

# Nurse-to-patient ratio and nurse staffing norms for hospitals in India: A critical analysis of national benchmarks

Suresh K. Sharma<sup>1</sup>, Ritu Rani<sup>1</sup>

<sup>1</sup>College of Nursing, AIIMS, Rishikesh, Uttarakhand, India

## ABSTRACT

Optimum nurse-to-patient ratio is the concern of most of the nurse leaders globally. It has benefits both for nurses and patients; which is essential for patient's safety and quality of care. Some parts of the world such as California, USA, and Queensland, Australia has passed the law for the minimum nurse-to-patient ratio, which has scientifically found to be beneficial for the patients and healthcare system. Indian nurse staffing norms given by the Staff Inspection Unit, Indian Nursing Council, and Medical Council of India are developed through professional judgement models and are not updated. Five electronic databases were considered for literature search; in addition, grey literature and books were also searched. The primary outcome was to summarise exiting national nurse-to-patient norms and to find out the ideal nurse-to-patient ratio and nurse staffing norms as per Indian resources. 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.

**Keywords:** Nurse patient ratio, nurse staffing norms, nursing manpower requirement, nursing workforce requirement

## Introduction

The enactment of a standardized nurse to patient ratio is an ongoing discussion all over the world that would necessitate a precise nurse-patient ratio for hospitals to employ.<sup>[1]</sup> Studies have shown that appropriate nurse staff helps to achieve clinical and economic improvements in patient care, including enhanced patient satisfaction, reduction in medication errors, incidences of fall, pressure ulcers, healthcare-associated infections, patient mortality, hospital readmission and duration of stay, patient care cost, nurses' fatigue, and burnout.<sup>[2-7]</sup>

**Address for correspondence:** Dr. Suresh K. Sharma, College of Nursing, AIIMS, Rishikesh, Uttarakhand, India. E-mail: sk.aiims17@gmail.com

Received: 11-02-2020

Revised: 13-03-2020

Accepted: 20-03-2020

Published: 30-06-2020

It is a difficult question to answer how many nurses will be sufficient for a particular type of unit/ward of a hospital. However, the decision on the optimum level of nurse-to-patient ratio for a particular unit depends on several factors such as intensity of patients' needs, the number of admissions, discharges, and transfers during a shift, level of experience of nursing staff, layout of the unit, and availability of resources, such as ancillary staff and technology. The American Nurses Association supports a legislative model in which nurses are empowered to create staffing plans specific to each unit.<sup>[8]</sup> Victoria state in Australia was the first region in the world to introduce mandated minimum nurse/midwife-to-patient ratios during 2000 in its public sector enterprise agreement of nurse-to-patient ratio, 1:4 on morning shifts, 1:5 on afternoon shifts and 1:8 on night duty shifts, plus an in-charge nurse on all shifts, who have flexibility to allocate even fewer number of patients to a nurse based on patients' level of dependency.<sup>[9]</sup> Later in 2004, California became the first state of

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Sharma SK, Rani R. Nurse-to-patient ratio and nurse staffing norms for hospitals in India: A critical analysis of national benchmarks. *J Family Med Prim Care* 2020;9:2631-7.

### Access this article online

#### Quick Response Code:



Website:  
www.jfmpc.com

DOI:  
10.4103/jfmpc.jfmpc\_248\_20

USA to legally define required minimum nurse-to-patient ratio, i.e., general medical-surgical ward 1:5, emergency-1:4, and critical care units-1:2 or fewer in all the shifts,<sup>[8]</sup> which was found to be beneficial for both patients and nurses, and now other US states have also considered laws on minimum nurse staffing standards.<sup>[10]</sup>

The nurse–patient ratio is calculated using various approaches as no single approach would find its place in all settings. Over many years, staffing was determined by the census, i.e. the volume of patients indicated the volume of nurses needed to care for them. This was indeed rigid enough to meet the health needs of the patients during unforeseen emergencies etc.<sup>[11]</sup> The other approach, workload analysis or timed assignment or activity method includes the types and frequency of activities of nursing care. The World Health Organization has developed an approach to estimate the nurses' manpower requirement popularly named as workload indicator of staffing need; which is also known as the bottom-up approach that utilizes activity assessment to assess the need for nursing staff. It calculates the number of health care workers per cadre based on the available workload in the hospital.<sup>[12]</sup> Although it is an objective technique; it requires a committed and skilled team to assess significant personnel estimation information.<sup>[13]</sup> It depends upon the amount of workload available in a particular department. Some activities, however, trigger unforeseen delays, such as lagging reaction from others, changes in the condition of the patient, changes in the nursing team and skill mix, etc., There are three different aspects of workload such as task level, job-level and unit level where emotional and physical workload should be taken into consideration and these aspects have a direct effect on burnout, job satisfaction, and medication error.<sup>[14]</sup>

Various Indian committees and regulatory bodies have provided recommendations on benchmarks of the nurse-to-patient ratio. However, there is a paucity of critical analysis of the existing norms. Therefore, the present paper is providing a critical analysis of existing national nurse staffing norms by comparing with international norms, guidelines and legislations and discussion with national and international research evidence in this regard.

