Assessment of nurses' perceptions of their workload in a University Hospital

Ikram Abbas Elsayed Mohmed *Faculty of Nursing, B.Sc. in Nursing, Nursing Specialist.*

Prof. Azza Hassan Mohamed Hussein
Professor, Nursing Administration Department, Faculty of Nursing, Alexandria University, azza.hussein@alexu.edu.eg

Dr. Nancy Sabry Hassan
Assistant professor, Nursing Administration Department, Faculty of Nursing, Alexandria University, Sabry_nancy@yahoo.com

Corresponding Author: Ikram Abbass Elsayed, Faculty of Nursing, B.Sc. in Nursing, Nursing Specialist.

Email: Ikramahmed201055@gmail.com.

Article History:
Received: 15\3\2025
Revised: 17\3\2025
Accepted: 2\4\2025
Published: 1\9\2025

Abstract

Background: Nursing workload and its impacts on the quality of nursing care is a major concern for nurses and healthcare organizations. The global nurse shortage is a significant issue that needs to be addressed shortly. **The study aimed** to assess nurses' perception of workload in their healthcare setting. **Setting:** This study was conducted in all critical care, medical, and surgical units at Alexandria Main University Hospital. **Subjects:** 140 nurses were assigned to the previously mentioned units selected conveniently. **Tool:** The National Aeronautics and Space Administration Task Load Index (NASA-TLX). **Results**: The study showed that many nurses perceived a high level of workload (73.87%) with mean ± SD (443.25 ± 84.54). **Recommendations:** nurse managers should understand that a positive work environment decreases nurses' workload levels. This involves establishing, maintaining, and rebuilding a workplace that can maintain nurses' satisfaction, improve performance, and enhance the quality of care.

Keywords: Workload, Nurses, Healthcare, Perception.

Introduction

Nurses in healthcare settings often face significant workloads due to staff shortages, increasing patient acuity, and excessive administrative demands (Nakweenda et al., 2022). High workloads can lead to stress, burnout, and compromised patient care quality (Bae, 2011; Carthon et al., 2015). Nurses working in healthcare organizations invest more energy straightforwardly focusing on patients and have numerous duties like continually focusing on patients' requirements, connecting with their families and making decisions in critical circumstances. Therefore, they tolerate a higher workload (Restuputri et al., 2019). Addressing these challenges through adequate staffing, efficient resource allocation, and supportive policies is crucial for maintaining nurses' well-being and ensuring optimal healthcare outcomes.

Nursing workload was defined as the amount of time and care that is needed from nurses to provide direct and indirect care to the patients, and to carry out needs the workplace, and maintain professional improvement (Alghamdi, 2016). Furthermore, it refers to every nursing task that a nurse must complete over a specific period (Myny et al., 2011).

Workload can be divided into two words; "work and-load," which refers to tasks completed with a specific load (Hashish et al., 2020). Ihorindeba (2017) identified two types of workloads: qualitative workload and quantitative workload. Qualitative workload refers to nurses' feeling that they are unable to accomplish tasks while quantitative workload indicates their perception of an excessive number of duties. Nurses' workload is calculated based on patient reliance on nurses and the complexity of nursing care delivery activities to assist evidence-based workforce planning (Hashish et al., 2020). From another perspective, nurses' workload level is differentiated into three levels: unit, job, and task level. Nurses who had a high ratio of nursing tasks had a lower level of the quality of nursing care (Zhu, et al. 2019). The nursing workload is also categorized as direct care, indirect care, or non-patient care (Kraljica et al., 2017).

Patient throughput, patient characteristics, communication skills between teamwork, and the hospital environment all have an impact on workload. Nurses' workload is impacted by various factors such as an aging population, new diseases, technologies, treatments, increased patient throughput, length of stay, and frequent work interruptions (Kraljica et al., 2017). The NASA Task Load Index divides workload into six aspects. Physical demand, mental

demand, effort, time, frustration, and performance which are the aspects used to assess workload levels (Hoogendoorn et al. 2021).

