

# INCIDENCE OF ERGONOMIC HAZARDS AMONG NURSES AND QUALITY OF CARE AT INTENSIVE CARE UNITS

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### Abstract

**Background:** Ergonomic hazards are a serious health problem affecting nurses and they should give importance to their own well-being. This will, in turn, ensure the best quality of care is delivered to patients. **Aim:** to assess the incidences of ergonomic hazards among nurses and quality of care at intensive care units in fayoum hospitals **Design:** Exploratory descriptive design was utilized. **Setting:** in three general intensive care units with different specialist at three selected hospitals from different organization system as general hospital, insurances hospital, and university hospitals in Fayoum. Those intensive care units were selected according to the type of patient, which is affiliated to ministry of health. **Subjects:** A convenience sample of all staff' nurses at the selected hospital (n=149). **Tools:** Three tools were used for data collection; 1) Incidences of ergonomic hazards questionnaire, 2) Factors affecting ergonomic hazards questionnaire and 3) Quality of nursing care observational checklist. **Results:** There was high incidence of ergonomic hazards (back pain, neck and shoulders pain) among staff nurses working in intensive care unit (88, 2%) at three hospitals. The majority of staff nurses (92%) in insurances hospital, followed by (88.5%) in university hospital, and (83%) in general hospital perceive causes of musculoskeletal disorders in neck and shoulder pain, both university and general hospital). Also showed a statistical significant between the physical layout factors and types of hospitals (C=12.04-0.00). There statistical significant differences(C=2.34, P 0.03) between individual factors and types of hospitals. Also, the highly statistical significant differences negative correlation ( $r = -0.2$ ,  $P = 0.88$ ) between the incidences of ergonomic hazards in general hospital and quality of patient care. **Conclusion:** based on the results of the present study concluded the highly incidences of ergonomic hazards and level quality of patient care in three hospitals was moderate level. In which highly statistical significant negative correlation between the incidences of ergonomic hazards in general hospital and university hospital with quality of patient care. While, there was no statistical significant differences negative correlation between the incidences of ergonomic hazards in health insurances hospital and quality of patient care Also, showed a statistical significant between the physical layout factors and types of hospitals. **Recommendations:** the study recommended that develop ergonomic safety guideline. Continues quality and skill training for leader and staff nurses, continuous follow up the staffs' performance from nursing leadership to nursing staff.

**Keywords:** Ergonomic hazards, Quality of care, Staff nurse, Intensive care unit

## INTRODUCTION

Health care has long used ergonomic concepts, as the goals and objectives of effective healthcare are similar to those of making objects people use, as well as how and where they use them ,as safe, easy to use, comfortable ,and effective as feasible (Abd Rabou

& AKel,2020). Ergonomic as physical hazards, the science of lifting the job to the worker. When there is a mismatch between the physical requirements of the job and physical capacity of the worker, work-related musculoskeletal disorders (MSDs) can result. Hazards in the environment that can harm body without actually touching it, like radiation, prolonged exposure to sunlight, extreme high or low temperatures, and loud noise, (Isabel, 2017).

Ergonomics is important when doing a job and body is stressed by an awkward posture, extreme temperature, or repeated movement the musculoskeletal system is affected. The body may begin to have symptoms such as fatigue, discomfort, and pain, which can be the first signs of a musculoskeletal disorder (washinton, 2020). Ergonomic risk factors are workplace situations that cause wear and tear on the body and can cause injury. These include repetition, awkward posture, forceful motion, stationary position, direct pressure, vibration, extreme temperature, noise, and work stress (Abbas, Abu Zaid, Alhamdan, & Fiala, 2020).

Musculoskeletal disorders (MSDs) are defined as injuries to muscles, tendons, ligaments, joints, nerves and discs that are caused or aggravated by our actions and environment that does not follow safe and healthy work practices. Musculoskeletal Disorders (MSDs) are the leading cause of occupational disease (washinton, 2020, & Kherbach, Bouabdellah, & Mokdad, 2019).

The most significant factors of musculoskeletal disorders are standing, walking and inappropriate body postures. Working in intensive care units, surgery, orthopedic, geriatric and medical wards also increases the risk of back pain. Another important factor influencing the development of musculoskeletal disorders is the absence of an ergonomic working environment. Buildings usually are not in good condition (Bakalis, 2019).

