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INVESTIGATION OF KNOWLEDGE, ATTITUDES, AND PREVENTIVE PRACTICES REGARDING OCCUPATIONAL HAZARDS OF NURSES WORKING IN PUBLIC AND PRIVATE HOSPITALS IN AL-DIWANIYAH CITY, IRAQ.

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BY

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The Institute of Health Sciences
The Department of Nursing

The Degree of Master of Science in Nursing

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2022

ACCEPTANCE AND APPROVAL

Kadhim ALDAWOOD, the graduate student of The Institute of Health Sciences with the student number of 208205204, has successfully presented her thesis entitled "Investigation of Knowledge, Attitudes, and Preventive Practices Regarding Occupational Hazards of Nurses Working in Public and Private Hospitals in Al-Diwaniyah City, Iraq" before the jury whose signatures are below, after fulfilling all of the requirements determined by the relevant regulations for the degree of Master of Science in Nursing.

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ETHICS STATEMENT

The thesis entitled “Investigation of Knowledge, Attitudes, and Preventive Practices Regarding Occupational Hazards of Nurses Working in Public and Private Hospitals in Al-Diwaniyah City, Iraq” which was prepared and presented as a thesis, was written by myself and in accordance with the scientific, academic rules and ethical conduct. The idea/hypothesis of my thesis solely belongs to my supervisor and to me. The research pertaining to the thesis was conducted by myself and therefore, all of the used sentences and interpretations within the work belongs to me.

I declare the aforementioned issues to be correct.

27 July 2022

Kadhim Aldawood

ABSTRACT

INVESTIGATION OF KNOWLEDGE, ATTITUDES, AND PREVENTIVE PRACTICES REGARDING OCCUPATIONAL HAZARDS OF NURSES WORKING IN PUBLIC AND PRIVATE HOSPITALS IN AL-DIWANIYAH CITY, IRAQ.

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The study objective to evaluate and compare the occupational hazards and knowledge, attitudes, and preventive practices of nurses working in public and private hospitals in Al-Diwaniyah City, Iraq. The study was done at Public and Private Hospitals from 23 /December/ 2021 to 16 /March/ 2022. The study sample were 200 nurses working in public and private hospitals. It was observed that the majority of the sample was male in private hospitals and female in public hospitals, and the groups were generally composed have diploma in nursing. It was also found that the most majority of nurses in the groups participated in occupational hazards education programs. It was observed that the mean age and work experience of the nurses working in the private hospital were higher ($p<0.05$). When the knowledge, attitude and preventive practices of the groups were compared, it was found that the knowledge and preventive practices of nurses working in private hospitals were higher than those of nurses working in public hospitals (respectively; high/moderate, $p=0.001$; appropriate/moderate $p=0.001$). Although the attitudes of the nurses were seen in positive in both groups, the attitudes of the nurses working in public hospitals were found to be higher ($p=0.005$).

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Keywords: Attitude, Knowledge, Nurses, Occupatıonal hazards, Safety practices.

ÖZET

IRAK, AL-DIWANIYAH ŞEHRİNDE DEVLET VE ÖZEL HASTANELERDE ÇALIŞAN HEMŞİRELERİN MESLEKİ TEHLİKELERE İLİŞKİN BİLGİ, TUTUM VE ÖNLEYİCİ UYGULAMALARININ ARAŞTIRILMASI

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Sağlık kuruluşları çok yönlü ve komplike sağlık hizmetlerinin sağlandığı ortamlar olarak çalışanlar için mesleki tehlike ve yaralanma risklerine açık alanlardır. Hemşireler işlerinin kendine özgü doğası ve günlük olarak karşılaştıkları birçok tehlike nedeniyle fiziksel, kimyasal, biyolojik, çevresel ve psikolojik tehlikeler gibi çok çeşitli iş sağlığı tehlikelerine maruz kalmaktadırlar. Mesleki tehlike, bir çalışanın iş görevlerini yerine getirme kabiliyetine risk oluşturma olarak tanımlanmaktadır. Fiziksel, psikolojik, biyolojik, mekanik, ergonomik ve kimyasal tehlikeler, sağlık bakım ortamlarında işyerinde meydana gelebilecek tehlikelerden bazılarıdır. Bu araştırmanın amacı Irak'ın Al-Diwaniyah şehrinde çalışan hemşirelerin mesleki tehlikeler ile ilgili bilgi, tutum ve önleyici uygulamalarını değerlendirmek ve kamu ve özel hastanelerde çalışan hemşirelerin sonuçlarını karşılaştırmaktır. Çalışma 23 Aralık 2021-16 Mart 2022 tarihleri arasında kamu ve özel hastanelerde çalışan 200 hemşirenin katılımıyla tamamlandı. Veriler SPSS 21.0 paket programı kullanılarak analiz edildi. Grupların dağılımı Kolmogorow-Smirnov testi ile değerlendirildi ve verilerin normal dağıldığı belirlendiği için iki grubun karşılaştırmasında student t testi, ilişki analizleri için pearson korelasyon analizi kullanıldı. Değerlendirme sonuçlarına göre; hemşirelerin özel hastanelerde daha çok erkek (%79), devlet hastanelerinde ise kadın (%59) olduğu ve hemşirelerin daha çok üniversite mezunu oldukları (%42) görüldü. Aynı zamanda

gruplardaki hemşirelerin büyük çoğunluğunun (özel %87; kamu %63) mesleki tehlikelerle ilgili eğitim programlarına katıldıkları bulundu. Özel hastanede çalışan hemşirelerin yaş ortalamalarının ve iş deneyimlerinin daha yüksek olduğu görüldü (p=0,000; p=0,001). Grupların bilgi, tutum ve mesleki tehlikelere karşı önleyici uygulamaları karşılaştırıldığında özel hastanede çalışan hemşirelerin bilgi ve önleyici uygulamalarının kamu hastanelerinde çalışan hemşirelerinkinden daha yüksek olduğu (sırasıyla; yüksek/orta, p=0,001; uygun/orta p=0,001) bulundu. Hemşirelerin tutumları her iki grupta da pozitif sınıflandırmada görülmesine rağmen kamu hastanelerinde çalışan hemşirelerin tutumlarının daha yüksek olduğu bulundu (p=0,005). Hemşirelerin demografik özellikleri ile bilgi, tutum ve uygulamaları arasındaki ilişkiler incelendiğinde; özel hastanelerde çalışan hemşirelerin yaşları ile deneyim, mesleki tehlikelere karşı eğitim, bilgi ve uygulamalarının ilişkili, tutumlarının ise ilişkisiz olduğu görüldü (sırasıyla p=0,001; r=0,797; p=0,001; r=0,472; p=0,024; r=-0,198 p=0,001; r=0,328; p=0,045; r=0,045). Hemşirelerin deneyimleri, mesleki tehlikelere karşı eğitimleri ve önleyici uygulamaları ile pozitif yönde (sırasıyla p=0,001; r=0,409; p=0,002; r=0,286) ve bilgi düzeyleri ile uygulamaları arasında negatif yönde ilişkili olduğu bulundu (p=0,013; r=0,222). Hemşirelerin mesleki tehlikelere karşı eğitimleri ile uygulamaları arasında pozitif yönde (p=0,001; r=0,373), bilgi ve uygulamaları arasında negatif yönde (p=0,026; r=-0,196) ilişki bulundu. Kamu hastanelerinde çalışan hemşirelerin sonuçlarında ise; hemşirelerin yaşları ve eğitim düzeyleri arasında negatif (p=0,003; r=-0,294), deneyim, mesleki tehlikelere karşı eğitim ve tutumları arasında pozitif yönde ilişki saptandı (sırasıyla, p=0,001; r=0,599; 0,001; r=0,392; 0,001; r=0,382). Mesleki tehlikelere karşı eğitim ile bilgi, tutum arasında pozitif ilişki (sırasıyla p=0,008; r=0,263; p=0,035; r=0,212) görülürken uygulamaları arasında ilişki bulunmadı (p=0,248; r=0,322). Bilgi ile tutumlar ve uygulamalar arasında pozitif yönde ilişki bulundu (sırasıyla p=0,001; r=0,315; p=0,002; r=0,312). Kamu hastanelerinde çalışan hemşirelerin tutumları yaşları, mesleki tehlikelere karşı eğitim programlarına katılımları ve bilgi düzeyleri pozitif yönde ilişkilidir (sırasıyla; p=0,001; r=0,382; p=0,035; r=0,212; p=0,001; r=0,035). Uygulamaları ise sadece bilgi düzeyleri ile ilişkili bulunmuştur (p=0,002; r=0,312). Tüm bu sonuçlarla deneyim ve mesleki tehlikelere karşı eğitimin hemşirelerin tutum ve uygulamalarına önemli şekilde yansıdığı ancak bilginin uygulamalara aynı şekilde yansımadığı görülmektedir. Özel hastanelerde

çalışan deneyimi ve yaşı yüksek hemşirelerin uygulamalarında bilgilerinden çok tecrübelerine ve alışkanlıklarına bağlı oldukları söylenebilir. Özel hastanelerde çalışan hemşirelerin mesleki tehlikelere karşı eğitim programlarına daha çok oranda katılmış olmaları onların bilgi ve uygulamalarını deneyimleriyle birlikte geliştirmelerine olanak sağlamış olabilir. Kamu hastanesinde çalışan hemşirelerin daha genç, deneyimsiz ve mesleki tehlikelere karşı eğitim programlarına daha düşük oranda katılmış olmaları bilgi ve uygulamalarının geliştirilmesi açısınan desteklenme ihtiyaçlarını göstermektedir. Bununla birlikte kamu hastanelerinde çalışan hemşirelerin tutumlarının özel hastanelerde çalışan hemşirelerden yüksek olması deneyime bağlı yanlış öğrenmelerin daha az olmasıyla ilişkilendirilebilir. Araştırmamız, özellikle kamu hastanelerinde çalışan hemşireler için mesleki tehlikelere karşı koruyucu uygulamalar konusunda eğitimler verilmesini, ayrıca deneyimlerin paylaşılması, zorlukların tartışılması gibi uygulamaların mesleki tehlikelerin belirlenmesi ve önlenmesine yardımcı olabileceğini önermektedir. Aynı zamanda, uygulamaların sadece bilgiye bağlı olmadığını, davranış alışkanlıklarının da uygulamalarda önemli olduğunu ortaya koymaktadır.

2022, 86 sayfa

Anahtar Kelimeler: Tutum, Bilgi, Hemşireler, Mesleki tehlikeler, Güvenlik uygulamaları.

