

The Relationship between Twelve Hour Shift and Patient Safety at Cairo University Hospitals

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Abstract

Background: Patient safety has become a priority in healthcare system and among health care workers. Nurses play a major role in patients' safety through twelve hour shift because they are accountable for direct and continuous patient care. So errors occur for a variety of reasons, including the effects of twelve hours shift. It is estimated that 1.3 million health care errors occur each year and of those errors 48,000 to 98,000 result in the deaths of patients.

Aim of Study: To assess the relationship between twelve hour shift and patient safety.

Subjects and Methods: A descriptive research design was utilized to collect data from (150) staff nurses working in all Medical, Surgical Departments and Intensive Care Units at National Cancer Institute which is affiliated to Cairo University having at least one year of experience. Data was collected by using Hospital Survey of Patient Safety Culture (HSOPSC) and patient safety assessment manual.

Results: The study revealed that the dimension with the highest positive responses was; teamwork within units (mean=4.61) and the lowest positive response was in the dimension of non-punitive response to error (mean=1.81) and also feedback and communication about error (mean=2.71).

Conclusion: The study concluded that there was a significant relation between 12 hour shifts and patient safety dimensions.

Recommendations: The study recommended Schedule sensibly for nurses to decrease fatigue that leading to error. Head nurses should be encouraged to establish non-punitive environment as well as a teamwork spirit among nursing staff working in critical care and general ward staff nurses. Develop a well-established system for incident reporting, and all staff nurses should be informed and trained about it.

Key Words: Twelve hour shift – Patient safety.

Introduction

TRADITIONALLY, shift work was organized by dividing the day into three 8-hour shifts. This

pattern was the norm in nursing for many years

But over the past 20 years there has been a tendency to move away from this pattern of working in preference for the 12-hour shift. Hospitals began using the 12-hour shift in the 1970s during a national nursing shortage as a way to retain nurses. Today, 75% of nurses today work 12 hour shifts [2]. Nursing shifts of 12 hours or longer are more common in teaching and high-technology hospitals

[3].

Working long hours and overtime can lead to fatigue, which leads to patient care errors [4]. The negative outcomes that have been associated with 12 hour shifts in nurses include tiredness and levels of alertness [5]. Mortality [6] and overall poorer quality care [7]. Many as 440,000 people die every year from hospital errors, injuries, accidents, and infections. Every year, 1 out of every 25 patients develops an infection while in the hospital-an infection that didn't have to happen. Today alone, more than 1000 people will die because of a preventable hospital error.

The relationship between working long shifts (12 hour) and safety outcomes is complex and maybe influenced by several other factors, such as patient acuity, workload, type of shift, and how effectively fatigue is managed. There is a little evidence regarding the effects of long shifts on nurse performance, cognitive functioning, and patient outcomes. Available evidence, although inconclusive, points to a link between long shifts and suboptimal patient outcomes, as well as increased healthcare errors [7].

Subjects and Methods

Setting: This study was carried out on all Medical, Surgical Departments and Intensive Care Units at National Cancer Institute which is affiliated to

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Cairo University from 11-6-2018 till 23-11-2018. The National cancer Institute serves about 200,000 patients annually, about 80% of them free of charge and the rest is followed by health insurance, state maintenance and pay. It consists of seven floors that cover and serve all specialties of oncology.

Research design:

A descriptive research design was utilized to carry out the study.

Research question:

What is the relationship between twelve hour shift and patient safety?

Sample:

All available staff nurses in the previous selective departments who provide direct patient care and will accept to participate in the study (about 150 staff nurses).

Inclusion criteria:

- All staff nurses who have more than one year of experience.
- All staff nurses who work for 12 hours shifts.

