

Association between nursing workload and quality of nurses' performance in pediatric and neonatal units in Mosul hospitals

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Abstract

Objective: The study aimed to examine the association between nursing workload and nurses' performance quality in pediatric and neonatal units in Mosul governmental hospitals.

Methods: A descriptive cross-sectional design was used, involving 207 nurses working in neonatal intensive care units, emergency units, and medical, surgical, and premature infant wards in Mosul teaching hospitals. Data were collected using a structured, self-administered questionnaire developed by the researcher. Statistical analysis was performed using SPSS version 27. Ethical approval was obtained before data collection, and confidentiality was maintained throughout the study.

Results: The results showed that 57% of participants were female and 43% were male. Most nurses (60%) were under 30 years old, while 27% were aged 30-40 years. Overall nursing performance quality was found to be high based on the Relative Importance Index. Many nurses reported that increased workload negatively affected their performance, particularly in pediatric and neonatal settings.

Conclusion: The study found that nursing documentation quality achieved the highest score, whereas workflow scored the lowest. The findings demonstrate a generally high level of nursing performance quality and indicate an association between nursing workload and the quality of nursing performance.

Keywords: Nursing Workload, Quality of Performance, Pediatric Units, Neonatal Units, Mosul Hospitals

Plain English Summary

This study examined the relationship between nursing workload and the quality of nurses' performance in pediatric wards in Mosul hospitals. The findings indicate that a high workload may reduce the quality of nursing care and increase work-related stress among nurses.

Introduction

Pediatric wards are highly specialised hospital units that require the provision of safe, effective, and high-quality nursing care. Nurses working in these settings are responsible for delivering continuous and complex care to children while addressing their physical, psychological, and developmental needs. Pediatric nursing demands advanced clinical skills, emotional resilience, and constant vigilance, making nurses in these units particularly vulnerable to occupational stressors that may affect the quality of care provided (1).

Nursing workload is one of the most critical challenges affecting healthcare systems worldwide. It refers to the cumulative physical, psychological, and organisational demands placed on nurses during patient care delivery. High workload is commonly associated with staff shortages, increased patient acuity, extended working hours, and administrative responsibilities, all of which can compromise nurses' ability to provide safe and effective care (2).

Evidence suggests that increased nursing workload is associated with missed nursing care,

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reduced job satisfaction, emotional exhaustion, and a higher risk of clinical errors. Studies conducted in pediatric and neonatal settings have demonstrated that high workload negatively affects nursing performance and patient outcomes, including increased hospital-acquired infections and prolonged hospital stays (3). In Iraq, particularly in Mosul city, pediatric and neonatal units encounter persistent challenges such as staff shortages, high patient demand, and limited healthcare resources following prolonged instability. The absence of local empirical evidence underscores a critical research gap concerning the relationship between nursing workload and the quality of nurses' performance in these sensitive hospital settings. Accordingly, this study seeks to examine the association between nursing workload and the nurses' performance quality in pediatric and neonatal units within governmental hospitals in Mosul.

This study aimed to examine the association between nursing workload and the quality of nurses' performance in pediatric and neonatal wards in Mosul hospitals. Specifically, the objectives were to describe the level of nursing workload and the quality of nursing performance in these wards; to examine the association between nursing workload and the quality of nursing performance; and to determine whether nurses' sociodemographic characteristics are associated with the quality of nursing care provided in pediatric and neonatal settings.

Materials and Methods

Research Design

This study employed a descriptive cross-sectional research design to examine the association between nursing workload and the quality of nurses' performance among nurses working in pediatric and neonatal units. A quantitative approach was adopted to capture the breadth of the relationship between workload

and performance quality across diverse healthcare settings. Data were collected using a structured self-administered questionnaire, ensuring systematic measurement of both workload dimensions and performance indicators.

