

**WORKLOAD MEASSUREMENT OF EMERGENCY PHYSICIAN  
IN EMERGENCY DEPARTMENT  
RUMAH SAKIT DAERAH BAGAS WARAS KLATEN**

**THESIS**

**Submitted to International Program Industrial Engineering Department in Partial  
Fulfillment of Requirement for Bachelor Degree of Industrial Engineering  
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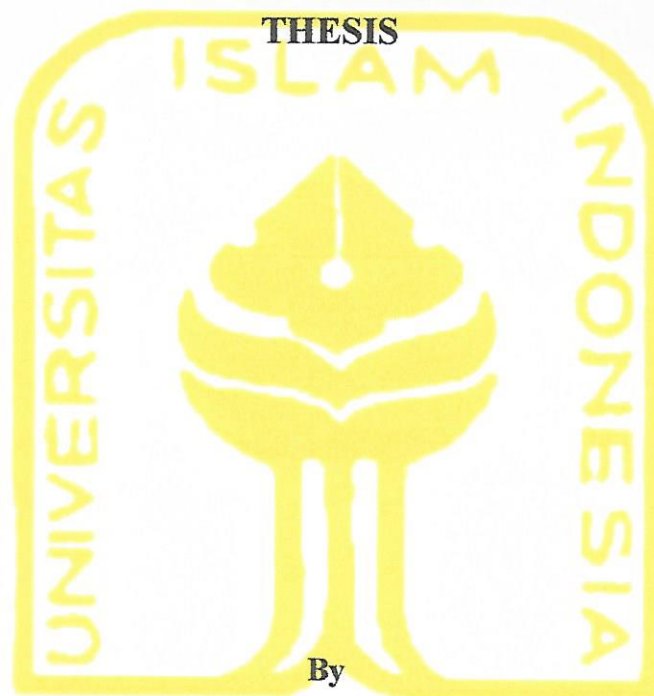


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WORKLOAD MEASSUREMENT OF EMERGENCY PHYSICIAN  
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RUMAH SAKIT DAERAH BAGAS WARAS KLATEN



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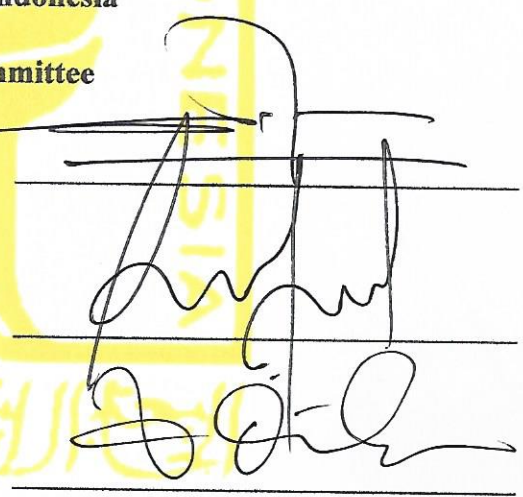
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## DEDICATION

*I dedicate my final project for my beloved parents, especially wife and son.*

*I would thank my parents for the support, taking care and anything they gave to me.*

*I also thank my beloved wife for the support and motivation.*

## MOTTO

*“Whoever wants the world then seek knowledge, and whoever wants the hereafter then seek knowledge, and whoever wants both then seek knowledge”*

( H.R. Bukhari)

*“Science without religion is lame, religion without science is blind”*

(Albert Einstein)

## PREFACE

*Assalamu'alaikumWarrahmatullahi Wabarakatuh.*

*Alhamdulillah rabbil'alamin.* Praise thankfulness to Allah SWT, with all the outpouring of grace and His guidance, whose with the guidance and intercession we expect salvation in this world and the hereafter, this thesis can be finished. With the completion of the thesis work, on this occasion the author would like to say thanks to all supporting people:

1. Muhammad Ridwan Andi Purnomo., ST., M.Sc., Ph.D as my supervisor and the Head of International Program Department of Industrial Engineering that always gives all directions and motivations to finish this thesis.
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3. My beloved family, mother for countless things happen in my life from her, my wife and son for support and motivation
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5. Classmates from IP Industrial Engineering year 2005 for their supports and motivations.
6. All parties that have provided assistance to the author either directly or indirectly in the writing of this report cannot mention one by one author.

Author realizes that this work might not be perfect. Hence, supportive arguments would be always welcomed. Hopefully this report and information included will be useful for Author and give benefit to other parties related to this thesis.

*Wassalamu'alaikum Warrahmatullahi Wabarakatuh*

Yogyakarta, December 2017

Amri Hasan Fauzi



## ABSTRACT

Emergency Department becomes one of the most crowded and stressfully part of a hospital worldwide. Emergency physician as the person in charge for whole time carry enormous burden both physically and psychologically. *Rumah Sakit Daerah Bagas Waras Klaten* as newly operated hospital is still in developing phase currently facing one of problem which is employment planning. There is no data whether the emergency physician working at Emergency Department has already assigned with proper workload, thus this study examines this particular issue. The research conducted workload defines as the amount of time emergency physician spent during work shift specifically for emergency clinical purpose, displayed as unit time of hour per week and summed up for a month duration. The study result shows that emergency physician workload is 119 hours which below standard of 160 hours according government of Republic Indonesia declared in Undang-undang No 13 Tahun 2003 about Employment (*Ketenagakerjaan*). Further research with more complex and detailed study objects is needed to get more in-depth understanding of emergency physician workload.

**KEY WORDS:** Workload measurement, Emergency Physician, Hospital

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## CHAPTER I

### INTRODUCTION

#### 1.1 Background

World Health Organization (WHO) defines Hospitals as health care institutions that have an organized medical and other professional staff, and inpatient facilities, and delivers services 24 hours per day, 7 days per week. They offer a varying range of acute, convalescent and terminal care using diagnostic and curative services. According to Indonesian Ministry of Health (PMK/No 340/MENKES/PER/III/2010), hospital is health service institution which provides comprehensive individual health care comprise of following: emergency service, inpatient service, and outpatient service.

