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Sertifikat

Literature Review: Cause Factor Analysis and an Effort to prevent Medication Administration Error (MAE) at Hospital

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Abstract

The high number of medical errors, especially in medication administration errors (MAE) in the last few decades that have occurred in hospitals in developed and developing countries makes patient safety an important issue. This requires the hospital to take steps that prioritize patient safety by focusing on preventive measures, so as to reduce the risk of an MAE. The writing of this article of literature review aims to explain the determinants of MAE in hospitals and their prevention efforts through preventive measures, so that patient safety standards in hospitals (zero defects) can be achieved. The design of the article search in this literature study was carried out through Google scholar, JAKI, and PSNet with the keywords of patient safety incident, medication administration error, contributing factor of MAEs, and determinant factor of MAEs. Based on 13 articles that have been obtained in accordance with the criteria, there are 38 determinant factors in MAE which are grouped into three categories, namely ineffective communication factors, work environment factors, and human factors. Various preventive efforts that can be done to prevent MAEs include: implementing crew resource management, clarifying the chain of command, using the communication form of SBAR, designing an ergonomic workplace, implementing Patient Advocacy Reporting System (PARS), providing training and education for health workers, and setting work schedules that do not exceed workload. Implementation of effective MAE preventive measures can reduce the number of MAEs in the hospital directly.

INTRODUCTION

The hospital is a health service institution for the community by providing safe, quality, anti-discrimination and effective health services by prioritizing the interests of patients. Implementation of health services must be carried out in accordance with hospital service standards so that the highest degree of public health can be achieved (Law of the Republic of Indonesia, 2009). The implementation of health services in hospitals has a variety of very complex characteristics, ranging from the availability of various types of health workers to the rapid development of science and technology. This complexity, if not managed and coordinated properly, will lead to incidents that threaten patient safety (Department of Health of the Republic of Indonesia, 2008).

Patient safety is a discipline in the health service sector that applies the method of safety science towards a goal which is to achieve a reliable health service delivery system. Patient safety is also an attribute of the health care system that minimizes events and impacts, and maximizes recovery from side effects (Emanuel et al., 2008). Patient safety then becomes an important issue because of the large number of medical error cases that occur in various countries. Patient safety incident reports in northern England show that

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1 in 10 patients experience a patient safety incident with a type of medication error (Hara et al., 2018).

Medication errors are the incidents that most often endanger the patient, although not all of them can cause serious failure in patients (Hines et al., 2018). The number of reports of medication errors has continued to increase in the last few decades, so it is a concern in terms of patient safety in hospitals (Saghafi & Zargarzadeh, 2014). In the United States, medication errors account for 28% of all patient safety incidents and can have serious patient complications (Patel & Balkrishnan, 2010). According to a review study in 2013, the prevalence of medication error in Middle Eastern countries including Iran is 7 to 90% (Leber, et al., 2018).

Medication errors can cause losses in terms of treatment, so patients must spend more time to stay in the hospital and increase the burden of care, and costs. The existence of medication errors can threaten the quality of the hospital because the patient or family has the right to report incidents that occur through legal action (Saghafi & Zargarzadeh, 2014)especially in medical centers has become a growing concern for patient safety in recent decades. Patient safety and in particular, medication safety is a major concern and challenge for health care professionals around the world. Our prospective study was designed to detect prescribing, transcribing, dispensing, and administering medication errors in two major university hospitals. Materials and Methods: After choosing 20 similar hospital wards in two large teaching hospitals in the city of Isfahan, Iran, the sequence was randomly selected. Diagrams for drug distribution were drawn by the help of pharmacy directors. Direct observation technique was chosen as the method for detecting the errors. A total of 50 doses were studied in each ward to detect prescribing, transcribing and administering errors in each ward. The dispensing error was studied on 1000 doses dispensed in each hospital pharmacy. Results: A total of 8162 number of doses of medications were studied during the four stages, of which 8000 were complete data to be analyzed. 73% of prescribing orders were incomplete and did not have all six parameters (name, dosage form, dose and measuring unit, administration route, and intervals of administration. Medication errors contribute to morbidity, mortality and an increase in health care costs (Kumar, K.S.A. & Venkateswarlu, K., 2011).