Ergonomics hazards of nurses are a growing concern. Compared to the general working population, many, nurses suffer from ergonomics hazards, dealing with high levels of work strain and emotional demands. Nurses spend a considerable period in the hospital. Also, have to work with high workload and stress in emergency situations. Healthcare workers at intensive care units are ranked among one of the top occupations for musculoskeletal disorder (MSD) injuries that affect the muscles, the bone, the nervous system, also due to repetitive motion tasks,numerous high-risk patient handling task such as lifting, transferring , ambulating and repositioning of patient cause injuries that can be prevented when evidence –based solutions are used for safe patient handling and mobility tasks ( Melek, & Duygu, 2017; Terry& Cherkaoui, 2019) .

Musculoskeletal Disorders are common among healthcare workers especially nurses, prevention, attention should be raised towards the importance of training as the first step for improving both health of nurses and quality of patient care thus decreasing both human and economic costs. Used of workplace ergonomics is really about building a better workplace. When jobs are designed to match the capabilities of people, resulting in better work being produced and a better experience for the person doing (Matt, 2017).

According to the International Ergonomics Association, three broad domains of ergonomics: physical, cognitive, and organizational. Physical ergonomics is concerned with human anatomical, anthropometric, physiological and biomechanical characteristics as relate to physical activity, the ergonomics domain most concerned with in the workplace. The workplace is science of fitting workplace conditions and job demands to the capabilities of the working population. Ergonomics is an approach or solutions to deal with a number of problems among are work-related musculoskeletal disorders (Matt, 2017).

Cognitive ergonomics is concerned with mental processes, such as perception, memory, reasoning, and motor response, affecting interactions among humans and other elements of a system, for example mental workload, decision making, skilled performance, human-computer interaction, human reliability, work stress, and training relating to human-system design. Organizational ergonomics is concerned with the optimization of sociotechnical systems, including organizational structures, policies, and processes, for example communication ,crew resource management, work design, design of working times, teamwork, participatory design, community ergonomics, cooperative work, new work paradigms, virtual organizations, telework, and quality management ( Washinton, 2020).Nurses' health well-being is vital not only to the individual nurses, but also to ability to provide high-quality patient care.

Quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes. It is based on evidence-based professional knowledge and is critical for achieving universal health coverage. As countries commit to achieving health for all, it is imperative to carefully consider the quality of care and health services. High quality of health care as care that is effective, safe, patient centered, timely, efficient, equitable, and delivered by professionals who respectful, communicate clearly, and involve patient in decision making. Understanding and improving the organizational structure, the people, and labor is an important factor to reach high levels of quality in patients' health care.(WHO,2020) ( Khachian , Aliha, Haghani,& Sarabi 2018) .

Patients are more likely to receive high quality care in hospitals with higher registered nurse staffing ratios. Increase in the number of patients assigned to a nurse leads to increase the ergonomic hazards, and adverse events such as infections, medication errors, and other injuries (Weisman, 2011). According to The Joint Commission (2012), "quantifying the effect that nurses and nursing interventions have on the quality of care processes, and on patient outcomes, become increasingly important to support evidence-based staffing plans, understand the impact of nursing shortages and optimize care outcomes.

Ergonomics in working conditions forms the basis for better quality that; adverse working conditions e.g., insufficient lighting, vibration, repetitiveness, monotonous design of tasks, high postural discomfort and inadequately short cycle times increase human error frequency and quality deficiencies. Demonstrated that reduction in ergonomic

problems lead to higher product quality (Endler, k. 2019& Eklund,J. 2015& Gonzalez et al 2013),

### **Significance of the study**

Ergonomics hazards are present internationally, and nationally .Health care facilities around the world employ over 43 million health workers in 2015, including 9.8 million physicians and 20.7 million nurses/midwives. Hospital staffs are exposed to a wide range of health hazards in the workplace, including biological, chemical, physical, ergonomic and psychological hazards (Izadi, & Piruznia, (2018).

From the investigator clinical experiences in hospitals, the majority of nursing staff in intensive care unit at Fayoum are suffering from musculoskeletal injuries at unacceptable rates. It leads to early burnout, intention of changing career, transferring to other units in the hospitals, requesting a half-paid job or requesting a child care leave. Moreover, the majority of nurses in Fayoum hospitals intended to leave due to working conditions which contributes further to the nursing shortage. So, it is important to identify the magnitude of this hazard in this setting and study its relation to quality of care as well as develop ergonomics safety guidelines as an attempt to protect staff well-being to perform their job more effectively.

