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Impact of Nurses' Work Patterns on Nurses and Patients in Critical Care and Toxicology Care Units of Alexandria University Hospitals

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Abstract:
Background: Nowadays, there are difficulties in recruiting and retaining nursing staff with increasing pressures and demands on nurses working in critical care areas. The role of nursing care in patients' safety and healthcare outcomes has led to increased interest in measuring and reporting nurses' work patterns and their consequences on nurses and patients. **Objectives**: Describe nurses' work patterns and their impacts on nurses and patient outcomes. **Methods**: Self-report forms were used to collect data regarding nurses' time spent on direct and indirect nursing activities, non- nursing care and personal activities as well as care left undone. Questionnaires were used to measure stress, tension, conflict, nurses' intent to leave, nurses' satisfaction and patient satisfaction **Results**: nurses spent their working time on direct nursing care (36.64 %); indirect nursing care (28.18 %), non-nursing care (30.64 %) and personal activities (4.7%). Profile of direct and indirect patient care and personal activities increased in night shifts, while the profile of non-nursing tasks increased in morning shifts. There was a positive correlation between care left undone and three non-nursing tasks. Besides, there was a positive correlation between left care undone, non-nursing duties and four nursing job outcomes. There also was a negative correlation between care left undone, non-nursing tasks and nurses' and patients' satisfaction. **Conclusion**: the study focused on the importance of direct patient care on improving quality of care and patient safety. Reducing the performance of non-nursing duties by nurses and decreasing care left undone will most likely result in greater nurses' and patients' satisfaction, reduced stress, tension, and conflict and decreased numbers of nurses' leaving their jobs.
Keywords: work, patterns, nurses, patients, outcomes

INTRODUCTION:

Nursing care is one of the fundamental services, especially in the critical care and toxicology care units, where patients need to receive more service and care. Nurses are the front line of caregivers and have a key role in providing patient care in these units (Nayeri, 2005; Hendrich et al., 2008). Efficient nurses' work patterns include optimizing the use of nurses' time and effort to meet patients' needs (Brillhart and Sills, 1994). Thus, nursing work patterns involve multitasking and spending time in four main activities. The first activity is ***direct nursing care activities.*** These activities are carried out by a nurse during a shift and occur in the presence of a patient, including patient assessment; basic and routine nursing care as hygiene, nutrition, and elimination; nursing procedures; administering medication; and monitoring vital signs. The second activity is ***indirect nursing care activities.*** They occur away from the patient; involving preparing for nursing interventions, medications and therapies, and documentation of nursing care. The third activity is ***non-nursing tasks***. They refer to the activities carried out by a nurse during a shift, which do not require specific nursing qualifications or expertise and have no direct therapeutic value and direct patient care. They include clerical work, housekeeping, dietary services, coordinating ancillary services and transporting patients. The last activity is ***personal activities***. They are not directed towards patient care or unit management, including mealtimes, breaks and are called non-productive time (Hendrickson and Doddato, 1990; Brillhart and Sills, 1994; Lundgren and Segesten, 2001).

Shortages of nurses have been recognized as a worldwide problem that is seriously affecting the quality of patient care. This shortage mostly affects specialty areas such as the critical care units, the operating rooms, and pediatric intensive care units. In light of current nursing shortages, it is time to consider some of the factors, which have affected the nurses' work, which in turn, affect the time available to provide direct patient care.

The important factors affecting the work of nurses are non-nursing duties (Norrie 1997; Harrison and Nixon, 2002; Duffield and Gardner, 2008). The performance of non - nursing tasks such as cleaning and making beds, ordering supplies, transporting patients, and assembling patient charts are more stressful, increasing role conflict and compromising the quality of care. In addition, they have a direct effect on nurses pushing them to leave hospitals for less demanding jobs (Kearney, 2016). Non - nursing tasks are considered one of nurses' workload, leading to in-completing nursing activities in nursing care units (Al-Kandari and Thomas, 2009).

Removing of non-nursing tasks from nurses' roles and responsibilities would allow nurses to carry out their professional roles, help the nurses to provide direct patient care, and improve quality of care and patient's satisfaction (Kearney, 2016). Support staffs are the most appropriate group to perform non-nursing care activities in the hospitals. If support staff assigned to transfer and messenger duties and all other activities that are not related to patient care, they would save nurses' time to spend in performing essential nursing tasks (Davis, 1982; McGillis and O'Brien-Pallas L, 2000; Joanne, 2007; Ausserhofer et al., 2013).

The shortage of nurses also linked to unrealistic nurse workloads (Aiken et al, 2002). If the nurses have less and less time to spend with their patients because of over workload, the nurses have a lack time to perform essential nursing measures and interventions (Booth, 2002). Gurses (2005) argued that nurses stressed with obstacles of workload and time availability have reported not performing detailed nursing care and spending inadequate time with the patients/families. Nursing care activity/task left undone refers to any nursing task required for patient care, but which the nurse was unable to perform fully during the shift (Al-Kandari and Thomas, 2009).

Many studies report that nursing care activities left undone frequently occurred in nursing care units. The most common nursing care omissions recorded were: comforting/talking with patients, developing or updating nursing care plans, documentation of nursing care as well as assessing the effectiveness of medications, turning patients and mouth care (Al-Kandari and Thomas,2009; Ausserhofer et al. ,2014 ; Ball et al ,2014 ;Bekker et al ,2015) . Recent studies suggest associations between omitting nursing care and poorer patient outcomes, including increased inpatient mortality, medication errors, patient falls, pressure ulcers and nosocomial infections (Sochalski ,2001 ; Schubert et al. ,2008 ; Kalisch et al. ,2012; Schubert et al. ,2012; Ausserhofer et al. ,2013) . Additionally, higher levels of omitted nursing care are also associated with adverse nurse outcomes, including reduced job satisfaction, increased stress and tension with role conflict, and increased intention to leave (Tschannen et al., 2010; Kalisch et al., 2011; Aiken et al.; 2013).

Across the world, nurses' working time has been subject to discussion and become the area of interest of policy makers and nurse managers (Lundgren and Segesten, 2001). Today, understanding of how nurses spend their time and use of their skill to meet the needs of patients are the first priority in health care systems and accreditation agencies (Gholizadehc et al., 2014). Assessment of nurses' activities is considered a bone stone of improving the quality of care and nursing care effectiveness (Poor et al., 2016). Work sampling is one method that is used to assess nurses' activities and estimate amount of nursing time spent on these activities.

Work sampling can employ a self-reporting technique where nurses record the activity they are undertaking when prompted, or by the observational technique where a researcher observes and records the activities of the worker. Much of the work sampling literature discusses the advantages and disadvantages of these two techniques. Although the self-reporting technique has been advocated and has certain advantages over the observational method, few work-sampling studies in critical care units have employed this method (Ampt, 2007).

The present study used the self-report technique to assess patterns of nursing activities and the utilization of nursing time. Although nurses' work patterns and their consequences on nurse and patient outcomes are likely to study across all countries (Tschannen et al. ,2010 ; Kalisch et al., 2012 ; Kalisch et al. ,2011; Aiken et al. ,2013; Ausserhofer et al. ,2014 ; Ball et al. ,2014 ; Bekker et al. ,2015;), little is known in Egypt. According to our knowledge, few studies have examined nurses' work patterns and decided which care of activities are done or not done by nurses in Egypt (El-sayed, 1996; Elsayed et al., 2012; Gabr, 2012). In addition, they have not investigated consequences of nurses' work patterns on nurse and patient outcomes.

The present study attempts not only to identify nurses' work patterns, but also to clarify how the available nurses could better use their time, and describe consequences of nurses' work patterns on nurse and patient outcomes. The aims of the current study were to identify nurses' work patterns and measure times spent in performing four activities (direct and indirect nursing care, personal activities and non-nursing care). It also aimed to identify nursing duties left undone; describe the level of nursing job outcomes (stress related job, job tension, conflict, turnover and nursing satisfaction) and patient satisfaction with nursing care. Additionally, it purposed to examine the relationship between non-nursing duties and nursing duties left undone; and their relation to nursing job outcomes and patient satisfaction with nursing care.

