INTERNATIONAL JOURNAL OF SOCIAL SERVICE AND RESEARCH

ANALYSIS OF NURSE STAFFING NEEDS METHODS IN INPATIENT ROOM AT HOSPITAL : LITERATURE REVIEW

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Abstract

Planning for nurse staffing needs was very important at hospital. Nowadays there are some new methods and tools perform to count nurse staffing needs. The use of correct tools and methods makes hospital run well in quality of service, administration, and also financial. This study aims to analyze various methods that can be used in determining nurse staffing needs in hospital inpatient room. This study using PRISMA/ Preferred Reporting Systematic Reviews and Meta-analysis with final result there are 12 literatures for this study. Results of study show that there is no definite requirement which method should be used from a country in the literature to calculate nursing staff compliance. There are only recommendations from the government or associations rather than professional organizations from each country which method that have good recommendation. Thus, each method has its own way of providing insight into the number of nurses needed in the inpatient room. Each method is interrelated and the calculation results often differ from one method to another

INTRODUCTION

Quality of health service may decrease if the workload increases due to lack of nurse workforce in health facilities. At the same time there will be increase of financial burden if health facilities have excess nurse workforce.

Study by Erfiana (2018) in hospital settings found that nurse face mild to high workload when like in Destiani (2019) study that found the same thing where 53.8 % of nurse in inpatient room have high workload. That thing happens in some Indonesian Hospital. This condition need assessment from hospital management to give attention to count total nurse workforce to employed.

Some study report that using of many methods to count nurse workforce in hospital. A study by Fenton, 2015 was design an instrument to help nurse workforce count called Safer Nursing Care Tool or also simplified SNCT. This instrument may help hospital management to make decision for how many nurses on duty they need each shift in inpatient room based on illness and patient dependence. There are many methods and tools to count how many nurses staffing needs in inpatient room at hospital depend on approach they use (Griffiths, Saville, Ball, Chable, et al., 2020; Saville, Griffiths, Ball, & Monks, 2019).

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METHOD

This Study is a literature review study. This study using PRISMA/ Preferred Reporting Systematic Reviews and Meta-analysis method. The literature was selected from some database. There are three different databases for finding the literature using some Boolean logic formulas. From software literature are being screened based on duplication, title, and abstract based on PRISMA flow chart. And also exclude many articled that not include the inclusion criteria. There are found 12 literature that check with JBI Critical Appraisal tool for eligibility. The final result there are 12 literatures for this study
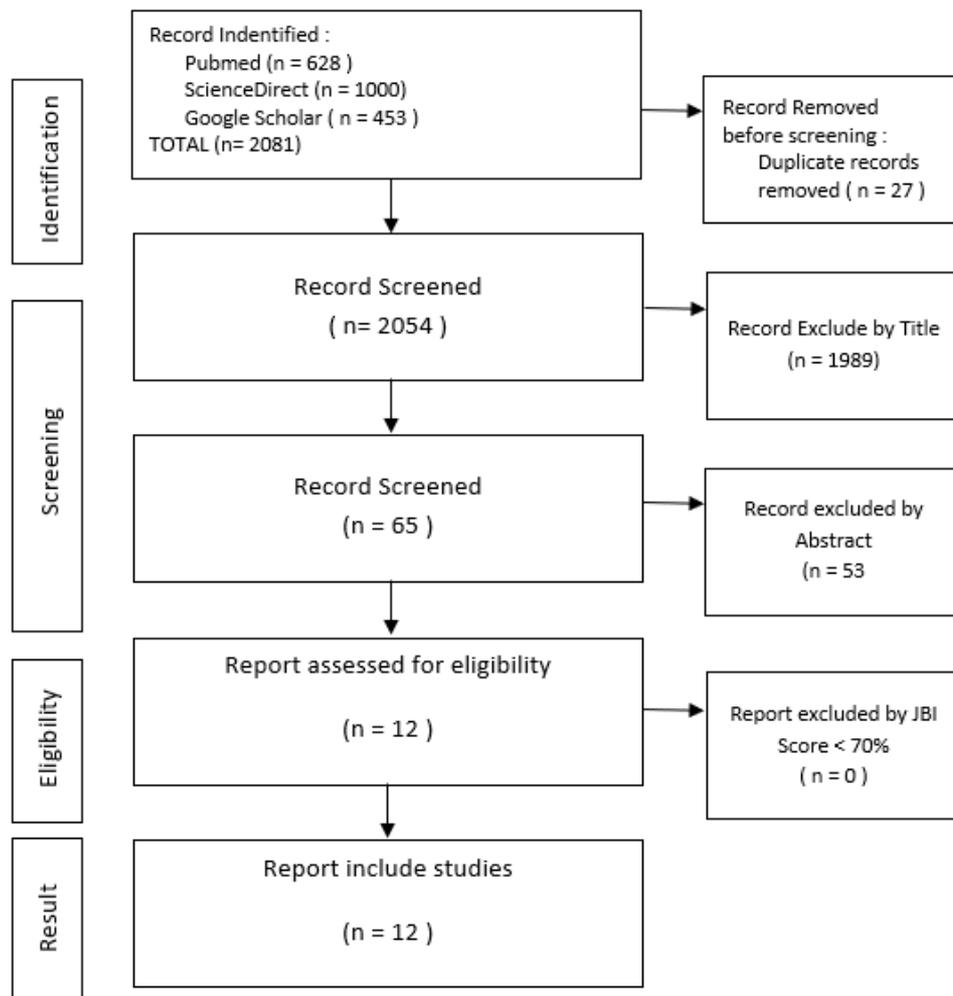
RESULTS AND DISCUSSION

