THE EVALUATION OF STEMI CLINICAL PATHWAY IN CARDIAC SERVICES AT DR. KARIADI HOSPITAL SEMARANG

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Abstract—Clinical pathway (CP) can be used for evaluation of the given health services including cardiac services. This study aims to evaluate the STEMI clinical pathway in terms of content, quality, hospital cost, length of stay and outcomes of cardiac services at Dr. Kariadi hospital. The study design is retrospective cohort. 18 data was gathered both before the implementation of the CP in 2015 (retrospective) and after it is implementation (cohort) in 2018. Data regarding to content and quality of the CP was gathered from 13 key persons using the integrated care pathway appraisal tool (ICPAT). Findings show that the content and quality of the STEMI CP is in a good category (content 76.3%, and quality 94.8%). No difference was found in terms of length of stay, outcome and total cost between STEMI patients using CP and those without CP (P>0.05)

Keywords—Evaluation, Clinical pathway, STEMI, ICPAT

1 INTRODUCTION

Coronary cardiac disease is the leading cause of death in developing countries. It is predicted as the first killer in 2020.[1] Heart disease or myocardial infarction related-mortality is estimated around 1.2 million lives per annum.[2] The heart disease prevalence in Indonesia is around 0.5% based on medical diagnose and around 1.5% based on medical diagnose or symptoms.[3] Meanwhile, the heart disease incidence in Central Java in 2017 was around 3.61%.[4] Measuring a service effectivity and efficiency can be conducted by evaluating the ongoing implementation. Evaluation of the already implemented clinical pathway is the best method of measuring cardiac services since clinical pathway is one of the integrated, organized and comprehensive clinical service tools. Within clinical pathway, there are time flow of clinical interventions for patients treated in hospitals[5] that helps hospitalization cost saving,[6] reducing numbers of medical complications, improving documentation process and lowering length of hospital stay.[7] Clinical pathway also can be used for evaluating INA CBGs tariff against hospital based-rate, hospital operational cost,[8] and improving the process of disease treatment.[9] Some studies already used this method for measuring clinical services in hospital, such as stroke unit at Bethesda hospital Yogyakarta which evaluated the implementation of clinical pathway for stroke. It was found that the implementation of clinical pathway can improve swallowing function and medication adherence, enhanced education and rehabilitation process also lowering complications.[10] In the same setting, a study researching the effect of clinical pathway implementation on hospital cost by Irotch et al. (2016) found that clinical pathway can lower hospital cost of acute ischaemic stroke patients at Bethesda hospital Yogyakarta for about Rp 2,446,961.70.[11] The implementation of clinical pathway for pneumonia conducted by Septiani et al. (2016) found that the clinical pathway being used was substandard since there were some barriers during it's implementation such as lack of time, lack of awareness to implement the clinical pathway, lack of sense of belonging and some medications were not administered in accordance to clinical pathway.[12] Cardiac service is one of strategic plans of Dr. Kariadi hospital Semarang and one of priority areas. One of clinical pathway simplemente for patients with cardiac conditions in Dr. Kariadi hospital is myocardial infarction clinical pathway with elevated ST segment (STEMI) without complication. It has been used since 2016 and revised for twice. However, the implementation of clinical pathway in terms of effectivity and cost efficiency has never been evaluated.

2 RESEARCH METHOD

The study design is retrospective cohort by reviewing data before the implementation of clinical pathway in 2015 (retrospective) and after its implementation in 2019. The study population is all of clinical pathways of STEMI patients without complication hospitalized in Dr. Kariadi hospital (before and after the implementation of clinical pathway). The control group consists of STEMI patients without complication before the implementation of clinical pathway. The inclusion criteria are patients with completed clinical pathway data and register. The exclusion criteria are uncompleted clinical pathway data and register, illegible, broken or missing. Evaluation of clinical pathway in terms of content and quality was analysed from primary data gathered from the ICPAT questionnaire based-responses of 11 subjects consisting of the head of medical services, the head of Elang installation, head nurses (2 people), the person in charge for service quality in Elang installation, primary doctors (3 people), and clinical nurses (3 people). Subjects were recruited with purposive sampling method based on criteria of as a key source of information according to the study aims. The evaluation of
hospital cost, length of stay and outcomes (output) were used for the group of STEMI patients with clinical pathway and those without clinical pathway. The sample size is based on a study by Muhammad Ardhianto (2015) who found the proportion of STEMI without risk factors as 0.032.\textsuperscript{[22]} The type I error is 5%, the type II error is 20%, the confidence interval is 95%, and the proportion of STEMI patients is 0.40.\textsuperscript{3}

\[ n_1 = n_2 = \frac{2z_\alpha^2 \sqrt{p_1(1-p_1) + p_2(1-p_2)}}{(p_1-p_2)^2} \]  

with \( P = \frac{1}{2} (P_1 + P_2) \)

The samples needed for evaluating hospital cost, length of stay, and outcomes (output) are 36 secondary data consisting of 18 STEMI patients before the implementation of clinical pathway (register) and 18 STEMI patients after it’s implementation. Samples were recruited with purposive sampling method. Data regarding to content and quality evaluation were gathered from the Integrated Care Pathway Appraisal Tool (ICPAT). Data related to hospital cost, length of stay and outcomes (output) were gathered from secondary data. Univariate data involves evaluation in terms of content and quality. Bivariate data include hospital cost, length of stay and outcomes (output). Hospital cost and length of stay related-data were analysed with independent t-test and Mann Whitney test using SPSS version 22 with significance level 5%.

