

Nursing Workload Influence on Nurses Job Injury and Patient Complications

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1.ABSTRACT

Background: Nursing workload is a major problem that facing health care system and is very influential for physical and mental condition of nurses as well as for patient outcomes. **Aim:** To investigate nursing workload influence on nurses' job injury and patient complications. **Methods:** Descriptive correlational design and 220 nurses working at Oncology Center- Mansoura University included in the study. Two tools were used; nursing staff workload structured questionnaire and job related injury, patient related complications and quality of care questionnaire. **Results:** The majority of nurses perceived moderate level of total workload, and were experienced back injury. The majority of them were zero reporting of job injury. The highest perceived adverse events were patient fall but no injury followed by other complications as hematoma. There is statistically significant relation between nursing workload and both job-related injury and patients' complications. **Conclusion:** Although, most nurses workload moderately and reported that workload effect on work and delayed some nursing procedure, they had delivered good nursing care. Also, most of them suffering from back injury and not reporting about this because they thought that the injury was low risk and not important to report. Patient fall but no injury and hematoma are the highest perceived patient complication. Finally, high nursing workload produce more job injuries and patients' complications. **Recommendations:** Holding regular meeting with nurses to discuss their problems and needs, maintaining adequate staffing, encouraging cooperative and team work spirit among nurses, maintaining safe work environment, participating nurses in contentious educational programs and scientific conferences are recommended.

Keywords : Job Injury, Nursing workload, Patient Complications, Workload

2.Introduction

In the past, present or future, the nursing profession remains one of the most important professions in improving the quality of health care, whether in hospitals or in society as whole (Morin, 2021). Therefore, the nurse always works under constant pressure for her an important role in caring for the patients and supporting them in all stages of their illness to provide integrated health care (Almomani, Maysa et al., 2022). Nursing is a high workload profession, and excessive workload has been shown to have an adverse effect on patient care. This problem has been compounded by shortages of qualified nurses in hospitals, resulting in increased workload of the existing nursing staff (Neto & Amaral, 2020).

Workload is defined as a number of activities and tasks that assigned and must be completed by a nurse or organizational unit in a certain period by using their knowledge and skills (Ferramosca et al., 2023). Nursing workload is the existing ratio between the patients and nursing professionals at a given facility within a given time frame (Hellin Gil et al., 2022).

The categorization of nursing workload including direct and indirect patient care. The primary care provided as a function of the nursing profession including direct care that also named "face-time," which is the time spent with a patient as administering medications, physical care, emotional support, and patient teaching (Helgheim, Sandbaek & Slyngstad, 2018). Indirect care consists of both indirect patient activities and non-patient-related activities. Indirect care involving patient care, such as ordering medications, doctor's orders, telephone calls related to patient care and non-patient related activities as staff conferences and nursing education (Kaur & Gural, 2017).

High nursing workload is significantly associated with deterioration of nurses' health, and professional exhaustion, as well as their relationship with job dissatisfaction, and quality of life at work. Additionally, high nursing workloads increase incidence of nurses' job injuries and acquisition of infections (Bae, 2021). It also can effect on nurses' health as cardiovascular and respiratory problems, visual impairment and increased metabolic rates (Dall'Ora et al., 2020).

Nursing is a highly physical job, as a nurse, requires regularly moving, lifting or otherwise physically assisting patients. Performing these actions or moving heavy equipment can easily lead to overexertion job injuries. Injury refers to damage to the body produced by energy exchanges that have relatively sudden discernible effects. Job injury is an injury or illness caused, contributed or significantly aggravated by events or exposures in the work environment (Zhou & Wiggermann, 2021).

Job-related diseases or injuries are frequently physical, but can also be psychological. Physical injuries are these types of injuries that are defined as damage to the body from an external force and can be different degrees of seriousness (Charpe & Joshua, 2020). They can be injured by a variety of things they encounter on a daily basis in their jobs as repetitive stress, sprains and strains, slipped discs, blood borne infectious diseases, infections, broken bones, and head injuries. Nurses can also experience many other injuries because they may spend their days dealing with hazardous workplaces (McGhan, Ludlow, Rathert, & McCaughey, 2020).

Nurses safety from workplace-induced injuries and illnesses is essential to the patients they care for as well as to nurses themselves. Nurses must be in good physical and mental health to give satisfied patient care and decrease the incidence of patient complications (Irandoost et al., 2022). Patient complications are defined as therapeutic problems that occur during a disease, or after a procedure or treatment. Also they are defined as unanticipated problem that arises following a procedure, treatment, or illness. A complication is so named because it complicates the situation (Ahmadian, Salehi & Padidar, 2021). There are several types of patient complications as medication medical errors include wrong prescription, impaired delivery, or improper adherence. Surgery-related medical errors that can be anesthesia-related, but most often include wrong-site and wrong-patient procedural errors. Diagnostic errors include misdiagnosis, wrong diagnosis, and over diagnosis. Diagnostic errors are often the result of patient characteristics and physician bias (Helo & Moulton, 2017).