MATERIALS AND METHODS:

Study Setting: included 11 critical care and toxicology care units within the Alexandria University Hospitals.

Study design: A cross-sectional descriptive correlation study

Sample size: Study sample included:

(A) All nursing personnel in the critical care and toxicology care units concerned with patient care in three different shifts (morning, evening and night), excluding nurses holding managerial positions. They amounted to 305 nurses. Only 287 nurses were willing to participate in the study and agreed to sign the study informed consent. They completed 861 self-report work sampling forms covering day's workflow (morning, evening and night) for 12 weeks.

(B) Frequency of performing each nurse's work category was set as the following: assuming an average activity time of 95 %, and α of 0.05 and absolute precision of 9%, a minimum frequency of performing each activity in each shift was 22 times.

(C) All alert and conscious patients admitted to these units within 3 months and willing to participate in the study. The patients gave informed consent before participation. They amounted to 178 patients. Patients under age of 18, illiterate, or unconscious patients were excluded.

Data collection: Data were collected by a self-reported work sampling technique, and self – administered questionnaire including nursing job outcomes questionnaire and a patient satisfaction questionnaire. The study tool consisted of four sections:

(I) Demographic data: contained demographic characteristics of critical care and toxicology nurses as age, level of education in their units, job title and the number of years worked as a nurse,

(II) The self-reported work sampling technique forms of nurses' work patterns:

In this study, the researchers developed Self-report forms of nurses' work patterns, including nursing duties, non-nursing duties and nursing duties left undone based on literature review (Kiekkas et al. ,2005; McCann et al. ,2007 ; Al-Kandari and Thomas ,2009; Jacob and Rekha,2010; Gabr and Mohamed, 2012; Gholizadehc et al. ,2014; Bekker et al. ,2015; Perry and Potter, 2017). The self-reported work sample form was designed to measure the amount of time spent and frequency of performing nursing and non-nursing tasks among nurses and identify nursing duties left undone inside their units.

The content validity of the study form was established by 7 critical care nursing experts willing to participate in the process, with at least 10 years of experience in their specialty.

The researcher asked 7 experts to review. The experts were asked to rate whether the duties were: **(a)** 5 = definitely nursing activities were performed by the nurse; **(b)** 4 = definitely nursing activities, but may be delegated to other staff; **(c)** 3= unsure; **(d)** 2= not nursing activities; should not be performed by the nurse; **(e)** 1= definitely not a nursing activity but can be performed by the nurse. The researchers also asked the experts to add duties, which they considered nursing and non-nursing. Experts' comments were received and used to revise and modify the list of nursing duties and non-nursing duties.

The results from experts' panels were used to develop a final self-report form. It contained 134 nurse's activities and three main categories: 1) direct nursing care activities included 17 sub- categories and 70 activities; 2) indirect nursing care activities comprised 6 sub- categories and; and 21 activities; 3) non nursing care activities involved three sub-categories and 37 activities; and personal activities enclosed 6 activities. Rater reliability was assessed using Content Validity Indexes for each item separately (I-CVI) and for the entire scale (S-CVI). Both the average inter-item percentage should be 80 % or exceed to achieve rater reliability (Polit et al, 2007).

A. ***Developed self-report forms of nurses' work patterns***: It contained 134 activities that may be performed in the critical care and toxicology care units and frequency of performing each task during a shift. Self-report work sample forms were distributed to nurses who were willing to participate in the study during different shifts on a regular working day. Concerning nursing duties, the nurses were asked to record and report the time spent by minutes to perform each duty in each shift (morning, evening and night) and record the frequency of doing each duty during the current shift. Frequency was set at 22 times per shift.

Regarding non-nursing duties, Each nurse was asked to indicate whether she had performed non-nursing duties or not in each shift and if yes, the nurses were required to tick their current activity each time (frequency)they were performed, and record time spent by minutes to perform it. Frequency was also set at 22 times. The self-report forms were collected at the end of each shift. Time spent on each nurses' work category and frequency were multiplied to set the total time spent in each nursing category in each shift. Each category was ranked on its occurrence on nurses' workday by time percentage. Then, the percentage of time in each shift was scored to estimate the prevalent score for each category of nurses' work patterns as the following: fair = 0 % and scored zero; Low = < 20 % and scored one; mild = 20-25 % and scored two; moderate = 26-60 % and scored three; and at last high = > 60 % and scored four.

B. Developed self-report form of nursing duties left undone: It is composed of a list of 30 nursing care activities and 7 main categories. Nurses were asked to determine which of the following tasks were considered necessary, but were unable to complete them, so left undone during their current shift because due to lack of time. The nurses rated their response on a five-point Likert scale ranging from 1 (never) to 5 (always). In addition, there was a provision to add any other task that was not included in the list and which the nurse was unable to complete. Composite scores of nursing care left undone were derived from the aggregated average sum of nursing care activities left undone.

(III) Section C: Nursing job outcomes questionnaires enclosed 59 items :

1. **Nurses' job satisfaction**: nurses' job satisfaction scale (Hackman and Oldham, 1980) was used to

assess job satisfaction among nurses. It consisted of 19 items and two main aspects: (a) general satisfaction (5 items) and specific satisfaction (14 items) covering pay (2 items), security (2 items), social (3 items), supervisor (3 items), as well as growth (4 items). The nurses were asked to describe each of their satisfaction aspects by using a Likert Scale (1= dissatisfied, 5 = strongly satisfied). The reliability coefficient for job satisfaction questionnaire was at 0.97 and reported as 0.87 for general satisfaction and 0.95 for specific satisfaction

2. **Nurses' stress-related work**: The Stress in General (SIG) scale (Smith et al, 1992; Stanton, 2001) was used to measure the nurses' level of stress at work and was composed of 15 items and had two sub-scales: pressure at work (seven items) that relates to time pressure; and work-related threat (eight items) that relates to threatening and negative qualities in the work experience. The nurses rated their responses on 1–5 scale, with "1" indicating no stress and "5" indicating the maximal level of stress. Thus, the alpha reliability of the whole scale was found to be 0.974 and reported as 0.96 for job pressure and 0.82 for work threat.
3. **Nurses' job tense**: Job-related tension (Lyons, 1971) was investigated by the Tension Index and contained nine items. They were used for addressing the frequency of nurses' experience and feeling with tension during performing their activities by nine work-related factors. Nurses rated their response by using a 5-point Likert scale from 1 (never) to 5 (nearly all the time). The alpha reliability was 0.860.
4. **Nurses' conflict**: Nurses' conflict scale (Rizzo et al., 1970) was developed and measured the nurses' perceptions about the clarity of their role. It consisted of 13 items covering: (i) incompatibility between the defined role behavior with one's internal standards, capabilities, time and resources; (ii) role overload; and (iii) mismatch between one's expectations and demands from organization and colleagues. Nurses' responses were rated from 1= Incompatibility and 5 = maximum compatibility. The alpha reliability score for the scale was 0.756.
5. **Nurses' intent to leave*:*** Nurses' intent to leave scale (Khatri et al., 2001) was used to measure nurses' intention to quit their job and included three items. The three total items were presented to the nurses as a series of statements, of which they were asked to indicate the extent to which they agree/disagree along a five-point Likert response scale (1 = strongly disagree, 5 = strongly agree). The alpha reliability score for the scale was 0.897.

(IV)Section D:

- **Patients' characteristics,** including sex, age and diagnosis.
- **Patients' satisfaction questionnaire**: The Newcastle Satisfaction with Nursing Scale (NSNS) was used to assess patients' satisfaction with nursing care and comprised 19 items. For these items, patients rated their response by 5 point Likert scale from 1 = not at all satisfied and 5 = completely satisfied. The NSNS was found to be valid and reliable in previous Arabic studies (Alasad J and Ahmad, 2013; Alasad, 2015). The 1-item scale on overall patient satisfaction served as a stand-alone scale and was used to check the accuracy of patients' response in the total score of the 19-item scale. The Cronbach's alpha coefficient for NSNS of patients was 0.95.

