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LEAN SIX SIGMA AND ELECTRONIC RECIPES IN EFFORTS TO IMPROVE PATIENT SAFETY IN THE INSTALLATION OF EMERGENCY SANGLAH DENPASAR HOSPITAL

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A R T I C L E I N F O

Keywords: *lean six sigma, electronic prescriptions, medication errors, patient safety.*

ABSTRACT: Introduction: Patient safety is a trending topic in various hospitals. Patient safety involves preventing mistakes and eliminating various dangers due to errors and can occur at any time during the health care process, especially in the treatment of patients. **Research Objectives**: This study aims to determine how the implementation of Lean Six Sigma in electronic prescription services by calculating the incidence of potentially medication errors analyzed by Six Sigma is used to determine improvements in the quality of prescription services. **Research Methods**: The method used in this study is a mix method. The first step was to observe the implementation of recipes with a sample size of 100 recipes then the second stage conducted in-depth interviews with 20 respondents. **Research Result**: defect of prescription service by 2.25% with a sigma value of 3.50 means that electronic prescription service is good enough but needs improvement. **Conclusion:** Six sigma can be used as an evaluation in an effort to improve the quality of electronic prescription services, electronic prescriptions can reduce the incidence of medication errors as an effort to improve patient safety in the Emergency Department of Sanglah Hospital. The results of interviews with informants agreed that electronic prescriptions could improve patient safety.

Kata Kunci : *lean six sigma, resep elektronik, medication error, patient safety*

ABSTRAK: Pendahuluan*: Keselamatan pasien menjadi trending topik diberbagai rumah sakit. Keselamatan pasien meliputi pencegahan kesalahan dan mengeliminasi berbagai bahaya akibat kesalahan dan dapat terjadi setiap saat selama proses pelayanan kesehatan, khususnya dalam pengobatan pasien.* ***Tujuan Penelitian****: Penelitian ini bertujuan untuk mengetahui bagaimana implementasi Lean Six Sigma dalam pelayanan resep elektronik dengan menghitung kejadian yang berpotensi medication error dianalisis dengan Six Sigma digunakan untuk menentukan perbaikan mutu pelayanan resep.* ***Metode Penelitian****: Metode yang digunakan dalam penelitian ini adalah mix methode. Tahap pertama dilakukan observasi terhadap pelaksanaan resep dengan jumlah sampel 100 resep kemudian tahap kedua melakukan wawancara mendalam dengan terhadap 20 responden.* ***Hasil Penelitian****: defect pelayanan resep sebesar 2,25% dengan nilai sigma 3,50 berarti pelayanan resep elektronik sudah cukup baik namun perlu perbaikan.* ***Kesimpulan****: Six sigma dapat digunakan sebagai evaluasi dalam upaya peningkatan kualitas pelayanan resep elektronik, resep elektronik dapat menurunkan kejadian medication error sebagai upaya peningkatan keselamatan pasien di Instalasi Gawat darurat RSUP Sanglah. Hasil wawancara terhadap informan menyatakan setuju bahwa resep elektronik dapat meningkatkan keselamatan pasien.*

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Introduction

The development of the world of health in Indonesia is very rapid, especially in the current industrial era 4.0. The development of the disease with the number of new disease cases found causes the needs of consumers in this case for health services especially hospitals also increased. This development will be accompanied by patient demands as consumers of the quality of health services provided. Hospitals that provide services with low quality of marketing services will fall because they are abandoned by their customers. The hospital is a place of health care to meet the community's need for healing. Hospitals have an important role in providing fast and appropriate and quality services to patients.

Sanglah Central General Hospital as the largest hospital in Bali and referral centers for the regions of Bali, West Nusa Tenggara and East Nusa Tenggara are required to always provide the best service to the community. Sanglah Hospital also organizes plenary health services with the mission of organizing professional health education and research in hospital-based health. Health services that are held must always give priority to patient safety (patient safety). Patient safety is a trending topic in various hospitals. Patient safety is defined as an effort to prevent danger or injury to the patient during the treatment process. In general, patient safety includes preventing errors and eliminating various dangers due to these errors. Mistakes can be made by members of the health team and can occur at any time during the health service process, especially in the treatment of patients.

The occurrence of medication error is one measure of achieving patient safety. Medication errors are adverse events for patients due to drug use errors during treatment, which can actually be prevented. Medication errors can occur at the prescribing, dispensing, and drug administration stages. Errors at one stage can occur in a chain and cause errors at later stages. The occurrence of medication errors related to practitioners, drug products, procedures, environment or systems involving prescribing, dispensing, and administration in electronic prescription services (Donsu et al., 2016; Ulfah & Mita, 2016). Sanglah Hospital, especially in the Emergency Room, began using electronic prescriptions since May 2019. To overcome the problems of electronic prescription services in the Emergency Room, quality control efforts are needed. One way is to implement a Six Sigma approach which is a quality improvement strategy that focuses on meeting customer requirements or desires (Suwarni et al., 2018).

Suraningtyas, (2014) states that Six Sigma is a scientific method used to solve problems in business and industry. Six Sigma focuses on process and service process failure prevention, besides that Six Sigma is also a quality improvement program. Six Sigma as a methodology in the improvement process is a process of investigation, evaluation, measurement and analysis of a problem by looking to the root cause of the problem, where the problem that arises is the cause of dissatisfaction of patients as hospital customers. The Six Sigma method consists of five stages, namely Define, Measure, Analyze, Improve and Control. The Six Sigma method is expected to improve the quality of health services

The causes of the low quality of health services include input factors (equipment, funds, lack of facilities, skilled doctors, and so on). In addition, there are other supporting factors that cause the low quality of services in hospitals, namely the quantity and quality of nurses, the number of specialist doctors, and the allocation of funding is still focused on physical and equipment. This small allocation of funds is one of the reasons hampered improvement in service quality (Arifin et al., 2011). Ensuring patient satisfaction is a top priority set by various health organizations.

