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Macey Schwenker
University of Arkansas, Fayetteville

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Effects of Inadequate Nurse Staffing and Need for Standard Nurse-to-Patient Ratios to Increase Patient Safety in Acute Care Settings

Honors Thesis Expanded Literature Review

Macey N. Schwentker

University of Arkansas

College of Education and Health Professions

Eleanor Mann School of Nursing

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Abstract

This study includes articles including research regarding the effects of the current nursing staff shortage and overtime on patient care and outcomes. A systematic review of research was conducted guided by PRISMA guidelines and consists of articles collected from PubMed. Studies were taken place in the United States, England, Taiwan, Singapore, United Kingdom, Brazil, South Korea, Sweden, India, and Australia involving hundreds of thousands of participants. Methods include mean ratio, regression models, surveys, and questionnaires. Nurse staffing shortages, overtime, and inadequate staffing increased the risk of patient mortality and decreased overall patient safety and quality of care in acute care facilities.

Introduction

Nurses are vital to the healthcare system and make up largest portion of healthcare employees. Nursing shortages lead to less nurses having to care for patients around the clock care in the acute care setting. Less nurses available to work results in overtime and more patients per nurse. This is where a standardized nurse-to-patient ratio and state mandatory overtime laws needs plays a role. Overwork of nurses can lead to burnout and fatigue leading to more errors and slower cognitive ability. This is especially dangerous in the hospital workplace, where nurses have patient's lives in their hands.

"Hospitals find it difficult to fully staff hospital wards. In the face of budgetary constraints and increasing demand for healthcare, there are persistent and growing shortages of registered nurses (RNs)" (Griffiths, et al., 2019, pg. 1). Along with a care facility, many acute hospitals are owned and operated as business. Hospitals do have adequate nursing staffing evidenced by decreased patient outcomes and nursing burnout. Research in these 13 articles goes into depth about the effects of overtime, scheduling, increasing patients per nurse, burnout, and the need for a standardized nurse-to-patient ratio. Constant overtime and overwork can lead to careless mistakes, poor patient outcomes, higher risk of patient mortality, etc.

PICOT Research Question

In acute patient care setting, does adequate nursing staffing and standard nurse-to-patient ratios increase patient safety?

Study Design

A systematic review of research was conducted on the effect that adequate nursing staff has on the safety of patients. This review was guided by PRISMA guidelines and consists of articles collected from PubMed.

Information Sources

The researcher searched the PubMed and CINAHL databases from the University of Arkansas Library databases independently. All articles besides one used were found on PubMed and PubMed Medical Subject Headings (MeSH) was used in an electronic search of the databases. A keyword search following the subject heading searches did not produce any additional articles.

Search Strategy

Search terms used, based on the research question, include “nursing ratios”, “patient safety”, and “nursing ratios and increased patient safety,” and “association between nursing staff.” MeSH was used to define search terms for the PubMed search. Search limiters were used to ensure results contained human subjects, language in English, and publish dates of 2013-2021.

Inclusion/Exclusion Criteria

Articles were excluded if they did not include key PICOT elements. (a) The study included nursing and patients (P); (b) the study investigated a correlation between higher nursing staff rates and less overtime with increased patient outcomes (I); (c) the study compared acute hospitals that had overworked nurses or understaffed floors with adequate staffed floors and the effects on patient safety (C) in acute hospitals; and (d) outcomes measured must include adequate patient safety (O) in five years (T).

Table 1

Table 1					
Griffiths, P., Saville, C., Ball, J., Culliford, D., Pattison, N., & Monks, T.	2020	United States	Observational study Multilevel logistic regression modeling	The SNCT can provide reliable estimates of adequate nursing staff.	Level 2 Evidence

