

Safe Nurse Staffing: a Systematic Review

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ABSTRACT

Goals: The presentation of importance of the enactment of safe staffing that concerns nurse to patient ratios, in relation to quality of patient care given, to the promotion of healthy work environments for nurses and in relation with the reduction of health cost, as well as the presentation of countries that legislated law about the guaranteed and safe nurse staffing.

Plan: Methodology of subjective content analysis was followed.

Data Sources: Electronic bases of Blackwell-synergy and Medline (1970-2007) with key words: nurse, registered nurses, safety, staffing, nurse to patient ratio. Supplemental bibliography has been reached through other internet search machines as well as through bibliographic references of retrieved articles.

Method of review: Methodology of subjective content analysis that call for a close –up reading, identification of the subjects repeated and classification in greater categories. The procedure resulted in setting two subject categories: safe nurse staffing in relation to the patient, the nurse and the organization and the legislation of countries about nurse staffing.

Results: Staffing ratios have been first recommended in Belgium in 1987, using a minimum data set of 12 nurses to 30 beds. In the Australian state of Victoria in 2000 specific nurse-to-patient ratios have been implemented, according to the hospital category. In 2005 the American state of California established 1:5 nurse to patient ratio, in wards.

Conclusions: Safe and sufficient staffing is the key for quality and safety in healthcare. The definition of the right synthesis of personnel is important.

Key words: nurse, nurse to patient ratio, safety, staffing.

Introduction

The staffing of institutions has become object of study from many researchers because the multiple consequences that has in patients' safety, in the quality of given care but also in health expenses. What the present article adds in the nursing science is the composition of bibliography for nursing understaffing repercussions in personnel, patients and the organizations, the focus in measures that are taken by the international nursing community for the resolution of the problem as well as the promotion of the need for law that ensure safe proportions of nurses per patient.

WHO's report "Working Together for Health" in 2006, nominated decade 2006-2015 as the decade of workforce of health, giving particular emphasis in the growth of effective strategies in workforce. These include three basic elements: improvement of staffing, support of existing workforce for the maximisation of his possibility and, simultaneously reduction of workforce loss. This process led to the configuration of two thematic categories: safe nursing staffing in combination with the patient, the nurse and the organization and legislation of countries about nurse staffing.

Bibliographic review

For the search of relative bibliography the electronic bases of CINAHL, Blakwell-synergy and Medline (1970-2007) were used with word keys "nurses", "registered nurses", "safety", "staffing", and "nurse to patient ratio". Additional bibliography was sought also through other electronic search engines of internet as well as through

bibliographic references of already recovered articles. Methodology of thematic analysis of content was used, that forecasts careful reading of material, recognition of repeated subjects and classification in wider categories (Green, Thorogood, 2004).