Hospitals can overcome patient complications by eliminating the source of the excessive workload, compensating or balancing out the workload. Also, redesigning the work system to eliminate the negative aspects of work. Additionally, nurses are in responsible for ensuring that patients are safe and that any difficulties or unfavorable occurrences

that might arise when they are admitted to the healthcare facility are avoided (Vaismoradi, Tella, Logan, Khakurel & Vizcaya-Moreno, 2020).

2.1 Significance of the study

The health of employees is important issue for any organization especially for health care organizations. As nurses are play an effective role in patient care and they considered the main hospital staff infrequent closes contact with patient. They are usually at risk for work related injuries or illness, where by nursing is a high workload profession. This workload is associated with many problems related to nurses and patient as nursing burn out, low quality of nursing care and patient safety (Umansky & Rantanen, 2016). So, this study aims to investigate the nursing workload influence on job related injuries for nurses and patient complications.

2.2 The aim of study

The study aims to investigate nursing workload influence on nurses' job injury and patient complication at Oncology Center, Mansoura University through:

- 1- Assess level of nursing workload of nurses working at Oncology Center.
- 2- Assess nurses' job injury related to workload at Oncology Center.
- 3- Assess patients' complication related to nursing workload at Oncology Center.
- 4- Detect nursing workload influence on nurses' job injury and patients' complications

2.3 Research questions

- Q1:** What are the levels of nursing workload among nurses at Oncology Center, Mansoura University?
- Q2:** What are the job related injuries among nurses at Oncology Center, Mansoura University?
- Q3:** What are patient related complications at Oncology Center, Mansoura University?
- Q4:** What is the influence of nursing workload on job related injury among nurses and patient related complications at Oncology Center, Mansoura University?

3. Methods

3.1 Study Design

Descriptive correlational design was utilized.

3.2 Study setting:

This study was conducted at all departments of Oncology Center at Mansoura University. It was established in 1994. The center

aims at providing treatment and health care in Delta region for all patients in all disciplines of oncology. It serves about 40 % of population of the Arab Republic of Egypt, who are residents of the governorates of Delta, Canal and Sinai. It consists of eleven floors and 500 beds.

3.3 Study participants:

This study included all nurses who are available at time of data collection (220 nurses and 22 for pilot study).

3.4 Tools of data collection:

Two tools were used for data collection in the current study. Nursing staff workload structured questionnaire and Job related injury, Patient related complications and quality of care questionnaire.

Tool (I): Nursing Staff Workload Structured Questionnaire. It was developed by **Ausserhofer et al., (2013)** and modified by the researcher. It consists of two parts as followed:

Part one: It was related to personal characteristics that cover items related to nurses as age, gender, marital status, educational qualification, years of experience and name of ward.

Part two: It was used to measure nursing staff workload and it consists of four sections.

Section 1: It consists of four items, to discover the daily workload of nursing staff.

Workload level was classified into three levels depending on 4 items (shift of work, number of beds, number of patients and number of nurses) as the following:

- 1-Low workload level (shift of work, <30 beds number, < 30 patient number and 7-10 nurses).
- 2-Moderate workload level (shift of work, >30-40 beds, >30-40 patients and 4-6 nurses).
- 3-High workload level (shift of work, >40 beds, >40 patients and 1-3 nurses) **Ausserhofer et al., (2013).**

Section 2: Effects of workload on quality nursing care: It consists of three items:

- ✓ (1 item), its response was measured by four point Likert scale were (Excellent, good, fair and poor).
- ✓ (2 items), their responses were measured by (Yes, No and Not applicable).

Section 3: The effects of workload on work: It consists of 5 items regarding effect on work.

Their responses were measured by four point Likert scale were (Strongly disagree, disagree,

agree and strongly agree).

Section 4: Factors contributing to nursing staff workload: It consists of 28 items, divided into three subscales, which are:

Environmental factors (15 items), nurse factors (8 items) and patient factors (5 items). Their responses were measured by four points Likert scale were (Strongly disagree, disagree, agree and strongly agree) for environmental factors and (Not applicable, same as usual/ no change, decreased workload and increased workload) for nurse and patient factors. The total score of environmental factors effect on workload ranged from 15-60 (15 items), it ranged from 0-24 for nurses' factors (8 items) and it ranged from 0-15 (5 items) for patient factors.

The level of the effect of different factors on the workload of nursing care was classified into three levels based on cut of point as the following:

- 1-Low effect level (<50% of scores)
- 2-Moderate effect level (50% 70%)
- 3-High effect level (>70%)

Tool (II): Job related injury, patient related complications and quality of care questionnaire. It consists of two parts as follows:

Part one: Job related injury or illness: It was developed by (**Jenkins, Earle-Richardson, Slingerland & May 2002**). It consists of 17 items covered 4 dimensions namely: type of job related injury or illness; number of reporting injury, causes of didn't report injury and number of missed work due to injury. Their responses were measured by (No and Yes).