Workload negatively impacts staff morale, delays, team spirit, and compliance with rules, ultimately affecting organizational effectiveness (Hashish et al., 2020). According to Greaves et al. (2018), increased workload in nursing might lead to decreased work satisfaction. According to Magalhães et al. (2017), nurses may experience feelings of unease, anger, tension, despair, and weariness.

Noprianty et al. (2020) and Yuan et al. (2023) explained that nurse workload is all tasks done by nurses based on estimation time of nursing experience in each unit. The analysis of the nurse's workload may be seen from different aspects such as tasks completed in accordance with main responsibilities and additional tasks, the quantity of patients to be treated, the working capacity related to the nurses educational level, the working time used to perform the assigned work according to the working hours that takes place every day, and the overall facilities that can help the nurse to complete her/his work well. In Egypt, there are a few studies discussed the workload among nurses. Some of these studies explained that nurses reported that they had stress and fatigue due to perceiving high level of workload in healthcare organization (Abdallah Ali et al., 2022; El Shahhat et al., 2024; Abdalgeleel et al., 2024).

Significant of the study:

Nurses are the most important group of hospital staff, accounting for the majority of the organizational capital. Nurses have a direct impact on patient quality of care, making appropriate staffing requirements, workload management, and task design crucial (Burns & Grove, 2017). Nurses do various activities such as patient admission, patient transferring, discharge process, care of the patient, and health education (Endsley, 2017). The shortage of nurses world-wide is a critical issue that is unlikely to improve shortly. A scarcity of nurses and increased workload can lead to lower patient care quality (Goh et al., 2018).

Assessing nurses' perceptions of their workload in hospitals is crucial for enhancing patient care quality and staff well-being. High workloads can lead to stress, burnout, and reduced performance, negatively affecting patient safety and outcomes (Schlak et al., 2021). Understanding these perceptions helps policymakers develop strategies to

optimize staffing, improve work environments, and support nurses' mental health (Chen et al., 2020). Furthermore, Understanding and addressing these issues through research can inform strategies to optimize nurse staffing and work environments, ultimately enhancing patient outcomes (Hashish et al., 2020).

Aim of the Study

The aim of this study was to assess nurses' perception of their workload in a University Hospital.

Research Question

What is the nurse's perception of their workload in a University Hospital?

Materials and Method

Materials

Design: A descriptive research design was utilized to accomplish this study.

Setting: This study was conducted in all critical care units (n=25); surgical units (n=12), and medical units (n=10) at Alexandria Main University Hospital.

Subjects: Out of 699 staff nurses in the selected units (a total population), 140 nurses were found to be the minimum sample size at a confidence level of 99% based on the G-power program. Critical care units' nurses (N = 70), medical unit nurses (N = 28), and surgical units (N = 42) were recruited. The participants were selected conveniently .Nurses were familiar with the hospital system and had an experience in the working unit not less than 6 months, being willing to participate in the study, and being available at the time of data collection were eligible.

Tools:

Tool I: National Aeronautics and Space Administration Task Load Index (NASA-TLX).

It was developed by Hoonakker et al. (2011) and adopted by the researcher to assess their workload. The questionnaire consisted of 6 items divided into 6 main dimensions. Each dimension consists of one item: namely, Mental Demand (MD), Physical Demand (PD), Temporal Demand (TD), Frustration (FR), Effort (EF), and Performance (PE). The responses were done by using a continuum (visual analog) starting from low workload (zero) to high workload (100). Total workloads score ranges from 0-600 where Low workload ranges from 0 < 200; Moderate workload ranges from 200< 400, and High workload ranges from 400 ≤ 600.