In addition to ensuring patient satisfaction, efforts to use electronic prescriptions and Lean Six Sigma Management are expected to increase patient safety efforts. Patient Safety Targets (SKP) are a requirement to be applied in all hospitals that are accredited by the Hospital Accreditation Commission. The preparation of this target refers to the Nine Life-Saving Patient Safety Solutions from the World Health Organization (WHO) which is also used by the PERSI Hospital Patient Safety Committee (KKP-RS, PERSI), and from

the Joint Commission International (JCI). The purpose of the Patient Safety Goal is to encourage specific improvements in patient safety. The target highlights the problem areas in health care and explains the evidence and solutions of the evidence-based consensus and expertise on these issues. It is recognized that a good system design is intrinsically intended to provide safe and high-quality health services, as far as possible the target is generally focused on comprehensive solutions (Garvey, 2005).

Literature Review

Lean Six Sigma

Lean Six Sigma is one method that is developing in the world today. Lean is a continuous improvement effort to eliminate waste and increase value added both products and services (Devani & Sari, 2018). The application of Six Sigma is expected to reduce failure (damage) in achieving the desired quality goals. Six Sigma is defined as an advanced technology method used by engineers and statisticians to improve / develop processes or products. Six Sigma uses statistical methods, although it is not entirely about statistics. The main key to the above understanding is measurement, goals or changes in corporate culture. Sigma is a Greek alphabet that shows the standard deviation of a process. The standard deviation measures the variation or number of distributions of an average process. The sigma value can be interpreted as to how often a defect might occur. If the higher the level of sigma, the less tolerance is given to disability so that the higher the capability of the process, and it is said to be the better. In its essence, Six Sigma advocates that there is a strong relationship between product defects and the resulting product, reliability, costs, cycle time, inventory, schedule and others. If the number of defects increases, the number of sigma will decrease. In other words, with a greater sigma value the product quality will be better (Saad, 2018).

The definition of Six Sigma according to Gaspersz (2002) contained in his book entitled Guidelines for Implementation of Six Sigma Integrated Programs with ISO 9001: 2000, MBNQA and HACPP is a vision of improving quality towards the target of 3.4 failures per million opportunities (DPMO) for each transaction products (goods and / or services), active efforts towards perfection (zero defect). Six Sigma is also a management philosophy that focuses on removing defects by emphasizing understanding, measuring, and improving processes (Brue, 2002).

From the definitions mentioned above, it can be concluded that Six Sigma is a comprehensive and flexible system for achieving, maintaining, and maximizing business success. Six Sigma is uniquely controlled by a strong understanding of customer needs, disciplined use of facts, data, statistical analysis, and careful attention to managing, improving, and reinvesting business processes.

Lean and Six Sigma are quality improvement methods that are done together. Lean focuses on reducing waste and increasing process speed while Six Sigma focuses on reducing variation and improving product quality (George, 2003). Lean and Six Sigma have sections covering businesses, organizations, and government agencies to aggressively expand the use of Lean and Six Sigma as a core strategy to overcome competitive market pressures that affect cost, quality, and customer demand. Lean is driving change in various commercial and industrial sectors, from automotive, aerospace, and metal finishing to health care, construction and wood products. Although commitments to Lean and Six Sigma vary significantly throughout the organization, many view implementation as a long-term journey that will require ongoing leadership and organizational commitment.

Electronic prescription

Electronic prescribing system (e-prescribing) is software specifically designed to facilitate drug prescribing services starting from the prescribing stage, the transcribing stage, the dispensing stage (preparation to the delivery of a prescription by a pharmacist), administration stage (the process of using drugs) and monitoring. Electronic prescriptions are expected to be able to replace manual recipes into computer printed recipes and computer faxed prescriptions (Pratiwi & Lestari, 2013). Electronic prescribing is expected to reduce some errors (medical error) at the stage, namely the prescribe stage (prescription writing), the transmit stage (reading the recipe for dispensing process), the dispense stage (preparation until submission of prescriptions by pharmacists) and the administrators stage (the process of using drugs) and stage monitoring (monitoring) (Douglas et al., 2004 in Arifin & Dirgahayu, 2017).

Electronic prescription has a number of benefits, namely there is no risk of misreading, correct drug dosage, fast data input, economical paper and practical (Kusumarini et al., 2014), reducing the occurrence of medical treatment errors due to incorrect prescribed medication indication, incorrect patient or contraindicated, improper drug or drug that has no indication, improper dosage and usage rules (Soegijoko, 2010), increasing competence and supporting decision-making difficulties when needing information (MOH RI, 2008), simplifying the administration and history of drug use by the patient thus supports the decision and provides a strong audit trail for all medicines used, thereby supporting the rational prescription control of drugs (Mudzakir in Arifin & Dirgahayu, 2017).

