The Relationship among Workload, Teamwork, and Missed Nursing Care at Intensive Care Units

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Abstract

Background: Nurses are vital to the delivery of safe and effective care at critical units, but improper team work and high patient workloads may cause missed nursing care. **Research Aims:** To examine the relationship among workload, teamwork, and missed nursing care at intensive care units **Methodology:** Correlational research design was conducted at Intensive Care Units (ICU) at Fayoum university hospitals. Intensive care units at Kom Hamada central hospital, Damanhour fever hospital and Damanhour chest hospital. The subjects were 207 nurses. A self-administered questionnaire containing four parts; (Part I: Demographic characteristics of the subjects such as age, gender, marital status, nurse role, qualifications, experience, shift worked, nurse to patient ratio, length of shift time, Part II: Miss care Survey was developed to measure the frequency with which nursing care activities are omitted or delayed, and to identify the factors that contribute to these missed activities as perceived by nursing staff in the acute care setting,Part III: Workload Subscale was used to measure the nursing staff's perception of workload. This subscale was designed to measure "the extent to which feelings of pressure and urgency dominate the work environment", Part IV: Nursing Teamwork Survey, This 33-item instrument was designed to measure teamwork among nurses in the acute care setting, but the items generically address teamwork activities across nursing care settings.) **Results:** The present study showed that less than half of studied nurses had moderate missed care and moderate team work. According to workload perception, about half of studied nurses had moderate workload **Conclusions:** There was highly significant positive correlation between workload and missed care at p value <0.01. While, there was highly significant negative correlation between teamwork with workload and missed care at p value <0.01. **The study recommends that:** Nurse managers must monitor missed care and workload daily to ensure proper sizing of staff and safety of care, Educational workshop for nurses about teamwork skills and coping mechanism related workload, Further researches about predictive factors affecting nursing missed care.

Keywords: Work load, Team work, Missed nursing care

Introduction

The nursing team considered as two or more nurses who working together to deliver nursing care and managerial tasks for critical patients **(Foster et al., 2019).** As in professional healthcare providers, teamwork among nurses is serious to provide safe and quality nursing care *(Goh et al., 2020).*

Improper nurses' teamwork has been displayed to increase the frequency of missed care by nurses, which has been considered as indicator of safety and quality. Missed nursing care is well-defined as "any phase of required nursing care that is lost either in entire or part of it or delayed" **(Celik et al., 2019).** The kinds of missed nursing care often stated by the patients consist of ambulation, mouth care, bathing, getting out of bed and explaining procedures for patients. Causes frequently stated for missed nursing care involved insufficient nurses, supplies, communication skills, improper teamwork and high nurse workload (**Rosen et al., 2018).**

The critical nature of nursing work across different hospital organizations impact the worth and the actual level of care that provided to the patient (**Alghamdi, 2016**). The intensive care unit (ICU) is classified as a specialist provision with comprehensive services and

complex equipment which give basic consideration to cases with life-threatening conditions **(Aprilia et al., 2019).**

Nurses working in the ICU 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 than nurses on other wards **(Chang & Hsiu-Hui, 2019; Mohammadi et al., 2015; Restuputri et al., 2019).**

Researchers stated that heavy workload had high relation with missed nursing care in adult populations; higher nurse workload measured as perceived staffing adequacy, staffing ratio and nursing care hours per patient day that caused missed different nursing care **(Tubbs-Cooley et al., 2019)**

Aim:

This study aimed to examine the relationship among workload, teamwork, and missed nursing care at intensive care units through:

- Assessing workload and teamwork among nurses at intensive care unit.

- Assessing missed nursing care among nurses at intensive care unit.

- Assessing the relation between workload, teamwork, and missed nursing.

Research questions:

- What is the level of workload, teamwork, and missed nursing care at intensive care units?

- Is there relation between workload, teamwork, and missed nursing care at intensive care units?

Methods:

Research design: A correlational research design was utilized from January 2020-March 2020.

Research Setting: The study was carried out at Intensive care units at Fayoum university hospitals (N=172) who divided on surgical university hospital (N=60), Medical university hospital (N=55) and Mostafa Hassan university hospital (N=57). Intensive Care Units (ICU) at Kom Hamada central hospital (N=85), Damanhour fever hospital (N=73) and Damanhour chest hospital (N=70).

Subjects: Convenience sample include the subjects were available nurses who worked in the abovementioned settings and who provided care for critical ill patients at intensive care units regardless of their age, gender, qualification, and experience.

Sample Size:

The estimated sample size was 207 nurses arranged as mentioned below, at confidence level 95%, and the precision rate at 0.05 by using the equation devised by Thompson (2006) as the total number of available nurses is 400.