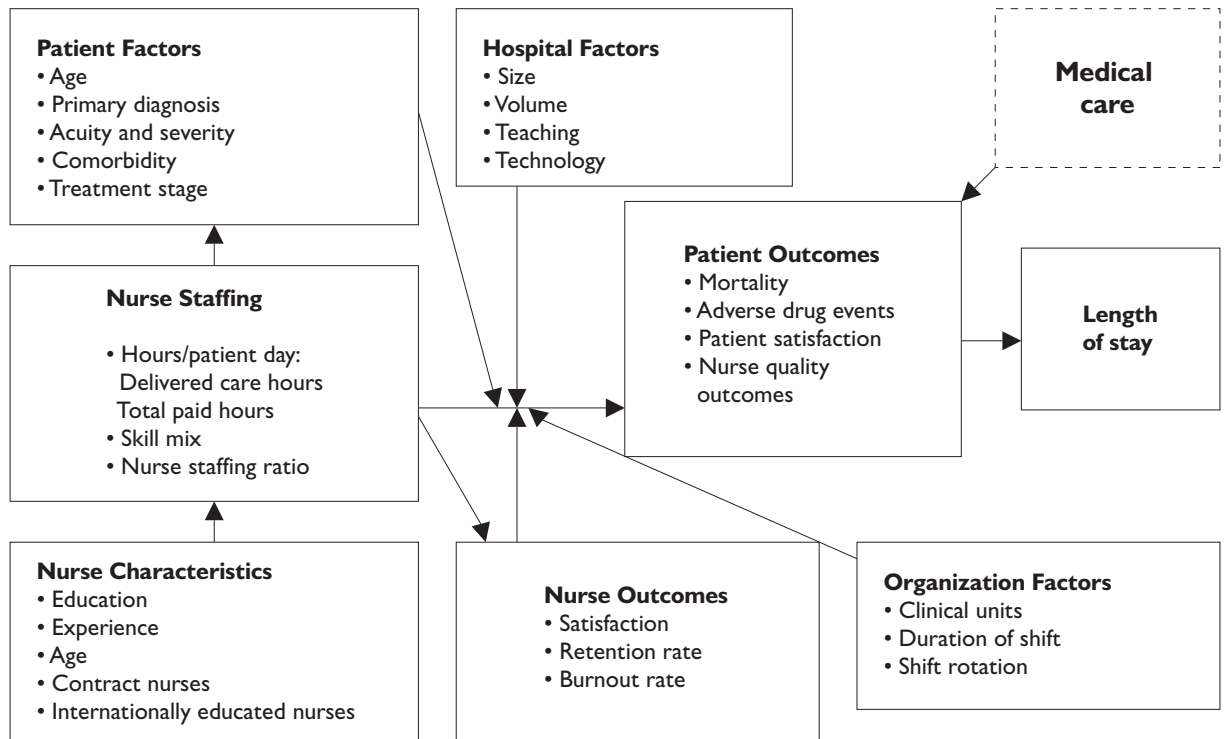
Nurse Staffing

The American Federation of Teachers (1995) states: "Safe staffing means that an appropriate number of staff, with a suitable mix of skill levels, is available at all times to ensure that patient care needs are met and that hazard free working conditions are maintained." According to the North Carolina Nurses Association (NCNA, 2005) "Safe staffing reflects the maintenance of quality patient care, nurses' work lives and organisational outcomes". Safe staffing practices incorporate the complexity of nursing activities and intensities? varying levels of nurse preparation, competency and experience? development of health care personnel? support of nursing management at the operational and executive levels? contextual and technological environment of the facility? available support services? and the provision of whistleblower protection (International Council of Nurses, 2006).

Staffing relates with the number and the type of personnel that is needed for the provision of care to the patient, but must also be correlated with variables such as: workload, work environment, cost efficiency and effectiveness of expenses, patient complexity, skill level of the nursing staff, mix of nursing staff for the right determination of real needs of each nursing unit (diagram 1).

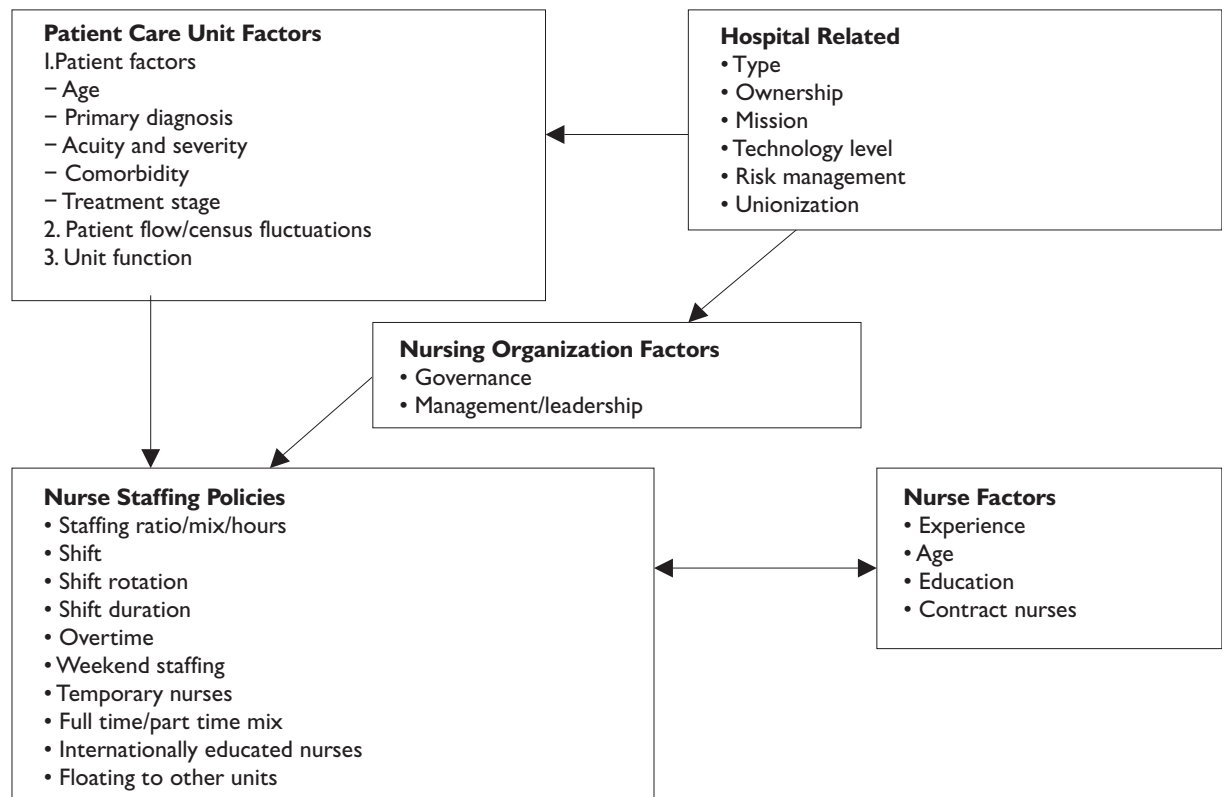
Nurse staffing has effects not only on the patients and on nurses but more generally in all the health system, while proportions of safe nursing staff have been shaped even by World Health Organisation and also by the International Council of Nurses. Generally each country's policies of nurse staffing but also more specifically, each organisation should take into consideration many elements (diagram 2).