Pilot study: Pilot study was carried out to assess the nurses' ability to utilize and answer the study tools and to measure the test-retest reliability of the self-report sampling technique and self-administered questionnaire. The study tools were undertaken with 30 nurses, 20 patients within the critical care and toxicology care units for ensuring appropriateness, completeness, and clarity of tools. Test-retest reliability of self reporting technique was 0.81, while the test-retest reliability of the self-administered questionnaire including nursing job outcomes questionnaire and a patient satisfaction questionnaire was 0.87 and 0.76 respectively.

Ethical considerations: Permission to collect data was obtained from Dean of Faculty of Medicine, Alexandria University. The researchers explained essential information and the purpose of the study to all nurses and patients who were involved in the study. All the study data were handled in anonymity and confidentiality manner.

Statistical analysis: Data were analyzed by using SPSS version 18. Descriptive statistics were used to (a) describe the percentage of personal characteristics of nurses and patients; (b) calculate the average percentage of time spent on each activity and prevalence of nurses' work patterns; and (c) estimate mean scores of nursing job and patient outcomes questionnaires. The mean scores were categorized into four levels: low = < 3; Moderate = 3–3.5; and finally high level = > 3.5. The prevalence of performing non- nursing tasks correlated with the level of nurses' outcome and patients' satisfaction. In addition, the relationships between nursing duties left undone and nursing job and patient outcomes were also tested. The Spearman correlation coefficient was used to establish whether a relationship existed. The reliability analyses of measures were examined by the following: (i) the test-retest was tested using Pearson correlations and (ii) A Cronbach's alpha for each measure was determined to confirm internal consistency of questionnaires.

RESULTS

Table (1) shows personal characteristics of nurses and patients in critical care and toxicology care units. As seen in the table, a total of 287 nurses were included in this study with 84 bachelor degree nurses, 49 technical nurses and 154 secondary diploma nurses. 72.1 % of nurses were 20-30 years old, against 27.9% of them between 31-40 years old. As regards nurses' experience in their career, 31.7 % of nurses had more than 10 years of experience and 43.1 % of them had less than 1 year. In critical care and toxicology care units, 37.9 % nurses had experienced less than one year and 29.3% of them had work experience of more than 10 years.

The patient population during the period of the study amounted to 178 patients, about 56.9 % of them were males, and 43.1 % were females. The age of more than half of patients was between 41 to 60 years (58.4 %), while about quarter of them aged between 21- 40 years (25.8 %). 15.8% of patients had ages more than 60 years. Finally, 46.3 % of patients' diagnosis was related to cardiac disease and only 4.8 % of patients' diagnosis was related to neurological diseases.

Table (2) presents the mean number of nurses and patients in different shifts. It is clear from the table that patient to nurse ratio was increased in the night shifts **(**1.9±0.9) and decreased during morning shifts (1.3 ± 0.4). In contrast, the number of nurses was increased in the morning shifts (12.2± 4.9) and decreased in the night shifts (3.3± 0.6) and evening shift (2.9± 0.5).

Table (3) and figure (1and 2) illustrate mean time in percentage and prevalence of nurses' work patterns among different critical care and toxicology care units according to nurses' self-report. As shown in the table, there were no statistically significant differences between study units regarding percentage of time spent on direct nursing care activities (F =1.726, p =0.181**)**, indirect nursing care activities (F =1.891, p =0.405), non nursing tasks (F =1.291 p = 0.278) and personal activities (F = 0.355 p = 0.702). The highest mean time percentage and prevalence were reported for direct nursing care (36.64 % with moderate prevalence) followed by non- nursing care (30.48 % with moderate prevalence) and indirect nursing care (28.18% with moderate prevalence), while the last mean time percentage (4.7% with low prevalence) was recorded for personal activities.

Figure (3) represents time percentage of nurses 'work patterns among different shifts according to nurses' self-reports. It was noticed that time percentages of direct nursing care (18.24 %), indirect nursing care (13.46), and personal activities (1.91 %) were increased during night shifts while the time percentages of non-nursing duties were increased in the morning shift (12.12 %) followed by night shifts (10.83 %).

Table (4) reveals the profile of time percentage of nurses' work patterns and sub-activities. Regarding direct nursing care, the table shows that the high proportion of nurses' time was spent on administering medications (7.27%), administering IV therapy (4.56%); performing routine nursing care (3.43%); suction (2.60 %) and performing certain nursing procedures such as urinary catheter insertion and nasogastric intubation (2.43%). At the same time, the low proportion of nurses' time was spent on assessing and monitoring patients' conditions (0.97 %), guiding patients, and their families (0.81%).

Concerning indirect nursing care, the nurses spent a high proportion of their time on documentation and charting of nursing care (8.81%), preparing medication and treatment trays (5.45%) and helping in diagnostic and treatment procedures (5.29%), while they spent low proportion of their time on preparing patients for discharge (1.52 %).

As regards non-nursing tasks, the nurses spent the high proportion of their time on clerical activities (14.84%), housekeeping (8.16%) and transporting activities (6.58%), while they spent less time on dietary activities (0.90 %). In relation to personal activities, the nurse spent a high proportion of time on breaks for meal and drinks (2.01%) and rest (1.75%) and spent less time in chatting with friends (0.21%), making personal phone calls (0.23%) and using social media and websites (0.24%).

Table (5) shows mean scores of nurses reporting nursing care left undone in critical care and toxicology care units. It was evident that nurses rated the highest care left undone to be inadequate documentation and charting (4.29±0.543), preparing the patient for discharge (3.87± 0.497), pain management (3.75±0.844) and care of patient's hygiene and comfort (3.69±0.751). They also posted a low mean score of care left undone in performing routine nursing care (2.73±0.611), certain nursing interventions on time such as administering medications , withdrawing lab specimens ....etc (2.67±0.575) as well as starting and changing I.V Therapy (2.54±0.693). The total mean of care left undone was 3.36±0.645.

Table (6) presents the relation between non-nursing duties and nursing care activities left undone. The table illustrated that there was a moderately positive, statistically significant correlation between tasks left undone and their non nursing duties (r= 0.594). These non nursing duties were clerical (r= 0.462); housekeeping (r = 0.356) and transporting activities (r= 0.297), while there was a mild negative statistically significant correlation between care left undone and dietary activities (r= - 0.168).

Figure (4) clarifies the mean scores of nursing job and patient outcomes in critical care and toxicology units. It was noticed that nurses highly rated stress-related work (4.29) and job tension (4.32), followed by role conflict (4.15) and intent to leave (3.69), with nurses' job satisfaction (2.52) being lowest in the score. In addition, the patients fairly rated their satisfaction (2.65).

Table (7) and figure 5 represent the relationship between non-nursing duties and nursing duties left undone on one side and nursing job outcomes and patient outcomes on the other**.** As seen in the table and the figure, there was a moderately positive statistical correlation between non-nursing duties and four nursing job outcomes, namely: stress-related work (r= 0.470); job tension (r=0.435), role conflict (r=0.403) and intent to leave (r=0.345). In addition, there was a moderately negative statistical correlation between non-nursing tasks and nurses' satisfaction (r= -0.307) and patient satisfaction (r= -0.259). Furthermore, there was a moderately positive, statistically significant correlation between the care left undone and four nursing job outcomes specifically stress-related work (r= 0.380); job tension (r=0.403), role conflict (r=0.286) and intent to leave (r = 0**.**332**)**. Besides, there was a moderately negative statistical correlation between care left undone and nurses' satisfaction (r= -0.340) and patient satisfaction (r= -0.263).