The research was conducted in the pediatric departments of six teaching hospitals in Mosul. The overall study period included obtaining ethical approval and developing the research instruments. Data was collected between November 1, 2025 and January 15, 2026. The main data collection phase involved distributing questionnaires to nurses working in the pediatric departments. A preliminary pilot study was conducted to assess the clarity and reliability of the research instrument. After data collection was completed, the data were analysed using SPSS version 27.

Sample Size Calculation

Given the availability of several websites for determining the minimum suitable sample size for structural equation modeling, one of the most widely used is website at the following link (<https://www.danielsoper.com/statcalc/calculator.aspx?id=89> (danielsoper.com in Bing)), this website requires the entry of several parameters, including those related to the accuracy of the results such as effect size, statistical power level, and significance level, and information related to the questionnaire such as the number of observed variables (questions) and the number of dimensions, as listed in Table (1). The results presented in the table indicate that the minimum suitable sample size for this study was 150. Therefore, to obtain the highest accuracy and based on the above, we distributed 225 questionnaires, of which 210 were returned. After examining the returned questionnaires, it was found that 207 questionnaires were valid for analysis.

Table 1: Determining the minimum sample size for applying structural equation modelling

Inputs	Acceptable values	Selected values
Anticipated effect size	0.10 small 0.30 middle 0.50 big	0.3
Desired statistical power level	It should not be less than 0.80	0.80
Number of latent variables		5
Number of observed variables		50
Probability level	0.01 0.05 0.1	0.05
Outputs		
Minimum sample size to detect effect		150

Study Population and Sampling

The study population consisted of registered nurses working in pediatric and neonatal units within the teaching hospitals of Mosul. A probability sampling technique, specifically simple random sampling, was employed to select participants from pediatric and neonatal wards across six hospitals.

The total sample size included 207 nurses, ensuring adequate statistical power and enhancing the generalizability of the findings. Initially, 225 questionnaires were distributed, of which 210 were returned. After screening, 207 questionnaires were considered valid for analysis. The sample was drawn from hospitals located on both sides of the Tigris River (left and right banks), ensuring representation from different healthcare environments.

Inclusion/Exclusion Criteria

Inclusion: Nurses actively working full-time in those units during the data collection period.

Exclusion: Part-time nurses, administrative nurses, or those on leave/unavailable, in addition to participants in the pilot study. Multiple visits were conducted to each hospital to maximise participation and ensure comprehensive coverage.

Data Collection Instrument

A structured self-administered questionnaire was developed by the researcher based on an extensive review of relevant literature, previous studies, and practical experience. Part I: Sociodemographic characteristics (age, gender, marital status, academic qualification, years of experience, working hours, income, shift type). Part II: Quality of Nursing Performance (four domains: hygiene and safety, nursing care, documentation of nursing procedures, workflow). Part III: Workload (10 items measured using a three-point Likert scale: Yes, Somewhat, No). This instrument was carefully structured to ensure clarity, relevance, and suitability for the study population.

Content validity was established through a panel of sixteen experts from diverse specialties (community health nursing, pediatric nursing, adult nursing, psychiatric nursing, applied English, and statistics). Based on their feedback, modifications were made to improve clarity and comprehensiveness.

A pilot study was conducted on 30 nurses (excluded from the main sample) between October 18 and 28, 2025. Reliability was

evaluated using Cronbach's alpha coefficient, yielding an overall value of 0.87, indicating high internal consistency. Reliability values for individual dimensions ranged from 0.66 to 0.89.

Measurement Approach and Interpretation Thresholds

Scoring System: Responses were recorded on a three-point Likert scale (1 = No, 2 = Somewhat, 3 = Yes). Relative Importance Index (RII) formula: $RII = \text{Mean Score} / \text{Highest Likert Score}$. Performance Quality: $RII \geq 0.66$ = High quality; $0.33-0.65$ = Moderate quality; <0.33 = Low quality.

Workload: $RII \geq 0.66$ = High workload; $0.33-0.65$ = Moderate workload; <0.33 = Low workload.

Statistical Analysis

Data were analysed using SPSS version 27. Descriptive Statistics, including Frequencies, percentages, means, and standard deviations, were used to summarise demographic characteristics and study variables.