The national coordinating council for medication errors and prevention states that medication errors are preventable events, which lead to drug abuse or patient error in the treatment process under the control of health workers (Saghafi and Zargarzadeh, 2014)especially in medical centers has become a growing concern for patient safety in recent decades. Patient safety and in particular, medication safety is a major concern and challenge for health care professionals around the world. Our prospective study was designed to detect prescribing, transcribing, dispensing, and administering medication errors in two major university hospitals. Materials and Methods: After choosing 20 similar hospital wards in two large teaching hospitals in the city of Isfahan, Iran, the sequence was randomly selected. Diagrams for drug distribution were drawn by the help of pharmacy directors. Direct observation technique was chosen as the method for detecting the errors. A total of 50 doses were studied in each ward to detect prescribing, transcribing and administering errors in each ward. The dispensing error was studied on 1000 doses dispensed in each hospital pharmacy. Results: A total of 8162 number of doses of medications were studied during the four stages, of which 8000 were complete data to be analyzed. 73% of prescribing orders were incomplete and did not have all six parameters (name, dosage form, dose and measuring unit, administration route, and intervals of administration. The high prevalence of medication error has a detrimental impact on health services. This has the potential to threaten patient safety, making it a challenge for hospitals to prevent the incident from recurring through preventive action (Saghafi & Zargarzadeh, 2014; Mekonnen et al., 2018; Leber et al., 2018)especially in medical centers has become a growing concern for patient safety in recent decades. Patient safety and in particular, medication safety is a major concern and challenge for health care professionals around the world. Our prospective study was designed to detect prescribing, transcribing, dispensing, and administering medication errors in two major university hospitals. Materials and Methods: After choosing 20 similar hospital wards in two large teaching hospitals in the city of Isfahan, Iran, the sequence was randomly selected. Diagrams for drug distribution were drawn by the help of pharmacy directors. Direct observation technique was chosen as the method for detecting the errors. A total of 50 doses were studied in each ward to detect prescribing, transcribing and administering errors in each ward. The dispensing error was studied on 1000 doses dispensed in each hospital pharmacy. Results: A total of 8162 number of doses of medications were studied during the four stages, of which

8000 were complete data to be analyzed. 73% of prescribing orders were incomplete and did not have all six parameters (name, dosage form, dose and measuring unit, administration route, and intervals of administration.

Medication errors can occur at any stage, namely prescribing, documentation, expenditure, preparation, or giving (Kumar K.S.A. & Venkateswarlu, K., 2011). In 2007, the National Patient Safety Agency statistics (NPSA) showed that 59.3% of medication errors occurred during the administration phase (Kumar, K.S.A. & Venkateswarlu, K., 2011). The administrative stage of the treatment process is the most common point where errors occur, with an incidence of 50% of all medication error events in the United Kingdom (Hines, Kynoch & Khalil, 2018). 1 in 3 patients experience medication administration error (Saghafi & Zargarzadeh, 2014).

A review article published in 2013 in Iran reported that administration error was the most common type of medication error with a prevalence range of 14.3-70% (Saghafi & Zargarzadeh, 2014). Levinson, 2011 in his research conducted in Colombia stated that the occurrence of patient safety incidents in hospitals related to medication administration (medical administration error) occurred by 31%.

The higher MAE incidence volume was found in a study from Girma & Feleke (2010), which managed to identify the MAE incidence as much as 89.9% of the 218 observations that had been made. In a study conducted by Feleke, et al. (2015) at one hospital in Ethiopia, showed the results of 360 treatment administration interventions, 98.1% of them experienced MAE events. The results of this study are also in line with studies conducted by Westbrook et al., (2011) in Sydney, Australia.

The reported number of patient safety incidents in Indonesia in 2007 was 145 incidents. DKI Jakarta was ranked first with a number of incidents of 37.9% (KKPRS, 2008). Indonesia has a tendency towards high incidence of patient safety incidents, given the low incidence of incident reporting that is carried out in accordance with procedures. Law of the Republic of Indonesia No. 44 of 2009 concerning Hospitals explains that hospitals have an obligation to implement patient safety standards in order to reduce the number of unexpected events. The magnitude of patient safety incident cases, including MAE, requires hospitals to take steps to prioritize patient safety by focusing on preventive measures.