Emergency Department which becomes first encounter for most of the patient required to be fully operated 24/7, moreover the staff often facing life threatening situation that needs immediate decision-making and heavy physical activity, hence the psychological and physical tensions are vigorous. *Rumah Sakit Daerah (RSD) Bagas Waras Klaten* is a government owned and operated public hospital which began its service since October 2015, as a relatively new operating hospital many things are still in the developing processes, one of the issue is about human resource management.

Staff placement in accordance to the individual qualification and job requirement is always challenging. The assignment of limited number emergency physician to ensure the service is always running, while keeping the staff always in the good condition requires scientific approaches to acquire reliable and accountable method.

Triage is a central task in an Emergency Department (ED). In this context, triage is viewed by Gerber (2006) as the rating of patients' clinical urgency, Rating is necessary to identify the order in which patients should be given care in an ED when demand is high. Triage is not needed if there is no queue for care. Triage scales aim to optimize the waiting time of patients according to the severity of their medical condition, in order to

treat as fast as necessary the most intense symptom(s) and to reduce the negative impact on the prognosis of a prolonged delay before treatment. Triage is a complex decision-making process, and several triage scales have been designed as decision-support systems to guide the triage staff to a correct decision as stated by Bullard (2006).

Currently, RSD Bagas Waras Klaten adopts The Emergency Severity Index (ESI) as triage procedure. Gillboy (2011) defines Emergency Severity Index is a five-level emergency department triage algorithm based on the acuity of patients' health care problems and the number of resources their care is anticipated to require.

In order to overcome the need of human resources and staffing management to answer the problem, the effort of conducting Job Analysis study is made. Job analysis provides information to organizations which helps to determine which employees are best fit for specific jobs. Through job analysis, the analyst needs to understand what the important tasks of the job are, how they are carried out, and the necessary human qualities needed to complete the job successfully as implied by Sacket (2003). One of the main purposes of conducting job analysis is to prepare job descriptions and job specifications which in turn help hire the right quality of workforce into an organization. The general purpose of job analysis is to document the requirements of a job and the work performed.

According to government legislation Undang-undang no 13 Tahun 2003 Tentang Ketenagakerjaan (employment) regulate that working time for a worker is 40 hours a week, despite the workplace apply five or six weekdays in a week. In short, as consequences if employer assign worker more than declared time overtime pay must be given to the worker.

Therefore this study is conducted to investigate whether the workload of emergency physician in Emergency Department RSD Bagas Waras Klaten has already meet the standard by using objective tool Fatigue Severity Scale, so that we may assure the number of staff is balanced to the job's burden, hence the efficient number of staff can be achieved without causing overwhelmed workload.

Rasulullah peace and blessings be upon him, once said *“No one eats a better food from the hard work of his own hands. And Prophet David 'alaihi salam ate from the hard work of his hands.”* (Narrated by Bukhari no 2072), implies that Islam encourage it's adherence to become diligent and perform for the best.

## **1.2 Problem Identification**

According to the background above, there is question that generated and need to be answered: Is the workload assigned to the emergency physician in Emergency Department Rumah Sakit Daerah Bagas Waras Klaten has already meets the regulation requirement?

## **1.3 Research Objectives**

To measure whether the workload assigned to the emergency physician in Emergency Department Rumah Sakit Daerah Bagas Waras Klaten has already meets the regulation requirement.

## **1.4 Scope of Research**

The research is conducted under following scope and limitations:

The study is focused to the measurement of emergency physician staff workload in Emergency Service Rumah Sakit Daerah Bagas Waras Klaten according to applied regulation.

## **1.5 Significance of Research**

It is expected that by conducting this research, some benefits can be earned:

1. To enrich scientific literature in job analysis topic and provide scientific reference for related research.



2. To help determine appropriate workload for emergency physician by hospital management.
3. To ensure that emergency physician is well functioned according to the proper duties and responsibilities.

## **1.6 Research Writing Structure**

The research outline will be arranged as the following:

### **CHAPTER I INTRODUCTION**

This chapter explains introduction of the study, there will be explanation of the problem background, problem formulation, research objective, scope of the problem, research benefit, systematical writing

### **CHAPTER II LITERATURE REVIEW**

This chapter will elaborate about the inductive and deductive study. Inductive study is primarily important to determine the literature study of the previous research. Deductive study is needed to be elaborated to provide basic supporting theories to develop the benchmarking assessment.

### **CHAPTER III RESEARCH METHODOLOGY**

This chapter will describe the methodology which is applied in the study. It consists of several parts: the arrangement of research position, conceptual model and model development as improvement.

### **CHAPTER IV DATA COLLECTING AND PROCESSING**

This chapter provides the data collected in the research and how the data is processed. The data will be delivered with graphs, charts, or tables supporting the explanation as needed.

**CHAPTER V DISCUSSION**

This Chapter is going to discuss the results of data processing and the analysis. Discussion will be presented the result of assessment based on the parameters.

**CHAPTER VI CONCLUSION AND RECOMMENDATION**

The final section will describe the overall conclusions from the results of study and the suggestion to be applied and for future research.

**REFERENCES****APPENDICES**

## CHAPTER II

### LITERATURE REVIEW

#### 2.1 Related Works

There are many previous studies about workload in medical staff, especially in Emergency Department, some of them that related to this research are mentioned below, nonetheless there are none of those study that have exact same feature with current study. Kanter *et al.*, (2016) conducted similar study with same methodology descriptive analytical, in order to calculate the number of medical staff needed for each unit, and the number of available working time for each medical staff. The result is there is only one medical staff that work below available working time and its compensated by the duty of corresponding person as 24 hours on call internal medicine consultant.