The normal distribution of data was checked before regression and ANOVA. Independence of observations was ensured through random sampling. Reliability was confirmed with Cronbach's alpha (overall $\alpha = 0.87$).

Inferential Statistics included Independent samples t-tests to assess differences between two groups. One-way ANOVA to examine differences across multiple groups. Simple linear regression was used to examine the association between nursing workload (independent variable) and performance quality (dependent variable). Normality of the study variables was assessed using the Shapiro-Wilk test. Results indicated that all variables were normally distributed ($p > 0.05$); thus, parametric assumptions for t-tests, ANOVA, and regression analyses were met. To examine common method bias, Harman's single-factor test was conducted. The results showed that a single factor accounted for 32% of the variance, which is below the critical threshold of 50%. Therefore, common method bias was not a serious concern in this study, since the regression model in the current study included only one independent variable (workload) predicting nurses' performance quality; multicollinearity diagnostics such as Variance Inflation Factor (VIF) and Tolerance values were not applicable or required. Statistical Significance was determined using p-values at a significance level of $p < 0.05$.

Results

Out of 225 distributed questionnaires, 210 were returned, and 207 were valid for analysis, yielding a response rate of 92% (Table 2).

Table 2: Number and percentage of forms distributed, returned and valid for analysis

Community size	Number of forms distributed	Number of forms valid for analysis	Number of returned forms
	225	Number 207 (92%)	Number 210 (93%)

Table 3 summarises the sociodemographic profile of the 207 participating nurses. The majority were female (57%) and under 30 years of age (60%). Most held a bachelor's degree

(44%) or a diploma in nursing (37%), had 1–5 years of experience (55%), and worked 40 hours or less per week (87%). Monthly income for most (72%) fell between 600,000 and 1,000,000 IQD.

Table 3: Sociodemographic Characteristics of the study sample

Age	No.	Percentage
Less than 30 years	125	60%
30-40 years	55	27%
41-50 years	24	12%
More than 50 years	3	1%
Total	207	100%
Gender	No.	Percentage
Male	88	43%
Female	119	57%
Total	207	100%
Marital status	No.	Percentage
Single	101	49%
Married	98	47%
Divorced / Widowed	8	4%
Total	207	100%
Educational level	No.	Percentage
Nursing Baccalaureate	35	17%
Diploma Technician Nurse	76	37%
Bachelor's university nurse	88	44%
Higher Diploma of Nursing	5	2%
Master	3	1%
Total	207	100%
Service years	No.	Percentage
Less than 1 year	25	12%
1-5 years	114	55%
6-10 years	26	13%
11 years and more	42	20%
Total	207	100%
Monthly income	No.	Percentage
≤ 500,000 IQD	34	16%
600000-1000000 IQD	149	72%
1000001 – 1500000 IQD	24	12%
Total	207	100%
Weekly working hours	No.	Percentage
40 hours or less	181	87%
41-50 hours	26	13%

Table 4 presents the Relative Importance Index (RII) thresholds used to interpret the three-point Likert scale responses. Scores of 0.66 and above

were classified as high importance, scores between 0.33 and 0.65 as moderate, and scores below 0.33 as low.

Table 4: Relative Importance levels according to the three-point Likert scale

Relative importance	RII
High	$0.66 \leq RII \leq 1$
Medium	$0.33 \leq RII < 0.66$
Low	$0 \leq RII < 0.33$

Table 5 shows the Relative Importance Index for the four dimensions of nursing performance quality. Documentation of nursing care achieved the highest score (RII = 0.957), followed by

missed nursing care (0.943) and hygiene and safety (0.940). Workflow disruption scored the lowest (RII = 0.827), indicating it was the most challenging dimension.