Tools for data collection:

To achieve the aim of the present study data were collected using two tools:

1- *Hospital Survey of Patient Safety Culture (HSOPSC)*: Was developed by the researcher and is based on a literature review (AHRQ 2004, Sexton et al., 2006, Parker et al., 2010, Wakefield et al., 1999). Contains two main parts:

- First part was personal data sheet which designed to collect characteristics of the respondents such as gender; age, educational level, years of experiences hours per week, and unit name etc...
- Second part was patient safety questionnaire includes three main dimensions: Work area/unit (18 items), according to scoring system the work area/unit has to rate each items are scored using a five-point Likert scale (5=strong disagree, 4=disagree, 3=neutral, 2=agree, 1=strongly agree). Communication openness (6 items), according to scoring system the communication openness has to rate each items are scored using a five-point Likert scale (5=never, 4=rarely, 3=always, 2=sometimes, 1=most of the time). Patient safety grade according to scoring system it has to rate each items are scored using a five-point Likert scale (5=excellent, 4=very good, 3=acceptable, 2=poor, 1= failing) and number of events reported.

2- *Second tool*: Was patient safety assessment manual developed by World Health Organization

(2011): Includes two main dimensions: Supervisor/manager (6 items), hospital management support (21 items) according to scoring system it has to rate each items are scored using a five-point Likert scale (5=strong disagree, 4=disagree, 3=neutral, 2=agree, 1=strongly agree).

Methods of data collection:

Upon receiving the formal approval through formal channels. The investigator got a letter from Faculty of Nursing seeking for the approval of hospital and director of National Cancer Institute. Separate letter was handed to the managers exploring purpose, nature and significance of the study. The investigator explained the aim, nature, and significance of the study for every eligible nurse to obtain their acceptance to participate in the study. Then, the investigator obtained their acceptance in a written form. During data collection the investigator handed the questionnaire sheets individually to the nurses in their units then the investigator explained the questionnaire to them and asked them to fill it. The investigator waited until the participants filled the questionnaire and was ready to answer any question. After completion of filling the questionnaire the investigator collected them. Data was collected over a period of 6 months from June 2018 to November 2018.

Pilot study:

The pilot study was carried out on (10%) of the study sample which was as following (15 nurses) of the current sample from different units at the selected hospitals to ensure the clarity of the items and estimate the time needed to complete the questionnaire.

Ethical considerations:

The study proposal was approved by the Ethics and Research Committee in the Faculty of Nursing. Official permissions to conduct the study were secured. All participants gave their oral informed consent to participate in the study sample. They were informed about the study purpose, procedure and about their rights to refuse or withdraw without giving reasons. They were reassured about the anonymity of the information collected, and that it would be used only for the purpose of scientific research.

Statistical analysis:

The collected data will be categorized, scored, tabulated, and analyzed by computer using Statistical Package for Social Science (SPSS) version 20. Descriptive statistics will be used in the form of frequency distribution and percentages.

Results

Table (1) shows that one third of the studied sample was in each of three departments, Medical Oncology, Surgical Oncology and Intensive Care Unit. Also more than third (42%) the sample were females and nearly two thirds (58%) of the sample were males. More than one third (40%) was in the age group 25-29 while around quarter (22%) was in the age group 30-34. The majority of the sample (79.3%) had Technical Nursing Institute degree while the rest had Technical School of nursing degree. Near half of the sample (42.7%) had 5-9 years of experience in job while around quarter (24%) had 10-14 years. More than one third (40.6%) worked 48 hours per week, while above quarter (28%) worked 60 hours per week.

Table (1): Socio-demographic data and work related data of nurses in studied sample (n=150).

Items	No.	%
<i>Current area of work:</i>		
Medical Oncology Department	50	33.3
Surgical Oncology Department	50	33.3
Intensive Care Unit	50	33.3
<i>Gender:</i>		
Male	87	58
Female	63	42
<i>Age (years):</i>		
20-24	31	20.7
25-29	60	40.0
30-34	33	22.0
35-39	21	14.0
40-44	5	3.3
<i>Educational level:</i>		
Technical School of Nursing	31	20.7
Technical Nursing Institute	119	79.3
<i>Years of experience in this job:</i>		
<5	24	16.0
5-9	64	42.7
10-14	36	24.0
15-19	16	10.7
20-24	8	5.3
>24	2	1.3
<i>Hours per week:</i>		
12	1	.7
24	1	.7
36	27	18.0
48	61	40.6
60	42	28.0
72	18	12.0

Table (2) shows that the highest patient safety dimensions were about teamwork within units (mean=4.61) while the lowest patient safety dimensions were about non-punitive response to error (mean=1.81) and also feedback and communication about error (mean=2.71).

