International Journal of Advanced Trends in Computer Science and Engineering

Algorithm Automatic Full Time Equivalent, Case study of health service

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ABSTRACT

Health care management increasingly relies on the right time to connect with their customers. In addition, it also requires the support of a medical record administration workforce, which is managed by the workforce. The administration of medical records in the clinic is explained by a series of performance measures that are consistent with the time of service work and the number of patients in the clinic. Adjustments need to be made from time to time, so that service level requirements are met at all times. This study is intended to predict the labor requirements of medical record administration services according to the number of workloads and services as well as administrative service staff needs, so that operational costs can be minimized. The method used to determine employee workload and services is Full Time Equivalent (FTE). This method makes it easy for decision makers to measure the quality of workforce needed in accordance with the workload. The results show that the workload experienced continues to increase in total administrative services. Therefore, the medical record service for patients will run optimally.

Key words: Forecasting, Workforce, Full Time Equivalent (FTE)

1. INTRODUCTION

Predicting the quality of health services in the future is very important for an effective and efficient workforce for the development and progress of the administration of medical records at the clinic. This study was motivated by the management of the administration of medical records at the clinic, where accurate predictions of the rate of patient arrival were primitive, important to determine the need for future administration of medical records. Empirical results show how dynamic estimates and updates of puskesmas service levels can affect the accuracy of the medical record administration's workforce services. Administrative records The medical records officer is responsible for most of the tasks and services provided to patients.

The main objective in this problem is related to predicting the administration of medical records service workload to know the workload and adequate workforce in a timely manner to provide quality patient services [1]. In the administration of service settings in the clinic the welfare of service providers is very important because on the quality of clinic services to develop. The quality of services provided has been shown to have an impact on the results of the administration of medical records workload with the number of patients [2]. Limited organizational resources and facilities can make matters worse. The limitations of workforce resources in administration of medical services are one of the most common problems of the healthcare system in general [3]. Metrics that have been proposed to evaluate the adequacy of staff to achieve good patient outcomes based on the patient's workload of administration of medical records and the number of full administrative services [4] the importance of improving the working life of the administration of medical records has also been emphasized in the Aim Quadruple [5].

In this study, the workforce needs of the Medical Record administration officer were proposed by considering factors related to patient satisfaction and workforce to consider the priorities inherent in the problem in decision making, in order to get all the benefits from them in improving the relationship between medical record services with patients, Puskesmas service centers present an additional operational challenge to find out the workload of many patients who have to be served with medical record administration services and administrative workforce needs. Industry surveys show that one of the main challenges in the management of puskesmas service centers is the management of staff workforce. Ideally, clinic can choose to keep their best services available according to the patient's needs. to determine how to manage workload evenly and still maintain sufficient flexibility in the work schedule.

The aim is to maximize resource efficiency while ensuring that all staff have the same workload and meet expectations for medical record work [6]. Specifically the research performance is the most specific thing needed, in this study a test was conducted to prove that the quality improvement of research performance can be realized [15]. They must ensure that these health service resources are optimally aligned with financial fund stability at its core [16]. Utilizing technology and innovation strategies to help and To improve workforce and maximize the use of the workforce with the Full-Time Equivalent Method (FTE) in accordance with the workload and medical record service personnel. This era brings new responsibilities for employees to balance competitive changes in the workplace [17]. The results show that the proposed method can identify this problem. .

2. LITERATURE REVIEW

There is a vast and growing literature on the workforce, following 7 (seven) summaries of the literature that is

oriented towards service workforce management. Research on scheduling workers in the service industry has been well-documented in various sectors. Especially for nurse scheduling, inadequate staffing levels can cause an increase in workload, which can directly affect patient care [7]. At the operational level, without an adequate balance between service requirements and nursing resources, the quality of care provided can be affected due to increased workload and low morale [8]. Various mathematical programming approaches (MP) and discrete event simulation models have been proposed to deal with nurse scheduling [9]. To consider the results and level of patient satisfaction and service providers, a multi-objective objective) programming model has also been proposed [10].