## Methods

The search strategy was developed by the research team. Five electronic databases (Embase, Ovid, ClinicalKey, PubMed, and MEDLINE) were considered for literature search; in addition, grey literature and books were also searched. Controlled vocabularies such as MeSH (medical subject headings) terms were used wherever available; otherwise, a combination of keywords as boolean operators were used for electronic literature search. The search terms used were nurse staffing, nurse-to-patient ratio, nurse workload, nursing workforce, measures for nurses' workload, manpower requirement, nurse staffing norms. The search was limited to the English language; however, all the published data related to Indian recommendation of nurse-to-patient ratio/nurse staffing norms and recently published (since independence till 2020) national and international evidence related to nurse staffing norms were considered. The primary outcome was to find out the ideal nurse to patient ratio and nurse staffing norms.

### Nurse staffing norms in India

The Bhole Committee, Shetty Committee, Bajaj Committee, High power committee, and Cadre review committee on nursing and nursing profession have provided recommendations about nurse-to-population ratio and nurse staffing norms for the hospitals. Summaries about the nurse-to-patient recommendations of these committees have been illustrated in Table 1.

Nurse staffing norms also have been enacted by nursing and medical regulatory/accrediting bodies in India. Summaries of norms for nurse-to-patient ratio provided by Indian Nursing Council (1985),<sup>[17]</sup> Medical Council of India (1990),<sup>[18]</sup> Staff Inspection Unit (1991 - 92)<sup>[19]</sup> and National Accreditation Board for Hospitals and Healthcare providers (2005)<sup>[20]</sup> has been presented in Table 2.

### Research evidence on nurse-to-patient ratio

Some of the research studies conducted to assess the gap between required and existing nurse-to-patient ratios in selected units of

**Table 1: Nurse staffing recommendations of various Indian committees**

Indian Committees	Summary of nurse-to-patient ratio recommendations <sup>[15,16]</sup>
Bohre Committee, (1946)	The Health Survey and Development Committee, for the first time, took an initiative to improve the working condition, training, advanced studies, gazetted status and social security of nurses. It proposed one nurse to 500 population.
Shetty Committee, (1954)	It recommended the minimum nurse to patient ratio of 1:3 in teaching hospitals and 1:5 in general hospitals and a post of senior nurse.
Bajaj Committee, (1986)	It recommended NS- 1:200 beds, DNS- 1:300 beds, ANS- 7:1000+ one additional 1000 beds, Nursing Sisters- 8:200+30% LR, Staff Nurses for Wards- 1:3 (or 1:9 for each shift) + 30% LR, Staff Nurses for ICU- 1:1 (or 1:3 for each shift)+30% LR; Nurses for OPD & Emergency etc.- 1:100 patients+30% LR, For specialized departments such as OT, Labour Room- 8: 200+30% LR.
High Power Committee, (1987)	It recommended NS- 1:200 beds (hospitals with 200 or more beds), DNS-1:300 beds (wherever beds are over 200), ANS- 1:150 beds (wherever beds are over 150) (7:1000), Nursing Sisters- 1:25 beds+30% LR, Staff Nurses for Wards- 1:3 (or 1:9 for each shift) + 30% LR, Staff Nurses for ICU-: 1:1 (or 1:3 for each shift) + 30% LR; Nurses for OPD & Emergency etc.- 1: 100 patients+30% LR, For specialized departments such as OT, Labor Room- 1: 25+30% LR.
Cadre Review Committee, (1988)	It provided nurse staffing norms for a 500 beds hospital as follows: NS-01, DNS-01, ANS-09, Nursing sisters-54, staff nurses-270.

NS: Nursing Superintendent, DNS: Deputy Nursing Superintendent, ANS: Assistant Nursing Superintendent, LR: Leave Reserve, ICU: Intensive Care Unit, OPD: Out Patient Department, OT: Operation Theatre