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LIST OF ABBREVIATIONS

WHO	World Health Organization
ILO	International Labor Organization
AORN's	The Association of Peri Operative Registered Nurses
CDC	Centers for Disease Control and Prevention
MOH	Ministry of Health
HCWs	Healthcare workers
HIV	Human immunodeficiency virus
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HDV	Hepatitis D virus
MMR	Measles, Mumps, and Rubella
COVID-19	Coronavirus-19
LBP	low back pain
MSDs	Musculoskeletal disorders
NSIs	Needle stick injuries
SD	Standard Deviation
DM	Diabetes mellitus
TB	Tuberculosis

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1. INTRODUCTION

Hazards are described as intrinsic features of substances, factors, or the source of energy or situation that are likely to create harmful or undesired effects, whereas risk is defined as the possibility of harm to "life, health, or the environment" caused by the risk (Tziaferi *et al.* 2011). Healthcare organizations are multifaceted and complicated healthcare settings, nursing staff are at risks for occupational hazards and injuries. Due to the unique nature of the nurse's job and the many hazards they face daily, nurses are subjected to a wide range of occupational health hazards such as (physical hazards, chemical hazards, biological hazards, psychological hazards, and environmental hazards) (Isara and Ofili 2012, Anandh *et al.* 2015). Occupational health is a developing field of health and has been integral of as an important part of workplaces, and nursing is a very risky job because it is so hazardous. Some of the possible hazards include physical hazards, biological hazards, needle stick injuries, toxic chemicals, and poisonous chemicals (Kumar 2015). Occupational health hazards refer to workplace activities, substances, materials, procedures, or situations that raise the risk of injury, accident, or disease. Occupational hazards are described as posing a risk to an employee's ability to perform their job duties. (Rajan 2014).

Nurses can be exposed to infectious agents (biological risks) and toxic chemicals while they are on the job. Furthermore, they can be attacked and beaten. Physical threats, ergonomic hazards, attacks, as well as psychological and organizational factors, are all present in their jobs (Walton and Rogers 2017). There have been significant shifts in work as well as the risks they encounter on the job in recent years. These transformations have a wide range of consequences for the workplace, the demography of the workforce, and the delivery of healthcare services. The analysis of these patterns reveals that the link between work and health is developing in a variety of ways, including the quality of work, the reduction of dangers the workplace, and the delivery of health care system (Burgel and Childre 2012). Occupational injuries are most commonly caused by unsafe working circumstances or practices and are usually avoidable. Chemical exposure, injuries from sharp items or machines, and accidents

resulting from unsafe working conditions such as uneven flooring, inadequate ventilation (poor ventilation), and defective electrical are just some examples of workplace injuries that can occur. The occupational health care workers must play a crucial role in dealing with problems at work. Indeed, the roles of occupational hazards in the workplace are to keep from getting hurt and sick, as well as to help people who have been hurt or sick get better (Ahmed and Shareef 2019). According to Ghahremani et al., the majority of the threats faced by nursing staff were ergonomic hazards for example (skeletal and muscular disorders) and physical health hazards for example inadequate ventilation (poor ventilation) and noise pollution at the workplace (Ghahremani et al., 2018). Since 1919, the World Labor Organization has emphasized the importance of protecting employees from workplace hazards as a key principle (Niu 2010).

Health care services, like other high-risk workplaces, have a high level of exposure to hazardous variables, which can pose a major threat to the health and lives of employees in these fields (health care workers). Based on the World Health Organization (WHO), occupational health is a multidisciplinary effort aimed at protecting and promoting the health of workers by preventing occupational hazards, accidents, and injuries, and by eliminating occupational factors and situations that pose a threat to the health of workers in their places of workers. Develop and improve the health of workers physically, socially, and psychologically, as well as preserve and promote their practical talents and success in the workplace, as well as professional and social development. Additionally, workers should be allowed to live productive lives and contribute positively to their long-term progress (Shinde *et al.* 2016).

The environments of healthcare organizations are diverse and complex, exposing nursing personnel to hazards and accidents that can occur in the workplace. In addition to the nature of their work and responsibilities, nursing proprietors face a wide range of occupational hazards, including physical, chemical, biological, environmental, and psychological threats (Senthil *et al.* 2015). Staff members in the nursing profession, like other workers in other professions, are at the greatest risk due to their exposure to a large number of work-related problem and hazards. In the healthcare field, nursing staff

represent the largest group of health workers, and some of them have direct and indirect contact and interaction with patients when they assist and perform additional procedures. As a result, the nursing staff is exposed to a higher level of workplace hazards than any other professional in the medical field (Awan *et al.* 2017). Nurses are widely recognized to be a vital parts of the healthcare system. They are an integral parts of clinical services and bear a great deal of responsibility when it comes to caring for patients in the majority of healthcare facilities. Nurses are exposed to a wide range of occupational health hazards as a result of their everyday work and activities in settings where patients get healthcare services. The nature of the nursing work environment, obligations, and duties, the fact that nursing is a particularly hazardous occupation, and the relationship between nursing staff and health care workers personnel are on the front lines of many occupational health hazards, and they are also the ones who are most vulnerable to occupational health hazards at work. Many different types of health hazards might be experienced in the nursing profession. Some have been around since the beginning of the nursing field, but they have only recently received the attention they deserve (Morsy and Sabra 2015). Physical, psychological, biological, mechanical, ergonomic, and chemical hazards are some of the hazards that can happen at work in health care settings. Many previous researchs have mentioned health care workers have the highest problems of work-related injuries and illnesses, but they could be reduced (Amosu *et al.* 2011).

Many studies have noted the importance of identifying and evaluating hazards related to the nursing job, as well as solutions to avoid them and improve nurses' health and safety (Shimizu *et al.* 2010).

1.1 Importance of the Study

The significance of occupational health hazards to healthcare workers is owing to an increase in the number of accidents and injuries among those who are exposed to occupational health hazards. A total of (100,000) persons are estimated to die as a result of occupational health hazards, while 400,000 new cases of health risks at work are found every year (Bell *et al.* 2013). As a result of their work, the vast majority of nurses

suffer persistent pain. According to an Iranian research, 89 % of nursing staff reported experiencing musculoskeletal disorders (Madani *et al.* 2014). In Nepal, 78 percent of nursing staff reported suffering from Low Back Pain (Adhikari and Dhakal 2014). Also in Nepal, the prevalence of needle stick injuries is (80 percent) (Sayami and Tamrakar 2013). Aside from that, nurses may become infected with (blood-borne infections) as a result of injuries caused by needle sticks, which can lead to illness. The number of needle-stick injuries in all healthcare settings is estimated to be between 600,000 and 800,000 per year (Wilburn and Eijkemans 2004).

Physical losses, economic losses, and mental disorders for example stress and depression are all associated to the cumulative consequences of occupational diseases and injuries in healthcare providers. As a result, they have negatively impact the health of healthcare professionals, their families, and the overall health of the nation's population (Osungbemiro *et al.* 2016). Occupational health hazards result in a wide range of disabilities and injuries, as well as a loss in the labor force, which results in lower productivity and, in severe situations, the death of workers. They can also result in the loss of individuals with extensive knowledge and expertise. Occupational hazards could put the quality of health care in high-quality developing countries at risk for more healthcare workers including the nurses are exposed to risks such as needle pricks, cuts from sharp items, musculoskeletal injuries, aggressive attacks by patients, and inadequacies in facilities that lack the equipment necessary to improve best practices to reduce or prevent occupational hazards and injuries (Aluko *et al.* 2016).

International Labor Organization (ILO) estimates that (160) million people in the world suffer from diseases and injuries caused by the nature of their jobs, such as muscle problems and mental health problems of workers, while (270) million people suffer from work-related injuries, including fatal and non-fatal accidents, according to the ILO (350000). More than (2) million deaths related to work per year, all attributable to occupational hazards at work. The toll that work-related injuries, accidents, and diseases take on the workforce is immeasurable. According to the International Labor Organization (ILO), occupational hazards cause a loss of (4 %) of gross domestic product. Employers are confronted with the loss of competent workers, absenteeism,

immigration, and early retirement as a result of workplace accidents, injuries, and diseases (ILO,2016).

Every year, about one million work-related fatalities and 250 million occupational accidents occur. In Pakistan, a developing country, the situation is deteriorating owing to a variety of factors, including the fact that each year, many workers suffer from injuries, a lack of education, poor medical facilities, a lack of right information, and a lack of literacy at the workplace. World Health Organization states that "Occupational hazards are the tenth largest cause of sickness and death in the workplace." (Awan *et al.* 2017).

Therefore, an excessive number of researchers conducted studies connected to these critical topics, whereas Iraq in general and Al-Diwaniyah governorate, in particular, had not been previously investigated. Furthermore, all international organizations have considered these critical considerations as well. Furthermore, healthcare professionals are the primary beneficiaries of an organization's policy. In the delivery of health care, health care personnel are at the epicenter of the system. Because he or she is the most important membrane in healthcare delivery One of the Iraqi Ministry of Health (MOH) strategies is to do research on occupational health hazards, with an emphasis on their prevalence, kind, and causes of their occurrence (MOH 2009).

As a result, the researcher became interested in discovering the categories of work-related health hazards that nursing staff members are exposed to as a result of their jobs. According to some key characteristics, the result of this study help increases nurses' knowledge and attitudes towards occupational hazards as well as their preventive practices and this outcome may assist in identifying strategies to improve the working environment in hospitals as well as measures to lessen the occupational hazards that nurses face.

1.2 Problem Statement

An estimated 4% of a country's gross domestic product is lost each year due to occupational diseases, accidents, and illnesses (Agbana *et al.* 2016). Disabilities caused by occupational health hazards include a variety of physical and mental impairments; a reduction in manpower, which can result in a reduction in production; and in severe circumstances, the inevitable death of workers, which results in a reduction in the availability of trained personnel. Furthermore, the occupational vulnerability of healthcare personnel in developing nations, particularly among physicians, nurses, and nurse assistants, may jeopardize the quality of healthcare delivery in these countries (Bazeyo *et al.* 2015, Abidoye *et al.* 2016).

In the healthcare field, underreporting of occupational health hazards is a prevalent practice, and it represents a significant concern for occupational safety and health professionals around the globe (WHO 2014). Occupational health hazards can result in a variety of different types of harm. The loss of human resources might have repercussions for result in decreased production and service capacity, and in some severe cases, It is also possible for it to cause the death of one of the workers affected by the loss of human resources. Furthermore, in developing countries, poor and unsatisfactory professional performance of healthcare personnel, particularly among nurses, has the potential to degrade the overall quality of healthcare institutions. Hospitals are home to a variety of specific dangers that may have an impact on the health of their employees. The level of risk exposure varies greatly from one area of the hospital unit to another. Exposure to chemicals can occur as a result of disinfectants, sterilizers, cleaning agents, anesthetic gas, mercury, and hazardous medications. The viruses that cause hepatitis B, hepatitis C, HIV, TB, methicillin-resistant staphylococcus aureus (MRSA), and latex sensitivity are examples of biological hazards (Hamad and Qassim 2019). The COVID-19 pandemic is one of the most recent and prominent examples, which has shown how vulnerable health care workers are and how important it is to keep them safe (Lancet 2020).