Part two: Patient related complications and quality of care: It was developed by (**Aiken, Clarke & Sloane, 2002; Sochalski, 2004**). It consists of 5 items:

- ✓ (2 items), indicate adverse events occurred in last shift and experienced patient related complications. Their responses were measured by (No and Yes).
- ✓ (2 items), to describe the quality of nursing care delivered to patients on last shift. Their responses were measured by four points Likert scale were (Excellent, good, fair and poor).
- ✓ (1 item), to describe what happened to the quality of nursing care delivered to patients in the past year. Its response was measured by three points Likert scale were (Improved, Stayed the same and Deteriorated).

3.5 Validity:

Tools were translated to Arabic and were tested for its content validity by five experts. Two experts from the same field Nursing Administration Department, Faculty of Nursing, Mansoura and Tanta University. Two experts from Community Department, Faculty of Nursing, Mansoura University and One expert from Public Health Department, Faculty of Medicine, Tanta University who revised the tools for clarity, relevance applicability, comprehensiveness, understanding and simplicity for use and according to their opinions modifications were done. (The modification for tool I part two: section 1: become four items instead of five items because this item present in part one in the tool I. Section 3 rearranged with section 4 to maintain sequence of tool and exclusion 4 items from section 4 (Environmental factors to become 15 instead of 19.

3.6 Reliability:

Reliability of the data collection tools were tested via Cronbach's alpha test which revealed that $r = 0,836$ for nurses' workload structured questionnaires (tool I), $r = 0,924$ for job related injury and illness (tool II, part one) and $r = 0,882$ for patient complications and quality of care (tool II, part two).

3.7 Pilot study:

A pilot study was carried out on 10% of total study subject (22 nurses) to test the clarity, feasibility and applicability of the questions, identifying barriers and problems that may be encounter during collecting data and it helped the investigator to use and modify the data collection tools. Participants involved in the pilot study were excluded from the main study sample. The necessary modifications were done based on the result of pilot study.

3.8 Field work:

The actual field work was started from September 2019 to February 2020. the researcher meeting nurses in different three shifts morning, afternoon and night every day, and distributing questionnaire to each participant in the study at the end of shift. The study purpose and how to complete tools were explained by researcher. The researcher gives each nurse her copy to fill it and handed it back to researcher. Give 20 minutes to fill the questionnaire sheet, to ensure that all questions were addresses, the nurses completed the questionnaire sheet while the researcher was present.

3.9 Ethical considerations:

An ethical approval was obtained from the Research Ethics Committee of Faculty of Nursing, Mansoura University. An official permission to conduct the study was obtained from the responsible administrator of the hospital. Written informed consent was obtained from nurses who participate in this study. The privacy and confidentiality of obtained data were ensured. The nurses were informed that the content of tools will be used for research purpose only. All participants were informed that participation in the study is voluntary and that they had the right to withdraw from the study at any time.

3.10 Statistical design:

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 22, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (χ^2). Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance.

4. Result

Table (1): Illustrates personal characteristics of the studied nurses. According this table, more than two thirds (68.6 %) of nurses in age group 20-<30 years old with mean score 26.71 ± 4.64 , most of them were female (85.5%), and (60.9) were married. Concerning to educational qualification, (64.5%) of nurses had institute of technical degree, and approximately half of them (48.2%) had 1 to less than 5 years of experience with mean score 6.78 ± 5.23 . Nearly one third of them (33.2%) worked in surgery ward.

Figure (1): Illustrates levels of total daily nursing workload as perceived by nurses. This figure shows that majority of nurses (66.7%) had moderate level of workload, while small percentage (3.6%) of them had high level of workload.

Figure (2): Demonstrates total effects of workload on work as perceived by nurses. The highest response by the nurses (38.2%) were agree about effect of workload on work, while the lowest of them (12.3%) were strongly disagree.

Figure (3): Shows levels of factors effecting to nursing workload as perceived by nurses. According to this figure, environmental factors had moderate effect (47.3%), while nurses and patient factors had high effect of nursing workload (65%, 67.8) respectively.

Figure (4): Illustrates types of job-related injury or illness as perceived by nurses. According to this figure, the highest percent of nurses (73.2%) were experienced back injury, followed by (55.0 %) for blood or body fluid exposure from needle stick, and blood or body fluid exposure from splash. While the lowest percent (10%) were experienced other injury such as headache, dizziness and varicose veins.

Table (2): Illustrates number of reporting of job-related injuries by nurses. According to this table, majority of nurses (80.0 %) were zero reporting of job injuries, while (16.4%) of them reporting one time and only (0.5%) of them reporting five times.

