

Analysis of workforce needs in the medical records unit at Esthomihi Hospital Medan using the queuing theory approach

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ARTICLE INFO	ABSTRACT
<i>Article history:</i> Received May 10, 2025 Revised May 15, 2025 Accepted May 22, 2025 <i>Keywords:</i> Manpower Needs Medical Records	Medical records are important records that contain all information related to services that have been provided to patients. The less than optimal process of implementing medical records can be due to a lack of human resources, training, or supporting facilities and infrastructure. This study aims to analyze the need for workers in the medical records department of the hospital with a theoretical approach (queueing theory) at Esthomihi Hospital Medan. This type of research is quantitative with an analytical observational approach. The research design used is cross sectional. This study was conducted at Esthomihi Hospital in December-January 2025. In this study were all health workers related to the implementation of medical records consisting of doctors, nurses, medical records officers and pharmacists at Esthomihi Hospital Medan as many as 252 people. The sample in this study were all doctors, nurses, medical records officers and pharmacists related to patient medical records at Esthomihi Hospital Medan as many as 252 people. Data analysis was carried out univariately, bivariate and multivariate. The results of the study indicate that there is an influence of the level of patient arrivals, the level of patient service, the number of patient servers, and the system capacity. The most influential variable on the need for manpower in hospital medical records affairs with a theoretical approach (queueing theory) at Esthomihi Hospital Medan is the variable number of patient servers with a p value of 0.000, OR = 125.571 (95% CI = 25.114-627.866) meaning that respondents who stated that the number of patient servers was lacking a 125.571 times less chance compared to respondents who stated that the number of patient servers was good. It is expected to be able to improve, expand, develop, experience and knowledge directly regarding the need for manpower in hospital medical records affairs with a theoretical approach (queueing theory) at Esthomihi Hospital Medan. <i>This is an open access article under the CC BY-NC license.</i>



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INTRODUCTION

Inefforts to improve the quality of service in hospitals, the implementation of medical records is one of the factors that determines the good or bad quality of service in the hospital. Without being supported by a good and correct medical record system, hospital services become less productive in improving the quality of service (Hada, 2021)(Hastri, 2023)(Hanifah & Wahyono, 2023). Medical Records are files containing notes and documents about patient identity, examinations, treatments, actions and other services that have been provided to the patient.

Medical records are important records that contain all information relating to the services that have been provided to patients (Nabuasa, 2021)(Abduh, 2021). The implementation of medical records must be carried out in accordance with standards, in order to produce quality data for services. The less than optimal implementation of medical records can be due to a lack of human resources, training, or supporting facilities and infrastructure (Gianna, 2012).

Currently, paper-based medical recording techniques are starting to be abandoned in several developed countries and are switching to electronic medical records. The main reason is to speed up the decision-making process of a doctor in diagnosing and treating a patient. Another goal of implementing electronic medical records is to improve the comfort of the patient himself, for example, with electronic medical records, patients do not need to bother having to store their medical registration cards and bring them every time they seek treatment at a health service facility, meaning that by simply mentioning the name or other identity, the patient's database will be quickly found, which in the end the patient's comfort is really considered by the managers of health service facilities that use electronic medical records (Syahputra et al., 2022)(Nurhayati et al., 2023)(Almira, 2024).

Medical records are a collection of information about the identity, results of anamnesis, examinations, and records of all activities of health workers on patients from time to time (Kurniawan & Setiawan, 2021)(Nurchayati et al., 2021). This record can be printed or digital data. Currently, the implementation of the medical record data archiving process is still local or only utilized by the relevant health service implementing institution. On the other hand, it is possible that a patient will request medical treatment in several different places, where each previous medical treatment should be one of the references in a medical treatment for a patient (Yudianto, 2020)(Sulistiyanta et al., 2021)(Muntaha, 2022). With the help of RME, doctors in different hospitals can view patient medical records from billing, treatment, lab reports, and prescriptions very easily. So doctors will get accurate information about patients and this is much more valuable.

The health system will become more authentic and efficient with the presence of RME (Dewi et al., 2020)(Irwanto et al., 2023)(Bakhtiar, 2024). If medical records are stored electronically then better care can be given to patients. With EMR there is almost no possibility of data being lost or misplaced. EMR data can be easily accessed not only in that area but also abroad. Every user can access it in a short time and does not frustrate the user. The backup mechanism of the system allows EMR data to be stored permanently and for a long period of time. But there are many obstacles in the implementation of EMR such as lack of certification, little knowledge of the system, cost, lack of health information technology, and others.