Based on the number of MAE problems that occur in hospitals in developed and develo-ping countries that have been mentioned, the objectives of this article are formulated. The writing of this literature review article aims to explain the determinants that influence the medication administration error (MAE) in hospitals and their prevention efforts through preventive measures, so as to prevent the occurrence of patient safety incidents and the achievement of patient safety standards at the hospital (zero defect).

METHOD

The collection of journal articles in this literature study was carried out through searches from Google scholar, JAKI (Indonesian Health Administration Journal), and PSNet (Patient Safety Network) with keywords of patient safety incidents, medication administration errors, contributing factors of MAEs, and determinant factors of MAEs . The inclusion criteria in this literature study are 1) the article has a scope of research on medication administration error; 2) articles were published in 2014-2020; 3) the article is available in full text. Articles discussing medication administration error theoretically are the exclusion criteria in this literature study. The incident factors found were then grouped and analyzed narratively. The next step is to provide recommendations as a follow-up effort to prevent the occurrence of patient safety incidents in the treatment administration process.

RESULTS AND DISCUSSION

Based on data searches using keywords and criteria in the database above, obtained 13 relevant journal articles. Found 38 factors that contributed to the occurrence of medication administration error. All these factors are then described in Table 1.

Of all the factors that have been identified based on research findings, 38 existing factors can be classified into three categories seen in Figure 1. These categories include ineffective communication factors, work environment factors, and human factors. The distribution of these three factors can be seen in Figure 1.

Based on Figure 1, it can be seen that the most dominant factor influencing the incidence of incidents in treatment administration comes from the individual factors of health workers. The distribution and amount of each factor that affects medication administration error can be seen in Table 2.

Based on Table 2, it appears that the most dominant factor in the incidence of MAE is human factor, which amounts to 21 of the total 38

Table 1. Summary of selected studies

| References	Design	Sample	Data collection method	Factors contributing to MAE
Mansah et al., 2014	A retrospective (case control) audit	1 large tertiary metropolitan hospital in New South Wales, Australia	The information from Incident Information Management System (IIMS)	Violation procedures
Parry et al., 2015	A thematic analysis and narrative synthesis	Six electronic databases	Cochrane, MedLine, CINAHL, BNI, Embase, PsycINFO	Workload Work setting Nurse characteristics Experience of work
Tehewy et al., 2016	Descriptive direct-observational study	Aim Shams University hopital	A standarized observational checklist, and a medical record audit form	Workload Illiteracy and elderly patient
Dietrich & Norman, 2017	A cross-sectional study	Six agency CNOs (Chief Nurse Officers) at the hospital	CALNOC direct observation methodology	Perceived skill of nurses
Thomas et al., 2017	Hierarchical	79 RN from 9 hospital in Newyork	The ISRN Coordinating Center	Workload Human factor
Budihardjo, 2017	Descriptive observational	56 nurses in 7 rooms at the Haji General Hospital in Surabaya	Questionnaire, interview	Skill of nurses Nurses' knowledge Communication
Handayani, 2017	Qualitative, explanative	Employees of the Antapura General Hospital of Palu City	Observation, interview, document review	Health worker Patient factors Work environment
Baraki et al., 2018	Prospective observational based cross-sectional study	1251 medication administration in Jimma University Specialized Hospital	Pre-tested structured questionnaire and blind observation checklist	Patient factor Nurses' knowledge Work environment Experience of work
Keers et al., 2015	Qualitative interviewing	20 nurses in two NHS in the North West of England	Face-to-face semistructured interviews	Violation procedures Team's support Workload Shift changes
Felekeet al., 2015	A prospective, observation-based, cross-sectional study	82 nurses in the Felege Hiwot Refferal Hospital inpatient department	Pre-tested structured questionnaire	Nurse's age Experience of work Patient factor Interruption Shifts taken
Elasrag & Abu-Snieneh, 2020	Descriptive exploratory cross-sectional design	146 nurses from two regional hospitals in Egypt	Medication Administration Error Reporting Scale	Nursing Staffing Communication
Alemu et al., 2017	A quantitative and observational approach, cross-sectional design	141 nurses working in two hospitals in Southern X	A structured, pretested, self-administered questionnaire and a semi-structured, pretested, observational checklist	Lack of sufficient training Inadequate staffing Distraction Like-looking like drugs
Ayorinde & Alabi, 2019	A descriptive cross- sectional study	300 nurses in University College Hospital, West Africa	A structured pre-tested questionnaire	Nurse Staffing Confusion about drug Illegible writing
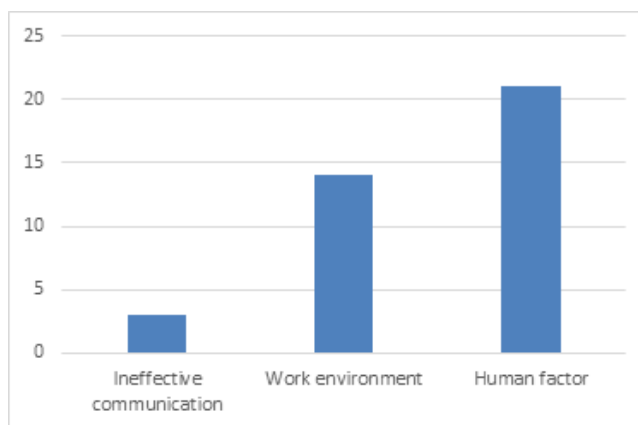
Figure 1. Contributing factors to MAE

