

## Relation between Working Hours and Occupational Health Hazard among Staff Nurses at Hospitals

Zeinab Ibrahim Shafeek <sup>(1)</sup>; Safaa M. Abdelrahman<sup>(2)</sup>; Ebtsam Ahmed Mohamed <sup>(3)</sup>; Faten Ali Ahmad <sup>(4)</sup>

1. B.Sc. Nursing.
2. Professor of Nursing Administration, Faculty of Nursing - Minia University.
3. Assistant Professor of Nursing Administration, Faculty of Nursing –Minia University.
4. Lecturer of Nursing Administration, Faculty of Nursing –Minia University.

### Abstract:

**Background:** There are virtually endless occupational hazards for nurses in the workplace, in relation of their place of employment as well as the working hours which may be categorized into physical, social and psychological hazards. **The study aimed to** identify the relation between working hours and occupational health hazard among staff nurses at hospitals. **Research design:** A descriptive correlation research design was utilized in this research. **Sample:** Convenience sample were included all staff nurses who worked in critical care units in the three hospitals (Intensive Care Unit, Dialysis Unit, Neonatal Intensive Care Unit and Emergency Care Unit) with total number is (301) nurse. **Setting:** This research was conducted at critical care units in three different hospitals named as Minia University, Minia General Hospital, and Alfekrya at Minia governorate, Egypt. **Tools of data collection:** two tools were used, 1<sup>st</sup> tool: Working Hours Questionnaire and 2<sup>nd</sup> tool: Occupational Health Hazards Questionnaire. **Results:** reveals that (91.7%) of the staff nurses were high exposure total hazards, while (8.3%) of them were low exposure total hazards. **Conclusion:** There were positive correlations between health hazards and (the number of working hours you work each week as well as the number of overtime hours you work each week). **Recommendations:** Providing clear and specific job description, flexible work schedules, fair treatment and regular meeting between supervisors and their staff nurses to discuss any occupational hazards and solve their problem

**Keywords:** Occupational Health Hazard, Staff Nurses, Working Hours

### Introduction

In March 2020, the World Health Organization (WHO) announced a global pandemic due to the impact of the international transmission of COVID-19, resulting in numerous deaths and creating economic disruptions and massive social problems. Meanwhile, front-line healthcare workers have faced extreme physical and psychological stress. In these circumstances, nurses work in high-demand environments for extended periods and are continually in danger of contracting diseases while away from their families and enduring societal stigma. Accordingly, the pandemic led to considerable challenges experienced by the nursing profession, including higher patient loads, patient volumes, and new COVID-19 protocols (Pappa et al., 2020; Al-Bsheish et al., 2021).

Nurses' working hour duration plays a primary role in the positive response against infection and quality of care. Nurses were further pushed to the breaking point during the pandemic because they were required to work longer hours due to a nursing shortage. May 2020, respectively. The overtime negatively affects the health and well-being of caregivers' quality of care. Before the pandemic, also shifts of more than 12 hours were associated with poor quality of care ratings, higher rates of care left undone, and the longer the shift, the higher the dissatisfaction level. Unexpectedly, the 12-hour day or night shift was unrelated to care outcomes. These mixed results mean that further research is required. The longer working hours might be associated with the decreased quality of care compared with nurses working fewer hours. Moreover, increasing duty hours was associated with decreased reported quality of care (Lorente et al., 2021; Al-Rawajfah et al., 2021).

Shiftwork may be defined as a job schedule other than the standard hours. Shift work is usually described as

work outside normal day hours. Work within day hours means: a work day usually completed within a spread of hours starting at or after 7 am and finishing before 7 pm between Monday and Friday, working time consisting of no more than 8 hours per day and 40 hours or less per week (excluding overtime). Moreover, working hours, particularly in the nursing profession, are determined by shifts. Nursing shiftwork may be as little as four hours, or as high as 16 to 20 hours, with variable lengths of recovery in between. The traditional pattern of shiftwork in the nursing profession involves working different shifts or elongated shifts in an unpredictable pattern (Min et al., 2019).

Therefore, shift work is considered necessary to ensure continuity of care in hospitals and residential facilities. Shift work, and night shift in particular, is one of the most frequent reasons for the disruption of circadian rhythms, causing significant alterations of sleep and biological functions, which, in turn, can affect the physical and psychological well-being and negatively condition work performance. Also there are many studies have been analyzed the impact of shift work on the physical health of worker (Bae, 2021).

Moreover, nurses are an integral component of the health care delivery system. In discharging their duties, nurses encounter a variety of occupational health problems which may be categorized into mechanical hazards, biological hazards, chemical hazards, physical hazards, and psychosocial hazards. The nursing is younger, inexperienced, unskilled, less aware of self-protection, and lack of professional knowledge of protective measures as compared with the senior registered nurses, which make them more susceptible to occupational injury (Nabil et al., 2018).

Also nursing profession deals with the health and most importantly, life of the patients and society at large

although it demands a great deal of commitment. Nurses are confronted with many occupational hazards during the course of discharging their duties and continue to report high levels of job-related injury and illness. Working environment and nurse's responsibilities put them in the front line of numerous occupational health hazards, leading to acute or health problems. There are biological, physical, chemical and psychosocial hazards as common occupational health hazards in the health setting (Denge & Rakhudu, 2022).

**Physical hazards**, is defined as bodily pain and biological disturbances such as; sleep disturbances, leg pain, back pain, body pain, circulatory disturbances, arm pain, shifts in appetite, digestive disturbances, auditory disturbances, visual disturbances and respiratory disturbances (Woetzel et al., 2020). **Psychological hazards**, is defined as negative self-perception, negative outlook on life in general, and shifts in mood such as; irritation with everything, loss of self-confidence, feeling of emptiness, loss of self-control, feeling of bitterness, feeling of defeat, crying for no apparent reason, willingness to give everything up, long-lasting feeling of despair, negative image of oneself and difficulties to concentrate (Amare et al., 2021)

While **social hazards**, is defined as a feeling of isolation and difficulties in family relationships, such as; family relation difficulties, affective relation difficulties, insensitivity towards others, social life difficulties, find it difficult to make friends, social isolation, difficulty in making decisions regarding personal life, overall disinterest towards others and uncontrolled aggressiveness. Notwithstanding the essential nature of the work carried out by nursing staff in hospital environments, various social and historical aspects are also involved, such as insufficient social recognition as illustrated by the undervalued and invisible nature of this position in relation to other healthcare professional (Ahmed & Shareef, 2019).