Table (1): Personal characteristics of nurses and patients in critical care and toxicology care units

Nurses	**Number (No.= 287)**	**Percentage (%)**	**Patients**	**Number (No.= 178)**	**Percentage (%)**
Age			**Sex**		
20-30	207	72.1	Male	101	**56.9**
31-40	80	27.9	Female	77	**43.1**
Educational level			***Age***		
Diploma	154	53.7	21- 40	46	**25.8**
Technical	49	17.0	41-60	104	**58.4**
Baccalaureate	84	29.3	> 60	28	**15.8**
Experience (Years) in nursing filed			***Medical diagnosis***		
< 1	124	43.1	Cardiac	82	**46.3**
1-10	72	25.2	Respiratory	33	**18.5**
>10	91	31.7	Nervous	9	**4.8**
Experience (years) in critical care & toxicology Units			Renal	13	**7.3**
< 1	109	37.9	Diabetes	30	**16.9**
1-10	94	32.8	Intoxication	11	**6.2**
>10	84	29.3			

Table (2): Mean number of nurses and patients in different shifts

Shifts	**Number of nurses Mean ±SD**	**No. of patients Mean ±SD**	**Assigned patients to a nurse Mean ±SD**
Morning	12.2± 4.9	6.3± 1.0	1.3 ± 0.4
Evening	2.9± 0.5	6.2±1.3	1.7±0.6
Night	3.3± 0.6	6.1±0.9	1.9±0.9

Table (3): Mean time in percentage of nurses' work patterns among different critical care and toxicology care units according to nurses' self-reports.

Critical Care & toxicology Units	Nurses' work patterns (Mean time in percentage)			
	Direct nursing activities Mean ±SD	Indirect nursing activities Mean ±SD	Non-nursing activities Mean ±SD	Personal activities Mean ±SD
Unit (1)	37.53 ± 2.63	28.21 ± 3.02	29.87 ± 3.53	4.39±2.62
Unit (2)	37.15 ± 2.16	28.55 ± 2.92	29.01 ± 2.14	5.29±2.18
Unit (3)	36.56 ± 3.06	28.16 ± 2.30	30.15±2.16	5.13±1.87
Unit (4)	36.39 ± 3.62	28.89±3.82	29.40±3.76	5.32±1.61
Unit (5)	36.19± 2.74	28.61±3.78	30.22±3.17	4.98±1.11
Unit (6)	35.7 ± 3.08	28.41±2.72	31.32±1.61	4.57±2.21
Unit (7)	35.62 ± 3.93	27.05±3.90	32.62±0.93	4.71±1.24
Unit (8)	38.07 ± 0.94	28.38±2.74	29.01±3.26	4.54±2.78
Unit (9)	36.60 ± 1.01	27.19±3.47	31.97±1.97	4.24±2.46
Unit (10)	35.41 ± 3.64	28.31±2.36	31.92±1.25	4.36±2.18
Unit (11)	37.82 ± 2.81	28.22±3.02	29.79±2.38	4.17±2.45
Total time percent	**36.64 ± 0.97**	**28.18±2.59**	**30.48±2.91**	**4.70±1.08**
F (p-values)	**F =1.726, p =0.181**	**F =1.891, p =0.405**	**F =1.291 p = 0.278**	**F = 0.355 p = 0.702**

* **P < 0.05 (significant)**

Figure (1): Time percentage of nurses' work pattern according to nurses' self-reports

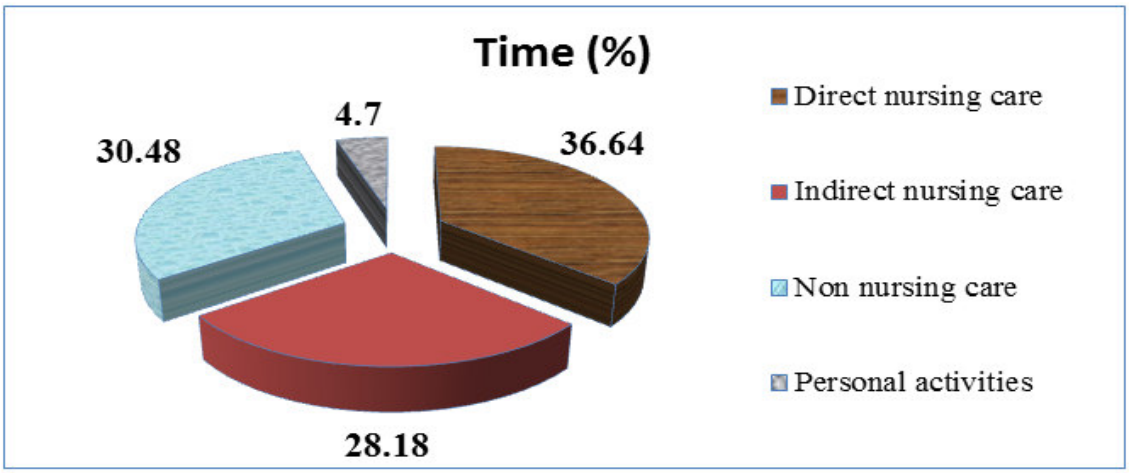


Figure (2): Prevalence of nurses' work patterns in critical care and toxicology care units

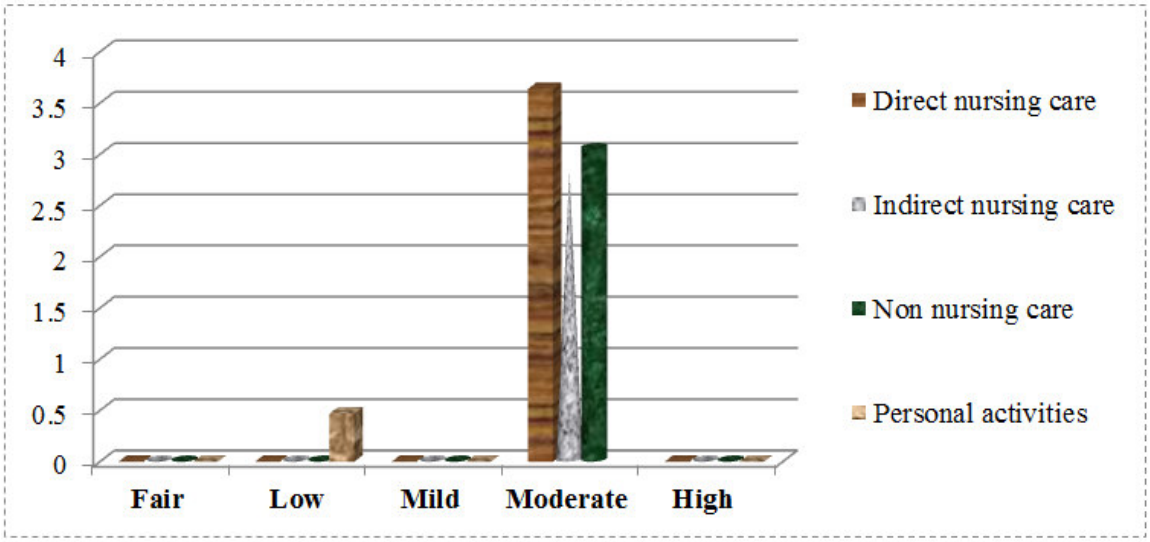


Figure (3): Time percentage of nurses 'work patterns among different shifts according to nurses' self-reports.