In line with the description, one of the important elements to support the effectiveness and efficiency in managing medical records is the human resources aspect. One of the obstacles to the realization of human resources professionalism in an organization is the mismatch between staff capacity and their work. This mismatch is caused by the composition of staff expertise or skills that are not yet proportional, or because the distribution of staff still does not refer to real needs or workloads in the field. A high workload can certainly cause negative things that are not desired (Budiasa, 2021)(Santoso & Rijanti, 2022)(Hairina & Komalasari, 2022)(Ma'wa et al., 2024).

One of the hospitals in Medan that always needs workers in the field of hospital medical records is Esthomihi Hospital. This hospital is a type C hospital. Based on an initial survey conducted at Esthomihi Hospital Medan, it is known that the Registration Counter has 5 personnel,

one person in charge (D3 Accounting), three staff for managing and processing medical record data (D3 Management) and one coding staff (D3 Medical Records). Patient Registration Staff is under the auspices of the Finance installation. There are quite a lot of patients, around 4500 each month because the coverage of the service location is not only for the West Medan area. Even the location is strategic because it is close to the market and terminal. All permanent employees of Esthomihi Hospital Medan and their families are also part of the health service participants. At the time of the observation, there were complaints from patients regarding the long waiting time for the registration process queue before going to the intended polyclinic, plus the limited waiting room conditions because it only provides around 50 chairs so that dozens of other registrants have to stand in the Registration service area. Patients usually start queuing to take a queue number from 6 am to get the earliest queue number while service time starts at 8 am, so the quota in the registration counter waiting room is large and the queue is longer.

The queuing theory approach is a mathematical study that examines how queues or waiting lines form and behave in various situations (Prabowo et al., 2020)(Kurdhi et al., 2023). This theory can help understand the factors that affect system performance and efficiency, such as arrival rate, service level, number of servers, and system capacity. In the middle of the waiting time, the patient's patience affects the service of the registration staff in welcoming the patient to the counter and providing an explanation. Not infrequently, there are still many patients who have not completed the files that must be attached so they have to return to the counter several times to complete them, and also for certain prescription guarantees that must be stamped by BPJS officers. This takes longer because the staff at the registration counter must provide an explanation that must be understood by the patient. Currently, the number of available personnel is still limited, all staff in the unit.

Patient registration must do double work, so that the work is not optimal if there are staff who are absent. Moreover, for coding officers who only number one person, at least serve 300 patient data in a day, so additional staff are needed. Until today, Esthomihi Hospital has never calculated the need for manpower in the Registration section. Therefore, to anticipate changes in the workload of these registration officers, researchers want to know how the workload and needs of registration officers are, which can later be used as a consideration for personnel in implementing needs planning.

Medical records are very important in hospitals so that the implementation of medical records must be managed by professional staff. One of the parameters for determining the quality of health services in hospitals is data or information from good and complete medical records. Indicators of good medical record quality are completeness of content, accuracy, timeliness and fulfillment of legal requirements. Therefore, in the implementation of medical records, each hospital always refers to the guidelines or technical instructions for managing medical records made by the hospital concerned. Management of medical records in hospitals is to support the achievement of orderly administration in order to achieve hospital goals, namely improving the quality of health services in hospitals. In managing medical records to support the quality of service for hospitals, management of medical records must be effective and efficient (Mulyani et al., 2022)(Pratama & Mulyanti, 2023)(Ariana, 2023). The completeness of medical record documents is also an important component in accreditation assessment. In the Minister of Health Regulation Number 12 of 2020 concerning Hospital Accreditation, there are 18 assessment criteria with 46 assessment elements in them related to medical records. One of the accreditation assessment criteria is regarding the completeness of medical records. This shows that medical record documents have a great contribution to supporting the results of the accreditation assessment. If this medical record document has a value of more than or equal to 80% in each of its assessment criteria, it shows that the 4 assessment elements concerning the medical records have been achieved. The achievement of the assessment criteria regarding medical records will certainly affect the number of values that can be used to support the results of the accreditation assessment.