**Environmental hazards** an adequate water supply and a clean overall environment are basic for protecting workers and patients in a health care center as asepsis and cleanliness are required for successful medical interventions. Adequate natural or artificial ventilation is essential to combat many of the threats to workers' health such as the transmission of tuberculosis and the exposure to anesthetic gases. The physical hazards these hazards involve agents in the work environment such as radiation (X rays, laser, etc.), electricity, extreme temperatures, and noise that can cause tissue damage and other injury (Mossburg et al., 2019).

**Chemical hazards** these are various chemical substances that are toxic or irritating to the body system, including medications, solvents, and gases (for example, ethylene oxide, anesthetic gas wastes). Mechanical hazards these factors in the work environment increase risk of accidents, wounds, injury, or discomfort (e.g., poor lifting devices or inadequate equipment, slippery floors, etc.). Psychosocial hazards these are factors and conditions associated with work tasks or working environments that cause or augment the risk of stress, emotional strain, an interpersonal problem (Rai et al., 2020).

Moreover, there have been concerns about long working hours and the associated increased risk of injuries and illnesses. Thousands of workers spend a significant amount of time at their place of occupation exposing themselves to potentially numerous workplace hazards. It is understood that in today's economy many people have to work multiple full time jobs to "earn a living", many of who

do not know how these working habits affect their health (Persaud and Williams, 2017).

### Significance of the study

Multiple studies have shown a strong association between long working hours and the development of various illnesses and injuries including, but not limited to, hypertension, diabetes, cardiovascular disease, musculoskeletal disorders, stress, fatigue, chronic infections, and substance abuse. In addition, people working overtime are subjected to a greater risk of adverse work-related outcomes. During the year 2017, it was estimated that deaths due to occupational injuries and illnesses was higher than deaths due to breast cancer, motor vehicle accidents or prostate cancer. This highlights the collective social need to reduce occupational injuries and illnesses (Persaud and Williams, 2017)

Working in jobs with overtime schedules was associated with a 61% higher injury hazard rate compared to jobs without overtime. Working at least 12 hours per day was associated with a 37% increased hazard rate and working at least 60 hours per week was associated with a 23% increased hazard rate. A strong dose-response effect was observed, with the injury rate (per 100 accumulated worker-years in a particular schedule) increasing in correspondence to the number of hours per day (or per week) in the workers' customary schedule (Yarmohammadi et al, 2016)

There is a study conducted by National Institute for Occupational Safety and Health (NIOSH) in 2015 found that first year medical residents who work continuously more than 24 hours are two times more likely to be in a car crash driving after their work shift, and five times more likely to be in a near-miss accident when compared to medical residents who work shorter shifts (Hittle & Gillespie, 2018).

From my experience as supervisor nurse in hospital the nurses working in hospital exhausted from long work hours and a lot of nurses suffer from low back pain, lung diseases, stress, headache and hepatitis(C)so we need this study to identify if there is relation between working hours and occupational health hazard among staff nurses.

### Aim of the Study

The aim of the current study is to identify the relation between working hours and occupational health hazard among staff nurses at hospitals

### Research Questions:

1. What are the occupational health hazards that affect nurses health?
2. Is there relation between working hours and occupational health hazards?

### Subject and Method:

#### Research design:

A descriptive correlation research design was utilized to achieve the aim of the current research.

#### Setting:

This research was conducted at critical care units in three different hospitals named as Minia University, Minia General Hospital, and Alfekrya at Minia governorate, Egypt.

**Subjects:**

Convenience sample were included all staff nurses who worked in critical care units in the three hospitals (Intensive Care Unit (ICU), Dialysis Unit, Neonatal Intensive Care Unit (NICU) and Emergency Care Unit) with total number is (301) nurse as following

Department	Hospital Name		
	Minia University Hospital	Alfekrya Hospital	Minia General Hospital
Intensive Care Unit	30	12	15
Dialysis Unit	22	40	50
Neonatal Care Intensive Unit	26	26	30
Emergency Care Unit	18	12	20
<b>Total</b>	<b>96</b>	<b>90</b>	<b>115</b>

**Data Collection Tools:**

Data were gathered by two tools divided as following

**Tool (1): Working Hours;** it was consisted of two parts as follow:

**Part one is Socio- Demographic Data Sheet;** this sheet was attached with tool, and included data about nurses age, gender, years of experience, education level, department and marital status.

**Part two: Working Hours Questionnaire**

It was designed by **Australian Council of Trade Unions (ACTU), (2000)** and translated into Arabic by researcher. It consisted of 37 items and classified into 6 dimensions as:

**First dimension was scheduling;** it consisted of 11 items as two multiple choice questions; five questions measured by yes or no response; and 4 questions measured by 3 point likert scale ranged from (never=0 to frequently=2).

**Second dimension was hours of work;** it consisted of 9 items as 4 questions measured by 3 point of likert scale ranged from (never=0 to frequently=2) and 5 multiple choice questions.

**Third dimension was work load;** it consisted of two questions one question measured by likert scale ranged from (never =0 to frequently =2) and one question measured by (yes, no, don't know).

**Fourth dimension was traveling to and from work;** it consisted of 3 items as one multiple choice question and 2 question measured by yes or no response.

**Fifth dimension was fatigue;** it consisted of six items as two questions measured by no, sometimes, yes and 4 questions measured by likert scale ranged from (never =0 to frequently =2).

**Six dimension was family and social live;** it consisted of 6 items as 5 questions measured by 3 likert scale as (never =0 to frequently =2) and one question measured by yes or no response.

**Tool (2) Occupational Health Hazards Questionnaire**

This tool designed by **Keorekile, (2015)** and translated into Arabic by researcher. It is consisted of 29 items and divided into three dimensions:

**Frist dimension was Hazards** it consisted of 16 items, classified into four sub dimensions as follow: **Physical Hazards** consisted of 4 items one multiple choice question and 3 questions measured by yes or no response.

**Biological Hazards;** it consisted of 6 items as two multiple choice questions and 4 questions measured by yes or no response. **Chemical hazards;** it consisted of two questions measured by yes or no response. **Psycho-social hazards;** it consisted of 4 items as two multiple choice questions and two questions measured by yes or no response.

