

Title: Perceptions of occupational hazards among Jordanian nurses: a cross-sectional study

Nuha Kamel Zayadeen*

ziadeen2006@mutah.edu.jo

Sakhaa S. Habashneh

Abstract

Background: Occupation health pertains to the health of employees in relation with their workplaces, and is aimed at the prevention of job-related injuries and illnesses. However, given the significance of occupational health and the possible adversarial effects of occupational hazards to the nursing team, there is paucity of evidence on the level of awareness, knowledge and attitudes of nurses towards occupational hazards in the workplace.

Aim: To measure levels of perceptions of occupational hazards, and to identify relationships and differences on perceptions of occupational hazards based on sociodemographic characteristics

Methods: A cross-sectional, descriptive study was performed. Convenience sampling with inclusion-exclusion criteria was performed to recruit eligible nurses working at Al-Karak Governmental Hospital (n = 86). A valid and reliable 13-item questionnaire was used to measure perceptions of occupational hazards. Ethical approval was granted prior to data collection.

Results: Results showed that nurses had high levels of perceptions of occupational hazards. Nurses with longer lengths of work experiences had higher levels of perceptions of occupational hazards than nurses with shorter lengths of work experiences. No other significant relationships or differences were found based on other sociodemographic characteristics.

Conclusion: Hospitals should implement strategies that can support nurses in sustaining high levels of perceptions of occupational hazards, and should find ways to retain nurses within the hospital workforce. Future research can examine personal- and organizational-level factors that can impede or facilitate perceptions of occupational hazards.

Keywords: Nurse; Occupational hazards; Perceptions; Jordan

* Adult Nursing Department Faculty of Nursing, Mutah University.

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تصورات الممرضات الأردنيات حول مخاطر الصحة المهنية: دراسة مقطعية*

نهى كمال زيادين*

سخاء سالم الحباشنه

ملخص

خلفية الدراسة: تعنى الصحة المهنية بصحة الموظفين في أماكن عملهم، وتهدف إلى الوقاية من الإصابات والأمراض المرتبطة بالعمل. وبالرغم من أهمية الصحة المهنية والآثار السلبية المحتملة للمخاطر المهنية على فريق التمريض، فهناك ندرة في الأدلة الخاصة بمستوى الوعي والمعرفة لدى الكوادر التمريضية تجاه المخاطر المهنية في مكان العمل.

الهدف: قياس مستويات إدراك المخاطر المهنية، وتحديد العلاقات والاختلافات في إدراك المخاطر المهنية بناء على أسس الخصائص الاجتماعية والديموغرافية.

منهجية البحث: تم إجراء دراسة وصفية مقطعية. وتم جمع العينات المستهدفة بناء على معايير الاختيار والاستبعاد لتوظيف الكوادر التمريضية المؤهلة العاملة في مستشفى الكرك الحكومي (حجم العينة = 86). تم استخدام استبيان صحيح وموثوق مكون من 13 بندًا لقياس إدراك المخاطر المهنية. وتم تحصيل الموافقة الأخلاقية قبل جمع البيانات.

النتائج: أظهرت النتائج أن الكوادر التمريضية لديها مستويات عالية من إدراك المخاطر المهنية. كان لدى الكوادر التمريضية ذات الخبرة الطويلة في العمل مستويات أعلى من إدراك المخاطر المهنية مقارنة بالكوادر التمريضية ذات الخبرة العملية القصيرة. لم يتم العثور على علاقات أو اختلافات مهمة بناءً على الخصائص الاجتماعية والديموغرافية الأخرى.

الخلاصة: يجب على المستشفيات تنفيذ الاستراتيجيات الداعمة للكوادر التمريضية للحفاظ على مستويات عالية من إدراك المخاطر المهنية، ويجب إيجاد طرق للاحتفاظ بالكوادر التمريضية ضمن القوى العاملة في المستشفى. يمكن للبحوث المستقبلية التركيز على دراسة العوامل الشخصية والتنظيمية التي يمكن أن تعرقل أو تسهل إدراك المخاطر المهنية

* قسم تمريض، كلية التمريض، جامعة مؤتة.