Dall'Ora, C., Maruotti, A.,	2019	England	Retrospective longitudinal observational study	Temporary staffing to maintain safe staffing levels lead to decreased hazard of death.	Level 3 Evidence
Lin, C., Huang H., Lu, M.	2013	Taiwan	Qualitative Study	Results provide a basis for formal standards for minimum nurse-to-patient ratios.	Level 3 Evidence
Fan, E. M. J., Nguyen, N. H. L., Ang, S. Y., Aloweni, H. Q. I. G., Quek, L. T., Ayre, T. C., Pourghaderi, A. R., Lam, S. W., & Ong, E. H. M.	2021	Singapore	Retrospective Study	The effects of COVID-19 caused drastic changes in bed capacity and nursing workforce requirements.	Level 3 Evidence
Magalhães, A., Costa, D., Riboldi, C. O., Mergen, T., Barbosa, A., & Moura, G.	2017	United States	Cross-sectional Study	The increase in the workload of the nursing team had an impact on quality of care and safety for patients in a surgical unit. An adequate staffing promotes a safer care environment.	Level 3 Evidence
Griffiths, P., Maruotti, A., Recio Saucedo, A., Redfern, O. C., Ball, J. E., Briggs, J., Dall'Ora, C., Schmidt, P. E., Smith, G.	2019	United States	Retrospective longitudinal study	Lower RN staffing and higher levels of admissions per RN are associated with increased risk of death during an admission to hospital.	Level 3 Evidence
Cho, E., Lee, N. J., Kim, E. Y., Kim, S., Lee, K., Park, K. O., & Sung, Y. H.	2016	South Korea	Cross-sectional Study	Ensuring appropriate nurse staffing and working hours is important to improve the quality and safety of	Level 3 Evidence

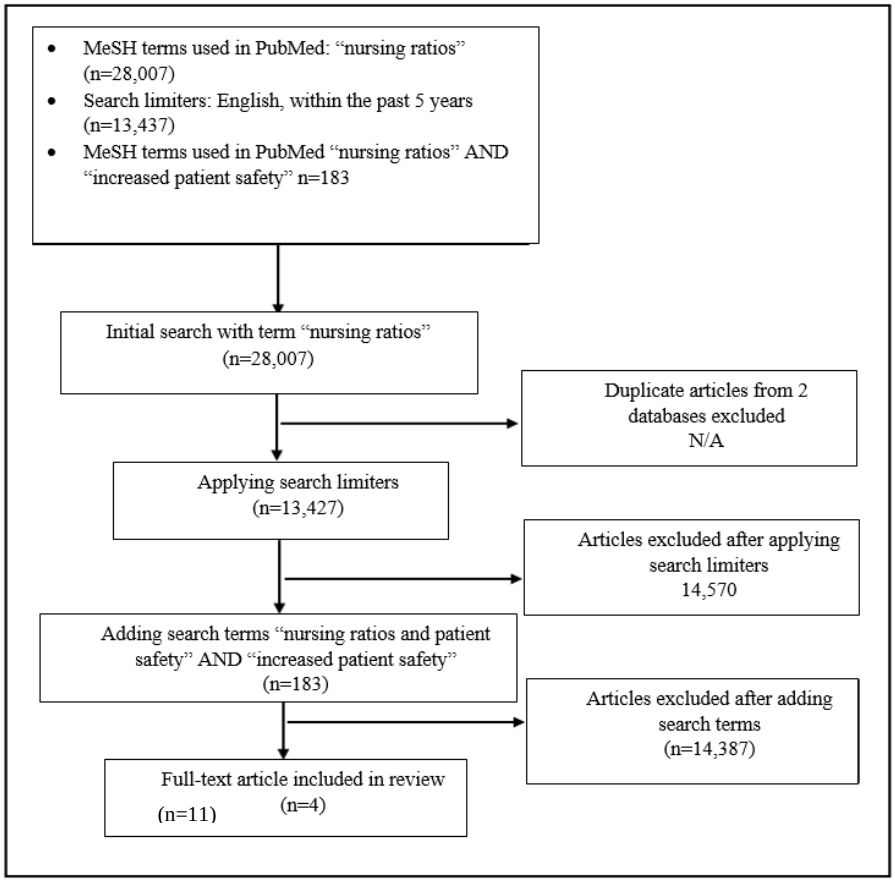
				care and to reduce care left undone in hospitals	
Kullberg, A., Bergenmar, M., & Sharp, L.	2016	Sweden	Quasi-experimental study	Fixed scheduling should be considered in order to lower overtime. Further	Level 2 Evidence
Chen, Y., Guo, Y. L., Chin W., Cheng, N., Ho, J., Shiao, J. S.	2019	Taiwan	Cross-sectional study	The association between the standardized ADPNR and intention to leave their job was significantly mediated by personal burnout, client-related burnout, and job dissatisfaction.	Level 3 Evidence
Wynendaele, H., William, R., Trybou, J	2020	United States	Systematic Review	A relationship between the patient-nurse ratio and specific staff-related outcomes is confirmed by various studies.	Level 1 Evidence
Sharma, S. K., Rani, R.	2020	India	Systematic Review	Nurse staffing norms must be immediately revised in the light of international norms and research evidence available in this regard.	Level 1 Evidence
McHugh, M. D., Aiken, L. H., Windsor, C., Douglas, C., Yates, P.	2020	Queensland, Australia	Cross-sectional analysis Study	Before ratios were implemented, nurse staffing varied considerably across Queensland hospital medical-surgical wards and higher nurse workloads were associated with patient mortality, low quality of care, nurse emotional exhaustion and job dissatisfaction.	Level 3 Evidence
Casey, F.	2015	United States	Systematic Review	The SNCT is a tool to calculate safe nurse-to-	Level 1 Evidence