**Second dimension was organic and inorganic disorders;** it consisted of 8 items as follow: **Organic Disorders** consisted of 2 questions as one question measured by yes or no response and one multiple choice question. **Inorganic Disorders** consisted of 6 questions as of two questions measured by yes or no response and four multiple choice question

**Third dimension was compliance level** of nurses towards written protocols meant to address occupational health hazards it is consisted of 5 questions measured by yes or no response

**The scoring system**

< 50% low exposure to hazards

≥ 50% high exposure to hazards

**Validity of the tool:**

The tools were submitted to a jury of five experts in the field of nursing administration as (one assistant professor, as well as one professor) from Minia University and three professors from Assuit University; each expert panel was asked to examine the instruments for their content validity, coverage, clarity, wording, length, format, applicability, and overall appearance. No modification was done.

**Reliability of the tool:**

Reliability of the tools were performed to confirm the consistency of the tools. The internal consistency was measured to identify the extent to which the items of the tools measured what it was intended to measure. Also, the Cronbach alpha test was used for measuring the reliability of tools and it was (0.89) for working hours' questionnaire, and (0.90) for occupational health hazards questionnaire.

**Pilot study:**

A pilot study was conducted on (10%) of staff nurses (nurse = 30) (of the total study subjects) before starting the fieldwork to test the clarity and applicability of items included in the tools. Estimated time required for filling the tools; was ranged from 30:40 min; the tools were applicable, didn't need changes and it was added to the final results. The pilot study subjects were excluded from the total number of study subjects.

**Data collection procedure:**

A written initial approval was obtained from the Research Ethics Committee of the Faculty of Nursing, Minia University. Permission letter to conduct the study was obtained from the Dean of the Faculty of Nursing, Minia University as well as the directors of the selected hospitals. An oral consent was obtained from the participants to collect the study data before data collection. After explanation of the purpose of the study, the privacy and confidentiality of the answers were guaranteed by the researcher. The sheets were given individually to the staff nurses who participated in this research and they were given time to respond to all items in the tools. Each assessment sheet was coded and participants' names not appeared on the sheets for the purpose of anonymity and confidentiality. The participants were informed that their participation in the study was completely voluntary and there was no harm if they not participate in the study and can withdrawal at any time of the study conduction. Data were collected from beginning of September 2019 to the end of February 2020.

**Ethical Consideration:**

An official letter was granted from the Ethical Committee of Research as well as the Faculty Dean as well as obtained the approval letters from the directors of the selected hospitals. Before conducting the pilot study as well as the actual study, oral consent was obtained from the staff nurses after explaining the aim of this research. The study subjects had the right to refuse to participate or withdraw from the study without any rationale at any time. The study subjects' privacy was considered during the collection of data. Participants were assured that all their data were highly confidential; anonymity was also assured by assigning a number for each staff nurses instead of names to protect their privacy.

**Statistical analysis:**

The collected data were tabulated, computerized, analyzed, and summarized by using descriptive statistical tests to test research questions using the SPSS version (23). Qualitative data were expressed as frequency and percentage. Probability (P-value) is the degree of significance, less than 0.05 was considered significant. The spearman correlation coefficient (rho) is expressed as the Pearson co efficient. The sign of the co-efficient indicates the nature of relation (positive / negative) while the value indicates the strength of relation as follows: Weak correlation for who less than 0.25, intermediate correlation for who of value between 0.25-0.74 and strong correlation for values between 0.75.

**Results**

**Table (1) Distribution of the staff nurses socio demographic data (no.= 301).**

Characteristics	Staff nurses (no.=301)	
	(no.)	(%)
<b>Age</b>		
1-20yrs	14	4.7
21-30yrs	218	<b>72.4</b>
31-40yrs	43	14.3
41-50yrs	23	7.6
≥51yrs	3	1.0
<b>Mean+SD</b>	25.16+4.364	
<b>Gender</b>		
Male	77	25.6
Female	224	<b>74.4</b>
<b>Marital status</b>		
Single	93	30.9
Married	193	<b>64.1</b>
Divorce	15	5.0
<b>Education levels</b>		
Diploma	69	22.9
Technical institute	160	<b>53.2</b>
Bachelor	72	23.9
<b>Years of experience</b>		
1-10yrs	225	<b>74.8</b>
11-20yrs	53	17.6
21.50yrs	23	7.8
<b>Mean+SD</b>	7.16+1.454	
<b>Department</b>		
ICU	57	18.9
Dialysis unit	112	<b>37.2</b>
NICU	82	27.2
Emergency room	50	16.6

**Table (1)** shows that (72.4%) of the staff nurses are ranged from 21: 30yrs., with mean age (25.16+4.364), also (74.4%) of them are female. Moreover (64.1%) of them are married. Concerning educational level, it is reveals that (53.2%) of staff nurses have technical institute degree. As regards to their year of experience (74.8%) of them are having years of experience from (1:10yrs.), with the mean score (7.16+1.454). In addition, (37.2%) of them are worked in dialysis units.

**Table (2) Distribution of the staff nurses related to their scheduling (no.= 301).**

	no.	%
<b>1-What shift/s do you work? (tick all that apply)#</b>		
• Day shift	166	<b>55.1</b>
• Afternoon shift	78	25.9
• Night shift	67	22.3
• Rotating shifts	138	45.8
<b>2-What is the length of your shift? (tick all that apply)#</b>		
• 6 hours	98	32.2
• 12hours	166	<b>55.1</b>
• 18 hours	72	23.9