Therefore, to produce good and correct medical records, it is very necessary to develop professional and productive health workers. Health workers are everyone who devotes themselves to the health sector and has knowledge and/or skills through education in the health sector which for certain types requires authority to carry out health efforts. From the explanation that has been explained, it aims to increase the provision of the number of workers, the quality of professional and productive health workers, but the health workers needed according to the field of medical records are medical recorders. Planning for the need for health workers in hospitals must be in accordance with the requirements for fulfilling the organizational structure in hospitals, both in terms of type, qualification, number, and procurement. In addition, it is also stated in the Regulation of the Minister of Health No. 56 of 2014 concerning the classification and licensing of hospitals that human resources in general hospitals consist of medical personnel, pharmaceutical personnel, nursing personnel, other health workers, and non-health workers. The number and qualifications of other health workers and non-health workers as mentioned are adjusted to the needs of hospital services. Excess personnel will result in unproductive use of working time, while a shortage of personnel will result in excessive workload and can affect the quality of service in the hospital, so that in planning the need for health workers, an analysis of the workload is needed.

In health services, there must be a balance between officers and workload based on service time standards. If the number of officers is lacking or not balanced with the workload in the medical records unit, the provision of medical record files is late and patients have to wait a long time to get service, this will affect the quality of service in a hospital and affect the productivity of medical records officers.

This method of calculating the need for manpower based on workload is a method of calculating the need for health workers based on the actual workload carried out by each category of health human resources in each work unit in health service facilities including hospitals. This calculation method has currently been adapted and used by the Indonesian Ministry of Health in calculating the number of needs for each category of health workers needed in Provincial, District or City Hospitals. The purpose of the study was to analyze the need for manpower in hospital medical records affairs using the queueing theory approach at Esthomihi Hospital Medan.

RESEARCH METHOD

TypeThis research is quantitative with an analytical observational approach. The research design used is cross-sectional. This research was conducted at Esthomihi Hospital. This research was conducted from December to January 2025. The population in this study were all health workers related to the implementation of medical records consisting of doctors, nurses, medical record officers and pharmacists at Esthomihi Hospital Medan as many as 252 people. The sample in this study were all doctors, nurses, medical record officers and pharmacists related to patient medical records at Esthomihi Hospital Medan as many as 252 people. Data analysis using chi-square test and Logistic regression statistical test.

RESULTS AND DISCUSSIONS

Labor Requirements Calculation Results

Patient Arrival Rate

Estomihi Hospital Medan, North Sumatra, serves a variety of services, including: 24-hour general emergency services and 7 days a week, Internal medicine services, Children's health services, Surgical services. Estomihi Hospital has 3 registration counters at the front office consisting of 1 general patient counter, 1 Jamkesmas counter and 1 BPJS patient counter which are open for 6 working days with working days open Monday to Thursday at 07.30-13.00, Friday at 07.30-13.00 and Saturday at 07.30-11.00. The general patient counter is to serve general patients at personal expense, both new and old patients. The BPJS patient counter is to serve the registration

of new and old BPJS member patients. Estomihi Hospital Medan has 2 outpatient registration counters or where there are 2 officers at the general counter, 1 officer registers for Jamkesmas outpatients and 1 officer registers outpatients at the BPJS counter.

Based on the level of patient arrivals taken, the average service time at the BPJS counter is as follows: Average BPJS patient service time is 126.12 seconds = 2.1 minutes. From the calculation above, the average time required by officers to serve one patient is obtained or called normal time.

Patient Service Level

The standard time of a job is equal to the normal working time plus free time. Standard patient service time $\text{Standard time} = \text{normal time} + (\text{normal time} \times \text{PFD}) = 126.12 + (126.12 \times 15\%) = 126.12 + 18.918 = 145.038$ seconds. At the counter for the queue time to the service that occurs at Estomihi Hospital Medan between 24 minutes. The service time required for new patients is 24 minutes and for old patients 5 to 10 minutes. The results of the calculation of one outpatient registration counter for BPJS patients from the calculation using the WIN QSB program above, it can be concluded that the patient arrival rate per unit of time is 24 patients / hour.