Table (2): Mean and SD of patient safety dimensions among studied nurses.

Patient safety dimensions	Mean ± SD	
	Mean	SD
• Teamwork within units	4.61	0.38
• Organizational learning	4.40	0.53
• Staffing	3.82	1.06
• Teamwork across hospital units	4.04	0.90
• Non-punitive response to error	1.81	0.87
• Rating overall perceptions of patient safety	3.96	0.87
• Supervisor expectations and actions related to patient safety	3.94	0.84
• Hospital management support.	4.05	0.68
• Safe evidence-based clinical practices	4.07	0.85
• Safe environment	4.12	0.83
• Lifelong learning	3.72	0.97
• Communication openness	3.14	1.03
• Feedback and communication about error	2.71	1.12
Total	3.82	0.40

Table (3) around half of the studied sample (46.7%) gave acceptable grade for patient safety and 30% a very good while only 13.3% poor and 2% failing. Also around half (46.7%) said that there are 1 to 2 events reported in past 12 months while 32.7% said that there are no events reported. The most frequent event was infection (60%) and bed sores (38.7%).

Table (3): Patient safety grade and events reported in studied sample (n=150).

Items	No.	%
<i>Patient safety grade:</i>		
Excellent	9	6.0
Very good	73	30.0
Acceptable	45	48.7
Poor	20	13.3
Failing	3	2.0
<i>Number of events reported in past 12 months:</i>		
No event reports	49	32.7
1 to 2 event reports	70	46.7
3 to 5 event reports	29	19.3
6 to 10 event reports	2	1.3
<i>Type of events:</i>		
Patient fall	2	1.3
Infection	90	60.0
Bed sores	58	38.7

Table (4) there is a significant relation between hours per week and patient safety dimensions such as supervisor expectations and actions related to patient safety, hospital management support, safe evidence-based clinical practices, lifelong learning, feedback and communication about error and total dimensions. So 12 hours and 36 hours are the highest and 24 hours is the lowest.

Table (4): Relation between patient safety dimensions of studied nurses and hours per week.

Patient safety dimensions	12		24		36		48		60		72		ANOVA test	p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
• Teamwork within units.	4.50	0.00	5.00	0.00	4.58	0.57	4.59	0.43	4.68	0.32	4.57	0.31	.658	.656
• Organizational learning.	4.00	0.00	5.00	0.00	4.50	0.67	4.49	0.53	4.30	0.46	4.38	0.55	1.030	.402
• Staffing.	5.00	0.00	4.33	0.00	3.39	1.02	3.74	0.92	3.81	1.22	3.97	1.05	.921	.469
• Teamwork across hospital units.	4.00	0.00	3.75	0.00	4.10	0.69	4.16	0.71	3.95	1.15	3.97	0.89	.328	.895
• Non-punitive response to error.	1.00	0.00	2.00	0.00	2.06	0.74	1.51	0.54	1.80	1.02	2.05	0.96	2.245	.053
• Rating overall perceptions of patient safety.	4.00	0.00	2.50	0.00	4.17	0.61	3.69	0.83	4.12	0.86	4.06	0.92	2.045	.076
• Supervisor expectations and actions related to patient safety.	4.43	0.00	3.00	0.00	4.43	0.40	4.13	0.53	3.97	0.89	3.61	1.01	3.316	.007*
• Hospital management support.	4.27	0.00	2.91	0.00	4.37	0.39	4.32	0.43	4.06	0.62	3.72	0.81	5.697	.0001*
• Safe evidence-based clinical practices.	4.83	0.00	3.00	0.00	4.29	0.38	4.32	0.72	4.13	0.76	3.73	1.01	3.278	.008*
• Safe environment.	4.00	0.00	5.00	0.00	4.25	0.45	4.26	0.66	4.02	0.83	4.03	1.04	.767	.575
• Lifelong learning.	4.00	0.00	2.00	0.00	3.89	1.31	3.98	0.49	3.82	0.97	3.37	1.12	2.902	.016*
• Communication openness.	3.00	0.00	2.00	0.00	3.28	0.93	3.26	0.79	3.10	0.99	3.03	1.27	.523	.758
• Feedback and communication about error.	2.67	0.00	2.33	0.00	3.53	0.87	2.70	0.97	2.31	0.91	2.87	1.35	2.732	.022*
Total	4.00	0.00	3.20	0.00	4.05	0.33	3.92	0.28	3.82	0.36	3.68	0.49	3.374	.007*