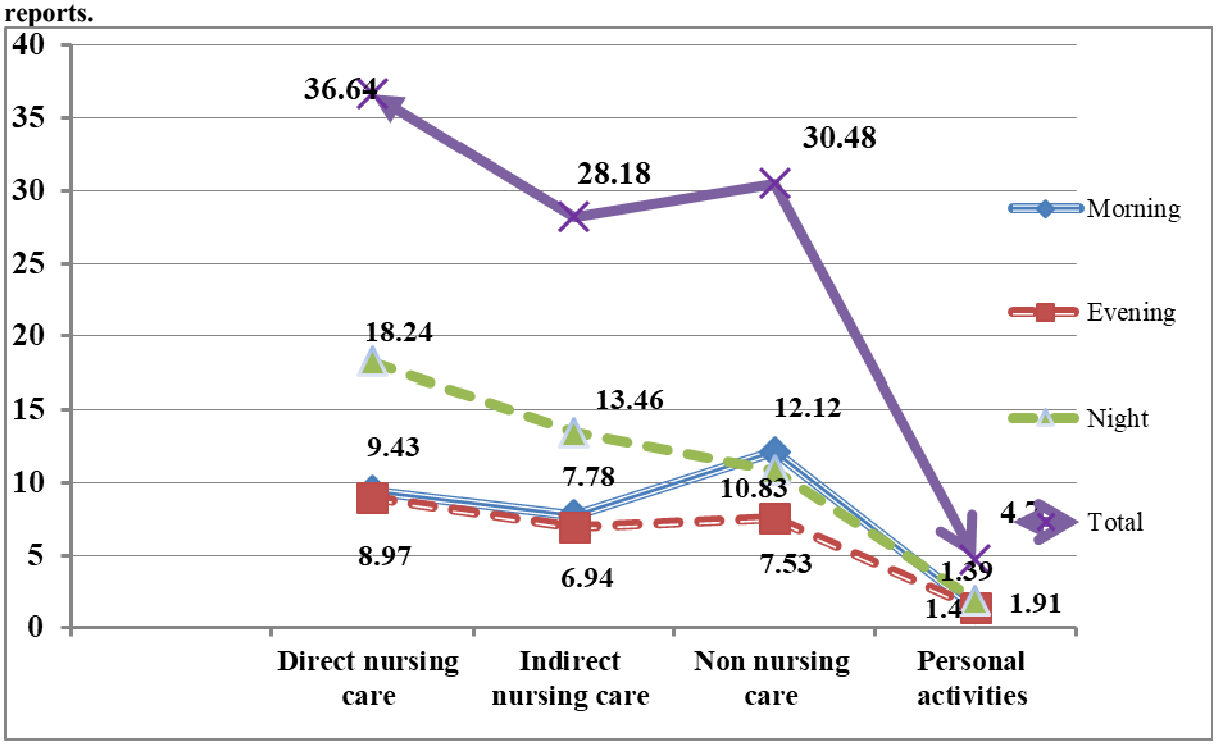


Table (4): Profile of time percentage of nurses' work patterns and sub-activities

Nursing care activities (Mean of time in percentage)	Time (%)
I. Direct nursing care activities	**36.64**
1. Administering medications: bolus IV, continuous IV, IM, SC, oral, inhalation..... etc	7.27
2. Administering IV therapy: starting, discontinuing and changing	4.56
3. Assessing & monitoring patient condition	0.97
4. Performing certain nursing procedures: vein puncture, urinary catheterization, N.G.T	2.43
5. Performing diagnostic \ treatment test: ECG, ABG, Clotting & bleeding time, blood sugar	1.23
6. Cardiopulmonary resuscitation: cardiac compression, oxygenation through Ambu bag, administering resuscitation medications through endotracheal tube	1.42
7. Feeding: through N.G.T or gastrostomy	1.38
8. Routine nursing care of tracheostomy, chest tube, ETT, gastrostomy, dressing drainage tube, Foley catheter, IV line, connecting and changing intercostal tube, monitoring central venous pressure, chest physiotherapy	3.43
9. Patient' s hygiene and comfort: skin care, back rub, oral hygiene, turning and moving the patient, making occupied bed, bed bath for unconscious patient	1.88
10. Elimination: apply condom, colonic & gastric lavage, colostomy care, administering enema	1.16
11. Dressing care: change wound dressing, remove sutures & drainage tube	1.7
12. Suctioning: nasopharyngeal, endotracheal, tracheostomy	2.60
13. Oxygen therapy: mask, ETT, tracheostomy, nebulizer therapy	1.86
14. Monitoring vital signs: Temp, pulse, Bl.P, Resp.	1.53
15. Fever and heat loss control: cold and hot compresses	1.02
16. Blood and blood product transfusion: blood, plasma, platelets	1.39
17. Guiding patient and family	0.81
II. Indirect nursing care activities	**28.18**
18. Preparing medication and treatment tray	5.45
19. Helping physician in diagnostic and treatment procedure: An arterial puncture, endotracheal intubation, insertion CVP, chest tube, removal chest tube	5.29
20. Documentation: document nursing care provided, recording An Electrocardiogram, chart intake and output, chart enema result, chart ventilator data, write shift report	8.81
21. Preparing patient for discharge	1.52
22. Work with medical equipment: monitor, ventilator, pulse oximeter	3.73
23. Communicate with other health care providers: reporting laboratory results to physician, attending and participating in physician round, give & receive shift report to & from another nurse	3.28
III. Non-nursing activities	**30.48**
1. Clerical activities	14.84
1.1. Transcribing and charting	2.74
1.2. Assembling clinical records	3.18
1.3. Handling telephone call and appointments	3.84
1.4. Handling drugs, supplies, and equipment	5.08
2. Transporting activities	6.58
3. Dietary activities	0.90
4. Housekeeping activities	8.16
IV. Personal activities	**4.7**
1. Breaks for meals and drinks	2.01
2. Rest	1.75
3. Chatting with friends	0.21
4. Personal phone calls	0.23
5. Connecting with social media & websites	0.24
6. Personal work (visit or inquire about a patient in another department)	0.26

Table (5): Mean scores of nurses reporting nursing care left undone in critical care and toxicology care units.

Nursing care left undone	Nurses reporting Mean ±SD
1. Adequate documentation and charting	4.29±0.543
2. Preparing patient for discharge	3.87±0.497
3. Pain management	3.75±0.844
4. Patient' s hygiene and comfort such as skin care, back rub, oral hygiene, turning and moving the patient, making occupied bed, bed bath unconscious patient	3.69±0.751
5. Performing routine nursing care, such as chest tube, ETT, Foley catheter, IV line, monitoring CVP, chest physiotherapy, tracheostomy, connecting and changing an intercostal tube	2.73±0.611
6. Performing certain nursing interventions on time such as administering medications, taking lab specimen, lavage, enema, suctioning, measuring output, nebulizer therapy, measuring vital signs	2.67±0.575
7. Starting and changing I.V therapy	2.54±0.693
Composite scores of nursing care left undone	3.36±0.645

Table (6): Relation between non-nursing duties and nursing care activities left undone.

Nursing duties left undone	Non – nursing activities				
	Non nursing activities	Clerical activities	Housekeeping activities	Transporting activities	Dietary activities
1. Starting and changing I.V therapy	.354(*)	.314(*)	.304(*)	.322(*)	-.120
2. Adequate documentation and charting	.427(*)	.392(*)	.488(*)	.299(*)	.160(*)
3. Performing routine nursing care	.490(*)	.363(*)	.432(*)	.278(*)	-.137
4. Performing certain nursing practices on time	.360(*)	.341(*)	.423(*)	.311(*)	-.156
5. Patients' hygiene and comfort	.415(*)	.367(*)	.325(*)	.291(*)	.188
6. Pain management	.302(*)	.373(*)	.243(*)	.284(*)	-.167
7. Preparing patient for discharge	.411(*)	.379(*)	.278(*)	.295(*)	-.193
Composite scores of nursing duties left undone	**.594(*)**	**.462(*)**	**.356(*)**	**.297(*)**	**-.168**

* **P < 0.05 (significant)**

Figure (4): Mean scores of nursing job and patient outcomes in critical care and toxicology care units