**#more than one responses**

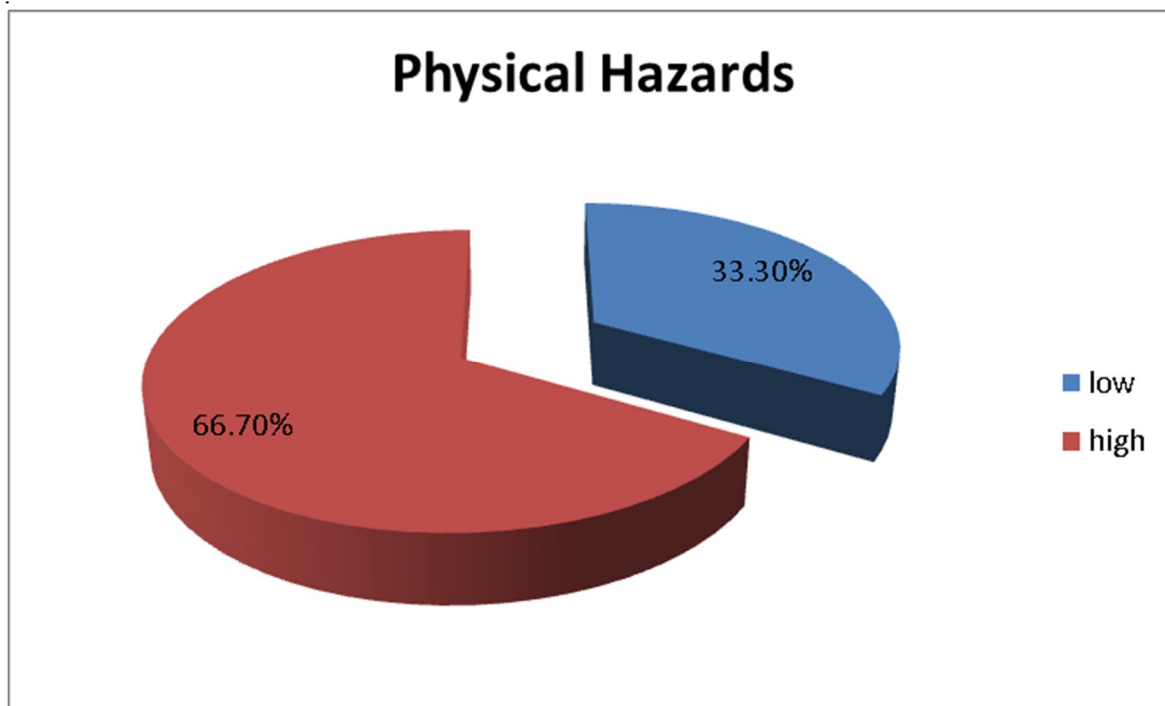
**Table (2)** clarifies that (55.1%) of staff nurses are worked on day shift and 12 hours.

**Table (3) Distribution of the staff nurses related to their working hours (no.= 301).**

Working hours	no.	%
<b>5-What are your total working hours each week? (averaged over 4 weeks)</b>		
• 20 - 29	4	1.3
• 30 - 34	19	6.2
• 35 - 39	33	11
• 40 - 44	42	14
• 45 - 49	49	16.3
• ≥50	154	<b>51.2</b>
<b>6-How many hours of paid overtime do you work each week? (averaged over 4 weeks)</b>		
• Less than 2 hours	8	2.7
• 2 - 5 hours	13	4.3
• 6 - 10 hours	24	8
• 11 - 15 hours	88	29.2
• More than 15 hours	59	19.6
• Not limited	109	<b>36.2</b>
<b>7-Why do you work paid overtime? (tick all that apply)#</b>		
• Need the money	24	8
• Employer makes me	64	21.3
• Too much work	105	34.9
• Must to keep the job	50	16.6
• Not enough staff	126	<b>41.9</b>
• Part of roster	17	5.6
<b>8-How many unpaid hours do you work in a week? (averaged over 4 weeks)</b>		
• Less than 2 hours	66	21.9
• 2 - 5 hours	25	8.3
• 6 - 10 hours	13	4.3
• 11 - 15 hours	10	3.3
• More than 15 hours	24	8
• Not limited	163	<b>54.2</b>
<b>9-Why do you work unpaid hours? (tick all that apply)#</b>		
• Employer makes me	40	13.3
• Too much work	163	<b>54.2</b>
• Must to keep job	42	14
• Not enough staff	163	<b>54.2</b>

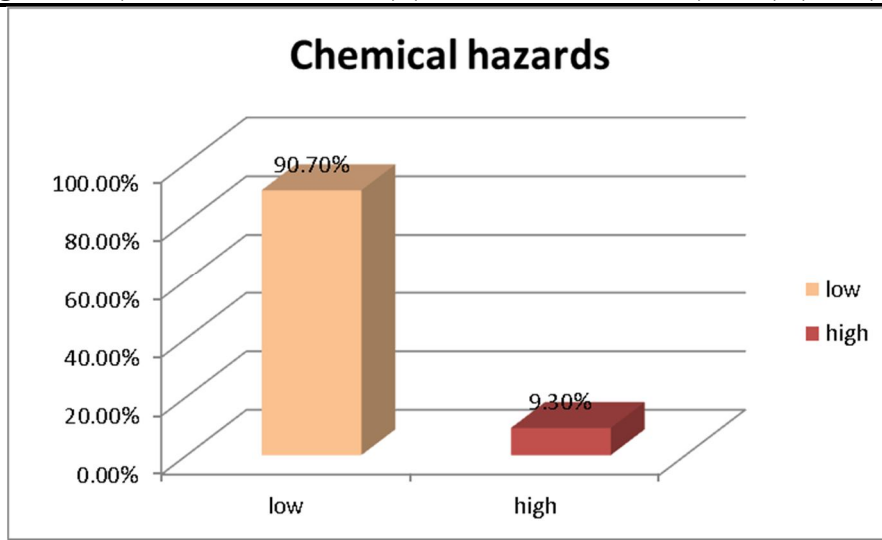
**#more than one responses**

**Table (3)** discuss that (51.2%) of staff nurses are worked 50 or more per week, (36.2%) of them are work no limited paid overtime time hours each week, (41.9%) of them are worked paid over time due to not enough staff as well as(54.2%) of them are work no limited unpaid overtime time hours each week, (54.2%) of them are worked unpaid overtime due to not enough staff and too much work .



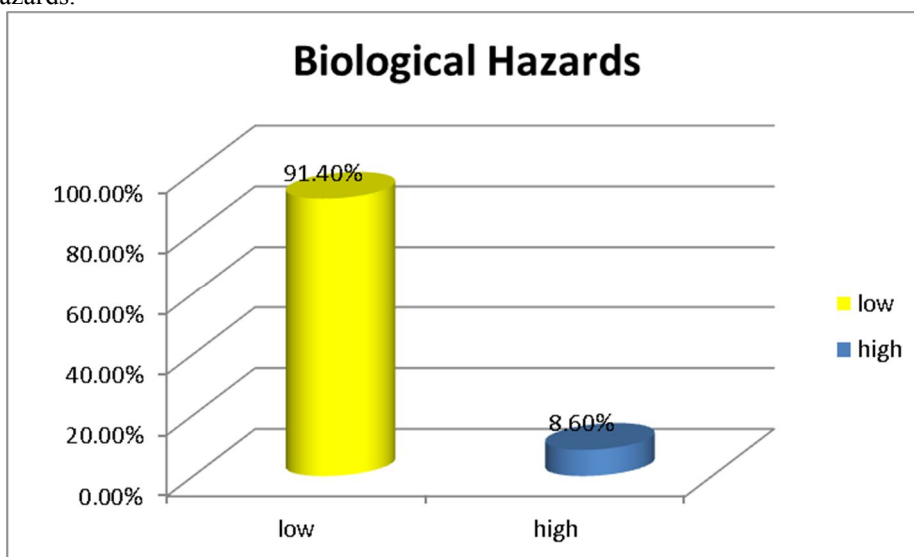
**Figure (1) Distribution of the staff nurses exposure to physical hazards (no.= 301).**

**Figure (1)** illustrates that (66.7%) of the staff nurses are high exposure to physical hazards, while (33.3%) of them are low exposure to physical hazards.