*: Statistically significant at p -value <0.05 .

Discussion

The findings of the present study showed that, the majority of them were males. These finding could be due to males prefer work 12 hours shift than females specially who were married and had children so the majority of them were males. Recently the number of male nurses is increasing. Moreover years of experience of large percent of the staff nurses ranged between (5 to 9 years) and more than one third was in the age group between (25 to 29 years old) and this age may indicate that nurses are young and will be active manpower forces. Also majority of the study nurses were graduated from nursing technical institute. This finding might be due to the hospital's nursing technical institute which employs most of graduated nurses in the same hospital every year. Additionally employing diploma nurses may be seen by the hospital administrators as mean for decreasing nursing care cost.

The study revealed that the dimension with the highest mean score was; teamwork within units, the dimensions with the lowest mean score were non-punitive response to error and feedback and communication about error. Regarding to teamwork within units, the current study revealed that the highest mean score of the patient safety dimensions (92.2%). This finding agreed with different Egyptian studies with varied percentages as follows; [8] who reported high mean score of teamwork within units in his study of assessment of patient safety

culture in primary healthcare services in Alexandria, Egypt. It was also agreed with [9] who reported high mean score of teamwork within units in his study of study assessing nurses' perception and developing an improvement plan. The pervious finding supported by [10] who reported high mean score of teamwork within units in his study of assessment of patient safety culture among healthcare providers at a teaching hospital in Cairo, Egypt.

Regarding to non-punitive response to error, the present study revealed that the lowest mean score of the patient safety dimensions was; non-punitive response to error (20.8%) these result also matched with different Egyptian studies with varied percentages as follows; [10] who reported low mean score of non-punitive response to error in his study of assessment of patient safety culture among healthcare providers at a teaching hospital in Cairo, Egypt. Moreover, [11] who reported low mean score of non-punitive response to error in his study of assessment of patient safety culture among health care workers in Beni-Suef University Hospital, Egypt.

According to patient safety grade through twelve hour shift, "acceptable" grade had the highest score. Also approximately half of the respondents complete 1-2 event reports in the past 12 months. The most frequent event through twelve hour shift was infection. This result was on the same line with the study conducted by [10] who

studied assessment of patient safety culture among healthcare providers at a teaching hospital in Cairo, Egypt.

There is a significant relation between age and patient safety dimension such as teamwork within units, staffing, non-punitive response to error, supervisor expectations and actions related to patient safety, lifelong learning and feedback and communication about error. This result was on the same line with the study conducted by [10] who reported that a significant relation between age and patient safety dimension. This result contradicts with the results of [12] who reported that there is no significant relation between age and patient safety dimensions.

There is a significant relation between educational level and patient safety dimension such as non-punitive response to error and safe environment. Technical nursing institute level is higher for non-punitive response to error and lower for the safe environment. This result was on the same line with the study conducted by [10] who reported that a significant relation between educational level and patient safety dimension. This result contradicts with the results of [12] who reported that there is no significant relation between educational level and patient safety dimensions.