Figure (5): Illustrates experienced patient-related complications in the 4 months as perceived by nurses. According to this figure, the highest perceived adverse events were patient fell, but no injury (32.7%), followed by other experienced patient complication as hematoma (28.6%), and wrong medication time (24.5 %). While (10.5%) of them were wrong medication dose.

Figure (6): Shows effect of workload on quality of nursing care as perceived by nurses. According to this figure, (43.6% & 34.1 %) of nurses had delivered good and excellent quality of nursing care respectively as an effect of workload, while (6.8%) of them had delivered poor quality nursing care.

Table (3): Illustrates relation between levels of nursing workload and job-related injury as perceived by nurses. This table shows that there

was statistically significant relation between job-related injury or illness experienced in the past 4 months related to blood or body fluid exposure from splash, latex allergy with levels of nursing workload of the studied nurses at ($p=0.009^*, 0.007^*$) respectively. The highest percent of job related injury or illness (87.5%) for back injury, blood or body fluid exposure from splash, latex allergy and injury related violence were related to high workload. While, the lowest percent was (16.9 %) for others job related injury or illness as headache, dizziness and varicose veins were related to low workload.

Table (4): Illustrates relation between nursing workload and patient complications as perceived by nurses. According to this table there is statistically significant relation between all dimensions of patient related complications and studied nurses' levels of workload except wrong medication time ($p=0.076$). The highest percent of patient related complications (87.5%) for patient fell, but no injury and patient fell, and resulted in injury were associated with high workload. Also, (50%) of nurses had high workload, were associated with wrong medication time as a patient related complication. Moreover, more than one third of nurses had high workload were associated with medication error as a patient related complication. While, the lowest percent was (3.1%) for patient fell, and resulted in injury, wrong medication dose and route were related to low workload.

Table (1): Personal characteristics of the studied nurses (n=220).

Personal characteristics	The studied nurses (n=220)	
	n	%
Age years:		
20-<30	151	68.6
30-43	69	31.4
Range	20-43	
Mean±SD	26.71±4.64	
Gender:		
Male	32	14.5
Female	188	85.5
Marital status:		
Single	85	38.6
Married	134	60.9
Divorced	1	0.5
Educational qualification:		
Nursing diploma	49	22.3
Institute of technical	142	64.5

Bachelor of nursing	28	12.7
Postgraduate	1	0.5
Experience years:		
1-<5	106	48.2
5-10	51	23.2
>10-20	63	28.6
Range	1-20	
Mean±SD	6.78±5.23	
Name of ward:		
Blood bank	3	1.4
Blood diseases	11	5.0
Chemical composition	9	4.1
Economic	8	3.6
Internal medicine	66	30.0
Marrow transplant	6	2.7
Pediatrics care	40	18.2
Reception	4	1.8
Surgery	73	33.2

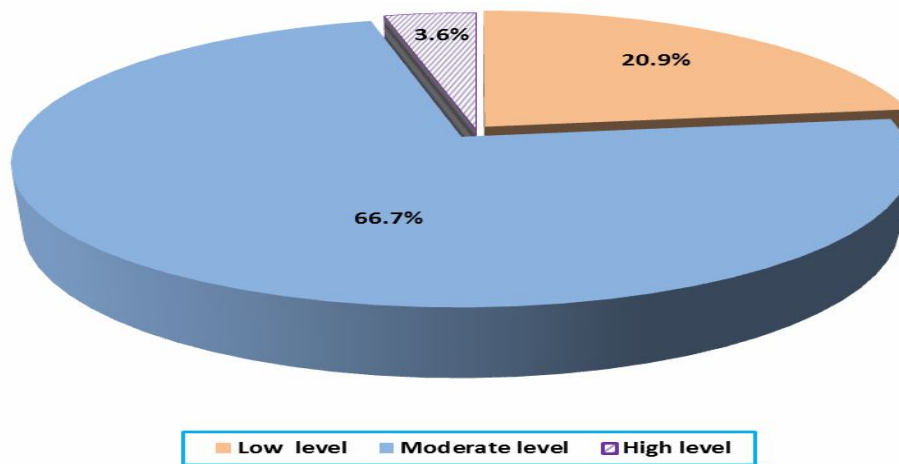


Figure (1): Levels of total daily nursing workload as perceived by nurses (n=220).

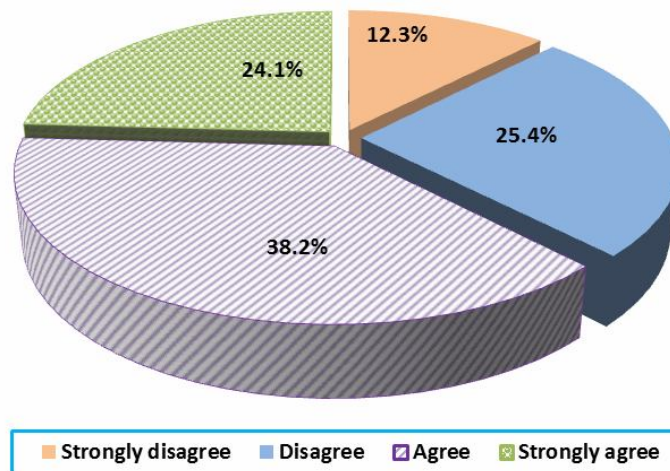


Figure (2): Total effects of workload on work as perceived by nurses(n=220).