**Table 2: Existing Nurse-to-Patient Ratio Norms in India**

Statutory/Accrediting Bodies	Summary of nurse-to-patient ratio recommendations
Indian Nursing Council, (1985) <sup>[17]</sup>	It recommended CNO- 1:500 beds, NS- 1:400 beds, DNS- 1:300 beds & 1 additional for every 200 beds, ANS- 1:100-150 beds or 3-4 wards, Nursing sisters- 1:25-30 beds or one ward+30% LR, Staff Nurses- 1:3 beds in teaching and 1:5 beds in non-teaching hospital+30% LR, Staff Nurses for ICU- 1:1 (or 1:3 for each shift)+30% LR, For OPD & Emergency etc.- 1: 100 patients+30% LR, For specialized departments such as OT, Labur Room- 1:25+30% LR, one Infection Control Nurse (ICN) for 250 bedded hospital, Extra nursing staff for departmental research work.
Medical Council of India, (1990) <sup>[18]</sup>	For Teaching Hospital (150 beds): NS-01, DNS-01, ANS-02 (For every additional 50 beds, one more ANS should be there) For wards- (Medical, Surgical, Orthopaedic, Paediatric, Gynaecology, Maternity including new-borns)- DNS/ANS: 01 for 34 ward; Nursing Sister: one for each ward/shift or 1:25 and Staff Nurses: 1:3 (for 24 hours). For specialized/Critical Care Units (ICU, CCU, Nephrology, Neurology & Neurosurgery), & special wards as Eye, ENT: - DS/ANS: 01 for 3-4 units; Nursing Sister one per shift and Staff Nurses: 1:1 (for 24 h), For OT - DNS/ANS: 01 for 4-5 Operating Rooms; Nursing Sister: 01 per shift; Staff Nurses: 03 per table (24 h), For Minor OT: - 01 staff nurse for every 13 patients. Causality & Emergency Unit - DS/ANS: 01 for each unit; Nursing Sister: 01 per shift; Staff Nurses: 2-3 staff nurses (depends on beds). Out Patient Departments (OPDs) - Based on actual observation as detailed below: For Surgical, orthopaedic, Dental and ENT- 01 staff nurse for every 120 patients; Medical- 01 staff nurse for every 140 patients; Gynae- 01 staff nurse for every 35 patients; Paediatrics- 01 staff nurse for every 85 patients; Skin- 01 staff nurse for every 100 patients and Injection Room & Eye OPD- 01 staff nurse for every 86 patients. In addition to the mentioned ratio, there will be 30% LR in all categories of nurses.
Staff Inspection Unit (SIU) Norms, (1991-1992) <sup>[19]</sup>	It recommended CNO- 1:500 or more beds; NS- 1:250 beds; one DNS: 7.5 ANS; one ANS: 4.5 nursing sister; one nursing sister: 3.6 staff nurses; Staff Nurses-to-bed ratio: General wards- 1:6; Special wards-1:4; ICUs-1:1; Nursery Unit-1:2; Major OT- 2 staff nurses per table; Minor OT- 01 staff nurse per table. Casualty:- Main (up to 100 patients/day)- 03 staff nurses/nursing sisters for 24 h; 1:1 per shift+1:35 (for every additional 35 patients); Burns (up to 15 patients/day)- 3 staff nurses for 24 h; 1:1 per shift+1:10 (for every additional 10 patients); Orthopedics (up to 45 patients/day)- 03 staff nurses/nursing sisters for 24 h; 1:1 per shift+1:15 (for every additional 15 patients); Gynae/Obstetric (up to 40 patients/day)- 03 staff nurses/nursing sisters for 24 h, 1:1 per shift+1:15 (for every additional 15 patients). Out Patient Department (OPDs): 1-3 staff nurses, Injection Room- 1: 100 patients, 2: 120-220 patients, 3: 221-320 patients, 4: 321-420 patients per day. It also recommended 45% additional staff for the leaver reserve.
NABH, (2005) <sup>[20]</sup>	ICU- 1:1 (Ventilator beds), 1:2 (Non- Ventilator beds) each shift, HDU- 1:3 each shift, Inpatient beds- 1:6 each shift, OT- two nurses per table each shift, Emergency- 1:1 (Ventilator beds), 1:4 (other beds) each shift, OPD/Variuos procedures- as per workload, Labur table- 01 nurse per table each shift, ICN - 01 for 100 beds, Supervisor staff- as applicable.

CNO: Chief Nursing Officer, NS: Nursing Superintendent, DNS: Deputy Nursing Superintendent, ANS: Assistant Nursing Superintendent, LR: Leave Reserve, DS- Departmental Sister, ICU: Intensive Care Unit, OT: Operation Theatre, OPD: Out Patient Department, HDU: High Dependency Unit, ICN: Infection Control Nurse, CCU: Coronary Care Unit, ENT: Ear, Nose and Throat, MoHFW: Ministry of Health and Family Welfare, NABH: National Accreditation Board for Hospitals & Healthcare Providers

acute care hospitals in India. The summary of these studies has been presented in Table 3.

### International nurse staffing norms

The norms or legislations for minimum nurse-to-patient ratio prescribed by different organization in selected developed countries like UK, USA, Australia, and Canada has been presented in Table 4.

## Discussion

The nurse-to-patient ratio is one of the determining factors of the patient outcome. The higher workload and lower nurse-to-patient ratio increases the risk of medication errors, iatrogenic complications, hospital morbidity, prolonged hospital stay and compromised patient safety.<sup>[26]</sup> A study was conducted in 168 general hospitals of Israel and found that an increase in the nurse-to-patient ratio from 1:4 to 1:6 raised the patient mortality rate by 7% and with further increase in nurse-patient

ratio to 1:8, the mortality rate increased to 14%.<sup>[11]</sup> The world authority in nurse-to-patient ratio research Professor Linda Aiken and her team (2002) found that for every extra patient over four patients per nurse in a general medical or surgical ward, there is a direct impact on a patient's recovery and the risk of serious complications and/or death.<sup>[2]</sup>