Figure 1. PRISMA Flow Chart

Analysis of Nurse Staffing Needs Methods in Inpatient Room at Hospital : Literature Review

Based on the PRISMA study found 12 literature. Here is the table about the findings show in table 1.

Table 1
List of Literature Review

No	Authors, Year	Aim	Result
1	Griffiths, Saville, Ball, Jones, et al. (2020)	This study aims to give overview about some approach that use to count nurse staffing needs based on evidence, including accuracy and methods or tools that use to counts	• The literature found is quite varied and growing. There is no single literature that mentions a method or tool which is the most appropriate to use • In its development, the new methods that appear are also revisions of the previous methods, which ultimately depend on the current users of these methods.
2	Soesanto and Ersyad (2019)	This study aims to determine the number of nurses in inpatient installations using the WISN method so that they can determine the need for personnel by analyzing the workload and being able to plan the needs of nurses in the inpatient room.	• The nurse staffing needs using the WISN method in the inpatient room is 10 nurse's workforces in the adult inpatient room and 8 nurses' workforce in the children's inpatient room. • From these results, the nurse staffing needs in the adult inpatient room is still lacking, thus requiring additional nurses.
3	Margadant et al. (2021)	This study aims to develop a time-based nurse calculation model that can assess based on patient care related accurate nursing workload and to evaluate whether patient characteristics affect treatment time with new methods developed from existing methods	• A total of 287 unique patients were observed in 371 shifts. With Pearson's calculations with a result of 0.89 (95% CI 0.86-0.92) • The newly developed Nurse Operating Workload (NOW) method outperforms existing measurement methods. Patient-related nursing workload as measured by the NOW method provides insight into the actual nursing time required by the patient and can therefore be used to evaluate the average workload per patient per nurse
4	Kastuti (2018)	This study aims to count the number of nurses needs in the inpatient room by comparing 2 different methods, namely between the Gillies method and the Method Workload Indicator Staff Need (WISN)	• Calculations used by the WISN and Gillies methods have different calculation results. The difference is in the number of patient calculations using the Gillies method, which requires 155 nurses. Meanwhile, with the WISN method, 144 nurses are needed. • Gillies calculation has greater results than the WISN method
5	Sartika (2019)	This study aims to compare the number of nurses with	• Calculation of nurses using the calculation method of the Indonesian

