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STAFFING NEEDS ANALYSIS IN THE PHARMACY UNIT OF SANTA MARIA HOSPITAL PEKANBARU 2017

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ABSTRACT

***Background**: Several previous studies have calculated the workload and the needs of human resources in the pharmacy unit and found that the availability of human resources is still not in accordance with the workload undertaken. This study aims to analyse the workload and human resource requirement in Pharmacy Installation of Santa Maria Hospital Pekanbaru 2017*
***Methods**: This research is descriptive research conducted at Hospital Santa Maria Pekanbaru from January until December 2017. Subject of the research included pharmacist laboratory and pharmaceutical technical personnel (pharmacist assistant). Data collection was done by in-depth interview with key informants and from hospital staffing documents and hospital pharmacy installation documents.*
***Results**: Total requirement of pharmaceutical work force during effective day is 40 persons, while requirement during holiday accounted for 21 persons and make it totally 61 persons.*
***Conclusions**: With The current number of employee of 54 people, the hospital required an additional seven person to cope with the workload at the Pharmacy unit of Santa Maria Hospital.*

***Keywords**: Workload, workload analysis, pharmacy installation, hospital, formula ilyas*

INTRODUCTION

Continuity of implementation of high quality health services in a hospital is determined by Hospital Pharmaceutical unit specifically in regard to ensure the accuracy of patient's identity, prescribed drugs, dose, route of administration, and timing of drug administration. An error in drug administration can be caused by two distinctive factors, including human error and an error in the system applied in a healthcare center. Human resources play a significant role in both triggering the error and improving the applied system [1]. The constant increase in workload of staffs working in the pharmacy installation will result in a wide variety of consequences. Errors, absence, and the increase of workers turnover can result from the elevating number of patients seeking for health services [2]. Probability of error in drug packaging, especially for drugs that interact with one another, can also substantially be affected by the excessive workload of the staffs in charge [3].

Workload is a set or a number of activities that should be completed by a unit of organization or stakeholder within a specific period of time [4]. The definition of workload was also disclosed by Indonesian Ministry of Health (2003) stating that workload is the amount of work to be completed by a worker. This definition is more a physical definition of workload [5]. According to another definition, workload is the average frequency of activity of each work within a certain period of time that include

physical and mental workloads. Excessive workloads or lack of physical fitness could lead a worker to have work-related illnesses [6].

Changes do always happen in the working environment, so that a good workload management is required in order to design and allocate the available resources to achieve balance in employee's life [7]. Calculation of workload is exceptionally needed and important for an organization featuring high activity rate because concordance of the available human resources with the assigned workloads and worker's competence should be the basis in designing a good functional hospital [8]. Workload calculation model is a tool that can be used to identify variables that are parts of the work and to analyse its influence to the worker's perfomance. Measurement of workload determines the number of staffs required in order to perform a service by categorizing type of works related to providing a service and other type of activities. Workload comparison would be complicated to conduct if the definition of work and the model applied are different [9].

The workload measurement can be done by using work sampling, time and motion study and daily log techniques. Work sampling technique measures workload using standards of work that has been assigned previously and an observation is subsequently conducted to see performance of the staff in charge in doing their daily activities. The steps that should be done when using work sampling technique are as follow: determining the specific type of personnel studied, sampling process to ease the observation, making a form consisting of list of activities that has been classified into productive and non-productive activities or direct or indirect activities (depends on the aim of study), the observers are trained to conduct an observation using work sampling technique and adjustment of observation timing interval [8].

Aside from assessing workload, time and motion study can also measure the quality of performance concurrently. The measurement can be conducted using one sample from experienced staff who is considered a good representative. This approach is usually employed for activities with uncertain quality of stages as a thorough assessment. Its implementation cost a lot and hence is not frequently applied. Daily log technique is more affordable and simpler, the subjects studied memorize and write down their activities and the duration of each activity by themselves. Its application highly depends on the cooperation and honesty of personnel enrolled to the study. The study uses a form to record the list of activities in which it was subsequently analyzed to evaluate the activity with the highest workload [8].