Mustika (2014), attempted to calculate the productivity of general practitioner in *Rumah Sakit Umum Daerah Leuwilang Bogor*, and to determine whether the amount of general practitioner needed. The result is the productivity of general practitioner in the hospital is above 80% that means the staffing is optimal and meets the standard of workload and working time determined by hospital policy. Both of the studies above recommend hospital to make employment planning based on workload analysis to achieve more optimized health service.

France *et al.*, (2005) suggest the importance of Information Technology in emergency service affect the physician performance in emergency department, The study used a time-in-motion, primary task analyses to study faculty and resident physician behavior in the presence of an electronic whiteboard. The NASA Task Load Index (TLX) was used to measure subjective workload and the underlying dimensions of workload at the end of each physician observation. With the finding of the study is physicians in the study performed more tasks and were interrupted less

than physicians studied previously in conventional ED that has not applied information technology system.

Study by Levin *et al.*, (2017) suggest the importance of time-dependent workload patterns for emergency department (ED) physician teams across work shifts. And to demonstrate how ED demand patterns and the timing of shift changes influence the balance of workload among a physician team. The result and conclusion is Physician patient load patterns and ED demand patterns should be taken into consideration when physician shift times are scheduled so that patient load may be balanced among a team. Real-time monitoring of physician patient load may reduce stress and prevent physicians from exceeding their safe capacity for workload.

Dubinsky (2012) made a review various existing model on how to develop ideal workload for medical staff especially in emergency setting. And somehow the conclusion is predictable that none of the models currently used to measure emergency department workload can be relied on to accurately predict the number of staffed hours necessary.

Innes and Stenstrom (2005) in their study mentioned a reliable emergency department (ED) workload measurement tool would provide a method of quantifying clinical productivity for performance evaluation and physician incentive programs; it would enable health administrators to measure ED outputs; and it could provide the basis for an equitable formula to estimate ED physician staffing requirements. They aimed to identify predictors that correlate with physician time needed to treat patients and to develop a multivariable model to predict physician workload. Their study clarifies important determinants of emergency physician workload.

Study by El-Sharif *et al.*, (2016) about interruptions in the Emergency Department (ED) in regard to their impact on physicians' workload. This study captured interruptions characteristics and measures of workload. Twenty-eight ED physicians were followed during their shifts; interruptions they faced were captured using a validated tablet PC-based tool. At the mid and end of their shift, providers completed a NASA-Task Load Index (TLX) questionnaire and a reaction time task. High/critical interruptions were the least frequent but had longer duration and greater impact on

workload. This study provided a unique examination of interruptions over an entire provider shift and identified interruptions as potential causes of increased workload for ED physicians.

Inductive study from previous literature confirmed the originality of this study, that in Indonesia specifically, there has been any study that focusing on analyse whether the medical staff e.g. emergency physician in accordance to the requirement by government legislations about workload.

## **2.2 Regulation and Legislation**

Undang-undang No 13 Tahun 2013 about employment in this Law the meaning of Employment is all matters relating to labour in the time before, during, and after the employment. While the workforce is any person who is capable of performing the work to produce goods and / or services either to meet his own needs or for the community. Every worker has the same right and opportunity to choose, obtain, or move jobs and earn a decent income in or overseas. In the placement of labour is exercised on the basis of an open, free, objective, fair and equitable basis without discrimination.

Some of the point that may highlighted in this regulation are employers who employ disabled workers are required to provide protection in accordance with the type and degree of disability. Employers are also prohibited from employing children, Women workers under the age of 18 (eighteen) years are prohibited from employing between the hours of 23:00 to 07.00 and also prohibited from employing pregnant women workers / labourers who according to doctor's information is dangerous to the health and safety of her womb or herself if working between 23.00 to at 07.00. Every worker / labourer is entitled to income that fulfils a decent living for humanity.

Specifically Article (*Pasal*) 77 -78 regulate about working time and overtime pay as stated below

### Article 77

- (1) Every employer is obliged to implement the provisions of working time.
- (2) The working hours referred to in paragraph (1) shall include:

a. 7 (seven) hours 1 (one) day and 40 (forty) hours 1 (one) week for 6 (six) working days in 1 (one) week; or

b. 8 (eight) hours 1 (one) day and 40 (forty) hours 1 (one) week for 5 (five) working days in 1 (one) week.

(3) The provisions of working time as referred to in paragraph (2) shall not apply to certain business sectors or occupations.

(4) The provisions concerning working time in certain business sectors or occupations referred to in paragraph (3) shall be regulated by a Ministerial Decree.

#### Article 78

(1) Entrepreneurs who employ workers / labourers exceeding the working hours referred to in Article 77 paragraph (2) shall be eligible:

a. there is a consent of the worker / labourer concerned; and

b. overtime work can only be made at most 3 (three) hours in 1 (one) day and 14 (fourteen) hours in 1 (one) week. (2) Entrepreneurs who employ workers / labourers exceeding the working hours referred to in paragraph (1) shall pay overtime wages.

(3) The provisions of overtime working hours as referred to in paragraph (1) letter b shall not apply to certain business sectors or occupations.

(4) The provisions concerning overtime and overtime wages as referred to in paragraphs (2) and (3) shall be regulated by a Ministerial Decree.

### **2.3 Workload**

Jex (1998) defines and classifies workload is the amount of work an individual has to do. There is a distinction between the actual amount of work and the individual's perception of the workload. Workload as classified as quantitative (the amount of work to be done) or qualitative (the difficulty of the work).

Kohn (2000) mentioned that in medical field, the workload of healthcare provider is strongly related to patient safety, thus thorough consideration about workload and fatigue is an important subject. Up to 98 000 patients die each year in the hospital as a result of preventable medical errors. Most errors are caused by well-intentioned individuals working within faulty systems, processes, or conditions. One

such condition is excess clinical workload. For resident physicians, workload so heavy as to result in physician fatigue is associated with increased medical errors and has led to the implementation of work-hour restrictions as stated by Jagsi (2008). For nurses, a recent cross-sectional analysis showed a significant association between patient mortality and low staffing. In United States fourteen states have enacted legislation and/or adopted regulations to address nurse staffing.

