Factors Affecting Nurses' Actions in Prevention of Ventilator Associated Pneumonia (VAP): Literature Review

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A B S T R A C T

Doctors, nurses and other health teams have a very important role in the prevention of Ventilation Associated Pneumonia. VAP needs to be managed with a bundle of care from evidence-based guidelines (study results). However, although various research results can be used as evidence and can be used in efforts to prevent VAP, in reality there are various obstacles so VAP prevention cannot be carried out optimally. Various previous studies stated that non-compliance of health workers to the prevention of VAP is still common. Nurses' attitudes and actions in preventing VAP are still lacking. The purpose of this study was to analyze the factors that influence the attitudes and actions of nurses in preventing VAP. Literature review using the PubMed database, Scopus, Ebsco, Google Schoolar. publications from 2000 to 2021. Findings from studies were extracted and collected, guided by the Joanna Briggs Institute (JBI). The keywords used were "Ventilation Associated Pneumonia" OR "Healthcare Associated Pneumonia" "Nurses" "Prevention" "Experience". The inclusion criteria used were articles related to the prevention of VAP and its treatment, which used a qualitative, quantitative design, published from 2000 to 2021 which was not a research protocol and a systematic review, in English, full text. A total of 358 articles were obtained. The final results obtained 5 articles that meet the review requirements. And based on the review of the article, the researcher found that the scope of previous research related to the prevention of VAP by nurses included aspects of education level, nurses work experience lack of continuing education. From this literature review, it can be concluded that strategic steps need to be taken in the form of a basic ICU training program that can improve the professional skills of nurses in the development of critical care science in order to provide protection, safety and comfort to patients, in this case to prevent the occurrence of VAP in patients.

A B S T R A K

Dokter, perawat dan tim kesehatan lain memiliki peranan yang sangat penting dalam upaya pencegahan Ventilation Associated Pneumonia. VAP perlu dikelola dengan serangkaian tindakan pencegahan (bundle of care) dari pedoman yang berbasis bukti (hasil-hasil penelitian). Namun demikian, meski berbagai hasil-hasil penelitian dapat dijadikan bukti dan dapat di gunakan dalam upaya pencegahan VAP, pada kenyataannya terdapat berbagai kendala sehingga pencegahan VAP belum dapat dilakukan secara optimal. Berbagai studi terhahulu menyebutkan bahwa ketidakpatuhan tenaga kesehatan terhadap pencegahan VAP masih kerap terjadi. Sikap dan tindakan perawat dalam pencegahan VAP masih sangat kurang. Tujuan penelitian ini untuk menganalisis faktor – faktor yang mempengaruhi sikap dan tindakan perawat dalam pencegahan VAP. Literature review

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menggunakan database PubMed, Scopus, Ebsco, Google Schoolar. publikasi dari tahun 2000 hingga 2021. Temuan dari studi diekstraksi dan dikumpulkan, dipandu oleh Joanna Briggs Institute (JBI). Keywords yang digunakan "Ventilation Associated Pneumonia" OR "Healthcare Associated Pneumonia" "Nurses" "Prevention" "Experience". Kriteria inklusi yang digunakan adalah artikel yang berkaitan dengan pencegahan VAP dan penanganannya, yang menggunakan desain kualitatif, kuantitatif, diterbitkan tahun 2000 sampai tahun 2021 yang bukan merupakan protokol penelitian dan systematic review, berbahasa Inggris, full text. Didapatkan total 358 artikel. Hasil akhir diperoleh 5 artikel yang memenuhi syarat review. Dan berdasarkan kajian artikel tersebut, peneliti mendapati bahwa ruang lingkup peneletian sebelumnya terkait pencegahan VAP yang dilakukan perawat meliputi aspek tingkat pendidikan, pengalaman kerja perawat kurangnya pendidikan berkelanjutan. Tinjauan literature review ini dapat disimpulkan bahwa perlu dilakukan Langkah – Langkah strategis berupa program pelatihan ICU dasar yang dapat meningkatkan ketrampilan professional perawat dalam pengembangan ilmu cirtical care guna memberikan perlindungan, keamanan dan kenyamanan kepada pasien, dalam hal ini untuk mencegah terjadinya VAP pada pasien.