Translation, validity, and reliability

Initially, a comprehensive translation of the tool was carried out to verify their compatibility with the Arabic language and alignment with the Egyptian culture, also their appropriateness for different nurses' educational levels. Subsequently, a panel of five academic experts rigorously assessed the content validity and linguistic fluency of the translated tools. The experts were asked individually to evaluate the instrument's qualities in terms of item relevancy, comprehension, and comprehensiveness. To ensure accurateness and decrease potential threats to the study's validity, a few items were adjusted for greater clarity before being back translated into English by linguists. Based on their agreement rating, the resulting content validity index (CVI) for the tool was 0.896, which denotes that the study tool is valid. Also, they approved the back-translation of the tools.

A pilot study was done on 14 nurses to assess the tools' clarity and applicability as well as to determine how long it would take them to complete the study questionnaires. Additionally, the internal reliability of the study's tool was done using Cronbach's alpha correlation coefficient which was 0.896 that means that the tool is reliable.

Data collection

The researcher conducted a meeting with the nursing management to provide a complete brief explanation of the purpose of the survey. During this meeting, the researcher answered all questions which were asked, and the academic purpose of this research was emphasized. The anonymity of the participants also was promised to be maintained during the study. After explaining the purpose of the study, each participant received a hand-delivered questionnaire from the researcher during break time in the clinical setting. Nurses were requested to give it back to the researcher. It took two months, from 15 November 2023 to 20 January 2024 to collect the data.

Ethical considerations

Official clearance for conducting the study was obtained from the Research Ethics Committee, Faculty of Nursing, Alexandria University before conducting the study (permission no. 2023-7-55, IRB00013620 (9/19/2025). Written informed consent was obtained from each of the study subjects after explaining the aim of the study. Confidentiality of the data and the anonymity of the study's subjects were maintained. The subjects' right to withdraw from the study at any time was assured. Additionally, approval to collect data was secured from the hospital's managers.

Data analysis

Data were collected, coded, tabulated, and analyzed statistically using an IBM Statistical Package of Social Science (SPSS) version 26.0. The Kolmogorov-Smirnov test was used to verify the normality distribution of the quantitative data described using minimum and maximum, mean and standard deviation, median, and interquartile range (IQR). Also, the t-test was used to compare the means of two groups and determine if they were significantly different, while the F-test was used to compare variances of two or more groups and assess if they were significantly different. The significance of the obtained results was judged at the 5% level. Demographic and professional data were described using frequency and percentages. To quantify the variables under research, the arithmetic mean, and standard deviation (SD) were utilized as measures of central tendency and dispersion, respectively.

Results

Personal-professional work-related data:

Table 1: Nearly two-thirds of nurses (59.7%) were young adults aged 20≤30, indicating a relatively youthful workforce. Only a small proportion (4%) were aged 40<50, reflecting potential challenges in workforce experience and retention over time. The workforce is predominantly females (70.5%), aligning with the gender trends in nursing professions globally. A significant proportion were married (51.7%), and half of the nurses had children, indicating potential work-life balance challenges that could affect job performance and satisfaction. Almost half of the nurses held a Nursing Technical Institute diploma (46.0%), while 38.9% had bachelor's degrees, and a minority (3.4%) held postgraduate qualifications. This suggests variability in professional preparation levels, potentially impacting clinical competence and career progression opportunities. A notable portion (35.61%) weighed 60≤70 kg, while 15.41% were >90 kg. Additionally, 65% reported current health complaints, and %34.2 were on medications, highlighting potential health issues that could influence their ability to perform physically demanding tasks.

Table 2: Nearly 36.9% of nurses had 1-5 years and only 4% had more than 15 years. Similarly, more than half (54.4%) had only 1-5 years of experience in their current positions, indicating a young or inexperienced workforce. Approximately 50% of nurses worked in critical care units, with 36.2% in medical care units and 14.8% in surgical care units. This shows that critical care units are a primary emphasis for staffing. The majority of nurses reported having extensive working hours, with 40.9% working 48 hours per week and a sizable minority (23.5%) working 60 hours. The

average working hours (50.04 ± 8.20) indicate a heavy workload, potentially leading to fatigue.