3 RESULTS AND DISCUSSION

3.1 Content and Quality Evaluation

The evaluation of content and quality of STEMI clinical pathway was categorized into three criteria involving good (>75%), moderate (50-75%), and bad (<50%). It was found that the clinical pathway is good in terms of content and quality (76.3% and 84.8%) with some dimensions need for improvement such as dimension 2 (documentation of the clinical pathway), dimension 4 (implementation of the clinical pathway) and dimension 5 (maintenance of the clinical pathway). Dimension 4 needs attention in terms of content and quality. The documentation of clinical pathway is useful to look at the obedience of health provider according to the available standard operational procedure. The implementation of clinical pathway aims to look at the development of clinical pathway and trial process having been taken by medical service team so the clinical pathway is considered ready for implementation in clinical settings. The maintenance of clinical pathway aims to look at dynamic improvement of clinical pathway as feedbacks for health providers so encouraging efficiency and implementation of evidence based-medicine.\textsuperscript{[21]} Some barriers were found during the implementation of clinical pathway such as some primary doctors did not get explanation yet regarding with excluded conditions. Lack of coordination between medical committee and medical services board.

Monitoring of clinical pathway should be conducted by medical committee and medical service board help this process, also become one of barriers during its implementation. Besides, the clinical pathway implemented in Dr. Kariadi hospital is an online version still under development process so the system still needs for improvement.

3.2 The differences between STEMI with and without clinical pathway

Findings showed that most STEMI patients are male within age range of 42-75 years old. No difference exists between gender and age between groups (p>0.05). These findings are similar with a study by Clark et al. (2011) showing that most heart disease subjects are male (60.7%) with mean age of 68.5 years old (45-88 years old).\textsuperscript{[23]} A study by Doering et al. (2011) also found that most heart disease patients recruited during their research is male (64.6%) with mean age of 65.5 years old for male and 68.3 years old for female.\textsuperscript{[24]} No significantly different with a study conducted by Stewart et al. (2017) showing that female subjects are only 18.6% and the rest are male (81.4%) with mean age of female subject is 65 years old.\textsuperscript{[25]} These findings are contradicitive with those from basic health research year 2013 showing that most heart disease experienced by female in comparison with male with prevalence of 1.6% and 1.3% respectively.\textsuperscript{[3]} However, based on technical guidance of cardiovascular management for physicians, male is at higher risk for heart disease at age of >40 years old and >50 years old for female. About 82% incidences of heart disease among people aged above 65 years can increase mortality since heart already experiences physiologic changes even without previous disease. Moreover, middle aged-women probably experiences more frequent heart disease in comparison with male. However, this difference in less progressive after menopause and it occurs particularly in...
the role of estrogen. The mechanism of estrogen potentially beneficial as antioxidant, lowering LDL and increasing HDL, stimulating expression and activation of nitric oxide synthase, also causing vasodilation and increasing plasminogen production. These lead to lower case number of heart disease among female compared with that in male. [26]

Table 1. Differences between STEMI Patients with and without Clinical Pathway

<table>
<thead>
<tr>
<th>No</th>
<th>Characteristics</th>
<th>STEMI With CP</th>
<th>STEMI Without CP</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Male</td>
<td>46</td>
<td>42</td>
<td>0.423*</td>
</tr>
<tr>
<td></td>
<td>b. Female</td>
<td>74</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Age (years)</td>
<td>56.33</td>
<td>60.33</td>
<td>0.131†</td>
</tr>
<tr>
<td>3</td>
<td>Length of stay (days)</td>
<td>2</td>
<td>2</td>
<td>0.949*</td>
</tr>
<tr>
<td>4</td>
<td>Outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. cured/discharged</td>
<td>88.9</td>
<td>100</td>
<td>0.151*</td>
</tr>
<tr>
<td></td>
<td>with improvement</td>
<td>1.56</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. died &gt;48 hours</td>
<td>1.56</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Total cost (Rupiah)</td>
<td>48.825.400</td>
<td>46.800.007</td>
<td>0.062*</td>
</tr>
<tr>
<td></td>
<td>Min: 46</td>
<td>Max: 125.666.599</td>
<td>Max: 91.839.608</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD: 65.558.507.72</td>
<td>70.979.395.17</td>
<td>12.209.006.499</td>
<td></td>
</tr>
</tbody>
</table>

* Mann Whitney Test  
† Independent t-test

This study found an increased length of stay for one day, a case of died patients (<48 hours and >48 hours), and a reduced hospital cost for about Rp 5,420,887.45. However, these three variables are not statistically different between STEMI with and without clinical pathway (p<0.05). These findings are congruent with dimension 4 and 5 (implementation and maintenance of clinical pathway respectively) that need for attention. However, these findings are incongruent with a statement by Health Department of the Republic of Indonesia (2020) stating that clinical pathway truly reduces length of stay and lowers hospital cost. [30] No different length of stay between STEMI patients using clinical pathway and those not using since there are factors such as patient culture believing that they should not being discharged on Saturday so hindering patients from being discharged on that day and they should wait until the next day. Besides, factors such as preparation of surgery for 2 days and unpredicted surgery outcomes can contribute for longer hospital stay. Lack of explanation related to exclusion criteria to primary doctor can be the cause of death incidence during this study. Instead, for certain cases, patients should no need clinical pathway. Longer length of stay and not different outcomes can be the cause of not significantly lowered hospital cost.

4 CONCLUSION

The content and quality of STEMI clinical pathway is good (76.3% and 84.8% respectively). No different length of stay, outcomes and total cost between STEMI group using clinical pathway and another group not using.

ACKNOWLEDGMENT

The research team thanks to relevant parties already gave considerable support and help the research process. We also thank to Dr. Kariadi hospital providing financial support for this research.

REFERENCES