### **2.3 Emergency Department**

Emergency medicine is the medical specialty dedicated to the diagnosis and treatment of unforeseen illness or injury. It encompasses a unique body of knowledge as set forth in the Model of the Clinical Practice of Emergency Medicine.” The practice of emergency medicine includes the initial evaluation, diagnosis, treatment, coordination of care among multiple providers, and disposition of any patient requiring expeditious medical, surgical, or psychiatric care (ACEP, 2001).

Emergency department (ED) is a medical treatment facility specializing in emergency medicine, the acute care of patients who present without prior appointment; either by their own means or by that of an ambulance. The emergency department is usually found in a hospital or other primary care centre. The emergency departments of most hospitals operate 24 hours a day, although staffing levels may be varied in an attempt to reflect patient volume.

Due to the unplanned nature of patient attendance, the department must provide initial treatment for a broad spectrum of illnesses and injuries, some of which may be life-threatening and require immediate attention. In some countries, emergency departments have become important entry points for those without other means of access to medical care.

An ED requires different equipment and different approaches than most other hospital divisions. Patients frequently arrive with unstable conditions, and so must be treated quickly. They may be unconscious, and information such as their medical history, allergies, and blood type may be unavailable. ED staff are trained to work

quickly and effectively even with minimal information. ED staff must also interact efficiently with pre-hospital care providers such as EMTs, paramedics, and others who are occasionally based in an ED.

Metrics applicable to the ED can be grouped into three main categories, volume, cycle time, and patient satisfaction. Volume metrics including arrivals per hour, percentage of ED beds occupied and age of patients are understood at a basic level at all hospitals as an indication for staffing requirements. Cycle time metrics are the mainstays of the evaluation and tracking of process efficiency and are less widespread since an active effort is needed to collect and analyze this data. Patient satisfaction metrics, already commonly collected by nursing groups, physician groups and hospitals, are useful in demonstrating the impact of changes in patient perception of care over time. Since patient satisfaction metrics are derivative and subjective, they are less useful in primary process improvement. Health information exchanges can reduce non-urgent ED visits by supplying current data about admissions, discharges, and transfers to health plans and accountable organizations, allowing them to shift ED use to primary care settings according to Agency for Healthcare Research and Quality (2014).

Statement by Aarcharya (2011) Emergency department overcrowding is when function of a department is hindered by an inability to treat all patients in an adequate manner. This is a common occurrence in emergency departments worldwide. According to Trzeciak (2003) overcrowding causes inadequate patient care which leads to poorer patient outcomes. To address this problem, escalation policies are used by emergency departments when responding to an increase in demand (e.g., a sudden inflow of patients) or a reduction in capacity (e.g., a lack of beds to admit patients). The policies aim to maintain the ability to deliver patient care, without compromising safety, by modifying traditional processes as mentioned by Back, *et al.*, (2017).



## 2.4 Fatigue

Fatigue is a subjective feeling of tiredness which is distinct from weakness, and has a gradual onset. Unlike weakness, fatigue can be alleviated by periods of rest. Fatigue can have physical or mental causes. Physical fatigue is the transient inability of a muscle to maintain optimal physical performance, and is made more severe by intense physical exercise (Hawley and Reilly, 1997). Mental fatigue is a transient decrease in maximal cognitive performance resulting from prolonged periods of cognitive activity. It can manifest as somnolence, lethargy, or directed attention fatigue (Marcora, 2009).

Avelladena (2009), describes fatigue is a normal result of working, mental stress, overstimulation and understimulation, jet lag or active recreation, depression, boredom, disease and lack of sleep. It may also have chemical causes, such as poisoning, low blood sugar, or mineral or vitamin deficiencies. Chronic blood loss frequently results in fatigue, as do other conditions that cause anemia. Fatigue is different from drowsiness, where a patient feels that sleep is required. Fatigue is a normal response to physical exertion or stress, but can also be a sign of a physical disorder. Temporary fatigue is likely to be a minor illness like the common cold as one part of the sickness behavior response that happens when the immune system fights an infection.

Study by Nijrolder (2009) concluded that about 50% of people who have fatigue receive a diagnosis that could explain the fatigue after a year with the condition. In those people who have a possible diagnosis, musculoskeletal (19.4%) and psychological problems (16.5%) are the most common. Definitive physical conditions were only found in 8.2% of cases.[22]

The Fatigue Severity Scale (FSS) is a self-report questionnaire designed to assess disabling fatigue in all individuals (Krupp *et al.* 1989). The scale was designed to investigate fatigue/function measures, that is, the connection between fatigue intensity and functional disability (Dittner *et al.* 2004; Taylor *et al.* 2000). The FSS, which consists of nine questions, uses a 7-point Likert scale ranging from strongly disagrees to strongly agree. The scores from each question are totalled with lower scores indicating

less fatigue in everyday life. The total score for the FSS is calculated as the average of the individual item responses. The FSS scale is a self-report scale that is easy to administer and can be completed quickly with minimal effort. Krupp (1989) states that the average score per question for a group of healthy adults was found to be 2.3, so a total for the scale of 20.7; popular opinion mention that fatigue is occurred when the average score is 4.0 but no scientific resource was found by author during research. Below are 9 questions that subject must fulfil to complete the test.

