incidents surpasses that of their female counterparts. During the period spanning from 2013 to 2020, there were 15 reported fatalities among female health workers resulting from occupational accidents. In contrast, the corresponding figure for male healthcare personnel was determined to be 40.

**Figure 11:** The rate of male and female healthcare workers who lost their lives due to occupational accidents



Since women are more commonly employed in the health sector, they may be statistically more likely to be exposed to more accidents. On the other hand, male health workers are more likely to die due to occupational accidents may also be due to different factors. Men tend to work in more dangerous and high-risk areas, such as surgery or emergency medicine. For these reasons, female health workers are more likely to suffer more occupational accidents, usually resulting in lower-risk injuries. In comparison, male health workers may be considered to suffer fewer accidents.



It was determined that no health personnel died due to occupational diseases.

#### IV. DISCUSSION

Gender inequalities in occupational health and safety practices have received global attention, particularly in non-traditional employment sectors such as construction [32]. The workplace is a crucial setting where gender issues and organizational structures can influence occupational health and safety practices [33]. The realization of dominant norms of masculinity in high-risk occupations can expose men to significant risks of injury and death [33]. However, it is essential to note that female healthcare workers also face unique occupational risks and challenges [34]. Occupational health literature has revealed that sex and gender are associated with all dimensions of the workplace, including healthcare settings [35]. Sex and/or gender factors shape male and female healthcare providers' experiences, exposures, and health outcomes, particularly in conflict settings [35]. It is crucial to consider sex/gender-sensitive research in occupational health to develop effective policies and interventions that protect the health and safety of both male and female healthcare workers [35]. Numerous scholarly investigations have explored the incidence of occupational accidents and occupational diseases among healthcare professionals in the literature. According to Cvejanov-Kezunovic et al. [36], it is recommended to adopt various measures to enhance the safety of healthcare workers, particularly in developed nations. These measures include the implementation of standard precautions, the use of increased personal protective equipment, routine hepatitis vaccinations, post-exposure prophylaxis, engineering measures, and appropriate laws. Nevertheless, the aforementioned study underscores the infrequency with which healthcare workers in low-income nations have ac-

cess to these aforementioned measures. According to Zhang et al. [37], the incidence of percutaneous injuries among nurses in China was found to be higher than that of other countries. The authors suggest that this issue should be regarded as a significant occupational hazard in China. Moreover, a study carried out in the United States determined that workers employed in the emergency health services sector were subjected to occupational injuries at an elevated frequency. The majority of reported injuries were found to be associated with bodily movements, such as excessive physical exertion, posture disorders, and repetitive movements, accounting for 28% of cases. Additionally, exposure to harmful substances, including body fluids or chemicals, was reported in 27% of cases.

A recent study carried out in Egypt revealed that a considerable proportion of healthcare professionals, specifically 35.9%, experienced at least one incident of puncture injury within the preceding three months. On an annual basis, there have been an average of 4.9 incidents of needlestick accidents. The elevated frequency of needle stick injuries has resulted in a surge in viral hepatitis infections among healthcare workers, as pointed out by Talaat et al. [38].

A research investigation carried out in Denmark scrutinized the physical and psychosocial hazards associated with low back and back injuries during patient transfer among healthcare professionals, predominantly nurses, operating within hospital settings. The incidence of low back and back injuries was found to be higher in elderly care facilities. According to Andersen et al. [39], the failure to use appropriate assistive devices has a significant impact on the rise of such injuries. A study was conducted in a hospital in Poland to analyze work-related accidents among healthcare personnel. The findings indicate that a total of 88 healthcare workers experienced 390 incidents, with 256 of these incidents being attributed to sharps injuries. The

findings indicate that a majority of the incidents took place during nighttime hours, and nearly half of them were not documented through official channels. The elevated incidence of injuries associated with cutting tools presents a significant public health concern. Moreover, Garus-Pakowska et al. [40] have established that the health sector accounts for roughly 10% of occupational accidents in Poland annually, with female health personnel, including midwives and nurses, being more susceptible.

A study carried out in Poland reported that a significant proportion of healthcare personnel, specifically 78%, were exposed to infectious substances on a frequent basis while carrying out their duties in various healthcare facilities. Furthermore, the study revealed that 39% of healthcare workers were susceptible to contracting infections during their professional tenure. It has also been found that male workers are less at risk due to the refusal of male healthcare personnel to care for infected patients [41]. Comparable outcomes have been achieved within our nation; however, the inadequacies present in the documentation and the ambiguous delineations of occupational illnesses and workplace mishaps impede the findings. According to a study by Kermode et al. [42], blood-borne viruses affect an estimated 3 million healthcare workers annually worldwide. A significant proportion, exceeding 90%, of these avoidable infections transpire in nations with low economic status. Unfortunately, the status of health workers in low-income countries is poorly documented, and their health and safety continue to be neglected [42]. In Turkey, in the research conducted by Azap et al. (2005) [43], it is stated that the occupational acquisition risks of pathogens transmitted through exposure to blood and body fluids pose a severe problem for healthcare professionals in Turkey. However, national data on exposure frequency are unavailable due to a lack of systematic

records. A study by Çelikkalp and Dilek [44] in a university hospital in Turkey determined that 68.5% of nurses had at least one occupational accident.

Occupational accidents and the risks of infection are experienced by healthcare professionals due to heavy working conditions, occupational health hazards, and ineffective utilization of personal protective equipment. While injuries caused by penetrating tools are the most frequently occurring occupational accidents, incidents of violence, slips, and falls are also prevalent. This phenomenon can be attributed to changes in work schedules, nocturnal employment, extended work hours, and a substantial volume of tasks. Ndejjo et al. [45] conducted a study that identified several factors that contribute to occupational accidents among healthcare personnel. These factors include failure to utilize personal protective equipment, working beyond regular hours, experiencing work-related stress, and working in multiple healthcare facilities. According to a study carried out in Germany, healthcare workers who have frequent interactions with tuberculosis patients are at an elevated risk of contracting the infection, with nurses being particularly susceptible [46].

#### IV. CONCLUSION

According to the results of this study, the incidence of occupational accidents in the health sector in Turkey is higher in women than in men. However, it is noteworthy that such accidents have increased since 2013. This increase in the figures can be attributed to the increased effectiveness of record-keeping and health surveillance practices following the enactment of the Occupational Health and Safety Law No. 6331. The study results show that it is necessary to implement special measures to protect female workers against occupational diseases in the health sector. In addition, increasing employment will

improve the working environment for health workers, increase opportunities for rest and ease the burden of responsibilities.

In conclusion, health workers represent a significant occupational group due to the hazards inherent in their field of work. In particular, health workers may face more hazards and strenuous working environments in countries with limited financial resources. Protecting the occupational health and safety of health workers is a crucial concern for healthcare providers and patients, and appropriate measures must be implemented globally. As a result, female healthcare workers face many occupational health and safety challenges. The COVID-19 pandemic has further highlighted the risks and stressors faced by health workers, including women. It is crucial to address these challenges through gender-sensitive research, effective policies, and interventions that prioritize the health and safety of women health workers, and further work is recommended.

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