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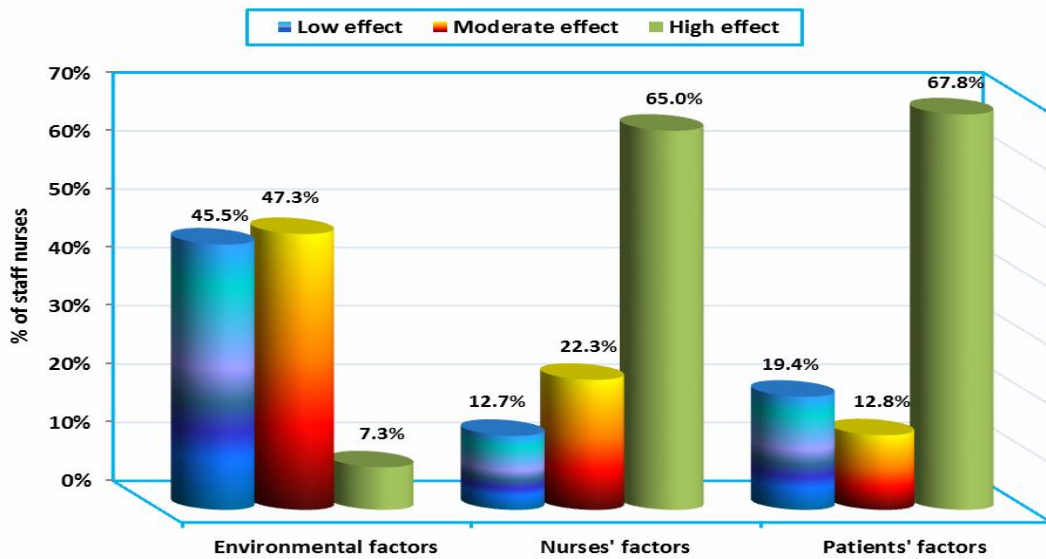


Figure (3): Levels of factors effecting to nursing workload as perceived by nurses (n=220).

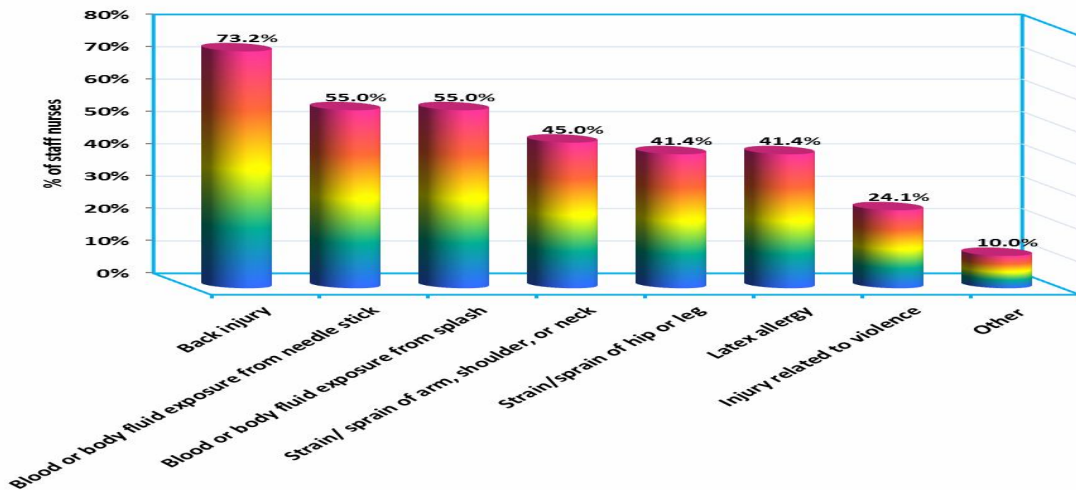


Figure (4): Types of job-related injury or illness as perceived by nurses (n=220).

Table (2): Number of reporting of job-related injuries by nurses (n=220).