Various available techniques have its own strengths and limitations. Ilyas Formula provides an option to calculate workload and need of human resources in an easy, affordable, rapid and accurate manner. This formula will provide a good result if there are accurate informations regarding type, number, and duration of transaction and no duplication of activity is found. Workload of each human resource per day can be quantified in minutes or hours per working day. The followings are the formulas used for calculating the number of human resources required per day: [8]

Number of human Resources needed/Effective working day= {(B.K $_{i-j}$ = J T x W.T) :JKE }.
Number of human resources required/holiday = (365 - effective working days) x number of human resources required/effective working day
Total number of human resources required/day =
Number of human resources required/effective working day + Number of human resources required/holiday

B.K $_{i-j}$ = Type of workload
J.T. = Number of transaction per day
W.T.= Duration required for each transaction type
J.K.E = Effective working hours of human resources per day

The process of designing the need of human resources starts with conducting analyses of current available personnels in the hospital and how adequate it is according to the prediction for the upcoming days, provision of the hospital, requirement of healthcare professionals in the future, discrepancy between personnels needed in the future and the current available personnels and also document of hospital personnel needs that includes number, type and competence as needed within a specific period of time [8].

Nurses' workload calculation has been a great interest to avoid adverse events to patients, as the increase in number of patients is not accompanied by the increase in healthcare resources [10]. Pharmaceutical service is directly related with patients and is responsible for pharmaceutical preparations aiming to improve patient's quality of life. In order to conduct a pharmaceutical service, every personnel involved is guided by pharmaceutical standards. Human resources availability calculation is necessary in order to implement the pharmaceutical standards, patient safet-oriented organization, and standard operating procedures. This goal can be achieved if only the pharmacy unit has adequate number of pharmacists and pharmaceutical personnels compared to the workload assigned. There are several factors to be noticed when calculating pharmaceutical workload, including: bed capacity, number and type of pharmaceutical activities, number of prescriptions, and drug request form [11].

A number of previous studies have calculated the workload and the need of human resources in the hospital pharmacy unit. The results showed that the number of healthcare professionals available does not fit the assigned workload. A study investigating Subjective and Objective Workloads of Pharmaceutical Personnels in Outpatient Setting at one of Type B Private Hospitals in Surabaya concluded the subjective workload of pharmaceutical personnels: be it considered high or low, was strikingly resulted from discrepancy between the availability of personnels and demand of patient's health services [12].

This finding is consistent with another study conducted at GRHA Permata Ibu Hospital in Depok about Analysis of the Need of Pharmaceutical Personnels at the Pharmacy Installation using WISN method. The study found the ratio of 0.7 explaining that the current number of personnels is much smaller that the required number in order to resolve the excessive workload problem [13].

Santa Maria Hospital is one of private hospitals located in Pekanbaru that committed to always maintain the excellence in providing high quality of services, excellence in medical technology and implement Growth Management to broaden the extent of health services through professional Human Resources, as well as to always uphold the spiritual values. Beginning with building a modest medical center on 11th November 1964, it was subsequently developed into Santa Maria Hospital on 9th October 1974, it has gotten through lots of ups and downs until it is currently labeled as a nationally-accredited type B hospital. Assessment of hospital performance efficiency revealed BOR score of 70-80% by the year 2017, and the average daily visit was 600-800 patients per day showing a high rate of activity in performing daily health services.

The number of personnels in the pharmacy unit, Santa Maria Hospital, Pekanbaru in 2017 was 55 personnels, consisted of 12 pharmacists and 43 technical pharmaceutical personnels/pharmacist assistants. Pharmaceutical services are conducted at Outpatient Clinic Pharmacy Satellite at the first floor and Pharmacy Satellite at the second floor that serves for both inpatient and outpatient patients. The head of pharmacy installation who is also the head of Logistic Department, is currently held by a pharmacist, hence the daily pharmaceutical services is conducted by the other 11 pharmacists. The number of pharmaceutical personnels in 2017 has increased compared to previous year where the pharmacy installation was only run by 5 pharmacists and 17 technical pharmaceutical personnels in 2016.