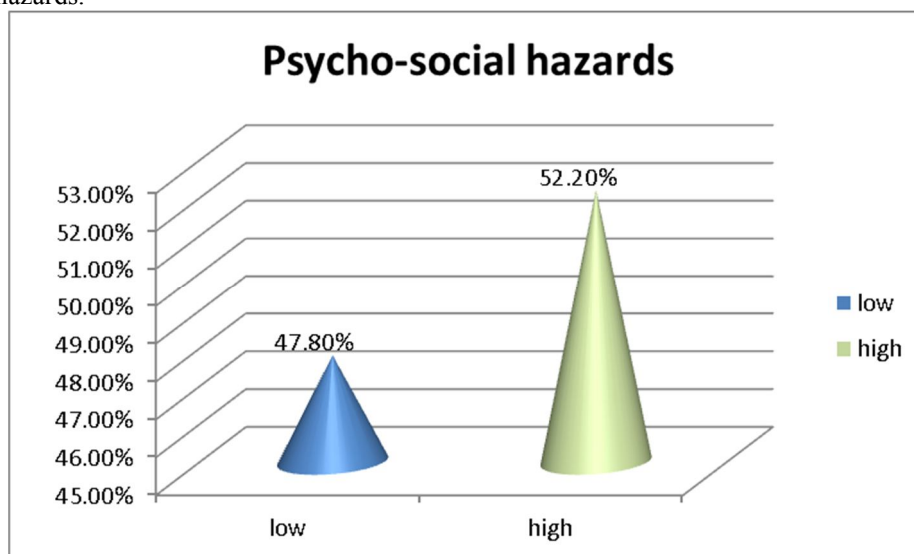
**Figure (2) Distribution of the staff nurses exposure to chemical hazards (no.= 301).**

Figure (2) mentions that (90.7%) of the staff nurses are low exposure to chemical hazards, while (9.3%) of them are high exposure to chemical hazards.



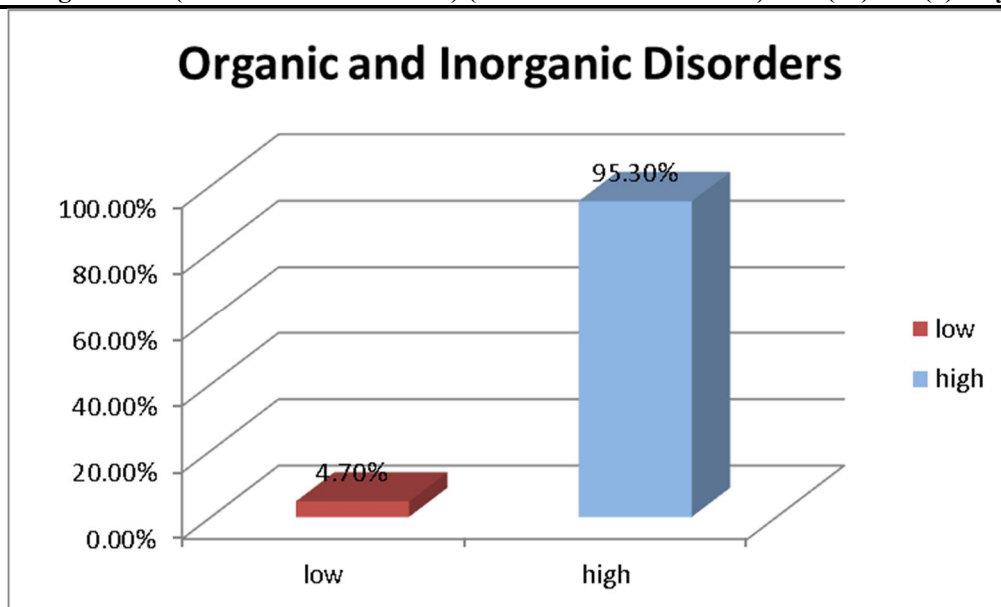
**Figure (3) Distribution of the staff nurses exposure to biological hazards (no.= 301).**

Figure (3) reveals that (91.4%) of the staff nurses are low exposure to biological hazards, while (8.6%) of them are high exposure to biological hazards.



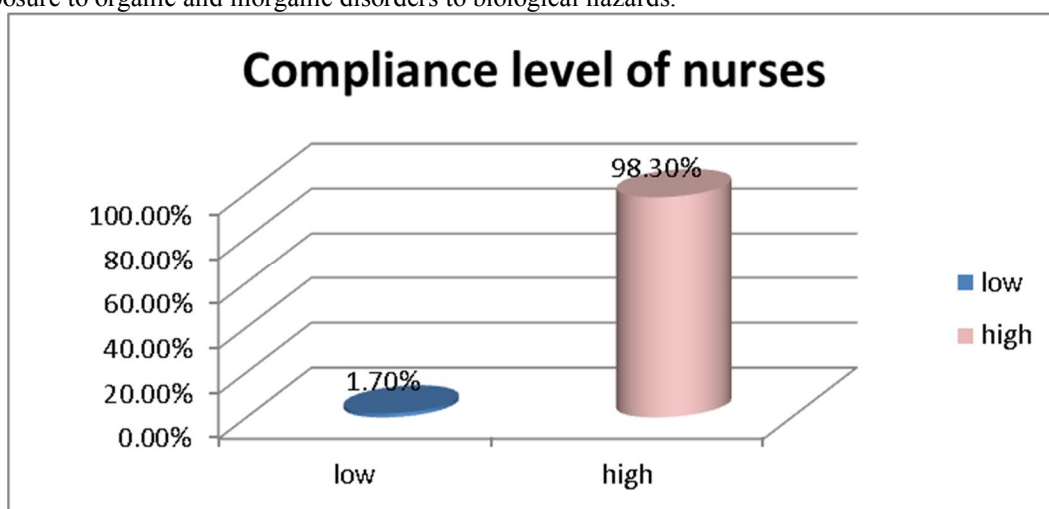
**Figure (4) Distribution of the staff nurses exposure to psycho-social hazards (no.= 301).**