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Introduction:

A healthcare worker is a person who delivers health care and services to the sick either directly as doctors and nurses or indirectly as X-ray and laboratory technicians (Joseph & Joseph, 2020), and because healthcare services are among the basic needs of every human being, they need a large number of workers specialists such as doctors and nurses (Chhabra, 2016). Within the healthcare industry, nurses comprise the largest part of the human workforce (Shaheen et al., 2023). According to the Arab Strategy for the Advancement of the Nursing and Midwifery Professions 2022-2023 issued in cooperation with the United Nations Population Fund (UNFPA), nursing workers constitute (50-60%) of the total health workforce in the Arab countries (UNFPA, 2022). In Jordan, there are 23,651 nurses, constituting about 53% of the total number of workers in the field of health care (Ministry of Health, 2023).

A healthy workplace is a critical component in the ability of healthcare professionals to carry out their roles and responsibilities with the minimal amount of risk to hazards that might compromise their safety and well-being (Purohit et al., 2018). Occupation health pertains to the health of employees in relation with their workplaces, and is aimed at the prevention of job-related injuries and illnesses (Peckham et al., 2017). When there is focus on occupational health, healthcare organizations prioritize the nature, character and quality of working conditions of their human workforce (Mohanty et al., 2019). As such, occupational health can have a significant impact on the quality of work and work conditions of healthcare professionals (Birhan & Endawoke, 2023).

Due to the large number of nurses working in the healthcare sector and due to their proximity to patients, nurses are at high risk of experiencing work-related hazards (Kowalczyk et al., 2018). Nurses serve in milieus that might expose them to various work-related hazards (Ndejjo et al., 2015), such as physical, biological, ergonomic, and psychosocial hazards (Hamid et al., 2018). Nurses are prone to physical hazards as the nature of their work requires them to be on the frontline in their work. Among the main physical hazards that nurses may endure are musculoskeletal disorders such as sprains, lower back pain and injury, and leg and hand muscle pain, since they are directly involved with patients' lifting, and transporting patients for diagnosis and treatment. For instance, physical hazards are exacerbated by the increasing number of obese patients (Walton & Rogers, 2017). Obese patients present challenging situations to nurses – due to their weight, nurses need to implement interventions that will prevent skin breakdown, reduce

risks for pressure injuries and promote mobilization such as regular turning, meticulous skin care and personal hygiene, and provision of assistance in walking, getting out of bed and sitting in chairs (McClellan et al., 2021). Such interventions for obese patients mean that nurses will have to access equipment and observe correct manual handling techniques to reduce the risk of musculoskeletal injuries to both patients and nurses (Baqraf et al., 2020). On the other hand, biological hazards occur due to exposure to microorganisms through direct or indirect contact with patients such as coming in direct contact with patient blood and body fluids or sustaining a needle stick injury that may lead to blood-borne infections (Hamid et al., 2018).

In addition to physical hazards, nurses are also exposed to ergonomic and psychosocial hazards. Apple and Letvak (2021) provided some examples of nursing tasks that pose ergonomic hazards such as lifting and carrying equipment, supplies and resources, pushing, pulling and moving equipment, with or without wheels, holding retractors for a long time (for nurses working in operating room environments), standing for long periods of time, repositioning and lifting patients and extremities, and transferring patients from beds to trolleys. There are also ergonomic challenges in accessing computers, trolleys and cupboards. On the other hand, the labor-intensive and complex work that nurses do, and their constant exposure to suffering, dying and death brought about by disease and injuries put them at risk for psychosocial hazards. Examples of psychosocial hazards are work-related stress, depression, burnout, exhaustion, and depersonalization. Psychosocial hazards were found to have negative effects on well-being and quality of life of nurses (Misiak et al., 2020).