### **Subject and methods**

#### **Aim of the study**

The aim of the current study was to assess the incidences of ergonomic hazards among nurses and quality of care at intensive care units in fayoum hospitals

#### **Research objectives**

The following objectives were formulated:

1. Assess incidence of ergonomic hazards in intensive care units (ICU) among nurses in a general hospital, a university hospital, and an insurance hospital in Fayoum .
2. Assess the relationship of ergonomic hazards incidences and quality of patient care among nurses in ICU

### **RESEARCH DESIGN**

Exploratory descriptive design was used to achieve the aim of the current study.

#### **Setting**

This study was conducted in three general intensive care units at three selected hospitals from different organization are university hospital, health insurance hospital, and general hospital in Fayoum. Those intensive care units were selected according to the type of patient,

## Sample

A convenience sample of 149 nursing staff, direct level,(143 staff nurses) and nursing manger (6)who were working at previously mentioned in fayoum , university hospital 62 nurses), health insurance hospital (49 nurses), (the general hospital 48 nurses), was recruited to carry out the present study.

## DATA COLLECTION TOOLS

Three tools was used for data collection in this study

**1. Incidences of ergonomic hazards questionnaire**, it was developed by researcher based on reviewed literature mainly (Amind, 1996). And was modified by the researcher. It was divided into two parts

**1<sup>st</sup> Part: personal characteristics data sheet:** It was developed by the researcher and includes such data of the participants: gender, position, age, years of experience, work place, the level of education, and one question related to attending of previous training programs.

**2<sup>nd</sup> Part: Incidences of ergonomic hazards questionnaire:** it was used to assess incidence of ergonomic hazards in intensive care units (ICU) among nurses in the previously selected hospitals. It includes 31 items divided into 6 dimensions, and subdivided: the incidences to musculoskeletal disorders contain (5 items), pain recognition period, contain (5 items), degree of musculoskeletal disorders, contain (6 items), causes of pain contain (7 items),therapeutic management for back, neck, and shoulder, contain (3items),and vacation due to back, neck, and shoulder pain, contain(5 items).

### Scoring system:

The value of each item was granted one point for the yes answer and zero for no answer.

## 2. Factors affecting ergonomic hazards questionnaire:

It was developed by researcher based on reviewed literature mainly (Hildebrandt, 2001), to assess factors effecting ergonomic hazards in intensive care unit among nursing staff. It includes (50) items divided into 3 dimensions as follows: ergonomic factor in ICU, contain (13 items), human factor related to individual, contain (5 items), and hospital/intensive care unit factors contain (32 items).

### Scoring system:

The value of each item was granted one point for the yes answer and zero for no answer.

### **3. Quality of nursing care observational checklist:**

This tool was adopted from Mahmoud, Etway, Seada, (2017). It used to assess the quality of nursing care in ICU during different shift among staff nurses of assessment among staff nurses. It includes 16 dimensions, and subdivided into (83) items.

#### **Scoring system**

The value was a 3 points Likert scale, (3) Done, (2) Not Done and, (1) Not Applicable,

#### **Tool Validity**

Content validity was checked by a three experts are consulted from nursing administration department at faculty of nursing, Cairo university. Each expert was asked to evaluate the two data collection tools for their content, clarity, wording format, \ length, and overall appearance minor change were be made at first and second tools.

#### **Tools reliability:**

The Cronbach's Alpha test was done for study tools. The calculated reliability was (0.891) for assess the incidences of ergonomic hazards, the calculated reliability was within the acceptable limit. As regarding to factors effecting ergonomic hazards, the calculated reliability was (0.70) which was within the accepted limit. Finally, according to observational checklist for the quality of nursing care it was (0.87) and that was within the accepted limit also.

#### **Ethical consideration**

Before data collection, an official permission to conduct the proposed study was obtained from the research ethical committee at Faculty of Nursing, Cairo University to carry out the study.

#### **Procedure**

After explanation of the aim and the objective of the study official administration permission was obtained from three pervious hospitals. After obtained the administration approved letter the researcher met the staff nurse's member to explain the purpose and impotence of the study.

