

Nurses' Workload in Trauma and Post Operative Intensive Care Units at Assiut University Hospital

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Abstract:

The patient expects to receive high quality nursing care, delivered promptly and efficiently by nurses who appear to be satisfied with their workload .This **study aims** at measuring nurses' workload at trauma and post operative intensive care units. **Methods:** the subjects consisted of the total number of admitted patients, 112 patients at trauma ICU and 111 patients at post operative ICU and total number of nurses was 68 at trauma ICU and 23 at post operative ICU. Data collected for the period of 3 months by observation of nursing care given to all admitted patients at the selected sites for 24 hours from admission to discharge and **Results:** Trauma ICU patients and(nursing care given to the patient take about two thirds of 24 hours daily), post operative ICU patients had a workload. **Conclusions and Recommendations:** As NAS is a new workload measurement system at Assiut University Hospital and almost at Egypt it should be significantly used routinely to identify nurses' workload and to quantify staffing for effective use of nursing resource so: it is important to applying (NAS) to retain staff, and avoid waste of time and Inform staff with patient care results.

Key Words: Staffing - Nurses Workload.

Introduction:

Nurses coordinate the care they provide to patient, and the patient's stay in hospital by integrating a wide variety of information in the hospital from many sources (**Registered Nurses Association of Ontario Hospital, 2005**). Accurate definition and quantification of the nursing work is critical to the identification of appropriate nursing resource requirements (**Graf, et al., 2003**). Workload can be defined as the time spent on patient care by health care worker during a specific period of time (**Nijssen, et al., 2002**). Also workload can be defined as the amount of care allocated to patients based on an assessment of their nursing needs and the care they require (**Hadley, et al., 2005**). The use of actual workload can facilitate calculation of staff ratio that is, done by dividing the actual numbers of staff on the expected staff number, which results in the actual workload pressure on health workers (**Yoder-Wise, 2007; Ministry of health and social welfare, 2008**).

Factors that influence nursing workload and organizations' response include: patient demand; environmental complexity; medical complexity; quality; nursing sensitive outcomes (a standard of measurable outcomes that can be used to evaluate nursing practice in all settings); nursing intensity; nursing skill mix; and work systems. These factors illustrate the complexity of measuring nursing workload, indicating that only some of these factors are likely to be measured by a well developed tool (**George, 2003; Walker and Hendry, 2009**).

A nursing workload measurement system is a key component of any process to measure nursing resource intensity (**Canadian Nurses Association, 2003**). The workload measurement can be broadly categorized into two types: activity based (**Hughes, 1999; Siew and Ghani, 2006**) and dependency based (**Hurst, et al., 2008; Bray, et al., 2010**).

By reviewing international literature a study of **Hegney, et al., (2003)** revealed that nurses experienced difficulties in meeting patient needs because of insufficient staffing. The outcomes of that study suggest that the majority of nurses perceive current workload to be unacceptable. **Pink, et al., (2004)** revealed that nurses' shortage imposed real economic costs. The results of nurses' shortage were unavailability of nursing staff, increased sick time, injuries, disability and other forms of productivity loss.

Nationally in Egypt, a study done on two of Menoufiya hospitals revealed that the workload at the operating theatre at University of Menoufiya hospital was greater than that at Shebin El-Kom teaching hospital (**El-Salam, et al., 2008**). **El-Mehrezy, (2001)** demonstrated that nurses' workload in Sohag governorate was as the following, 81% in the rural health unit, 56% in the combined unit, 33% in the integrated hospital and 56% in the maternal and child health division of the general medical center.

Measurement of nurses' workload helps to enhance effective use of human resources. So it is important to measure nurses' workload in trauma and post

operative intensive care units at Assiut University Hospital.

Aim Of The Study

The study aims to: Measuring nurses' workload at Trauma and post operative intensive care units.

Subject And Methods

A descriptive and observational design was followed to measure nurses' workload at trauma and post operative Intensive Care Units (ICUs) at Assiut University Hospital. Trauma ICU had 16 beds; post operative ICU had 8 beds.

Subjects included in this study are: **Patients:** total coverage of nursing care given to all patients

admitted to ICUs was carried out by observation for 24 hours from admission to discharge throughout the period of data collection (3 months). **Nurses:** total number of nurses was 68 at trauma ICU and 23 at post operative ICU.