To avoid negative consequences, it is necessary to be knowledgeable about workplace hazards and safety practices (Nurwani and Minghat 2018). A key "root cause" of workplace injuries, illnesses, and incidents is the failure to notice or avoid risks that were present or that may have been predicted. A proactive strategy for identifying and analyzing risks is an essential part of any effective safety and health management system. By looking at past research on occupational hazards, it seems that many nurses are exposed to a wide range of health risks at work. This is an important research topic that needs to be looked into further. Also, it is clear that nurses make up the largest group of health workers in most countries, and that they play a very important role in making sure that the public gets the care they need.

To contribute to safety and health on the job and reduce occupational hazards faced by nurses working in public and private hospitals in this city, The current research is must be completed. By providing information on occupational health hazards in hospitals, the current study will be of great assistance. It will also generate information on the gaps in mitigation methods that may be utilized to change regulations to lessen the risks associated with the workplace.

1.3 Objective of the Study

To evaluate and compare the occupational hazards and knowledge, attitudes, and preventive practices of nurses working in Public and private hospitals in Al-Diwaniyah City, Iraq.

1.4 Hypotheses

1. H0: There is no difference between the knowledge, attitudes and protective practices of nurses working in public and private hospitals about occupational hazards.
2. H0: There is no significant relationship between nurses' demographic characteristics, occupational hazards, and prevention measures among nurses.

1.5 Limitations

The fact that the average age of nurses working in private and public hospitals and the related work experience are not equal is an important limitation that may affect our results.

2. GENERAL INFORMATION

2.1 A Historical View

Occupational health is a branch of health sciences that is interested with the promotion and health and safety protection for all members of the workforce (Adeniyi 2002).

Occupational health hazards are described as "possible threats to people's health that develop as a result of an unhealthy work environment" (Fasunloro and Owotade 2004). Occupational hazards are common health issues. It can be defined as any action, material, location, or function that may result in occupational harm, accident, or disease. Despite significant advancements in occupational health in the majority of industrialized countries, protecting workers from occupational risks in many developing countries it is not a priority due to the fact that many other health concerns compete for attention. This condition will likely persist for a long period of time because of numerous social, economic, cultural, and political obstacles that frequently obscure the importance of occupational health. This has elevated occupational health and safety to a fundamental right in order for developing countries' welfare systems to remain sustainable (Owie and Apanga 2016).

Healthcare workers HCWs at hospitals are vulnerable to a wide range of occupational health hazards on a daily basis, which is hazardous to their health and well-being (Topf 2000).

The health and safety of employees in the workplace is a key concern not just for the general public, but also for labor organizations and business owners. In recent years, a variety of proactive measures have been taken to address the problem of occupational health and safety. Due to the fact that the working environment has become increasingly intolerable and that a growing number of employees are continuously exposed to a variety of health concerns, there is a need for increased safety precautions (Quinlan *et al.* 2001).

The health of employees is strongly influenced by their working conditions. If an unsupportive work environment is not controlled, it can cause injury and lead to occupational health concerns (WHO 2009).

Historically, occupational Health has been a story of attention being drawn to health hazards, employers and insurers attempting to deny or minimize their significance, isolated medical or scientific investigators bravely defending their position (often against pressure from their employers or conservative professional associations and funding bodies), followed by acceptance as a legally recognized "occupational disease," regulation, and the establishment of eve This trend can be traced back to Thomas Arlidge in the Staffordshire potteries, through Alice Hamilton's work with lead, silica, carbon disulphide, mercury, and other substances, Alice Stewart's work with ionizing radiation, Case's work with aromatic amines, Gough's work with coal dust, and Lewinsohn, Doll, Mancuso, and Selikoff's work with asbestos (Leigh 2002).

The World Health Organization Act, the Alma Ata announcement (1978) on the primary health care, the health strategy for all people, and the International Labor Organization (ILO) Conventions on occupational and workplace safety and health for employees and health services, among other things, state that all workers have the fundamental right to a high level of health and well-being. To achieve these objectives, it is necessary to provide occupational health services to all workers worldwide, regardless of age, gender, occupation, work quality, size, or workplace. Occupational health is defined by the International Labour Organization (ILO) in 2000 as a concept aimed at promoting and improving workers' health and maintaining physical, mental, and social well-being of workers in all professions, protecting workers from environmental health hazards, maintaining workers health in an environment adapted to their physical and mental needs, and adapting work with men and every man in his job. In today's world of work, issues such as underdevelopment, child labor, and the employment of women in factories, as well as the desire to improve productivity, have drawn scholars' consideration of how a workplace affects employees and society. The growing researcher interest in the work environment is most appropriate because, other

than the home environment, the workplace consumes the majority of people's time (Eze and Ihekerenma 2012).

The role of occupational health nursing staff in delivering clinical care and treatment has a long history and is highly respected by both employees and employers in the healthcare industry. They have a proven track record as certified health care practitioners who have provided direct care and built trusted and credible relationships with their patients and co-workers throughout the years. occupational health nurses and nurse practitioners, provide direct care on and off the job site, at all levels of prevention and treatment (Burgel and Childre 2012).

2.2 Diseases at the Workplace and the Health Problems

Hospitals are moderately risky industries because they provide health services to people suffering from a variety of illnesses (Maier 2009).

Epidemiological studies have revealed a rise in the prevalence or risk of certain diseases among the working population, including chronic nonspecific respiratory disease, cardio-vascular disease, including hypertension, musculoskeletal disorders, and gastric and duodenal ulcers (WHO 2010).

In France, a study was conducted among nursing staff and nursing assistants to determine the correlation between blood pressure levels and occupational hazard among hospital staff. The findings revealed that systolic and diastolic blood pressure were strongly related to age and weight. (2.5) mmHg is the difference in systolic blood pressure between and during day and night. The weak team relationships are the most appropriate dimension to systolic and diastolic blood pressure level, and, despite the fact that the difference was only a single point in the degree of stress, systolic blood pressure was (0.2) mmHg higher (de Gaudemaris *et al.* 2011).

Diabetes mellitus (DM) is a metabolic disorder condition marked by chronic hyperglycemia with metabolism and imbalance of carbohydrates, lipids, and protein to varying degrees. Diabetes mellitus is one of the earliest human illnesses known. Diabetes has continuing to spread throughout the world. As of 2011, the estimated global prevalence of (DM) was (366) million, with the second kind accounting for around (90 percent) of cases. Each country sees a rise in the number of people with (DM), with (80%) of those diagnosed with a new blood disease living in low- and middle-income countries (Baynest 2015).

Bronchial asthma is reversible due to airway dysfunction caused by any of a number of stimuli, including allergies, inhaled irritants, environmental gases, and infections (usually viruses). A heredity tendency appears to exist in two-thirds of all known causes; allergy rhinitis attacks account for approximately (50 %) of these cases that may lead to asthma. It can be classified either as extrinsic (related to allergy) or intrinsic asthma (Brunner 2012).

Also, in 2015, was expected (18.4 million) adults were diagnosed with active asthma, and 3996 persons died as a result of asthma. Occupational risks are estimated to be responsible for 11% to 21% of asthma deaths. Deaths due to asthma among people aged (15-64) years (Patel *et al.* 2018).

Cardiovascular diseases (CVD) encompass a wide spectrum of heart conditions, such as congenital coronary heart disease (CHD), cardiovascular illness, and heart disease and other similar conditions. In terms of worldwide mortality, cardiovascular diseases (often referred to as heart disease). The most prevalent cause of death worldwide is cardiovascular disease (CVD). Each year, more people are killed by the disease than any other cause. About 17.5 million individuals died in 2012 from cardiovascular disease (CVD), which accounted for 31% of all fatalities globally. About 7.4 million of these fatalities are caused by coronary artery disease. Middle- and low-income nations account for more than (80%) of all cardiovascular-related deaths. Sixteen million deaths occurred under (70) years related to non-communicable diseases (37 percent) attributable to cardiovascular disorders (Al-Mawali 2015).

Chronic obstructive pulmonary disease (COPD) is defined by a partially reversible obstructive pulmonary embolism, bronchitis, systemic consequences, or common disorders. Smoking is the main contributor. which accounts for 80 percentage of the disease's causes. chronic obstructive pulmonary disease is COPD the worlds represent fourth cause of death. Due to the fact that chronic obstructive pulmonary disease COPD typically manifests in middle age and the likelihood of the possibility of confusion with other disorders, it is difficult to establish the prevalence of the disease. Typically, an examination of lung function is required to confirm the diagnosis. In England, an estimated 900,000 new cases are being detected each year, while an estimated 2 million people are suspected of being infected but have not been diagnosed. Additional environmental risk factors for COPD have been found, as well as evidence substantiating these additional risks. For instance, the involvement of coal, cadmium, silica, and biomass in the causal link COPD is relatively well established, and the most frequently cited source of exposure is the possibility for harmful inhalation in the workplace, referred to as dust and vapors. COPD expected to be multivariate in nature, with numerous individual risk factors and their effect on the disease's development and progression (Fishwick *et al.* 2015).

COPD prevalence is difficult to estimate because the disease typically begins in middle life and can be mistaken for other conditions. The condition has been detected in an estimated 2 million people, but many more remain undiagnosed due to the need for further testing of lung function (National Institute for Clinical Excellence 2010).

A study was carried out among the nursing staff in Iran, with the goal of determining the frequency of disturbances and damage, as well as the relationship between work shift and occupational stress, in order to identify potential strategies for improving the quality of life among nurses who work shift work. The most common injuries and the most prevalent condition were both discovered to be connected with digestive problems (81 % of the cases) (Khammar *et al.* 2017).

This was the most common cause of blood-borne disease exposure for health care workers according to Shiao, McLawsy, Huanggz and Guox (2001). This demonstrates that workplace health dangers continue to be a challenges for providers of health care.

In the Gaza Strip city, according to a survey done by Eljedi, 66 percent of nurses at the Gaza Hospital had been hurt by sharps or needles (Obaid and Eljedi 2015).

South Africa has a lot of laws and acts in place to deal with issues of health and safety at work, but they aren't being used. This is demonstrated by the number of claims filed by health professionals who have been injured on the job. In South Africa, the compensation commissioner says that 0.05 percent of all compensation claims come from illnesses that people get at work (Department of Health 2000). 77 % of all recognized claims are for diseases like pneumoconiosis (Department of Health 2000). According to these numbers, South Africa's workplaces do not provide adequate protections for employee health and safety. Despite the fact that these rules are in place in South Africa, little is known regarding the level of knowledge among nurses of the importance of following such legal processes to protect them from workplace health threats. The Study findings found that respondents who reported occupational hazards were more likely than others to have encountered work-related pressures. In addition to Patients' and healthcare staff' quality of life is also decreased, work-related pressures have been connected to a diminished ability to deliver adequate patient care (Ziraba *et al.* 2010).

The findings about staff training are also similar to those of a study that looked at the relationship between employees' perceptions of safety and organizational culture. Additionally, insufficient safety training was found to be the root cause of major workplace accidents because employees didn't know or have the skills to identify potential hazards (O'Toole 2002).