P= 0.5, N= Total population, Z= Z value "1.96", D= Standard Error, n= sample size

Setting	Total number of available nurses	Sample size
Fayoum Surgical university hospital	60	31
Fayoum Medical university hospital	55	28
Mostafa Hassan Fayoum university hospital	57	30
Kom Hamada central hospital	85	44
Damanhour fever hospital	73	38
Damanhour chest hospital	70	36

Data Collection:

Data was collected through a self-administered questionnaire translated to Arabic language, containing three parts developed by the researchers:

Part I: Demographic characteristics of the subjects such as age, gender, marital status, nurse role, qualifications, experience, shift worked, nurse to patient ratio, length of shift time

Part II: The **MISSCARE Survey** is a frequently used instrument to measure missed nursing care. Part A of the MISSCARE Survey was developed to measure the frequency with which nursing care activities are omitted or delayed, and to identify the factors that contribute to these missed activities as perceived by nursing staff in the acute care setting *(Kalisch & Williams, 2009)*.

Items are rated on a Likert-type scale with five 23 possible response choices ranging from "always missed" to "never missed." Activities of care are considered to be missed when the participant identifies the activity as "always," "frequently," or "occasionally" missed. The scores can range from 25 where all activities are rated as never missed to 125 whereby all items are rated as always missed; higher scores indicate more missed care

Workload Subscale of the Individual Perceptions:

The six-item Workload Subscale of the Individual Workload Perception Scale — Revised 2nd Edition **(Cox, Teasley & Olney, 2010)** was used to measure the nursing staff's perception of workload. This subscale was designed to measure "the extent to which feelings of pressure and urgency dominate the work environment" **(Lacey et al., 2007)**.

This instrument includes a five-point Likert scale ranging from strongly agree to strongly disagree where nurses are asked to rate their agreement with statements based on their typical workload over the previous six months **(Cox, Teasley & Olney, 2010).** Four items in this subscale (items 1, 2, 3, and 6) exhibit positive valence and required reverse coding. Scores can range from 6–30, with a higher score indicating the perception of higher levels of workload.

Nursing Teamwork Survey

The Nursing Teamwork Survey **(Kalisch, Lee & Salas, 2010)** was used to measure each participant's perceptions of teamwork on the unit where they work. This 33-item instrument was designed to measure teamwork among nurses in the acute care setting, but the items generically address teamwork activities across nursing care

settings. Using a five-point Likert-type scale with responses of rarely (1), 25% of the time; (2), 50% of the time; (3), 75% of the time (4); and always (5), respondents were asked to rate how frequently team related behaviors typically occurred among their work team.

The total nursing teamwork score was calculated in this study by summing the scores of each of the 33 items in the instrument. Items with a negative valence were reversed scored. Total scores for this instrument can range from 33–165, with a higher score indicating higher levels of teamwork.

Pilot Study:

The pilot study was conducted with 21 nurses who represent 10% of nurses at the previously mentioned settings in order to test the applicability of the constructed tools and the clarity of the included tools. The pilot also served to estimate the time needed for each subject to fill in the questionnaire.

A group of 3 experts in the administrative nursing departments ascertained the content's validity, their opinions were elicited regarding the format, layout, consistency, accuracy, and relevancy of the tools. Reliability testing was carried out to test the reliability in terms of Cronbach's Alpha for MISSCARE Survey= .821, Workload Subscale = .840 and Nursing Teamwork Survey = .799.

Fieldwork:

The fieldwork for this study was carried out in the period from the first of January 2020 to the end of March 2020. The investigator met with the respondents individually during their morning shifts and explained to them the purpose of the study. They were reassured about the anonymity of answers, and that information will be used for scientific research only and will be confidential. Then, the questionnaires were handled to them to be self-administered the respondents filled in the questionnaire, and the researcher was present all the time to clarify any ambiguities and answer any queries.

Administrative Design:

An official request was submitted to the Dean of the Faculty of Nursing, Fayoum and Damanhour University explaining the aim of

the study and fieldwork requirements. Then, a letter containing the aim and objectives of the study was directed from the Faculty of Nursing to the Administration of the study settings requesting their approval and cooperation for data collection. Each hospital director referred the researcher to the nursing director office. The researcher explained the aim of the study to the nursing directors. Then, the schedule of fieldwork was arranged with them in order to avoid any affection of the service provision.

Statistical Design:

Data collected from the studied sample was revised, coded, and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the form of mean and S.D. A linear regression model is a linear approach to modeling the relationship between a scalar response and one or more explanatory variables. Pearson's correlation coefficient is the test statistics that measures the statistical relationship, or association, between two continuous variables.

Ethical considerations:

Each nurse was informed about the purpose and benefits of the study in the first part before participation at the study, where every one can't be starting the questionnaire without consent to participate in data collection in the current study. The nurses were assured that all data was used for research purpose only and each one was informed of the rights to refuse participation in the study or withdraw at any time before completing the questionnaire with no consequences.