INTRODUCTION

Nosocomial infections, including VAP, occur worldwide with varying incidence rates. Based on a survey conducted by the World Health Organization (WHO, 2002) with a sample of 55 hospitals in 14 countries representing the Eastern Mediterranean and Southeast Asia, Western Pacific and Europe regions, it was found that the average incidence of nosocomial infections was 8.7%. WHO further stated that the incidence of nosocomial infections was higher in the Eastern Mediterranean region by 11.8% and Southeast Asia by 10.0%. Nosocomial infection most often occurs in the ICU, operating and orthopaedic room. This infection for cases of the respiratory tract, urinary tract, and surgical wound infections (WHO, 2002) Eight 86% of nosocomial infections are Ventilator-Associated Pneumonia. Other studies that are more specific to VAP state that the incidence of VAP ranges from 5%-67%, depending on the complexity of the disease and the diagnostic criteria used. In addition, the incidence of VAP is also increasing, especially in elderly patients, in the case of surgery and it immunocompromised patients (Timsit et al., 2017).

It is reported that in the United States, there are 250,000 to 300,000 cases of VAP per year, of which 5-6 cases per 1000 cases of patients on a ventilator occur on day 11 after intubation. It was further reported that mortality rates due to VAP range between 0 and 50% (Koenig & Truwit, 2006). Based on these data, it can be concluded that the incidence of nosocomial infections, especially VAP, occurs worldwide with various incidences that increase the severity and risk of patient mortality.

In Indonesia, no specific study describes the incidence rate of VAP. However, the incidence of nosocomial infections ranges from 15.74%, whereas jackfruit is far above the incidence rate in developed countries, which ranges from 4.8-15.5%. In addition, there are also several sporadic studies in several hospitals in regional areas in Indonesia related to the incidence of VAP. Among them is the prevalence of VAP in hospitals in the ICU room at RSUD DR. Zainoel Abidin Banda Aceh, 2012 was 28. 9% In Madiun, the Infection Prevention and Control Team of Dr Soedono Madiun Hospital reported that the incidence of VAP in hospitals was high, and the highest incidence was in July 2016 which was 70.17% (Khayati et al., 2017). Based on these data, it can be seen that the incidence of VAP, although it has not had many studies and is still sporadic, is carried out in various regions. It can be seen that the incidence of VAP is relatively high in the regions when compared to the average incidence reported by the Ministry of Health.

Doctors, nurses and other health care teams have a very important role in the prevention of VAP. VAP needs to be managed with a bundle of care from evidence-based guidelines (study results). However, although various research results can be used as evidence and can be used in efforts to prevent VAP, in reality there are various obstacles so that VAP prevention cannot be carried out optimally. Various previous studies stated that non-compliance of health workers to the prevention of VAP is still common. The attitudes and actions of nurses in preventing VAP are still lacking.

Health workers' non-compliance with VAP prevention is still common. various studies stated that the level of nurse adherence to the VAP prevention protocol in the ICU only ranged from 56.32% to 85.9% (Al-Sayaghi, 2021) (Tabaeian et al., 2017) Nurse knowledge is one of the factors which also affects nurses' compliance in preventing VAP (Al-Sayaghi, 2021)(Madhuvu et al., 2020)(WHO, 2002)(Jansson et al., 2013).

The factors that influence the attitude and level of education of health workers in preventing VAP are the constraints experienced by nurses so that they can be used as a basis for planning and improving the quality of nursing services, especially in efforts to prevent VAP events. The scope of previous studies on VAP prevention carried out by nurses covers knowledge, attitudes, education level, choice of intervention, and other obstacles. where it all relates to action decisions and compliance.

Based on these data, it can be concluded that the incidence of nosocomial infections, especially VAP, occurs worldwide with various incidences, severity, and mortality. With this literature review, it is essential to identify the factors that influence the behaviour and actions of nurses in preventing VAP.

METHOD

Data Sources and Search Strategy

Available literature is searched from databases: Ebsco, Pubmed, Scopus and Google Scholar. By using keywords: 'ventilation associated pneumonia', 'nurses', 'prevention', and experience'. Boolean AND and OR are used to combine keywords. The inclusion criteria used in the database search were as follows: literature published from 2000 to 2021, types of qualitative and quantitative research, English literature, population in adult intensive care unit nurses and research settings conducted in hospitals, literature related to prevention of VAP and handling.