Surprisingly, the existing recommended nurse-to-patient ratio for the general wards in India is 1:6 by SIU<sup>[19]</sup> and NABH,<sup>[20]</sup> and 1:5 by INC<sup>[17]</sup> for non-teaching hospitals; which is significantly lower when compared to international norms. The understaffing results in more "task-oriented" nursing care with minimal consideration of the emotional well-being and quality of care.<sup>[34]</sup> However, in the present scenario of higher care complexity and advancement in technologies, the concept of an optimal level of nurse staff planning fails to estimate the nurse-patient ratio as no one size can fit all.<sup>[1,35]</sup> Even the recommendations of nurse-to-patient ratios from the United States, United Kingdom, Australia, Canada, and other developed nations are also not consistent, however, the studies suggested that 1:4 nurse-to-patient ratio is

**Table 3: Research evidence on Nurse-to-Patient Ratio in India**

Author, year	Study design	Participants	Ward, Area	Measure of NPR	Results
Soumi Sarkar, 2014, Maharashtra <sup>[21]</sup>	Prospective Observational study	32 Neonates in NICU & 18 in step down nursery	NICU, Tertiary Care teaching hospital	Activity Analysis	Required NPR Non ventilated & non-surgical NICU-1:3.3 Existing- 1:10
Manu Sharma, 2010, Chandigarh <sup>[22]</sup>	An exploratory design	Total of 970 patients	Cardio-thoracic vascular surgery (CTVS) ICU, Step-down ICU and ward, tertiary care hospital	Dependency acuity-quality method given by K. Hurst along with professional judgments.	Required NPR CTVS ICU- 1:1.5, CTVS step down ICU- 1:3, Cardio ward-1:6. Existing- NA
Seema Sachdeva, 2010, Chandigarh <sup>[23]</sup>	An exploratory study design	Total of 701 patients and 95 nursing activities	Neonatal Surgical Intensive Care Unit (NSICU)	'work measurement' concepts	Required NPR ICU-1.5:1 per day Recovery Unit- 1:1 per day Private Unit- 1:1 per day Existing- NA
Rajinder Kaur, 2010, Chandigarh <sup>[24]</sup>	An exploratory study	NSICU-183 & NSW- 502 patients	Neurosurgery intensive care unit (NSICU) and neurosurgery ward (NSW)	Acuity quality and activity analysis method	Required NPR NSICU-1:0.7 NSW- 1: 0.6 Existing -NA
Amanvir Kaur, 2010, Chandigarh <sup>[25]</sup>	Descriptive observational	600 observations on 132 ventilation and 285 non-ventilation neonatal days	Neonatal Intensive Care Unit (NICU)	Activity analysis	Required NPR Ventilated patients-1:2, Non Ventilated Patients- 1:3 Existing NPR Ventilated patients- 1:2.4 Non Ventilated Patients-1:3.6
Deepi, 2010, Chandigarh <sup>[26]</sup>	Exploratory study	Nursing activities and the 276 patients admitted in CCU	CCU (Coronary Care Unit) PGIMER, Chandigarh	Dependency acuity-quality method	Required Ratio- 1:2-day time 1:3-night time Existing- NA
Bala R, 2010, Chandigarh <sup>[27]</sup>	Exploratory study	96 Nursing activities 35 patients in 12 bedded ICU (34 days)	ICU, Tertiary Care hospital	Activity analysis, and Arndt and Huckabay equation	Required Ratio-1.75:1 Existing Nurses- 1:1

NPR: Nurse Patient Ratio, NA: Not Available ICU: Intensive Care Unit, NICU: Neonatal Intensive Care Unit, NAS: Nursing Activities Score, TISS: Therapeutic Intervention Scoring System, NEMS: Nine Equivalents of Nursing Manpower use Scale.

best for patients' health outcomes.<sup>[36]</sup> Optimum nurse-to-patient ratio not only reduces the workload of the nurses but also improves patients' satisfaction and quality of health care.<sup>[1]</sup>

The nurse-to-patient ratio for intensive care units recommended by SIU is 1:1; while NABH recommended 1:1 for ventilated patients and 1:2 for non-ventilated patients. These recommendations are in line with international norms. However, the ratio recommended by INC was significantly lower, i.e. only 1:3 or 1:1. Most of the research studies conducted in critical care units of the selected tertiary care hospitals in India also highlighted the required nurse-patient ratio of less than 1:1 in different ICUs.<sup>[23,24,27]</sup> The norms recommended by these Indian committees, and Statutory/Accrediting bodies were about 30–35 years back, based on census and professional judgement method to estimate the nurse-patient ratio. These approaches of nurse-to-patient ratio estimation have serious drawbacks of under or overestimation of direct nursing care activities.<sup>[37]</sup> SIU norms are most frequently used for nurses manpower estimation in India but it is also not flawless, for example, it has clubbed the post of the nursing sisters and the staff nurses together, which makes staff estimation confusing.<sup>[17]</sup>

Several time and activity studies recommend that the requirement of the nurses for meeting the minimum standards of care should

be based on the degree of the patients' illness, i.e. completely dependent, partially dependent and ambulatory.