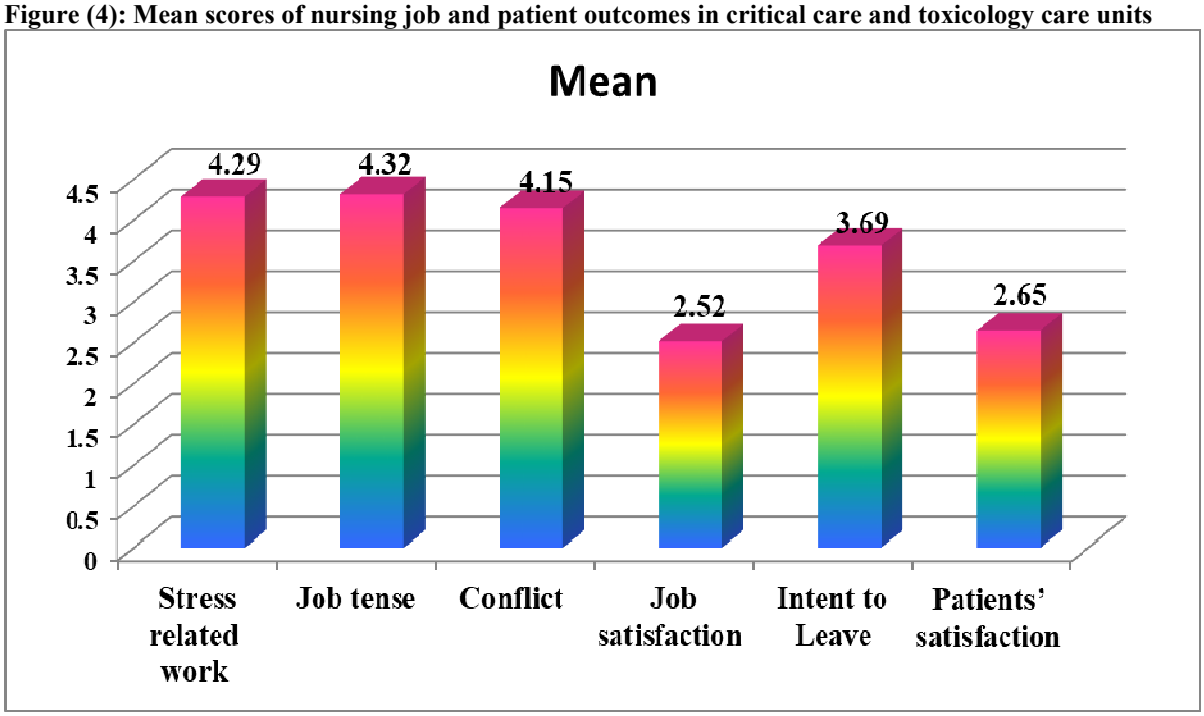
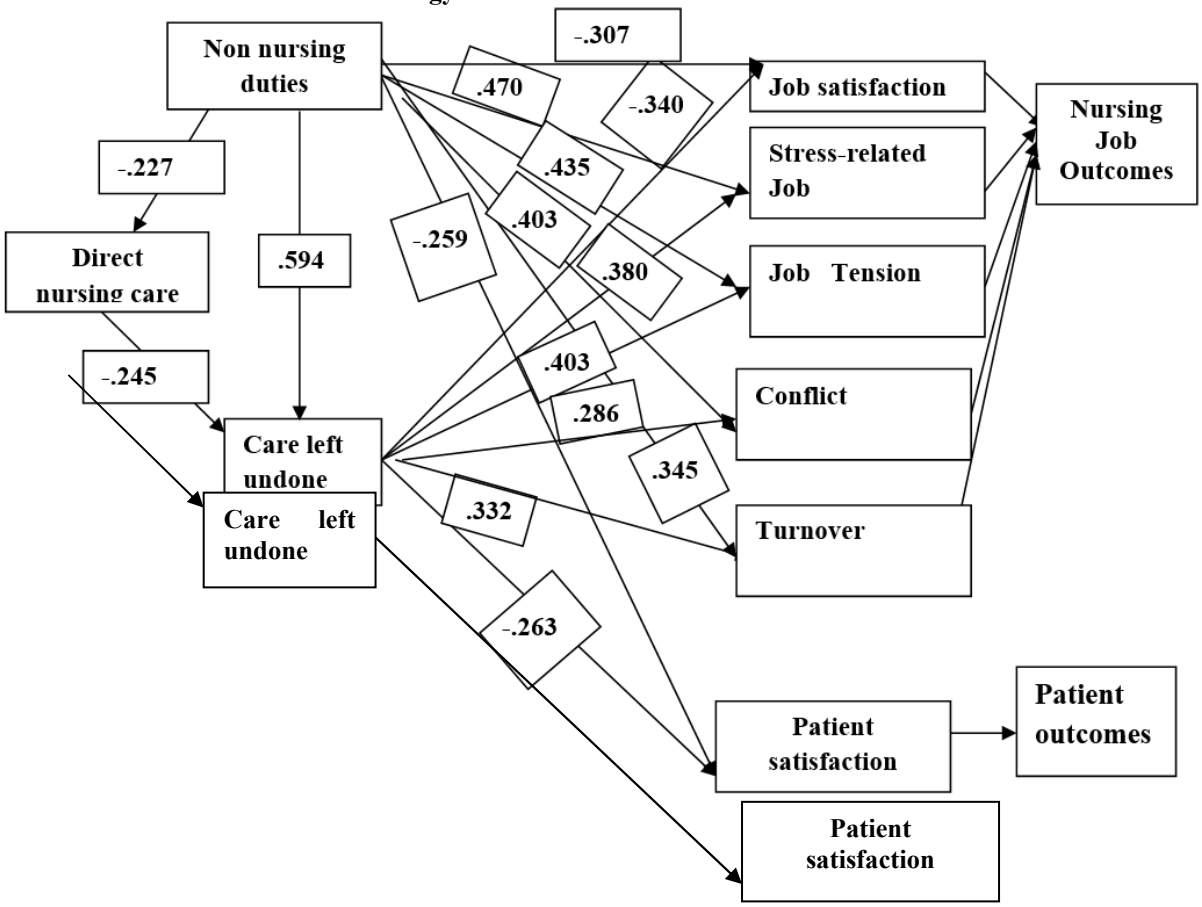


Table (7): Relationship between non-nursing duties and nursing duties left undone and nursing job outcomes and patient outcomes.

Non-nursing duties and nursing duties left undone	Nursing Job outcomes					Patient satisfaction
	Job satisfaction	Stress-related job	Job tension	Conflict	Intent to leave	
- Non nursing duties	**-. 307(**)**	**.470(*)**	**.435(**)**	**.403(**)**	**.345(**)**	**-.259(*)**
1. Clerical activities	-.537(*)	.740(*)	.713(*)	.514(**)	.704(**)	-.175(**)
2. Transporting activities	-.314(**)	.467(**)	.497(**)	.474(**)	.455(*)	-.106(**)
3. Dietary activities	-.321(*)	.429(*)	.354(**)	.398(*)	.378(*)	-.254(*)
4. Housekeeping activities	-.364(*)	.574(*)	.539(*)	552(**)	.559(**)	.109(*)
- **Nursing care left undone**	**-.340 (*)**	**.380(**)**	**.403(**)**	**.286(*)**	**.332(**)**	**-.263(*)**
1. Starting and changing I.V therapy	-.349(**)	.478 (**)	.409(**)	.409(**).	.455(**)	- .337(**)
2. Adequate documentation and charting	-.376(**)	.555(*)	.577(**)	.658(**)	.524(**)	-.467(**)
3. Performing routine nursing care	-. 366(**)	.497(**)	.413(*)	.551(**)	.495(*)	-.388(*)
4. Performing certain nursing practices on time	-.393(**)	.493(**)	.514(**)	565(**)	.472(**)	-.370(**)
5. Patients' hygiene and comfort	-.276(*)	.527(**)	.545(**)	.543(**)	.517(**)	-.256(**)
6. Pain management	-.252(**)	.407 (**)	.463(*)	.488(**)	.531(**)	-.206(**)
7. Preparing patient for discharge	-.256(*)	.546(**)	.467(**)	.513(**)	.599(**)	-.235(*)

*** Correlation is significant at the 0.05 level (2-tailed).**
**** Correlation is significant at the 0.01 level (2-tailed**

Figure (5) : Correlation diagram of consequences of nurses' work patterns on nurses and patient outcomes in critical care and toxicology units.



DISCUSSION

Nurses play a great role in healthcare organizations to provide safety and improve health care outcomes (Roohi, 2015 et al). Although most healthcare systems suffer from deficiencies in nursing staff, they are always required to effectively provide direct patient care with maximum skills, education, experience and abilities. Nurses' performance below accepted standards would result in negative consequences such as low quality of patient care with lower satisfaction , and together with increased nurses' stress, tension and conflict in their work , and intent to leave their job (Duffield et al. , 2008; Hendrich et al. ,2008). Measuring nurses' performance and optimal use of their work time has the first priority in health care systems across the world for maximizing the efficiency of nursing care (Hendrich et al., 2008). Therefore, the aim of the present study was to throw the light on nurses' work patterns and their consequences on nurses and patient outcomes in critical care and toxicology care units.