Table 2.1 Fatigue Severity Scale

No	Question	Score						
		1	2	3	4	5	6	7
1.	my motivation is lower when I am fatigued	1	2	3	4	5	6	7
2.	exercise brings on my fatigue	1	2	3	4	5	6	7
3.	I am easily fatigued	1	2	3	4	5	6	7
4.	fatigue interferes with my physical functioning	1	2	3	4	5	6	7
5.	fatigue causes frequent problems for me	1	2	3	4	5	6	7
6.	my fatigue prevents sustained physical functioning	1	2	3	4	5	6	7
7.	fatigue interferes with carrying out certain duties and responsibilities	1	2	3	4	5	6	7
8.	fatigue is among my three most disabling symptoms	1	2	3	4	5	6	7
9.	fatigue interferes with my work, family, or social life	1	2	3	4	5	6	7

## CHAPTER III

### RESEARCH METHODOLOGY

#### 3.1 Research Design

This study conducted by using descriptive observational method, without any interventional means. The study was approved by Director of Rumah Sakit Daerah Bagas Waras Klaten, with disposition to Head of Emergency Department, and all participating subjects provided verbal consent prior to their observational sessions.

#### 3.2 Research Location and Time

The study was conducted at Emergency Department Rumah Daerah Sakit Bagas Waras Klaten, during November for data collecting purpose. The data processing and analysis was held in early December in the year 2017

#### 3.3 Research Subject

The subject of this study is emergency physician working at Emergency Department Rumah Sakit Daerah Bagas Waras Klaten, the inclusion criteria is permanent employees who are not Civil Servant (*Pegawai Negeri Sipil*), work for at least 2 years, and have definitive License of Practice (*Surat Izin Praktek*). The exclusion criterion is physician who has any work off that month.

#### 3.4 Operational Definition

Ideal or Theoretical workload is the number of time which subject should work in a week or month and expressed as a time unit, which is 40 hours in a week, or estimated to be 160 hours in a month. This statement based on Undang-Undang Republik Indonesia Nomor 13 Tahun 2003.

Actual workload is the number of time which subject actually in the activity of doing task that related to their jobs and expressed as a time unit of minutes or hour. The actual workload is presented in weekly quantity so it equivalent to the statement of the official regulation.

Duty Schedule is the schedule which subject must accomplish in order to emergency service in Emergency Department Rumah Daerah Sakit Bagas Waras Klaten always fully operated 24 hours a day, 7 days a week. The duty schedule was built so that a number of physicians could attend the entire shifts (3 shifts a day) take place in a month for virtually same workload. Whereas the shifts are described as following :

Morning shift : 07.00 – 14.00 (7 Hours)

Evening shift : 14.00 – 20.00 (6 Hours)

Night shift : 20.00 – 07.00 (11 Hours)

### **3.5 Data Collection**

The data collected for this study were collected through several ways, the actual workload generated by observation of subject activity and recording how many time spent on each shift for actual workload. Duty schedule was taken from already existed document containing time of subject's shifts.

### **3.6 Research Instrument**

The following tools are used in order to conduct this study

1. Timer/Stopwatch to measure subjects activity duration
2. Stationery to fulfilled the questioner and to record workload
3. Duty schedule document as document of reference to calculate working shifts

### **3.7 Research Procedure**

The study was conducted mainly to generate primary data in which researcher collect data directly by observing and recording subject's activity on duty. Initially, research permission was submitted to the Director of Rumah Sakit Daerah Bagas Waras Klaten,

followed by screening held for inclusion and exclusion criteria. Verbal consent was taken during interview.

Data collected by observing subject in duty schedule, and recording on how many time spent for doing tasks related to the job to obtain actual workload. Time recorded by using stopwatch to measure the ongoing activity, the actual time spent each shift was recorded despite the number of patients neither each shift, nor the possibility of concurrent multiple patients at the same time with various needs.

The data collected during observation is in the form of time spent by subject during each shift, which to be generated in the weekly report to make it easier for comparison with the official regulation that stated workload in hour per week. Data then analyzed using qualitative method to determine whether the subject workload is already appropriate according to the official regulation.

The conclusion and recommendation will be given to the hospital management according to the result from data analysis, whether the workload is proper or not. It's expected for the hospital to be able to manage human resource with scientific approach for reliable and accountable decision making.

