

## Uncovering Hospitalization Hidden Costs of Quality for Dengue Fever Patients: A case of a Private Hospital in Indonesia

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**Abstract.** National Health Insurance, a public health insurance currently used in Indonesia, is created with the aim of effective and efficient quality health services for the community and providers of health facilities, but on the one hand it still has the potential to cause real costs for hospitals as found in the case of hospitalization of patients with dengue fever. Basically, dengue fever is included in the category of tropical infectious diseases and in its handling falls into the non-surgical category, but the reality in the case of this disease provides a significant negative difference for the hospital, in contrast to previous studies which state that special cases surgery gives a lot of real costs to hospitals. Details of treatment costs that can be concluded from patients admitted to the hospital until the patient returns home with the approval of the doctor in cases of dengue fever include: (1) inpatient room, (2) examination of emergency room / outpatient clinic, (3) general practitioner visits, (4) specialist visits, (5) drugs, (6) injection drugs, (7) intravenous fluids, (8) use of ingredients, (9) room actions, (10) laboratory examinations, and (11) administration. The research method used is descriptive qualitative. The data used came from claims files and medical records of JKN-BPJS dengue fever patients in Sinar Kasih Hospital Purwokerto for the period of January 1, 2019 until March 30, 2019. The sampling technique uses total sampling, with 60 subjects after going through the exclusion process. All data were observed and recorded on the observation sheet, then analysed data using descriptive statistical analysis. The results of the study explain that the biggest cause of over cost in this case is hospitalization and laboratory examination.

**Keywords:** cost of quality, hidden cost, national health insurance, inpatient, dengue fever.

### 1. INTRODUCTION

In the National Health Insurance in Indonesia it called Jaminan Kesehatan Nasional (JKN), the pattern of payments to advanced health facilities in Indonesia is regulated by INA-CBGs (Indonesian Case Based Groups), which is a system of providing health services based on group diagnosis of disease as cost control without overriding health services quality, so that the health services provided are effective and efficient (Annavi, 2011) and the Health Social Security Organizing Agency (BPJS) is a public legal entity formed to organize Health Insurance programs (Regulation of the Minister of Health of the Republic of Indonesia Number 54, 2014).

It has been observed that INA-CBGs rates are still likely to cause harm to hospitals (Rejeki & Nurwahyuni, 2017) (Putra et.al, 2014), which is a significant difference between the service rates obtained by the Hospital with the INA-CBGs rates obtained by the Hospital through BPJS where rates issued by hospitals in some cases of disease (surgery) are greater than the rates of INA-CBGs. According to interviews conducted by researchers with BPJS officers in Sinar Kasih Purwokerto Hospital, one of the diseases that has the potential to cause harm to hospitals is dengue fever. This mainly arises in cases of dengue fever as the primary diagnosis, and does not apply if dengue fever is listed as a secondary diagnosis and there is another bacterial infection as the main diagnosis where the INA-CBG rates will be greater than the real costs of the hospital. Dengue fever is included in the category of tropical infectious diseases and in its treatment falls into the non-surgical

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category, but the reality in the case of this disease provides a significant negative difference for hospitals. According to data (Health Office, 2018) cases of dengue fever are found to occur most frequently from January to April. Below is a table that shows the number of hospitalized cases of dengue fever patients during the period January to March in 2018 and 2019. During the process of recording the data, it is also known that the majority of patients are class 3 JKN-BPJS users. This can increase the negative difference received by the hospital (Regulation of the Minister of Health of the Republic of Indonesia Number 69, 2013). Data for April 2019 cannot be included, because it is still in the process of data entry, so to equalize the data for 2018 data is also calculated until March.