				patient ratios in critical care wards.	

Data Extraction

The figure above displays a final evaluation table on the articles chosen for this research. The table includes authors, conceptual framework, design/method, sample, setting, major variables studied, measurement, data analysis, findings, and appraisal. Results were all discerned and obtained from the articles listed in Figure 1 besides two. The two articles were found by mentor (DD) researching the SNCT tool. All articles have been peer-reviewed and taken from PubMed, which is a scholarly and reliable database recommended by the University of Arkansas librarian for research purposes.

Figure 1



Research and Results

Effects of Inadequate Nurse Staffing on Patient Safety

In the study conducted by Magalhães et al. (2017), it concludes that a higher workload of nurses impacts safety and quality of care for patients negatively. This studied discussed the relevance of the data compared to 12 other studies. They concluded all studies, conducted in different countries (one being the United States) concluded similar results. Despite the differences in context, working hours, professional training and others, and studies in different countries indicate that the increase in the number of nurses and nursing hours in patient care can improve quality and safety outcomes for patients in hospitals. A higher proportion of nurses in teams composed also by professionals with a vocational education can also improve quality and safety outcomes for patients in hospitals (Magalhães et al., 2017, pg. 8).

The purpose of the article by Magalhães et al. (2017), was to see increase the effect of the workload on nursing teams and see if it had an impact on quality of care and safety for patients. This study was conducted on a total of 157, 481 patients and 502 nursing professionals located in Brazil. The factor under study was the workload, expressed as the ratio between the mean number of patients and the number of nursing professionals in 24 hours and in the day shifts. 264 observations of safety outcomes were used. The ratios of patients per nurse and per nursing technician in day shifts indicate a mean estimate of 14-15 and 5-6 patients per professional, respectively.

Table 1

Table 2 Association between management and care quality indicators related to patient safety and workload of the nursing staff - Porto Alegre, Rio Grande do Sul, Brazil, 2015

Quality and Safety Indicators	Patient/ Nurse 24h		Patient/ Nurse Day Shift		Patient/ Nursing Technician 24h		Patient/ Nursing Technician Day Shift	
	BB[†]	P	BB[†]	P	BB[†]	P	BB[†]	P
Care								
Mean lenght of stay	0.65	0.00	0.34	0.00	3.44	0.00	2.28	0.00
Incidence of falls (IF)	0.00	0.96	0.02	0.71	0.12	0.67	0.19	0.32
Incidence of pressure ulcer (PU)	-0.08	0.39	-0.05	0.43	-0.34	0.44	-0.21	0.46
Urinary tract infection related to invasive procedures (UTI)	0.23	0.00	0.16	0.00	1.26	0.00	0.80	0.00
Primary bloodstream infection (BSI)	-0.08	0.52	-0.05	0.55	-0.61	0.39	-0.43	0.41
Management								
Absenteeism	0.12	0.38	0.15	0.07	0.49	0.42	-.28	0.52
Turnover	0.20	0.04	0.13	0.06	0.61	0.24	0.39	0.24
Level of satisfaction with the nursing team	-2.61	0.00	-1.63	0.00	-8.84	0.00	-5.67	0.00