Figure (4) explains that (52.2%) of the staff nurses are high exposure to psycho-social hazards, while (47.8%) of them are low exposure to biological hazards



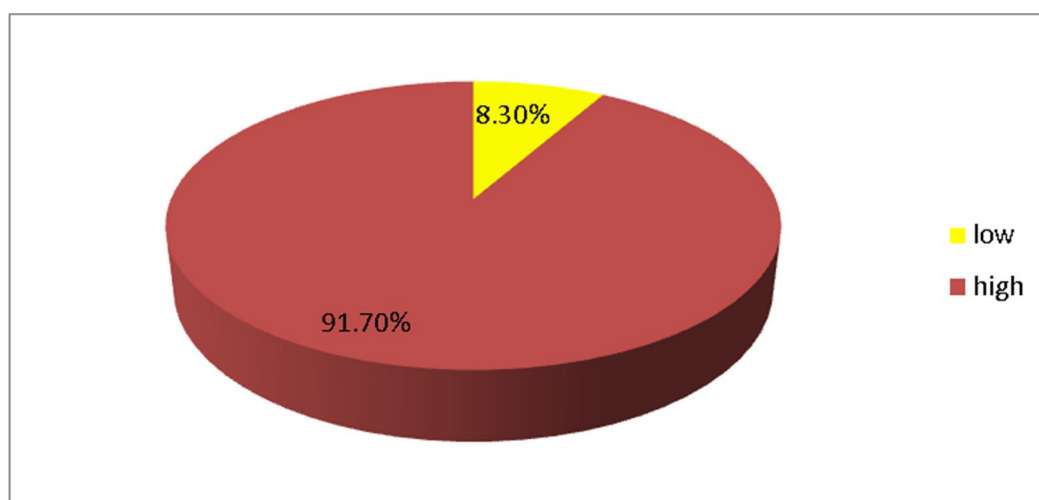
**Figure (5) Distribution of the staff nurses exposure to organic and inorganic disorders hazards (no.= 301).**

Figure (5) mentions that (95.3%) of the staff nurses are high exposure to organic and inorganic disorders, while (4.7%) of them are low exposure to organic and inorganic disorders to biological hazards.



**Figure (6) Distribution of the compliance level of staff nurses towards written protocols meant to address occupational health hazards (no.= 301).**

Figure (6) discuss that (98.3%) of the staff nurses are high compliance level towards written protocols meant to address occupational health hazards, while (1.7%) of them are low compliance level towards written protocols meant to address occupational health hazards.



**Figure (7) Distribution of the staff nurses exposure to total occupational health hazards (no.= 301).**

Figure (7) illustrates that (91.7%) of the staff nurses are high exposure occupational health hazards, while (8.3%) of them are low exposure occupational health hazards.

**Table (4) Correlation matrix between the staff nurse's working hours and occupational health hazards (no.= 301).**

Variable		The number of working hours you work each week	The number of overtime hours you work each week
Total occupational health hazards	R	.132*	.051
	P	.022	.375

**Table (4)** explains that there are positive correlations between health hazards and (the number of working hours you work each week as well as the number of overtime hours you work each week)

### Discussion

It is widely acknowledged that nurses are a crucial component of the healthcare system. They are an integral part of clinical services and have primary responsibility for a significant proportion of patient care in most health care settings. Nurses are prone to occupational hazards in the course of their day to day activities in the health care settings. Given the nature of nursing working environment, responsibilities and duties, nursing is a uniquely hazardous occupation, nurses and health care personnel are on the frontline of numerous occupational hazards and are most vulnerable to occupational health hazards in the work place. In the nursing profession, the types of health hazards encountered are varied. Some have existed since the birth of the nursing industry, but due recognition has only been accorded them recently. Other health hazards are new, mostly a consequence of the rapid advancement in the health care field in recent times. For convenience, occupational health hazards among nurses may be categorized into three categories, namely, physical hazards, Psychological hazards and social hazards. The order of presentation of the various hazards in the ensuing paragraphs does not reflect their relative importance (**Di Prinzie et al., 2023**).

**So the aim of this research** to identify the relation between working hours and occupational health hazard among staff nurses at hospitals

**The present research findings** showed that nearly three quarters of the staff nurses were ranged from 21: 30yrs., with mean age (25.16+4.364), and were female. Moreover, about two thirds of them were married. Concerning educational level, it is revealed that more than half of staff nurses had technical institute degree. As regards to their year of experience nearly three quarters of them are had years of experience from (1:10yrs.), with the mean score (7.16+1.454). In addition, more than one third of them were worked in dialysis units.

**Regarding staff nurses working hours**, this study finding discussed that more than fifty percent of staff nurses are worked fifty or more per week, also more thirty- three percent of them worked no limited paid overtime time hours each week, as well as more fifty percent of them worked no limited unpaid overtime time hours each week. This is might be the staff nurses working paid as well as unpaid overtime due to the excessive work load and the shortage of the staff also the staff needed to maintain their job. This agreed with **Othman et al. (2022)**, they mentioned that nurse accomplish a range of work duties during nursing shifts, including patient admission, transfer, and discharge as well as patient care and condition education. Simultaneously, there are not enough nurses, which is turning into a serious global health issue that is unlikely to improve anytime soon. Increased workload as a result of the shortage of nurses and an increase in overtime, both paid and unpaid.\

**Moreover, the current research findings** illustrated that more than two thirds of the staff nurses are high exposure to physical hazards, while one third of them are low exposure to physical hazards. This could be due to the nurse workload

lead to the headache, backaches as well as loss of the sleep, all of these issues increase the staff nurses physical hazards. Moreover, most of them experiencing work related pressures that affect their physical abilities.

This in the same line with **Janssen and Voelcker-Rehage, (2023)** who stated that Healthcare workers (HCWs) encounter different hazards due to their activities even though their work places (hospitals, clinics and laboratories). This includes but not limited to sharp related injuries, direct infections, stress, assault from patients and their relatives, allergies, back pain, and other musculoskeletal injuries

Also the actually research illustrates that the majority of the staff nurses were low exposure to chemical hazards, while the minority of them are high exposure to chemical hazards. This could be due to not all the nurses staff are at risk of exposure to chemical hazards, and the nurses worked in the departments which little exposure mercury, solvents and anesthetic gases that lead to less exposure to chemical hazards. While, most of them worked at general and critical units at the hospitals away from any chemicals products.