**Table 1. Dengue Fever Case Data, INA-CBGs and Hospital Rates.**

Tahun	Jumlah Kasus (Penderita)	Tarif INA-CBGs (Rupiah)	Tarif Rumah Sakit (Rupiah)
2018	17	21.138.600	37.331.786
2019	255	312.146.200	527.873.807

Source: BPJS Claims Data of Sinar Kasih Hospital Purwokerto

Getting the best quality at the lowest cost - the main goal is in all aspects of the business sector even in the field of health services (Porter, 2010). It was stated (Porter, 2009) that there is a unity of values which, if resolved properly, is capable of providing overall benefits, covering all stakeholders in health services, namely patients, health care providers, and payers. At present, hospitals have become an industry that not only works for public health services but also tries to take advantage of it financially (Tanner et.al, 2007). One approach that can be done is to apply the cost of quality in the health sector. There is research on the cost of quality in the health sector in hospitals in the field of surgical services (Medbery, 2014) and in cancer treatment (Mariotto, 2011), but research on the cost of quality in hospitals regarding denque disease is still not found, even though dengue disease is still found quite a lot in Indonesia (WHO, 2012).

The concept of the cost of quality that can be applied in hospitals is mainly to direct the cost of failure (internal failure and external failure) to a minimum (Campanella, 1990). The cost of failure here can be assumed as the cost of care incurred by the hospital as long as the patient is hospitalized, where the emergence of over cost is known after the patient has finished treatment. The detailed maintenance costs that can be concluded from patients admitted to the hospital until the patient returns home with the approval of the doctor in Sinar Kasih Purwokerto Hospital include: (1) inpatient room, (2) examination of emergency room / polyclinic, (3) general practitioner vision, (4) visite specialist, (5) drugs, (6) injection drugs, (7) intravenous fluids, (8) use of ingredients, (9) room actions, (10) laboratory examinations, and (11) administration. Based on these data, it is then searched for any factors in the details of the cost of care which are the biggest potential problems causing loss in hospitals in hospitalized cases of dengue fever with JKN-BPJS, which is expected to bring alternative solutions.

## **2. THEORITICAL FRAMEWORK**

### **2.1. Cost of Quality (CoQ) Concept**

Cost of quality is defined as the difference that arises between the current costs of providing a product or service and the costs incurred in the event that there is no error (H.R. Ali, 2015). Cost of quality is not only useful in aspects of the business field (Harrington, 1987) but also in the health sector (Wei, 2015) (Sabharwhal, 2016). COQ is categorized into 4 categories:

prevention (P), appraisal (A), internal failure (IF), and external failure (EF). Prevention and appraisal cost represent control costs, while internal and external failure costs reflect consequential costs or failures. The aim of the COQ program is to develop strategies to facilitate continuous improvement efforts. The more minimal COQ is the better, this is realized subject to the constraints imposed by company policies, customer requirements, and process capabilities. In doing the strategy (Campanella, 1990) consists of four steps: 1) carrying out a direct attack on the cost of failure (IF and EF) in an effort to direct them to zero results, 2) invest in appropriate prevention activities to produce improvements, 3) reduce the cost of assessment in accordance with the results achieved, and 4) continue to evaluate and direct prevention efforts to get further improvements.

### **3. RESEARCH METHOD**

This is descriptive qualitative research. Data comes from various sources including claim files and medical records of JKN-BPJS dengue fever patients in Sinar Kasih Hospital Purwokerto for the period of January 1, 2019 until March 31, 2019, with a primary diagnosis of dengue fever or dengue haemorrhagic fever, no secondary diagnosis, INA code -CBGs are A-4-13-I, patients are class-3 BPJS insurance users, use facilities according to their class, and return status is with the doctor's approval or healed. The sampling technique used total sampling and the research subjects after going through the exclusion process were 60 files. All data were observed and recorded on the observation sheet. Data analysis used descriptive statistical analysis.

### **4. RESULT AND DISCUSSION**

#### **4.1 Result**

As many as 60 files of patients with dengue fever have been observed in the details of care costs, with variables namely inpatient room, ED examination / polyclinic, general practitioner visits, specialist doctors visits, drugs, injection drugs, intravenous fluids, used of materials, room actions, laboratory tests and administration. It was found that the first biggest cost came from the inpatient room / ruang rawat (31%), the second largest cost came from laboratory examinations / laboratorium (25%). The characteristics of detailed maintenance costs are in diagram 1.