Patient Safety

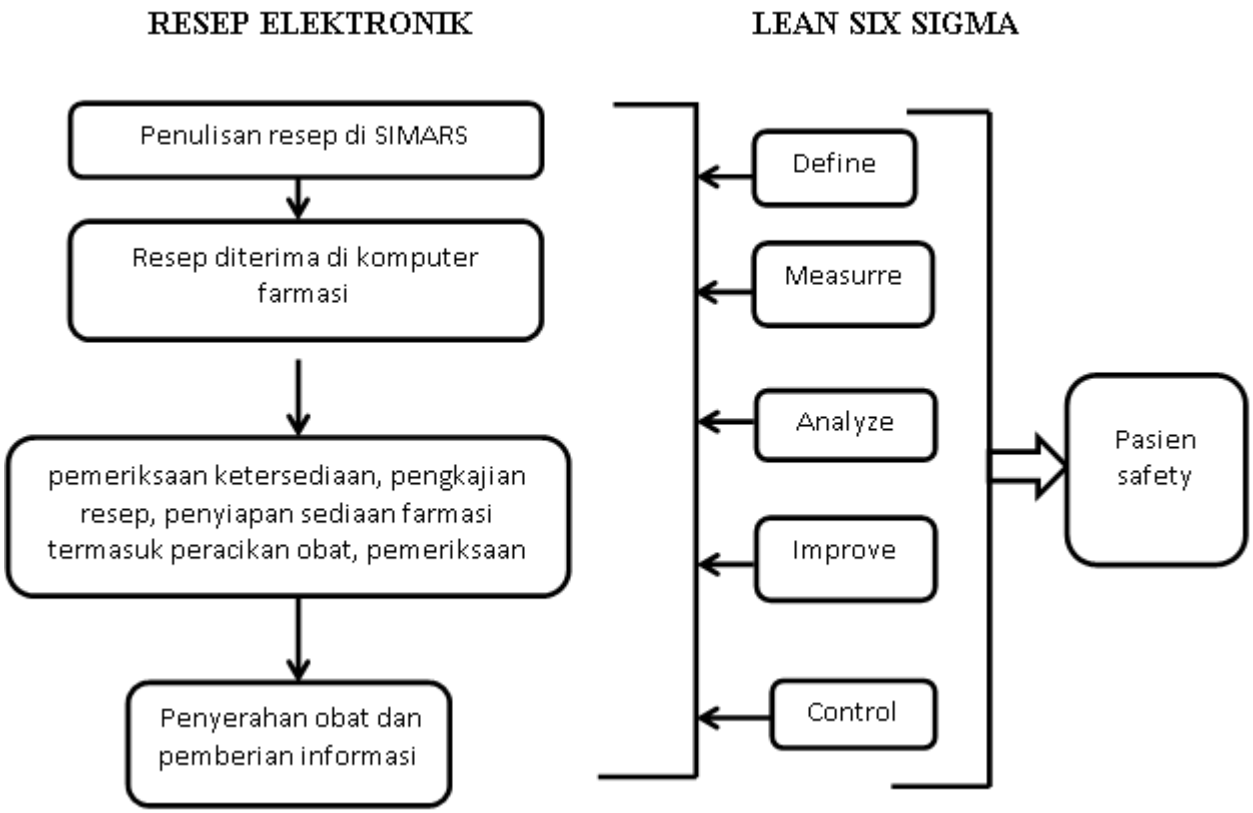
Hospital patient safety is a system where the hospital makes patient care safer. The system includes risk assessment, identification and management of matters related to patient risk, patient reporting and analysis, the ability to learn from incidents and their follow-up and the implementation of solutions to minimize the risk of emergence (MOH, 2008). The implementation of patient safety programs in hospital services is influenced by various factors consisting of: organization and management, blaming work environment and excessive workload, team work, task factors such as SOP availability and individual factors which include knowledge, skills, attitudes and conditions physical / mental (Cahyono, 2008).

Patient safety is a priority issue in health care, where the patient safety movement began in 2000 which began when the Institute of Medicine published the To Err Is Human Building a Safer Health System report (IOM, 1999). Patient safety is a patient's right. Patients are entitled to security and safety during their treatment in the hospital (Saar, 2011). In accordance with the Law on Health Article 53 (3) of Law No. 36/2009 states that the implementation of health services must prioritize the safety of patients' lives.

Patient safety is an important component of the quality of health services. Joint Commission International (2011) developed policies or procedures that support ongoing reduction of infections related to health care. The policy consists of correctly identifying patients, increasing effective communication, increasing the safety of drugs that need to be watched, ensuring the correct location of surgery, the right procedure, surgery on the right patient, reducing the risk of infection (JCI, 2011).

Research Consept

Problem solving models in the Six Sigma method there are 5 stages, namely the formulation (define), measurement (measure), analysis (analyze), corrective actions (improve), and control (control). The Six Sigma process and the use of electronic prescriptions are expected to reduce the incidence or incidence of patient safety. Hospital patient safety (Patient Safety) is a system where the hospital makes patient care safer. The system includes risk assessment, identification and management of matters related to patient risk, patient reporting and analysis, the ability to learn from incidents and their follow-up and the implementation of solutions to minimize the risk.



Research Method

This study uses a mix method research design (quantitative and qualitative). The first stage of quantitative research was carried out sampling with a purposive sampling method and using the observation sheet checklist instrument calculation of the incidence of medication error. The recipes that are served in the Emergency Room will also provide data and information about medication errors that occur. The number of prescription samples taken was 100 sheets while for the qualitative sample the researchers conducted interviews with management and service providers in the Emergency Department. The sample was obtained by snowball technique, the first respondent interviewed was the head of the Emergency Department then the next respondent was determined by the first respondent. The number of respondents sampled in this study amounted to 20 people or until the last correspondent with the same understanding and understanding as the other correspondents so that it was considered sufficient. Criteria in determining respondents are based on the competence of respondents that the respondent is involved in patient service and knows the situation and conditions in the Emergency Department. Data collected through observation, interviews and document study. Data collected can be in the form of qualitative data and quantitative data. Qualitative data in the form of interviews with the management of the Emergency Room at Sanglah Hospital. Quantitative data were obtained through observation of the electronic prescription service process and the findings of the Medication error. Prescription observation sheet for collecting data through observation on prescription in the form of: observation medication error prescribing, transcribing, and dispensing stages. Prescription services in the Emergency Room at Sanglah General Hospital were observed and then analyzed using the

Six Sigma methodology with DMAIC problem solving methods. Outpatient pharmaceutical prescription services with Six Sigma (DMAIC) (Define, Measure, Analyze, Improve, Control).
The research data was collected through three stages namely preparation, implementation and final stages. In the preparation phase, the researcher submits the application for a research permit. After the research permit was obtained, the researcher met with the head of the Emergency Department at Sanglah Hospital. The researcher involved 4 enumerators as assistants in collecting observation data to avoid the researchers' subjectivity. Data or qualitative information obtained were recorded with electronic media to avoid subjectivity from researchers.