Number of Patient Servers

Probability of no patients in the system or unemployed officers (P_0) = 11%. Probability of busy server or busy officers = 54%. System length/Average number of patients in the system, namely the number of patients served plus the number of patients in the queue (L) = 2.42 or 3 patients Queue length/Average number of patients in the queue (L_q) = 0.25 or 1 patient Average patient time in the system, namely the average waiting time plus the time the patient is served (W) = 0.037 hours or 20 minutes Average patient time queuing (W_q) = 0.004 hours or 17 minutes. The BPJS outpatient registration flow at Estomihi Hospital Medan comes to register according to the queue number that has been taken by the patient, the patient registers according to the registration procedure. BPJS patients before being registered at the counter must obtain a referral letter from a primary health facility in order to receive services at Estomihi Hospital Medan.

So that the flow of procedures carried out by the BPJS outpatient registration section is in accordance with the SOP for outpatient registration. The number of counters available at Estomihi Hospital Medan is 3 counters, namely 1 general counter, 1 Jamsostek counter and 1 outpatient registration for BPJS member patients. The number of officers is 2 general counter officers, 1 officer for the Jamkesmas counter, and 1 officer for the BPJS counter. This is not in accordance with the KARS accreditation regulations in 2012 which state that the number of counters available must be proportional to the number of officers. The job description carried out by the BPJS outpatient registration officer is to call the patient's queue number, the officer registers the patient in order with the queue number, identifies the requirements determined by BPJS, makes a medical identity card for new patients, provides a medical record number according to the sequence, asks the intended polyclinic and then makes an SEP to be given to the patient. This is in accordance with the Job. This can affect patient services so that officers cannot provide maximum service.

System Capacity

The number of patient arrivals each week is 540 with the number of patient arrival hours of 24 hours so that the patient arrival rate is 90 patients/day with a service level of 126.12 seconds with a standard service time of 2.01 minutes. At Estomihi Hospital Medan, the standard service time for old patients is 5 to 10 minutes and for new patients 24 minutes. The waiting time required from the patient taking a queue number until the patient gets a call is 30 minutes with a service time for new patients of 10 to 15 minutes and for old patients is 5 to 10 minutes. From the calculation results using the WIN QSB program, the results show that the patient arrival rate is 37 patients/hour with a standard service time of 126.12 seconds (2.01 minutes) so that the average number of patients who can be served is 30 patients/hour. Based on the calculation results of the WIN QSB program, the average number of patients in the queue (L_q) is 1 patient with an average patient queue time (W_q) of 17 minutes, the average patient in the system (L) is 3 patients with an

average patient arrival time, queueing until being served (W) of 20 minutes. During a long waiting time, patients can wait comfortably in the waiting room and seating facilities provided. By using the WIN QSB program, the probability of unemployed officers (Po) is 11% and the level of officer busyness is 54%. Based on the theory, an officer does his job optimally if each worker is given a time allowance or PFD (Personal Fatigue Delay) for personal interests, fatigue and delays in the system of 15%, meaning that the productivity of officers works a maximum of 85% if it exceeds the standard then it is less efficient in doing his job.

Table 1. Distribution of respondent characteristics at Esthomih Hospital Medan

Characteristics	f	%
Age		
< 35 years	104	41.3
36-45 years	143	56.7
> 45 years	5	2.0
Gender		
Man	94	37.3
Woman	158	62.7
Education		
D3	74	29.4
S1+Profession	178	70.6
Total	252	100

Based on table 1 above, it is known that out of 252 respondents, respondents aged <35 years were 104 (41.3%), those aged 35-45 years were 143 (56.7%), and those aged >45 years were 5 (2.0%). There were 94 (37.3%) male respondents and 158 (62.7%) female respondents. Respondents with D3 education were 74 (29.4%) respondents and 178 (70.6%) respondents had S1+Professional education.

Table 2. Cross tabulation of factors influencing workforce requirements in medical records affairs

Manpower Needs							
Patient Arrival Rate	No		Yes		Total		p value
	f	%	f	%	F	%	
Not enough	119	47.2	11	4.4	130	51.6	0,000
Good	10	4.0	112	44.4	122	48.4	
Patient Service Level	No		Yes		Total		p value
	f	%	f	%	F	%	
Not enough	125	49.6	10	4.0	135	53.6	0,000
Good	4	1.6	113	44.8	117	46.4	
Number of Patient Servers	No		Yes		Total		p value
	f	%	f	%	F	%	
Not enough	123	48.8	8	3.2	131	52.0	0,000
Good	6	2.4	115	45.6	121	48.0	
System Capacity	No		Yes		Total		p value
	f	%	f	%	F	%	
Not enough	122	48.4	8	3.2	130	51.6	0,000
Good	7	2.8	115	45.6	122	48.4	
Total	129	51.2	123	48.8	252	100	

