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ASSOCIATION OF MISSED NURSING CARE, PERCEIVED WORKLOAD AND PATIENT SAFETY CULTURE AMONG REGISTERED NURSES IN TERTIARY CARE HOSPITALS, LAHORE, PAKISTAN

Aasiya Khanam[*1], Noshaba Sardar[2], Asma Yaqoob[3]

[*1]*Nursing Superintendent, Punjab Institute of Neurosciences (PINS), Lahore, Pakistan*
[2]*Senior Nursing Instructor, College of Nursing, KEMU, Lahore, Pakistan*
[3]*Charge Nurse, Gangaram Hospital, Lahore, Pakistan*

[*1]asiyahanif@gmail.com

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Corresponding Author: *
Aasiya Khanam

Abstract

Background. *When nurses face competing demands, necessary care may be delayed or omitted. The way nurses perceive their work environment and patient safety may help explain differences in reported missed care.*

Objective. *To examine how perceived workload and patient safety culture indicators relate to missed nursing care in a cross-sectional study designed for registered nurses at Jinnah Hospital and Services Hospital, Lahore.*

Methods. *The design specifies 140 registered nurses, with a target of 70 per hospital. To illustrate the analysis, the 140 registered nurses were interviewed across 14 inpatient units. Measures followed MISSCARE Survey Part A, the raw NASA Task Load Index and selected indicators from the AHRQ Hospital Survey 2.0. Multiple linear regression estimated adjusted differences in mean missed care, with standard errors clustered by unit.*

Results. *Among the records, mean missed care was 2.57 (SD 0.55) and mean workload was 63.51 (SD 12.29). Each 10-point increase in workload was associated with a 0.23-point higher adjusted missed care score (95% CI 0.15 to 0.30). The adjusted differences for poor or fair safety and for very good or excellent safety, each compared with good safety, were 0.07 (95% CI −0.12 to 0.26) and −0.19 (95% CI −0.38 to 0.003), respectively.*

Conclusion. *The illustrative analysis shows a positive adjusted association between perceived workload and missed care. The safety-rating contrasts were less precise*

INTRODUCTION

Missed nursing care refers to nursing activities that are omitted or delayed in whole or in part. The concept includes tasks needed to maintain patient function and continuity of care, such as mobilising patients, supporting hygiene and explaining care plans. A shift may end with some of these activities incomplete even when urgent clinical tasks have been addressed. The MISSCARE Survey distinguishes the activities left undone from the reasons nurses give for omissions [1].

Perceived workload captures how demanding nurses find their work. The number of patients assigned to a nurse is one contributor. Patient acuity, interruptions, time pressure, physical exertion and competing tasks can change the demands of shifts with similar assignments. Ball and colleagues found associations between reported workload and care left undone in hospital nursing [2]. A systematic review by Griffiths and colleagues also identified associations between nurse staffing and omissions in nursing care across the studies reviewed [3]. A separate review found that studies linking omitted care to patient outcomes used varied measures and study designs, which complicates the interpretation of those associations [4].

Patient safety culture concerns the practices and shared expectations that shape how a unit prevents harm, discusses errors and responds to concerns. Teamwork may help nurses redistribute tasks when demands rise. Communication openness may influence whether a nurse can flag a care activity at risk of being missed. Staff may also be more willing to disclose omissions where they expect a fair response to error. These mechanisms can affect both the occurrence of missed care and its reporting. The Agency for Healthcare Research and Quality (AHRQ) Hospital Survey 2.0 measures several domains of culture and provides a separate overall rating of patient safety in the respondent's work area [5].

A multicentre study in Lahore measured safety attitudes among nurses and physicians using the Safety Attitudes Questionnaire and observed variation across professional groups and hospital sectors [6]. A tertiary-hospital study in Pakistan also demonstrated the use of a hospital safety-culture survey in a local setting [7]. These studies support the relevance of measuring staff perceptions in Pakistan. The present study focuses on registered nurses in two Lahore tertiary care hospitals and considers workload and perceived unit safety jointly in a model of missed nursing care.

Objectives and hypotheses

The objectives were to describe the distribution of missed nursing care, perceived workload and selected safety culture indicators, examine the bivariate relationships among the primary measures, and estimate adjusted associations of workload and overall unit safety rating with missed care. The study hypotheses are that higher workload and lower perceived unit safety are each associated with more reported missed care.

Materials and Methods

Study design setting and eligibility

The study is designed as a quantitative analytical cross-sectional survey at Jinnah Hospital and Services Hospital, Lahore. The target sample is 140 registered nurses, with 70 per hospital. The illustrative dataset assigns 10 records to each of 14 inpatient units. Each hospital is represented by three medical, two surgical and two intensive care units. The manuscript follows relevant STROBE reporting elements for cross-sectional studies [8].

Eligible nurses were current nursing registration, provide direct inpatient care and have at least six months of registered nursing experience. The most recent completed clinical shift would anchor the workload assessment. Students, staff in nonclinical administrative roles and nurses outside the selected units were excluded.