Tool of data collection: NAS aimed to estimate nursing workload by determine the percentage of time spent in patient care during 24 hours and collectively during the period of data collection, adapted from (**Miranda, et al., 2003**). The following table shows NAS:

	Basic activities of NAS	Score
1. Monitoring and titration		
1a Hourly vital signs, regular registration and calculation of fluid balance	4.5	
1b Present at bedside <i>and</i> continuous observation <i>or</i> active for 2 hrs or more in any shift, for reasons of safety, severity, or therapy such as noninvasive mechanical ventilation, weaning procedures, restlessness, mental disorientation, prone position, donation procedures, preparation and administration of fluids or medication, assisting specific procedures	12.1	
1c Present at bedside <i>and</i> active for 4 hrs or more in any shift for reasons of safety, severity, or therapy such as those examples above (1b)	19.6	
2. Laboratory, biochemical and microbiological investigations	4.3	
3. Medication, vasoactive drugs excluded	5.6	
4. Hygiene procedures		
4a Performing hygiene procedures such as dressing of wounds and intravascular catheters, changing linen, washing patient, incontinence, vomiting, burns, leaking wounds, complex surgical dressing with irrigation, and special procedures (e.g. barrier nursing, cross-infection related, room cleaning following infections, staff hygiene)	4.1	
4b The performance of hygiene procedures took >2 hrs in any shift	16.5	
4c The performance of hygiene procedures took >4 hrs in any shift	20.0	
5. Care of drains, all (except gastric tube)	1.8	
6. Mobilization and positioning, including procedures such as: turning the patient; mobilization of the patient; moving from bed to chair; team lifting (e.g. immobile patient, traction, prone position)		
6a Performing procedure(s) up to three times per 24 hrs	5.5	
6b Performing procedure(s) more frequently than 3 times per 24 hrs, or with two nurses, any frequency	12.4	
6c Performing procedure with three or more nurses, any frequency	17.0	
7. Support and care of relatives and patient, including procedures such as telephone calls, interviews, counseling; often, the support and care of either relatives or patient allow staff to continue with other nursing activities (e.g., communication with patients during hygiene procedures, communication with relatives while present at bedside, and observing patient)		
7a Support and care of either relatives or patient requiring <i>full dedication</i> for about 1 hr in any shift such as to explain clinical condition, dealing with pain and distress, difficult family circumstances	4.0	
7b Support and care of either relatives or patient requiring <i>full dedication</i> for 3 hrs or more in any shift such as death, demanding circumstances (e.g., large number of relatives, language problems, hostile relatives)	32.0	
8. Administrative and managerial tasks		

Basic activities of NAS	Score
8a Performing routine tasks such as processing of clinical data, ordering examinations, professional exchange of information (e.g., ward rounds)	4.2
8b Performing administrative and managerial tasks requiring <i>full dedication</i> for about 2 hrs in any shift such as research activities, protocols in use, admission and discharge procedures	23.2
8c Performing administrative and managerial tasks requiring <i>full dedication</i> for about 4 hrs or more of the time in any shift such as death and organ donation procedures, coordination with other disciplines	30.0
Ventilatory support	
9. Respiratory support: any form of mechanical ventilation/assisted ventilation with or without positive end-expiratory pressure, with or without muscle relaxants, spontaneous breathing with or without positive end-expiratory pressure with or without endotracheal tube supplementary oxygen by any method	1.4
10. Care of artificial airways: endotracheal tube or tracheostomy cannula	1.8
11. Treatment for improving lung function: thorax physiotherapy, incentive spirometry, inhalation therapy, intratracheal suctioning	4.4
Cardiovascular support	
12. Vasoactive medication, disregard type and dose	1.2
13. Intravenous replacement of large fluid losses. Fluid administration >3 L/m2/day, irrespective of type of fluid administered	2.5
14. Left atrium monitoring: pulmonary artery catheter with or without cardiac output measurement	1.7
15. Cardiopulmonary resuscitation after arrest, in the past period of 24 hrs (single precordial thump not included)	7.1
Renal support	
16. Hemofiltration techniques, dialysis techniques	7.7
17. Quantitative urine output measurement (e.g., by indwelling urinary catheter)	7.0
Neurologic support	
18. Measurement of intracranial pressure	1.6
Metabolic support	
19. Treatment of complicated metabolic acidosis/alkalosis	1.3
20. Intravenous hyperalimentation	2.8
21. Enteral feeding through gastric tube or other gastrointestinal route (e.g., jejunostomy)	1.3
Specific interventions	
22. Specific intervention(s) in the intensive care unit: endotracheal intubation, insertion of pacemaker, cardioversion, endoscopies, emergency surgery in the previous 24 hrs, gastric lavage; routine interventions without direct consequences to the clinical condition of the patient, such as: radiographs, echography, electrocardiogram, dressings, or insertion of venous or arterial catheters, are not included	2.8
23. Specific interventions outside the intensive care unit: surgery or diagnostic procedures	1.9

Scoring system: The weights of nursing activities score represent the percentage of time spent by one nurse on the activity mentioned in the item, if performed. Items 1, 4, 6, 7, and 8, only one sub item and the score calculated when chose (a, b, or c). Performed items were coded as "1" and un-performed items were coded as "2". Total score (workload) calculated by the actual NAS score for each item as mentioned in the tool, to calculate the mean of workload for each patient and then collectively to all patients during data collection period. A total score of

100.0% indicates the work of one nurse over a 24 hours period. The sum of the 23 items ranges between 0 and 177%.