No	Authors, Year	Aim	Result
		2 different methods, the Indonesian Ministry of Health method and the Full Time Equivalent (FTE) method	Ministry of Health, which requires 25 nurses and 5 non-nurses. Meanwhile, with calculations using the FTE method, the results obtained are 30 nurses and 3 non-nurses • Differences in calculation results may be caused by differences in the determination of the hours of patient care. • The method recommended or chosen in this study is the method of the Ministry of Health of the Republic of Indonesia
6.	Susilo and Yustiawan (2015)	This study aims to determine the comparison of the number of nurses using the Full Time Equivalent (FTE) method with the Indonesian Ministry of Health method	• In the FTE method, it is found that the number of nurses needed is more than the Ministry of Health of the Republic of Indonesia method • The FTE method is considered not always an option in the calculation of nursing staff in a hospital because it depends on the number of beds or inpatient wards and the needs of the hospital itself, although this method is considered to be able to improve service quality or patient satisfaction
7.	Griffiths, Saville, Ball, Chable, et al. (2020)	This study aims to see whether nursing staff can be calculated using a measuring tool called SNCT (Safer Nursing Care Tool) and compared to professional decisions.	• Calculation of nurses using the SNCT measuring instrument is always related to the decisions or views of professionals. • SNCT does not show that this measuring tool is better than the professional view. However, this measuring instrument can be used flexibly if it requires temporary staff or temporary nurses
8	Fenton and Casey (2015)	This study aims to provide an overview of the use of Safer Nursing Care Tool (SNCT) in nursing units	• The measuring tool called "SNCT" can be used to fulfill the needs of nurses in inpatient rooms • SNCT is very easy to use but must be used consistently • SNCT is able to provide a basis for decisions to meet the needs of nurses in the ward, but the final decision to meet the needs of nurses depends on the factors that exist in hospitals that use this tool
9.	Lasater et al. (2021)	This study aims to evaluate the number of nurses against the number of existing patients on the	• Each additional patient per nurse resulted in a 12% higher in-hospital mortality rate, a 7% higher mortality calculated in 60 days, a 7% higher

No	Authors, Year	Aim	Result
		incidence of Sepsis	chance of re-admission due to illness, and a longer length of stay. • The nurse to patient's ratio method is appropriate to use, the more appropriate the ratio according to the recommendations, the mortality rate can be reduced if the nurse to patient ratio is not appropriate because the number of patients is more and it is not according to the recommendations, causing the mortality rate to increase because the workload of nurses also increases
10	Twigg, Whitehead, Doleman, and El‑Zaemey (2021)	This study aims to systematically review and synthesize the available evidence to identify the relationship between the application of the Nurse-to-Patient Ratio-based nurse needs methodology	• From the results of the literature review, 22 studies met the inclusion criteria. 21 of them used the minimum required nurse-patient ratio methodology and 1 study used the number of nurse hours per day method. Both methodologies are recommended methods • All studies that report nurse outcomes show an increase in performance with the application of the recommended minimum nurse to patient ratio method
11	Sharma and Rani (2020)	This study aims to provide an overview of determining the ratio of the need for a good nurse using nurse to patient ratio method	• Regulations on the number of nursing personnel in India have not been updated for a long time and are far from international recommendations. The recommendations provided by NABH are the most recent, reliable, applicable and most likely to be implemented in India
12	Hu et al. (2019)	This study aims to carry out an assessment of the needs of nurses and doctors in order to provide optimal services	• Nurses' workload pressure is high (WISN ratio 0.69). 50% of nurses' time is spent on support activities, not nursing care. There are different workloads among the same categories of staff in different health facilities. • The result found that the number of doctors and nurses owned was more than the actual need for doctors and nurses

The methods found are the Gillies method, the Indonesian Ministry of Health 2005 method, the WISN method, the FTE method, the Nurse to Patients Ratio method, the NOW method, the Six Lean Sigma method, the SNCT method, and the method using application software.