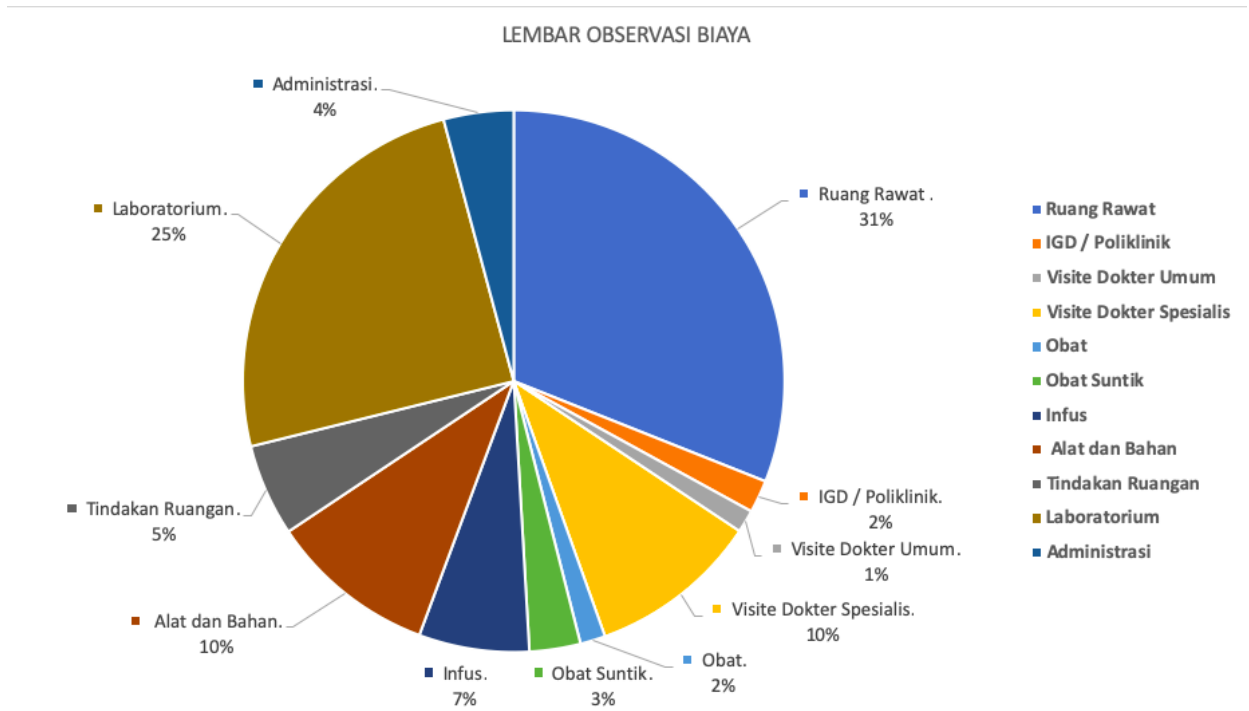


Diagram 1. Observed cost characteristics

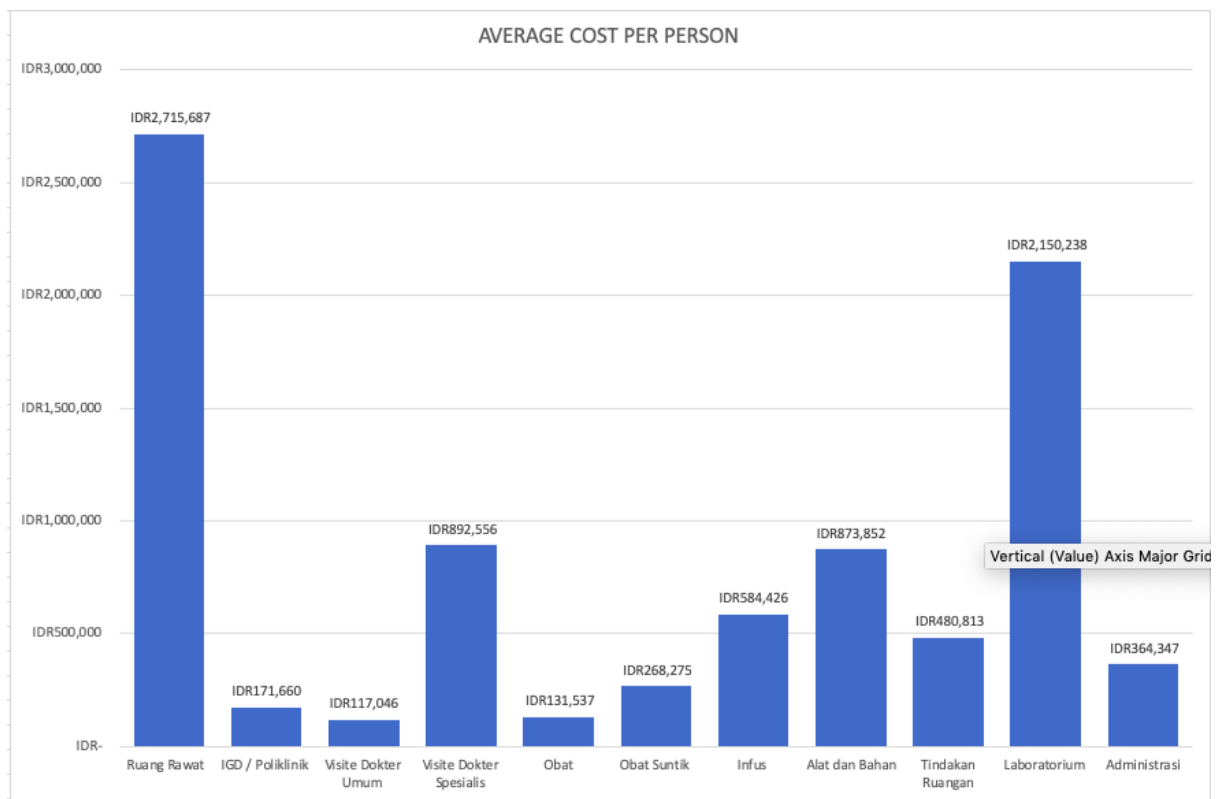


Diagram 2. Average cost per person

**Cost of Observation (Rupiah)**

	Mean	Standard Deviation	Median
Inpatient room	526,879.70	181,992.97	450,000
ER/ Outpatient clinic	33,293.23	9,384.69	30,000
General practioner visits	23,436.09	20,870.58	15,000
Specialist visits	175,015.04	56,186.65	153,000
Drugs	25,887.60	23,701.27	17,568
Injenction drugs	52,136.71	58,438.94	25,500
Intravenous fluids	112,043.23	44,756.16	112,000
Used of materials	178,259.56	181,384.20	158,500
Room actions	94,030.08	39,286.76	91,500
Laboratory tests	424,289.47	212,193.45	419,000
Administration	70,000.00	5,146.02	70,000

Table 1. Cost of observation (Rupiah)

#### 4.1. Statistical Process Control (SPC) Analysis

Of the two causes of overcost SPC analysis was then carried out. SPC is a technique that enables quality controllers to monitor, analyze, predict, control, and improve production processes through control charts. Control charts are a tool in analyzing variations of the production process. Usually control charts plots consist of lines showing Upper Control Limit (UCL), Center Line (CL), Lower Control Limit (LCL), and sample mean. The benefit of using the control line in SPC is to identify symptoms of deviation from a process.

$$\begin{aligned} CL &= \text{Deviation standart} \\ UCL &= \text{Means} + (3 \times CL) \\ LCL &= \text{Means} - (3 \times CL) \end{aligned}$$

The control line in the control chart is an effective tool for detecting specific causes of variation. If there are points that are outside the control line, it will be indicated that the process is out of control and corrective action must be taken.

At this time the X bar used is S Chart. Xbar - s Chart is a control map for controlling processes based on Average (X-bar) and Standard Deviation (s). Xbar-s Chart is used if the sample size collected is more than 5 ( $n > 5$ ) in each set of data samples, the ideal number of sample sets is 20-25 sets of samples.