The fixed nurse-to-patient ratio is followed in most parts of the world and it has even become legislation in some parts of the world like California,<sup>[32]</sup> Queensland,<sup>[38]</sup> and Australia.<sup>[9]</sup> Further, other states of the USA and Australia are trying to get such legislations implemented in their states. However, the American Organization of Nurse Executives objects fixed mandatory laws for nurse staffing with an argument that it reduces the flexibility in the working conditions of the nurses.<sup>[39]</sup> The American Nurses Association supports a legislative model in which nurses are empowered to develop nurses staffing plans which are particular to their unit, more flexible and can change according to the health needs of the patient, expertise level of the nurses, working environment, availability of resources with the provision of minimum upwardly adjustable staffing levels in order to achieve safe and apt staffing strategies.<sup>[40]</sup>

It has been observed in the research studies that patient care load does not remain constant during all three shifts; it is highest during the morning shift and progressively lesser during the evening and night shift.<sup>[41]</sup> Thus, Australian Nursing and Midwifery Federation, Victoria recommended varying nurse-to-patient ratio in general wards for each shift,

**Table 4: International Nurse Staffing Norms**

Staffing Norms Agency	Summary of Nurse-Patient Ratio Recommendations
BACCN, RCN, CC3N & In-flight forum, (2009), UK <sup>[28]</sup>	All agencies worked together to develop contemporary standards for critical care nurses in the UK. In Wales, Scotland and Northern Ireland may have different health policies specific to these areas, however, the principles are transferable to all critical care units. Adult Intensive Care- 1:1 (Ventilated)
RCN (2003), UK <sup>[29]</sup>	Children General ward and departments- <2 years- 1:3, other ages- 1:4 (day), 1:5 (Night).
DH guidance (2003), British Association of Perinatal Medicine (2001), UK <sup>[29]</sup>	Minimum RN: Infant ratio- Special care - 1:4, High dependency- 1:2, Intensive care- 1:1.
Paediatric Intensive Care Society, UK <sup>[30]</sup>	Level 1-0.5:1, Level 2-1.5:1, Level 3-1.5:1, Level 4-2:1.
The European Federation of Critical Care Nursing Associations, (2007), UK <sup>[31]</sup>	Level 3 (intensive care) patients- 1:1 to deliver direct care Level 2 (high dependency) patients - 1:2 to deliver direct care.
NNU RNs Sponsor National Ratio Legislation, USA <sup>[32]</sup>	ICU/NICU- 1:2, OT - 1:1 (Plus at least one additional scrub assistant), Post anaesthesia- 1:2; Labor and delivery- 1:2; Antepartum/Postpartum couplets/Combined labor & Delivery & postpartum- 1:3; Intermediate Care Nursery- 1:4, Well baby nursery- 1:6, Paediatrics- 1:3; Emergency Room-1:3; Trauma patient in ER-1:1; ICU patient in ER- 1:2; Medical/Surgical wards- 1:4; Coronary Care/Acute Respiratory Care/Burn- 1:2; Psychiatric/Other speciality care units-1:4; Rehabilitation- 1:5; Skilled Nursing facility- 1:5.
California, (2008), USA <sup>[32]</sup>	Intensive/Critical Care- 1:2; Pediatrics- 1:4; Neonatal Intensive Care- 1:2; Emergency- 1:4; Operating Room- 1:1; PAR- 1:2; Trauma Patients in ER- 1:1; Ante partum- 1:4; Labour & delivery- 1:2; Postpartum- mother & baby- 1:4; Postpartum- women only- 1:6; Medical Surgical wards- 1:5; Other speciality care- 1:4; Psychiatric- 1:6.
Victorian Staffing Ratio, (2001), Australia <sup>[9]</sup>	General medical/surgical wards- 1:4-6 plus in-charge nurse (M & E), 1:8-10 (N); Ante/postnatal-1:4 plus in-charge nurse (M & E) and 1:6 (N); NICU- 1:2 plus one in-charge nurse on all shifts; Acute wards- 1:6 plus one in-charge nurse (M); 1:7 plus one in-charge nurse (E); 1:10 (N); Aged Care Wards- 1:7 plus one in-charge nurse (M); 1:8 plus one in-charge nurse (E); 1:15 (N); CCU- 1:2 plus one in-charge nurse (in all shifts); Palliative Care- 1:4 plus in-charge nurse (M); 1:5 plus in-charge nurse (E); 1:8 (N); PACU Recovery Room- 1:1 (unconsciousness patients).
Canada MIS Database, CIHI, (2014-2015) <sup>[33]</sup>	General Medical-1:4; Surgical-1:3; Combined Med-Surg-1:3; Paediatrics -1:2; Adult ICU- 1:1; Palliative nursing unit- 1:3; Obstetric nursing unit-1:2; Mental health and addiction services nursing unit- 1:4.