Results:

Table (1) revealed that mean age of studied nurses was 32.41 ± 7.88 years and mean of nursing experience was 12.05 ± 3.96 years. Also, showed that 82.1% of studied nurses were female, 80.7% of them were married and 91.8% of studied nurses were nurses' staff. Related shift work, 84.5% of studied nurses attended days shift. According length of shift time, 78.8% of studied nurses worked 12 hours per shift. Related nurse to patient ratio, 49.3% of studied nurses was nurse to two patients.

Table (2) reported that 45.9% of studied nurses had moderate missed care and 20.3% of them had high missed care with mean score 70.57 ± 16.45. Related team work survey, 43.9% of studied nurses had moderate team work and 24.2% of them had low team work with mean score 90.001 ± 21.3. According to workload perception, 36.7% had high workload and 50.2% of them had moderate workload with mean score 17.33 ± 4.96.

Table (3) stated that highly significant model detected through F test value was 12.410 with p value <0.01.This model explain 59% of the variation in missed care scores detected through R^2 value. Also, explained that if educational level improved with one unit that decrease missed care score with (0.235), while showed that if experience level increased with one unit that decrease missed care score with (0.318), meanwhile, night shift worked increase missed care score with (0.201) and increased length of shift by one unit means increased at missed care score with (0.199).

Table (4) stated that highly significant model detected through F test value was 9.41 with p value <0.01.This model explain 42% of the variation in teamwork survey scores detected through R^2 value 0.423. Also, explained that charge nurse increased teamwork survey score with (0.380), while showed that if educational level increased with one unit that improve teamwork score with (0.175), and increased age by one unit means increased at teamwork score with (0.208).

Table (5) stated that slight significant model detected through F test value was 6.412 with p value <0.05.This model explain 39% of the variation in teamwork survey scores detected through R^2 value 0.397. Also, explained that if nurse to patient ratio increased by one unit caused increased workload with (0.197), while showed that married status lead to increase workload with (0.157), and increased experience by one unit means increased at workload with (0.183). Also, detected that increased length of shift by one unit means increased at workload with (0.163)

Table (6) revealed that there was highly significant positive correlation between workload and missed care at p value <0.01. While, there was highly significant negative correlation between teamwork with workload and missed care at p value <0.01.

Table (1): Distribution of the studied nurses according to their demographic data (n=207).

Items	N	%
Age (year)		
20-<30	82	39.6
30-<40	79	38.2
≥ 40	46	22.2
Mean SD **32.41 ± 7.88**		
Gender		
Male	37	17.9
Female	170	82.1
Marital status		
Married	167	80.7
Unmarried	40	19.3
Nurse role		
Charge nurse	17	8.2
Staff	190	91.8
Educational level		
Diploma of Nursing	45	21.7
Technical High School of Nursing	105	50.7
Bachelor of Nursing	57	27.6
Years of nursing experience		
<10	70	33.8
10-<20	89	43
≥ 20	48	23.2
Mean SD **12.05± 3.96**		
Shift worked *more one answer		
Days	175	84.5
Evening	156	75.4
Nights	163	78.7
Length of shift time		
6 hours	22	10.6
12 hours	163	78.8
24 hours	22	10.6
Nurse to patient ratio		
1 : 1	27	13
1 : 2	102	49.3
1 : 3	53	25.6
1 : 4	25	12.1

Table (2): Distribution of studied nurses related missed care, team work and workload (n=207).

	High N (%)	Moderate N (%)	Low N (%)	Mean score	Mean recent
Missed care (25-125)	42 (20.3)	95 (45.9)	70 (33.8)	70.57±16.45	56.45%
Team work survey (33-165)	66 (31.9)	91 (43.9)	50 (24.2)	90.001±21.3	54.50%
Individual Workload Perception Scale (6-30)	76 (36.7)	104 (50.2)	27 (13.1)	17.33±4.96	57.66%

Table (3): Best fitting multiple linear regressions model for total missed care

	Unstandardized coefficient		standardized coefficient	T- test	P value
	B	Std. Error			
Educational level	-0.235	0.209	0.189	5.017	.011*
Experience	-0.318	0.311	0.246	7.894	.007**
Shift worked "Night"	0.201	0.187	0.199	6.102	.009**
Length of shift	0.199	0.200	0.178	6.944	.008**

R square .597   Model ANOVA 12.410   p value .001**
Dependent variables: Missed care
Independent variable: Educational level, Experience, shift worked and length of shift.