RESEARCH RESULT

Kuantitatif Result

This research was carried out by observing 100 electronic prescriptions in the Emergency Room at Sanglah General Hospital using an observation sheet to find the potential for medication error. The quantitative description of the data collected starts from observing the completeness of the prescription including the patient's identity, RM number, drug name, rules of use, dosage, weight, height, history of allergy and the name of the prescribing doctor

Table 1. Observation Results Completeness of Prescription and Potential Medication errors

Completeness of the recipe	Uncompleteenes Prosentase	Medication error risk
Patients identity	0%	Wrong patients risk
Medical record number	0%	Wrong patients risk
Drug name	0%	Wrong drug administration risk
Rule to use	2%	Wrong drug administration risk
Drug dose	2%	Uncorrect drug dose administration risk
weight	3%	Uncorrect drug dose administration risk
High	2%	Uncorrect drug dose administration risk
Allergy history	1%	Alergic reaction risk

Table 1 describes the 100 recipes that were observed that incomplete according to the rules of use, drug dosage, patient's weight, patient's height and history of allergies. Incomplete based on patient identity, RM number and drug name does not exist (0%) because electronic prescriptions are going well. The finding of medication error risk requires an evaluation of the electronic prescription process used to minimize the occurrence of medication errors so that the goal of improving patient safety is achieved. Six sigma analysis is carried out from the prescribing, transcribing, dispensing and administration stages. Six sigma is a process improvement method used to provide better products and services that are accurate enough to solve problems.

1. Define stage

In the define stage, researchers identify the implementation of electronic recipes and define the role of people who play a role in the implementation of electronic prescribing. Next the researcher identifies the characteristics related to the specific needs of the patient or customer and determines the goals.

2. Measure (M)

Measure is the second operational step in the program to improve the quality of electronic prescription services using the Six Sigma method. Some of the main things that researchers do are:

a. Conduct and develop data collection plans that can be carried out at the process, and / or output level. In carrying out the data collection the researcher was assisted by four enumerators with enumerator criteria

who were people who understood and understood the electronic prescription work process, the enumerator had a working period in the emergency department> 5 years.

b. Measuring current performance to be determined as a performance baseline at the beginning of a Six Sigma project. Implementation of this performance is carried out by observing the prescription process starting from making electronic prescriptions to the drug given to patients. This activity is to analyze the existence of problems related to drugs, if found problems related to drugs should be consulted to the prescribing doctor. The pharmacist must do the prescription review according to administrative requirements, pharmaceutical requirements, and clinical requirements for the patient. Then the drug is prepared by the pharmacy until it is then handed over to the nurse on duty. The whole process is evaluated so that the yield, defect is then calculated DPMO sigma level. Data is presented in Table 2

Tabel 2 .Hasil Observasi pada tahap peresepan elektronik

	Yield (%)	Defect (%)	DPMO	Sigma
Prescribing	96	4	40000	3.25
Trancribing	99	1	10000	3.83
Dispensing	97	3	30000	3.38
Administration	99	1	10000	3.83
Mean	97.75	2.25	22500	3.50

Table 2 describes the defect in the overall electronic prescription service at the Sanglah Hospital Emergency Room at 2.25% with a sigma of 3.50 this means that the quality of the electronic prescription service at the Sanglah Hospital Emergency Room is quite good but it still needs improvement.

3. Analyze (A)

Is the third operational step in the program to improve the quality of prescription services using the Six Sigma method. Actually the target of the Six Sigma program is to bring the electronic prescription service process to conditions that have stability (capability) and capability (capability), so as to achieve a zero failure rate (zero defect oriented). Analysis of each stage in electronic prescribing starts from the prescribing transcribing dispensing and administration stage with the lowest performance is prescribing, with a defect of 4%. There needs to be an improvement in this phase by taking into account the completeness component of the recipe given through the electronic information system.

4. Improve (I)

In the improve phase, researchers obtained sources and root causes of electronic prescription service quality problems then an action plan was established to carry out an increase in the quality of electronic prescription services that describe the allocation of resources and priorities made in the implementation of the plan. The average value of the recipe service performance in the Emergency Department with no defect is 97.75, which means that the overall performance of the Emergency Room prescription service is 3.25% which still gives a chance of error. Sigma The actual recipe value is 3.50

5. Control

The final stage in the project is to improve the quality of Six Sigma electronic recipes. At this stage quality improvement procedures and results are documented as standard work guidelines to prevent the same problem or old practices from reoccurring. The Emergency Department of Sanglah Hospital has a SPO (Operating Service Standards) related to prescription services in full. This form of supervision can be

carried out by regular monitoring and evaluation to ensure that the correct procedures have been followed. If it is not according to procedure, then corrective action must be taken to resolve the problem and bring the process. The system phase in Six Sigma focuses on how to maintain improvements in an effective, efficient and certainly oriented way to patient safety. Improvements made are the use of information technology, the system utilizes a patient identity database and a drug database so that it helps the doctor write the correct medication and comply with the prescription requirements. The problem of incompleteness of prescriptions written by doctors, errors in determining the dosage of drugs that can potentially cause medication errors.

Result kualitatif

Respondents in this study were described based on age, educational status, years of service, employment status. Data is described in table 3

Table 3 characteristics of respondents

Informant number	age	Education Status	Work period	Employ Status
Informant 1	52	S2	23	ASN
Informant 2	57	S2	57	ASN
Informant 3	33	S1	5	contract
Informant 4	30	S1	7	contract
Informant 5	33	S1	8	ASN
Informant 6	36	D3	14	contract
Informant 7	34	S1	6	contract
Informant 8	26	D3	4	contract
Informant 9	31	D3	10	ASN
Informant 10	46	D3	15	ASN
Informant 11	53	D4	32	ASN
Informant 12	35	D3	6	ASN
Informant 13	30	D3	6	contract
Informant 14	48	D3	26	ASN
Informant 15	29	S1	5	contract
Informant 16	39	S1	13	ASN
Informant 17	33	S1	8	ASN
Informant 18	27	S1	2	Residen
Informant 19	31	D3	7	ASN
Informant 20	28	S1	1	Residen

Table 3 describes the characteristics of the respondents as informants in this study. Based on the age characteristics, the average age of respondents was 36 years, the average education level of Bachelor respondents, the average length of service of respondents was 12 years, the average employment status of informants was ASN.

The results of the interview in this study are based on the problems that have been written in the interview guidelines as follows.