BACCN: British Association of Critical Care Nurses, CC3N: Critical Care Networks Nurse Leads, RCN: Royal College of Nursing, DH: Department of Health, UK: United Kingdom, USA: United States of America, RN: Registered Nurse, PAR: Post Anaesthesia Recovery, ER: Emergency Room, NICU- Neonatal Intensive Care Unit, M: Morning, E: Evening, N: Night, CCU: Coronary Care Unit, PACU: Post Anaesthesia Care Unit, CIHI: Canadian Institute for Health Information, MIS: Management Information System, NNU: National Nurses United, RNs: Registered Nurses, ER: Emergency Room.

i.e. morning-1:4; afternoon-1:5, and night-1:8.<sup>[9]</sup> However, existing Indian norms are not as per workload of the different shifts, which could contribute into an overestimation of the required number of nurses and higher healthcare cost. In line with a study, done in the maternity ward of the Medical College Hospital in Kolkata, which aimed to find out the nurses' requirement based on the workload analysis method, showed that there was over staffing and less work pressure.<sup>[42]</sup>

The high power committee for nursing and INC recommended 30% leave reserve considering 24 offs, 30 EL, 10 CL, and 02 RH to be provided to the nurses.<sup>[43]</sup> However, as per new norms, nurses working in the public sector are expected to give 99 offs in a year and there is also the provision of Child Care Leave for female nurses; thus additional 15% leave reserve is required.<sup>[44]</sup> In this line, SIU norms recommended 45% posts added for the area of 365 days working including 10% leave reserve (maternity leave, earned leave, and days off) as nurses are entitled for 8 days off per month and 3 national holidays per year when doing 3 shift duties.<sup>[17]</sup>

The estimations of the nurse-to-patient ratios are primarily done based on the projected workload of nurses for direct patient care.<sup>[17]</sup> However, nurses are involved in various indirect care activities such as in documentation, communication, meetings, rounds, reporting, administrative, and other logistics-related

activities; which are generally not taken into consideration while estimating nurse-to-patient ratio. Studies highlighted that nurses are found to spend their 30–50% time in indirect care activities.<sup>[41,45]</sup> Thus, nurses should be provided with technological and supportive staff help, so that they can spend more time on direct patient care.

A different approach that would optimize the nursing performance needs to be developed, like constituting a team of nurses with a range of skill levels and experiences. Instead of one nurse working exclusively with one patient, a team of nurses could work for a group of patients including the most senior team member who guides, facilitates and offers patient care as well.<sup>[46]</sup>

## Conclusion

- Nurse staffing norms in India are not updated since a long and they are far behind from international norms and estimated ratios in some of the research studies conducted in India. However, recommendations given by NABH are most recent and realist, practical and feasible to use in India
- A single norm for all the wards and hospitals cannot be used for a fair estimation of nursing human resource needs. While estimating nurse-to-patient ratio estimation different factors such as unit workload, patients' dependency,

skill mix, available proportion of nurses' productive and non-productive activities, and variations in time and nursing care activities during the shift should be considered

- Considering Indian resources, best international norms and Indian research evidence, we recommend following nurse-to-patient ratio in each shift for Indian hospitals.

General wards: 1:6; Super speciality wards: 1:4; high dependency units: 1:3; ICUs and Post-op recovery rooms: 1:1 (ventilator beds) and 1:2 (non-ventilator beds); Emergency and Trauma: 1:1 (ventilator beds) and 1:2 (non-ventilator beds); Labor room: 02 nurse per labor table; antenatal/postnatal ward: 1:4; Pediatric ward:- 1:5; neonatal ICU 1:1; acute respiratory/burns unit: 1:2; palliative care unit: 1:4; major OT: 02 nurses for each table; minor OT: 1:1; Chemotherapy/Daycare Unit: 1:3; OPD procedure rooms: 1:1 and OPDs: 1:50 patients; Infection control nurse: 01 for every 100 beds; and 10–15 nurses for the work of diabetes nurse educator, wound care nurse, stoma nurse, dialysis nurse, organ transplant coordinator nurse, Peripherally inserted central venous catheter (PICC) line care nurse and nurse research assistants. Further, there must be 45% additional nurses for the leave reserve and in-charge nurses must have the flexibility to distribute nurses as per workload in each shift. Further extensive studies are needed to provide staffing standards for nurses, based on the available workload of tertiary care hospitals.

### Acknowledgement

We are sincerely thankful to Dr. Shiv Kumar Mudgal and Ms. Km. Madhu for their contributions during the article preparation.

### Institutional clearance

This study was duly approved by the competent authority but being a review did not require ethical approval.

### Financial support and sponsorship

This study received no specific grant from any funding agency.

### Conflicts of interest

The authors declare that they have no conflicts of interest.