Study Selection and Data Extraction

All relevant articles were analyzed for quality and relevance to the review topic, questions and objectives of the literature review. To organize found articles, use bibliographic software, namely Endnote to help organize search results articles. Create folders in Endnote named after the database name. Then screening is done whether there are duplicate articles obtained. After the duplicate articles are removed and stored in a folder, the title and abstract of the articles are screened again to determine whether the articles are appropriate or relevant. Next, read the full text of the article and examine whether the articles meet the inclusion criteria of the literature review.
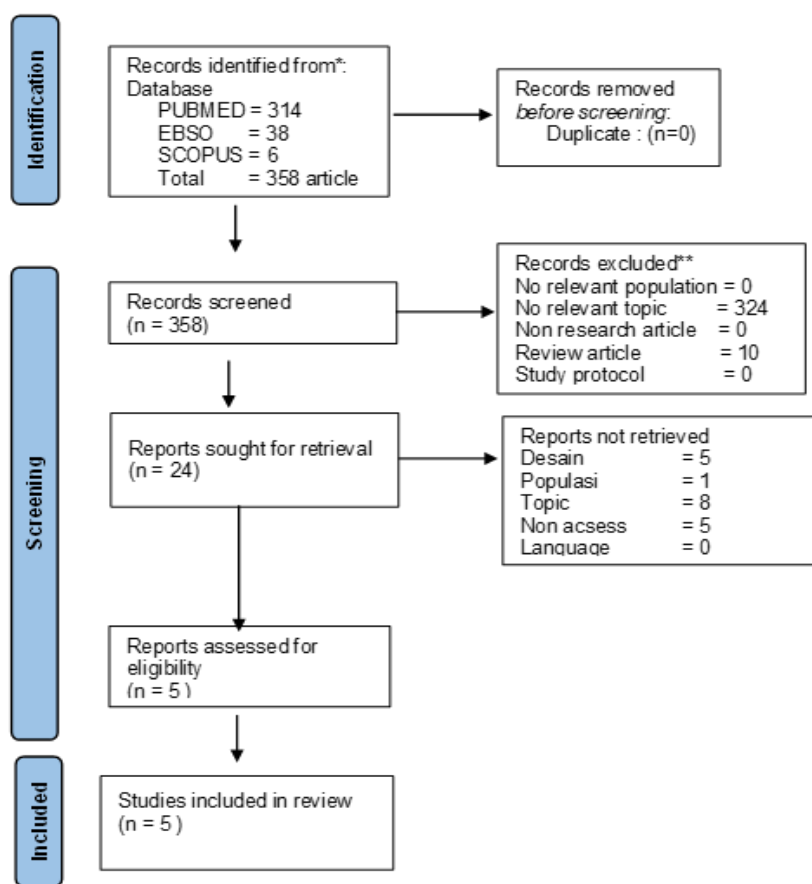

Figure 1. Prism Diagram

RESULTS AND DISCUSSION

The stages of the process carried out using the PRISMA guidelines can be seen in Figure 1. The article search obtained 358 articles from 3 databases: PubMed, Ebsco, Scopus, there were no duplications and from 358 articles there were 324 that were not in accordance with the topic, and 10 were in the article review.

And when analyzed again by reading the full text, there are 19 articles that are not in accordance with the design, population, topic. So from these results obtained 5 articles that can provide an overview of the factors that influence the attitudes and actions of nurses in preventing VAP. The participants of these 5 articles are all nurses who work in the

ICU. The research from this article was conducted in Kuala Lumpur, Western Turkey, Medina, Saudi Arabia and Isfahan, Iran. which investigated the knowledge of critical care in the prevention of ventilator-associated pneumonia.

Health workers' non-compliance with VAP prevention is still common. Various studies state that the level of adherence to the VAP prevention protocol in the ICU is up to 85.9% (Tabaeian et al., 2017) Nurses' knowledge is one of the factors that also affects nurses' compliance in preventing VAP In line with this stated that nurses' education level, duration of work experience, and participation in-service training programs at preventing the development of VAP. (Al-Sayaghi, 2021) (Jansson et al., 2013) (Madhuvu et al., 2020)

According to (Norazlin Ab Manap, 2019) inadequate knowledge in the prevention of VAP will have an impact on the quality of patient care. The study shows that age, experience in nursing, certificate of intensive care training and training in infection control as well as proper and regular monitoring will affect the knowledge of respondents. There should be more programs to increase nurses' knowledge in VAP prevention.