Nursing manages must have a foresight in advance the number of nurses that needs to hire and the number of nurses

which work each shift, daily plan or as an urgent need. That decision can made by using different method. Because each method may give different result (Griffith et.al, 2020).

Table 2
Literature Grouping

Group	Description	Source
Description	Several sources mention or describe the method used with a nurse's working hours approach and based on workload	(Margadant et al., 2021; Soesanto & Ersyad, 2019).
Comparison	Sources compare two (2) or more different methods in calculating the number of nursing staff needs	(Griffiths, Saville, Ball, Chable, et al., 2020; Kastuti, 2018; Sartika, 2019; Susilo & Yustiawan, 2015).
Evaluation	The source provides an evaluation of the results of existing nurses with other methods or recommended new applications	(Allocate Software, 2017; Fenton & Casey, 2015; Griffiths, Saville, Ball, Jones, et al., 2020; Twigg et al., 2021).

The methods used to count the needs of nurses in hospitals may give different results even though the settings used are the same. For example, the "Republic of Indonesia Department of Health" method and the FTE method give different results. The results nurses number count using the FTE method are more often used by hospitals that have inpatient rooms with more bed capacities, this method is not suitable for inpatient rooms with relatively few beds (10 beds or less). In the FTE method, it is possible that the calculation results of the number of nurses needed will not be sufficient to carry out shift changes when used in inpatient rooms with low patient dependence (Susilo & Yustiawan, 2015). The nurse's workload will be greater if using the FTE method in the inpatient room which will make it difficult when regulate service time so that it can reduce patient and nurse satisfaction (Susilo & Yustiawan, 2015).

The Gillies method and the Workload Indicator Staffing Needs (WISN) method were used in the same setting but gave different results. Based on the calculation of the results using the Gillies method, the need for nurses is greater than the results from the calculation using the WISN method (Kastuti, 2018). This is because there are differences in treatment hours. The WISN method refers to the calculation of the length of time for activities carried out by nurses with observation, while the Gillies formula uses the average time needed for care per 24 hours (the treatment time needed by the patient) based on a reference, not a real calculation of the workload in that setting. The WISN method uses workload as a calculation in the formula so that the needs can be calculated properly.

However, another method calculates the workload of nurses based on the pure workload of patient care, which is clearly what care needs to be done (Margadant et al., 2021). This method is a Nurse Operating Workload (NOW) method. In this method, actions that are not related to the patient such as lecturing a student, medical or other training, join an emergency schedule are not counted in determining the workload (Margadant et al., 2021). There is already a checklist of what examinations are carried out by nurses so that users of this method clearly measure what activities need to be measured. This method is the latest method recommended in the Netherlands

CONCLUSION

There is no definite requirement which method should be used from a country in the literature to calculate nursing staff compliance. There are only recommendations from the government or associations rather than professional organizations from each country.

Each method has its own way of providing insight into the number of nurses needed in the inpatient room. Each method is interrelated and the calculation results often differ from one method to another. The method used in a hospital inpatient room can be more than one method used depending on the purpose used in the method. For retrospective purposes, the Gillies, MOH RI, Nurse to Patient Ratio method can be used because this number can be predicted because it does not use real time in its use. For urgent needs, the Safe Nurse Care Tool (SNCT) method can be used or by using software equivalent to the SNCT method, such as the Allocate Software System. For retrospective evaluation methods as well as future planning, you can use workload-based methods such as the Workload Indicator Staffing Need (WISN) in collaboration with the Nurse Operating Workload (NOW) method, which is the latest recommendation, although there have not been many studies related to this method.

The WISN method has a subjective weakness, because this method depends on the completeness of the data and the accuracy of the measurements related to the workload. Errors that can occur in the time and motion study method are in the researcher or observer because at the time of the measurement the observer must continue to follow the activities of the research subject while on duty and this can be inaccurate because the observer also needs time for personal purposes when making observations, for example going to the bathroom, resting, and so on, so that not 100% accurate measurements can be made .

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