## References

1. Rassin M, Silner D. Trends in nursing staff allocation: The nurse-to-patient ratio and skill mix issues in Israel. *Int Nurs Rev* 2007;54:63-9.
2. Aiken L. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA* 2002;288:1987-93.
3. Duffield C, Diers D, O'Brien-Pallas L, Aisbett C, Roche M, King M, *et al.* Nursing staffing, nursing workload, the work environment and patient outcomes. *Appl Nurs Res* 2011;24:244-55.
4. Tubbs-Cooley H, Cimiotti J, Silber J, Sloane D, Aiken L. An observational study of nurse staffing ratios and hospital readmission among children admitted for common conditions. *BMJ Qual Saf* 2013;22:735-42.
5. Twigg D, Duffield C, Thompson P, Rapley P. The impact of nurses on patient morbidity and mortality-the need for a policy change in response to the nursing shortage. *Aust Health Revi* 2010;34:312-6.
6. Spetz J. What should we expect from California's minimum nurse staffing legislation? *J Nurs Admin* 2001;31:132-40.
7. Buerhaus P, Needleman J. Policy implications of research on nurse staffing and quality of patient care. *Policy Polit Nurs Pract* 2000;1:5-15.
8. The Importance of the Optimal Nurse-to-Patient Ratio [Internet]. *Nursingeducation.lww.com*. 2020 [cited 2020 Feb 8]. Available from: [http://nursingeducation.lww.com/blog.entry.html/2016/11/10/the\\_importance\\_ofth-GCAE.html](http://nursingeducation.lww.com/blog.entry.html/2016/11/10/the_importance_ofth-GCAE.html).
9. [Internet]. 2020 [cited 2020 Jan 2]. Available from: <http://www.anmfvic.asn.au/~media/f06f12244fbb4522af619e1d5304d71d.ashx>.
10. Nurse-to-Patient Ratio: How Many is Too Many? | King University Online [Internet]. King University Online. 2020 [cited 2020 Jan 2]. Available from: <https://online.king.edu/news/nurse-to-patient-ratio/>.
11. Adomat R, Hewison A. Assessing patient category/dependence systems for determining the nurse/patient ratio in ICU and HDU: A review of approaches. *J Nurs Manag* 2004;12:299-308.
12. Workload Indicators of Staffing Need (WISN) [Internet]. World Health Organization. 2020 [cited 2020 Mar 18]. Available from: [https://www.who.int/hrh/resources/wisn\\_user\\_manual/en/](https://www.who.int/hrh/resources/wisn_user_manual/en/).
13. Higgins L, Shovel J, Bilderback A, Lorenz H, Martin S, Rogers D, *et al.* Hospital nurses' work activity in a technology-rich environment. *J Nurs Care Qual* 2017;32:208-17.
14. Van den Oetelaar W, van Stel H, van Rhenen W, Stellato R, Grolman W. Balancing nurses' workload in hospital wards: Study protocol of developing a method to manage workload. *BMJ Open* 2016;6:e012148.
15. Bajaj JS. Expert Review Committee Health Manpower Planning and development. U11010/2/86-MEP dated 8/5/1986. Ministry of Health and Family Welfare, New Delhi: Government of India; 1986.
16. Basavanthappa BT. *Community Health Nursing*. 2<sup>nd</sup>ed. New Delhi: Jaypee Brothers Publications; 2008. p. 878-85.
17. Function of nursing management [Internet]. *Currentnursing.com*. 2020 [cited 2020 Feb 8]. Available from: [http://www.currentnursing.com/nursing\\_management/staffing\\_nursing\\_units.html](http://www.currentnursing.com/nursing_management/staffing_nursing_units.html).
18. [Internet]. *Mciindia.org*. 2020 [cited 2019 Dec 2]. Available from: <https://mciindia.org/CMS/wp-content/uploads/2017/10/Minimum-Standard-Requirements-for-100-Admissions.pdf>.
19. [Internet]. *Indiannursingcouncil.org*. 2020 [cited 2019 Dec 2]. Available from: <http://www.indiannursingcouncil.org/pdf/ICNGoldenJublie.pdf>.
20. [Internet]. *Ficci.in*. 2020 [cited 2019 Dec 2]. Available from: [http://ficci.in/spdocument/20756/FICCI\\_heal-Report\\_Final-27-08-2016.pdf](http://ficci.in/spdocument/20756/FICCI_heal-Report_Final-27-08-2016.pdf).
21. Sarkar S, Kumari M, Sangwan M, Rashid S, Lukas R, Narayan S. Estimating neonatal nursing staff requirement by activity analysis. *J Mar Med Soc* 2014;16:132.
22. Sharma M, Sharma S, Singh RS. An exploratory study on "nursing manpower requirement" for cardio-thoracic vascular surgery intensive care unit, Step-down intensive care unit and ward. *Nurs Midwifery Res J* 2010;6:47-57.