Topic 1

The implementation of electronic prescriptions in the Emergency Room at Sanglah Hospital is explained as follows:

Informant 1

"As long as I am in the emergency room we always hold regular meetings every month, the implementation of this prescription has never experienced problems, both in medical triage, surgery as soon as there are patients when they need medication a doctor on duty or a resident doctor so needs medication to the place where the medication is remedy immediately stating the medicine needed "

Informant 2

"Alright ... the implementation of the diigD electronic prescription includes in outpatient care, triage, also in some inpatients in MS and Ratna ... maybe those who are still ... uh ... what is the name of the electronic prescription that has been running in the emergency room"

Informant 3

"Hmmm, thank you doctor Kadek ... so far, the implementation of electronic prescriptions. I feel helped by this electronic system ... compared to before, such as no need to write ... a little error, medication error has decreased greatly." Informant 4 "Eh, this is the electronic recipe that has been running from last year and is very helpful and accelerates service".

Informant 6

"We have started to use electronic prescriptions but there are some drugs that sometimes appear sometimes not so we use manuals when no medicine appears on the computer"

Informant 8

"In my opinion it has been going well, just in the beginning it still needs to be adjusted ... when using electronic prescriptions often we have to go to the pharmacy to ask for a cure but now it's smooth"

Informant 9

"In my opinion, it works well, doc ... compared to the past who used paper recipes, sometimes the side of the pharmacy was often asked to prescribe because it was difficult to read the doctor's writing"

Informant 14

"In the past, using recipe paper was often difficult to read the recipe ... yes, now it is more practical and efficient."

Informant 17

"If during my duty it has been going well doc ... Just because at the beginning I often have trouble finding where to drop the dose, sometimes there is no drug name so we have to find the same type of medicine"

Informant 19

"In my opinion it's going well, it's just the beginning of the time using electronic prescriptions often we have to go to the pharmacy to ask for a cure but now it's smooth"

The results of the interview can be concluded that the implementation of electronic prescriptions in the Emergency Room at Sanglah Hospital has been going well even though there are obstacles but it does not affect patient services. Especially for the emergency room VK room, it still uses the drug index card because the network signal to the room is not good

Topic 2

The implementation of electronic prescriptions in an effort to improve patient safety in the Emergency Room is described as follows.

Informant 1

"This is important, yes ... because in the past, my doctor's writing was difficult to read, difficult to understand, prescription writing is always symbolic, now the concept of a recipe must be read clearly by 2 people or more, especially now that you only need to take medicine that is already there, just adjust the dose, age, body weight ... yes, the writing is very clear and the rules are clear as long as he inputted there correctly ... there was no mistake reading the recipe ... "

Informant 2

"We use smart words here, there are often incompleteness such as many drug contents that are not listed, causing us to need more time to reconfirm so that there is a delay in drug administration while the emergency needs speed and accuracy ... the system is clear

Informant 4

"There are obstacles, sometimes when searching for the name of the drug, it is usually typing less knowledge with the name of the drug available at the pharmacy."

Informant 5

"It has been running from the planning, implementation and monitoring, there have been obstacles several times the system error, the electricity was off but not too often"

Informant 8

"Some of the obstacles that occur may be related to the system starting from the spelling that often occurs, for example dipen with dhypenhidramin, also from Depo, still help manually if, as well as if the patient needs for example 3.5 ml while the preparation is 4 milli, then we still have to input 4 milli "

Informant 9

"Electronic recipes are easy to read, so the dosage is also clear that using paper is hard to read."

The results of the interview can be concluded that during the implementation of electronic prescribing, it was found that there were several obstacles such as frequent incompleteness, such as the contents of many drugs which were not included, causing more time to be reconfirmed, causing delays in drug administration. There is a new staff so that it needs socialization, as well as a spelling system of drugs that needs to be equated perception between doctors.

Topic 3

The process and control of the implementation of electronic prescriptions in the Emergency Room at Sanglah Hospital Denpasar is described as follows.

Informant 1

"Yes, the process is that once there is a patient after taking the action if he needs medication, the doctor will go through the computer, the control is directly from the pharmacy ... the clinical pharmacy will confirm one number of times once the clinical pharmacy gets an irregularity for example about the dose he will confirm then sometimes what is prescribed there is no cure then the pharmacy will confirm the doctor if the medicine may be changed according to indications ... the control is already there immediately "

Informant 2

"The control process is usually done in the form of monitoring and evaluation of services every month. In addition, if a problem occurs, the depo officer will confirm the doctor"

Informant 4

"Yes, the doc usually is what often happens is the dosage prescription is unclear, so it is often asked by pharmacy"

The results of the interview can be concluded that the control process is carried out starting from the pharmacy when receiving drug messes, then continued based on reports and monitoring and evaluation conducted every month from the pharmacy.

Topic 4

Internal and external problems encountered during the implementation of electronic prescriptions in the Emergency Room at Sanglah Hospital Denpasar are described as follows.

Informant 1

"Yes, if at the beginning of the beginning yes, because it was a problem in the electronic field but now all are smart electronics, there are no more problems with surrender and so on. so it takes time but we have anticipated that the IGD gets priority that no one dies during electricity for a long time about 8 minutes 15 minutes has come back to life when the server shouted "

Informant 2

"There are some problems, if we don't have an external emergency line, so if the power fails, it will cause the system to be shut down and have to be restarted, if there are internal problems, for example, if there is a new pharmacy, it needs training first"

Informant 3

"Considering it's based on a computer system so it's very dependent on the server, with firework and chrome it's different maybe it's just tennis but it doesn't interfere with the process ... when the electricity goes out too"

Informant 4

"The problem is usually when there is a power failure, there is timing when turning on the generator so the recovery takes time" Informant 5 "The steps we report to IT while we serve it manually, the remission of manua, the drug is given with normal etiquette ... etiquette with label printing"

The interview results describe several problems such as a dead server, a problematic WIFI network, power outages. Internally, problems can be identified such as new staff who need guidance or training before starting work.

Topic 5

The steps taken when facing problems relating to the implementation of electronic prescriptions in the Emergency Room of Sanglah Hospital Denpasar are described as follows.