This were supported by **Varshavsky et al., (2023)** who concluded that the majority of the staff nurses were less exposure to chemical substances that are toxic or irritating to the body system, including medications, solvents, and gases (for example, ethylene oxide, anesthetic gas wastes), while the minority of them are high exposure to chemical hazards.

Also the present research noted that the majority of the staff nurses were low exposure to biological hazards, while the minority of them are high exposure to biological hazards, this could be related to the nurses when worked with the infected patient take the protective measures to prevent the acquired infection from the patients, in addition the nurses deal with all patients as infectious persons, so the nurses take the preventive measures when deal with the all patients.

This was against with **Khoshakhlagh et al. (2023)** who summarized that healthcare workers are exposed to blood-borne infections which usually expose them to diseases such as HIV, TB, and hepatitis B and hepatitis C. Substantial morbidity and mortality among these workers inevitably lead to loss of skilled personnel and adversely impact healthcare services which are already strained in many low and middle income countries. Also, this finding is inconsistent with **Bin-Ghouth et al. (2021)** in which they revealed that 39.5% of the staff nurse's exposure to biological hazards.

Regarding staff nurse's exposure to psycho-social hazards, the present study revealed that more than half of the staff nurses were high exposure to psycho-social hazards, while the less than half of them are low exposure to psycho-social hazards, this was due to the nurses worked in the stress area, critical areas and needed to thinking to take the clinical judgment, these all issues made the nurses with emotion exhaustion, anxiety, depression as well as more stress. This was agreeing with **Izadi and Piruznia, (2018)** who mentioned that psychosocial hazards these are factors and conditions associated with work tasks or working environments that cause or augment the risk of stress, emotional strain, an interpersonal problem. Also, the finding supported by



Moreover, the actually research revealed that the majority of the staff nurses were high exposure to organic and inorganic disorders, while the minority of them are low exposure to organic and inorganic disorders, this was due to the nurse workload lead to the stress, emotional disturbances as well as loss of the sleep, all of these issues increase the staff nurses organic and inorganic disorders. Moreover, the nursing staff working with infectious disease and exposure to dusts, droplets make them highly exposure to organic and nonorganic disorders such as respiratory infection, asthma.

This in the same context with **Rapisarda et al. (2019)** who stated that occupational health hazard are injuries sustained from falls, needle pricks, contact with infected body fluids from patients, lifting heavy patients and objects, and long periods of standing due to job demands. Moreover, occupational health hazard is a dangerous phenomenon, substance, and human activity or condition that may cause loss of life, injury, or other health impacts at the workplace.

Also, the finding is consistent with **Ali et al. (2022)** in which they revealed that the highest percentage of the nurse's staff are highly exposure organic and inorganic disorders.

Moreover, the actually research revealed that the majority of the staff nurses were high exposure to total occupational health hazards, while the minority of them are low exposure to total hazards. This could be due to the natural condition of the nursing profession that make most of the nurse's staff suffer from different health hazards that affect their productivity and effectiveness. This was line with **Denge (2021)** who explained that the health workers as individual are holistic being with physical, emotional, social, mental and psychological aspects which could be affected when exposed to hazards. Occupational safety and health aimed at promotion and maintenance of optimum degree of physical, mental, psychological and social wellbeing of workers in any given institution

Regarding the correlation between the study variables, the current study revealed that there were positive correlations between health hazards and (the number of working hours you work each week as well as the number of overtime hours you work each week), from the researcher point of view the increase of working hours lead to less concentration, body fatigue, poor energy, and less satisfaction which reflect on the more adverse effects on the quality of care, and productivity.

This was agreeing with **Ferri et al (2016)** who stated that shift work, and night shift in particular, is one of the most frequent reasons for the disruption of circadian rhythms, causing significant alterations of sleep and biological functions, which, in turn, can affect the physical and psychological well-being and negatively condition work performance. Also there are many studies have been analyzed the impact of shift work on the physical health of worker

## Conclusion

This research conducted that more than two thirds of the staff nurses are high exposure to physical hazards, while one third of them are low exposure to physical hazards, moreover the majority of the staff nurses were low exposure to chemical hazards, while the minority of them are high exposure to chemical hazards. Also the majority of the staff nurses were low exposure to biological hazards, while the minorities of them are high exposure to biological hazards.

Also this research showed that more than half of the staff nurses were high exposure to psycho-social hazards, while the less than half of them are low exposure to psycho-social hazards, in addition the majority of the staff nurses were high exposure to organic and inorganic disorders, while the minority of them are low exposure to organic and inorganic disorders, finally the staff nurses were high exposure to total hazards, while the minority of them are low exposure to total hazards.

Last not least, there were positive correlations between health hazards and (the number of working hours you work each week as well as the number of overtime hours you work each week).

## Recommendations

According the current finds of this research, the following recommendations were inferred:

- Providing clear and specific job description, flexible work schedules, fair treatment and regular meeting between supervisors and their staff nurses to discuss any occupational hazards and solve their problem
- Applied occupational health and safety policy and programs for healthcare workers by the hospital authority.
- Provide policies that reduce stress from shift work should be developed. These could include reducing the number of hours of the night shift, increasing the rest time between shifts, providing adequate meal times, and providing a fair distribution of weekend and holiday work.
- Attending the nurses managers as well as the supervisors training program about the types and influence of hazards in work place and this should be take into consideration in any program addressing occupational health and safety issues.
- Provide psychological counseling and therapy should be easily accessible and available for troubled staff members.
- Encourage and supervise the staff nurses to use of personal protective equipment by the nurses.
- Conduct further research to understand the predisposing factors for occupational hazards among healthcare workers