factors identified.

Factors that contribute to MAE
Ineffective communication

Ineffective communication is one of the factors associated with the occurrence of medication administration errors in hospitals. Communication failures in medication administration are caused by several things, namely the delivery of ambiguous verbal instructions to nurses, the weakness of giving direct instructions to nurses, and nurses' lack of understanding in interpreting communication that is being established among health workers (Delgado et al., 2015).

The flow of communication in health services is divided into three, namely communication of health workers to patients, communication among health workers, and communication of patients to health workers (Mansah, et al., 2014; Hara et al., 2018). Most of the communication error is caused by health workers, namely the lack of availability of health workers to respond to patient questions in administering treatment. Therefore, this will lead to miscommunication between patients and health workers so that the risk of developing MAEs will increase (Hara et al., 2018). Health workers who do not establish good communication among staff, especially in terms of treatment schedules will trigger MAE (Elasrag & Abu-Snieneh, 2020). Communication failures among nurses and nurses with doctors contribute

to 64% of medication error events (Mansah et al., 2014).

A health professional needs high concentration during the treatment process, from preparation to administration of the drug. Nurses who face interruptions, including communication that takes place during drug administration, are twice as likely to develop medical administration errors compared to nurses who work without disturbances (Feleke et al., 2015). One source of interruption can be done by medical personnel, namely doctors. Examples of such interruptions include discussing patient care plans while other medical personnel are doing other works (Johnson et al., 2017)interruptions during medication rounds have been associated with medication errors. Method: A non-participant observational study was undertaken of nurses conducting medication rounds. Results: Fifty-six medication events (including 101 interruptions.

A health service must be able to develop its strategy in order to improve the effectiveness of communication between nurses and doctors. The better communication is established among health workers, the smaller the number of medication errors in a service unit occurs (Budihardjo, 2017).

Work environment

One factor related to the occurrence of medication errors is the work environment. Work

Table 2. Contributing factors to MAE

No	Contributing Factor to MAE	Total
1	Ineffective communication	3
2	Work environment	14
3	Human factor	21
Total		38

environment is a composition of three main sub-environments namely technical environment, human environment, and organizational environment (Oludeyi, 2015).

Technical environment consists of equipment, infrastructure, and other physical environmental factors in the workplace (Oludeyi, 2015). Health facilities, availability of drug preparation rooms, number of drug prescriptions per patient and availability of drug administration guidelines were found to be significant independent factors related to MAE. In the administration of treatment that is prepared without the availability of drug preparation space 13.5 times more risk of developing MAE (Baraki et al., 2018). Likewise, during the treatment administration process, namely the provision of drugs which are prepared in places where there are no drug administration guidelines 4 times more at risk of developing MAE (Baraki et al., 2018). If viewed from the physical work environment, the ones that contribute to the occurrence of medication error are the noise level, lighting level, and work-space layout (Hara et al., 2018).