According to (Akin Korhan et al., 2014) knowledge related to the daily practice of how ICU nurses understand their patient care, shows the experience illustrates contextual practical knowledge that nurses develop to look after and protect their patients. In line with this stated that the level of education of nurses, duration of work experience and participation in in-service training programs aimed at preventing the development of VAP.

According to (El-Khatib et al., 2010) the experience of intensive nurses of less than 5 years or more than 5 years who are directly involved in providing care for patients with mechanical ventilation understand how to prevent ventilator-associated pneumonia. Meanwhile, in research Blot et al1 said that more experienced nurses had a higher level of knowledge than nurses with less than 1 year of experience. So it shows that the experience of nurses in the first 5 years is very adequate in the effort to prevent VAP.

Also (Al-Sayaghi, 2021) stated that the nursing staff is sufficient to comply with the guidelines for preventing pneumonia related to ventilators but the obstacle in implementing these guidelines is the lack of nurses which has an impact on the commitment of the nursing staff. And (Atashi et al., 2018) said that the barriers in preventing ventilator-associated pneumonia were divided into three main categories, namely limited professional competence of nurses, supportive environmental conditions, and passive resource management.

Table 1
Summary of the included study

No.	Authors & year	Title	Research Design	Settings	Respondent Characteristic	Intervention	Outcome
1.	(Norazlin Ab Manap, 2019)	Critical Care Nurses Knowledge in Prevention of Ventilator-Associated Pneumonia	Quantitative descriptive survey	Kuala Lumpur	Nurses in the ICU room consisted of 121 participants.	Intensive care unit training certificate, education based on practice, improving hand hygiene, oral care and adjusting the head position 30-45 degrees can prevent VAP	59.5% of respondents have poor knowledge about the prevention of VAP. Nurses who have more than 4 years of work experience can do how to prevent VAP than nurses who work less than 1 year.
2.	(Akin Korhan et al., 2014)	Knowledge levels of intensive care nurses on prevention of ventilator-associated pneumonia	Cross-sectional	Western Turkey	150 in the intensive care unit	Conducting education programs on information on VAP prevention, compliance in carrying out written protocols in each intensive care unit	The median value of the total points scored by nurses on the questionnaire was 4.00±2.00. The difference between nurses' education level, duration of work experience and participation in an in-service training program on prevention of ventilator-associated pneumonia and the median value of their total score on the questionnaire was found to be statistically significant (p<0.05).
3.	(El-Khatib et al., 2010)	Critical care clinician's knowledge of evidence-based guidelines	Quantitative study	University Hospital ICU.	10 physicians, 41 nurses, and 18 respiratory therapy	Implementation of VAP prevention guidelines, improving infection control programs by preventing contamination of mechanical ventilator equipment, maintenance of ETT cuff pressure which can avoid the entry of subglottic secret microorganisms.	The mean (SD) total scores of doctors, nurses, and respiratory therapists were 80.2% (11.4%), 78.1% (10.6%), and 80.5% (6%), with no significant difference between them. the scores of professionals with less than 5 years of intensive care experience were not significantly different from the scores of professionals with more than 5 years of intensive care experience.

No.		Title	Design	Location	Sample	Nursing care actions	Results/Barriers
4.	(Al-Sayaghi, 2021)	Critical care nurses compliance and barriers toward ventilator-associated pneumonia prevention guidelines: a cross-sectional survey	A cross-sectional descriptive survey	Medina, Saudi Arabia	283 nurses in critical care unit	Implementation of the VAP bundle and compliance in running it	Lack of staff lack of continuing education and compliance 29.2% of 34 (85.9%), 23% high compliance, 31% good compliance, 45.9% unsafe compliance. Where nurses who received education about VAP prevention had a compliance score of 1.1 higher than those who did not (p<0.043)
5.	(Atashi et al., 2018)	The barriers to the prevention of ventilator-associated pneumonia.	qualitative descriptive study	Isfahan, Iran.	23 critical care nurses	Nursing care actions head of bed elevation 30-40 degrees, reduction of sedation, patient criteria for extubation, oral care, hand hygiene and correct suction management	Limited professional competence of nurses, unsupportive environmental conditions, and passive management of human resources. Of these three main categories there are 10 sub-categories including: poor professional attitude, limited knowledge, lack of work motivation, limited professional accountability, inadequate physical structure and equipment, heavy workload, shortage of staff and inadequate training and supervision. ineffective