In addition, over half of the nurses (53%) were assigned 1-6 patients every shift, which is a reasonable ratio in most situations. However, 28% had more than 10 patients per shift, which is excessive and likely reduces patient care quality and nurse well-being. A significant proportion of nurses (28.9%) worked at more than one hospital, while 18.1% had a second employment outside of nursing. This indicates economic pressures and could lead to nurse fatigue and poor performance.

Table 3: shows that nurses had a high overall workload, with a mean workload score of 443.25 ± 84.54 and a mean percentage score of 73.87%. This shows significant stress across multiple workload dimensions. Physical workload was the most demanding dimension, with 75.5% of nurses reporting high levels of physical effort (mean score: 79.60 ± 21.72). The mental burden was likewise very high at 69.1%, followed by effort (65.1%), temporal demands (62.4%), performance (61.7%), and frustration (47%), which was the lowest. While nurses report reasonably high satisfaction with their performance (61.7%), the lower frustration level (47%) suggests that while the workload is heavy, frustration may stem from other factors such as administrative tasks or understaffing.

Table 4*:* demonstrates that there were statistically significant differences between nurses overall workload according to their nursing experience, (F = 12.253, p = <0.001), nurse's experience in work unit (F= 6.645, p = 0.001), working hours per week during last three months (F =13.155, p = <0.001), nurses - patient ratio (F = 13.221, p = <0.001), and working in more than one hospital (t = 2.629, p = 0.009). Also, there were significant differences were reporting regarding nurses who had a second job apart from nurses (t = 14.972, p = <0.001). The highest mean score of overall workloads was among nurses who have 1 year ≤5 years of experience with a mean score and ± SD of 85.82 ± 11.44. In addition, among nurses who have 1 year ≤5 years of experience in their working unit had higher workload with a mean ± SD of 78.37 ± 17.16 than others. Also, nurses who worked 60 hours in a week had the highest workload with a mean ± SD of 86.61 ± 11.31, nurses who were assigned to more than 10 patients every shift had higher workload than others with a mean ± SD of 86.46 ±12.81, respectively.

Discussion

The findings of our study showed that the mean score of the overall nurses' workload was perceived as high. This seems sensible in light of the average levels of the subsequent dimensions of nurses' workload including the physical, mental, effort, temporal, frustration, and performance dimensions. It might be due to nurses being assigned 1-6 sometimes to 10 patients in medical and surgical care units, as 28.9% worked also in private hospitals. These findings are constant with Malekpour et al. (2014); Jamebozorgi et al. (2021) and Sorić et al. (2013) who reported that the nurses generally had a high level of workload that can lead to exhaustion and burnout.

These findings could be attributed to the fact that Egypt faces a chronic nursing shortage. According to WHO (2015), they found that are 14.8 nurses and midwives for every 10,000 Egyptians. This ratio amounts to almost half the global benchmark figure of 28.6 nurses (Wood, 2016).

These findings are higher than the findings of Bakhshi et al. (2017), who reported that the workload perceived by nurses was lower than the current study with a mean ± standard deviation of 69.73 ±15.26. Unlikely other studies claimed that nurses' mean workload was moderate to low in non-critical situations (Destiani, Mediawati, Permana, 2020; Mohammadi, Mazloumi, Kazemi, Zeraati, 2016; Asamani JA, Amertil NP, Chebere, 2015). Malekpour et al. (2014) reported that nurses were responsible for 80% of tasks including direct patient care tasks in health and medical centers and generally had a heavy workload (Malekpour, et al., 2014). High and frequent workloads are two key factors leading to frustration and fatigue (Jamebozorgi et al., 2022; Pamungka et al. 2022). Resulting in a decreased level of overall nurses' performance, concentration, and thinking processes, causing irritability, and reduced ability to learn (Sorić et al., 2013; Pourteimour et al., 2021; Li et al., 2023; Babamohamadi et al., 2023).