Informant 1

"In general, there is no problem, if there is a problem, our server coordinates with IT, then our electricity coordinates with the installation of facilities and infrastructure, but if indeed the emergency is needed, we use prescription paper again because the emergency medicine needed because the system screams down ..."

Informant 2

"We are pleased every time we have a problem we try to solve it first if we can't coordinate with IT with the electronic prescription, if before the electronic medication recipe there was a high error if now there are very few"

Informant 3

"So far there is no problem usually we contact EDP IT if necessary when we use paper recipes"

Informant 4

"When there is a problem when the electricity turns back on, we contact EDP because he who understands IT ... yes, if the power goes out the nurse will report the doctor, use prescription paper first"

Informant 7

"For us here, if we take our medicine to the pharmacy, OK, if there is no cure, we will go to the depot emergency room."

Informant 8

"Usually, interference due to server, wifi, and electricity, we report it to the head of the room or the nurse on duty"

Informant 10

"That happened ... when I was watching the server die due to a sudden power failure but it functioned again, the prescribing was delayed for a while but I told the patient that the medicine was not so emergency"

Informant 11

"The server usually just dies, so use the paper recipe again if it's an emergency"

Informant 12

"I have never found that condition the most because I only use it with friends."

The results of the interviews concluded that steps were taken if there were prescribing problems such as using manual recipe paper if it did not work, if there were server problems coordinating with IT then electricity problems coordinated with Facility and Infrastructure Installations.

Topic 6

Reporting when problems and incidents related to patient safety and electronic prescriptions are explained are as follows.

Informant 1

"Yes there is an incident reporting system for example sentinel there when there is an undesirable event that occurs then in the pharmaceutical system I am sure there is also reporting there aimed at the Pharmacy Installation ... well then we are also in the ER right too same so if there is something happening related to this drug there is reporting to the head of the room, to the coordinator there is also a close monitoring meeting of the record documents and so on ... so there are many things we do if something happens so that there is no error in prescribing then which is dangerous for the sometimes possible we are a bit difficult to anticipate is the patient's address because very often the address listed on the ID card is not the same as the actual address there we are important to record the patient's phone number ... like that because we know there is an error now sometimes we don't know the error in the delivery of drugs ... so it's very important the address and telephone number other than identification with name and date of birth "

Informant 2

"If there is a problem, we usually conduct investigations, root cause analysis, usually sound alike and look alike drugs, so we usually provide clearer information as an effort to prevent medication errors ... they have received enough training so that the computer system is easy to understand, the facilities are good enough "

Information 3

"Usually we report via MOD to the head of the installation ... if all the tools and equipment readiness that we use are already connected to the network ... It's just that sometimes when drugs that are not in the depot we give paper recipes ... electronic prescriptions really help improve patient safety if I used paper recipes that are hard to read, now easy to read. "

Informant 4

"If it is reported that we report it to the MOD first then it will be reported to EDP ... this electronic prescription has been very helpful, lacking only the name of the drug because doctors often change so it must be socialized"

Informant 5

“For reporting, we report to superiors that there is a level from depot to installation ... if human resources are still sufficiently trained, before our task is given training to operate ... electronic prescription minimizes prescription reading problems and greatly helps drug services in depots and increases patient safety as well. because the dose is clear, the medicine is clear"

Informant 10

"There is a patient safety officer who makes a patient safety incident report, there is a duty to collect data on all incidents if an error occurs or the incident will be inputted on SIMARS"

Informant 14

"Reporting on patient safety incidents by inputting patient safety reports through SIMARS"

Informant 17

"There is a patient safety officer who makes a patient safety incident report, if an error occurs or an incident will be inputted to SIMARS"

Informant 20

"Yes, it is true that the incident report is done through SIMARS, but I have never found the incident so it has never been reported"

The results of the interview can be concluded that the system of reporting the occurrence of patient safety incidents through patient safety reports that are in SIMRS. Reporting system manually is carried out in stages starting from the head of the room, the coordinator to the head of the installation.

Discussion

The role of lean six sigma Six sigma is done as a form of evaluation of the application of electronic prescriptions in the Emergency Room because the six sigma contains elements of a continuous understanding of measurement and improvement of the activity process for the sake of patient satisfaction with the performance of prescription services. The expected result is the risk of irregularities or mistakes can be reduced to a minimum. DMAIC is a method of improvement that goes through five stages, namely define, measure, analyze, improve and control. The define stage determines the customer and what is needed from the product or service, and what is expected. The measure stage measures the performance of the core processes of the business, building data for the process. Tahapan analyze analyzes the data collected and maps the process to determine the base of the problem and the opportunity to make improvements. Stages of improve improve process targets by designing creative solutions to overcome and prevent problems. Control stages control the process of improvement so that the process runs smoothly and prevents the repetition of past mistakes (Gasperz, 2007; Mahendaringratry & Herawan, 2017).

1. Define Stage

The results of the observation at the define stage obtained the components of the completeness of the recipe that were examined in an electronic prescription which was submitted by a doctor. Incomplete recipes occur in many rules of use, drug dosage, patient weight, patient height and history of allergies. Rules for taking drugs a day how many times and additional rules for when to take medication such as morning, afternoon, evening or night. Rules that can be seen also include after meals, before meals, when eating. Some of the clinical dosage requirements are also inappropriate. Suwarni's research (2019) states that it is related to pharmaceutical completeness if the prescription does not mention the strength of the preparation, so there is a potential for medication error, meaning that the dose used exceeds or is less than the therapeutic dose. Of the three components of prescription completeness for the clinical requirements studied, drug interactions were also found. This is because the requirements for drug interactions are the most potentially medication errors and their effects are the most dangerous if not properly controlled. Drug interactions are changes in the main drug effect by the administration of other drugs before or simultaneously. Requirements for the study of drug interactions are stated by reference interactions as either major, moderate or minor drug interactions in prescription drug combinations.