Based on table 2, it is known that out of 252 respondents studied, respondents stated that the patient arrival rate was lacking as many as 130 (51.6%) respondents. There were 119 (47.2%) respondents stating the patient arrival rate and did not need manpower, as many as 11 (4.4%) respondents stated that the patient arrival rate was lacking and needed manpower. Based on the calculation results above, it is known that the statistical test results obtained a p significance value of 0.000 <0.05. So it can be concluded that there is an influence of the patient arrival rate on the need for manpower in the hospital's medical records affairs with a queueing theory approach at

Esthomihi Hospital Medan. Based on the table, it is known that out of 252 respondents studied, respondents stated that the patient service rate was lacking as many as 135 (53.6%) respondents. There were 125 (47.2%) respondents stating the patient service rate and did not need manpower, as many as 10 (4.4%) respondents stating the patient service rate was lacking and needed manpower. Based on the calculation results above, it is known that the statistical test results obtained a p significance value of $0.000 < 0.05$. So it can be concluded that there is an influence of the level of patient service on the need for manpower in the hospital's medical records affairs with a queueing theory approach at Esthomihi Hospital Medan. Based on the table, it is known that out of 252 respondents studied, respondents stated that the number of patient servers was lacking as many as 131 (52.0%) respondents. There were 123 (48.8%) respondents stated that the number of patient servers and did not need manpower, as many as 8 (3.2%) respondents stated that the number of patient servers was lacking and needed manpower. Based on the calculation results above, it is known that the statistical test results obtained a p significance value of $0.000 < 0.05$. So it can be concluded that there is an influence of the number of patient servers on the need for manpower in the hospital's medical records affairs with a queueing theory approach at Esthomihi Hospital Medan. Based on the table, it is known that out of 252 respondents studied, respondents stated that the system capacity was lacking as many as 130 (51.6%) respondents. There are 122 (48.4%) respondents stating the system capacity and no need for manpower, as many as 8 (3.2%) respondents stating the system capacity is lacking and requires manpower. Based on the calculation results above, it is known that the statistical test results obtained a p significance value of $0.000 < 0.05$. So it can be concluded that there is an influence of system capacity on the need for manpower in the hospital's medical record affairs with a queueing theory approach at Esthomihi Hospital Medan.

Table 3. Results of logistic regression analysis

Variables	B	p value	Exp(B) OR	95% CI For Exp (B)
Number of patient servers	4,833	0,000	125,571	25,114-627,866
System capacity	4,657	0,000	105,355	21,196-667

Based on table 3 above, it can be seen that the final stage of the logistic regression analysis produced variables that influenced the need for manpower in the hospital's medical records affairs using a theoretical approach (queueing theory) at Esthomihi Hospital, Medan, namely the variable number of patient servers. with p value 0.000, OR =125.571 (95% CI = 25.114-627.866) means that respondents who stated that the number of patient servers was lacking had a 125.571 times lower chance compared to respondents who stated that the number of patient servers was good.

Discussion

The Influence of Patient Arrival Rates on Manpower Needs in Medical Records Affairs

Based on the results of the study, it is known that out of 252 respondents studied, respondents stated that the patient arrival rate was lacking as many as 130 (51.6%) respondents. There were 119 (47.2%) respondents stating the patient arrival rate and did not need workers, as many as 11 (4.4%) respondents stated that the patient arrival rate was lacking and needed workers. Based on the results of the calculations above, it is known that the results of the statistical test obtained a p significance value of $0.000 < 0.05$. So it can be concluded that there is an influence of the patient arrival rate on the need for workers in the hospital's medical records affairs with the Queueing theory approach at Esthomihi Hospital Medan. The high number of patient arrivals at the hospital affects various operational aspects, including the need for manpower in medical records. Medical records play a very important role in every aspect of health care, and the number of patients coming to the hospital has a direct impact on the workload of medical and administrative personnel in the medical records department.

In addition to managing medical records, workers must also handle other administration, such as filling out forms, verifying patient data, and ensuring complete medical records for insurance reporting or claim submission purposes. The more patients come, the more administrative procedures must be handled.