When unaddressed, occupational hazards and threats to occupational health can adversely affect the working conditions of nurses, thus affecting intention to leave and nurse retention (Nantsupawat et al., 2017). For one, experiencing occupational hazards can result in long-term sicknesses which will result in reduced income and lesser work exposure among affected nurses (Kowalczyk et al., 2018). Two, occupational hazards may be a major reason for leaving work among nurses. The US Occupational Safety and Health Administration reported that 20% of nurses left their work sites due to risks of exposure to occupational hazards (Mohanty et al., 2019). Also, according to the International Labor Organization, hospitals experienced shortage of several medical workers, specifically nurses, due to work injuries, illnesses or early retirement as a result of exposure to occupational

hazards in the workplace (Denge & Rakhudu, 2022). Three, occupational hazards can significantly affect nurses' performance in their work in hospitals and healthcare facilities especially in light of the increase in the number of patients and the poor level of nurses' perceptions of occupational hazards. A systematic review of occupational hazards experienced by nurses in multiple countries showed that low levels of performance arising from occupational hazards resulted in low patient satisfaction, poor organizational outcomes, low quality of care, poor financial management, high levels of burnout, lack of autonomy at work, and degradation of the quality of healthcare service delivery (Rai et al., 2021). Therefore, it is imperative that healthcare organizations conceptualize, develop and implement strategies that can improve levels of occupational health knowledge, skills and practices among nurses and the wider multidisciplinary team (Huei et al., 2020; Cooklin et al., 2017).

Problem Statement:

However, given the significance of occupational health and the possible adversarial effects of occupational hazards to the nursing team, there is paucity of evidence on the level of awareness, knowledge and attitudes of nurses towards occupational hazards in the workplace. Where evidence is available, nurse knowledge, attitudes and practices were low and insufficient (Awan et al., 2017; Mossburg et al., 2019; Elbilgahy et al., 2019; Amare et al., 2022). In Jordan, there is very limited research in this area (Abuzeid et al., 2018), and researchers have focused on specific occupational hazards such as needlestick injuries (Nawafleh et al., 2017), psychological stress (Saifan et al., 2022), low back pain (Suliman, 2018), and biological hazards (e.g., COVID-19) (Alhwamdih et al., 2022).

In contrast, there are also studies that demonstrated high levels of perceptions of occupational hazards among nurses (Sabita et al., 2018; Awan et al., 2017; Al Faouri et al., 2021). In such studies, nurses were found to have high levels of knowledge and awareness regarding occupational health and the negative effects of occupational hazards. Nurses were highly aware about the presence of occupational hazards either because of organizational policies or because of their experience of working in their current workplaces. However, the studies did not account for how their results could integrate with results of other studies that show low levels of perceptions of occupational hazards.

These represent a gap in evidence on the nature and extent of the way nurses understand and perceive occupational hazards in the clinical workplace environment. In addition, there is less evidence in literature providing a rationale for the existence of such disparities in measurements of perceptions of occupational hazards among nurses working in hospital settings. The lack of evidence in both regard can have a substantial impact on the way hospitals and healthcare institutions address occupational hazards at work for nurses who comprise the majority of frontline healthcare professionals.

Study Aims

The study aims to (1) assess the level of nurses' perceptions regarding occupational hazards, and (2) examine differences on levels of perceptions of occupational hazards based on sociodemographic characteristics of nurses (e.g., sex, age, educational level, workplace and years of working experience).

Methods

Study Design

A descriptive, cross-sectional design was used. The design was chosen for its primary advantage of providing ease of access to eligible participants, and for allowing the researcher to measure key variables of interest in real time (Polit and Beck, 2020). The study design has been used by other studies that measured nurse perceptions of occupational hazards (Nantsupawat et al., 2017; Kowalczyk et al., 2018).

Study Setting and Sample

This study took place in Al-Karak governmental hospital. It is the largest governmental hospital that serves the population of Karak governorate which is administered by the Ministry of Health. The accessible population was all nurses who were working in Al-Karak Governmental Hospital at the time of data collection. According to 2023 data from the human resources department of the hospital, the hospital employed 378 nurses.

Convenience sampling with inclusion-exclusion criteria was used to recruit nurses who can participate in the study. Inclusion criteria were (1) must be registered nurses, (2) must be employed by the participating hospital, and (3) must have provided consent to participate in the study. On the other hand, exclusion criteria were (1) must not have any disability that will restrict the ability to answer survey questionnaires, and (2) must not occupy an administrative or executive position. Sample size calculation was done based on a 5% error, 95% confidence interval, moderate effect size, and power of 0e.8. Using the G*Power software and the total accessible population of 378, th calculated minimum target sample size was 191 nurses. Written informed consent was obtained from nurses who were found eligible and who were invited to join the study.