In a comparable study, institutions and organizations that placed a strong emphasis on safety through training and other managerial practices saw an increase in the number of employees who adhered to safety regulations (Colligan and Cohen 2004).

Additionally, another study indicated further reported that employees who get safety training are more will than their untrained counterparts to report less work-related injuries (Wasswa *et al.* 2015).

According to the results of a study done in Saudi Arabia, the nurses were the most negatively affected group of professionals during the time of the study. They are also more likely to get hurt by sharp objects and get sick from airborne diseases (Abdullah *et al.* 2013).

Thousands of workers in both developed and developing countries could be exposed to physical, chemical, medical, or psychosocial hazards at work. The health care business is diverse. It includes a wide range of jobs and work settings that pose a wide range of health risks and health problems. There are also physical, biological, chemical, and psychological risks in the places where nurses work. These things made it more likely for nurses to experience professional burnout, exhaustion, work-related illnesses and accidents, exposure to blood-borne infections, infectious diseases, and musculoskeletal disorders (Sager 2014).

Accident reports assist in determining why accidents do not occur. Numerous incident reporting forms detail the barriers that keep dangerous situations from escalating into serious accidents. These are critical insights. They assist analysts in determining where more support is required to ensure the continued benefit of those measures. Due to the increased frequency of events, quantitative analysis is possible. One could claim that many accidents occur as a result of atypical circumstances. As a result, they supply only a limited amount of information on the type of future failures. By contrast, a larger frequency of occurrences reveals more about the proportional proportions of various types of human 'error,' system failure, and regulatory weakness, among others. They serve as a reminder of potential dangers. Incident reports enable you to keep track of possible problems and risks as they occur throughout the life of an application. By documenting these issues, it enhances the possibility that recurrent failures will be identified and addressed. Employees are kept informed through feedback. Schemes for incident reporting enable staff participation in safety improvement (Johnson 2002).

The idea of 'do no harm' lies at the heart of patient safety. It is essential that patient safety and nurse safety work in tandem; neither should be given more importance than the other. Importantly, a task is not safe unless everyone involved in or affected by it is safe, including the patient and all healthcare staff (Work Health and Safety Essentials for Nurses and Midwives 2013).

It is essential that nurses and other healthcare personnel obtain training and information on how to preserve one's own health and safety by preventing hospital hazards (Smith 2009).

2.3 Occupational Hazards

A hazard is defined as anything that can cause or predispose workers to an accident, injury, sickness, or death as a result of their work environment's materials, chemicals, work processes, or other factors. A study found that 53.6 % of hospital nurses were uninformed of the things they had to deal with on the job. About 89 percent of the high-risk nurses were aware of the expected occupational hazards for worker health at the workplace. They were also aware that hand cleaning is essential before and after clinical procedures. (Aluko *et al.* 2016).

Occupational hazards are still present and continue occur every day (Bekele *et al.* 2015b), and according to what has been observed (226 %) greater than other types of injuries (Malkin *et al.* 2006).

Medical sharp injuries are a recognized occupational health hazard for healthcare providers, according to the World Health Organization (2006). Each year, medical sharps injuries result in roughly (2 million infections with HBV), (900,000 infections with HCV), and (170,000 infections with HIV) among health-care professionals globally (WHO 2006).

However, occupational hazards in the field of health care can be further classed as the following categories: physical hazards (noise, vibration, radiation, temperature extremes and ergonomics), chemical hazards (liquid, solid, and vapour), biological hazards (fungi, bacteria, and viruses), (social and psychological stressful factors) as psychosocial hazards (Tziaferi *et al.* 2011). Additionally, Musculoskeletal disorders (MSDs) and injuries are greater prevalent and occur at a higher rate among all employees (Orme *et al.* 2015).

The hazards of nursing work and their jobs can have a detrimental effect on health both acutely and in the long term. These health effects outcomes include musculoskeletal injuries/disorders, other injuries, infections, and changes in mental health, as well as cardiovascular, metabolic, and neoplastic problems in the long term. Among these health hazards, low back discomfort is among the most frequently cited health hazards in the workplace by nurses. The majority of health care workers have encountered low back discomfort. This pain has an effect on the worker's health, but also on the worker's family. Numerous causes contribute to low back discomfort in nurses. In the United States, the incidence of self-reported low back pain was more prevalent among workers (Yang *et al.* 2016).

Because of their professional activities and work in the health care system, nurses are at risk of injury and occupational hazards, including physical, chemical, mechanical, psychosocial, and biological hazards (Isara and Ofili 2012).

According to a study conducted by the Office of Nursing at Health Canada, registered nurses who were full-time employees had an illness- and injury-related absenteeism rate that was 83 percent greater than the rate experienced by workers in other occupational groups. This amount of absenteeism raises concerns regarding the health of nurses, their safety from occupational dangers in the workplace, the nature of their employment, and the way their work is structured (Sawatzky *et al.* 2009).

The nursing staff is the most common group of people at the hospital because nurses often cut and pierce objects while doing their jobs. In an Italian study on Human

Immune Deficiency Virus (HIV) risk at work, there were 19,860 workplace exposures to blood or other potentially contaminated biological fluids (Bergamini *et al.* 2009).

According to the AORN (Association of Peri Operative Registered Nurses) Workplace Safety Position Statement, "key indicators of an organization's safe workplace include maintaining safe equipment, providing culture and commitment to ensure adequate nurse staffing levels, and fostering safe work practices." Perioperative nurses who work in the hazardous setting are more likely to experience physical, mental, and financial problems as a result of work-related injuries and diseases. Occupational injuries caused by a dangerous job result in increased costs and a reduced ability to provide services in the healthcare setting. Workplace hazards have been identified as a major cause in nurses quitting the sector, contributing to the growing nursing staff shortage (Clark *et al.* 2002).

In the hospital care context, safety means to the presence of safeguards that reduce the likelihood of physical, biological, chemical, and psychological risk occurring. Safety in handling of patients and movement techniques, as well as reasonable patient care assignments and shift durations, are examples of how these can be achieved (Zolot 2017).

Nursing staff should be proficient and equipped with the relevant knowledge information and skills necessary to protect themselves from potential hazards by employing preventative measures such as personal protective equipment, handwashing, incident reporting, and documenting (Institute of Medicine 2011).

2.4 Types of Occupational Hazards

2.4.1 Physical Hazards

Physical health hazards include pain in the body and biological disorders such as insomnia and sleep disturbances, pain in the leg, discomforts and back pain, body pain,

pain in the arm, gastrointestinal disorders and appetite changes, respiratory diseases, visual disturbances, and hearing disorders (Senthil *et al.* 2015).

Physical health hazards are characteristics of the workplace that are potentially to be hazardous, either because of the way the environment has been constructed or because workers have failed to adhere to safe work standards. Both of these situations' subject employees to unwarranted risks, such as failing to provide safety equipment (Andel and Spector 2015).

Sleep issues are one of the most prevalent health complaints that people experience. Estimates of the prevalence of sleep disorders are highly variable. Sleep issues are also more common among working individuals in many regions of the globe. In Europe, the incidence of sleep disturbances is approximately (18%), whereas in the United States, the prevalence is approximately (15% to 23%) (Uehli *et al.* 2014).

Sleep disruption is a prevalent symptom among the general Public. An approximate (50 percent or more) of American adults with symptoms of insomnia experience sleep difficulties at least a few evenings a week, according to the National Sleep Foundation (National Sleep Foundation 2009).

Nurses who do not get enough sleep not only risk the safety of their patients, but they also risk their own safety and health (National Center on Sleep Disorders Research 2009).

The term "Musculoskeletal disorders" refers to a group of inflammatory and degenerative diseases that affect muscles, ligaments, joints, tendons, and peripheral nerves. These diseases also impede blood vessel support as a result of pain or discomfort. Numerous professions and industries have rates of musculoskeletal problems that are up to three or four times greater than those of the general population. For instance, hospital employees are more susceptible to musculoskeletal problems than the general population. Musculoskeletal illnesses that are caused by acts taken at work

are known as work-related musculoskeletal diseases (WMSDs).WMSDs are widespread among healthcare personnel, especially the nursing staff which reported the highest percentage of occupational injuries. (Amosu *et al.* 2011).

Musculoskeletal disorders (MSDs) affecting the arms, lower back, and neck are prevalent throughout the world, affecting both employees and society, and are frequently connected with workload. Nursing staff members are subject to a variety of injuries and MSDs, most notably low back pain (LBP). Nursing is a highly valued profession in a number of countries. Due to the high risk and big workforce, possible occupational hazards MSDs are critical. The majority of studies MSDs among nurses are focused on LBP (Harcombe *et al.* 2014).

Musculoskeletal disorders associated with work are defined as symptoms of occupational risks that include pain and discomfort in bodily structures such as muscles, bones, nerves, the vascular system, tendons, and ligaments (Bernal *et al.* 2015).

In the United States, a study was done amongst nursing staff and nursing assistants concerning WMSDs because of the patients they care on a daily basis who are gaining weight and becoming obese. The goal of this research was to find out what kinds of musculoskeletal problems people had at work. The dangers linked with weight management are patients with excessive obesity, and giving them recommendations on how to limit the risk of skeletal muscle between nursing staff and nursing assistants. Sprains/strains, low back discomfort, wrist, knee, and shoulder injuries were among the musculoskeletal concerns connected with work between nursing staff and nursing assistants, according to the findings. When nurses and nursing assistants move or raise a patient by hand, the risk of WMSD increases, especially when the patient is overweight or obese, according to the findings (Choi and Brings 2016).

According to global data, there are 160 million new cases of work-related injuries each year, with an estimated 2 million individuals dying from injuries or accidents brought on by workplace hazards (ILO 2012).

Nurses are classed as one of the jobs with the greatest prevalence of diseases related to the workplace and injuries because of the nature of their employment. Between (40% - 85%) of nursing groups reported an annual incidence rate MSDs (Amin *et al.* 2014).

Work-related musculoskeletal disorders have a major negative influence on the quality of life, resulting in absenteeism or job loss, increasing labor constraints, big losses and compensation per capita, organization, family, and community, among other consequences. It is common for WMSDs to occur among health-care workers, with a high proportion of nursing staff 33 % and a large proportion of the workforce working in a hospital 60 % being at risk of injuries and multiple occupational accidents. The precise reason for the increased prevalence of WMSDs among hospital nurses. The most common risk factor WMSDs is induced by significant physical demands such as lifting in an unusual position and full body vibration (Mirmohammadi and Charati 2014).

According to a study conducted in Nigeria, low back pain affects 68 percent of female nurses and 32 percent of male nurses, and this is a very serious aspect component of occupational hazards (Sikiru and Hanifa 2010).

Human engineering experts evaluated occupational exposure (sitting, standing, walking, kneeling, heavy lifting, and working in a confined space) from the types of jobs reported (D'Souza *et al.* 2008).