The study is arranged by following steps

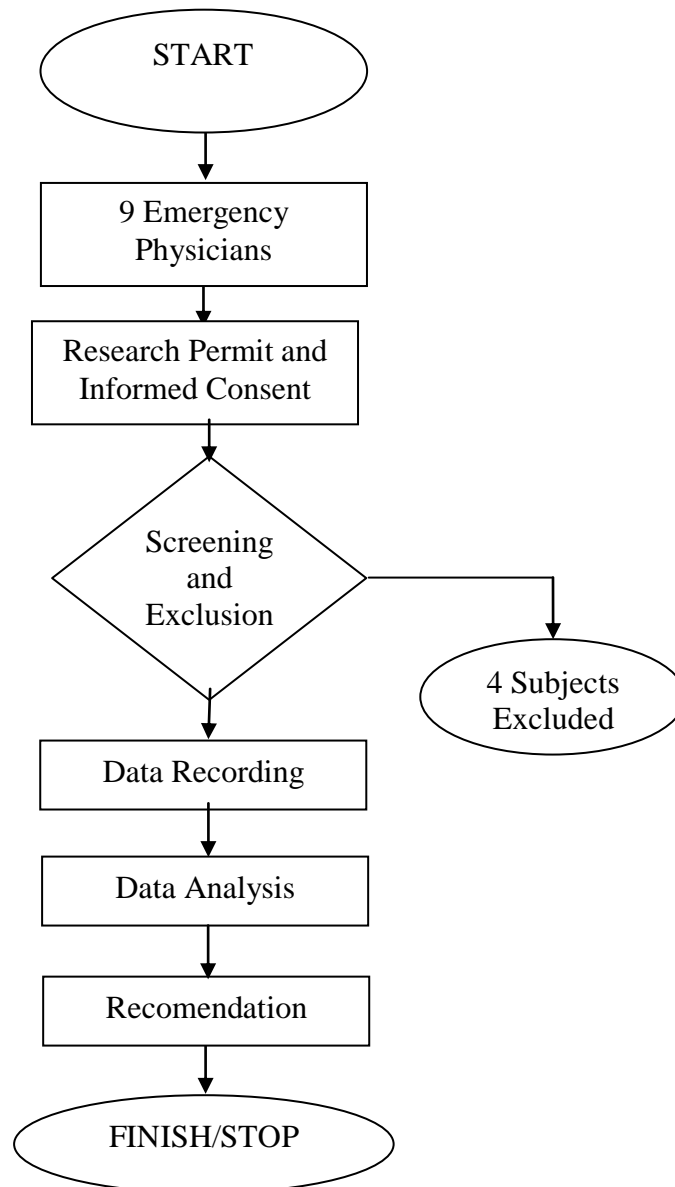


Figure 3.1. Research Procedure Flowchart

### 3.8 Expected Result

The expected outcome of this study is able to identify the workload of subject which is emergency physician in Emergency Department Rumah Sakit Daerah Bagas Waras klaten, and furthermore as reference for hospital in managing human resources based on scientific foundation.

## CHAPTER IV

### DATA COLLECTING AND PROCESSING

#### 4.1 Data Collecting

Data collecting processed completely occurred at Emergency Department Rumah Sakit Daerah Bagas Waras Klaten, during November 2017. Research subject was followed during the duty shift, and each subject's working activities were recorded, and then the data obtained summed up to be presented in the form of daily shift workload which states as time unit hour spent during those duty shift. The working shift is divided into three periods in a day which are morning shift 7 hours, evening shift 6 hours, and night shift 11 hours. There is no precise sequence in the arrangement of the working shift due to workers conciliation to meet their need.

From the whole 30 days in November 2017, it is calculated that the subject workdays are 20 shifts or days. For every night shift is followed by one off day, and the rest off days randomly to be found in the month after morning or evening shift. According to the schedule there are 8 morning shifts, 5 evening shifts, and 7 night shifts that research subject accomplished. Morning shift consist of 7 hours duration, evening shift is 6 hours duration, and night shift is 11 hours duration.

The times spent for every activity are measured using digital timer from the phone *Xiaomi Mi5* then recorded in the note. Multiple patients occurred are measured as one single time if take place simultaneously, regardless the complexity. Idle time and all activities that are not related to the task were not recorded as workload. The actual workload time is varies in each working shift due to differences in the number and complexity or severity of the patients presenting at Emergency Department Rumah Sakit Daerah Bagas Waras Klaten.

Data that collected then arranged as weekly report so it become easier to be compared to the standardized official regulation on working time regulation by government. All the data that presented in this report are already in the weekly number for practical purpose, so the data collected during November 2017 are formulated as 4-weeks period of time.

Fatigue Severity Scale was given at the end of study to be fulfilled by subjects, the questioner was completed by all of subjects in less than ten minutes using paper based method.

## 4.2 Data Processing

The data collected then processed using Microsoft Office Excel 2007®, using simple calculation and presented as chart figure. The computer used for running the calculation is supported with @1.6 GHz of Intel(R) Atom(TM)2 CPU N280, 1,00 GB RAM, and 32-bit Windows XP OS. The chart below shows time (in hours unit) comparison between actual workload per week and the government official standard of working time per week which is 40 hours.

Table 4.1 Emergency Physician Workdays and Shift Duration

<b>Shift</b>	<b>Amount (Days)</b>	<b>Duration (Hours)</b>	<b>Total (Hours)</b>
<b>Morning</b>	8	7	56
<b>Evening</b>	5	6	30
<b>Night</b>	7	11	77
<b>Total</b>	20	-	163

Table 4.1 above shows amount of emergency physician's shifts and workloads during November 2017. It shown that during 30 days length of November 2017, emergency physician working for 20 days workdays, assumed that if there are 3 shift in a day, so there is total 90 shifts of the month. In those working days, total of 163 hours of actual working time, which virtually equal to the standard workload monthly which is 160 hours a