As for 2018's work programmes of Pharmacy Unit of Santa Maria Hospital, they are still proposing to increase the number of pharmacist and technical pharmaceutical personnels as many as 8 personnels and 10 personnels, respectively.

There had been numerous studies conducted to calculate the number of pharmaceutical personnels required by employing Workload Indicators Staff Need (WISN) method, including studies conducted at Regional Mental Hospital in Lampung, Krakatau Medika Hospital in Cilegon and GRHA Permata Ibu Hospital in Depok [13,15]. In order to ensure the accuracy of WISN methode, careful observation, adequate observation period and experienced observer are highly necessary, and thus in this study, Ilyas Formula was prefered because of its practical and accurate properties as well as its suitability for a high rate of daily health services. There will always be discrepancies among Pharmacy Installation studied due to the difference in condition and facilities among those hospitals. The discrepancy could be found in regard to service flow, assigned working hours, number of prescription, number of activities, number of personnels and policies applied. Therefore, this paper aims to anlyse the workload and demand of human resources at the Pharmacy Installation of Santa Maria Hospital, Pekanbaru in 2017.

METHODS

This is a descriptive study conducted at Santa Maria Hospital Pekanbaru by collecting data for one year, from January to December 2017. The study subjects consisted of pharmaceutical personnels at Santa Maria Hospital Pekanbaru, including pharmacists and technical pharmaceutical personnels (pharmacist assistant). Data collection was conducted by in-depth interview with the Head of Pharmacy Installation of the Hospital, Head of Sub-Division of Employment and Pharmaceutical Personnels. Informant are people who evaluating, staffing, and scheduling method in Santa Maria Hospital. Secondary data were obtained from document of employment and document of pharmacy installation of the hospital.

The main activities included in the inclusion criteria, which calculated as workload, were all activities done by a total of 54 pharmaceutical personnels in charge within their shift period, divided into 3 shifts of service. List of main activities done and duration required per activity were obatined through interview with the Head of Pharmacy Installation and pharmaceutical personnels doing the activities at the pharmacy satellite. The number of transactions/activities per day was obtained from activity report of pharmacy installation and report of number of perscriptions per day. Effective working hours per day are determined by observing all the activities directly and indirectly related to the service.

RESULTS

Overall description of effective working hours is shown in table 1 in which it was found that the effective working hour for one shift was 375 minutes/day after removing all the activities that are not directly related with the service-related activities. The number of national holidays in 2017 was 16 days, and it was adjusted with the Joint Decree of the Minister of Religious Affair, Minister of Manpower and Minister of Administrative Reform and Bureaucracy Reform of Indonesia No. 68, 302 dan SKB/02/MENPAN/RB/11 in 2016 regarding National Holidays and Annual Leaves in 2017 [16]. Total of annual leaves granted for all the employees of Santa Maria Hospital are 12 days per year.

Table 1. Effective working hour of pharmaceutical personnels/day

No	Activities	Duration (minute)
1	Average duration per shift	480
2	Meeting	60
3	Spending time in toilet	15
4	Break (having meal/drink)	15
5	Chatting	15
	Total effective working hour/day	375

Table 2. Effective working day in 2017

No	Factors	Freq	Unit
A	Working days after removing national holidays, Sundays	297	Day/year
B	Annual leave	12	Day/year
C	Education and training	3	Day/year
D	Absence on working days	10	Day/year
	Effective Working Days	272	Day/year

The average shift of pharmaceutical personnels was 24 days a month, accordingly effective working days of the pharmaceutical personnels were 24/30 multiplied with 272 days, which were 237.6 days rounded to 240 days. Matrix of business transaction of pharmaceutical personnels at Outpatient Clinic, at Pharmacy Unit Santa Maria Hospital Pekanbaru adopted from Ilyas Formula consist of 18 activities and 3295 numbers of transactions per day. The total 8695 types of workload need 24 human resources per day to deal with it (table 3).