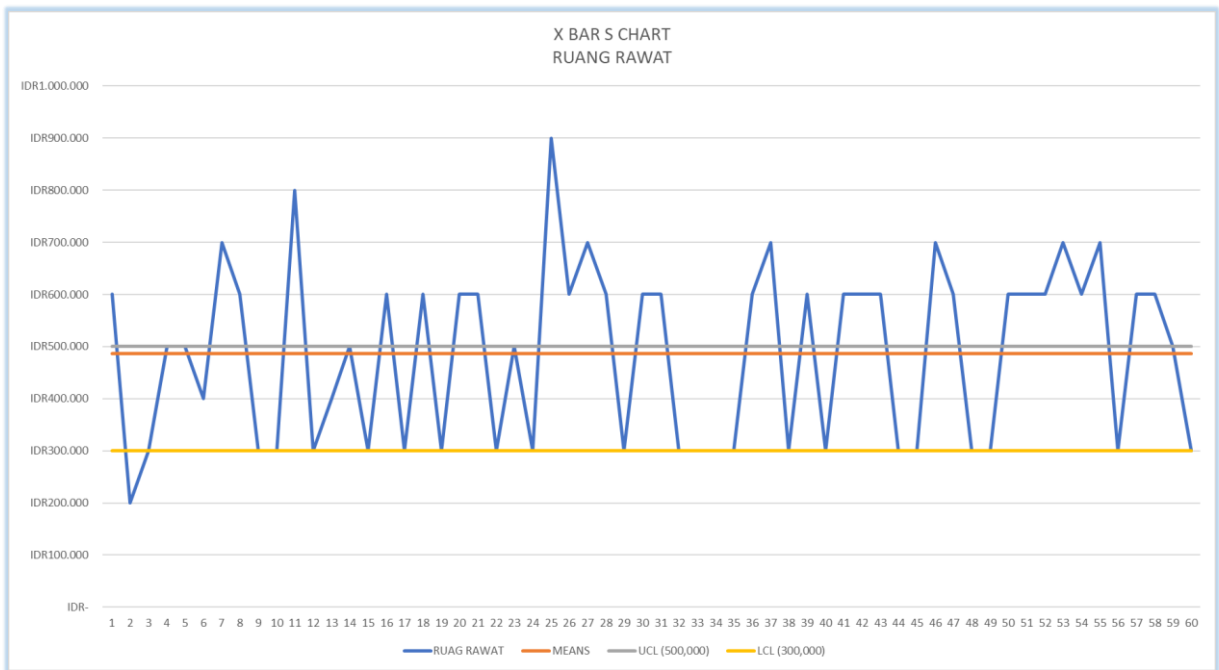


Diagram 3. Treatment room S-Chart; UCL = Upper Control Limit; LCL = Lower control limit