Human environment is related to interpersonal relations of staff with staff or staff with their superiors (Oludeyi, 2015). Errors at the administrative stage are more often caused by busy workers in the related service units (Handayani, 2017). Medication administration error occurs when nurses are not supported by the work team in their work unit, and / or when the workload is increasing due to shifts in work, or because of an emergency (Keers et al., 2015)where they were asked to discuss perceived causes of intravenous MAEs that they had been directly involved with. Transcribed interviews were analysed using the Framework approach and emerging themes were categorised according to Reason's model of accident causation. Results: In total, 21 intravenous MAEs were discussed containing 23 individual active failures which included slips and lapses (n=11.

Interpersonal relationships among doctors and nurses with other health professionals can be at risk for MAE. This includes inefficiencies in the division of roles during examinations in patients, resulting in overlapping work. Examples of errors that occur are health workers not doing double checking during the treatment administration process (Keers et al., 2015). So adaptive coordination is needed in establishing interpersonal relationships among health workers, including dynamic allocation of tasks and responsibilities (Manser, 2009).

Organizational environment is related to the structure of hospital organization, assignment of duties, leadership of department heads, communication in teamwork, and patient safety programs in hospitals (Oludeyi, 2015; Parry, Barriball & While, 2015). Delgado, et al (2015) states that excessive workload is a major factor in workplace conditions that triggers medication errors, followed by work time pressure and the addition of new members in the work unit.

An increase in workload results in work stress experienced by nurses so that it affects the incidence of medication administration errors (Parry, et al., 2015). The number of work shift taking is the implication of the nurse's workload. Workload consisting of taking night shift work and work on holidays is a significant independent variable on the occurrence of MAE. The workload can be represented through the high number of nurse services to patients and the number of shifts taken per month. The severity of the nurse's workload will have an impact on patient safety (Tehewy et al., 2016).

Nurses who work during the night shift can experience circadian disorders that cause fatigue, disturbed hours of sleep, so that the impact on performance is not optimal. The process of treatment to patients at night is twice as likely to experience to MAE compared to treatment during the day (Feleke, Mulatu and Yesmaw, 2015). The complexity of the nurse's work, interruption and interruption of work, and high workload demands are the cause of the MAE. The higher the workload that must be done, especially in the treatment administration process, the risk of a MAE will be higher too (Thomas et al., 2017).

Elasrag & Abu-Snieneh (2020), in his research stated that the inadequate number of nursing staff affected the MAE incidence. The limited number of staff and the presence of distraction factors in the organizational environment are proven to affect the MAE (Alemu et al., 2017). The number of staff who do not meet the needs will have an impact on work fatigue due to high workload so that MAE can occur (Ayorinde & Alabi, 2019).

Human factor

Human factor is a scientific discipline that deals with understanding interactions between humans and other elements of a system, and professions that apply theories, principles, data, and methods to optimize overall system performance (Hayden et al., 2018).

Medication errors (ME) caused by human factors include various aspects of triggers therein. Violations of Operational Standards The appli-

cable procedures, writing errors, lack of work experience, and work stress are examples of several aspects involved in the human error (health care practitioners) factor to the incidence of medication errors (Mansah, et al., 2014). Human error contributes to medication errors by 19.4% which consists of the level of knowledge of health workers, work stress, and lack of work motivation of health workers in doing their work optimally (Delgado et al., 2015).

Human error factor by health workers is the main factor causing medication administration error. The majority of incidents (88%) are caused by health workers who do not comply with policies and procedures that apply to the treatment administration process (Mansah, et al., 2014). A health worker can violate SOPs when administering drugs, when working with work teams, to violations using irrelevant medical or non-medical equipment (Keers et al., 2015).

Parry et al. (2015) in his study also stated that individual factors of health workers included factors that contributed to MAE. This factor is divided into two, namely the characteristics of nurses and experience of working in the health field. Health workers who work in service units in a period of less than 12 months have a 63% potential to experience MAE, compared to health workers who have experienced more than 24 months working in the health sector (Baraki et al., 2018).