Table 3. Need of Personnels in Outpatient Clinic Pharmacy Unit, Santa Maria Hospital Pekanbaru in 2017 (adopting Ilyas Formula)

No	Types of Work	Number of Transaction	Duration (minutes)	Types of Workload
1	Preparing drugs	1	30	30
2	Receiving drug prescription and checking the completeness of the drug prescription	400	1	400
3	Packing drugs and attaching etiquettes	350	4	1400
4	Mixing drugs	50	10	500
5	Checking the compatibility between drugs and prescription	400	3	1200
6	Delivering drugs	400	5	2000
7	Reconciling inpatients' medication in emergency room	30	10	300
8	Collecting and sorting the prescriptions	3	30	90
9	Making the recapitulation of drugs proposal claims of askes, companies and other health insurances	3	15	45
10	Checking the compatibility between drug prescription and health insurance claims (Askes, etc)	50	3	150
11	Recording and recapping the use of psychotropic drugs	3	30	90
12	Inputting prescriptions	400	3	1200
13	Making mail order to the storehouse	1	30	30
14	Recording invoices of incoming goods in drug reception book	1	30	30
15	Preparing drugs for emergency carts in emergency room	3	10	30
16	Tidying up and cleaning the work table and instruments	400	1	400
17	Filling the stock cards	400	1	400
18	Organizing drugs in the storage shelves	400	1	400

No	Types of Work	Number of Transaction	Duration (minutes)	Types of Workload
	Total			8695
	∑ human resources/day			23.18

Inpatient pharmacy unit of Santa Maria Hospital had 16 types of activities and 1116 number of transaction. Number of transaction multiplied by the duration required to determine the types of workload in Ilyas Formula. Number of personnels needed at inpatient pharmacy unit of Santa Maria Hospital Pekanbaru in 2017 is 12 person after dividing types of workload with the total effective working hour per day (table 4).

Table 4. Need of Personnels at Inpatient Pharmacy Unit of Santa Maria Hospital Pekanbaru in 2017 (adopting Ilyas Formula)

No	Types of Work	Number of Transaction	Duration (minutes)	Types of Workload
1	Receiving prescriptions and checking the completeness of new prescriptions	100	1	100
2	Receiving prescriptions and checking the completeness of prescriptions of outpatient medication	40	1	40
3	Packing drugs and attaching etiquettes	80	4	320
4	Mixing drugs	30	10	300
5	Checking the compatibility between drugs and prescription	110	3	330
6	Delivering drugs to inpatient wards	110	5	550
7	Collecting and sorting the prescriptions based on patient's ward	1	30	30
8	Making the recapitulation of drugs proposal claims of askes, companies and other health insurances	1	15	15
9	Recording and recapping the use of psychotropic drugs	1	30	30
10	Inputting prescriptions	110	3	330
11	Checking drug residues of each patient in the inpatient wards	5	15	75
12	Preparing UDD (*Unit Dispensing Dose*) medication for each inpatient except for intensive care patient	140	5	700
13	Attaching sign of high-alert medication	50	3	150
14	Tidying up and cleaning the work table and instruments	110	1	110
15	Filling the stock cards	110	1	110
	Doing Stock Opname	8	120	960
16	Organizing drugs in the storage shelves	110	1	110
	Total			4260
	∑ human resources/day			11.36

Pharmacy staff also working on logistics at pharmaceutical storehouse Santa Maria Hospital Pekanbaru. They have 100 number of transactions from 5 types of work and 1230 types of workload. Results of types of workload divided by effective working hour per day shown that pharmaceutical storehouse need 4 personnel to complete the workload (table 5).