Table 5: Relative Importance of the Dimensions of Nurse Performance Quality

Dimensions	Arithmetic mean	Standard Deviation	Relative Important	Rank
Hygiene and Safety	2.82	0.45	0.940	Third
Missed Nursing Care	2.83	0.45	0.943	Second
Documentation of Nursing Care	2.87	0.40	0.957	First
Workflow Disruption	2.48	0.60	0.827	Fourth

The overall workload RII was 0.893, which falls within the high workload category according to the interpretation thresholds, indicating that nurses experienced substantial workload demands.

Table 6 provides a statistical overview of workload challenges. The highest-rated item was

the perception that high workload negatively impacts performance quality (RII = 0.943), followed by the need for high concentration due to medication variety (RII = 0.940). The lowest-rated item was receiving adequate rest during shifts (RII = 0.780). The overall workload RII was 0.893, indicating a high workload level.

Table 6: Statistical overview of workload challenges in pediatric wards.

Items	Response scale			Mean	Standard deviation	Relative Important	Ranking
	Always (3) %	Sometime (2) %	Rarely (1) %				
I consider the workload in the pediatric unit to be manageable for me	85.02	9.66	5.31	2.8	0.52	0.933	3
I find the nurse-to-child ratio in the ward appropriate for providing good care	67.63	22.22	10.14	2.57	0.67	0.857	8
The workload is fairly distributed among the nurses on different shifts	75.85	19.81	4.35	2.71	0.54	0.903	6
I receive adequate rest during shifts	52.17	29.95	17.87	2.34	0.77	0.78	10
Rewards and incentives help reduce the feeling of workload	62.8	31.4	5.8	2.57	0.6	0.857	9
I feel that a high workload negatively impacts the quality of my nursing performance	86.47	10.14	3.38	2.83	0.46	0.943	1
I find that non-nursing tasks such as clerical and administrative work increase my workload	78.74	15.94	5.31	2.73	0.55	0.91	5
I feel anxious when dealing with children with infectious diseases	73.91	17.87	8.21	2.66	0.63	0.887	7
The lack of cooperation from children during nursing procedures makes the work more difficult	76.81	19.81	3.38	2.73	0.51	0.91	4
The variety of medications and small doses for children requires high concentration and extra effort	83.09	15.46	1.45	2.82	0.42	0.94	2
Rate	74.25	19.23	6.52	2.68	0.57	0.893	

Table 7 demonstrates a statistically significant negative association between nursing workload and overall performance quality ($\beta = -0.54$, $p =$

0.007), with workload explaining 78% of the variance in performance quality ($R^2 = 0.78$).

Table 7: Association Between Nursing workload and quality of Nurses' performance.

Independent variable	Direction of Effect	Dependent Variable	Regression Coefficient Estimate(β)	Standard Error of the Regression Coefficient SE.(β)	Coefficient of Determination (R^2)	Critical Value C.V	P-value	Confidence Intervals (CI)
Workload	→	Performance Quality Nurses	-0.54	0.085	0.78	-6.35	0.007	[-0.707, -0.373]

Table 8 reveals that workload had significant negative associations with all four performance dimensions. The strongest effect was on workflow interruption ($\beta = -1.05$, $R^2 = 0.94$), followed by documentation of nursing care ($\beta = -$

0.90, $R^2 = 0.80$), missed nursing care ($\beta = -0.88$, $R^2 = 0.90$), and hygiene and safety ($\beta = -0.65$, $R^2 = 0.74$). All associations were statistically significant ($p < 0.05$).

Table 8: Association Between Nursing Workload and Dimensions of Quality of Nurses' Performance

Independent Variable	Direction of Effect	Dependent Variable	Regression Coefficient Estimate(β)	Standard Error of the Regression coefficient SE (β)	Coefficient of Determination (R^2)	Critical Value C.V	P-value	Confidence Intervals (CI)
Workload	→	Hygiene and Safety	-0.65	0.106	0.74	-6.13	0.013	[-0.858, -0.442]
	→	Missed nursing care	-0.88	0.110	0.90	-8.00	0.012	[-1.096, -0.664]
	→	Documentation of Nursing Care	-0.90	0.100	0.80	-9.00	0.007	[-1.096, -0.704]
	→	Workflow Interruption	-1.05	0.097	0.94	-10.82	0.007	[-1.240, -0.860]