The researcher was get a list of staff nurses numbers at intensive care unit (ICU) to identify personal data and work and distribution in work setting. The researcher was distributing the incidences of ergonomic hazards and the factors effecting ergonomic hazards item questionnaires' to the nursing safft. Moreover, quality of nursing care for staff nurses was measured by the researcher using the quality of nursing care observational checklist, also every nurse was observed three different times by using intermittent observation (143 nurse × 3 intermittent observations) with total 429observations. Intermittent Observation was applied three sessions per week 2 hours for each. This was rotated among three hospitals in two shifts which include endorsement time night and day, beside different other activities (the observation session were completed in April

2022, distribution of the two questioner and returned back of the end of same day .Data collection procedure extended four month from January to April, 2022.

## RESULTS

Table (1) display a frequency distribution of staff nurses according to their personal characteristics, the highest percentage (40.9 %) of the staff nurses were in age group ranged between (20 < 25) years, while, the lowest percentage (11.4 %) were in age group ranged between (30- < 35) years. Also the highest of percentage (75.2%) of the staff nurses were provide direct care, while the lowest percentage (4.02%) were nursing manger. It is clear from the above table that the majority of staff nurses had technical diploma in nursing, while only (3.4%) had higher diploma of nursing. Also showed that the near half of the staff nurses (49%) had <5 years of experience in nursing, while, only (12.1 %) of them were in years of experience in nursing more than 25 years .Also half of staff nurses(51%) had <5 years of experience in ICU. While, only (11.4%) staff nurses had (10-<15) years of experiences in ICU. Furthermore, the most of staff nurses (67.8%) work long shift (12 hours), while the lowest percentage (32.3%) working 6hr./day/ week. The same table illustrated that the majority (96%) of staff nurses did not attend previous training program about ergonomic hazards.

Table (2) showed a frequency distribution incidences of musculoskeletal disorders among staff nurses, the majority of the staff nurses (88, 2%) agree about frequency of pain neck, shoulder to three- four times a week. Followed by (81%) complain is frequent, while only (36%) agree with more than 10 times a week. The same table illustrate that more than half of staff nurses (57%) had back pain from three- four times a week. i.e., there was a high incidences of ergonomic hazards among staff nurses working in intensive care unit in three hospitals.

Table (3) showed statistical relationship between frequency of Incidences of ergonomic hazards and three hospital among staff nurses ,that all staff nurses (100%) in university hospital, majority (86%) of general hospital staff nurses, and the highest percentage (71%) in insurances hospital had frequency of neck and shoulder pain (all frequency). Furthermore, the most (83%) in insurance hospital staff nurses, the highest percentage (64%) in university hospital staff nurses , and the more than half (52%) in general hospital staff nurses had frequency of back pain from three-four times a week for both university and general hospital respectively .Also, there was no statistical significant differences between the three hospitals.

Table (4) showed Statistical relationship between ergonomic factors affecting ergonomic hazards (ergonomic hazards, individual, physical layout) and the three of hospitals among staff nurses, there was a high a statistical significant differences between the physical layout factors and types of hospitals( $C=12.04-0.00$ ). Also showed a statistical significant differences between the individual factors and types of hospitals ( $C=2.34$ ,  $P 0.03$ ).a high percent in physical layout at insurances hospital (76%). It showed the health insurances hospital had highest mean score and percent than other hospitals (39,97%).

Table (5) display a mean percent of quality patient care dimension in the three hospitals among staff nurses, revealed that the highest mean percent (94%) in patient care regarding to vital signs. Followed by (83%) regarding to rest and sleep. While the lowest mean percent (61.3%) regarding to Patient discharge and follow up. followed by (62%) in patient car regarding to intravenous line.

Table (6) showed a mean percent of level quality of patient care among at three hospitals, There high statistical relationship in level quality of patient care in moderate level among three hospitals ( $p=0.001$ ). In which high mean percent at university hospital (97%).

Table (7) illustrate correlation between incidence in three hospital and quality of patient care among staff nurses, the highly statistical significant and negative correlation.

( $r=-0.4, P = 0.004$ ) between the incidences of ergonomic hazards in general hospital and quality of patient care, that there was a statistical significant and negative correlation ( $r =-0.3, P = 0.01$ ) between the incidences in university hospital and quality of patient care. While, there was no statistical significant differences negative correlation ( $r = -0.2, P = 0.88$ ) between the incidences in health insurances hospitals of ergonomic hazards and quality of patient care.