Table 5. Need for Personnels of Pharmacy Unit at Pharmaceutical Storehouse Santa Maria Hospital Pekanbaru in 2017 (adopting Ilyas Formula)

No	Types of Work	Number of Transaction	Duration (minute)	Types of Workload
1	Preparing drugs for services based on order from the respective unit	1	120	120
2	Making drug defecta, making PO, and ordering drugs	1	120	120
3	Delivering drugs to pharmacy satellite and medical instruments to patinet's ward	8	30	240
4	Receiving drugs from pharmacy wholesalers staff	30	15	450
5	Inputting invoices from pharmacy wholesalers	60	5	300
	Total			1230
	∑ human resources/day			3.28

The total need for pharmaceutical personnels in Santa Maria Hospital Pekanbaru can be calculated by summing the number needed after rounding it up from three related sections, including Outpatient Clinic Pharmacy Installation, Inpatient Ward, and Pharmaceutical Storehouse. Workload calculation using Ilyas Formula showed that effective working hours for each pharmaceutical personnel was 375 minutes or 6.25 hours per shift in which it has been adjusted for private non-service-related activities. Effective working hours became the denominator in determining the needs of human resources on effective working days for a total of 240 days. As there are 365 days in one year, it is necessary to also take into account the number of required personnels in charge on holidays by multiplying the increment of 365 and total effective working days to the number of human resources per day during the effective working day (table 6).

Table 6. Total Need for Pharmaceutical Personnels in Santa Maria Hospital Pekanbaru

No	Unit	∑ Human Resources/day	Note
1	Outpatient Clinic Pharmacy Installation	24	people
2	Inpatient Ward Pharmacy Installation	12	people
3	Pharmaceutical Storehouse	4	people
	Subtotal ∑ Human resources/day	40	people
	Subtotal ∑ Human resources/day on holiday:	125/240*40= 20.83 = 21	people
	Total ∑ Human resources/day	61	people
	Total Current Available Pharmaceutical Personnels	54	people
	Total Need for Human Resources	7	people

DISCUSSION

In conducting its service-related activities, Pharmacy Unit of Santa Maria Hospital Pekanbaru is focused on the following three different sections: first-floor pharmacy satellite, second-floor pharmacy satellite, and pharmaceutical storehouse. The first-floor pharmacy satellite receives prescriptions from Emergency Room, first-floor specialistic outpatient clinic and reconciliation of inpatients form Emergency Room. Outpatient pharmaceutical services from other specialistic outpatient clinics (second floor) and inpatient medication prescription service are performend in the second-floor pharmacy satellite. Pharmaceutical storehouse guarantees drugs availability in the respective pharmacy satellites and orders the medication from pharmaceutical wholesalers as well as inputs the invoices given by the wholesalers. The current distribution of pharmaceutical personnels at Santa Maria Hospital Pekanbaru is as follow: 1 pharmacist serves as the Head of pharmacy unit, 1 pharmacist works in the storehouse, 10 other pharmacists are in charge in outpatient and inpatient services. As many as 2 technical pharmaceutical personnels ot pharmacist assistant work in the storehouse and the remaining 41 are responsible in the outpatient and inpatient pharmacy satellites.

Our calculation adopted Ilyas formula, which is thought to be a fast, precise, and accurate instrument because it considers all of the main and private activities, working duration per shift and effective working hours, requirement of personnels in charge on effective working days and holidays as well. Workload calculation using Ilyas Formula showed the actual need of staff in pharmacy unit with taking required personnels in charge on holiday into account. With the current staffs that hospital has, incidence rate of pharmaceutical error still in the top five causes of unexpected medical error. The number of pharmacy staff that Santa Maria hospital has are not enough compared to effective working hour using ilyas formula. The results shown that performances of personnel should be further enhanced by maximizing productive activities and reducing non-productive activities. Improvement of performance can be done with lean management approach. Lean management can be applied if this study proceed with another study that calculates the optimum limit of productive activity. Additional staff is needed if based on further study productive activity has reached the optimum limit.

This study do not illustrate the data of pharmacist activities separately from pharmacist assistant. The classification of pharmaceutical staff needing can not be determined. The addition of personnel in a hospital must be consider the policy of the hospital and the urgency of personnel needs. It will be selected if other intervention of process can not be done. Hospital might have to changes the human resources and financial planning for adding staffs.