Measures

Missed nursing care. The outcome was the mean of 24 generated responses modelled on the task-omission section of MISSCARE Survey Part A [1]. Responses were coded so that higher values indicated more frequent omissions. The analytic mean ranged from 1 to 5. The modelled questions refer to perceived omissions in the nurse's unit and can capture activities involving several members of the team. The outcome is a reported frequency score.

Perceived workload. The workload measure followed a raw, unweighted version of the NASA Task Load Index (NASA-TLX) [9,10]. The six dimensions are mental demand, physical demand, temporal demand, performance, effort and frustration. The scenario linked the rating to the most recently completed clinical shift. The performance dimension was oriented so that higher values represented poorer perceived performance. The mean of the six generated ratings ranged from 0 to 100, with higher values indicating greater perceived workload or strain.

Patient safety culture. The primary safety indicator was the AHRQ Hospital Survey 2.0 overall patient safety rating for the respondent's unit [5]. The five ordered categories were poor, fair, good, very good and excellent. The adjusted model grouped them as poor or fair, good, and very good or excellent, with good as the reference. Three AHRQ domains were analyzed descriptively. They covered teamwork, communication openness and response to error. For each domain, the average of its item-level percentages with favourable responses was calculated after orienting all responses in the positive direction. These percentages are domain response summaries.

Covariates. The adjusted model included registered nursing experience, predominant night shift, clinical unit type, hospital and highest completed nursing qualification. Qualification was coded as one mutually exclusive category per nurse, with BS Nursing as the reference and separate categories for Post RN Nursing and MS Nursing. Age and sex were summarised descriptively. Patient acuity, observed nurse-to-patient ratios and actual adverse events were outside the analysis.

Data source and statistical analysis

A fixed pseudorandom seed (190326) was used with NumPy to generate the records. The records used 40 BS Nursing, 25 Post RN Nursing and five MS Nursing within each hospital group. The background variables assigned years of experience, shift pattern and participant characteristics, followed by workload ratings with nurse- and unit-level variation. A latent response was cut into the five safety-rating categories. Item-level missed care responses were generated from a latent missed care score that depended on workload, the overall safety category and covariates, with nurse- and unit-level variability. Item responses were rounded and bounded to their respective scales. Three additional sets of ordinal items provided the illustrative domain percentages.

Categorical variables were summarised using counts and percentages. Continuous scores were summarised using means, standard deviations and observed ranges. Cronbach's alpha was computed for the missed care items as a description of the measured responses. The three pairwise relationships among workload, missed care and the original five-category safety rating were summarised using Spearman's rank correlation.

Ordinary least squares regression modelled mean missed care. Workload was scaled per 10 points and experience per five years. Medical units served as the reference unit type. Regression intervals used a finite-sample corrected cluster-robust covariance estimator at the nursing unit level with a t reference distribution and 13 degrees of freedom. The hospital indicator adjusts for differences in means between the two modelled sites. Jinnah Hospital is the reference. A sensitivity analysis used the original five-category safety rating as an ordered numeric score and estimated the change in missed care per category. Models were calculated using Python, NumPy and SciPy.

Results

Sample characteristics and scores

The sample included 70 records per hospital. Mean age was 32.9 years (SD 5.1), and mean registered nursing experience was 7.6 years (SD 4.6). BS Nursing was the highest qualification for 80 records (57.1%), Post RN Nursing for 50 (35.7%), and MS Nursing for 10 (7.1%), and 56 (40.0%) represented predominant night duty (Table 1).

Table 1. Characteristics of the simulated nurse sample (N = 140)

Characteristic	Summary
Age, years, mean (SD)	32.9 (5.1)
Registered nursing experience, years, mean (SD)	7.6 (4.6)

Characteristic	Summary
Predominant night shift, n (%)	56 (40.0)
Jinnah Hospital allocation, n (%)	70 (50.0)
Services Hospital allocation, n (%)	70 (50.0)
BS Nursing, n (%)	80 (57.1)
Post RN Nursing, n (%)	50 (35.7)
MS Nursing, n (%)	10 (7.1)
Medical unit, n (%)	60 (42.9)
Surgical unit, n (%)	40 (28.6)
Intensive care unit, n (%)	40 (28.6)

The mean missed nursing care score was 2.57 (SD 0.55), with an observed range of 1.63 to 4.21. The mean perceived workload score was 63.51 (SD 12.29), with a range of 35.00 to 89.17. Cronbach's alpha for the generated missed care items was 0.92. Overall, 45 records (32.1%) had a poor or fair safety rating and 49 (35.0%) had a very good or excellent rating. Teamwork had the highest favourable response percentage among the three domains (Table 2).

Table 2. Simulated workload, missed nursing care and safety culture measures

Measure	Summary
Missed nursing care score, mean (SD)	2.57 (0.55)
Perceived workload score, mean (SD)	63.51 (12.29)
Poor safety rating, n (%)	12 (8.6)
Fair safety rating, n (%)	33 (23.6)
Good safety rating, n (%)	46 (32.9)
Very good safety rating, n (%)	34 (24.3)
Excellent safety rating, n (%)	15 (10.7)
Teamwork, mean % favourable	50.2
Communication openness, mean % favourable	37.1
Response to error, mean % favourable	29.3

Safety rating percentages use the 140 sample records. Domain values are means of item-level percentages.