5. Manpower Needs. The need for workers in hospital medical records affairs is influenced by several factors, including:

- Number and Duration of Patient Visits:** Patients who come in large numbers or have long-term care require more intensive data management.
- Number of Trained Workers:** Hospitals need to have medical records staff who are trained and knowledgeable about medical data management regulations and procedures.
- Technology Systems and Infrastructure:** Good use of digital systems can reduce the administrative burden, but requires staff who understand the technology.

If the number of patients coming exceeds the capacity of the medical records workforce, this can cause delays in recording, errors in data management, and problems in the smooth operation of the hospital. Therefore, hospitals must plan their workforce needs carefully, including arranging efficient shift schedules and ensuring that staff have sufficient training. Researchers assume that the high number of patient arrivals directly affects the need for manpower in hospital medical records. Hospitals must adjust the number of trained staff and use technology to support effective and efficient medical record management. This is important so that patient services are maintained properly and reduce the risk of administrative errors that can affect the quality of care.

The Impact of Patient Service Levels on Manpower Needs in Medical Records Affairs

Based on the results of the study, it is known that out of 252 respondents studied, respondents stated that the level of patient service was lacking as many as 135 (53.6%) respondents. There were as many as 125 (47.2%) respondents stating the level of patient service and did not need workers, as many as 10 (4.4%) respondents stating the level of patient service was lacking and needed workers. Based on the results of the calculations above, it is known that the results of the statistical test obtained a p significance value of $0.000 < 0.05$. So it can be concluded that there is an influence of the level of patient service on the need for workers in the hospital's medical records affairs with the Queueing theory approach at Esthomihi Hospital Medan.

The level of patient service to the workforce needs in medical records matters is very important because medical records are a vital part of providing quality health care. Medical records include patient medical data and information that is used to provide appropriate care, track health history, and as important documentation for medical personnel. Here are some factors that affect the level of patient service to the workforce needs in medical records matters:

- Availability of Trained Workers.** Medical personnel or administrative personnel who are trained in the field of medical records play a very important role in ensuring that patient data is recorded properly and accurately. The quality of this trained workforce directly affects the speed and accuracy of medical record management.
- Compliance with Regulations and Standards.** Medical record systems must comply with standards set by the government and related health agencies. Workers who manage medical records must understand and comply with applicable regulations, such as the protection of patient personal data (for example, regulations such as HIPAA in some countries).
- Use of Technology in Medical Records.** Electronic medical records (EMR) systems are increasingly being used to replace manual systems. This requires workers who are proficient in information technology and are able to manage data with a more efficient system. The level of patient service increases if the system used is fast, integrated, and easily accessible by medical personnel.

Communication Between Medical Teams. The availability of complete and timely medical records greatly supports effective communication between medical personnel and patients. Workers in the field of medical records serve as a liaison in conveying information related to the patient's medical history with doctors, nurses, and other medical staff, which in turn affects the quality of patient care.

Patient Data Security The security and confidentiality of medical records are top priorities in health services. Therefore, workers in the medical records department must have a

strong understanding of patient data protection and ensure that the data does not fall into the wrong hands. Sufficient Resource Needs Hospitals or healthcare facilities need to ensure that the number of available workers is sufficient to handle all medical record work. Lack of workers or an imbalance between the number of patients and workers can cause delays in managing medical records, which ultimately affects the quality of service to patients.

Researchers assume that Patient-Oriented services Every medical records worker must have a patient service orientation, namely ensuring that every administrative and medical records management need can be done quickly and without disturbing patient comfort. Overall, the involvement of competent medical records workers greatly affects the quality of service received by patients. Therefore, increased training, use of technology, and efficient management can greatly assist in improving the level of service to patients in the medical records field.

The Influence of the Number of Patient Servers on the Need for Manpower in Medical Records Affairs

Based on the results of the study, it is known that out of 252 respondents studied, respondents stated that the number of patient servers was lacking as many as 131 (52.0%) respondents. There were as many as 123 (48.8%) respondents stating the number of patient servers and did not need workers, as many as 8 (3.2%) respondents stated that the number of patient servers was lacking and needed workers. Based on the results of the calculations above, it is known that the results of the statistical test obtained a p significance value of $0.000 < 0.05$. So it can be concluded that there is an influence of the number of patient servers on the need for workers in the hospital's medical records affairs with the Queueing theory approach at Esthomihi Hospital Medan.