2. Measure Stage

The activities in the measure phase ascertain and analyze issues related to prescribing. Pharmacists evaluate recipes based on completeness of recipe review according to administrative requirements and defects are found. When a prescription is incomplete, the pharmacy must consult with a doctor. Prescription services may experience delays because the pharmaceutical department must clarify with the doctor who is prescribing the drug.

3. Analysis Phase

The analysis phase is carried out starting from the clinical prescribing phase. The re-checking process is needed to ensure the suitability of the prescription submitted by the doctor. Misconceptions and incompleteness in prescription and prescription services are mostly preventable events. The intervention strategy aims to increase knowledge and skills in electronic prescribing and increase patient safety efforts so that the goal of improving the quality of pharmaceutical services in hospitals can be achieved.

4. Improve Phase

The level of error, especially the incompleteness of prescriptions in the Emergency Room at Sanglah Hospital is quite low 2.25%, meaning that overall performance at the Emergency Room at Sanglah Hospital still provides an opportunity for the risk of medication error. Sigma prescription is 3.50 then sequentially based on sigma ranking is the prescribing, transcribing, dispensing, administration stage so it needs to be improved in analyzing the accuracy of the dose, weight, height and allergic drugs in the recipe.

5. Control Phase

Implementation has been carried out and visible improvement in the results, carried out the control stage which is also carried out an analysis of data and processes to determine the comparison between the old process with the process that has been improved. This stage is carried out by supervising the submission and procurement and inventory of medical drugs to suit the needs, emphasizing the vision and mission of the hospital to all levels of management and service support personnel to realize the hospital's goals. Training and improvement is reviewed every year for improvement efforts leading to the success of service improvement. Total disability services in one month period are always evaluated in management coordination meetings (Hartono, 2017).

Electronic Prescription Services in the Emergency Room of Sanglah Hospital The incompleteness of electronic prescriptions was observed using an observation sheet so that the risk of medication error could be analyzed. When one prescription requirement is found incomplete it is considered to be at risk of medication error. The results showed that the electronic prescription incompleteness factors that occurred were the rules of use, drug dosage, patient's weight, patient's height and history of allergies. This condition or event has the capacity to cause medication errors or risk medication errors. Suwarni's research (2019) states that clinical completeness requirements consist of 7 kinds of component requirements that require the author's knowledge regarding the accuracy of indications, dosage, time of drug use, duplication, allergies, unwanted drug reactions and interactions of drugs in prescription. This recipe review will be very instrumental in preventing medication errors. The ability and skills of prescription writers and recipe reviewers are needed in this regard. Electronic prescription has a number of benefits, namely there is no risk of misreading, correct drug dosage, fast data input, economical paper and practical (Kusumarini et al., 2014), reducing the occurrence of medical treatment errors due to incorrect prescribed medication indication, incorrect patient or contraindicated, improper drug or drug that has no indication, improper dosage and usage rules (Soegijoko, 2010), increasing competence and supporting decision-making difficulties when needing information (Depkes RI, 2008), simplifying the administration and history of drug use by the patient thus supports the decision and provides a strong audit trail for all medicines used, thereby supporting the

rational prescription control of drugs (Mudzakir in Arifin & Dirgahayu, 2017). Electronic prescriptions aim to make it easier to read recipes made by doctors and be able to recommend drugs automatically (Diana & Seputra., 2015).

Different research results in the study of Arifin & Dirgahayu (2017) found that the effectiveness of the implementation performance of the E-Prescribing module in the Eldewise Polyclinic of Sardjito General Hospital Yogyakarta obtained an effectiveness score of 80.95%. A total of four attributes achieve a maximum score (100%) meaning that it is in accordance with user needs, but as many as two attributes have an ineffective effectiveness score meaning there are still problems namely the performance attributes (57.14%) and information (66.67%). The problem in the aspect of performance is still the use of manual recipes, especially prescriptions for BPJS patients because for claims there is a prescription requirement signed by a doctor.

The results of Widiastuti & Dwiprahasto's (2014) study stated that incomplete prescription writing was found to be significantly higher in non-electronic prescriptions than electronic prescriptions (OR 1.30; 95% CI 1.06-1.58). Significantly illegible writing is only typed on non-electronic recipes in 91 recipes. The risk of drug interactions and other errors in the form of improper drug selection, polypharmacy and unusual doses are not reduced by electronic prescription. Other factors that influence prescribing errors are the background of the doctor's profession, the patient's age, the presence of concoctions and the number of types of drugs in the prescription. More than 50% of doctors agree and strongly agree with the perception of convenience and the perception of the benefits of electronic prescriptions. Electronic prescriptions play a role in reducing prescribing errors mainly due to the writing process, while to reduce errors due to decision making doctors need to add a support system and clinical pharmacy intervention to improve medication safety. The perception of the benefits of an electronic prescription system more influences the use of an electronic prescription system than the perception of convenience.

Excellence Electronic Recipes

The benefits of using electronic prescriptions are expected to reduce the case of medication errors. The results showed the most errors due to incomplete prescription existed at the prescribing stage. This stage is starting to be medicine dispensed by electronic prescription until it is read by the pharmacy department. The re-check process is also very much needed because of the number of prescriptions, drug variants, dosages and dosage forms are so numerous that the error factor can still be overcome before being exposed to the patient. Prescription review activities that must be passed in accordance with pharmaceutical service standards are a lot of screening so that it takes a lot of checking time and prescription recipients are sometimes not always Pharmacists so it is related to patient satisfaction that is a long waiting time. So for the screening process can be overcome by increasing the knowledge of pharmaceutical staff and prescriber / writer (Suwarni, 2019). A study conducted by Sutabri & Yanto (2015) also found that this eprescribing application became an appropriate and efficient media to prevent medical errors caused by errors due to carrying out an action, including drug administration. The electronic prescription system will improve medical services, medication safety, and help doctors and pharmacists at the Jakarta Hajj Hospital to improve efficiency and limit medical errors.