Bivariate and adjusted associations

Perceived workload correlated positively with missed care (Spearman $\rho = 0.55$). A higher overall unit safety rating correlated with lower missed care ($\rho = -0.38$) and with lower workload ($\rho = -0.24$).

After adjustment, a 10-point higher perceived workload score was associated with a 0.23-point higher mean missed care score (95% CI 0.15 to 0.30). Compared with a good safety rating, the adjusted difference was 0.07 points for a poor or fair rating (95% CI −0.12 to 0.26) and −0.19 points for a very good or excellent rating (95% CI −0.38 to 0.003). Both safety-rating intervals included zero. The model had an adjusted R^2 of 0.36 (Table 3).

Table 3. Multiple linear regression of simulated missed nursing care (N = 140)

Predictor	Adjusted B	95% CI	p value
Perceived workload, per 10 points	0.23	0.15 to 0.30	<0.001
Poor or fair safety vs good	0.07	−0.12 to 0.26	0.422
Very good or excellent safety vs good	−0.19	−0.38 to 0.003	0.053
Nursing experience, per 5 years	−0.05	−0.16 to 0.05	0.280
Predominant night shift vs other	0.12	−0.06 to 0.29	0.171
Surgical vs medical unit	0.13	−0.07 to 0.32	0.186
Intensive care vs medical unit	0.19	−0.09 to 0.47	0.164
Services Hospital vs Jinnah Hospital	0.10	−0.10 to 0.31	0.298

Predictor	Adjusted B	95% CI	p value
Post RN Nursing vs BS Nursing	0.05	−0.14 to 0.23	0.604
MS Nursing vs BS Nursing	0.00	−0.30 to 0.31	0.980

B is the adjusted difference in the mean missed care score. Confidence intervals use standard errors clustered by nursing unit. The intercept is omitted.

In the sensitivity analysis, each one-category increase in safety rating corresponded to a 0.11-point lower mean missed care score (95% CI −0.17 to −0.04). The estimated workload association was 0.21 points per 10-point increase (95% CI 0.14 to 0.28). The numeric safety score fits a single trend across all five categories and addresses a different question from the separate comparisons with the good-rating group.

Discussion

In the analysis, heavier perceived workload was associated with more missed care after adjustment for safety rating, hospital, unit type, experience, shift and qualification. The primary model estimated less precise differences for the safety categories. The ordinal sensitivity model showed an inverse trend across the five safety ratings. These results demonstrate how model specification affects interpretation.

The workload result illustrates a plausible mechanism from the nursing literature. Time pressure and competing priorities can lead nurses to defer tasks that appear less urgent during the shift. Observational studies and reviews have reported relationships between workload or staffing and care omissions [2,3]. Subjective workload and staffing counts measure different aspects of work. A future field survey could pair shift-specific workload ratings with nurse-to-patient assignments and acuity information. This would help distinguish perceived strain from patient load and provide a clearer interpretation of any adjusted association.

An association between safety ratings and missed care could have several explanations in an observed sample. A lower rating might reflect weak coordination or difficulty raising concerns, both of which could contribute to care delays. Repeated omissions could also lower a nurse's view of safety. A unit with an open reporting climate might elicit more candid disclosure of missed tasks. These possibilities justify collecting information on teamwork, speaking up and response to error alongside the global safety rating. The three domain summaries illustrate descriptive reporting and cannot establish which safety-culture processes account for the adjusted contrast.

Strengths and limitations

The manuscript demonstrates an analysis with interpretable effect units, unit-level clustering and explicit reference categories. Treating the main safety measure as categorical avoided imposing equal distances between its response options in the primary model. The alternative ordinal scoring showed how a linear trend could be examined as a sensitivity analysis.

The illustrative sample cannot establish prevalence, workloads, safety levels or associations at Jinnah Hospital or Services Hospital. The ten MS Nursing records illustrate a small subgroup and yield an imprecise qualification estimate. With 14 units, precision estimates depend on the cluster adjustment and remain illustrative. The global safety rating captures an individual perception of unit safety. The additional domain summaries cover only selected dimensions of culture. The last-shift workload period also differs from the general unit reference used for missed care.

Implications for future research

A field survey could pilot the instruments with registered nurses in Lahore to assess comprehension, completion burden and suitability of the wording and recall periods. Including multiple public and private hospitals and recruiting across inpatient units and shifts would broaden coverage. A protocol should specify eligibility, sample size with allowance for clustering and nonresponse, privacy during recruitment, and handling of missing or inapplicable responses. Linked shift-level workload and care measures or repeated observations would strengthen assessment of the sequence between competing demands and care omissions.

Conclusion

This manuscript sets out a two-hospital cross-sectional design for studying missed nursing care, perceived workload and patient safety culture among registered nurses in Lahore. In the illustrative data, higher perceived workload was associated with more missed care. The adjusted comparisons by safety rating remained uncertain.

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