The number of patient servers needed in hospital medical records matters is closely related to the workload and the amount of data that needs to be managed. Hospital medical records management includes a large amount of patient data, ranging from medical information, treatment history, laboratory test results, to other administration that requires efficient storage and processing.

Some factors that influence the need for servers and manpower in hospital medical records affairs include: Number of Patients Managed: The more patients a hospital serves, the greater the need for data storage and processing. Each patient will have a medical record that needs to be accessed, updated, and stored on a secure server. Data Type and Complexity: Medical records include not only administrative data, but also medical information that is often very detailed and sensitive. This requires a reliable system to handle large amounts of data, including backup and protection against data corruption. Electronic Medical Records (EMR) System: The use of Electronic Health Record (EHR) systems increases the need for more powerful servers and trained personnel to manage and maintain the system. EHR requires servers that are capable of real-time data synchronization and support access from various parties involved (doctors, nurses, administrators, etc.). Data Security: Patient data security is a top priority, so the servers used must be equipped with adequate security systems to protect medical data from potential leaks or illegal access. This requires IT personnel who are trained in data management and server security.

Maintenance and Technical Support Needs: The workforce that manages medical records affairs also needs to ensure regular server maintenance, as well as provide technical support when problems occur. Therefore, the workforce in the medical records department must be skilled in troubleshooting the hardware and software used. Number of servers can be calculated based on the volume of data generated, the level of redundancy required (to avoid downtime), and the need for scalability for the future. Large hospitals typically require multiple servers to support day-to-day operations, data backup management, and data analysis. The number of workers in the hospital's medical records department depends on the number of patients and the complexity of the data to be managed. This includes medical personnel who are directly involved with patient data, as well as IT professionals who handle hardware, software, and security. Researchers assume that overall,

hospitals with larger patient volumes and more complex EHR systems will require more servers and trained personnel to keep the systems running efficiently and securely.

The Impact of System Capacity on Manpower Requirements in Medical Records Affairs

Based on the results of the study, it is known that out of 252 respondents studied, respondents stated that the system capacity was lacking as many as 130 (51.6%) respondents. There were as many as 122 (48.4%) respondents stating the system capacity and did not need manpower, as many as 8 (3.2%) respondents stated that the system capacity was lacking and needed manpower. Based on the results of the calculations above, it is known that the results of the statistical test obtained a p significance value of $0.000 < 0.05$. So it can be concluded that there is an influence of system capacity on the need for manpower in the hospital's medical records affairs with the Queueing theory approach at Esthomihi Hospital Medan.

The system capacity for the workforce needs in hospital medical records affairs is an important factor in ensuring the smooth running of health services and medical information management. The Number of Workers Required is Medical Records staff: Hospitals need trained workers in the field of medical records, both for patient data management, medical archive storage, and insurance claim processing. The number of medical personnel required depends on the hospital capacity, the number of patients, and the type of services provided (outpatient, inpatient, or emergency services). Skilled Workforce: In addition to administrative staff, hospitals also require experts who have knowledge of medical record management systems and health information technology (HIT). This includes medical personnel with expertise in medical documentation and system programming for data integration. Electronic Medical Record (EMR) System: The use of EMR or EHR (Electronic Health Records) is essential in reducing the burden of manual labor and accelerating workflow. EMR helps speed up the recording, storage, and retrieval of patient medical information, which reduces the need for manpower for administrative tasks.

Process Automation: Some processes, such as patient data processing, reporting, and medical records management, can be automated with the right software. This can help reduce the need for manual labor, increase efficiency, and allow for focus on patient care. Limited Resources: Hospitals often face budget constraints that limit the hiring of additional staff or investment in technology to support medical record systems. Changing Regulations and Standards: Evolving regulations on patient data security and medical record standards (such as HIPAA in the US or PPI in Indonesia) can present challenges in assessing system capacity. Workforce Skills: Ongoing training and certification of medical record staff must be conducted to ensure they remain skilled in using the latest technology systems and understand applicable regulations and policies.

Workforce Planning: Hospitals should periodically conduct a workforce needs analysis in their medical records department, evaluating the number of patients, the existing workload, and the system's ability to support efficient medical records management. Workforce Flexibility: Sometimes hospitals need additional staff at specific times, such as during a surge in patients or the implementation of new technology. Having a backup staff or flexible system for hiring staff can help address immediate needs. System Integration: A medical records system that is integrated with other hospital systems (such as a hospital management system or insurance claims system) can help streamline the flow of information and reduce administrative workload. Data Analytics: A system equipped with analytical capabilities can help hospital management monitor workforce needs in real time, allowing them to make more informed decisions about scheduling and staffing tasks.