Translation of tool into Arabic was done. Pilot study to assess tools clarity and applicability, was carried out for two days to all patients admitted in the designated sites. Data collection was carried out from May to July 2011. Official approval to carry out this study obtained. Ethical considerations were considered. Data entry and statistical analysis were done using a computer software package (SPSS

version 16), descriptive statistics done in the form of means, frequencies, and percentages. Qualitative variables compared using T test applied to compare means values.

Results:

The results of the following study reveals that (75.9%) of trauma ICU patients were males compared to (63.1%) for patients of post operative ICU and the difference was statistically significant. As regards mean age for trauma ICU was (31.52 ± 16.41), and for post operative ICU was (39.80 ± 17.56).

Table (1) Workload at trauma and post operative intensive care units for the period of data collection.

Variable	Trauma ICU (patients' days=1026)	Post operative ICU (patients' days=651)
Mean of workload \pm SD per 24 hours	62.40 ± 11.20	54.17 ± 12.29
T test	13.82	
P value	0.000***	
Median of workload	60.89	53.23
Range of workload	18.60-113.80	11.10-110.00

*** The difference is very highly significant at $P < 0.001$.

Table (2) Mean time spent to provide care for one patient during 24 hours at trauma and post operative intensive care units for the period of data collection.

Variable	Trauma ICU (patients' days=1026)	Post operative ICU (patients' days=651)
Mean time \pm SD per 24 hours	14.98 ± 2.69	13.00 ± 2.95
T test	13.82	
P value	0.000***	
Median time	15.17	12.98
Range of time	4.46-27.31	2.66-26.40

Table (1) shows that the mean of workload was (62.40 ± 11.20) and (54.17 ± 12.29) for trauma and post operative ICUs respectively. The difference was statistically highly significant. As regards the median of workload it was (60.89%) for trauma ICU and (53.23%) for post operative ICU.

Table (2) shows that the mean time spent to provide care for one patient during 24 hours was (14.98 ± 2.69) for trauma ICU and (13.00 ± 2.95) for post operative ICU. The difference was statistically highly significant.

Discussion:

Regarding to patients' demographic data the present study findings are consistent with the findings of **Padilha, et al., (2007)** study who found that about two quarters of the patients were males and their mean age was about fifty years. **Kiekkas, et al., (2008)** study who revealed that more than two quarters of patients were males and the mean age was about fifty years. While the present study results contradict **Padilha, et al., (2008)** study which reported, the patients' age ranged between sixteen

and ninety nine years and about fifty five percent were males. In addition **Stafsetha, et al., (2011)** study who revealed that the patients' mean age was about fifty years.

The results for workload of the present study are almost consistent with **Silva, et al., (2011)** study who revealed that the mean NAS was 61.92%. **Ducci and Padilha, (2008)** study who found that mean NAS was 59.6%. **Padilha, et al., (2010)** study who found that patients workload was 57.4%. **Debergh, et al., (2012)** study who revealed that nurses' workload per 24 hours was 54.7 %. However, the study findings are dissimilar with the results of **Goncalves, et al., (2006)** study who revealed that mean NAS was 69.3%. **Conishi and Gaidzinski, (2007)** study which found mean NAS of 65.5%. **Dias, (2006)** study which found that mean NAS was 74.62%. **Stafsetha, et al., (2011)** study which found that each nurse is capable of performing NAS of 75-90% per shift, depending on which unit is investigated.

As regards the time to provide care by nurses, the present study findings are consistent with **Raj, et al., (2006)** study who reported, the average time spent by

a nurse on each patient during the first 24 hours of their stay was 16 hours.

Conclusions:

The study results concluded that trauma ICU patients had about sixty percent of workload, while post operative ICU patients had more than fifty percent of workload. The mean time spent by one nurse to provide care for one patient during twenty four hours was about fifteen and thirteen hours for trauma and post operative ICUs respectively.

As NAS is a new workload measurement system at Assiut University Hospital and almost at Egypt it should be significantly used routinely to identify nurses' workload and to quantify staffing for effective use of nursing resource. So, the following recommendations could be suggested:-

1. Applying NAS to retain staff, and avoid waste of nurses' time.
2. Training for nurses about NAS, application and the value of its application.
3. Regularly inform staff with patient care results to motivate and to improve them skills.

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