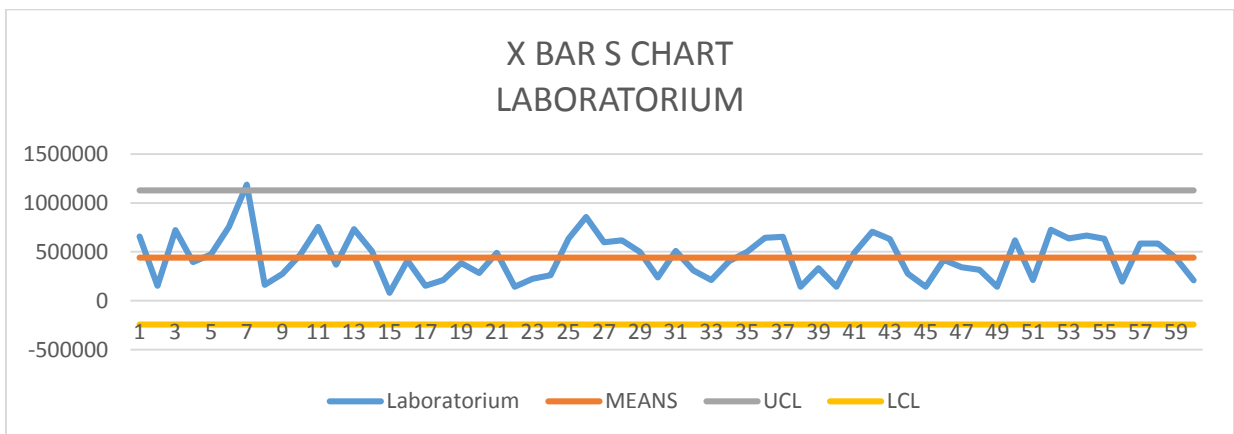


Diagram 4. S-Chart laboratorium; UCL = Upper Control Limit; LCL = Lower control limit

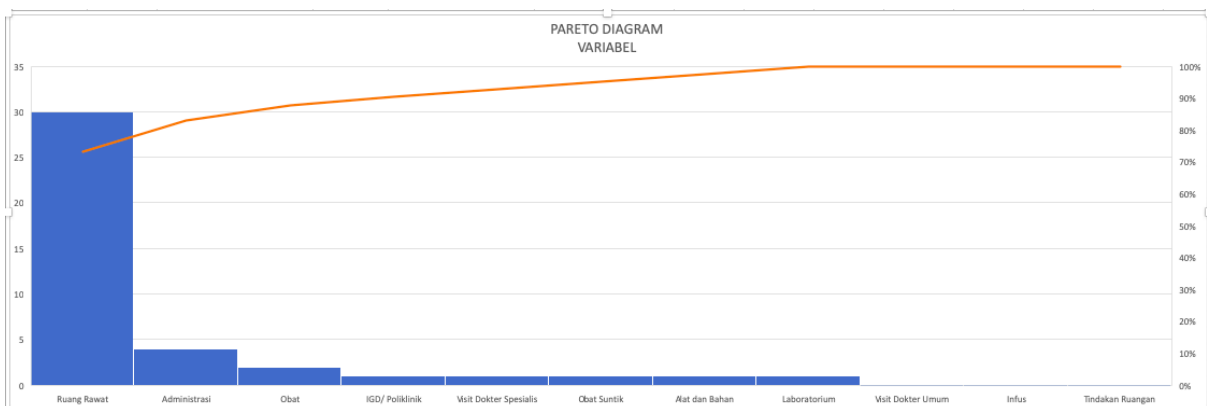


Diagram 5. The problem of funding in the hospital for dengue fever

Pareto diagrams are bar graphs that show problems based on the order of the number of events. The sequence starts from the number of problems that occur the most until the least occurs. In the Graph, it is indicated by the highest graph bar (far left) to the lowest graph bar (far right). In its application, the Pareto Diagram is very useful in determining and identifying priority issues to be resolved. The most frequent and frequent problems are our top priority for taking action. The Inpatient room is the most crucial variable to overcome.

#### 4.2 Discussion

From diagram 1 it is known that the first largest cost comes from the care room, the second largest cost comes from laboratory examinations. Both of these are closely related to each other. The care rooms in this case are related to length of stay (LOS). The longer the LOS the more costs incurred. Laboratory tests in this case blood tests need to be done every day in patients with dengue fever with low platelet levels (less than 150,000 mm) aiming to observe the emergence of complications of this disease. Hematocrit, albumin, liver transaminase, platelet count, and sodium concentration are laboratory parameters that are routinely examined in the management of dengue fever patients as recommended by WHO (WHO, 2011).

In this study, the subjects of this study were performed on patients with uncomplicated dengue fever. This is because, in patients with dengue fever accompanied by complications and / or accompanied by a secondary diagnosis as a companion of the disease it can actually increase BPJS claim rates (Regulation of the Minister of Health of the Republic of Indonesia Number 69, 2013), so that the rates obtained by hospitals can be equivalent or even more. The increase in service rates is also influenced by the length of stay in hospitals. The length of stay recommended by WHO for dengue patients is 3 to 5 days. Patients are usually treated during the 3rd day of fever, where the critical phase of dengue disease begins. The critical phase usually occurs on the 3rd to 7th day which is marked by a decrease in body temperature accompanied by an increase in capillary permeability and the emergence of plasma leakage or a decrease in platelet and leukocyte counts, usually lasting 24-48 hours, shock can occur in this critical phase (Fig. 1). In conditions where the critical phase has passed the patient can be discharged, which is usually characterized by an increase in platelets, the patient's general condition improves, appetite is restored and hemodynamically stable (WHO, 2009).