The current findings showed that the physical workload was the highest dimension perceived by the studied nurses with mean and SD scores of 79.60 ± 21.72. This finding may be because nurses in the current study were working in hospitals with high capacity of patients which increases physical workload. Similar findings are demonstrated in the studies of Yusefi et al. (2021); Nasirizad Moghadam et al. (2021); and Ivziku et al. (2022) who reported that nurses had a heavy workload due to moving and handling patients, decreased number of nurses, increase working hours.

On the contrary, Rosyidawati et al. (2020), Griswold et al. (2020), Yuan et al.

(2023), and Teng et al. (2024) found that the mental workload was the most common source of workload. Another study result explored that the physical and mental workload were at the same levels, and they were the most common source of workload (Yusefi et al., 2021). According to Lebet et al. (2021), the most frequently mentioned workload dimension was work performance, then cognitive demand, time pressure, effort, and physical demand.

The present study showed that nurses were considerably dissatisfied with the amount of workload linked to their performance dimension. The workload is one of important factors that affect nurses' performance, every activity that nurses provide while doing their job is a workload for them. This finding may be attributed to the fact of variation of the studied nurses in relation to their years of experience and educational levels. The study implies that one-third of studied nurses had a low number of nursing experience (five to ten years), and 23.5% had more than 15 years of experience in their working units. Also, one-third of nurses had bachelor's degrees in nursing while others had diploma degrees or associate degrees in nursing. A decreased level of nursing education may affect the level of nursing performance due to a lack of knowledge and practice to provide high-quality care, decreased ability of critical thinking, lack of communication skills, and decreased knowledge about healthcare policies. Also, educational level can affect workload level, nurses who have a low level of education can feel a high level of physical and mental effort that may affect performance level and decrease skills of time management.

In this context, the study by Pourteimour et al. (2021) reported that the performance dimension of workload was high because most nurses providing care to patients had high levels of mental workload. This similarity to Alrabae et al. (2021); and Rivera et al. (2021) who reported that the performance dimension of workload was high due to multiple tasks assigned to nurses in the ICU.

Conclusion

Nurses are suffering from high levels of workload. Among the possible extrinsic factors that might influence their workload, were the patient ratio, shortage of nursing staff, working hours, years of experience, and educational qualifications.

Limitations of the study

- Convenience sampling.
- Single hospital site
- Self-reported bias.

- Lack of inferential statistics or subgroup comparison.

Recommendations

In line with the findings of the study, the following recommendations are made:

- In order to reduce workload, the top nursing management should understand that a positive work environment might involve establishing, overseeing, and, if need, reestablishing a compassionate work culture.
- While creating a timetable that supports staff nurses in striking a balance between their job and family responsibilities, their perspectives must be considered.
- provide fixed and continuous meetings with nurses to discuss their problems and needs and to involve them in the decision-making process that relates to their work.
- Allow financial or non-financial incentives for nurses to encourage good performance and increase nurses' satisfaction.
- Adopt staffing pattern strategies to address the shortage of nurses such as floating, on-calling, part-time, and borrowing methods that can help to reduce nurses' workload.

Author contributions

Ikram Abbass Elsayed1, B.Sc. in Nursing, Nursing Specialist: Played a significant role in data collection, analysis, and interpretation. Assisted in drafting and revising the dissertation and contributed to methodology and statistical analysis.

Azza Hassan Hussein, Professor, Nursing Administration Department, Faculty of Nursing, Alexandria University: Oversaw the investigation and offered knowledgeable direction all through the study. Participated in the conceptualization process. Study design and the dissertation's final review.

Nancy Sabry Hassan3, Assistant Professor, Nursing Administration Department, Faculty of Nursing, Alexandria University: Provided expert interpretation, critical revision of the data, and insights into the findings' therapeutic relevance.