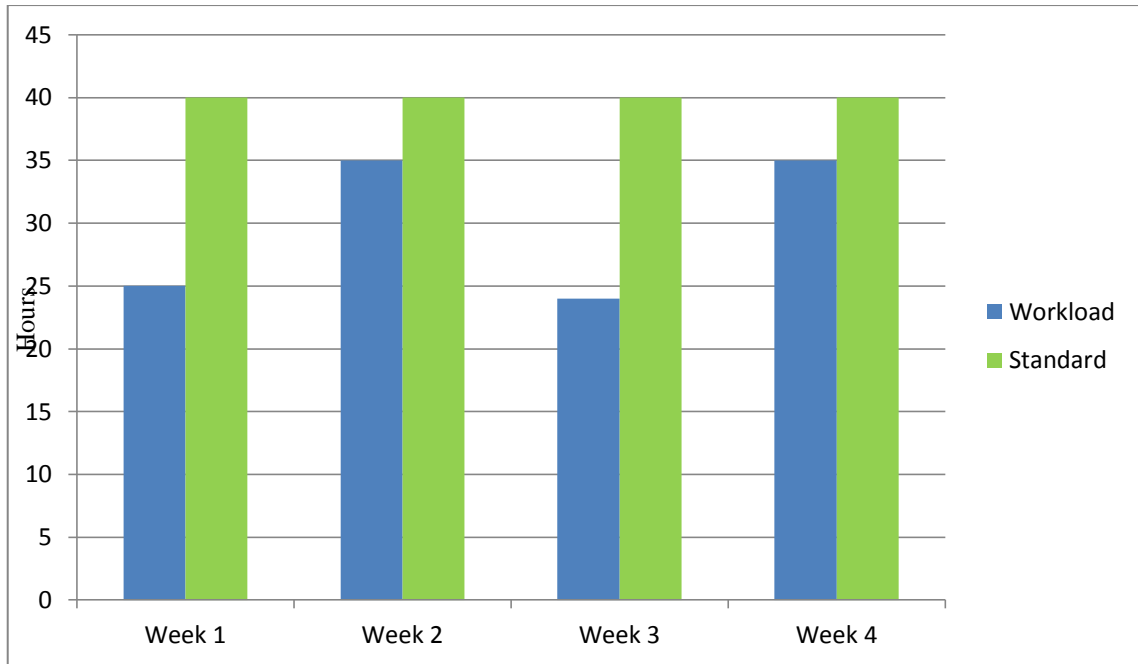


Figure 4.1 Comparisons between Actual Workload and Standard Workload

According to figure 4.1 above, it can be informed that from 4 weeks took place in November 2017, emergency physician always working below standard time of 40 hours a week, although the actual working time –as stated previously- is meet the requirement standard 160 hours a month

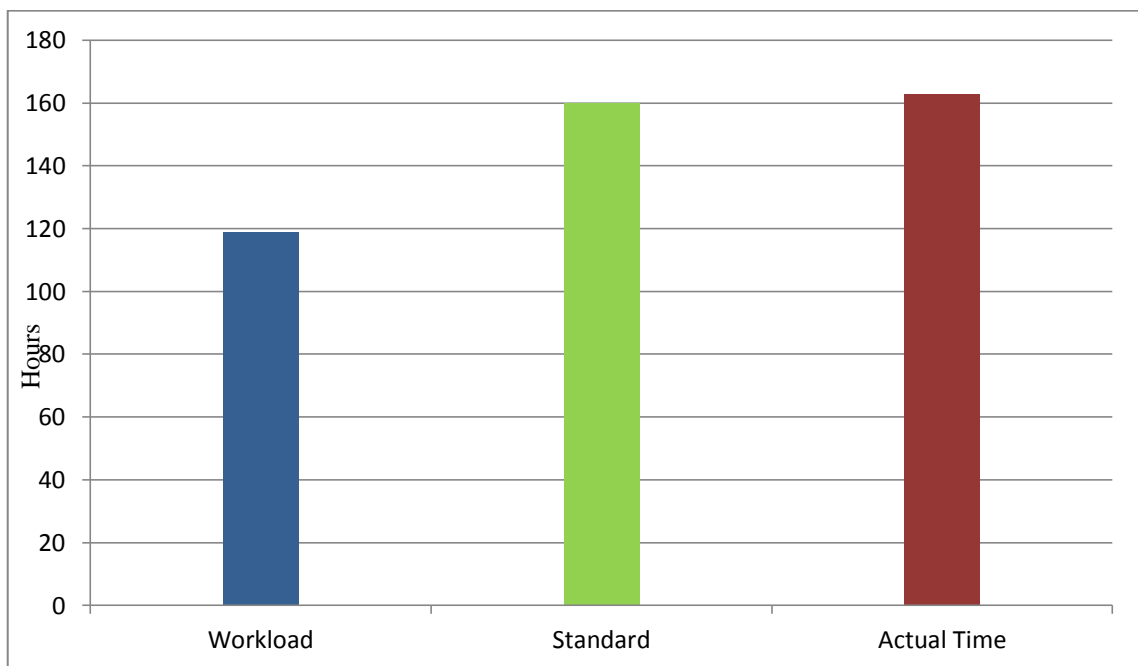


Figure 4.2 Comparisons between Actual Workload, Standard Workload, and Actual Time Spent by Subject

From the data processed a visual representation is made to show comparisons between actual workload, standard workload by legal regulation, and actual time that subject spent in a month, all stated in the unit time of hours. Here showed that the actual workload, standard time, and actual time spent are 119, 160, 163 hours respectively.

Table 4.2 Fatigue Severity Scale Score

<b>Subject</b>	<b>Score (Avg.)</b>
<b>I</b>	3.78
<b>II</b>	3.78
<b>III</b>	4.1
<b>IV</b>	3.89
<b>V</b>	4.1
<b>Total</b>	19.65

Fatigue severity scoring result is shown above in Table 4.2, from 5 subjects that being involved, the total score of 19.65, with the average score is 3.93. The interpretation of this test authorized to researcher opinion.

## CHAPTER V

### DISCUSSION

#### 5.1 Result Analysis

In the previous chapter of data processing, the amount of workload for emergency physician working at Emergency Department Rumah Sakit Daerah Bagas Waras Klaten is already obtained, which presented as following chart. The data presented below shows comparison between actual workload each week stated in unit time of hour and the standard working time according to Undang-Undang No 13 Tahun 2003 that regulates about employment (*Ketenagakerjaan*) which declares the amount of working time for employee is 40 hours weekly.