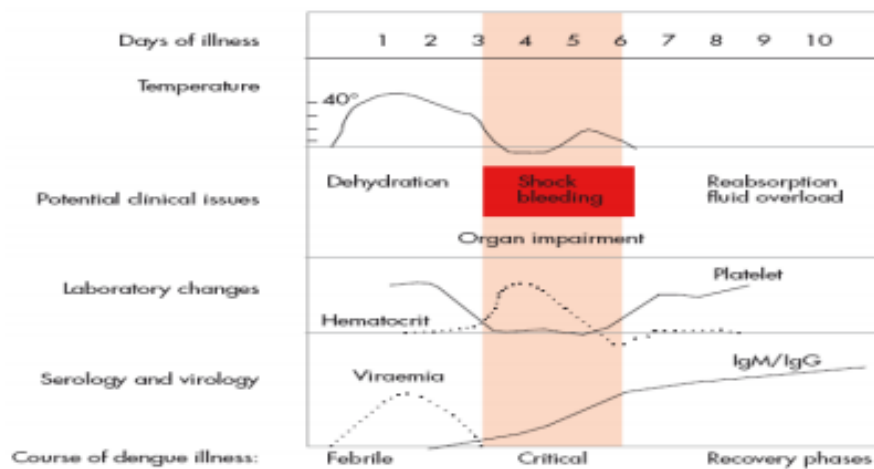


Figure 1. The course of dengue illness (WHO, 2009)

In length of stay conditions as shown in diagram 2, it shows that there are still many costs that exceed the ULC. ULC applied for Rp. 500,000 and LLC for Rp. 300,000, which was based on the cost of the care room per day for grade 3, which was Rp. 100,000, according to the length of stay that should be applied according to WHO on uncomplicated dengue fever.

Patients with dengue infection who must be hospitalized are as follows. When found danger signs, complaints, and signs of hypertension, bleeding, organ disorders (kidney, liver, heart, and neurologic), the increase in laboratory results in the form of hematocrit on laboratory re-examination, pleural effusion, ascites, comorbidity (pregnancy, diabetes mellitus, hypertension), certain social conditions (living alone, far from health facilities, and difficult transportation) (WHO, 2009). In conditions that occur at the place where the research is carried out, there are still many patients who should not require hospitalization but are still being treated, besides that there are still many patients with long fever 2 days with positive dengue results hospitalization has been done, so this causes an increase in the number of treatments dengue fever patients and length of hospital stay. Several studies have shown that the length of patient care to hospital rates is statistically significant showing a strong positive correlation (Puspandari et al, 2015).

Duration of treatment includes aspects of assessing whether the hospital is efficient or not. Some diseases that require longer days of treatment include diabetes mellitus, cancer, lung disease, heart disease, stroke and psychiatric illness (Cook et al, 2009). Whereas according to other studies, several things that affect the length of treatment days are the age and condition of the patient to the disease (Agboadoa et al, 2016).

The length of stay is related to the increase in hospital rates because the health services provided are also more numerous. In fact, it could actually be in vain. This raises inefficiencies in the allocation of funds and resources. Hospitals are expected to increase the efficiency and effectiveness of costs to increase the allocation of health services and reduce the length of treatment. In relation to the capacity of the number of beds, a lot of evidence shows that the increasing number of hospitals actually raises occupancy rates, resulting in too many empty beds in hospitals can cause inefficient resources (Chang and Lan, 2010).

## 5. CONCLUSION

Rates issued by hospitals are higher than the rates obtained through INA-CBGs in patients with dengue fever. Factors that are positively related to hospital rates and statistically significant are care rooms related to length of stay and laboratory examinations.

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