Researchers assume that overall, the system's capacity to meet the workforce needs in hospital medical records affairs is highly dependent on technological capabilities, trained human resources, and efficient management. Investment in a system that supports efficiency and continuous training for medical personnel will greatly assist in optimizing hospital capacity..

CONCLUSION

For the level of patient arrivals at Estomihi Hospital Medan, general emergency services are 24 hours and 7 days a week with 3 registration counters and an average number of patients per week of 540 patients, so the average patient service time is 126.12 seconds = 2.1 minutes without a break.

For patient service level, patient service time standard Standard time = normal time + (normal time × PFD) = 126.12 + (126.12 × 15%) = 126.12 + 18.918 = 145.038 seconds. At the counter for queue time to service that occurs at Estomihi Hospital Medan between 24 minutes. The service time required for new patients is 24 minutes and for old patients 5 to 10 minutes. the patient arrival rate per unit of time is 24 patients/hour.

For the number of patient servers, the probability of no patients in the system or the officer is idle (P_0) = 11%. The probability of the server being busy or the officer being busy = 54%. System length/Average number of patients in the system, i.e. the number of patients served plus the number of patients in the queue (L) = 2.42 or 3 patients Queue length/average number of patients in the queue (L_q) = 0.25 or 1 patient Average patient time in the system, i.e. the average waiting time plus the time the patient is served (W) = 0.037 hours or 20 minutes Average patient time in the queue (W_q) = 0.004 hours or 17 minutes. For system capacity, calculations using the WIN QSB program obtained results that the patient arrival rate was 37 patients/hour with a standard service time of 126.12 seconds (2.01 minutes) so that the average number of patients who can be served is 30 patients/hour. Based on the results of the WIN QSB program calculations, the average number of patients in the queue (L_q) was 1 patient with an average patient queue time (W_q) of 17 minutes, the average patient in the system (L) was 3 patients with an average patient arrival time, queueing until being served (W) of 20 minutes. During the long waiting time, patients can wait comfortably in the waiting room facilities and seating provided. By using the WIN QSB program, the probability of unemployed officers (P_0) was 11% and the level of officer busyness was 54%.

For the influence of each variable on the need for manpower in the hospital's medical record affairs with a queueing theory approach at Esthomihi Hospital Medan, it is known that: a) There is an influence of the patient arrival rate on the need for manpower in the hospital's medical record affairs with a queueing theory approach at Esthomihi Hospital Medan; b) There is an influence of the level of patient service on the need for manpower in the hospital's medical record affairs with a queueing theory approach at Esthomihi Hospital Medan; c) There is an influence of the number of patient servers on the need for manpower in the hospital's medical record affairs with a queueing theory approach at Esthomihi Hospital Medan; d) There is an influence of system capacity on the need for manpower in the hospital's medical record affairs with a queueing theory approach at Esthomihi Hospital Medan; e) The variable that has the most influence on the need for manpower in the hospital's medical record affairs with a queueing theory approach at Esthomihi Hospital Medan is the variable of the number of patient servers with p value 0.000, OR = 125.571 (95% CI = 25.114-627.866) means that respondents who stated that the number of patient servers was lacking had a 125.571 times lower chance compared to respondents who stated that the number of patient servers was good.

The results of this study can serve as a basis for the formulation of minimum standards for the number of medical record officers in type C hospitals with similar patient volumes, especially by considering the most influential variable, namely the number of patient servers (number of registration officers). The findings suggest that an imbalance between system capacity, patient waiting time, and staff productivity levels can hamper services, thus requiring an ideal ratio between the number of staff and patient load to ensure the efficiency of administrative services. The practical implications of these results can also be used as a reference in the preparation of standard operating procedures (SOPs) for patient registration and personnel allocation based on analysis of actual service times and patient arrival rates. Thus, hospitals can design HR policies that are adaptive, based on system capacity data, and pay attention to aspects of work fatigue (PFD allowance), so that personnel allocation not only meets quantity but also considers service quality

and officer work continuity. This approach is expected to improve the quality of hospital front office services while meeting national accreditation requirements.

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