Solve each goal in the model iteratively in order of priority. Priority goals are based on the relative importance of the various objectives given by the system under consideration. For public health care companies, the main goal is to achieve the best clinical outcomes and quality care possible for all patients. Nurse shift preferences and perceptions of schedule justice are also important goals that are less well-studied using the MP approach to scheduling [11]. Some prioritized goals related to provider satisfaction can be easily considered through the SGP framework without the need for arbitrary weighting of interests to be assigned a priori for various purposes in the multi-purpose decision model [12]. Nurse scheduling framework based on a set of performance measures that are aligned with various outcome measures: (1) nurse-patient ratio; (2) the number of profitable and unprofitable shifts and (3) rest day dispersion with the Mathematical method, programming-based decision support system [13]. With a series of work history, the administration of medical workforce needs can be predicted with several work series with a full time equivalent method so that it can produce a series of optimal work sizes[16][17].

3. METHODS
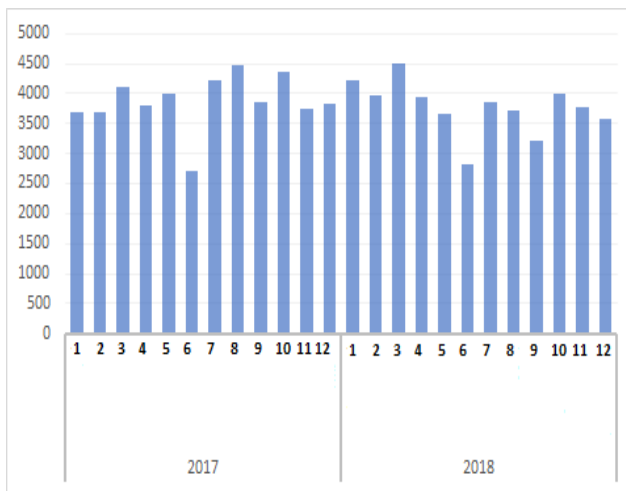
Figure 1: Historical Health Services per 11 Services in Clinic

1. Calculate working hours per day and per year the completeness analysis officer
   Work time Available at Medical Record Administration Services

Table 1: Working time health service

Days Category	Time spent per Day
Working days	313 days/year
Annual leave	12 days/year
National Holiday	20 days/year
Permission / illness	5 days/year
Working time	6 days/year
Total working days available	276 days/year
Working time available	1565 hour/year
Total patient average	144/days

2. Calculating the administrative service workload and completeness analysis

Table 2: The number of patients for 2016 to 2018

No	Year	Y
1	2016	40116
2	2017	40166
3	2018	39532

Based on patient data for the period of 2016 from 2018, it can be seen the number of patient estimates for the following year using the least square method which is using the equation[18][19][20]

$Y = a + bx$
Y = Total workload
a = The amount of workload in the base year or median year
b = The amount of workload every year
x = unit of year calculated based on the base year determined, x = 0, or base year equal to median year x = sequence of years.

The steps to find workload per year are:
Look for the values a and b by the formula:

$$a = \frac{\Sigma y}{n} \text{ and } b = \frac{\Sigma xy}{x2}$$

y = workload of the year known
n = amount of data
so that it is obtained:

Table 3: Number of patients for 2016 to 2018

No	Year	Y	X	Σxy	x2
1	2016	40116	1	40116	1
2	2017	40166	0	0	0
3	2018	39532	-1	-39532	1
	Total	119814	0	584	2

3. Input into the least squares formula, namely:
   Y = a + bx

Based on the data above, an estimate of the number of patients from 2019 to 2020 can be found by entering the values a and b. then the estimated number of patients in 2019 to 2020 is as follows:

Table 4: Estimated number of patients for 2019 - 2020

No	Year	X	Y
1	2019	-2	39354
2	2020	-3	39063

4. Hourly work targets and the number of administrative service personnel needs for medical records of the completeness analysis section using the FTE formula.
   The hourly work target is known to be the average completion time of completeness analysis, which is 10 minutes. Based on these data, the calculation of the amount of working time available each year can be done using the formula [21][22]:
   Hourly work targets Completeness analysis:

   Labor   = 1 hour in units of minutes Average time
                = 60 minutes10 minutes
                = 6 hourly medical record services
   from the results of the observations that the author has done, it can be increased the completion time from 10 minutes to 8 minutes, because if the target 1 medical record service can be obtained 8 minutes then 1 hour will get the following results

   Labor   = 1 hour in units of minutes/Average time

                = 60 minutes/8 minutes = 7.5 medical record services per hour

5. Amount of administrative staff requirements Record part of completeness analysis
   Based on the above calculation, the amount of effective working time per year is 1656 hours/year and the work target is 2 medical record officers. So we can calculate the labor requirements in 2019, d. 2020 with the FTE formula, namely:
   FTE= Total annual workload/Target per hour X Number of working hours per year