Findings of the present study showed no statistically significant difference between the study units regarding four categories of nurses' work patterns (**Table 3**). Based on self-reporting, nurses spent 95.3% of their time in three main categories, namely direct nursing care (36.64 %); indirect nursing care (28.18 %) and non-nursing care (30.48 %) (**Table 3 and Figure1**). These findings were close to those found in two studies in UK (Harrison and Nixon, 2002) and in Australia (Westbrook et al., 2011). The present study also highlighted that nurses spent less time in performing direct patient care activities (that required their knowledge and skills), compared to the rest of activities (**Figure 1**). They diverted most of their time to both non-nursing care and indirect nursing care, leaving less time to direct contact with patients (**Figure 2**). These are similar to those reported in studies across the world from 1986 to 2012 (Harper ,1986; Hendrickson et al. ,1990; Prescott et al. ,1991; McKenna,1995; Blegan et al. ,1998; Elsayed et al. , 2012).

As regards percentage of nurses' time spent in direct nursing activities, these results are also comparable to that found in several studies in other countries as Australia (37%) (Westbrook et al. ,2011), Greece (35.2%)(Blegan et al. ,1998) and Brazil (35%)(Garcia and Fugulin,2010) . At the same time, the percentage of nurses' time spent in direct patient care in the present study was greater than other studies in Canada (30.03%) (McGillis and O'Brien-Pallas L, 2000), Egypt (29.83 %) (Gabr and Mohamed 2012), USA (29.83%) (Hendrich et el., 2008), and Iran (19.3 %) (Poor et al., 2016) and lesser than other researches in other countries such as the Sweden (38%) (Furaker, 2009), USA (40.52%) (Gholizadehc et al., 2014), North America (41%) (Norrie, 1997),

George (46.46 %) (Rouhi et al., 2009).

The current study revealed that the high percentage of nurses' time in direct nursing care was devoted to administering medications and IV therapy, routine care of critical patients and suctioning and only a small proportion of this time was dedicated to monitoring and assessing the patient's condition and to guiding family (**Table 4**). This was consistent to a study in Egypt in 2012 (Elsayed et al., 2012) and in agreement with two studies in the USA (Hendrickson et al., 1990; Shi and Singh, 2004).

The results of the present study found that the nurses' time spent around 28.18% of their time on indirect nursing care (**Table 3 and Figure 1**). The area of indirect nursing activities involved documenting nursing care provided (8.81%), preparing treatment and medication tray (5.45%) and helping patients in diagnostic, treatment procedure (5.29 %), working with medical equipment (3.73%), communicating with other health care providers (3.28%) and preparing patients for discharge (1.52%) (**Table 4**). The results of the present study were very close to the studies of Harrison and Nixon study in 2002 (29.31%) and Westbrook et al in 2011 (30%). The findings of this study were greater than the time spent on indirect care in other studies by Garcia and Fugulin (12%) in 2010, Gabr and Mohamed in 2011 (24.56%), Gholizdeh et al. in 2014 (24.09%) and lower than the time spent on indirect care in the studies conducted by Rouhi et al. in 2009 (53.54%) and Mphil et al. in 2012 (32%).

According to the findings of the study, nurses in critical care and toxicology care units spent little time on their personal activities (4.7%) including personal breaks and rest, calling and receiving personal phone calls**,** using social media and communicating with other staff **(Table 3 and 4 and Figure 1)**. Although the time spent on personal activities was recorded to be very high in the study of Garcia and Fugulin in 2010 (18%), it was very low in the present study. This was not surprising among nurses working in critical care and toxicology care units who give their efforts and time to meet patients' needs. Nurses in the present study concentrated their effort to achieve a high degree quality of patient care even regardless their personal needs in different shifts. This could be explained by what Nauert et al. (1988) had said "When nurses are busy, they completed their assigned tasks instead of eating and having breaks".

The nurses also consumed much of their work time in performing non-nursing duties (30.48 %) (**Table 3 and Figure1**). The results of the present study found that nurses devoted a large proportion of their time to clerical activities (14.84%), housekeeping tasks (8.16%) and transport tasks (6.58 %). Dietary activity (0.90%) represented the least non-nursing activity on which the nurses spent a small proportion of their time **(Table 4)**. This may be attributed to the fact that nurses spend the highest frequency of time accompanying patients to the operating room, or X-ray department, bringing medication from a pharmacy and distributing or collecting request forms to different departments. The results of the present study contrast, those found in several studies in Latter Day Saints Hospital in USA (8%)(Bradshaw et al ,1989), USA Hospitals (10 %) (Hendrickson et al, 1990), ICU in North of America hospital (7%) (Norrie, 1997) and São Paulo's University Hospital in Brazil (12 %) (Garcia and Fugulin, 2010). This study was in agreement to a study in Mansoura University Hospital in Egypt in 2012, where it was found that non-nursing care activities compose the greatest proportion of time spent by nurses (Gabr and Mohamed, 2010).

This discrepancy between this study and other studies in the percentage of nurses' time spent on each nurses' work category may have occurred as a result of certain reasons that significantly have their impact on nurses' work patterns. These reasons were different nursing staff systems (assignment, number, type, and mix in each shift), workload, and nurse to patient ratio (**Table 1 and 2**), aspect of nursing care activities (**Table 4**), nature of work, design and size of critical care units, the patient's diagnosis (**Table 1 and 2**), bed turnover and length of stay.

The profiles of all three shifts (morning, evening and night) show that different features in terms of the total amount of time spent in four categories of activity (direct nursing care; indirect; non-nursing; and personal activities). Variations in the time spent on different activities were noticed among different shifts with double time spent on direct, indirect and personal activities at night shift (**Figure 3**). On the night shift, the amount of time spent in direct and indirect patient care was higher than on either morning or evening shifts (**Figure 3**), and this may have occurred as a result of working time of night shift (12 hours) being double the working time of morning 6 hours) and evening shift (6 hours). Care for unstable patients and nursing activities reach their peak during the night shift. Nurses may experience the impact of shift workload and fatigue, which may be additional factors contributing to increasing time spent in night activities (Hughes, 1999; Dorrian, 2006). This was confirmed by two studies by Byrness (1982) and Hassan et al. (1994) which reported that the highest utilization of nursing time in productive activities was reported during the night shift.

Regarding non-nursing duties, the present study found that the profile was different from direct, indirect and personal activities. The nurses during the night shift spent about 10.83% of their time undertaking non-nursing activities while in the morning shift, the figure increased to 12.12 % (**Figure 3).** Mahmoud (2002) stated that non nursing workload reached its peak during morning shifts. This may be due to the admission of new cases and the absence of supporting staff that would help the nurse with their non-nursing activities. These differences

between shifts in this study can be attributed to patients being discharged during the morning shift, increasing physician rounds and filling out requests, leaving beds to be cleaned and prepared by nurses, increasing clerical duties, transferring and discharge, transportation of the patient from or to the unit for certain medical interventions. Additionally, the percentage of time spent in non-nursing activities was increased in the night shift as non nursing tasks in the night shift should be performed before the morning shift. This study was contrasted with Greece study (Kiekkas et al., 2005), while the findings of these studies were confirmed by the study of Harrison and Nixon (2002).

The study also revealed that there were moderate positive relationships between non-nursing tasks and care left undone (**Table 6 and Figure 5)**. This study proved that nurses were making important decisions about which essential care to perform and which to omit based on the possible immediate negative consequences for patients' conditions if care left undone. Crucial nursing care duties such as administering medications; withdrawing lab specimens; suctioning, monitoring CVP; chest physiotherapy; vital signs; starting and changing IV therapy (**Table 5**) had a lower incidence to omit among nurses in the study units. At the same time, the activities that were time consuming with fewer priorities to patient care were most often left undone among nurses in the study units as documenting nursing care, educating patients and their families while preparing the patient for discharge and providing patient's hygiene and comfort (**Table 5**). Bowers et al. (2001) published that nurses working under the pressure of inadequate time and frequent interruptions, try to catch up time by minimizing the time spent on required tasks and redefine work responsibilities to complete the tasks they are accountable for, which often interfere with providing high quality care.