Number of reporting of job-related injuries	The studied nurses (n=220)	
	n	%
Zero reporting	176	80.0
One	36	16.4
Three	4	1.8
Four	3	1.4
Five	1	0.5

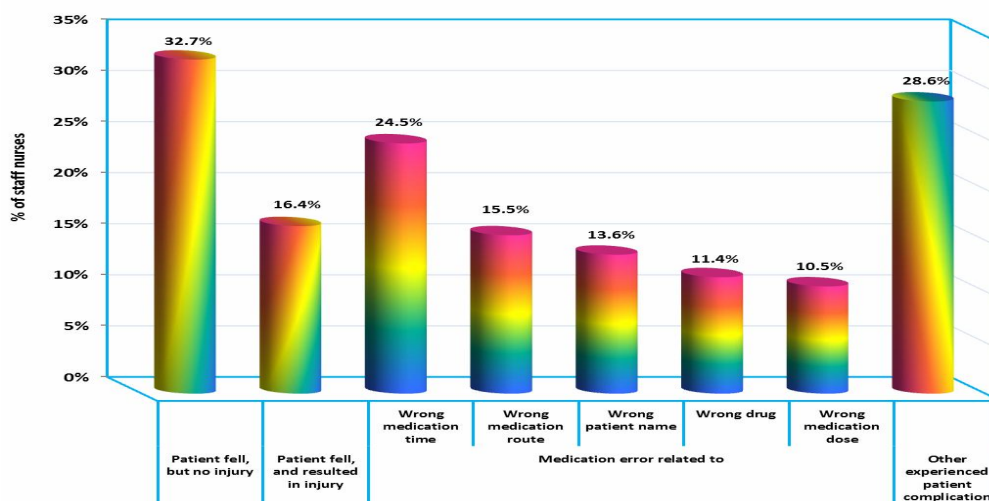


Figure (5): Experienced patient- related complications in the 4 months as perceived bynurses (n=220).

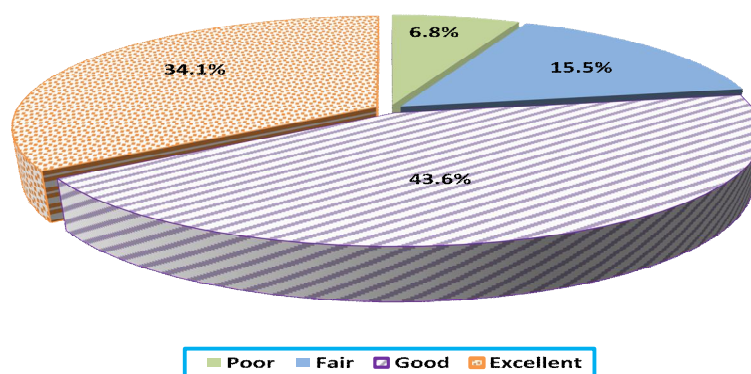


Figure (6): Effect of workload on quality of nursing care as perceived by nurses (n=220).

Table (3): Relation between nursing workload and job-related injury as perceived by nurses (n=220).

Job-related injury or illness experienced in the past 4 months	Level of nursing workload of the studied nurses (n=220)						χ^2	P
	High workload (n=8)		Moderate workload (n=147)		Low workload (n=65)			
	n	%	n	%	n	%		
1-Back injury	7	87.5	108	73.5	46	70.8	1.035	0.596
2-Strain/ sprain of arm, shoulder, or neck	5	62.5	62	42.2	32	49.2	1.933	0.380
3-Strain/sprain of hip or leg	3	37.5	59	40.1	29	44.6	0.424	0.809
4-Blood or body fluid exposure from needle stick	6	75.0	81	55.1	34	52.3	1.484	0.476
5-Blood or body fluid exposure from splash	7	87.5	71	48.3	43	66.2	9.348	0.009*
6-Latex allergy	7	87.5	53	36.1	31	47.7	9.803	0.007*
7-Injury related to violence	7	87.5	33	22.4	13	20.0	5.59	0.018*
8-Other (please specify)	2	25.0	40	27.2	11	16.9	2.612	0.271

*Statistically significant (P<0)

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Table (4): Relation between nursing workload and patient complications as perceived by nurses (n=220).

Patient related complications	Workload level of the studied nurses (n=220)						χ^2	P
	High workload (n=8)		Moderate workload (n=147)		Low workload (n=65)			
	n	%	n	%	n	%		
●Patient fell, but no injury	7	87.5	56	38.1	9	13.8	23.350	0.0001*
●Patient fell, and resulted in injury	7	87.5	27	18.4	2	3.1	38.396	0.0001*
●Medication error related to:								
□Wrong drug	3	37.5	19	12.9	3	4.6	8.720	0.013*
□Wrong medication dose	3	37.5	18	12.2	2	3.1	10533	0.005*
□Wrong medication time	4	50.0	39	26.5	11	16.9	5.151	0.076
□Wrong patient name	3	37.5	24	16.3	3	4.6	9.263	0.010*
□Wrong medication route	3	37.5	29	19.7	2	3.1	12.652	0.002*
Other experienced patient complication:	6	75.0	45	30.6	12	18.5	11.989	0.002*

*Statistically significant (P<0.05)

5. Discussion

There is a huge demand for nurses worldwide, and nursing is an extremely demanding job. Nurses are frequently faced with an excessive number of patient responsibilities and long shifts. Due to their heavy workloads, nurses often neglect certain tasks, which is associated with higher incidence of illness and injury among nurses. Additionally, nursing workloads are linked to poor patient outcomes because patients are more likely to experience adverse events such as prescription errors, falls, hospital-acquired infections, decreased patient security, subpar patient care, and more problems (MacPhee, Dahinten & Havaei, 2017).