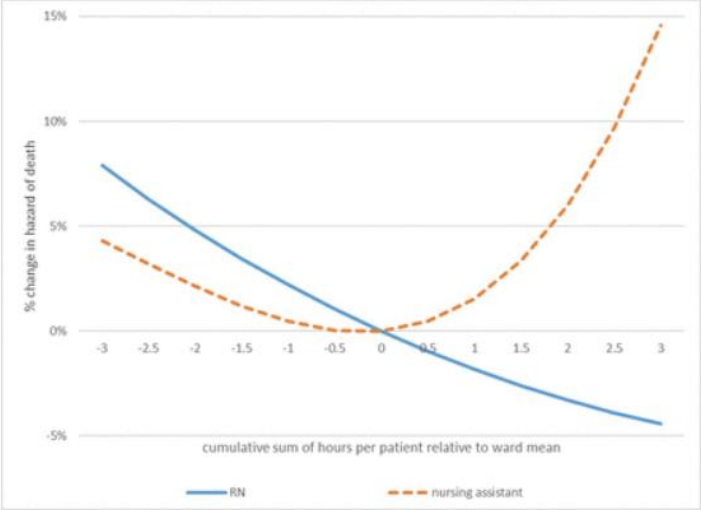
[B†]Generalized Estimating Equations describe the association between the factor under study and the outcomes. Associations were significant if P < 0.05.

"The results of the Generalized Estimating Equations (GEE) analysis demonstrated a significant association between the workloads in the inpatient units and the mean length of stay, urinary tract infection related to invasive procedure and the satisfaction of patients with the nursing care, as shown in Table 2" ((Magalhães et al., 2017, pg. 5).

A cross-sectional study conducted by Cho et al. (2016), included 60 hospitals with 100+ beds in South Korea. Initially, 65 hospitals with 100+ beds were selected (n=295) by a stratified random sampling method. All nurses in these hospitals were selected to participate. This study includes bedside RNs (n=3037) working in 51 of the hospitals selected (n=51). Responses are

from at least 10 bedside RNs. Through a nurse survey, data regarding staffing level, overtime, nurse-perceived patient safety, nurse-perceived quality of care, nurse-reported care left undone, and nurse characteristics were collected. Hospital characteristics were reported by the Health Insurance Review Agency (HIRA). Multilevel logistic regression models analyzed the effects of nurse staffing and overtime on patient safety, quality of care, and care left undone.

Figure 2



Results concluding that overtime and higher patients/nurse decreased overall patient safety (OR=1.02, 95% CI=1.004-1.03) and poor/fair quality of care (OR=1.02, 95% CI=1.01-1.04), and increased care left undone (OR=1.03, 95% CI=1.01-1.05). Compared to nurses working regular hours, registered nurses working overtime self-reported an 88% decrease in patient safety (OR=1.88, 95% CI=1.40-2.52), a 45% decrease in quality of care (OR=1.45, 95% CI=1.17-1.80), and an 86% increase in care left undone (OR=1.86, 95% CI=1.48-2.35). This study concluded that adequate nursing staff and fair working hours is vital to ensure patient safety and improve quality and safety of care, reducing care left undone.

Cho et al. (2016), concluded that appropriate nurse staffing and fair working hours is vital to improve the quality and safety of care and to reduce care left undone in hospitals. Similar

studies have been conducted in other countries and Cho concluded that, "The proportion of nurses that gave their hospital a patient safety grade of poor or failing was higher here in South Korea (16.4%) compared to the US (6%) and most European countries that participated in the Registered Nurse Forecasting (RN4CAST) project including Belgium, Finland, Germany, Ireland, Norway, Spain, Sweden, Switzerland, The Netherlands, and The United Kingdom (4–11%)" (Cho et al., 2016, pg. 6). From this, it is proven that nurse-perceived quality of care is more improved and better in the major countries, like the US, rather than South Korea. Advancements in technology and medicine can affect the quality of care. Richer countries have more resources and tend to have better patient care.

A quasi-experimental design conducted by Kulhberg et al. (2016), in Sweden compared nursing fixed scheduling vs. self-scheduling in oncological impatient care. 18-24 patients were in each ward. Over 90% of nursing staff were full-time employees, working 8-9 hours shifts including 2 out of 5 weekends. Fixed scheduling was implemented in two wards, while the other two wards continued with self-scheduling for a 10-week period. The Safety Attitudes Questionnaire was used to ask 31 specific questions pertaining to the study to all patients and 130 members of staff. Participations and their distribution over the wards is showed in Table 2.