23. Sachdeva S, Kalia R, Menon P. "Nursing Manpower" for neonatal surgical intensive care unit. *Nurs Midwifery Res J* 2010;6:81-92.
24. Kaur R, Vati J, Chhabra R. Exploratory study on "nursing manpower" requirement for patients of neurosurgical unit. *Nurs Midwifery Res J* 2010;6:58-70.
25. Kaur A, Kaur S, Kalia R, Kumar P. A study on "Nursing manpower requirement in neo-natal intensive care unit": PGIMER, Chandigarh. *Nurs Midwifery Res J* 2010;6:1-13.
26. Sharma S, Sharma YP. An exploratory study on "nursing manpower" requirement for coronary care unit of PGIMER, Chandigarh. *Nurs Midwifery Res J* 2010;6:14-23.
27. Bala R, Kaur S, Yaddanapudi L. Exploratory study on nursing manpower required for caring critically ill patients in intensive care unit. *Nurs Midwifery Res J* 2010;6:71-80.
28. [Internet]. 2020 [cited 2019 Dec 2]. Available from: [http://icmwk.com/wp-content/uploads/2014/02/nurse\\_staffing\\_in\\_critical\\_care\\_2009](http://icmwk.com/wp-content/uploads/2014/02/nurse_staffing_in_critical_care_2009).
29. [Internet]. 2020 [cited 2019 Dec 2]. Available from: <http://www.weds.wales.nhs.uk/sitesplus/documents/1076/rcn%20safe%20staffing%20levels.pdf>.
30. [Internet]. Picsociety.uk. 2020 [cited 2019 Dec 2]. Available from: [https://picsociety.uk/wp-content/uploads/2015/10/PICS\\_Standards\\_Appendix\\_2010.pdf](https://picsociety.uk/wp-content/uploads/2015/10/PICS_Standards_Appendix_2010.pdf).
31. [Internet]. Ficm.ac.uk. 2020 [cited 2019 Dec 2]. Available from: <http://www.ficm.ac.uk/sites/default/files/Core%20Standards%20for%20ICUs%20Ed.1%20%282013%29.pdf>.
32. [Internet]. 2020 [cited 2019 Nov 8]. Available from: [https://nurses.3cdn.net/f0da47b347e41bb03a\\_z1m6v11sd.pdf](https://nurses.3cdn.net/f0da47b347e41bb03a_z1m6v11sd.pdf).
33. [Internet]. 2020 [cited 2019 Nov 8]. Available from: <http://www.nhlc-cnls.ca/assets/2016%20Ottawa/Singer%20Poster%20FSI%20Staff%20to%20Patient%20Ratio.pdf>. Published 2020.
34. Hinno S, Partanen P, Vehviläinen-Julkunen K. Nursing activities, nurse staffing and adverse patient outcomes as perceived by hospital nurses. *J Clin Nurs* 2011;21:1584-93.
35. Saini SK, Singh C. Organisational structure and nursing service management of select hospitals. *Nurs Midwifery Res J* 2008;4:72-86.
36. The effects of nurse to patient ratios | Nursing Times [Internet]. Nursing Times. 2020 [cited 2019 Nov 8]. Available from: <https://www.nursingtimes.net/roles/nurse-managers/the-effects-of-nurse-to-patient-ratios-17-01-2011/>.
37. [Internet]. 2020 [cited 2019 Nov 8]. Available from: [https://www.who.int/hrh/documents/hurst\\_mainreport.pdf](https://www.who.int/hrh/documents/hurst_mainreport.pdf).
38. [Internet]. Who.int. 2020 [cited 2019 Nov 8]. Available from: [https://www.who.int/hrh/resources/WISN\\_Eng\\_UsersManual.pdf](https://www.who.int/hrh/resources/WISN_Eng_UsersManual.pdf).
39. Frequently asked questions | Queensland Health [Internet]. Health.qld.gov.au. 2020 [cited 2019 Nov 8]. Available from: <https://www.health.qld.gov.au/ocnmo/nursing/nurse-to-patient-ratios/nurse-patient-ratios-faqs>.
40. Welton J. Mandatory Hospital Nurse to Patient Staffing Ratios: Time to Take a Different Approach. *The Online Journal of Issues in Nursing* [Internet]. 2007;12. Available from: <https://ojin.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume122007/No3Sept07/MandatoryNursetoPatientRatios.html>. [cited 2020 Jan 12].
41. [Internet]. Nitte.edu.in. 2020 [cited 2019 Nov 8]. Available from: <http://www.nitte.edu.in/journal/September%202013/WSAQON.pdf>.
42. Das S. A study to calculate the nursing staff requirement for the maternity ward of medical college hospital, Kolkata applying WISN method. *IOSR J Dent Med Sci* 2013;8:1-7.
43. Basavanthappa BT. *Nursing Administration*. 3<sup>rd</sup>ed. New Delhi: Jaypee Brothers Medical Publications; 2014.p. 723-4.
44. [Internet]. 2020 [cited 2019 Nov 8]. Available from: <https://mohfw.gov.in/sites/default/files/7083117661Information%20on%20Nursing%20Section%20part2.pdf>.
45. Rezaei M, Ahmadishad M, Adib-Hajbaghery M, Atoof F, Munyisia E. Care and noncare-related activities among critical care nurses: A cross-sectional observational time and motion study. *Nurs Midwifery Stud* 2019;8:40-7.
46. Adomat R, Hicks C. Measuring nursing workload in intensive care: An observational study using closed circuit video cameras. *J Adv Nurs* 2003;42:402-12.