The present study results revealed that the majority of nurses had moderate level of nursing workload. It may be due to patient-related factors include restless, irritated, or confused patients as well as an unplanned prolonged length stay and communication barriers with patient and family. Also, factors related to nurses as absence, late of work tasks notifications, illegible handwriting of doctor's orders and calling doctors several times. This result on the same line with Asamani et al., (2015) who studied the influence of workload levels on performance in a rural hospital study and indicated that health practitioners' workloads were viewed as moderate. Furthermore, Othman, Abd El-Fattah & Ragab (2022) who study effect of nursing workload on work design as perceived by staff nurses at Sohag University Hospital and showed that more than three quarters of studied nurses had high level of workload. Additionally, Magalhães et al., (2017) who found that most nurses who participated in the research have high overloaded. On contrast to, the findings of Elsayad, Shazly & Mahmoud (2017) who studied

the perception of nurses toward nursing workloads and its impact on nurses' errors at Benha University Hospital revealed that the majority of staff nurses had low level of workload while minority of them had high level of workload.

Regarding patients' factors contributing to nursing workload, the study results revealed that most of nurses were increased workload as a contributing of patients' factors as agitated, confused or restless patients, unanticipated increase in patient length of stay, extra time needed for psychosocial support for patient, and communication barrier with patient and family were the main factors contributing to workload. This results due to excessive patient demands, high number of unplanned patients' admissions, performing procedures more frequently during shift and nursing shortage.

This is in consistence with the results of Silva, Sousa & Padilha (2011) who found that nursing procedures such movement and positioning, hygiene practices, and caring for the patient and his or her family were mostly responsible for the increased workload. Also, Hoogendoorn et al., (2021) conducted their study during the COVID-19 period and stated that the percentage of patients with an unplanned admission, both medical and surgical, was increased causing high workload for nurses. Furthermore, Margadant et al. (2020) on the study about Association between objective nursing workload with nursing activity score and perceived nursing workload found that higher mortality rates in hospitals was linked to an increased nursing workload. On contrast with, Shimp (2017) found that workload can be the result of poor leadership

and management, lack of lifelong learning opportunities, poor nurse empowerment, and an insecure work environment. Also, **Cummings et al., (2018)** concluded that the workload of nurses can be affected by organizational factors such as the environment or culture, organizational and manager support, and staffing adequacy.

The present results shown that the majority of nurses experienced back injury and more than half of them experienced blood or body fluid exposure from needle stick and splash, strain or sprain of arm, shoulder, or neck. It may occur due to excessive workload, long working hours, excessive physical effort, bending, twisting and lifting. This was consistent with the result of **Dressner & Kissinger, (2018)** on their study about occupational injuries and illnesses among registered nurses and revealed that nurses have workplace injuries and illness while doing their daily tasks. Moreover, the common work-related musculoskeletal risks among nurses due to manually moving or lifting patients included sprains, strains, low back pain, and wrist, knee and shoulder injuries. Additionally, **Belachew, Lema, Germossa, & Adinew (2017)** revealed that blood or body fluid exposures are common occupational injuries to the nurses. Majority of injuries among nurses occurred by syringe needle as most procedures in a clinical setting involve administering intravenous and intramuscular injections or the drawing of blood.

The study result revealed that the majority of nurses were zero reporting injury. Most of them don't report job-related injuries because of they thought that the injury was low risk, they don't think that it is important to report because the incident had already occurred and there was nothing that could be done about it, also, they didn't have time to report about the injury and they didn't know the reporting procedure. These results agree with **Fagan & Hodgson (2017)** on the study about "Under-recording of work-related injuries and illnesses" who revealed that job related injury is not reporting by nurses due to manager' disciplinary programs and nurses' fear of reprisal or job loss, and manager ' misunderstanding of recordkeeping requirements. Also, **Pérez-Francisco et al. (2020)** revealed that workload and pressure at work limited the time that nurses could dedicate to patients care and also their attitude towards patients.

Regarding to patient-related complications, the study results revealed that the highest perceived adverse events occurs for the patients in the past 4 months were patient fell but no injury, medication

error as wrong medication time, and other complication as hematoma. This may be due to events occurred in the past 4 months as perceived by nurses at Oncology Center in Mansoura University which are nurses were highly work loaded, a limited amount of time to interact with every patient or documenting care, which resulted in the neglect of some crucial tasks for the patients. In agreement of the present study **Banda et al., (2022)** who demonstrated that a nurse's workload contributes to medical errors. Due to job pressures, fatigued nurses may forget to administer medications, delay doing so, or prepare the incorrect medication for patients. Also, **Abdel-Hamid, Abdel Wahab & Aly, (2019)** showed that patient is the first person suffering from nursing workload as patient not take the ideal care, also it harms his safety.