Table 2

Participators and their distribution over the wards

	Baseline			*Follow-up*		
	Intervention n (%)	*Comparison n* (%)	*Total n*	*Intervention n* (%)	*Comparison n* (%)	*Total n*
Nurses	28 (61)	28 (61)	56	33 (57)	25 (58)	58
Assistant nurses	13 (28)	13 (28)	26	20 (34)	15 (35)	35
Physicians	4 (9)	3 (6)	7	2 (3)	0	2
Administrators	0	1 (2)	1	0	2 (5)	2
Unknown	1 (2)	1 (2)	2	3 (5)	1 (2)	4
Total	46 (100)	46 (100)	92	58 (100)	43 (100)	101
Patients	73 (52)	65 (48)	138	47 (52)	43 (48)	90

The response rate was 85% (n=46) in the fixed scheduling reporting less overtime and fewer shift changes. The response rate of the self-scheduling was 74% (n=46) reporting more

short notice shift change requests, but no effects of patient safety or outcomes. 138 patients responded at baseline and only 90 responded during follow-up. The mean score at baseline for the fixed scheduling group was 64, while the self-scheduling group was 57 (P-0.0298). At follow-up, the mean score for the fixed scheduling group was 63 and 53 for the self-scheduling group. (P=0.024). The P value indicates the differences between each group are independent of occasion. Through the survey, work satisfaction increased in the fixed scheduling group. No statistically supported evidence supports increased quality of care. This study concluded that fixed scheduling is preferable to limit overtime and shift changes, but more research is needed to expand upon the effects on patient safety and outcomes.

Dall'Ora et al. (2019), research temporary staffing and patient death in acute care hospitals through a retrospective longitudinal study. Data was collected on 138, 133 patients admitted to a hospital in England. Researchers concluded that days with 1.5 hours per patient of temporary nurses and days with more than 0.5 hours of temporary nurse assistants were associated with increased hazard of death.

Nurse-to-Patient Ratios

Lin et al. (2013), explores the standards for adequate nursing staff in acute care general wards in Taiwan. Researchers found that nurse-to-bed ratios and nursing hours are adequate indicators of nursing needs in acute care general wards. "The results of expert discussions and public hearings recommend 0.53 nurses per bed and 2.8 nursing hours for academic medical centers, 0.49 nurses per bed and 2.6 nursing hours for metropolitan hospitals, and 0.40 nurses per bed and 2.1 nursing hours for local community hospitals for the current stage of healthcare development; 0.57 nurses per bed and 3.0 nursing hours for academic medical centers, 0.53 nurses per bed and 2.8 nursing hours for metropolitan hospitals, and 0.44 nurses per bed and 2.3

nursing hours for local community hospitals in 3 years; and 0.61 nurses per bed and 3.2 nursing hours for academic medical centers, 0.57 nurses per bed and 3.0 nursing hours for metropolitan hospitals, and 0.48 nurses per bed and 2.5 nursing hours for local community hospitals in 5 years (Lin et al., 2013)."

Wynendaele et al. (2019), researched the association between the nurse-patient ratio and outcomes in acute care hospitals. Researchers concluded that apart for the need of a patient-nurse ratio, other variables need to be taken into consideration to ensure quality of care. These include patient acuity, skills of workers, and work environment. Taking these all into account can lead hospital managers to conduct evidence-based research to create new policy guidelines.

McHugh et al. (2020), conducted an observational study regarding nurse-to-patient legislation in Queensland, Australia hospitals. This included 4,372 medical surgical nurses and 146,456 patients in 68 public hospitals. "Medical-surgical nurse-to-patient ratios before implementation of ratio legislation varied significantly across hospitals (mean 5.52 patients per nurse; SD=2.03). After accounting for patient characteristics and hospital size, each additional patient per nurse was associated with 12% higher odds of 30-day mortality (OR=1.12; 95% CI 1.01 to 1.26). Each additional patient per nurse was associated with poorer outcomes for nurses including 15% higher odds of emotional exhaustion (OR=1.15; 95% CI 1.07 to 1.23) and 14% higher odds of job dissatisfaction (OR=1.14; 95% CI 1.02 to 1.28), as well as higher odds of concerns about quality of care (OR=1.12; 95% CI 1.01 to 1.25) and patient safety (OR=1.32; 95% CI 1.11 to 1.57)" (McHugh et al., 2020). Before ratios were standardized, higher nurse-to-patient ratios resulted in higher patient mortality, lower quality of care, and nursing burnout.