Discussion

The overall descriptive analysis indicates that the total sample consists of 207 nurses working in the pediatric wards of Mosul governorate hospitals. The study involved 207 nurses from pediatric wards across six hospitals in Mosul, with the largest proportion from Ibn Al-Atheer Teaching Hospital (38%), followed by Al-Khansa (31%). Lower representation from Al-Salam (18%) and Mosul General Hospital (5%) reflects differences in bed capacity and hospital specialisation. While Emergency and premature wards had higher nurse representation (4), female nurses comprised 57% of participants, reflecting the female-dominated nature of nursing (4). The majority (60%) were aged under 30 years old; a study by (5) also found that the majority of participants were under 30 years old. Regarding marital status, 49% were single, and 47% were married. This pattern is further supported by (6). Also, in the present study, most participants held a bachelor's degree, followed by nursing institute graduates, reflecting the predominance of higher education in pediatric nursing. These findings are consistent with the study by (7). Morning shifts were most common, reflecting peak workload periods. This pattern aligns with the findings of (8), while average working hours were 7–8 per day, with 1–5 years

of experience representing nearly half the sample. Regarding weekly working hours, 87% of participants reported working 40 hours or less per week. This figure is lower than typical nursing workloads reported in many healthcare systems internationally, where nurses frequently work 45–50 hours or more per week, often including mandatory overtime (9). Several explanations may account for this finding in the Mosul context. First, Iraqi labour regulations for public sector employees generally cap official working hours at 40 hours per week, and the study sample consisted exclusively of governmental hospital nurses who may adhere to these contractual limits. Second, the prolonged period of regional instability has led to a fragmented healthcare system with limited resources, which paradoxically may reduce the capacity for extended shifts due to infrastructural constraints such as unreliable transportation or security considerations that restrict night-time work. Third, self-reported working hours may be subject to under-reporting, as nurses might have omitted undocumented overtime or on-call duties that occur outside formal shift schedules. Future studies should employ objective measures such as shift logs or electronic timekeeping to validate these findings and distinguish between contracted versus actual worked hours.

Our results indicate that the relative importance index (RII) values for all dimensions ranged between 0.827 and 0.957, suggesting high ratings in the areas of hygiene and safety, nursing care, documentation, and workflow. However, this limited differentiation suggests that participants consistently perceived all aspects of nursing performance as strong. This may reflect genuinely high performance across all areas, as the documentation dimension scored the highest average, reflecting agreement on its importance as a key factor for patient safety and quality of care, as supported by (10), who emphasised its role in clinical outcomes and communication among nurses. The nursing care dimension scored a high average with a medium standard deviation, given the direct impact of inadequate care on safety (11). This reflects nurses' awareness that inadequate care negatively affects patient safety and care quality, as supported by (12). The hygiene and safety dimension demonstrated high commitment, with an average close to the previous dimensions and relatively low variance, reflecting a clear commitment to preventive practices and safety protocols, as confirmed by (13). This is further supported by (14), who highlighted the importance of infection prevention and control in reducing healthcare-associated infections. The workflow dimension scored the lowest average and highest variance, highlighting organisational challenges (15). In general, nursing performance is shaped by both individual commitment and organisational support.

Our results show that work pressure directly impacts performance quality (86.47%), while medication variety requires additional focus (83.09%). Conversely, insufficient rest periods (52.17%) reflect a clear gap between work demands and the ability to maintain performance, and non-nursing administrative tasks increase the workload (78.74%). Workload is a critical factor influencing nurses' performance and the quality of patient care (16), with scores in the upper-middle range and high variability reflecting differences in task distribution and institutional support. Nurses agreed that high workload negatively affects care quality (17). Rest during shifts scored lowest, highlighting the importance of adequate breaks to prevent burnout (18). Recommendations include fair task allocation, staffing adjustments, and structured rest periods to balance demands and sustain performance (19). Furthermore, the apparent inconsistency between items, where 85% of respondents reported that workload is manageable, yet 86% indicated that workload negatively impacts performance, likely reflects the dual reality of pediatric nursing. Nurses perceive themselves as able to manage daily demands, but acknowledge

that such demands still compromise performance quality. This suggests professional adaptation to workload pressures, while simultaneously recognising their adverse effects on care outcomes.