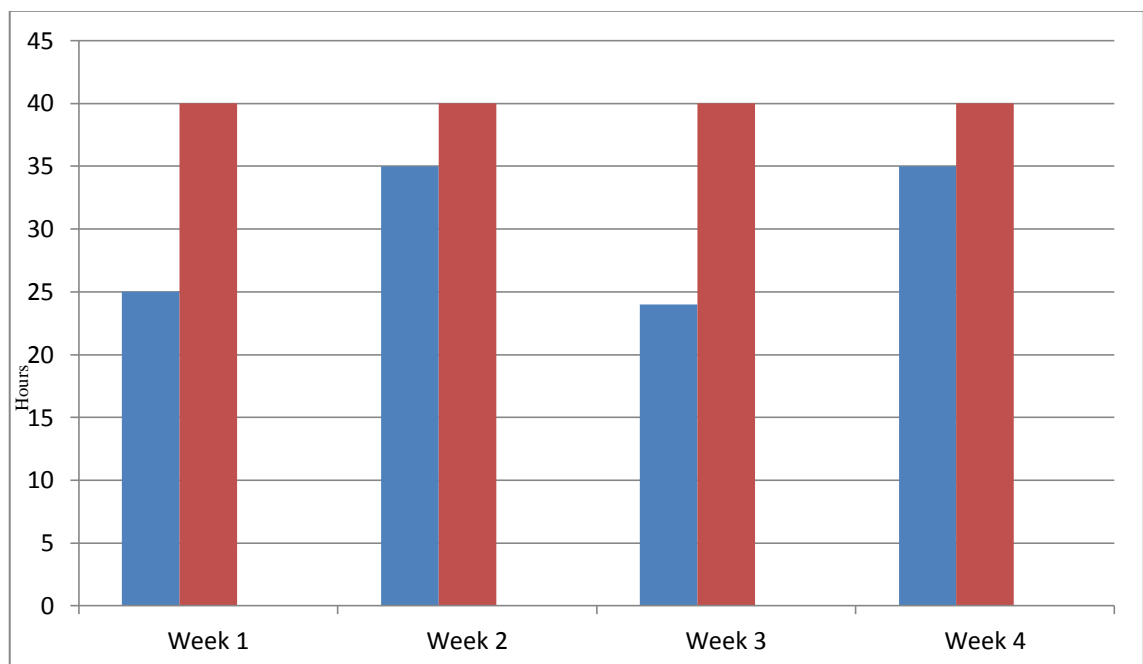


Figure 5.1 Comparisons of Weekly Actual Workload and The Government Standard Working Time

From the figure 5.1 it can be informed that as all four week in November 2017, the employee (emergency physician) is always has workload under the standard applied by government regulation, in term of time spent to do actual work. From the

observation conducted during study, this could be happen because the workload is measured solely from the time where emergency physician perform activities that related directly to the clinical means. While in reality, many activities that should be accomplished by emergency physician related to office managerial purposes during working shift time that this study did not record as workload. There are also activities that one must accomplished completely outside of working time such as medical community service held by hospital, government, and even non government organization.

Most if not all of the emergency physicians working at Rumah Sakit Daerah Bagas Waras Klaten are assigned to several managerial or structural positions. Although that emergency physicians working in shift cycle, due to many structural function can only be accomplish in office hour, they often required attending office prior or after working shift.

The works that assigned to the emergency physicians generally can be divided into two major task, office and outstation works. Those office works mostly take place in the hospital during office hours, including but not limited to managerial and structural duty, special purpose clinic, and administrative work of medical record. Sometimes this office work can not finished during office hours and must be taken home as outwork. On the other hand, the outstation works which mostly take place outside of hospital, such as but not limited to social service and emergency medical team occurred during day off. Thus both extra jobs are result in requiring emergency physician working outside shift cycle time.

According to the Undang-Undang No 13 Tahun 2003 about employment, worker who spent more time to accomplish work than standard working time are entitled to receive overtime pay from company. The overtime stated must not be longer than 3 (three) hours a day and 14 (fourteen) hours a week according to the regulation.

From other perspective of physical and psychological burden, this study finds that on average, subjects experience fatigue on the scale of 3.9 out of 7 scale

according to Fatigue Severity Scale, which as interpreted as they are in the state of exhaustion, as represented in more than half of the scale is exceeded.

Considering this study finding, several things are submitted for further consideration. Those are the need of more detailed research related to worker workload, employment planning based on scientific measured calculation, and for the worker the information about their right and obligation, so does the company/hospital to be more aware of the official regulation that applied in front of the law. For academic purpose, the more detail and in depth analysis and scientific foundation is strongly suggested for future study, considering the limitation and weakness of this study.

## CHAPTER VI

### CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 Conclusions

This study found that the workload for emergency physician working at Emergency Department Rumah Sakit Daerah Bagas Waras Klaten which is about 119 hours a month, is still under standard according to Undang-Undang No 13 Tahun 2003 Tentang Ketenagakerjaan, that stated workload based on working time for a worker in week is 40 hours, thus monthly workload based on working time for a worker is approximately 160 hours. Actual working time for emergency physician has already virtually meet official standard regulation declared by government.

According to this finding, emergency physicians working at Emergency Department Rumah Sakit Daerah Bagas Waras Klaten are still allowed to receive extra task(s) assigned by hospital management in order to accomplish standard workload that regulated by government. In case of the extra task consume more time than the standard workload time regulation, than the worker entitled to receive overtime pay.

#### 6.2 Recommendations

1. Rumah Sakit Daerah Bagas Waras Klaten need to conduct staff planning based on official regulation and accountable scientific calculation
2. The need of evaluation and correction of medical staff assignment based on human resource analysis to accomplish proportional work load and available staff

3. The necessity to conduct research related to human resource requirement especially in medical staff at Emergency Department Rumah Sakit Daerah Bagas Waras Klaten
4. The necessity to carry on continues monitoring and evaluation for medical staff human resource requirement.

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**APPENDIX**

Date	1	2	3	4	5	6	7
Shift	P	S	S	S	L	M	O
Hour	5	4	4	4	0	8	0

**25**

<b>P</b>	<b>8</b>	<b>56</b>
<b>S</b>	<b>5</b>	<b>30</b>
<b>M</b>	<b>7</b>	<b>77</b>
	<b>Hour</b>	<b>163</b>
	<b>Workday</b>	<b>20</b>

Date	8	9	10	11	12	13	14
Shift	P	P	L	P	P	P	M
Hour	5	5	0	6	6	6	7

**35**

Date	15	16	17	18	19	20	21
Shift	O	S	S	M	O	L	P
Hour	0	6	5	8	0	0	5

**24**

Date	22	23	24	25	26	27	28	29	30
Shift	M	M	O	L	M	O	L	P	M
Hour	6	8	0	0	6	0	0	6	9

**35**

<b>Actual Time (Hours)</b>	<b>119</b>
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