Sharma et al. (2020), is a systemic review researched in India. It discusses that some places have passed a law for minimum nurse-to-patient ratios in California, USA and

Queensland, Australia. It has scientifically been proved to benefit patients and the entire healthcare system. The Staff Inspection Unit, Indian Nursing Council, and Medical Council of India created nurse staffing norms but are not updated. “It is concluded that nurse staffing norms must be immediately revised in the light of international norms and research evidence available in this regard. Further, there is a need for workload analysis-based research evidence to have true nurse-to-patient ratio estimation for hospitals in India” (Sharma et al., 2020).

Nursing Burnout

Chen et al. (2019), gathered data on 1409 full-time RNs in medical and surgical wards in Taiwan through self-questionnaires. Higher average daily patient-nurse ratios predicted higher levels of burnout and job satisfaction. This results in more nurses wanting to leave their job, resulting in an even greater nursing shortage.

COVID-19 Effects on Bed Capacity

Fan et al. (2021), discusses the impact of COVID-19 on bed capacity and nursing workforce requirements through a retrospective review. COVID-19 created an increase demand for isolation beds, increasing the need for more nurses. Isolation bed capacity increased from <203 beds in January-March 2020 to up to 487 beds during March-April 2020. In April 2020, there was a shortage of 1.1 to 70.2 nurses in isolation units (Fan et al., 2021).

How to Calculate Safe Nurse Staffing Levels

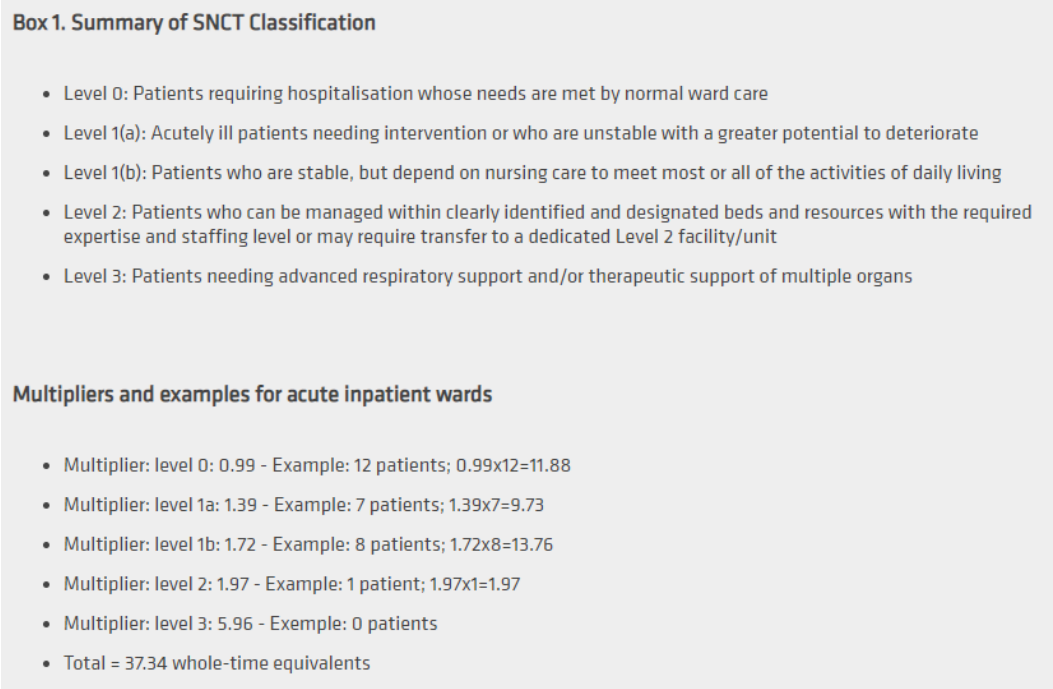
The National Institute for Health and Care Excellence endorsed a tool on safer nursing care and staff levels to be made locally for critical care wards. Decisions are based on sound evidence and factoring in not only number of patients, but patient needs and acuity. The Safer Nursing Care Tool (SNCT) helps to calculate safe nurse staffing for acute levels based on patient

acuity and dependency. It was developed by the Shelford Group of 10 leading teaching hospitals. It also includes quality indicators such as infection rates, complaints, pressure ulcers, and falls.

There is a need for nurse-to-patient-ratios because “low staffing levels and a low proportion of registered nurses on wards have been linked to poor patient outcomes, and there is evidence of increased harm when a registered nurse cares for eight or more patients during day shifts (Fenton et al., 2015).