Study Instruments:

The study utilized a structured self-administered questionnaire containing the following sections:

1. Demographics and job information for nurses which collected data on five variables namely sex, age, educational level, workplace, and length of years of experience, and
2. Nurses' perceptions of occupational hazards questionnaire – The questionnaire was developed based on previous studies that examined occupational hazards in the healthcare workplace (Ahmed and Shareef, 2019; Obono et al., 2019; Aluko et al., 2016). The questionnaire was composed of 13 items measuring perceptions on occupational hazards. Each item was measured using a five-point Likert scale (i.e., Strongly disagree, Disagree, Neutral, Agree, and Strongly agree). Face validity of items in the questionnaire was established by consensus of a panel of six experts in the nursing field.

Data Collection Procedure:

The electronic questionnaire was distributed to collect data from the study participants. These data included a set of questions that measured the levels of nurses' perceptions of occupational hazards alongside their sociodemographic characteristics. The data collection took three weeks. The questionnaires were distributed to participants by WhatsApp application.

Out of 191 eligible nurses who were approached to join the study, 86 nurses provided consent to participate, representing a 45.03% response rate.

Ethical consideration:

The ethics and research committee at the Faculty of Nursing of Mutah University and Ministry of Health granted ethical approval (Reference #: EC5/2023) for this study. Participants were provided with electronic informed consent that guaranteed their anonymity, confidentiality, and protection of their rights as human subjects. Participants were assured that their participation was voluntary and that they could withdraw from the study at any time before data analysis. The completed questionnaires assigned number identifiers to protect the anonymity of the participants, and were securely kept in a password-protected computer accessible only to the researchers for research purposes.

Data analysis :

Data analysis was conducted using the Statistical Package for Sciences (SPSS version 25). Descriptive statistics (e.g., mean, standard deviation and frequencies) were measured to describe the sociodemographic characteristics and levels of perceptions of occupational hazards of nurses. Inferential statistics (e.g., independent t test, and one-way analysis of variance) were performed to test differences and relationships of perceptions of occupational hazards with sociodemographic characteristics. There were no missing data in the collected questionnaires.

Results:

Characteristics of the study sample

A total of 86 nurses participated in the study of which 60.5% were females and 39.5% were males. When asked about their age, 52.3% of the participants were 40 years and older while the rest were 30-40 years old (32.6%), 25-30 years old (10.5%), and less than 25 years old (4.7%). In terms of education level, 83.7% of the participants had a Bachelor's degree. Participants worked in the intensive care unit (10.5%), emergency department (23.3%), surgery department (33.7%), maternity department (20.9%) and other departments of the hospital (11.6%). The majority (70.9

%) of the participants had work experience of 13 years and more. Table 1 presents the characteristics of the study participants.

Table (1) Socio-demographic characteristics of participants

Category	N	Percentage%
Sex		100 %
Male	34	39.5
Female	52	60.5
Age		100 %
Less than 25 years	4	4.7
25-30 years old	9	10.5
30-40 years old	28	32.6
40 years and older	45	52.3
Educational level		100 %
Diploma	9	10.5
Bachelor degree	72	83.7
High education	5	5.8
Work place		100%
ICU	9	10.5
Emergency	20	23.3
Surgery Department	29	33.7
Maternity section	18	20.9
Other	10	11.6
Working experience		100 %
Less than 1 years	6	7
1-7 years	10	11.6
7-13 years	9	10.5
13 years and more	61	70.9

Level of nurses' perceptions regarding occupational hazards:

Nurses' perceptions of occupational hazards were measured using a 5-point Likert scale with scores of 3.80 – 5.00 as high, 2.00 – 3.80 as moderate, and less than 2.00 as low. Table 2 showed that nurses had high perceptions of occupational hazards (mean = 4.00 out of 5.00, SD = 1.02). Results showed that item 10 (“Nurses should avoid standing for long periods”) had the highest score (mean = 4.31 out of 5.00, SD = 1.02) followed by item 11 (“All cases of exposure to occupational hazards must be reported and documented by the competent authority within the hospital”) with the second highest score (mean = 4.21 out of 5.00, SD = 1.19). On the other hand, item 4 (“Paying more attention to occupational hazards is an unnecessary burden for me”) had the lowest score (mean = 3.15 out of 5.00, SD = 1.41).