Table (1): Nurses' personal and professional characteristics

Socio-demographic characteristics		Frequency	
Total		**140**	
Age	20≤30	89	59.73
	30<40	47	31.54
	40≤50	6	4.0
	More than 50	7	4.69
	Mean± SD = 30.77±7.59		
Sex	Male	44	29.5
	Female	105	70.5
Place of residence	Alexandria	114	76.5
	EL Behera	35	23.5
Marital status	Single	65	43.6
	Married	77	51.7
	Divorced	4	2.7
	Widow	3	2.0
Having children	Yes	75	50.3
	No	74	49.7
Level of education	Secondary Nursing School (3 years) Diploma	8	5.4
	Nursing Technical Institute (5 years) Diploma	68	45.6
	Bachelor's in nursing science	58	38.9
	Postgraduate Diploma in Nursing	5	3.4
	Master's in nursing science	10	6.7
Weight	Less than 60 kg	16	10.7
	60 ≤ 70	53	35.6
	70 ≤80	31	20.8
	80 ≤ 90	26	17.4
	> 90	23	15.4
Mean ±SD 79.78±15.54			
Complaining of current diseases	Yes	53	35.6
	No	96	64.4
Taking any medication for this/these diseases	Yes	51	34.2
	No	98	65.8

Table (2): Professional characteristics of the studied nurses

Work related data:		**Frequency**	**Percent**
Nursing experience	**1 year ≤5**	51	36.9
	5≤10	53	35.6
	10≤15	35	23.5
	More than 15 years	6	4.0
Median (IQR) 8.0 (12.5)			
Experience in working units	**1 year ≤5**	81	54.4
	5≤10	43	28.9
	10≤15	20	13.4
	More than 15 years	5	3.4
Median (IQR) 5.0 (9.0)			
Your hospital department	Medical care unit	54	36.2
	Surgical care unit	22	14.8
	Critical care unit	73	49.0
Working hours/week during the last three months.	36.0	27	18.1
	48.0	61	40.9
	56.0	26	17.4
	60.0	35	23.5
Mean ± SD 50.04±8.20			
The nurse-patient ratio for every shift.	1 -6	79	53.0
	7 -10	28	18.8
	More than 10	42	28.2
Do you work in more than one hospital?	Yes	43	28.9
	No	106	71.1
Having a second job apart from nursing.	Yes	27	18.1
	No	122	81.9

Table (3): Frequency distribution of NASA Task Load Index

Tool 2: NASA Task Load Index	Low		Mode rate		High		Mean ± SD
	No.	%	No.	%	No.	%	
Physical	13	8.7	28	18.8	108	72.5	79.60 ±21.72
Effort	15	10.1	37	24.8	97	65.1	75.40 ±21.52
Mental	11	7.4	35	23.5	103	69.1	78.27 ±20.99
Temporal	15	10.1	41	27.5	93	62.4	74.66 ±21.80
Frustration	46	30.9	33	22.1	70	47	71.81 ±28.19
Performance	28	18.8	29	19.5	92	61.7	63.51 ±24.09
Overall Level workload	2	1.3	32	21.5	115	77.2	
Mean score of workloads	443.25±84.54						
Mean percent score	73.87%						

Total workloads range from 0-600 where:

Low workload ranges from 0 < to 200,

Moderate workload ranges from 200< to 400, and

High workload ranges from 400 ≤ to 600.

Table (4): Differences in nurses' overall workload according to their professional data

Work-related data:		overall Workload
		Mean ± SD
Nursing experience	1 year ≤5	85.82±11.44
	5≤10	73.20±17.12
	10≤15	76.93±10.53
	More than 15 years	60.54±16.54
F(*p*)		12.253* (<0.001)
Experience in working units	1 year ≤5	78.37±17.16
	5≤10	74.47±14.90
	10≤15	72.46±11.84
	More than 15 years	53.59±17.89
F(*p*)		6.645* (0.001)
Your hospital department	Medical care unit	76.07±17.42
	Surgical care unit	74.57±17.66
	Critical care unit	73.66±15.97
F(*p*)		0.323 (0.725)
Working hours shifts/week during last three months.	36.0	63.28±16.11
	48.0	74.34±12.54
	56.0	71.17±21.76
	60.0	86.61±11.31
F(*p*)		13.155* (<0.001)
The nurse-patient ratio for every shift.	1 -6	70.42±16.15
	7 -10	73.32±16.14
	More than 10	86.46±12.81
F(*p*)		13.221* (<0.001)
Do you work in more than one hospital	Yes	81.68±20.54
	No	72.90±15.15
t(*p*)		2.629* (0.009)
Having a second job apart from nursing	Yes	97.08±2.67
	No	73.05±16.09
t(*p*)		14.972* (<0.001)