All using this tool must collect data using the tool at the same time at least twice a year to ensure consistency and to create benchmarking. Nurses should collect data for each patient from Monday-to-Friday for a minimum of 20 days. Data include scoring patient who has occupied a bed in 24 hours to a sickness and dependency care levels, done each day as part of the 3pm round (Box 1). Data also includes monitoring NSIs, either retrospectively or using the electronic incident reporting system (Box 2).” Staffing multiplies for each sickness and dependency care level help nurses set baseline staffing levels (Box 1). These multipliers factor in nursing time spent on direct and indirect care, ward management, education/training, staff performance review, official and unofficial staff breaks, associated work such as administration and clerical, and bed occupancy” (Fenton et al., 2015).

Figure 3



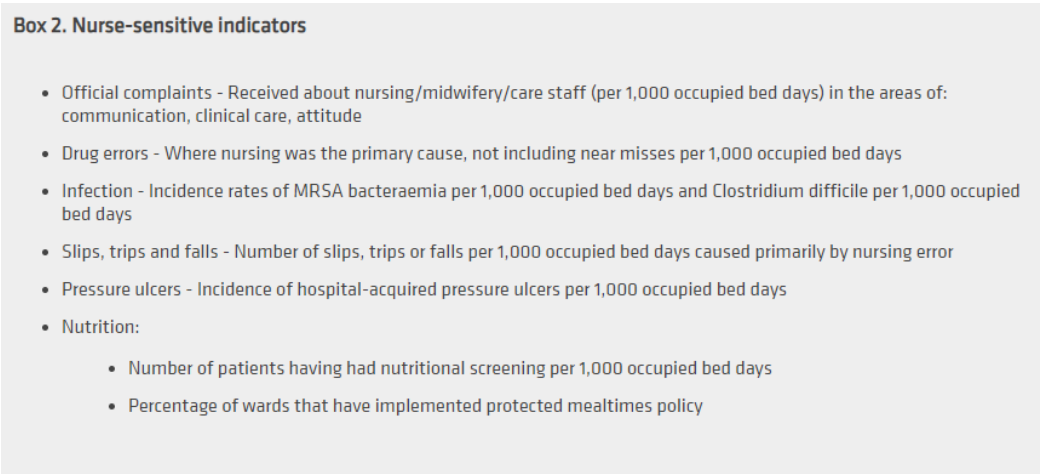
Box 1. Summary of SNCT Classification

- Level 0: Patients requiring hospitalisation whose needs are met by normal ward care
- Level 1(a): Acutely ill patients needing intervention or who are unstable with a greater potential to deteriorate
- Level 1(b): Patients who are stable, but depend on nursing care to meet most or all of the activities of daily living
- Level 2: Patients who can be managed within clearly identified and designated beds and resources with the required expertise and staffing level or may require transfer to a dedicated Level 2 facility/unit
- Level 3: Patients needing advanced respiratory support and/or therapeutic support of multiple organs

Multipliers and examples for acute inpatient wards

- Multiplier: level 0: 0.99 - Example: 12 patients; 0.99x12=11.88
- Multiplier: level 1a: 1.39 - Example: 7 patients; 1.39x7=9.73
- Multiplier: level 1b: 1.72 - Example: 8 patients; 1.72x8=13.76
- Multiplier: level 2: 1.97 - Example: 1 patient; 1.97x1=1.97
- Multiplier: level 3: 5.96 - Exemple: 0 patients
- Total = 37.34 whole-time equivalents

Figure 4



Box 2. Nurse-sensitive indicators

- Official complaints - Received about nursing/midwifery/care staff (per 1,000 occupied bed days) in the areas of: communication, clinical care, attitude
- Drug errors - Where nursing was the primary cause, not including near misses per 1,000 occupied bed days
- Infection - Incidence rates of MRSA bacteraemia per 1,000 occupied bed days and Clostridium difficile per 1,000 occupied bed days
- Slips, trips and falls - Number of slips, trips or falls per 1,000 occupied bed days caused primarily by nursing error
- Pressure ulcers - Incidence of hospital-acquired pressure ulcers per 1,000 occupied bed days
- Nutrition:
    - Number of patients having had nutritional screening per 1,000 occupied bed days
    - Percentage of wards that have implemented protected mealtimes policy

Nurses than can use NSIs to link data with outcomes of patient to ensure adequate staffing. NSI data is converted into a rate per 1,000 occupied bed days. University College London Hospitals and Frimley Health Foundation Trust have both successfully adopted the SNCT tool.