Workers often fall or slip while they are at work. This is because the floor is slippery; there isn't enough light in the work area or corridor, and they do not use non-skid footwear. A study is done on 1000 people who work at a place of work to find people who have had traumatic injuries. The study found that 20% of the workers have problems with falling (Chang *et al.* 2016).

Falling might occur as a result of job stress and staff shortages. It may result in major health consequences such as back pain or injury. It is a musculoskeletal disorder that occurs during job performance for early stated reasons (Salvage 2008).

Stress at work has the potential to negatively impact both the nurses' quality of life and the care they give patients. Stress brought on by the job has caused nurses' clinical practice errors to rise and their capacity to deliver high-quality patient care to decline. (Sarafis *et al.* 2016).

2.4.2. Chemical hazards

Chemical hazards are the second sort of occupational hazard faced by healthcare providers. They include exposed to very dangerous chemicals such as Peroxide, lead, harsh detergents, volatile solvents (flammable solvents), poisonous gases (noxious fumes), allergens, and active substances, all of which are typically found in health care facilities (Mequanint *et al*. 2017).

Healthcare workers are exposed to a wide variety of chemical hazards, including agents of cleaning (excluding those used to disinfect and disinfect medical instruments or surgical instruments) on the hospital floor, existing carpets, hospital baths, and windows, as well as other locations throughout the hospitals and reviewer waiting areas. The primary routes of exposure to agents of cleaning include inhalation of spray during spraying or vapors and direct contact with the skin, which may cause eye irritation. Formaldehyde is a preservative that is commonly used in tissues, laboratories, and suites. Glutaraldehyde is utilized as a high-level refrigerant disinfectant for heat-sensitive medical equipment, and is ranked top as an endoscope. Mercury is mostly employed in thermometers and blood pressure monitors, but it is also present in dental clinics, the gastrointestinal tract, ophthalmology, laboratory chemicals, and pharmaceuticals. Numerous hospitals worldwide have begun to phase out mercury thermometers and blood pressure devices. All of these substances irritate the eyes and respiratory passages (cause inflammation of the mouth, cough, and allergic rhinitis). Prolonged exposure to these compounds has been linked to more severe pneumonia,

asthma, and hypersensitivity. When this substance comes into direct contact with the skin, it can cause redness, burning, swelling, cracking, and itching. Methyl methacrylate exposure might result in fatigue, headaches, sleepiness, nausea, weakness, dizziness, appetite loss, and insomnia (Chhabra 2016).

Chemical risks may arise as a result of the treatment of patients and maintenance of a sanitary environment in healthcare institutions, and these hazards may exacerbate asthma symptoms or provoke asthma. Nurses can be exposed to chemicals through the use of sterilants, cleaning agents, dangerous medications, disinfectants, mercury, anesthetic gases, latex, and other substances. Chemical dangers are believed to be the most dangerous and significant since it is more difficult to determine their short- and long-term effects on the nurse who is exposed to them (Dropkin *et al.* 2013).

On the job, nurses are exposed to chemicals, medicines, and other disinfectants, which are beneficial to the diagnosis and treatment of their patients (Rhule 2012).

In Brazil, a study was done among nurses. The goal of the study was to identify chemicals that affect nursing staff, determine which substances are responsible for health hazards, and determine what adjustments are appropriate in light of the potential for chemical-related disorders. People claimed to have been exposed to essential antibiotics. Iodine (98.1%) and latex (88.7%), Materials causing the main problems were: anti-tumor substances (86.7%), glutaraldehyde (79.2%), and ethylene oxide (75.5%); were the materials that caused the most issues; and health changes as stated: Vomiting, nausea, eye irritation, allergic reactions (enfermeros and hospitalario 2006).

The sensitivity of natural rubber latex among nursing staff and other health care providers is one of the most serious occupational health issues. Corn husk powder can operate as a carrier of natural rubber latex allergens, which can be absorbed through inhalation or contact with the skin. Allergic contact dermatitis, delayed hypersensitivity, urticarial, and vascular edema are some of the skin symptoms. Rhinitis, conjunctivitis, and asthma are some of the difficulties produced by latex hypersensitivity, although allergic reactions are uncommon. Allergies differ between countries and regions within

the same country, according to data from many research. As a result, data on the frequency, determinants, and causes that cause diverse occupational dangers to nursing staff must be gathered, so that effective measures may be put in place (Amosu *et al.* 2011).

Dermatitis, eczema, ulcers, and inflammation are all brought on by the local activities of these substances on the skin. Ashes, metal vapors, and their derivatives are released into the atmosphere during various processes such as grinding, casting, and quarrying, among others. Chemical substance inhalation is detrimental to one's health in the long run. Occupation-related illnesses can also be induced by the consumption of hazardous chemicals such as lead, mercury, arsenic, zinc and phosphorus that are absorbed in minute amounts through infected hands and food, or through cigarettes. A large amount of the absorbed chemical is eliminated in the feces, and the general blood supply can only achieve a limited proportion. (Babatunde 2009).

Radiation was always a part of our everyday surroundings. However, it was not until the end of the century that humanity became aware of its presence, as a result of the scientific revolutions that took place. Before, during, and after radiation procedures, nurses in radiology and sections in the wings where radiation procedures are performed provide professional care for patients. Patient care after unique radiotherapy operations is made possible through the use of this service, which helps to reassure and prepare patients for the process. During the procedure, nurses will also be there to assist and support the patient. Nurses also assist and support the patient throughout the surgery, as well as set up equipment and tools for use during the examination process. In order to provide accurate information to patients and protect themselves, nurses working in the departments, units, or pavilions where the specific radiation occurs must be knowledgeable about radiation and radiation protection practices. This will allow them to protect themselves, as well as patients and the general Public, from unnecessary radiation (Alzubaidi *et al.* 2017).

Chemical hazards can impact as many as 10.7% of health-care workers, and corrosive chemicals such as strong acids are responsible for up to 30% of all burn-related fatalities

(Chou *et al.* 2015, Reddy *et al.* 2015). Understanding of the safety precautions that must be taken to safeguard healthcare professionals from exposure that is harmful to such substances can reduce accidents and injuries risks among them, allowing them to focus on their core mission of providing healthcare services.

2.4.3 Biological Hazards

Biological hazards are natural substances compounds that include diseases, infections, illnesses, crevices, and biodynamic substances, (Abdulraheem *et al.* 2012). Biological hazards include influenza, insect bites, dengue fever, TB, cholera, malaria, diarrhea, typhoid fever, hepatitis, parasite diseases, and fungal infections (Ahmad *et al.* 2017).

These biological agents may pass through the skin because of its weakened composition and "mucous membranes (mouth, eye, and urogenital mucosa)" as a result of its proximity to blood or body fluid and other sterile body fluid, as well as other sterile body fluid. While approximately 30 viruses can be transmitted in this manner, "hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HDV), and human immunodeficiency virus (HIV)" are the most significant viruses, because they can cause systemic infections due to their current prevalence and because they are the most common viruses. Physiological consequences of these agents range from asymptomatic infections to severe infections, which are frequently deadly in nature (Himmelreich *et al.* 2013).

It includes wounds, acute injuries, cuts, direct contact with infected specimens / potentially harmful biological agents, bloodborne diseases, infectious diseases / infection, airborne diseases, pollution from contaminated substances, and other types of injuries (Ndejjo *et al.* 2015). Further research indicated that infected needles and other sharp devices are responsible for the transmission of more than 20 different blood-borne diseases, including hepatitis B and HIV, to nurses working in hospitals (Ramsay *et al.* 2006).

Healthcare professionals are exposed to a wide variety of infectious diseases at their places of employment. These include: (the common cold and influenza, cytomegalovirus, herpes simplex virus, enteric pathogens, measles, mumps, Varicella, pertussis, scabies, rubella, staphylococcus, and tularaemia). The Centers for Disease Control and Prevention recommended and suggest that hospital employees receive vaccinations for hepatitis B, MMR, influenza, varicella, and tetanus (Shefer *et al.* 2015). It has been stated by the World Health Organization that about (3) million cases of cross-skin transplants or other skin-related skin transplants take place in healthcare delivery settings per year. The majority of instances (90 percent) occurred in developing nations. The hazards of HIV infection after skin exposure is predicted to be (0.3 %), and the risk of HIV infection after mucosal exposure is assessed to be (0.09 %) (Aminde *et al.* 2015).

This disease is one of the most severe diseases that may be spread through blood and represents a significant hazard to public health (HCWs). Among the most common ways of transmission from patient to healthcare worker HCWs are needle stick and other sharps injuries (NSSIs), which are followed by mucous skin exposure. People who have a chronic infection also act as a key reservoir for the spread of the disease on an ongoing basis (HBV). The annual percentage of HCWsexposed to pathogens (5.9%) for (HBV), corresponds to approximately (66,000) cases of hepatitis (C) virus worldwide (Yimer *et al.* 2017).

According to World Health Organization (WHO) estimates, a third of the world's population has been infected with tuberculosis, which has resulted in (1.4) million deaths, while roughly (9) million new cases are reported and diagnosed worldwide each year (WHO 2013).

Needlestick injuries are responsible for (37.6% of hepatitis B), (39% of hepatitis C), and (4% of HIV/AIDS) among healthcare providers worldwide (CDC, 2010). The majority of these infections occur in health care settings in developing countries as a result of exposure to percutaneous activities (Amira and Awobusuyi 2014). HCWs swere more likely than younger health care workers to be at risk for tuberculosis (TB). Employees

who had worked for more than ten years were shown to be at greater risk than their counterparts who had worked for less years, according to the findings of the studies. It was discovered that people working in health-care settings such as laboratories, TB patients, general medicine units, and emergency departments were at greater risk of contracting TB because they were more likely to spend more time with patients who had the disease. TB is a contagious disease that affects the respiratory tract TB. Compared to their peers who work in the administrative section of the health institution (Nicolau *et al.* 2012).

Many types of blood-borne pathogens can be spread by needle stick injuries (NSIs) that happen to health care workers. These include hepatitis B virus and HIV/AIDS in people who work in the health care field HCWs. People with hepatitis (B), hepatitis (C), and HIV / AIDS were found every year, with (2.1) million (926,000), and (327,000) people each. The total number of occupational hazards around the world is estimated to be (35) million, and each year, there are about 3 million (NSIs). As many as 50% of the nursing staff (NSIs) are at risk from this group. They are thought of as victims (Jahangiri *et al.* 2016). The fact that health care workers come into contact with patients and handle human biological wastes such as sputum, feces, urine, and blood increase their risk of contracting infections, which has the potential to have serious public health consequences because Patients and others in the community who are in close contact with them can be exposed to diseases that are spread by health care employees (Memish *et al.* 2013).

Personnel in the healthcare industry come into contact with infected patients and their bodily fluids. The execution of exposure operations, which will result in the injury of workers, is a very important component. Sharp item injuries to health care employees are among the most frequently reported occupational health hazards in health care (Hamid *et al.* 2010).

