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Analysis of Clinical Pathway Implementation on Pneumonia Case in PMI Bogor Hospital

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Abstract

Background: Pneumonia is the largest infectious disease that contributes to the world child mortality. Around 16% from the death of under five-year-old child is caused by pneumonia. Since the era of universal coverage, the hospital is required to maintain quality control and costs in the form of clinical pathway. Furthermore, Clinical Pathway is one of the requirements that must be met in the hospital's accreditation standards. The aims of this study were to evaluate the implementation of clinical pathway for pneumonia patients during the inpatient charge that consisted of length of stay, doctor visit, laboratory tests, medication, clinical practice and variation.

Method: Retrospective study was conducted on 73 pneumonia patients. The data and information were obtained from medical records and hospital information systems. In addition, the source of data was from the patient's recapitulation which obtained from medical record by the medical report unit in hospital that consists of patient's characteristic, length of stay, consultation, the laboratory test and radiology test.

Result: At first there were 73 pneumonia patients in six months, but there were only 5 patients that met the inclusive criteria. Sample's characteristics consisted of 3 males (60%) and 2 female (40%) with the age of under five years old and the elderly. The length of stay was shorter with an average of 4.6 days (maximum 11 days and a minimum 1 days), compared with the length of stay of the clinical pathway (around six until seven days). The average of doctor's visit regarding the clinical practice was about 1.4 times to the patient.

Conclusion: From six pneumonia clinical pathway indicators, there were 2 indicators that produced variances from the hospital practice which consist of laboratory tests and medication. These variances would contribute to the hospital's expenses.

Keywords: *Clinical Pathway, Pneumonia, Variance Analysis.*

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Introduction

About 16% from all the deaths of children under 5 years old were caused by pneumonia in 2015[1]. Indonesia became one of the 15 countries that were estimated to have the highest number of new pneumonia[2]. The mortality rate in developed countries is low (<1 per 1000 per year). In developing countries, respiratory tract infections are not only more prevalent but more severe. Worldwide, lower respiratory tract infections accounted for nearly 800,000 deaths among children ≤19 years of age in 2015 (31.1 per 100,000 population), second only to neonatal/preterm birth complications[3]. Pneumonia is not only found in children under five years old but also in people aged 65 and over and who have other health problems. In United States, there are 915,900 episodes of pneumonia estimated in adults >65 years of age each year[4]. Since 2014, Indonesia has enacted Law No. 24 of 2011 concerning the Social Security Administration Agency (BPJS) which demands hospitals to provide quality control and cost control services[5]. To support this, one of the efforts that can be done by the hospital is to make a clinical pathway. Rotter's study showed that clinical pathways have contributed to a decrease in the length of stay, a reduced risk of re-admission,

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complications, and a reduction in hospital costs[6]. In addition, the study of the Clinical Pathway Implication Effect on the total cost of hospitals in Thyroidectomy and Parathyroidectomy patients showed a decrease in Length of Stay (LOS) in patients that were given services according to the clinical pathways, as well as in average for the costs per case[7]. Furthermore, Clinical Pathway is an important part in realizing Good Clinical Governance in hospitals and is one of the conditions that must be met in the RS Accreditation Standards 2012 KARS version[8].

The aim of this study is to evaluate the implementation of pneumonia clinical pathway in PMI Bogor Hospital by knowing the description of variations in the output (in compliance with the implementation of clinical pathway).

Method

This study used quantitative method with retrospective analysis from medical records and hospital information systems from October 2016 to March 2017. There were 73 patients diagnosed with pneumonia and then re-selected based on the inclusion criteria of pneumonia with no comorbidities and inpatient patients. The number of cases that met the inclusion criteria was 5 patients. The Clinical Pathway developed at PMI Bogor Hospital was Pneumonia with no comorbidities with ICD-10 code, J18.9.

The source of data was from the patient's recapitulation which obtained from medical record by the medical report unit in hospital consisted of patient's characteristic (age, sex, payment method, and inpatient room type), length of stay (duration in days between admission to discharge date), consultation (frequency of doctor specialist's consultation), the laboratory test and radiology test. Moreover, there was medication data that were collected from the billing unit in the form of drugs name and their frequencies of usage. That medication data was classified into several classes of drugs using ISO (*Identifikasi Standar Obat*) such as Antibiotic, Analgesics, Antiemetic, Anti-inflammatory, Bronchodilator, Mucolytic, Antihistamines, Anti-hypertension, Antiseptic and Digestive system. All the variance and clinical data were analyzed using Microsoft EXCEL software while statistical analysis was carried out using Clinical Pathway Evaluation Tools version beta 2.6 software. Data were analyzed using descriptive statistics and presented as average utilization then compared with the clinical pathway standard.