Although the findings of the study were similar to patterns of nursing care left undone across the world, they were not identical to other studies (Felgen, 2003; Hegney, 2003; Horwitz and McCall, 2004; Abdallah, 2005; Al-Kandari and Thomas, 2009; Tschannen et al., 2010; Kalisch et al., 2011; Ausserhofer et al., 2014; Bekker et al., 2015) (**Table 5**). The study showed that the nurses were more likely to report care being left undone when they were working in shifts with a high workload. These results may be explained by the fact that the system of assigning nurses to nursing activities in the study units was the case method (**Table 2**). Each nurse had the total responsibility for the care of her patients, which meant that all patients' personal, environmental and service needs were the responsibility of the nurse. Tonges (2005) proposed that case assignment was arranged in a way that the nurse can care for the same patient from admission to discharge from the unit. In the present study, nurses mentioned that the number of activities left undone was also greater when critically ill patients received multiple medications and high frequencies of routine nursing care and practices. In addition, the nurses reported that they left some care undone when they were working in a worse organizational environment and lacking work pattern (high workload, rotating shifts, long hours and lack of arranging the work hours' schedules including weekends and vacations) to support nurses during the performance of their job. These findings were also found in other studies in different countries from 2003 to 2015 (Felgen, 2003; Hegney, 2003; Horwitz and McCall, 2004; Abdallah, 2005; Al-Kandari and Thomas, 2009; Tschannen et al., 2010; Kalisch et al., 2011; Ausserhofer et al., 2014; Bekker et al., 2015).

Moreover, care is more likely to be left undone in study units where nurses perform non-nursing tasks and indirect nursing practice. As found in other studies from 2001 to 2015, this could be another reason that the nurses were unable to complete some of the nursing activities (Nuikka et al., 2001; Al-Kandari and Thomas, 2009, Aiken et al., 2011; Bekker et al., 2015). Nurses spent a portion of their time in indirect and non nursing care (**Table 3 and 4 and Figure 1**). According to Elsayed et al (2012), the indirect and non nursing care activities consume a high portion of nurses' time. Relieving nurses from these activities would permit nurses to spend more time in direct care of patients and to raise the quality of care rendered and patient's satisfaction. Therefore, it should be urgently considered that professional nurses perform activities related to their skills, educational level and expertise (Scott et al., 2011; Bekker et al., 2015).

The findings of the present study proved that there were three non-nursing tasks correlated positively with nursing tasks left undone (clerical, transporting and housekeeping activities) while dietary activity of non nursing task correlated negatively with certain nursing tasks left undone (**Table 6 and Figure 5**). It can be explained by assigning clerical, transporting and housekeeping tasks to nurses, considering these tasks as part of nurses' job. On the other hand, there were nutritional employees who were responsible for writing the request of dietary and retrieving food trays thus carrying the dietary activities. The results of this study were found matching to other studies as the study of Van Tonder (1988), Aiken et al. 2001. This study was in contrast with the study of Bekker et al. (2015); it found that two non-nursing tasks as arranging discharge referrals and transporting patients in hospital correlated negatively with certain nursing tasks left undone.

Nurses in the study units also attributed care left undone to nurses' job and work factors. These factors were absence of policies, procedures and protocol, shortage of nursing staff and supplies, a lack of or poorly functioning equipment, lack of career development opportunities, inadequate supervision and guidance, and dissatisfaction with work hours' pattern. These factors also prevented professional nurses from completing their nursing tasks and were considered as obstacles that hindered nurses' work. Similar findings were also reported

by several other studies in Egypt from 2002 to 2014 (Abo El-Maged et al., 2002; Mabrouk, 2006; Aly, 2009; Elsayed and Sleem , 2011; Al-Youssef et al., 2013), two Arabic studies in Kuwait in 1998 (Al-Kandri ,1998) and in Jordan in 2002 (Al- Momani, 2002) and two studies in other countries as Canada in 2004 (O'Brien-Pallas, 2004) and South Africa in 2015 (Bekker et al. , 2015).

Finally, non-nursing duties resulting in nursing care left undone might also have negative consequences on nurses and patient outcomes, including reduced job satisfaction, increased stress-related job, job tension, role conflict, intention to leave their job and patients' dissatisfaction (**Table 7, Figure 4 and 5**). In this study, nurses felt frustrated, dissatisfied and tense with lack of social prestige/respect, in addition to being guilty of leaving some of the care undone. More to the point, nurses provided non-nursing tasks that were considered to be stressful and low-status work. Consequently, this would lead to problems in professional relationships manifested in interrupting and conflict relationship between nurses and their peers, supervisors, and physicians. This would also lead to lack of nurses' willingness to remain in their job and lack of patient trusts in nurses' care.

These findings of the current study were supported by other studies in different countries from 2008 to 2013 (Schubert et al,2008; Sochalski, 2001; Tschannen et al. ,2010 ; Kalisch et al., 2011; Kalisch et al., 2012; Gabr and Mohamed, 2012; Aiken et al. ; 2013; Schubert et al., Ausserhofer et al., 2013). This study was also in line with the study in a teaching hospital in Australia which found that the satisfaction of nursing staff, stress at work, job tension and role conflict were associated with the nurses' role in their work (Med et al ,2010). However, this study was consistent with a study in El – Shatby Maternity University Hospital in Egypt reporting that nurses experienced a higher level of stress and low level of job satisfaction in their work (El Dahshan and Hafez, 2014).

CONCLUSION:

This study highlights categories of nurses' work patterns that help nurses to increase their awareness about their practice role. Nurses provided care to critically ill patients with no significant differences between the studied units. Only 36.64 % of nurses' time spent on direct care activities while nurses spent the greatest proportion of their time on indirect nursing care and non-nursing care activities. Consequently, they performed extra work causing high workload and hindering the completion of their nursing tasks. The study also found a positive correlation between care left undone and non-nursing care. The nurses in the study unit felt dissatisfied with more stress, tension, and conflict with their job and role, not only because they performed non-nursing tasks, but also when they left nursing tasks undone. When the nurses gave the high volume of their time to non-nursing care and indirect nursing care, this indirectly affected the quality of care provided, patient satisfaction and their intent to remain to in their career. Therefore, diverting most of nurses' time to direct nursing care activities plays a significant role and has positive value on nursing job and patient outcomes.

RECOMMENDATIONS:

Efforts should be provided to improve nursing work environments and optimize the use of nurses' time and energy. On the other hand, managers should play a definite role in reducing non-nursing duties for enhancing nursing job and patient outcomes. They should adopt new management strategies such as:

1. A standardized nursing care plan to organize nursing care activities, increase the time allocated to direct clinical care and utilize nurses' time effectively.
2. Promote the design of nursing jobs that allows nurses to perform tasks appropriate to their level of expertise.
3. Define tasks that nurses perform below their scope of nurses' practice and delegate them to support staff. Thus relieving nurses and letting them perform their nursing tasks thoroughly and spend less time on non-nursing duties.
4. Improve the work environment to focus on patient care.
5. Provide training programs for defining professional nurse roles and responsibilities and recognizing tasks that can be delegated to support staff.
6. Nurses must be involved in implementing and evaluating change in nursing role.
7. Measures should be taken to overcome the problem of shortage in nursing staff, especially in the night shifts to decrease workload.
8. Standardized education for all support roles that are clearly defined will ensure they can operate at maximum capacity.
9. Use secretarial staff to spare nurses' time spent on daily and routine paperwork.
10. Use electronic patient records, computerized data entry and digital equipment for saving nurses' time, reducing errors, and enhancing communication.

FURTHER RESEARCH: Further studies are recommended to explore the relationships between performing non nursing duties and care left undone and nursing sensitive indicators that show the quality of patient's care in different wards and critical care units.

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