Diagram 1: Conceptual framework of nurse staffing and patient outcomes



Source: Kane, R.L., Shamliyan, T., Mueller, C., Duval, S., Wilt, T., 2007. Nursing staffing and quality of patient care. Evidence Report/ Technology Assessment No. 151. Agency for Healthcare and Quality, Rockville. Available at <http://www.ahrq.gov/clinic/tp/nursesttp.htm> Accessed on 20th December 2007.

Diagram 2: Factors affecting nurse staffing policies



Source: Kane, R.L., Shamliyan, T., Mueller, C., Duval, S., Wilt, T., 2007. Nursing staffing and quality of patient care. Evidence Report/ Technology Assessment No. 151. Agency for Healthcare and Quality, Rockville. Available at <http://www.ahrq.gov/clinic/tp/nursesttp.htm> Accessed on 20th December 2007.

Cross-correlation of health services staffing with nursing care quality indicators of research results

Most authors have found an inverse relationship between mortality and RNs per patient day, RNs as a percentage of all nursing staff, and RNs per hospital. Some authors reported an inverse relationship between RNs per patient day and adverse events. Higher registered nurse (RN) skill mix corresponded to a lower incidence of medication errors and pressure ulcers and higher patient satisfaction (Blegen, et. al., 1998). Sovie (2001) found that increased RN hours worked per patient correlate with lower fall rates and higher patient satisfaction levels with pain management.

An analysis was made in USA to examine the relation between care provided by hospital nurses and patient outcomes (Needleman, et. al., 2002). The outcomes indicated that a higher proportion of hours of care per day by RNs and a greater number of hours of care by RNs per day were associated with better care results for hospital patients. In the past few years nursing has focused its interest in the recognition of nursing sensitive outcome indicators (Ke-Ping, et. al., 1999). These indicators determine the final results of nursing interventions and they are indicators that show the progressive development to the resolution of problems or symptoms of patient (Manojlovich, Sidani, 2008, Seago, 2006). Such indicators are urinary tract infections, bedsores, pneumonia, thrombosis and pulmonary compromise, upper gastrointestinal bleeding (Brooten, Naylor, 1995).