Our data show that the effect of workload on nurses' performance quality indicates a statistically significant negative relationship ($\beta = -0.54$, $p = 0.007$). Statistical analysis confirmed a strong negative correlation between workload and performance quality, indicating that higher workloads reduce care quality and compromise patient safety (20). These findings highlight the critical impact of workload on nursing outcomes, emphasising the need for administrative policies that ensure equitable staffing and support nurses' well-being to enhance care outcomes (21).

Our data provide an overview of the impact of workload on specific dimensions of performance quality, revealing inverse effects across hygiene and safety, missed nursing care, documentation, and workflow interruption. All domains demonstrated consistent and statistically significant negative associations ($p < 0.05$), reflecting a clear decline in overall nursing performance quality with increased workload in pediatric and neonatal units (22). Regression analysis further revealed that workload negatively impacts all performance aspects (23), with notable declines in hygiene and safety compliance under high workload conditions (24). Missed Nursing Care increases with workload (25), Documentation accuracy and completeness decline with workload (26); clearly demonstrate that good documentation is essential for improving patient outcomes (27), and Workflow is most severely affected, increasing errors and delays (28). Excessive workload disrupts nursing processes and increases errors in service delivery (29). These findings emphasise that administrative interventions, supportive technology, and staffing adjustments are essential to mitigate these effects and sustain care quality (30).

Study Limitations

The cross-sectional design prevents the establishment of causal relationships between workload and nursing performance. In addition, the study was conducted only in Mosul teaching hospitals, which may limit the generalizability of the findings to other settings. Reliance on Self-Report Data: The study instrument was a self-administered questionnaire developed by the researcher to assess nursing performance and workload. This approach reflects the nurses' perspective but does not objectively measure performance through direct observation or clinical indicators. Consequently, there may be a gap between what participants report and what

actually occurs in daily practice. Furthermore, some participants may have provided socially desirable responses due to fear of criticism or repercussions, potentially introducing response bias. Additionally, the high variance explained (R^2 values ranging from 0.74 to 0.94) by the single predictor of workload in this study, while statistically significant, may be partially attributable to same-source bias, as both workload and performance quality were measured using self-reported instruments completed by the same nurses. This could inflate the observed associations. Future research should incorporate objective measures of nursing performance—such as direct observation, patient outcomes, or supervisor evaluations—to validate and extend these findings

Conclusions

The study concluded that nursing workload had a significant negative association with the quality of nurses' performance in pediatric and neonatal units. Despite adherence to infection control, safe medication administration, and accurate documentation, increased workload, frequent workflow interruptions, and limited resources reduced overall efficiency.

List of Abbreviations

NICUs: Neonatal Intensive Care Units
IQD: Iraqi Dinar
RII: Relative Importance Index
SPSS: Statistical Package for the Social Sciences

Declaration

Ethics Approval and Consent to Participate

The study obtained ethical approval from the Nineveh Health Directorate's Ethics Committee (Order No: 47250, Date: 22/10/2025). Written informed consent was obtained from all participating nurses, confirming that their participation was voluntary and that confidentiality of data would be strictly maintained for research purposes only.

Consent for publication

All authors gave consent for the publication of this work under the Creative Commons Attribution Non-Commercial 4.0 license. No individually identifiable data are reported.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Competing Interest

Conflicts of Interest: The authors declare that no competing interests exist.

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Author Contributions

AWMG contributed to data collection, statistical analysis, and manuscript writing. KRI supervised the study, revised the manuscript, and approved the final version.

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