There is a significant relation between years of experience in this job and patient safety dimensions such as teamwork within units, safe environment and feedback and communication about error. In addition the current findings are consistent with [13] there is a significant relation between current area of work and patient safety dimensions. This result contradicts with the results of [12] there is no significant relation between current area of work and patient safety dimensions.

There is a significant relation between hours per week specially 12 hour shifts and patient safety dimensions that shows the rates of error are higher among nurses working 12 hours or more on a single shift in hospital. So it is clear that a relationship between 12 hour shifts and error does exist. This finding was partly in line with the result of the study conducted by [14] there is consistent evidence that working longer than 12 hours increases the probability of errors and that the timing of most errors on a 12-hour shift is during or immediately after the last two scheduled hours.

Conclusion:

Based on the result of the current study, it is can be concluded that there is a significant relation

between hours per week especially 12 hour shifts and patient safety dimensions that shows the rates of error are higher among nurses working 12 hours or more on a single shift in hospital.

Recommendations:

Based on the findings of the present study the following recommendations were deduced:

- 1- Establish a patient safety committee. That forecast, detects, prevent all events or potential events and develop policies, procedures of patient safety.
- 2- Head nurses should be encouraged to establish non-punitive environment as well as a teamwork spirit among nursing staff working in critical care and general ward staff nurses.
- 3- Supporting more research efforts particularly in areas that yield the greatest benefit and that more effectively contribute to improving patients' safety and safe patients' lives.

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العلاقة بين نوبتجية (١٢ ساعة) وسلامة المريض بمستشفيات جامعة القاهرة

مهنة التمريض من المهن الشاقة والشيقة التي قد يعمل فيها التمريض لرعاية المريض لمدة تصل إلى ١٢ ساعة مستمرة حيث أن نوبتجية (١٢ ساعة) الأكثر إنتشاراً الآن في المستشفيات ويتم العمل بها من قبل هيئة التمريض مما يسبب التعب والإرهاق للتمريض الذي يعمل خلال نوبتجية (١٢ ساعة) وذلك يؤثر سلبياً على سلامة المريض حيث تحتل سلامة المريض اليوم في عالم الخدمات الطبية العالمية مكانة جيدة ومرموقة ومهمة وذلك كونها مؤشر مهم على جودة الرعاية الصحية. لذلك تلعب الممرضات دوراً رئيسياً في سلامة المرضى من خلال نوبتجية ١٢ ساعة لأنهم مسؤولون عن رعاية المرضى المباشرة والمستمرة. لذا يهدف هذا البحث إلى تحديد العلاقة بين نوبتجية (١٢ ساعة) وسلامة المريض وقد تمت الدراسة على عينة مكونة من ١٥٠ ممرض ممرضة في جميع الأقسام الطبية والجراحية ووحدات العناية المركزة في المعهد القومي للكورام التابع لجامعة القاهرة. أعلم المشاركون في الدراسة بكافة حقوقهم وإن إشتراكهم في الدراسة تطوعي وتم إستطلاع آراء المشاركين في الدراسة على مدى ٦ أشهر تبدأ من يونيو ٢٠١٨ إلى نوفمبر ٢٠١٨ وقد أظهرت الدراسة إلى أن هناك علاقة ذات دلالة إحصائية بين ساعات العمل في الإِسبوع وخاصة نوبتجات ١٢ ساعة وأبعاد سلامة المرضى التي تبين أن معدلات الخطأ أعلى بين الممرضات العاملات ١٢ ساعة أو أكثر في نوبتجية واحدة في المستشفى لذلك توصي الدراسة الحالية بتنظيم الجدول الزمني للنوبتجات لذلك من المستحسن أن تعمل الممرضة في نوبة النهار أولاً، تليها نوبة ليلية. بعد نوبة ليلية واحدة في الخدمة، يوصى بالراحة ليوم واحد قبل عودة الممرضة إلى بيئة العمل وهذا يقلل التعب الذي يشعر به الممرضات الذي يؤدي إلى الخطأ.