## References

1. Ahmed, S. A., & Shareef, O. H. (2019). Assessment of Occupational Health and Safety Measures' Knowledge and Experienced Types of Hazards among Nursing Staff in Rania Hospital. *Erbil Journal of Nursing and Midwifery*, 2(2), 85-92.
2. Al-Bsheish, M., Jarrar, M. T., & Scarbrough, A. (2021). A public safety compliance model of safety behaviors in the age of the COVID-19 pandemic. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 58, 00469580211031382.
3. Ali, A., Salih, A. M. E., Mostafa, S. M. M., & Fahmy, A. (2022). Biomedical Waste Product Management in Pediatric Units and Its Relation to the Occurrence of Occupational Health Hazards. *International Egyptian Journal of Nursing Sciences and Research*, 2(2), 46-58.
4. Al-Rawajfah, O. M., Al-Mugeed, K. A., Alaloul, F., Al-Rajaibi, H. M., & Al Omari, O. (2021). COVID-19 knowledge, attitude, and precautionary practices among health professional students in Oman. *Nurse Education in Practice*, 52, 103041.
5. Amare, T. G., Tesfaye, T. T., Girmay, B., & Gebreagziabher, T. T. (2021). Exposure to occupational

- health hazards among nursing and midwifery students during clinical practice. *Risk Management and Healthcare Policy*, 2211-2220.
6. Australian council of trade unions (ACTU). (2000). guidelines on shift work and extended hours, health and safety guidelines for shift work and extended working hours
  7. Bae, S. H. (2021). Relationships between comprehensive characteristics of nurse work schedules and adverse patient outcomes: A systematic literature review. *Journal of Clinical Nursing*, 30(15-16), 2202-2221.
  8. Bin-Ghouth, A. S., Al-Ammary, S. S., Alsheikh, G. Y. M., Alhaddadi, A. A. S., Al-broad, M. S. A., & Alswail, A. M. A. (2021). Occupational Hazards among Health Workers in Hospitals of Mukalla City, Yemen. *J Community Med Health Care*, 6(1), 1045.
  9. Denge, T. (2021). Perceptions of nurses on occupational hazards and safety practices in Ditsobotla public hospitals of North West Province (Doctoral dissertation, North-West University (South-Africa)). Izadi, N., & Piruznia, R. (2018). Occupational health hazards among health care workers. *Public Health Open Access*, 2(1), 1-3.
  10. Denge, T., & Rakhudu, M. (2022). Perceptions of nurses on occupational health hazards and safety practices in Ditsobotla public hospitals in North West province. *CURATIONIS Journal of the Democratic Nursing Organisation of South Africa*, 45(1), 2220.
  11. Di Prinzi, R. R., Bondanini, G., De Falco, F., Vinci, M. R., Camisa, V., Santoro, A., ... & Zaffina, S. (2023). The management of workplace violence against healthcare workers: a multidisciplinary team for Total Worker Health® approach in a hospital. *International journal of environmental research and public health*, 20(1), 196.
  12. Ferri, P., Guadi, M., Marcheselli, L., Balduzzi, S., Magnani, D., & Di Lorenzo, R. (2016). The impact of shift work on the psychological and physical health of nurses in a general hospital: a comparison between rotating night shifts and day shifts. *Risk management and healthcare policy*, 203-211.
  13. Hittle, B. M., & Gillespie, G. L. (2018). Identifying shift worker chronotype: implications for health. *Industrial health*, 56(6), 512-523.
  14. Janssen, T. I., & Voelcker-Rehage, C. (2023). Leisure-time physical activity, occupational physical activity and the physical activity paradox in healthcare workers: A systematic overview of the literature. *International Journal of Nursing Studies*, 104470.
  15. Keorekile, P. (2015). Occupational Health Hazards Encountered By Nurses At Letsholathebe Li Memorial Hospital In Maun, Botswana Master Of Public Health Faculty Of Health Sciences At The University Of Limpopo, South Africa. 1-3
  16. Khoshakhlagh, A. H., Yazdanirad, S., Saberi, H. R., Motalebi Kashani, M., Ghanaei Khaledabadi, F., Mohammadi-Moghadam, F., & Gul, M. (2023). Development and validation of a biological risk assessment tool among hospital personnel under COVID-19 pandemic conditions. *Plos one*, 18(5), e0286298.
  17. Lorente, L., Vera, M., & Peiró, T. (2021). Nurses stressors and psychological distress during the COVID-19 pandemic: The mediating role of coping and resilience. *Journal of advanced nursing*, 77(3), 1335-1344.
  18. Min, A., Min, H., & Hong, H. C. (2019). Work schedule characteristics and fatigue among rotating shift nurses in hospital setting: An integrative review. *Journal of nursing management*, 27(5), 884-895.
  19. Mossburg, S., Agore, A., Nkimbeng, M., & Commodore-Mensah, Y. (2019). Occupational hazards among healthcare workers in Africa: a systematic review. *Annals of global health*, 85(1).
  20. Nabil, N. M., Sorour, A. S., & Ahmed, F. M. (2018). Occupational health hazards among faculty of nursing students in Zagazig University. *Zagazig Nursing Journal*, 14(1), 133-147.
  21. Othman, A., El-Fattah, A., & Ragab, O. H. (2022). Effect of Nursing Workload on Work Design as Perceived by Staff Nurses. *Sohag Journal of Nursing Science*, 1(1), 21-27.
  22. Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V. G., Papoutsis, E., & Katsaounou, P. (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, behavior, and immunity*, 88, 901-907.
  23. Persaud, H., & Williams, S. (2017). Long working hours and occupational stress-related illness and injury: Mini review, 1(3): 1-4.
  24. Rai, R., El-Zaemey, S., Dorji, N., & Fritschi, L. (2020). Occupational exposures to hazardous chemicals and agents among healthcare workers in Bhutan. *American Journal of Industrial Medicine*, 63(12), 1109-1115.
  25. Rapisarda, V., Loreto, C., Vitale, E., Matera, S., Ragusa, R., Coco, G., ... & Ledda, C. (2019). Incidence of sharp and needle-stick injuries and mucocutaneous blood exposure among healthcare workers. *Future microbiology*, 14(9s), 27-31.
  26. Varshavsky, J. R., Rayasam, S. D., Sass, J. B., Axelrad, D. A., Cranor, C. F., Hattis, D., ... & Woodruff, T. J. (2023). Current practice and recommendations for advancing how human variability and susceptibility are considered in chemical risk assessment. *Environmental Health*, 21(1), 1-20.
  27. Woetzel, J., Pinner, D., & Samandari, H. (2020). Climate risk and response: Physical hazards and socioeconomic impacts.
  28. Yarmohammadi, H., Pourmohammadi, A., Sohrabi, Y., Eskandari, S., Poursadeghiyan, M., Biglari, H., & Ebrahimi, M. H. (2016). Work shift and its effect on nurses' health and welfare. *Social Sciences (Pakistan)*, 11(9), 2337-41.