RESULTS AND DISCUSSION

The results show that the barriers to preventing VAP in the ICU are very diverse and complex, including low knowledge, attitudes, and competence of nurses, lack of supervision by managers, and a lack of competent nurses in critical care, so nursing managers need to be developed by understanding how VAP prevention guidelines and the availability of tools in the prevention of VAP, so that adequate resources and staff levels are required. Nurses should be sensitive to the prevention of VAP. (Atashi et al., 2018).

Hospitals that have ICU rooms must have VAP prevention guidelines or implement a VAP prevention bundle. The level of compliance can be related to the availability of a VAP prevention procedure policy (Torres et al., 2017) Several studies reported that the incidence rate of VAP in the ICU after implementing the VAP prevention bundle Most VAP episodes were avoidable even reaching zero or near zero VAP rates, but that would require ongoing active surveillance and persistent adherence (Tobin, 2018). One of them is closed suction, with head of bed elevation and oral care once per shift using chlorhexidine, hand washing compliance. Nurses who have prior education about VAP prevention can intervene earlier regarding VAP prevention. Regarding barriers, lack of hospital-based education on prevention of VAP and nurses' forgetfulness to perform some evidence-based procedures were reported by 43.2% and 65.9% of nurses, respectively (Kobayashi et al., 2017). Lack of education and knowledge of evidence-based guidelines is a barrier to adherence to VAP prevention. (Al-Sayaghi, 2021).

Many studies have analyzed nurses' theoretical knowledge about VAP procedures. It is thought that nurses' awareness of the practice to prevent VAP is low, and this is the main reason that nurses lack information about evidence-based protocols on nurses' knowledge of VAP guidelines (Wolfensberger et al., 2018). As the experience of nurses increases, they also have different roles in the intensive care unit such as reduced working hours, the number of patients admitted, and less participation in in-service programs. In the study 79% of nurses knew that oral intubation was recommended to reduce the risk of VAP, 62.3% of nurses stated that the ventilator circuit should be changed every new patient, 75.0% of nurses stated that changes should be made every 72 hours, whereas 76% of participants in the study of Blot et al (2007) recommend changes to be made once a week. To remedy this situation, it is recommended to implement a multifaceted Education program consisting of information on the latest VAP prevention guidelines in intensive care units and infection control. Written protocols should be prepared in the intensive care unit and these should be monitored regularly in the management of patients on mechanical ventilation (Kalanuria et al., 2014).

Not only nurses, other health care professionals (doctors and respiratory therapists) they are all involved in providing direct care to mechanically ventilated patients in the ICU. Only 26% of nurses, 50% of doctors, and 45% of respiratory therapists changed airway humidifiers weekly or when clinically indicated (El-Khatib et al., 2010). Knowledge of the recommended guidelines does not necessarily reflect appropriate practice, but knowledge is the first step towards implementing evidence-based guidelines for the prevention of VAP (Tobin, 2018).

CONCLUSION AND SUGGESTIONS

Based on the results of a literature review, the longer work experience in the ICU with quality and professional education in the critical care field will greatly affect a service for the care and prevention of ventilator-associated pneumonia in patients with mechanical ventilation. However, if in an intensive care unit there are nurses who work for less than 1 year and do not understand the VAP prevention guidelines, it will be very risky in handling and providing care related to patients with mechanical ventilation. Therefore, in-service training or basic ICU training programs are needed specifically for nurses who have less knowledge, lack of work experience and do not understand VAP prevention guidelines to be able to increase knowledge, develop knowledge.

ETHICAL CONSIDERATIONS

There is no ethical clearance because all analyzes of this study were based on previously published literature.

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Conflict of Interest Statement

This review has no conflicts of interest

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