F: F for ANOVA test t: Student t-test *: Statistically significant at $p \leq 0.05$

References

- Abdallah Ali, A., Ali Abdelwahab, A., & Soliman Ahmed, A. (2022). The relation between job demands, stress and burnout among nursing staff regarding their knowledge about climate changes. *Egyptian Journal of Health Care,* 13(2), 2226-2242.

- Abdalgeleel, S. A., Moneer, M. M., Refaee, A. S., Samir, M. M., Khalaf, O. O., & Allam, R. M. (2024). Depression and fatigue among Egyptian health care workers: cross-sectional survey. *Journal of Public Health,* 32(11), 2153-2162.

- Alrabae, Y. M. A., Aboshaiqah, A. E., & Tumala, R. B. (2021). The association between self-reported workload and perceptions of patient safety culture: A study of intensive care unit nurses. *Journal of Clinical Nursing*, 30(7-8), 1003-1017.

- Babamohamadi, H., Davari, H., Safari, A. A., Alaei, S., & Pordanjani, S. R. (2023). The association between workload and quality of work life of nurses taking care of patients with COVID-19. *BMC nursing*, 22(1), 234.

- Bakhshi, E., Mazlomi, A., Hoseini, S. M., (2017). Mental workload and its determinants among nurses in one hospital in Kermanshah city, Iran. *Journal of Occupational Hygiene Engineering,* 3(4), 53–60. https://doi.org/10.21859/johe-03047.

- Destiani, W., Mediawati, A. S., & Permana, R. H. (2020). The mental workload of nurses in the role of nursing care providers. *Journal of Nursing Care,* 3(1).

- Ebrahimi H, Jafarjalal E, Lotfolahzadeh A, Kharghani M. (2021) The effect of workload on nurses' quality of life with moderating perceived social support during the COVID-19 pandemic. *Work.* 70(2):347–54.

- El Shahhat, Z., Ahmed, M., & El-Shaer, A. (2024). Nursing Workload Influence on Nurses Job Injury and Patient Complication. *Mansoura Nursing Journal,* 11(1), 369-382.

- Griswold, S., Lowndes, B. R., & Baer, H. (2021). Simulation to Prepare for the Surge: Workload Management When There Are Too Many Patients. Comprehensive Healthcare Simulation: *Improving Healthcare Systems,* 123-130.

- Hashish, E. A., & Ashour, H. M. (2020). Determinants and mitigating

factors of the brain drain among Egyptian nurses: a mixed-methods study. *Journal of Research in Nursing,* 25(8), 699-719.

- Hoonakker, P., Carayon, P., Gurses, A. P., Brown, R., Khunlertkit, A., McGuire, K., & Walker, J. M. (2011). Measuring workload of ICU nurses with a questionnaire survey: The NASA task load index (TLX). *IIE Transactions on Healthcare Systems Engineering,* 1(2), 131–143. 10.1080/19488300.2011.609524 [DOI] [PMC free article] [PubMed] [Google Scholar].

- Ivziku, D., de Maria, M., Ferramosca, F. M. P., Greco, A., Tartaglini, D., & Gualandi, R. (2022). What determines physical, mental and emotional workloads on nurses? A cross-sectional study. *Journal of Nursing Management,* 30(8), 4387-4397.