Result

At first there were 73 pneumonia patients in six months but there were only 5 patients that met the inclusive criteria. Sample's characteristics consisted of 3 males (60%) and 2 female (40%) with the age of under five years old and the elderly. Three of them had completed the pathway until getting better while two others were dead during hospitalization. All of the samples used the National Health Assurance as the guarantee for hospital care. The patients were cared in class I (20%), class II (20%), class III (20%) and ICU (40%).

Table 1. Room Care Distribution

Items	Cases
LOS (Days)	
ALOS	4.6
Minimum LOS	1
Maximum LOS	11
Age (Years Old)	
Average Age	46
Minimum Age	1
Maximum Age	80
Sex (%)	
Male	60
Female	40
Payment Methods (%)	
JKN	100
Discharge Status (N)	
Recovery	3
Dead after 24 hours	1
Dead before 24 hours	1
Room Care (N)	
I	1
II	1
III	1
ICU	2

Source: Data Analysis

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Table 2. Utilization of CP compliance

Pathway	Clinical Pathway	Utilization (average)	Variances
Average length of stay	6-7	4.6 days	
Doctor' visits	1	1.4	
Medical Support and monitoring			
• Monitor Vital Sign	1	0.2	
• Nebulizer	-	0.4	
Lab test			
• Complete Blood Count	1	1.8	
• LED	-	0.2	
• Oxygen Saturation (SpO2)	-	0.0	
• Blood Gas Test	-	0.4	
• ECG	1	0.0	
• Sputum Gram Stain	1	0.2	
• Antibiotic Resistance	-	0.0	
• Acid Resistant Bacteria	-	0.6	
• Creatinine Clearance			1.2
• Urea Clearance			1.2
• Albumin Test			0.4
• Na, K, Cl, Test			0.4
• SGOT and SGPT test			0.4
• Anti-HCV			0.2
• HBsAg (Hepatitis B Surface Antigen)			0.2
Radiology test			
• Ro Thorax	1	0.6	
Medicine:			
• Antibiotic	1	3.0	
• Analgesics	-	6.4	
• Antiemetic	-	1.0	
• Anti-inflammatory	-	1.0	
• Bronchodilator	-	0.6	
• Mucolytic	-	0.6	
• Antihistamines	-	0.4	
• Anti-hypertension			7.6
• Antiseptic			0.4
• Digestive system			1.4

Source: Data Analysis

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Table 3. The Price of Medicine Variance

Name of Medicine	Price (IDR)
M-Farsix Injection	4776/ampoule
Ranitidin Injection (H)	4505/ampoule
Amlodipin TB 5MG	712/tablet
Saccharin Tablet	250/tablet
Furosemide Tablet 40MG	237/tablet
M-Diovan 80 TAB	2341/tablet
M-Instilla Gel	49858/10 ml
Diovan TB 80 MG	15540/tablet

Source: Data Analysis

The data shows that the hospital length of stay was shorter with an average of 4.6 days, compared with the length of stay of the clinical pathway (around six until seven days). However, there was one patient who deserved to be taken care of for more than six or seven days. The average of doctor's visit regarding the clinical practice was about 3 times by the specialist doctor and 0.8 by the doctor to the patient which meant that it had fulfilled the clinical pathway standard. Based on the clinical practice, there were 12 types of laboratory test that had been given to the patient which consist of 5 tests written in clinical pathway document and 7 variance tests.

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In addition, medical support and monitoring the patient by the physician and nurse such as monitoring vital sign and nebulizer were utilized in about 0.2 and 0.4 respectively. It means that monitoring was not applied to all patients each day during treatment period. As medical support and monitoring, the radiology usage was only 0.6 which meant that this test was not applied to all five patients. At the end, there was one more variance that was applied to the practice, which was the medication. According to pneumonia clinical pathway, medication consisted of antibiotics, analgesic, antiemetic, anti-inflammatory, bronchodilator, mucolytic and antihistamines. There were three kind of variances and the biggest medication variances was anti-hypertension (utilization = 7.6). The other medication variances were antiseptic and digestive system of about 0.4 and 1.4 times respectively. Furthermore, it was considered that the medicine utilization would also impact the price. Table 3 showed that the price would be decreased around ten thousand rupiahs for every type of medication if the variance can be eliminated.