2.4.4 Psycho-social hazards

Psychosocial hazards are those aspects of the workplace, such as its organization and administration, as well as its social and organizational environment, that has the potential to inflict psychological or physical hazards to individuals (Cooper 2004).

Social hazards are Challenges in family relationships, feelings of isolation, lack of attention to others, difficulties in emotional relationships, difficulties in social life, barriers to social friendships, and trouble making personal life decisions (Shimizu *et al.* 2010).

The physiological and psychological response of a person to the physical and psychological strain caused by an imbalance between the needs of the job and the resources, needs, abilities, and knowledge of the individual is what is known as "job stress." (Van der Meij *et al.* 2018)

Nurses are direct providers of health care, and their contribution to the overall quality of health care services delivered to patients is significant and crucial. However, despite the fact that nurses, health systems, and hospitals, in particular, are critical components of the healthcare delivery system, they have not been able to protect nursing staff on the front lines from assaults in the workplace, which is critical because They have regular communication with patients and relatives. Violence in the workplace is a problem for health care workers from many different countries, and it can be hard to stop. A lot of HCWsare abused every year, according to international reports about (10-50%) of HCWsare exposed to violence every year and Some places have a rate of more than (85 %). Violence against health care workers, such as nurses, may arise in the future. In general, some things make it more likely that nurses will be Violence at work than other groups. These factors include close contact with patients and their families, night work and high-stress levels in clinical care settings, work in places where there aren't enough nurses to meet both patient and staff needs, and female dominance among nurses and safety in the places where nurses work. People who work in most hospitals have to

move between rooms, make stressful situations for patients' families while they wait for a doctor's visit, and prepare to "leave work" after a seizure (Teymourzadeh *et al.* 2014).

Researchers in Italy performed a research of nursing staff to learn more about the stress that comes with working in the healthcare industry, specifically in relation to gender issues and the pursuit of gender parity in the workplace. The study found that the length of time spent at work was the most significant source of stress. Perceived stress was greater in women than in men who took time to de-stress after a stressful day. There were also substantial disparities in perceived functional stresses among age groups as a consequence of the study's computational analysis (Pino and Rossini 2012).

Healthcare employees are frequently exposed to job stress, which is one of the most significant contributors to psychological hazards (Alosaimi *et al.* 2016). Furthermore, the job plan and everyday activities of a health providers are complicated by the necessity of working long hours, which contributes to stress (Ruitenburg *et al.* 2016). Fatigue caused by suffering lowers the quality of health care, which leads to more turnover, absenteeism, and low morale in the health care field. Marital problems, family problems, body fatigue, sleep problems, and alcohol and drug use are all signs of self-disfunction that are linked to it (Leiter and Maslach 2010). All of these issues are significant and well-documented contributors to psychological hazards in health care professions (Kelbitsch and Kenny 2003).

Excessive exposure to stress is related with negative health consequences, which include anxiety, mood fluctuations, lethargy, and depression, among other symptoms (Nouetchognou *et al.* 2016).

Shift work in a nursing job is associated with a number of health issues and is associated with an increase in the number of accidents, injuries, and disabilities among shift workers nurses. Working in shifts has a negative impact on both physical and mental health, resulting in mistakes and exhaustion (Ata *et al.* 2016).

Stress caused by labor is associated with fatigue, lengthy workdays, numerous transportation responsibilities, a significant number of cases, and frequent patient attendance, among other things. Furthermore, according to a study conducted in Pakistan, more than half of health-care personnel experienced stress at work as a result of factors such as long-distance travel to the job, poor communication among patients, low socioeconomic position, and a lack of medical supplies. The health facility is irregular, there is no regular job structure for family welfare agencies and the monthly income of health-care personnel is inadequate (Haq *et al.* 2008).

The findings of the study revealed that (95.9 %) of health care workers HCWs had been verbally abused, while just (29.1 %) of health care workers had been physically assaulted. Researchers believe that the cancellation of an appointment, the long wait in health-care facilities, and the payment of a patient's bill are the root causes of these infractions (Khademloo *et al.* 2013).

According to the findings of a study, employees were subjected to frequent verbal abuse during the morning working hours, while physical assaults against them happened during the nighttime work hours. This leads to overcrowding of reviewers and their families in health care settings during each review. She also stated that the rate of verbal and physical abuse is higher among female nurses than among male nurses because female nurses are more likely than male colleagues who tend to conflict with offenders (Mahnaz *et al.* 2008).

2.4.5 Ergonomic hazards

Ergonomic hazards, such as problems with the neckline, backbone, shoulder, and knees, are common problems from people who work in the medical, dental, and nursing fields (Yasobant and Rajkumar 2014). An example of an ergonomic injury is an injury caused by lifting and moving patients. Other instances include lifting and moving heavy equipment and standing in one location.

Ergonomics is the study and practice of adjusting people, machines, and work environments. Anthropometry, physiology, biometrics, psychology, and anthropometry are only a few of the scientific disciplines that are used in ergonomics. Manual handling of excessively heavy, excessively large, and difficult-to-reach loads raises the risk of Musculoskeletal Disorders (MSDs) in workers. MSDs are also caused by repetitive tasks, extended standing, which is frequently accompanied with a hunched over or awkward position, and sitting for lengthy periods of time (Ahmad *et al.* 2017).

In a study into the effects of transfer, lifting, moving, and repositioning procedures on health-care staff, they discovered that nurses were among those who suffered the most injuries, primarily to their backs, necks and shoulders, out of the total number of injuries suffered by health-care workers (Black *et al.* 2011)

Musculoskeletal system injury occurs as a result of the movement of repetitive joints. Heavy weight lifting, unnatural postures, and straining beyond one's comfort zone are all required to lift heavy items. But almost all places of business think of ergonomics as a useless luxury rather than a safety measure (Chaiklieng and Suggaravetsiri 2015), despite the fact that other healthcare organizations regard ergonomic injury to be a priority (Caraballo-arias 2015). In Malaysia, occupational safety and health (OSH) was the realm of health professionals, who demonstrated insufficient understanding (Lugah *et al*. 2010).

Healthcare workers are exposed to high levels of ergonomic risk, putting them at greater risk for musculoskeletal problems as well as other work-related ailments. Annually, more than 5000 injuries among health-care workers are documented, according to some estimates. These are mostly because of how they handle patients and how much work they have (excessive workloads). Also, awkward or still positions while treating patients cause strains and stresses, which are another cause of these problems (Ghosh 2013).

The prevalence of musculoskeletal disorders in the workforce hasn't decreased despite advances in safety measures like as mechanization, automation, and widespread safety

campaigns. These disorders may cause the potential to cause significant human misery as well as a reduction in work capability and production (Ee *et al.* 2005).

3. MATERIAL AND METHODS

3.1. The Study Design

The design of the study is a comparative study. A comparative study design was used for investigation of knowledge, attitudes and preventive practices regarding occupational hazards of nurses working in public and private hospitals in Al-Diwaniyah City, Iraq from 23 /December/ 2021 to 16 /March/ 2022.

3.2. The Study Setting

The study had been done at public and private hospitals in Al-Diwaniyah City, Iraq, in 2021-2022.

Public Hospitals: Al-Diwaniyah Teaching Hospital, Women and Children Teaching Hospital.

Private Hospitals: Al-Diwaniyah Private Hospital, Al-Furat Al-Awsat Private Hospital, Dar Al-shafaa Private Hospital, Al-Hayat Special Eye Center, Dr. Saif Al-Shamrty Special Eye Center.

3.3. The Study Sample

The study sample were 200 nurses working in public and private hospitals in Al-Diwaniyah City, Iraq. The sample size was determined by G power program analysis through a confidence interval of 95% and probability error of 0.5.

The sample is assigned to the study according to the following criteria:

3.3.1 Inclusion Criteria for the Sample

- Nurses working in public and private hospitals who agreed to participate in the research.
- They agreed to help and cooperate with the research

3.3.2 Exclusion Criteria for the Sample

- Nurses working in Public and private hospitals and who do not agree to participate in the research.

3.4. The Study Instrument

After an extensive review of relevant literature and previous studies, the researcher was used an improved Likert scales this questionnaire was created by Aluko *et al.* (2016), and the questionnaire was modified by Mahmood *et al.* (2018). Permission was obtained from the authors to use the questionnaire (Mahmood *et al.* 2018). Validity and reliability study of the scale was carried out. According to the results of our analysis; the questionnaire had an acceptable level as determined by Cronbach's alpha and It is a valid and reliable measure according to the values of the following results: Knowledge items=0.80, Attitude items=0.90, and Practices items=0.79.

The questionnaire consists of 4 parts: part one; demographic characteristics, part two; knowledge of nurses towards occupational hazards and safety practices, part three; attitude of nurses towards occupational hazards and safety practices, part four; check the list to assess nurses' practices regarding hazards prevention.

1. **Demographic Characteristics:** This part consists relevant of: age, gender, education level, experience, training about occupational hazards, and safety practices.
2. **Knowledge of Nurses towards occupational hazards and safety practices:** This part consists of 18 items. The nurses participating in the study answered

part two/ knowledge of nurses towards occupational hazards and safety practices are three points scales which are scored as: (Yes=3), (Uncertain=2), and (No=1). Evaluation of nurses' knowledge were based on: mean score for items equal to (1) or more was considered as an adequate: 1 to 1.66 was considered as a Low, 1.67 to 2.33 was considered as a Moderate, 2.34 to 3 was considered as a High.

3. **Attitude of Nurses towards occupational hazards and safety practices:** This part consists of 17 items. The nurses participating in the study answered part three/ (Attitude of Nurses towards occupational hazards and safety practices) three points scales which are scored as: (Agree=3), (Undecided=2), and (Disagree=1). Evaluation of nurses' attitude were based on: mean score for items equal to (1) or more was considered as an adequate: 1 to 1.66 was considered as a Negative, 1.67 to 2.33 was considered as a Moderate, 2.34 to 3 was considered as a Positive.
4. **Check the list to assess nurses' practices regarding hazards prevention:** This part consists of 10 items. Part four/ (Checklist to assess nurses' practices regarding hazards prevention) three points scales which are scored as: (Done perfectly=3), (Done but not perfectly=2), and (Not done=1). Evaluated by the researcher according to their preventive practices through three points scales which are scored as: based on: mean score for items equal to (1) or more was considered as an adequate: 1 to 1.66 was considered as a Not applicable, 1.67 to 2.33 was considered as a Moderate, 2.34 to 3 was considered as an Applicable.

3.5. Data Collection

The researcher met the nurses at the hospital's departments to obtain their consent to participate in the research and to clarify the research questions. The data collection process started from (23, December 2021 to 16 March 2022) in order to achieve the aims of the study.

The following ethical issues were applied when collecting samples:

- Voluntary participation by the nurses.

- During the interview, participants' privacy was respected.
- The researcher obtained informed approval from each nurse.
- Clarify the questions contained in the questionnaire by the researcher if the participant requests clarification.