In addition, the skills of nurses have a significant relationship to MAE (Budihardjo, 2017). The higher the level of nurse skills, the higher the level of accuracy in the treatment administration process to patients (Dietrich & Norman, 2017).

Various factors that cause MAE in the human error category have several elements in it. Age of nurses also has a significant relationship with the risk of MAE. The more a nurse ages, the higher the risk of MAE. The lower the knowledge of health workers and the level of nurse compliance with policies along with existing Standard Operating Procedures, the risk of MAE will be higher (Thomas et al., 2017). The better the level of knowledge of nurses, the smaller the number of medication error events in a service unit (Budihardjo, 2017).

Lack of adequate training of health workers contributes to the occurrence of MAEs (Alemu et al., 2017). Nurse accuracy also influences MAE, such as errors in reading doctor's writing about prescribed drugs, and errors in administering drugs that look similar (look alike sound alike) (Ayorinde & Alabi, 2019)

Types of violations that occur can be classified based on the source, namely violations by patients and violations by health workers. Research conducted by (Handayani, 2017) explains the human error factor in more detail from the two parties. Judging from the factors of health workers, the cause of administration error is the work culture that is applied in the related unit. Judging from the patient's factors, the cause of administration error is the family of the patient who is not cooperative and the lack of understanding of the patient's family about the treatment procedure.

Preventive Efforts to MAE

1. Implementing Crew Resource Management (CRM) is a technique used by a team to reduce performance errors and create a safety culture. CRM can improve communication between team members in terms of delivering briefings, a shared mental model, and encourage each team member to be able to express their opinions (McKoin et al., 2010). The use of communication guidelines is recommended in a team regarding work processes, standards for the transfer of patient information, team training in communication, and the use of standardized tools (Link, 2018). The MedTeams project has implemented the CRM principle in the delivery of health services and obtained results that decreased clinical error by 30% (Lindquist, 2009).

2. Clarifying the chain of command in health services for the patient care process and appropriate feedback to ensure that patients receive quality care. Command chain policies also play a role in reducing the risk of incidents and increasing patient safety (Mckoin et al., 2010). Studies at the RSUI of Malang show that a well-structured organization can affect the flow of the chain of command that runs well as well, so that health workers can prevent medication errors (Hastuti et al., 2014). Using simple and structured communication forms to efficiently convey information to patients thereby limiting the possibility of miscommunication. The skills of health workers in communicating effectively can be obtained through the SBAR method (Mckoin et al., 2010).

3. Redesign an ergonomic workplace so that it can increase work productivity. This is done through workspace settings, lighting, temperature, and noise levels that do not exceed excessive values. Good work design can produce good service processes and improve patient safety (Carayon, Alvarado and Schoofs Hundt, 2007).

4. Implementing a surveillance system, namely Patient Advocacy Reporting Systems (PARS), to recognize the behavior patterns of health professionals who are unprofessional and endanger patient safety. This is done based on patient or family complaints and the perception of coworkers. In its application, it is necessary to ensure that staffs have the opportunity to fully participate in risk identification and mitigation activities that will prevent patient safety incidents (Mckoin et al., 2010). PARS can improve supervision of the entire system of health personnel behavior that deviates from safety culture and seeks to improve patient safety culture (Battles et al., 2017).

5. Teamwork training through application *Team Strategies and Tools to Enhance Performance and Patient Safety™ (TeamSTEPPS™)* which consists of leadership, team member support, condition monitoring, and communication (Mckoin et al., 2010). TeamSTEPPS enables a team to adapt to changing situations, share understanding of patient care, develop positive teamwork attitudes, provide efficient and reliable patient care, and most importantly, achieve safer treatment outcomes (Hunt, 2010).

6. Encouraging the involvement of communication leaders in a service unit in the direction of the delivery of safety values, and provide feedback to members to improve patient safety (Mattson & Hellgren, 2015)

7. Providing education and training for health workers and enforcing policies or Standard Operating Procedures at work (Scanlon & Karsh, 2010). Simulation-based training program with scenario design and debriefing in accordance with the health service situation (Sarfati et al., 2019). Providing training of health personnel on patient safety that is relevant to the state of the hospital. Providing skills-based training and coaching is also needed for all unit leaders to provide feedback on the chain of command, unprofessional staff behavior, and problem resolution.