Discussion

Pneumonia clinical pathway in this hospital was designed without considering the payment types such as private, private insurance or universal coverage, and inpatient room classification. Among five patients, there was only one kind of payment, which was universal coverage. That was usual because it had been enforced since 2014 and BPJS users kept increasing over the years. There were six different types of inpatient room, which were class 1, 2, 3, VIP, VVIP and ICU at PMI Bogor Hospital. The distribution of patients according to room care is shown in table 1.

Pneumonia is generally diagnosed based on a history of typical symptoms, abnormal breath sounds that can be heard with a stethoscope, a chest radiograph showing characteristic shadows, and, sometimes, laboratory tests[9]. The Clinical Pathway document manages that the physician should do some clinical assessment, radiology test, and the laboratory test to diagnose the pneumonia. For the first three days, the patient should be given a clinical assessment, while the radiology (Ro Thorax) and the laboratory test (complete blood count, Oxygen Saturation (SpO2), ECG, and Sputum Gram Stain) should be tested in the first day of hospitalization. The Ro Thorax had been implemented to most of the pneumonia patients but only a fifth of them that met the clinical pathway standard, which was to be tested in the first day.

In addition, after the patient is diagnosed with pneumonia, the doctor may recommend some laboratory test to ensure about the immune system, bacterial infection, complications and others. The clinical pathways listed seven types of laboratory test which are Blood Test, Pulse Oximetry, Erythrocyte Sedimentation Rate, Arterial Blood Gas, Electrocardiogram, Sputum Test, and Pleural Fluid Culture Pneumonia. Along all the samples, unfortunately, from 8 kind of laboratory tests in pneumonia clinical pathway document, only five that had been tested by the hospital and 3 others were not implemented, especially the ECG which is really important as a part of the clinical assessment and should be tested in the first day of inpatient period. For further details, the CP said that the compulsory laboratory tests of pneumonia are Blood Test, Electrocardiogram, and Sputum Test which should be tested in the first day of inpatient period. In fact, the data described that about eighty per cent of data had met the CP standard but half of them overused the blood test which was tested around two or five times during the period. There was a finding that concluded that the useful diagnosis for pneumonia was by using the erythrocyte sedimentation rate (ESR), leucocyte count, and C-reactive protein (CRP)[10]

Treatment of pneumonia depends on its likely cause and how ill the person is. The usual approach is to give effective antibiotics against the most likely bacteria causing the infection [11]. In theory, based on the CP document, there are three kinds of medicine that should be given to the patient which are Empiric Antibiotic, antibiotic related to the bacteria, and symptomatic. However, the data explain that around 22% of the drug types (including three groups of medicine, such as Anti-hypertension, Antiseptic and Digestive system) which were given are not the medicine for pneumonia. In other words, it is not classified in the Pneumonia Clinical Pathway or the variance of care in this hospital. Moreover, about 78 per cent of drugs were known as antibiotic and seven groups were symptomatic.

Conclusion

From six pneumonia clinical pathway indicators, there are 2 indicators that produce variances from the hospital practice, which consist of laboratory test and medication. Laboratory and radiology tests are needed for ensuring the diagnostic and supporting medical service. However, there were several unimportant laboratory tests that were given to the pneumonia patients. There was an overuse of complete blood count,

creatinine, and urea tests in patients with pneumonia. Moreover, the creatinine and urea are not considered as the part of clinical pathway assessment and of course it can impact the hospital's expenses. In addition, three medication variances, which are anti-hypertension, antiseptic and digestive system, are considered as unnecessary care and would contribute to the hospital's financial expenses. In fact, the hospital should manage to maintain the expenditure but still keep their quality of care, especially because the INA-CBGs pricing policy for private hospital has been implemented. To prevent the unbalanced cost between the practice and INA-CBGs pricing policy, the evaluation of pneumonia clinical pathway implementation is essential to maintain the quality and cost of hospital services.

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Ethical Clearance: This study is a using secondary data so it does not require for ethical clearance.

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