The implementation of the questionnaire on the study sample includes the following steps:

1. The time required for answering the questionnaire ranged from (25-30) minutes.
2. The researcher obtained the consent of each nurse to participate in the study.
3. Every nurse who participated in the study filled out questionnare.

3.6. Statistical Analysis

When evaluating the data, IBM SPSS Statistics 21.0 Ver. (SPSS Inc, Chicago, IL, USA) package program was used. The suitability of the variables to normal distribution was examined using visual (histogram and probability graphs) and analytical methods (Kolmogorov-Smirnov and Shapiro-Wilk tests). Descriptive values were expressed as numbers, percentages, and arithmetic mean, standard deviation, minimum and maximum, and the values of independent groups was compared with student t-test according to the normal distribution feature. The chi-square test was used to investigate the difference between two or more groups. Analysis has been done pearson correlation coefficient to evaluate relationships between variables. Correlation values were accepted as r=0.01-0.30 low, 0.30-0.70 medium, 0.70-1.00 high. The statistical significance level was accepted as $p<0.05$.

3.7. Ethics Committee Approval

The official permissions were obtained from relevant authorities before collecting the study data as follows:

Çankırı Karatekın University Scientific Research Evaluation Ethical Committee granted ethical approval and permission for the researcher to begin studying the thesis and to

facilitate the task of the researcher to obtaining information from participants, under Resolution (No:23, Date:16.11.2021).

Getting the approval of the research was also approved by the Iraq Ministry of Health in the AL-Diwaniyah Health Directorate Office / (Training and Development Centre) in order to get official permission to carry out the study by the Researchers Committee under Resolution (No:10, Date: 18.11.2021).

The research was accepted by the Research Committee because the research met the approved criteria.

4. RESULTS

Distribution of nurses in private and public hospitals according to their demographic characteristics Table 4.1 is also shown the study result by their demographic data that indicate that majority of the study sample related to gender is male in the private hospitals and female in the public hospitals and most of the study sample have diploma in nursing in private and public. The study result indicates the majority of the nurses they are participant in the training about occupational hazardous in hospitals.

The average age of nurses working in private hospitals is higher than those working in public hospitals ($p<0.001$).

Table 4.1 Distribution of nurses in private and public hospitals according to their demographic characteristics.

DEMOGRAPHIC DATA	VARIABLES	PRIVATE (n=100)	PUBLIC (n=100)	Statistical Analysis	
		n, (%)	n, (%)	Chi- square	p
Gender	Male	79, (79.0)	41, (41.0)	8	**0.005**
	Female	21, (21.0)	59, (59.0)		
Level of education	Preparatory	30, (30.0)	28, (28.0)	21.23	**0.001**
	Diploma	48, (48.0)	42, (42.0)		
	under and post graduate	22, (22.0)	30, (30.0)		
Training about occupational hazards and safety practices	Didn't Participants in the Training	13, (13.0)	37, (37.0)	6	**0.04**
	Participants in the Training	87, (87.0)	63, (63.0)		

	Private	Public	Statistical Analysis	
	Mean ±SD (n=100)	Mean ±SD (n=100)	t	p
Age/years	38.81 ±7.68	28.37 ±6.21	10.56	0.000

$p<0.05$, t= independent t-test, Chi- square test, n=number of samples, %= percentage

In the Table 4.2 shown that the study results about the overall evaluation for (knowledge, attitude, and practice) in private and public hospitals. Regarded to overall knowledge is high in the private hospitals while moderate in the public hospitals and overall evaluate for attitude is positive in the private and public hospitals. The study result indicates related to overall practices are applicable in the private hospitals while moderate in the public hospitals about occupational hazards.

Table 4.2 Distribution of the study sample by their characteristics for nurses in private and public hospitals.

QUESTIONNAIRE PARAMETERS	QUESTIONNAIRE EVALUATE	GROUPS			
		PRIVATE (n=100)		PUBLIC (n=100)	
		n, (%)	Mean ±SD	n, (%)	Mean ±SD
Overall knowledge	Low (1- 1.66)	4, (4.0)	2.74±0.51 High	2, (2.0)	2.22±0.52 Moderate
	Moderate (1.67 -2.33)	18, (18.0)		61, (61.0)	
	High (2.34 - 3)	78, (78.0)		37, (37.0)	
Overall attitude	Negative (1 -1.66)	0	2.40±0.33 Positive	0	2.66±0.45 Positive
	Moderate (1.67 -2.33)	29, (29.0)		13, (13.0)	
	Positive (2.34 - 3)	71, (71.0)		87, (87.0)	
Overall practices	Not applicable (1- 1.66)	1, (1.0)	2.60±0.56 Applicable	4, (4.0)	2.33±0.33 Moderate
	Moderate (1.67-2.33)	8, (8.0)		54, (54.0)	
	Applicable (2.34 - 3)	91, (91.0)		42, (42.0)	

Anova; n=person number, SD: Standart deviation

Comparisons between nurses knowledge, attitudes and practices in private and public hospitals are shown in Table 4.3. Nurses in private hospitals had higher scores on knowledge and practices (p=0.001, 0.001, respectively). Nurses in public hospitals had higher scores on attitudes (p=0.005).

Table 4.3 Comparisons between nurses knowledge, attitudes and practices in private and public hospitals.

QUESTIONNAIRE PARAMETERS	GROUPS		Statistically Analysis	
	Private (n=100)	Public (n=100)		
	Mean ±SD	Mean ±SD	t	p
Overall Knowledge	2.74±0.51	2.22±0.52	5.28	**0.001**
Overall Attitude	2.40 ±0.33	2.66 ±0.45	2.81	**0.005**
Overall Practices	2.60 ±0.56	2.33 ± 0.33	7.931	**0.001**

p<0.05, SD:Standart deviation, Student t test,

The analysis of the relationships between the demographic characteristics of nurses in private hospitals and their knowledge, attitudes and practices is shown in Table 4.4. It was observed that the ages of the nurses working in the private hospital and their experience, training, knowledge and practices were correlated (p=0.001, r=0.797; p=0.001, r=0.472; p=0.024, r=-0.198; p=0.001, r=0.328; respectively). Nurses' experiences were positive correlated with training, and practice (p=0.001, r=0.409; p=0.002, r=0.286; respectively) and negative correlated knowledge (p=0.013, r=-0.222). A positive correlation was found between nurses' training and practices (p=0.001, r=0.373) and, negative correlation was found between knowledge and practices (p=0.026, r=-0.196). No correlation was found between other variables (p>0.05).

The analysis of the relationships between the demographic characteristics of nurses in public hospitals and their knowledge, attitudes and practices is shown in Table 4.5. Ages and education levels of the nurses working in the Public hospital were negatively correlated, while their ages were positively correlated with experience, training, attitude

and practices (p=0.003, r=-0.294; p=0.001, r=0.599; p=0.001, r=0.392; p=0.001, r=0.382; respectively). Training and knowledge and attitude were positively correlated (p=0.008, r=0.263; p=0.035, r=0.212; respectively). Knowledge and attitudes and practices were positively correlated (p=0.001, r=0.315; p=0.002, r=0.312; respectively). No correlation was found between other variables (p>0.05).

Table 4.4 Correlation between demographic characteristics with nurse's knowledge, attitude, and practice in the private hospitals**.**

Variables	Test	Age	Level of education	Experience	Training	Knowledge	Attitude	Practice
Age/years	r	1	0.069	.797*	.472*	-.198*	0.045	.328*
(n=100)	p	-	0.247	0.001	0.001	0.024	0.329	0.001
Level of education	r		1	-.145-	-.007-	0.072	-.162-	-.017-
(n=100)	p			0.076	0.472	0.238	0.054	0.433
Experience	r			1	.409*	-.222*	0.009	.286*
(n=100)	p				0.001	0.013	0.465	0.002
Training	r				1	-.056-	-.089-	.373*
(n=100)	p					0.29	0.19	0.001
Knowledge	r					1	0.129	-.196*
(n=100)	p						0.1	0.026
Attitude	r						1	0.016
(n=100)	p							0.439

*p<0.05, r: Pearson correlation coefficient

Table 4.5 Correlation between demographic characteristics with nurse's knowledge, attitude, and practice in the public hospital**s.**

Variables	Test	Age	Level of education	Experience	Training	Knowledge	Attitude	Practice
Age/years	r	1	-.294*	.599*	.392*	.163	.382*	.133
(n=100)	p		.003	.001	.001	.104	.001	.187
Level of education	r		1	-.082-	-.126-	-.109-	-.194-	-.034-
(n=100)	p			.415	.211	.28	.053	.74
Experience	r			1	.096	.165	.118	.1
(n=100)	p				.34	.1	.244	.322
Training	r				1	.263*	.212*	-.117-
(n=100)	p					.008	.035	.248
Knowledge	r					1	.315*	.312*
(n=100)	p						.001	.002
Attitude	r						1	.14
(n=100)	p							.166

*p<0.05, r: Pearson correlation coefficient

5. DISCUSSION

This study was conducted to investigation of knowledge, attitudes, and preventive practices regarding occupational hazards of nurses working in public and private hospitals in Al-Diwaniyah City, Iraq.

To distribution of nurses in private and public hospitals according to their demographic characteristics indicate that majority of the study sample related to gender is male in the private hospitals, this study findings are not consistence with the study conducted in Egypt that were the majority of nurses participating in the study were female (Elbilgahy *et al*. 2019). In the present study the majority of the study sample related to gender is female in the public hospitals, this study findings are consistent with the study conducted in Kampala, Uganda in 8 public and private hospitals, that mention the percentage of female participants was the highest among the participants were female (71.5 %) and male (28.5%) and this study indicate that the data shows that it was natural for nursing to be undertaken by a woman which is a reflection of the societal view as what Nightingale (mother of nursing) said (Ndejjo *et al.* 2015). Most of the study sample have diploma in nursing in the private and public hospitals. This study findings are consistence with the study conducted in Iraq that mention the majority of the nurses graduated from medical institutes (diploma in nursing) while the lowest percentage of them are graduates of Preparatory nursing school and college (Ahmed and Shareef 2019). This finding could be attributed to the presence of institutes in most of the cities in Iraq and the graduation of batches of morning and evening study in large numbers in addition to the presence of several departments and various specialties (Sekab and Abd 2021). The study finding indicate that the majority of the nurses they are participant in the training about occupational hazardous in the private and public hospitals, this study findings are consistence with the study conducted in Iraq that mention most of the nurses, had received training courses on occupational hazards, because health workers in Iraq must participate in annual training courses, including courses on occupational hazards (Hamad and Qassim 2019).

Also, average age of nurses working in private hospitals is higher than those working in public hospitals (p=0.000), this study findings are consistent with the study conducted in Kampala, Uganda conducted in 8 public and private hospitals, that mention there is a difference in ages (Ndejjo *et al.* 2015). In the private hospitals must nurses to have more experience and skill in their field of work, so their average age is higher.