**Table 1: Frequency Distribution of staff nurses according to their personal characteristics (n=149)**

Personal Characteristics Items	No.	%
Age		
20-<25	61	40.9
25-<30	50	33.6
30-<35	17	11.4
35+	21	14.1
M±SD	27.4±5.1	
Position		
Staff nurses	143	95.5
Manger	113	4.02
Level of education in nursing		
Technical Diploma	59	39.6
Associate technical diploma	33	22.1
Bachelor degree	52	34.9
Higher diploma	5	3.4
Years of experience in nursing		
<5	73	49.0
5-<10	31	20.8
10-<25	26	17.4
25+	18	12.1
M±SD	9.7±8.0	
ICU experience		
<5	76	51.0



5-<10	35	23.5
10-<15	17	11.4
15+	21	14.1
M±SD	9.1±5.2	
Type of Work		
Long shift	48	32.2
6 hr.per day	101	67.8
Attending pervious training program about ergonomic hazards		
Yes	5	3.4
No	144	96.6

**Table 2: Frequency distribution incidences of musculoskeletal disorders among nursing staff (n=149)**

Frequency of pain	Musculoskeletal Disorders							
	Back pain				Neck and shoulder pain			
	Yes		No		Yes		No	
	No.	%	No.	%	No.	%	No.	%
-Three-four times a week	86	57.7	63	42.3	131	88.2	18	11.8
-five-ten times	33	22.1	116	77.9	86	57.7	63	42.3
-More than 10 times a week	18	12.1	131	87.9	55	36.8	94	63.2
-The complaint is frequent	75	50.3	74	49.7	122	81.8	27	18.2
*-Others(pain associated with work and continues pain)	12	8.1	137	91.9	62	41.9	87	58.1

**Table 3: Statistical relationship between frequency of Incidences of ergonomic hazards and three hospital among nursing staff (n=149).**

Frequency of incidences	Ergonomic Hazards												Chi-square	p-value
	Back pain						Neck and shoulder pain							
	General N=48		insurance N=40		University=61		General N=48		insurance N=40		University N=61			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
-three-four times a week	25	52	22	55	39	64	33	68	39	97	61	100	0.19	0.66
-five--ten times	6	13	11	28	16	26	11	23	23	57	61	100	1.47	0.23
-More than10 times a week	8	17	4	10	6	10	14	29	17	42	61	100	1.33	0.25
-The complaint is frequent	24	50	33	83	18	30	41	86	28	71	61	100	1.42	0.23
-Others(causes pain associated with work and continues)	3	6	8	20	1	2	7	14	21	53	61	100	2.27	0.13

**Table 4: Statistical relationship between ergonomic factors affecting ergonomic hazards (ergonomic hazards, individual, physical layout) and the three of hospitals among nursing staff s (n=149)**

Factors	Hospitals						Chi-square	p-value
	General N=48		Insurance N=40		University N=61			
	No.	%	No.	%	No.	%		
Ergonomic Factors	39	80.5	34	84.6	52	84.6	0.80	0.83
Individual factors	36	76.2	39	97.0	37	61.0	2.34	0.03*
Physical layout	13	27.8	31	76.5	35	56.7	12.04	0.00*

**Table 5: Total mean percent of quality patient care dimension in the three hospitals among staff nurses (n=429)**

Dimensions of quality	Minimum	Maximum	Mean	Standard deviation	Mean percent
Patient assessment	4	12	8.35	0.69	69.6
Personal Hygiene and Physical Comfort	4	12	8.22	0.35	68.5
Safety Measures	7	18	12.77	0.53	70.9
Caring behavior / Patient rights	17	33	22.7	0.29	68.7
Vital signs	10	15	14.1	0.36	94.0
Oxygen and ventilation	6	18	12.15	0.53	67.5
Medication administration	4	9	6.3	0.68	70.0
Intravenous line	10	30	18.8	0.51	62.6
Nutrition, fluid and electrolyte balance	6	18	11.93	0.52	66.3
Rest and sleep	3	6	5.01	1.58	83.5
Activities and body mechanics	6	9	6.57	0.96	73.0
Elimination	2	3	2.02	0.15	67.4
Documentation principals	10	15	11.39	0.64	75.9
Patient and family education	6	12	8.51	0.72	70.9
Emotional support	6	12	8.02	0.19	66.8
Patient discharge and follow up	6	18	11.03	0.39	61.3
Total quality of patient care	107	240	167.87	0.56	69.9