Table (4): Best fitting multiple linear regressions model for team work survey

	Unstandardized coefficient		standardized coefficient	T- test	P value
	B	**Std. Error**			
Nurse role "charge nurse"	.380	.352	.109	6.082	.009**
Educational level	0.175	0.166	0.089	4.985	.013*
Age	0.208	0.176	0.154	3.968	.021*

R square .423   Model ANOVA 9.416   p value .004**
Dependent variables: teamwork survey
Independent variable: Nurse role, educational level and age

Table (5): Best fitting multiple linear regressions model for total workload

	Unstandardized coefficient		standardized coefficient	T- test	P value
	B	**Std. Error**			
Nurse to patient ratio	.197	0.201	.157	4.135	.010*
Length of shift	0.163	0.186	0.142	3.996	.022*
Marital status "Married"	0.157	0.142	0.136	2.897	.035*
Experience	0.183	0.186	0.172	3.746	.024*

R square .397   Model ANOVA 6.412   p value .011*
Dependent variables: Workload
Independent variable: Nurse to patient ratio, Length of shift, Marital status and Experience

Table (6) Correlation between studied variables

	Work load	Team work	Missed care
Workload		r. -0.628 p .001**	r. 0.730 p .000**
Team work	r. -0.628 p .001**		r. -0.599 p .003**
Missed care	r. 0.730 p .000**	r. -0.599 p .003**	

Discussion

After analyzing the collected data, we demonstrated that, related missed care, the current study mentioned that slightly less than half of studied nurses had moderate missed care and about one fifth of them had high missed care with mean score 70.57±16.45. Also, related multiple linear regression for missed care showed that high educational level and experience decreasing missed care, while night shift worked and increase length of shift caused increase missed care. These results may due to more than three quarters of studied nurses were married which may causes a lot of burdens resulting from family responsibilities and one quarter of them provided care for three patients which cause missed nursing care due to huge of responsibilities. These results

supported with the study conducted by **Moura et al., 2019** who mentioned that most of nurses suffered from missed care with different scores and need intervention to decrease that and MNC showed significant associations with job title (p = .006), with high frequencies for Nurse Technicians (NT). Also, cohort with **Drach-Zahavy & Srulovici, 2019** who showed across all 22 missed nursing care items, nurses with high personal accountability reported significantly lower frequency of missed nursing care than nurses with low personal accountability. And, support with the study by **Gathara et al., 2020** who demonstrated that by exploratory multivariable analyses, increase ratios of babies per nurse were associated with a 24-point reduction in the mean NCI.

Also, the current study revealed that team work survey, less than half of studied nurses

had moderate team work and about one quarter of them had low team work with mean score 90.001±21.3. Also, explained that charge nurse had teamwork survey score than staff nurse. And showed that high educational level improve teamwork score. These results may due to lack of knowledge about communication skills and observed differences between nurses at the education level, which negatively affects the communication between them. These results in cohort with the study by **Grubaugh & Flynn, 2018** who stated that more than half of studied nurses had high teamwork skills. Also, irregular with **Sonoda et al., 2018** who reported A large number of surgical nurses had a sense of teamwork performance. But, consistent with the study performed by **Barton et al., 2018** who detected that frontline leadership, supportive followership and skilled communication emphasis are required to translate teamwork competency into nursing practice.

According to workload perception, more than one third had high workload and about half of them had moderate workload with mean score 17.33±4.96. Also, revealed that nurse to patient ratio and length of shift increased workload and married nurses had high load than unmarried. These results may due to increase nurse to patient ratio which causes huge duties for patients and decrease teamwork that increase work load. These results supported with the study by **Browne & Braden, 2020** who mentioned that most of studied nurses reported high workload. Also, agreement with **Oliveira et al., 2016** who detected that the nursing workload increased by number of patients in the ICU. Also, cohort with the study by **Hendy et al., 2020** who revealed that mean *SD* score of studied nurses regarding to Workload was 21.84 (*SD* 5.367).

Related correlation between studied variables showed that there was highly significant positive correlation between workload and missed care at p value <0.01. While, there was highly significant negative correlation between teamwork with workload and missed care at p value <0.01. These results supported with **Anderson et al., 2019** who detected that perceived quality of teamwork was positively related to perceived quality of care. Also, cohort with **Tubbs-Cooley et al.,**

2019; Kim et al., 2018 and Henderson et al., 2018 who stated that workload had negative effect quality nursing care and increased missed nursing care. And, regular with **Cho et al., 2020** who reported that nursing staffing teamwork decrease burden of workload and enhance of quality work life.

Conclusion

To conclude, the present study reported less than half of studied nurses had moderate missed care and moderate team work. According to workload perception, about half of studied nurses had moderate workload. There was highly significant positive correlation between workload and missed care at p value <0.01. While, there was highly significant negative correlation between teamwork with workload and missed care at p value <0.01.

Recommendation

- Nurses must monitor missed care and workload daily to ensure proper sizing of staff and safety of care.

- Educational workshop for nurses about teamwork skills and coping mechanism related workload.

- Further researches about predictive factors affecting nursing missed care.

Conflict of interest: Not present any conflict

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