The overall evaluation for knowledge is high in the private hospitals, this study findings are consistent with the study conducted in Nawaz Sharif Social Security Hospital Lahore Pakistan, that mention of nurses were with high knowledge about occupational hazards (Awan *et al*. 2017). In contrast, the overall evaluation for knowledge is moderate in the public hospitals, this study findings are consistent with the study conducted in Onandjokwe health district that mention number of registered nurses have knowledge on occupational hazards, although there are a few numbers which have insufficient knowledge on occupational hazards. (Julia 2005). According to WHO (2012), the rational model of health promotion believed high knowledge, will translate to a positive attitude and subsequently good practice, though in reality, the transition is not straightforward but depended on several factors.

The overall evaluation for attitude is positive in the private and public hospitals, this study findings are consistent with the study conducted in Nigeria that mention the attitude summation revealed that the majority of respondents had a positive attitude toward safety practices and the prevention of occupational hazards. This could be due to respondents' high knowledge and fear of occupational infections and illnesses, which can be terminal and life-threatening in some cases. Again, many HCWs attend in-service training courses that include sessions on health care facilities and hospital safety procedures. that this should be a joint obligation of hospital administration and the employees who endure the repercussions of occupational injuries with their dependents. (Aluko *et al.* 2016).

The overall evaluation for practices is applicable in the private hospitals, this study findings are consistent with the study conducted in Namibia by (Amadhila *et al.* 2017) that Most of the participants in the study were applying preventive practices measures

about occupational hazards. In contrast the overall evaluation for practices is moderate in the public hospitals, this study findings are consistent with the study conducted in Iraq by (Mahmood et al,2018) that mention of the study findings revealed that (35%) of nurses had good practice, (34%) had fair level, and (31%) had poor practice. Nurses in private hospitals had higher scores on knowledge and practices and nurses in public hospitals had higher scores on attitudes, this study findings are consistent with the study conducted in Egypt by (Rayan *et al.* 2021) that mention there was a positive significance among total knowledge score and total practice score related occupational health hazards among nurses.

It was observed that the ages of the nurses working in the private hospital and their experience, training, knowledge and practices were correlated. Nurses' experiences were positive correlated with training, and practice and negative correlated knowledge. A positive correlation was found between nurses' training and practices and negative correlation was found between knowledge and practices. No correlation was found between other variables ($p>0.05$), this study findings are not consistent with the study conducted in Iraq by (Mahmood *et al.* 2018) that mention shows that there was significant association between nurses' attitude and years of experience, while there was a non-significant association between nurses' attitude and other characteristics (age, gender, level of education, and training related course). Also, there was a non-significant association between nurses' practice level and variables (age, level of education, and training related course). Also, this study findings are not consistent with the study conducted in Taiwan by (Tung *et al.* 2014) that mention there was only a significant difference in their knowledge about the prevention of occupational hazards. Furthermore, this study findings are consistent with the study conducted in India by (Sreekumaran and Balachandran 2017) that mention shows a significant positive correlation with practice and knowledge scores of nursing personnel regarding occupational health hazards. It is seen that experience and education against occupational hazards are reflected in the attitudes and practices of nurses, but only the education and knowledge received at school are not reflected in current practices. The fact that nurses working in private hospitals participated in training programs about

occupational hazards at a higher rate may have increased their knowledge and attitudes along with their experiences.

It was observed that ages and education levels of the nurses working in the public hospital were negatively correlated, while their ages were positively correlated with experience, training, attitude and practices, this study findings are not consistent with the study conducted in Nepal by (Sabita *et al.* 2018) that mention was significant association of knowledge with educational status. Training and knowledge and attitude were positively correlated, this study findings are consistent with the study conducted in Nigeria by (Aluko *et al.* 2016) that mention in the relationship among variables, the respondent's occupation and sex categories were significantly associated with knowledge and attitude while education was also associated with knowledge. Knowledge and attitudes and practices were positively correlated. No correlation was found between other variables ($p>0.05$), this study findings are not consistent with the study conducted in Afghanistan by (Fayaz *et al.* 2014) that mention we could not find any significant association between HCWs' knowledge and practice. On the other hand, this study findings are consistent with the study conducted in Karachi, Pakistan by (Joseph *et al.* 2021) that mention it is found that a nurse's knowledge of preventive measures is significantly associated with occupational hazards. However, the fact that nurses working in public hospitals are younger, inexperienced, and have less participation in training programs about occupational hazards may be supportive in terms of improving their knowledge and practices.

6. CONCLUSION

The study findings concluded showed relatively majority of the study sample related to gender is male in the private hospitals and female in the public hospitals and most of the study sample have diploma in nursing in private and public and the average age of nurses working in private hospitals is higher than those working in public hospitals. Regarded to the overall evaluation for (knowledge, attitude, and practice), overall knowledge was high in the private hospitals while moderate in the public hospitals, and overall attitude is positive in the private and public hospitals and overall practices are applicable in the private hospitals while moderate in the public hospitals about occupational hazards. Nurses in private hospitals had higher scores on knowledge and practices and nurses in public hospitals had higher scores on attitudes. Nurses' experiences were positively correlated with training and practice in private hospitals and negatively correlated knowledge and negative correlation was found between knowledge and practices. On the other side, in the public hospitals; education, knowledge, attitude and knowledge, attitude, practices were found to be positively related.

With all these results, it is seen that the experience and education against occupational hazards are reflected in the attitudes and practices of nurses, but the knowledge is not reflected in the practices in the same way. It can be said that nurses with high experience and age working in private hospitals depend on their experiences and habits rather than their knowledge. The fact that nurses working in private hospitals participated more in training programs against occupational hazards may have enabled them to develop their knowledge and practices together with their experience. The fact that nurses working in public hospitals are younger, inexperienced and have less participation in training programs against occupational hazards shows the need for support in terms of improving their knowledge and practices. However, the fact that the attitudes of nurses working in public hospitals are higher than those of nurses working in private hospitals may be associated with less false learning due to experience. Our research suggests that providing training on protective practices against occupational hazards, especially for nurses working in public hospitals, and practices such as sharing

experiences and discussing difficulties can help identify and prevent occupational hazards. At the same time, it reveals that practices are not only dependent on knowledge, but behavioral habits are also important in practices.

This study recommended conducting training courses about training about occupational hazards and safety practices for nurses, especially nurses working in public hospitals, as well as sharing experiences and discussing difficulties can help identify and prevent these hazards. also, Encourage nurses working in public and private hospitals to apply practice rules and increase their knowledge about occupational health hazards. Equipping nurses working in the public and private hospitals with the necessary personal protective equipment to prevent occupational hazards such as chemical and biological hazards and others. The nurses' usage of personal protective equipment should be encouraged and supervised by the management. Nursing staff should be required to notify the proper authorities of any potential hazards. Nurses should be fully aware of safety practices such as hand washing, disposal of sharps, etc. to avoid any potential hazards.

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APPENDIX 2. Questionnaire

Investigation of Knowledge, Attitudes and Preventive Practices Regarding Occupational Hazards of Nurses Working in Public and Private Hospitals in Al-Diwaniyah City, Iraq.

Part One / Demographic Characteristics

- Age
- Gender
- Level of education
- Experience
- Training about occupational hazards and safety practices

Part Two / Knowledge of Nurses towards occupational hazards and safety practices

No.	Items	Yes	Uncertain	No
1.	An occupational hazard is external conditions and influences affect work population in their work area			
2.	Occupational hazards can encompass many types of hazards, including chemical hazards, biological hazards (biohazards), psychosocial hazards, and physical hazards.			
3.	Occupational hazard as a term signifies both long-term (may be increased risk of developing cancer or heart disease) and short-term risks (may include physical injury) associated with the workplace environment			
4.	Hazardous agents in the workplace affect not only workers but also those outside the worksite.			
5.	Exposure to chemicals in the workplace can cause acute or long-term detrimental health effects.			
6.	This is evidence that workplace exposure to hazards such as silica dust, engine exhausts or welding fumes, among others are associated with increased prevalence of heart disease.			

7.	Biological agents, including microorganisms and toxins produced by living organisms, can cause health problems in workers.			
8.	Influenza is an example of a biohazard which affects a broad population of workers.			
9.	Health care professionals are at risk to exposure to blood-borne illnesses (such as HIV, hepatitis B, and hepatitis C)			
10.	Health care professionals are at risk to exposure to emerging infectious diseases, especially when not enough resources are available to control the spread of the disease.			
11.	Other occupations at risk to biological hazard exposure include poultry workers, who are exposed to bacteria and tattooists and piercers, who risk exposure to blood-borne pathogens.			
12.	Psychosocial hazards are occupational hazards that affect someone's social life or psychological health.			
13.	Psychosocial hazards in the workplace include occupational burnout and occupational stress, which can lead to burnout.			
14.	Physical hazards are a subtype of occupational hazards that involve environmental hazards that can cause harm with or without contact.			
15.	Physical hazards include ergonomic hazards, radiation, heat and cold stress, vibration hazards, and noise hazards.			
16.	Controls include any mechanisms to reduce the potential for exposure to infectious agents.			
17.	Controls include the immunization of personnel against infectious diseases to which they may be exposed.			
18.	Awareness of the infectious disease status of clients is another good control, though this is not always possible for nurses staff.			

Part Three / Attitude of Nurses towards occupational hazards and safety practices.

No.	Perception on occupational hazards	Agree	Undecided	Disagree
1.	Occupational hazard should be taken seriously and given prompt attention in the hospital			
2.	Prevention of occupational hazard is a joint responsibility of the hospital management and the staff			
3.	Paying extra attention to occupational hazard is an unnecessary burden on me			
4.	Training of staff and provision of personal protective equipment is necessary to reduce the risk of exposure to occupational hazard			
5.	Aprons and face masks should be worn in procedures where splash/spill of blood is likely			
6.	Gloves should always be worn when administering injections, starting IVs and drawing blood			
7.	Hands should be properly washed after each contact with a patient			
8.	Used needles should NEVER be recapped			
9.	Sharps should be disposed in sharps' boxes			
10.	Safety boxes should be located at close distances to where required procedures are administered			
11.	HBV, Measles, Mumps, Rubella and Influenza vaccines should be received by all health workers			
12.	Prolonged standing by HCWs should be avoided			
13.	All exposures to occupational hazards should be reported and documented by appropriate authorities			
14.	Adequate staffing of HCFs will reduce occupational hazards			

15.	Incentives should be provided for adhering to universal standard precautions			
16.	Punitive actions should be taken against HCWs that violates standard safety precautions and practices			
17.	Exposure and infection control policies (standard operating procedures) should be regularly reviewed and updated by the hospital management			

Check list to assess nurses' practices regarding hazards prevention

No.	Protective measures	Done perfectly	Done but not perfectly	Not done
1.	Hand washing			
2.	Wearing d. gloves			
3.	Wearing plastic apron			
4.	Put face shield			
5.	Put face mask			
6.	Use foot cover			
7.	Use head cover			
8.	Use eye cover			
9.	Disposal of sharp objects			
10.	Linen handling & disposal			

CURRICULUM VITAE

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