CONCLUSION

The results obtained from calculation using Ilyas Formula showed that the number of pharmaceutical personnels needed was 40 people for effective working days, 21 people for holidays, and hence at least 61 people are needed in total. The current availability of personnels are 54 people. Therefore, it is clear that 7 people are highly needed to also work in the Pharmacy Installation of Santa Maria Hospital to match the assigned workload. The addition of pharmaceutical personnels is expected to result in significant reduction of errors caused by excessive workload, avoidance of the increase in turnover number and reduction in training cost for new employees. We could not split the calculation of required number of pharmacist from pharmacist assistant since in fact, there are no significant difference between the two groups of professionals in regard to deliver pharmaceutical services. Pharmacists and pharmacist assitants undertake quite similar works yet it is only different in the matter of responsibility on supervising.

After observing and interviewing a number of resource persons regarding pharmaceutical services at Santa Maria Hospital Pekanbaru, optimization is needed. Workloads of pharmaceutical personnels in stock updating will be substantially reduced if a computerized information system is applied, as currently, they still fill the stock card and check the remaining drugs for ipatients manually. A

computerized information system will also reduce the workloads of staffs working in the storehouse to check the orders of medications for daily services and facillitate the calculation of drug procurement planning.

REFERENCES

1. Murianni, Laura. Marano, Cinzia. Nuilding a safer NHS for patient. Improving Medication Safety. Italian Journal of Public Health, 3 (1) (2005), pp 96-99.
2. Royal Pharmaceutical Society. Workload Pressure and The Pharmacy Workforce: supporting Professionals and protecting the public. Phramacy Practice Research Trust. 2009.
3. Malone, Daniel et al. Pharmacist Workload and Pharmacy Characteristics Associated With the Dispensing of Potentially Clinically Important Drug-Drug Interactions. 45 (5) (2007), pp 456-462.
4. Utomo, T.W.Analisis Kebutuhan Pegawai. 2008.
5. Departemen Kesehatan RI. 2003. Modul Pelatihan bagi Fasilitator Kesehatan Kerja. Jakarta.
6. Irwandy. Faktor-faktor yang berhubungan dengan Beban Kerja. 2007.
7. Queensland Government. Workload Management: a guide for managers. Public Service Comission. 2017.
8. Ilyas, Y. Perencanaan SDM Rumah Sakit, Teori, Metoda, dan Formula Cetakan Ketiga. Depok. Fakultas Kesehatan Msayarakat Universitas Indonesia. 2011.
9. S.Y. Hoi, N. Ismail, L.C. Ong, J. Kang. Determining nurse staffing needs: The workload intensity measurement system. Journal of Nursing Management, 18 (1) (2010), pp. 44-53
10. Jennings, B.M. Turbulence. In: Patient Safety and Quality: An Evidence-Based Handbook for Nurses, Agency for Healthcare and Quality, Rockville, 2011, pp. 193–202
11. Republik Indonesia, Peraturan Menteri Kesehatan Nomor 72 tahun 2016 tentang Standar Pelayanan Kefarmasian di Rumah Sakit. Ditetapkan di Jakarta, 23 Desember 2016.
12. Setiawan, Vreza Budi. Wulandari, Ratna Dwi. Beban Kerja Subjektif dan Objektif Tenaga Farmasi Rawat Jalan Rumah Sakit. 2016.
13. Verawaty, et al. Analisis Kebutuhan Tenaga Kefarmasian di Instalasi Farmasi Rumah Sakit Grha Permata Ibu. Depok. 2016.
14. Instalasi Farmasi Rumah Sakit Santa Maria. Laporan dan Evaluasi Instalasi Farmasi tahun 2017.
15. Krisna M. Analisis Beban Kerja dan Kebutuhan Tenaga di Instalasi Farmasi Rumah sakit Jiwa Daerah Provinsi Lampung Tahun. 2012.
16. Republik Indonesia, Keputusan Bersama Menteri Agama, Menteri Ketenagakerjaan, dan Menteri Pendayaguanaan Aparatur Negara dan Reformasi Birokrasi Indonesia Nomor 684, 302 dan SKB/02/MENPAN/RB/11 tahun 2016 tentang Hari Libur dan Cuti Nasional tahun 2017.