Concerning to effects of workload on quality of nursing care, more than half of studied participants had delivered good and excellent quality of nursing care. These results are due to that nurses were competent to work under pressure that they are qualified clinically to carry out certain responsibilities and had effective coping mechanism to deal with workload. This result on the same line with **Heydari & Sharifi (2017)** who reported that the majority of nurses assessed their overall nursing competencies and care quality as good and very good at workloaded clinical environment. Also, **Shouryabi, Ghahrisarabi, Anboohi, Nasiri & Rassouli (2017)** whose results indicated that the nursing work load and quality of nursing care were not significantly correlated.

Contradictory with, **Ventura, Alves & Meneses (2012)** whose results indicated that patient is the first person suffering from nursing workload as it prevents nurse from providing the ideal care to him and may harm his safety leading to low level of quality of care. Also, **Almenyan, Albuduh, & Al-Abbas (2021)** whose findings show that nursing workload has an impact on care quality and mortality because it is strongly correlated with the quality level of the care output provided by the nurses. As a result, the quality of nursing care can be improved by a balanced workforce distribution in relation to workload across different shifts.

Regarding to relation between nursing workload and job-related injury, the study findings concluded that there was statistically significant relation between nursing workload and job-related injury. This result may due to that the administration not listens and responds to nurses' concerns, there is no enough registered nurses on

shift (duty) to provide patient care, lack of nurse manager supports for new and innovative ideas about patient care, inadequate support services. This result on the same line with **Bagheri Hosseinabadi et al. (2019)** who showed that the nursing workload was positively associated with job-related injury revealed that an increased workload, consequently increase injuries and illness among nurse. Moreover, **Sengel, Tigen, Bilgin, & Korten, (2021)** showed that the nursing workload was positively associated with job-related injury as they revealed that injuries increases due to underreporting by nurses owing to heavy clinical workload or lack of knowledge about reporting the injuries.

Concerning to relation between nursing workload with patient complications, the study results concluded that there was statistically significant relation between nursing workload and patient complications. This result due to nurses were work loaded and there is ineffective communication between nurses and patients, inadequate nursing staff, inadequate hospital resources, interruption during providing care, many patients and family needs some important things didn't get done for the patient. This result is consistent with **Abadi, Akbari, Gholami-Fesharaki, & Ghasemi, (2017)** who studied "The association of nursing workloads, organizational, and individual factors with adverse patient outcome at Iran" revealed that there was statistically significant positive relation between nursing workload and patient complications and concluded that administration of the wrong medication, bloodstream infection, patient fall, nosocomial infections, pressure ulcer and this is due to decreased number of nurses during shift, long working hours and lack of nurses' work experiences.

Also, **Bae & Fabry (2014)** found that there was positive association between nurse's workload and patient complications such as medication errors, patients falls, decubitus ulcers, failure to rescue, hypoglycemic events, perceived adverse events. Conversely, the results of **Kovacs & Lagarde, (2022)** on their study about "Does high workload reduce the quality of healthcare? London, UK." showed that no significant associations between nurses' workload and the patient complications as workload not affecting the quality of nurses' performance or the quality of nursing care given during the shift.

6. Conclusion

Although, most nurses work loaded moderately and reported that workload effect on work and delayed some nursing procedure, they

had delivered good nursing. Also, most of them suffering from back injury and not reporting about this because they thought that the injury was low risk and not important to report. Patient fall but no injury and hematoma are the highest perceived patient complication. Finally, high nursing workload produce more job injuries and patients' complications.

7. Recommendations

Based on the study findings, the following recommendations are suggested:

➤ Recommendations for hospital management:

- Holding regular meeting with nurses and allowing them to discuss their problems, needs and interests.
- Maintaining adequate staffing as possible in different shifts by using part time, on calling and borrowing method that will help to decrease the workload
- Encouraging cooperative and team work spirit among nurses to facilitate knowledge and experience sharing and decrease workload.
- Maintaining safe work environment, provide sufficient equipment and supplies.
- Encouraging nurses to report any hazardous practices or behavior through establishing policies for reporting and safety standards guidelines.
- Using monitoring technology as bed alarm to notify staff if patient falls or barcode systems that verify patient medication safety.
- Providing open channels of communication and trustful relationships with nurses to provide them with constructive feedback and support.
- Participating nurses in contentious educational programs, workshops and scientific conferences to continually updating their knowledge, skills and abilities.

➤ Recommendations for nurses:

- Following all safety instructions and guidelines to avoid preventable injuries.
- Improving their communication skills, problem solving and maintaining good work relationships:
- Regular sharing in training programs and workshops.
- Working together as a team.

➤ **For further research:**

- Assessment of different strategies used by organization and nursing staff to manage workload.

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