Table (2) Level of nurses perceptions regarding occupational hazards

No.	Items	Mean	SD*	Level
1	I have awareness about occupational hazards in my workplace inthe hospital	3.87	1.36	high
2	Occupational hazards must be taken seriously and given adequate attention in the hospital	4.09	1.30	high
3	Prevention of occupational hazards is a joint responsibility of hospital management and medical staff	3.89	1.17	high
4	Paying more attention to occupational hazards is an unnecessaryburden for me	3.15	1.41	Medium
5	Training nurses and providing them with personal protective equipment is essential to reduce occupational hazards	4.08	1.29	high
6	I think it is always important to wear gloves when givinginjections, starting intravenous injections, and drawing blood	4.00	1.21	high
7	Hands should be washed properly after each contact with the patient	3.97	1.36	high
8	Used needles and sharp tools must be disposed of in special boxes	4.06	1.34	high

No.	Items	Mean	SD*	Level
9	Hepatitis A and influenza vaccines should be received by all nurses	4.16	1.20	high
10	Nurses should avoid standing for long periods	4.31	1.02	high
11	All cases of exposure to occupational hazards must be reported and documented by the competent authority within the hospital	4.21	1.19	high
12	Sanitary action should be taken against nurses who do not adhere to safety practices and protection from occupational hazards	3.99	1.17	high
13	The hospital administration must monitor the level of nurses' commitment to safety standards from occupational hazards	4.139	1.18	high
Perceptions regarding occupational hazards		4.00	1.02	high

*SD – standard deviation

Differences in nurses' perceptions of occupational hazards based on sociodemographic characteristics

Assumptions of homogeneity and variance were tested. Results of inferential statistics showed non-significant differences on perceptions of occupational hazards based on sex ($t = 2.20$, $p = 0.14$), age ($F = 0.83$, $p = 0.37$), educational level ($F = 0.17$, $p = 0.85$) and workplace ($F = 1.19$, $p = 0.33$). However, significant differences were found based on the length of work experience ($F = 5.03$, $p = 0.05$) with nurses working for 13 years and above having significantly higher levels of perceptions of occupational hazards than nurses who had shorter lengths of work experience. Table 3 presents the results.

Table (3) Difference in nurses' perceptions towards occupational hazards according to their demographic characteristics

Variable	Categories	Mean	SD*	F/t	P-value
Sex	Male	3.709	0.148	2.200	0.144
	Female	4.274	0.130		
Age	Less than 25 years	4.487	0.392	0.826	0.368
	25-less than 30 year	4.421	0.272		
	30-less than 40 year	4.070	0.173		
	40 years and more	3.834	0.138		
Educational level	Diploma	3.862	0.272	0.166	0.848
	Bachelor degree	4.082	0.109		
	High education	4.051	0.379		
Work place	ICU	4.231	0.252	1.194	0.325
	Emergency	3.915	0.192		
	Surgery Department	4.329	0.173		
	Maternity section	3.997	0.248		
	Other	3.651	0.265		
Working experience	Less than 1 years	3.615	0.336	5.030	0.048
	1-less than 7 years	3.968	0.258		
	7-less than 13 years	4.338	0.306		
	13 years and more	4.363	0.119		

*SD – standard deviation

Discussion:

Results of the study showed that nurses had high levels of perceptions of occupational hazards. This result is significant since high levels of perceptions indicate that nurses are aware about the occupational hazards that they might encounter in their work, and in turn, will have the necessary foundation to make decisions on how to mitigate the risks associated with unintentionally experiencing such hazards (Peckham et al., 2017). While the results of the study are similar to those by Setiyadi et al. (2022), high levels of perceptions of occupational hazards measured among participants were contrary to the low levels found in the systematic review by Mossburg et al. (2019) and in the scoping review by Rai et al. (2021). Factors within the organization such as low quality of clinical work environments, staff shortages, poor skill mixes, poor patient allocation, unavailability of resources, poor maintenance of equipment, and lack of education and training can contribute to the low levels of perceptions of occupational hazards found in the studies by Mossburg et al. (2019) and Rai et al. (2021). Conversely, it can be surmised that the participating hospital sites in the study and in those by Setiyadi et al. (2022) must have characteristics that promote the ability of nurses to highly perceive the presence of occupational hazards within their clinical environments and workplaces. These are supported by item analysis results where items pertaining to the abilities of nurses to document and report incidents, events or situations that might present as occupational hazards received the highest scores.

On the other hand, inferential statistics did not identify any significant differences or relationships on levels of perceptions of occupational hazards based on age, sex, educational level and workplace. These results suggest that perceptions of occupational hazards should be similar regardless of how old, how high the educational attainment or where the nurses worked because nurses are continually exposed to occupational hazards in the clinical environment (Huei et al., 2020; Cooklin et al., 2017; Min et al., 2019). While nurses on patient facing roles (e.g., staff nurses, charge nurses, nurse managers) might have a slight higher risk to physical, biological and chemical hazards than nurses on non-patient facing roles (e.g., nurse executives, nurse researchers, nurse informatics, etc.), nurses are always exposed to occupational hazards and it is necessary that they are aware of their risks and how to effectively prevent acquiring job-related illnesses and injuries (Halonen et al., 2017).

Nevertheless, significant differences were measured on levels of perceptions of occupational hazards based on the length of experience where nurses with longer years of experience had significantly higher levels of perceptions of occupational hazards. These results were similar to the studies by Elewa and El Banan (2016). Results suggest that the length of work experience can significantly affect perceptions of occupational hazards since the longer a nurse works in the workplace, the higher will be the level of their awareness of their surroundings and how their surroundings might impact their health and safety and their ability to perform their daily roles and responsibilities (Wei et al., 2018; Chappel et al., 2017). As such, it is essential that nurses increase their familiarization of their environment and improve their ability to detect problems, issues or challenges that might result in occupational hazards.

It is important to note that the study did not measure whether high levels of perceptions of occupational hazards translated to lower prevalence of occupational injuries and illnesses. No matter how high the level of perception is, it does not necessarily follow that nurses will automatically have lesser acquisitions of job-related health problems. In addition, the study did not measure how perceptions of occupational hazards affected nurse- and patient-sensitive outcomes such as job performance, patient satisfaction, quality of life, functional health, length of hospital stay, and discharge well-being. All of these can be topics that can be explored in future research.

Limitations :

The study has limited generalizability of results given that data collection was performed in only a single hospital site; therefore, results can only be applied among nurses and healthcare organizations with similar characteristics as the study participants and the participating governmental hospital. In addition, there is a degree of response bias since responses were based on a survey questionnaire, and perceptions were only measured in one point in time. Moreover, the study was not able to meet the minimum target sample size and has a low response rate, thereby having limited external generalizability.

Conclusion:

One of the most noticeable and significant components of the healthcare system is the nurse. As the health worker who comes into contact with patients the most while performing their duties and responsibilities,

nurses are also the ones most exposed to occupational health hazards. The study aimed to measure the levels of perceptions of occupational hazards among Jordanian nurses working in a governmental hospital. Results showed that nurses had high levels of perceptions and that length of work experience contributed to such high levels. Hospitals should implement strategies that can support nurses in sustaining high levels of perceptions of occupational hazards, and should find ways to retain nurses within the hospital workforce. Future research can examine personal- and organizational-level factors that can impede or facilitate perceptions of occupational hazards, and explore how perceptions of occupational hazards translate to actual injuries sustained at work, quality of workplace environment, quality of work life, job performance, patient satisfaction, and other relevant organizational and clinical outcomes.

Authors' Contributions:

Both authors contributed to the conception and design of the study. N.Z supervised the study. F.T collected and analyzed the data as well as drafting of the manuscript. All the authors contributed to the interpretation of the results, revision and approval of the manuscript.

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None

Competing interests

The authors declare that they have no competing interests.

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