   Work policies and procedures need to be developed and implemented in accordance with the principle of "zero tolerance", which means that staff who behave unprofessionally will receive disciplinary action (Timmons et al., 2014).

8. Striving for work schedule retrieval in accordance with work standards and capabilities, accompanied by giving instructions on patient handover and work procedures (Weinger & Gaba, 2014).

9. Creating a hospital environment that supports the process of care for patients to improve the level of service security by allocating special resources to deal with problems in the hospital environment (Sahlström, 2018)

CONCLUSION

Based on the literature review conducted on 13 journal articles, the results obtained are that there are three groups of factors that influence Medication Administration Error (MAE). These three factors include ineffective communication, work environment, and human factors.

There are various preventive efforts that can be done to prevent MAE in hospitals, namely implementing crew resource management, clarifying the chain of command, using SBAR communication forms, designing an ergonomic workplace, implementing a monitoring system namely Patient Advocacy Reporting System (PARS), providing training and education for health workers, along with setting work schedules that do not exceed workload.

A hospital can consider various preventive measures based on the level of importance and available resources to deal with patient safety incidents, especially in the case of medication administration errors. The implementation of MAE preventive programs will directly affect the decline in MAE cases that occur in hospitals.

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Telah melaksanakan penelitian dengan judul sebagai berikut :

No.	Judul Karya Ilmiah	Tahun Pelaksanaan Penelitian
1.	Implementation of Computerized Physician Order Entry in Primary Care: A Scoping Review	2021
2.	Adverse Reactions of COVID-19 Vaccines: A Scoping Review of Observational Studies	2023
3.	Literature Review: Cause Factor Analysis and an Effort to prevent Medication Administration Error (MAE) at Hospital	2020
4.	A Literature review on the Identification of Variables for Measuring Hospital Efficiency in the Data Envelopment Analysis (DEA)	2021
5.	Telemedicine Use In Health Facility During Covid-19 Pandemic: Literature Review	2022
6.	Faktor yang Menghambat Pelaporan Insiden Keselamatan Pasien di Rumah Sakit: Literature Review	2021
7.	Comparison of Four Methods To Detect Adverse Events in Hospital	2015
8.	Infections Prevention and Control (IPC) Programs in Hospitals	2021
9.	Studi Komparatif Pengembangan Contact Tracing Applications Di Singapura dan Indonesia (Studi Kasus: TraceTogether dan PeduliLindungi)	2022
10.	Faktor Penghambat Pelayanan Kesehatan Rutin di Rumah Sakit saat Pandemi COVID-19	2021
11.	Governmental Policies in Managing COVID-19 Pandemic: Comparative Study Between Indonesia and Vietnam, Period of January – March 2020	2021

12.	Akses Pelayanan Kesehatan Ibu dan Anak di Puskesmas Selama Pandemi Covid-19	2022
13.	Comparison of Dental Care Policies Before and During The COVID-19 Pandemic: A Literature Review	2022
14.	Analysis of Implementation of Patient Identification In Hospitals to Improve Patient Safety in Indonesia	2022
15.	Literature Review: Implementation Of Patient Safety Goals In Hospitals In Indonesia	2021
16.	Literature Review: Hospital Service Quality During The COVID-19 Pandemic	2022
17.	Comparison of Hospital Emergency Room Management Regulations in Indonesia Before and During The COVID-19 Pandemic: Literature Study	2022
18.	Analisis Pelaksanaan Pelayanan Kesehatan Perorangan (Ukp) Di Puskesmas Sebelum Dan Selama Pandemi Covid-19: Literature Review	2022
19.	Perbandingan Kebijakan Pelaksanaan Imunisasi Rutin pada Anak sebelum dan selama Pandemi	2022
20.	Recommendation Analysis Of Mental Health Services For Health Workers During Pandemic Covid-19	2021
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Adapun penelitian tersebut layak dilakukan dan menghasilkan output yang sangat baik, meskipun belum ada *Uji Etical Clearence* karena menggunakan metode litteratur review . Demikian surat keterangan ini kami buat untuk dapat dipergunakan sebagai persyaratan pengusulan Jabatan Fungsional Lektor Kepala.

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