**Table 6: Mean percent of level quality of patient care among staff nurses in the three hospitals (n 149)**

Levels of quality of patient care	Hospitals						Chi-square	p-value
	General N=46		insurance N=38		University N=59			
	No.	%	No.	%	No.	%		
Low	0	0.0	2	5.2	2	3.3	2.00	0.16
Moderate	40	87.0	31	81.5	57	96.7	14.8	0.001*
High	6	13.0	5	13.3	0	0.0	0.09	0.76

**Table 7: Correlation between incidence in three hospital and quality of patient care among nursing staff (n 149)**

Incidence of ergonomic hazards	Quality of patient care	
	r	p
General hospital	-0.4	0.004*
Heath insurance hospital	-0.02	0.88
University hospital	-0.3	0.01*

## DISCUSSION

Regarding the socio-demographic data of the present study findings revealed that highest percentage of nursing staff were aged from twenty to twenty five years old, more than fifty percent of nurses were at age group of thirty. Also the highest of percentage of the staff nurses were provide direct care, while the lowest percentage were nursing manger. And most of staff nurses had technical diploma in nursing, while only had higher diploma of nursing. Furthermore, the current study results showed that more than half of the study sample had experience in intensive care unit ranged above five years, while the lowest percent staff nurses had experiences ICU. The most of staff nurses work long shift (12 hours), while the lowest percentage working 6hr./day/ week. The same table illustrated that the majority of staff nurses did not attend previous training program about ergonomic hazards.

Regarding to incidences of MSD, the current study result showed a highly incidence of MSD among nurses working in ICU, showed results the highest percent from staff nurses complain of frequency of pain of neck and shoulder to three- four times a week. Also the current study results revealed, the highest percent from staff nurses complain incidences neck and shoulder is frequent. And more than half the staff nurses had back pain regarding to three- four times a week.

From the researcher point of view there finding could be to lack of poor knowledge of ergonomic principles regarding to lifting, moving technique, and body mechanism, natural of patient condition, workload, and long duration working in ICU. Staff nurses had neck and shoulder pain in the studied hospitals from exertion great force to push and pull

wheelchairs, crush care, hospital beds, cardiopulmonary station procedure, and bend sideways when carrying patients to the wheelchair or hospital bed. In addition to pain neck and shoulder posture forward and upward or backward posture according to monitor station position in intensive care unit.

There finding supported by Teyeme, & Van Langenhove, (2019) which declared that work during study evaluate prevalence and factors associated with WUEDs among nurses in Gondar town, Ethiopia, who found the upper body sites represented with the symptoms include upper back, shoulder, neck and elbow/forearms. Also The current study results supported by Ka, &young Kim,(2022), which study to develop a new instrument with a hierarchical structure in three university hospitals and one regional health center, South Korea, who found the most physical health problems, including back pain, and pain in specific upper (neck, shoulder, and arm) and lower (hip, leg, knee, and foot) body parts.

In relation to frequency of incidences of ergonomic hazards and three hospital among nursing staff, the current study results showed the all staff nurses at university hospital, followed by general, and insurances hospital had frequency of pain of neck and shoulder regarding to all frequency items. From the researcher point of view there finding could be to university hospital nursing staff working continuous 24 hours, and no monitor station.

The current study results matched with Wang, &Ding, Sang, & Song, (2022). Who Reported Significant differences in the frequency of pain in the low back shoulder and lower limbs were observed between ICU nurses and doctors. The previously finding answer the first question of assess incidence of ergonomic hazards in intensive care units (ICU) among nurses in a general hospital, a university hospital, and an insurance hospital in Fayoum

This result not matched with Ou, &Liu, (2021) ,which study nursing staff from a teaching hospital in southern Taiwan ,who revealed that a significant differences were present in the risk factors for lower limbs among participants in different departments ( $F(2.114) = 32.22, p < 0.001$ ). The post hoc test showed that the highest risk factor score was observed for the participants in the emergency department (17.36), followed by those in general wards (12.51) and those in the intensive care unit (10.89).

In relation to factors affecting ergonomic hazards, the current study results revealed that a highly statistical significant differences between the physical layout factors with types of hospitals, a high percent in physical layout at insurances hospital .In additional The current study results showed that a statistical significant differences was found between individual factors with types of hospitals. It showed the health insurances hospital had highest mean score and percent than other hospitals.

From the researcher point of view, this may be linked to the generally static natural of the working environment in ICU as well as administration and financial support required to carry out workplace change, lack of medical, failure of medical equipment to function as intended due to poor quality of maintenance system.