Figure 5

Box 3. Case studies

University College London Hospitals

Since 2012, University College London Hospitals Foundation Trust has set ward nursing establishments using the SNCT. The executive board is given regular updates on nursing and midwifery staffing and patient outcomes and experiences of care. Data on patients' levels of sickness and dependency is collected and analysed three times a year. The ward sister, matron and head of nursing review staffing and the data alongside nurse-sensitive indicators (NSIs), using their professional judgement to put staffing proposals to the annual staffing review. Agreed changes to the establishment are reflected in the following year's ward budget and updated on the e-rostering system. This allows recruiting to new posts and adjusting of "planned hours" of nursing care by day/shift for each ward. Any discrepancies between establishments, patient outcomes or experiences of care and nurses' professional judgement triggers an external service review. Staffing is displayed at the ward entrance at the start of each shift. If there is one registered nurse fewer than rostered, nurses are each caring for more than seven patients, or there are "red flag" events (NICE, 2014), the nurse in charge follows a standard escalation procedure, ultimately reporting to the chief or deputy chief nurses. NSIs are reviewed at monthly meetings of the matrons and nursing and midwifery board, allowing process and outcomes measures sensitive to nurse staffing to be monitored. This offers assurance methods to set nursing establishments are effective. A mobile app allowing direct data input on the ward (now being developed nationally) has reduced time spent on data collection for each ward by 45 minutes a day.

Frimley Health

Frimley Health Foundation Trust has used the SNCT throughout the trust to decide on nurse staffing levels for the past four years. Data on patients' levels of sickness and dependency is collected three times a year but the trust is now considering daily use of the tool, to ensure staffing needs based on patients' level of care become part of the daily "currency" of care. The intensive care unit already collects such data daily. As the tool does not take into consideration the turnaround of patients in the emergency department, so the trust no longer uses the tool in these areas. However, a recently adapted version of the tool is now used for the trust's acute assessment units. The trust gained the cooperation of staff by involving nursing staff from the outset, and encouraging open discussion of the advantages and disadvantages of using the tool. The senior sisters lead use of the tool, and data for each ward is collected by three people, either the senior sisters or a nominated deputy, One of the biggest challenges has been validating the data and ensuring consistency. Once a week when data is being collected, the trust allocates two senior nurses, one external and one from the ward, to validate and peer review the collection. Senior nurses also receive training three times a year prior to data collection, using case studies to agree the level of care. The tool lets the trust decide nurse staffing on the levels of care needed. The director of nursing is now proposing to use the data for budget review.

Griffiths et al. (2020), conducted an observational study to conclude if the SNCT is an adequate tool to measure nurse staffing requirement in acute hospitals. “When staffing was lower than that required according to the SNCT, for each hour per patient day of registered nurse staffing below the required staffing level, the odds of nurses reporting that there were enough staff to provide quality care were reduced by 11%. Correspondingly, the odds of nurses reporting that necessary nursing care was left undone were increased by 14%. Surgical specialty, patient turnover and more single rooms were associated with lower odds of staffing adequacy” (Griffiths et al., 2020).

Discussion and Conclusion

The primary outcome identified in the studies is the correlation of adequate nursing staffing and increased patient safety. Additional factors evaluated include overtime, scheduling process, nursing shortage, and patients/nurse.

Looking towards the future, it is vital for researchers to continue obtaining data on the relationship between nursing hours per shift and week, flexible scheduling, and adequate staffing. More evidence-based research can lead to changes in hospitals and care facilities around the world including new policies regarding staffing and hours. Many nursing associations have taken policy ideas for standardized nurse-to-patient ratios to policy changers. Another research study should be done to compare the long-term effects of overworked nurses, especially regarding COVID-19. Nurses are in constant demand right now and are putting their lives at danger. Nurses are now working more hours and each time they enter a shift, they have the potential to contract COVID-19 and spread it to their families who they go home to at the end of shift. Researches concluded first-hand from nurses that this has led to fear of working, burnout, and nurses personally becoming sick or losing their lives. An analysis of these working condition

outcomes will help the world realize the hardship or nurses and that more need to be hired to evenly distribute shift hours and floors. There is a need now more than ever for a standardized tool, such as the SNCT tool, to calculate a safe nurse-to-patient ratio to avoid burnout and decreased patient outcomes.

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