- Jamebozorgi, M. H., Karamoozian, A., Bardsiri, T. I., & Sheikhbardsiri, H. (2021). Nurses' burnout, resilience, and its association with Socio-demographic factors during COVID-19 pandemic. *Frontiers in Psychiatry,* 12, 803506. https://doi.org/10.3389/fpsyt.2021.803506.

- Jarahian, M., Sedighi, A., Khaleghdoost, T., Kazem Nejad, E., Javadi Pashaki, N. (2018). Relationship between Nurses' subjective workload and occupational cognitive failure in Intensive Care Units. *J Crit Care Nurs*, 11(4),53–61.

- Malekpour, F., Mohammadian, Y., Malekpour, A. R., Mohammadpour, Y., Ahmadi, S., & Shakarami, A. (2014). Assessment of mental workload in nursing using NASA TLX. *Nurs Midwifery J,* 11(11), 892–899.

- Mehmet, T. O. P. (2013). Organizational variables on nurses' job performance in Turkey: nursing assessments. *Iranian journal of public health*, 42(3), 261.

- Nasirizad Moghadam, K., Chehrzad, M. M., Masouleh, R., Maleki, S., Mardani, M., Atharyan, A., & Harding, S. (2021). Nursing physical workload. and mental workload in intensive care units: Are they related? *Nursing Open*, 8(4), 1625–1633.

- Nakweenda, M., Anthonie, R., & van der Heever, M. (2022). Staff shortages in critical care units: Critical care nurses experiences. *International Journal of Africa Nursing Sciences*, 17, 100412.

- Pamungkas, R. A., Ruga, F. B. P., & Kusumapradja, R. (2022). Impact of Physical Workload and Mental

Workload on Nurse Performance: A Path Analysis. *International Journal of Nursing and Health Services (IJNHS),* 5(2), 219-225.

- Pourteimour, S., Yaghmaei, S., & Babamohamadi, H. (2021). The relationship between mental workload and job performance among Iranian nurses providing care to COVID-19 patients: A cross-sectional study. *Journal of Nursing Management,* 29(6), 1723-1732.
- Restuputri, D. P., Pangesti, A. K., & Garside, A. K. (2019). The measurement of physical workload and mental workload level of medical personnel. *Jurnal Teknik Industri,* 20(1), 34–44.
- Rivera, D. I. C., Torres, C. C., & Romero, L. A. L. (2021). Factors associated with nursing workload in three intensive care units. *Revista da Escola de Enfermagem da USP*, 55, e20200272.
- Li, L., Feng, Z., Zhu, M., Yang, J., & Yang, L. (2023). The mediating effect of personality on mental workload and perceived professional benefits of nurses in East China. *BMC nursing*, 22(1), 440.
- Rosyidawati, D., Noor, N. B., & Zulkifli, A. (2020). The Influence of Workload, Job Satisfaction and Work Motivation on Nurse Performance in Hospital Inpatient Installation. *Journal of Asian Multicultural Research for Social Sciences Study*, 1(2), 56-63. sectional study. *Journal of nursing management*, 30(8), 4387-4397.
- Sorić, M., Golubić, R., Milosević, M., Juras, K., & Mustajbegović, J. (2013). Shift work, quality of life and work ability among Croatian hospital nurses. *Collegium Antropologicum*, 37(2), 379–384.
- Teng, M., Yuan, Z., He, H., & Wang, J. (2024). Levels and influencing factors of mental workload among intensive care unit nurses: a systematic review and meta-analysis. *International journal of nursing practice*, 30(4), e13167.
- Wood, D. (2016). Nurses Lampooned in Egypt, *Hospitals Face Shortages*. (https://worldcrunch.com/culturesociety/nurses-lampooned-in-egypt-hospitals-face-shortages.
- Yuan, Z., Wang, J., Feng, F., Jin, M., Xie, W., He, H., & Teng, M. (2023). The levels and related factors of mental workload among nurses: A systematic review and meta-analysis. *International Journal of Nursing Practice*,29(5). https://doi.org/10.1111/ijn.13148.