This finding supported with Fei Liu, & Ning (2023) which done in China who founded the A prevalence rate of 57.5% was identified as a protective factor of WMSs in nurses. The associations of adverse ergonomic factors, organizational factors, and environmental factors with WMSs were different among nursing staff in different positions

This finding supported by Chandralekha, & Joseph, (2022). In in Bangalore who found the most commonly affected regions of the body were the lower back followed by the neck and shoulders. There was no statistically significant association between job satisfaction and work musculoskeletal disorder (WMSDs). Staff nurses involved in doing repetitive movements, frequent bending at work, lifting or moving heavy weights at work, working in abnormal postures for prolonged periods, and who were working in congested workstations were an increased chance of developing WMSDs

In relation to quality of patient care, the current study results revealed, a highest mean percent in quality of patient care among staff nurses regarding to vital signs, followed by rest and sleep .While the lowest mean percent in patient care regarding to patient discharge and follow up, followed by intravenous line.

From the researcher's point of view, this finding of a highest of staff nurses mean scores to patient care regarding vital signs, rest, and sleep due to a positive effect of continuous monitoring of vital signs and keep patient rest is essential to improve patient safety in the intensive care units. Nursing response to abnormal vital signs is one of the most important indicators in patient safety. Maintain patient rest and calm environment. While the lowest percent was for patient discharge and intervenes lines due to need for frequent and effective skill training regarding to intravenous bundle and process of patient discharge and follow-up ,need for collaboration and communication with health team ( physician, nutrientist, and physiotherapist).

This result was agreement with Ab Malik, etal, (2018) (Al-Jubouri et al., 2021), who found that most of nurses during nursing care the nurses describe that should measure vital signs before any procedure to follow patient care and prevent their complication from any procedure and before given medications.

The current study results revealed, that was the level quality of patient care in was moderate level among three hospitals. In which high mean percent at university hospital. This differences was significant.

From the researcher's point of view the university hospital the team research round, frequency round meeting with faculty staff. In additional research paper it will be applied new techniques and methods.

This finding supported with Chandralekha,, (2022) in Indian, who found significant WMSDs can affect the productivity and Quality of patient care regarding to nurses.

The current study results illustrate that, the highly statistical significant negative correlation between the incidences of ergonomic hazards in general hospital and university hospital with quality of patient care. While, there was no statistical significant

differences negative correlation between the incidences of ergonomic hazards in health insurances hospital and quality of patient care.

According to the researcher point of view, a high incidences of ergonomic hazards in general and university hospital natural effect quality of patient care .While the insurances hospital had adequate number of nurses ,in additionally to availability of material resources.

This finding results supported by Naoum& Mitseas, (2022) who founded that nursing staff showed high percentage of MSDs that negatively affected their perceived dimensions of caring behaviors. In the same line Magnavita,., Chiorri,., Karimi,., & Karanika-Murray 2022, who founded hat both the direct and indirect via job strain, associations between work organization quality and psychological health were statistically significant after adjustment for gender, age, social support, and over commitment. The conditional effects of the independent variable

## **CONCLUSION**

The finding of the present study concluded that, a highly incidences of musculoskeletal disorders (MSD) among nurses in intensive care unit in three hospital (general, health insurance, and university hospital) at fayoum, These results show that the high prevalence of neck and lower back pain coexists with working conditions, that was the level quality of patient care in was moderate level among three hospitals. In which high mean percent at university hospital. In which highly statistical significant negative correlation between the incidences of ergonomic hazards in general hospital and university hospital with quality of patient care. While, there was no statistical significant differences negative correlation between the incidences of ergonomic hazards in health insurances hospital and quality of patient care That was a statistical significant between physical layout with types of hospitals. A high percent in physical layout at insurances hospital Also, showed a statistical significant differences between the individual factors with types of hospitals it showed the health insurances hospital had highest mean score and percent than other hospitals.

## **RECOMMENDATION**

Based on the findings: from the current study the following recommendation are, developed ergonomic safety guidelines, incorporating an ergonomic training courses into the orientation program for all newly hired staff, and include ergonomic as a sciences in the nursing curricula at nursing faculties and institutes. Continues skill training for leader and staff nurses, continuous follow up the staffs' performance from nursing leadership to nursing staff, and staff nurses need to improve their knowledge, qualifications and educational needs by frequency job training about quality of patient care.

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