   = 39354 (Estimated number of patients in 2019)/(6 RM per hour X 1656 working hours/year)

   = 3, 9 officers

   = 4 officers

   FTE = Total annual workload /Target per hour X Number of working hours per year

   = 39062 (Estimated number of patients in 2020) /(6 RM per hour X 1656 working hours / year)

   = 3, 9 officers

   = 4 officers

   And if the hourly complete work analysis target is 7.5 medical record files which are expected to increase the budget amount to 8 minutes, the calculation of labor requirements in 2019 can be carried out by 2020 with the FTE formula, namely:
   FTE = Total annual workload / Target per hour X Number of working hours per year

   = 39354 (Estimated number of patients in 2020) / (7.5 RM per hour X 1656 working hours / year)

   = 3, 2 officers

   = 3 officers

   FTE = Total annual workload / Target per hour X Number of working hours per year

   = 39062 (Estimated number of patients in 2020) / (7.5 RM per hour X 1656 working hours / year)
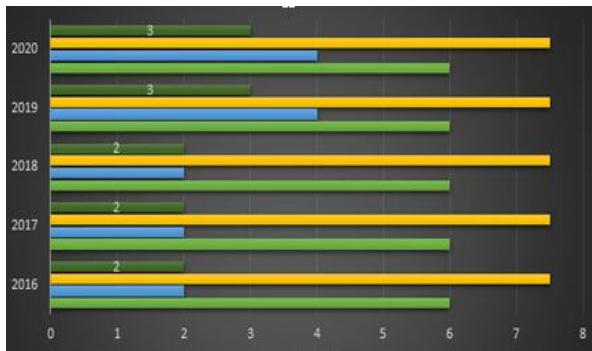
   = 3, 1 officer

   = 3 officers

Figure 2: Forecasting time, and workforce for health service

3. RESULT AND ANALYSIS

Figure 3: The number of services and the time at which a Medical Record Service is carried out in a given time

Working hours per day and per year, administrative staff, medical records, part of completeness analysis the work time of the completeness analysis part for one year is 1656 hours / year with an average working time of 7 hours per day. This shows that working time has been effective for an individual as much as 7 to 8 hours.

B. The workload of officers in the administrative service medical record part of the completeness analysis

The workload of completeness analysis officers is known by the large number of patients, reaching in 2016 as many as 40116 patients, in 2017 as many as 40166 patients, and in 2018 reaching 39532 patients. With these data, patient predictions can be searched for 2019 as many as 39354 and 2020 as many as 39062 patients.

C. Target work per hour and per day clerk of the administrative service medical record analysis of completeness the hourly work target by knowing the standard completion time of the medical record completeness analysis after observation requires an average time of 10 minutes. From the data it is known that the target per hour completeness analysis is 6 medical record files. Then in 1 day with a working time of 7 hours it can be known that 1 complete analysis officer can complete 42 medical record files. However, after observing the length of the settlement time is accelerated, as time goes by the officer will be more proficient in carrying out the task of analyzing the completeness of the medical record so that the productivity should be increased so that the work becomes 8 minutes of completion. If with 8 minutes 1 the medical record file can be completed, then in 1 hour 1 officer can complete 7, 5 medical record files, thus in 2019 only 3.2 officers will be required to complete the analysis.

D. Calculation of labor requirements using the FTE formula

Based on the workload of the medical record administration service staff in the completeness analysis section in 2016, 2018 as many as 40116 patients, so that FTE calculations can be obtained predictions of labor requirements for the 2019 period are 3.9 (7) officers. While the reality in the field is 2 officers. So 2 additional officers are needed to maximize the medical record administration services in accordance with the existing workload. If the work target increases from 10 minutes to 8 minutes, then the needs of the staff of the completeness analysis officer become 3.2 (3) officers. so 1 additional completeness analysis officer is needed.

5. DISCUSSION AND CONCLUSIONS

In this paper, we have studied the problem of identifying workforce loads that are ideal for Administrative of medical services where services can be added so that services can run well. Our analysis aims to solve related to the needs of the administrative service staff of the medical with the increasing workload according to the history of the number of patients so as to get the best service and optimal workforce, this study, we use the Full Time Equivalent (FTE) model.

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