Comparing these sensitive nursing indicators with the proportions of nursing personnel, it emerges that when there are more qualified nurses the patients face less complications, days of hospitalisation, levels of mortality decrease and finally the total cost of hospitalisation is decreased (American Nurses Association, 1996). Mortality was proportional with the number of nurses /patient (Aiken, et. al., 2002, Aiken, et. al., 2003). Specifically it is reported 7% increase in the likelihood of dying within 30 days of admission for each patient that the nurse undertakes. Also, an increase of 0.25 nurses per patient day was associated with a 20% decrease in 30day mortality. 22 studies were reviewed and confirmed adequate staffing

and skill mix were associated with improved patient outcomes (Lankshear, et. al., 2005).

Investigating the combination of nurses training, the years of clinical experience, the nursing ability with the rates of mortality when there is a 10% increase of registered nurses this lead to 5 less deaths per 1000 patients, while each moreover year of clinical experience of nurse was related with 6 less deaths per 1000 patients in the urban hospitals and 5 less in the regional hospitals (Tourangeau, et. al., 2002).

In a Canadian research an incidence rate of 7.5% for adverse events was found while about 185,000 of almost 2.5 million annual hospital admissions were associated with an adverse event and 70,000 (38%) were preventable (Baker, et. al., 2004). ICN suggests 4 patients per nurse and stresses that increasing the pressure of work in 6, the probability of patients to die in 30 days is increased at 14%.

Also reports that low percentages of RN place themselves in a bigger danger of needlestick. No research has clarified until now the suitable percentage of registered nurses to nurses' assistants that lead to safe nursing care (Mix skill). As long as it concerns the proportion of doctors - nurses the percentage of 4 nurses per 1 doctor is reported as reliable (Liaropoulos, 2007).

In Greece, the size and the composition of human resources were established after the establishment of National Health System. Legislative regulation that would impose concrete rates of staffing in the public hospitals does not exist. For the staffing of private clinics P.D. 517/1991 imposes for the nursing personnel the following composition:

One (1) registered nurse as a head nurse.

Two (2) registered nurses per fifteen (15) beds.

For Paediatric and pedo- psychiatric clinics, three (3) registered nurses per ten (10) beds.

two (2) nurse assistants with two or one year of study per five (5) beds.

For Paediatric, three (3) nurse assistants with two or one year of study per five (5) beds.

For pedo - psychiatric clinics, one (1) nurse assistant with two or one year of study per three (3) beds.

Nurse staffing and the consequences on nurses

It is important that in order the suitable staffing to be achieved the needs of patients and if possible of their carers to be taken into consideration. Insufficient staffing is related considerably with bigger probabilities of needle stick (Clarke, et. al., 2002). In a more recent study by Clarke (2007), the cross-correlation between wounds from sharp objects and various organizational factors was examined (i.e.: supporting leading personnel, sufficient staffing of units from nurses) in 188 hospitals in the Pennsylvania of USA. The study reports

that the wound from sharp objects was more frequent in nurses with five years or less previous work experience.

The decreased nursing personnel were correlated with high percentages of burnout. The studies have shown that there is a relation between the levels of personnel and work satisfaction (Aiken, et. al., 2002). A lot of nurses wound their back when the nursing institutions are insufficiently staffed and they should move patients alone (Rothschild, 1996).

Nursing institutions and nurse staffing

The insufficient staffing leads to increase of health expenses. In a research that took place in New York hospitals was realised that each additional hour of nursing care per patient involved reduction of expected time of patient stay in the hospital at 4,4%-9,7%. From the other hand more hours of nursing care by registered nurses

decreased the length of stay at 2,7% that is to say in percentage of 7-8,5 days. Safe staffing has repeatedly been shown to contribute to better patient outcomes, which ultimately manifest in reduced health costs for individuals, families and communities and increased tax revenues as patients return to the active workforce.

Countries that legislated laws about safe ratios of nurse staffing

Another approach to ensuring safe staffing for nursing is the legislation of safe staffing ratios (ICN n.d.).The ratios are the maximum number of patients that may be assigned to an RN during one shift and vary according to acute care units (CNA, 2003). In Belgium from 1987 already exists legislation that determines 12 nurses per 30 beds during the day. In California from 2001, (table 1) was already established nurse to patient ratio as part of national movement of protection of patients while in

2005 nursing unions proposed percentage 3:1. In the USA, the ANA has proposed the enactment of safe staffing for the nurses (The ANA Talks, 2001). In the Australian state of Victoria (CNA n.d.) specific proportions of patients per nurse (table 2) are in effect with law from 2000 and they are determined precisely depending on the type of hospital and on the type of patients that attends (maternity clinic, pediatric, psychiatric).