Six Sigma And Electronic Prescriptions In Efforts To Increase Patient Safety

Quantitative research results indicate the value of sigma in electronic prescribing is sigma 3.50 which means that electronic prescription services are good but there are about 2.25% of errors that must be corrected to prevent medication errors. The results of data collection in interviews also show that the advantage in electronic prescribing is because electronic recipes are easy to read compared to paper recipes which are sometimes very difficult to read and understand. Electronic prescription also has some

disadvantages because it depends on the server, network and electricity so that if one of these things is interrupted, it can delay the service of electronic prescription. This has been anticipated by a number of things such as adequate coordination between IT systems, facilities and infrastructure as well as in emergencies then a paper recipe can be applied if the server does not support.

Alkuwaiti's research (2016) states that medication errors will affect patient safety and the quality of health services. The purpose of this study was to analyze the effect of the Six Sigma methodology (DMAIC) in reducing medication errors at the outpatient pharmacy at Raja Fahd Hospital, Saudi Arabia. That is done through five phases (DMAIC) using various quality tools. Results were improved to reduce medication errors in pharmaceutical outpatients by 20%. After implementing the improvement strategy, there is a real reduction in defects and also an increase in their sigma ranking. Specifically, the Parts per million (PPM) of recipe / data writing errors was reduced from 56,000 to 5,000 and sigma ranking increased from 3.09 to 4.08. Alkuwaiti's research (2016) concluded that Six Sigma (DMAIC) had a more significant effect.

In general, interviews with informants stated that the implementation of electronic prescriptions had been going well starting from the implementation to the control in its implementation. The implementation of electronic prescriptions in an effort to improve patient safety was also stated by the informant to have gone better according to his statement which stated that previously the doctor's writings were difficult to read and difficult to understand. Recipe writing is always symbolic now the concept of the recipe must be read clearly by 2 or more people especially now that you only need to take the existing medication to set the dosage only, the age of the body weight is clear as long as it is correctly inputted so that there are no recipe reading errors. Internal and external problems were also found during the implementation of electronic prescriptions in the Emergency Room of Sanglah Hospital in Denpasar, as stated by informant 1 stating that "In the beginning the implementation of electronic prescriptions is due to skills problems in the electronic field, but now all are smart electronics, there are no more problems with surrender and etcetera. The problem that often occurs is that the server is down, the power fails suddenly so it takes time.

Steps taken when dealing with problems related to the implementation of electronic prescriptions in the Emergency Room of Sanglah Hospital Denpasar when there is a server problem coordinating with IT while for electricity coordinating with Facility and Infrastructure Installation, but if an emergency is needed then prescribing uses paper recipe back. The results of interviews based on informant 2 states that the electronic recipe for using the smart word here often happens incompletely as many milligrams are not included. This shows that the prescribing stage often experiences incomplete prescriptions that cause the pharmacy must often confirm back to the prescriber for the prescribed dose. This was acknowledged by informant 1 who stated that the control could be directly from the pharmacy. The clinical pharmacy will confirm if you get irregularities about the dosage he will confirm then sometimes what is prescribed there is no cure then the pharmacy will confirm the doctor whether the medicine may be changed according to indications.

Reporting when there are problems and incidents related to patient safety and electronic prescriptions there is a system through incident reporting. The reporting process was explained by informant 1 if there was an incident related to this drug there was a report to the head of the room, to the coordinator there was also a close monitoring meeting of the medical record documents. The difficult thing to do in anticipation is the patient's address because very often the address listed on the ID card is not the same as the actual address there, it is important to note the patient's phone number so that the address and telephone number are very important besides identification with the name and date of birth.

Conclusion

Six sigma has a role and function as a form of evaluation of the application of electronic prescriptions in the Emergency Room because the six sigma contains elements of a continuous understanding of

measurement and improvement of the activity process for patient satisfaction with the performance of electronic prescription services. The expected result in implementing Six Sigma is the risk of irregularities or mistakes can be reduced to a minimum. Six Sigma through DMAIC is a method of improvement that goes through five stages, namely define, measure, analyze, improve and control. The define stage determines the customer and what is needed from the product or service, and what is expected. The measure stage measures the performance of the core processes of the business, building data for the process. Tahapan analyze analyzes the data collected and maps the process to determine the base of the problem and the opportunity to make improvements. Stages of improve improve process targets by designing creative solutions to overcome and prevent problems. Control stages control the process of improvement so that the process runs smoothly and prevents the repetition of previous mistakes, especially in the implementation of electronic recipes. Electronic prescriptions based on research results have several advantages such as: being an appropriate and efficient media to prevent medical errors caused by errors due to carrying out an action, including drug administration, there is no risk of misreading, the right drug dosage, fast data input, efficient paper and practical, reduce the occurrence of medical mismanagement due to drugs prescribed incorrect indications, incorrect patients or contraindications, inappropriate drugs or drugs that have no indications, incorrect dosages and rules of use, increase competence and support the difficulty of decision making when needing information , facilitate the administrative and historical process of drug use by patients so as to support decisions and provide a strong audit trail for all drugs used, so as to support rational prescription control of electronic prescriptions aimed at facilitating reading prescriptions made by doctors and are able to recommend drugs automatically.

1. Six sigma can be used as an evaluation in an effort to improve the quality of electronic prescription services in the Emergency Department of Sanglah Hospital.
2. Electronic prescriptions can reduce the incidence of medication errors in an effort to improve patient safety in the Emergency Department of Sanglah Hospital.
3. Efforts to improve patient safety, especially in efforts to reduce the incidence of medication errors in the Emergency Department of Sanglah Hospital by 2.25% with a sigma of 3.50. This shows that the electronic prescription service in the Emergency Room is quite good but still needs improvement.

Recommendation

The application of Six Sigma is expected to reduce the failure (damage) in achieving the desired quality goals, especially in efforts to improve patient safety. Efforts to improve patient safety are focused primarily on the use of electronic prescriptions to prevent medication errors.

This research can also provide benefits in the field of hospital management knowledge, especially in the implementation of electronic prescription services as an effort to prevent the occurrence of medication errors in Sanglah Hospital. Researchers realize there are still some weaknesses in this study. For further research, it can be focused on improving efforts from the Six Sigma stage with other tool methods such as FMEA.

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