Table 1: California (USA) – NURSE TO PATIENT RATIO

Intensive/ critical care	1:2
Neonatal Intensive care	1:2
Operating room	1:1
Post- anesthesia Recovery	1:1
Labor and delivery	1:2
pediatrics	1:4
Emergency room	1:4
ICU patients in emergency department	1:2
Trauma patients in emergency department	1:1
telemetry	1:4
medical/ surgical	1:5
Other specialties care	1:4
Psychiatric	1:6

Source: California Nurses Association, 2008. Ratio basics. Available at <http://www.calnurses.org/assets/pdf/ratios/ratiosbooklet.pdf> Accessed on 2nd August, 2008

Table 2: Victoria of Australia – nurse to patient ratio

Type of unit	Type of hospital	Morning shift	Night shift
General Medical/ Surgical Ward	level 1	1:4 + head nurse	1:4 + head nurse
	Level 3	1:5 + head nurse	1:6 + head nurse
Ante/Postnatal	All the levels	1:5 + head nurse	1:6 + head nurse
Surgery	3 nurses per theatre (1 scrub, 1 scout and 1 anaesthetic nurse) This may vary up and down depending on predetermined factors		
Post Anaesthetic Care Unit/Recovery Room	All shifts 1:1 for unconscious patient		

Source: Canadian Federation of Nurses Union, 2005. Enhancement of patient safety through formal nurse – patient ratios: A discussion paper. Available at http://www.icn.ch/indkit_2006.pdf Accessed on 2nd August, 2008,

Conclusions

In a functional level it is a responsibility of managerial executives for proposing the suitable percentages of nurses of all rungs for the guarantee of quality and their combination in an environment of offer and demand (Scott, 2003). The healthcare environments vary, but the need for sufficient personnel is common. The numerical composition of workers and their proportion in health organisations in an international level is based henceforth on strict legal frames that however despite the legislative regulations still try to correspond in the new requirements according to the international data for the safe provision of care.

In Greece there is a need for regulations that concern

the nurse ratio, but also the creation of favourable working conditions, in order that the nurses do not present dissatisfied and professionally exhausted and finally turn to the redefinition of their professional identity or being occupied with the education and the administration and not with the clinical action. Patient care benefits through the existence of a safe working environment for the healthcare personnel. The quality of care is related with the sufficient nurse staffing, the recording of statistical elements in all the hospitals and the quality of working environment (Mallidou, Giovanetti, 2005).

Proposals

- Rational Planning is demanded (diagram 3) and accurate sorting of human resources that will guarantee the right and appropriate number of personnel and the necessary specialties in the right place and time.
- Claiming working conditions that will maintain efficient nurses in the field of healthcare.
- Renegotiating nurses working life.
- Coordination of research that will survey the effects of

- working conditions, of working life and patient safety in relation to the existing nursing personnel.
- Promotion of health organizations authentication with the criterion of safe staffing.
- Alliances with patients' organizations or other team professionals for informing the public about the importance of safe nursing services and the importance of safe levels of staffing and the safe nurse to patient ratios.

Diagram 3: Process of planning of human resources



Source: Papaleksandri, N., Bourantas, D., 2003. Administration of Human Resources. Benou, Athens.

Conclusion

High patient to nurse ratios not only have negative result on patients outcomes but they also influence nurses that are on a great danger of emotional exhaustion, stress, dissatisfaction from work and burnout. Safe staffing is the key for the quality and safety in the provision of healthcare.

Determining the right staff mix is important. Errors in nursing staff mix can lead to clinical errors, which may result in adverse patient and organisational outcomes (Canadian Nurses Association, 2003). Occupational associations will have to continue to be nurses' advocates and governance's counselors relatively to the inclinations

of nursing workforce and will also have to pressure for legislation so that nurses can practice their profession at the ultimate ability (Baumann, et. al., 2001, Dubois, et. al., 2006).

It is important a culture for the creation of an attractive working environment to be grown, in order sufficient number of nurses maintain the profession and get satisfaction and response from it, opportunities for continuing training to be provided as well as the suppleness that will allow the workers to participate in these activities.

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