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THE IMPACT OF CLINICAL PATHWAY TO EFFECTIVENESS OF PATIENT CARE IN CURRENT MEDICAL PRACTICE IN HOSPITAL: A LITERATURE REVIEW

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ABSTRACT

Background: *Clinical pathway is an effective way to maximize patient outcomes by organize and standardize care processes. Clinical pathway bring impact to the patient treatment and the quality of care in hospital. This study aims to examine the impact of clinical pathway in effectiveness of patient treatment in hospital.*
Methods: *This study was a literature review used PRISMA guidelines. Data obtained from electronic journal database ProQuest that published from January to December 2018 and used English or Indonesia language. The keywords of clinical pathway, care pathway, length of stay and mortality had been used to find relevant journal.*
Results: *The search of electronic journal database found 1,937 articles. Articles that were not suitable with inclusion criteria must be excluded. Totally, 6 articles were relevant for this study. The 6 articles were conducted in USA, Belgium, Australia, India, and China. The analyzed from these articles showed that clinical pathway gave positive impact to the length of stay and patient outcome in the hospital if the resources of the hospital were ready to implement clinical pathway.*
Conclusion: *Clinical pathway reduced the length of stay, improved the patient outcome, and reduced the mortality rate in hospital. To get the maximum benefit for implementing clinical pathway, the hospital must be prepared the environment and resources first before implementing clinical pathway.*

Keywords: *clinical pathway, care pathway, patient outcome, length of stay*

INTRODUCTION

Clinical Pathway has been known since early 1980s first as response to health care reimbursement system. Clinical Pathway then are used to reduce medical practice variations and to act more toward evidence-based medicine, operational efficiency and quality, in order to achieve goals which is decreased care fragmentation, optimized cost effectiveness, improved patient throughput, and enchanced patient and family education regarding an anticipated treatment course [1]. Clinical Pathways aim to organize and standardize care processes, thus maximizing patient outcomes and improving organization efficiency [2]. In measuring quality of care in hospitals, three outcome measures are commonly used in various countries: length of stay, readmission and in-hospital mortality [3].

In Indonesia, the national health insurance named "Jaminan Kesehatan Nasional" (JKN) has been implemented, which adopted fixed reimbursement or payment to hospital, using the Diagnosis Related Group (DRG) system [4]. In 2018 government is paying more attention to hospital claims due to deficit in JKN funds and encourage the use of Clinical Pathways for delivering medical service and also to

review claims [5]. Clinical Pathways are objective tools recommended for improving patient care outcome quality and safety for hospital in order to comply and make the most benefit from the health reimbursement system [6]. Length of stay in hospital is important because clinically long length of stay is associated with adverse event, which increase patient care needs, and financially reducing length of stay will save cost for the hospital. Readmission is defined as unplanned readmission usually within 30 days after discharge, which indicate inadequate treatment from previous hospitalization. Mortality was defined as death in hospital. Readmissions and Mortality reflect the safety, effectiveness and timeliness of care, making them important measure of quality.

Despite the problem that individual studies of the impact of Clinical Pathway are varied and contradictory and there is still no standardised definition of Clinical Pathway [2], there are already many literatures released and published that show the positive impact of implementing Clinical Pathway in healthcare environment.

This manuscript aims to describe and review the current practice evidence about the impact and effectiveness of using Clinical Pathway especially in hospital emergency and inpatient environment. Specifically, this study is needed to determine the importance of Clinical Pathways to increase hospital quality in delivering good patient care outcome while saving hospital cost in order to make the most benefit from the fixed payment system of JKN.

METHODS

Search Strategy

This study conducted in form of literative review by implementing literature search strategies suitable to topic of writing, adopting PRISMA protocol. All literatures are facilitated within electronic library provided by University of Indonesia, which goes through the international ProQuest online literature publication library. Literatures are assessed for information about the impact, effect or outcome of Clinical Pathway implementation, compared to before implementing the Clinical Pathway. The search is done in April 2019 and the keyword uses in the search were “Clinical Pathway”, “care pathway”, “length of stay”, “readmission” and “mortality” to focus the search on the information that related to quality of care. Descriptions of PICO elements of this study is shown in Table 1.

Table 1. Descriptions of PICO Elements for Literature Review

INDICATOR	DESCRIPTION
Participant (P)	Patients admitted to hospital into emergency or inpatient department
Intervention (I)	Clinical Pathway implementation as care management on patients.
Comparison (C)	Traditional patient care management, before implementing Clinical Pathway.
Outcome (O)	Impact of Clinical Pathway implementation to the quality of care indicator, including Length of Stay (LOS), Readmission and Mortality.

We originally implement four stages to achieve record searching result that we will review. First, we search directly every publication titled with “Clinical Pathway” or “care pathway”, and any part of the publications containing “length of stay” and “readmission” and “mortality”, with full-text availability. Second we limit the result to publication type of scholarly journals, dissertation and thesis. Third, we focus on current medical practice so we decide to limit the search period from January 1, 2018 to December 31, 2018. Fourth, we continue with the standard PRISMA protocol. We removed duplicates

and then go through the record screening evaluating the publication abstracts and full text for exclusions and inclusions in searching relevant information for our research.

Inclusion and Exclusion Criteria

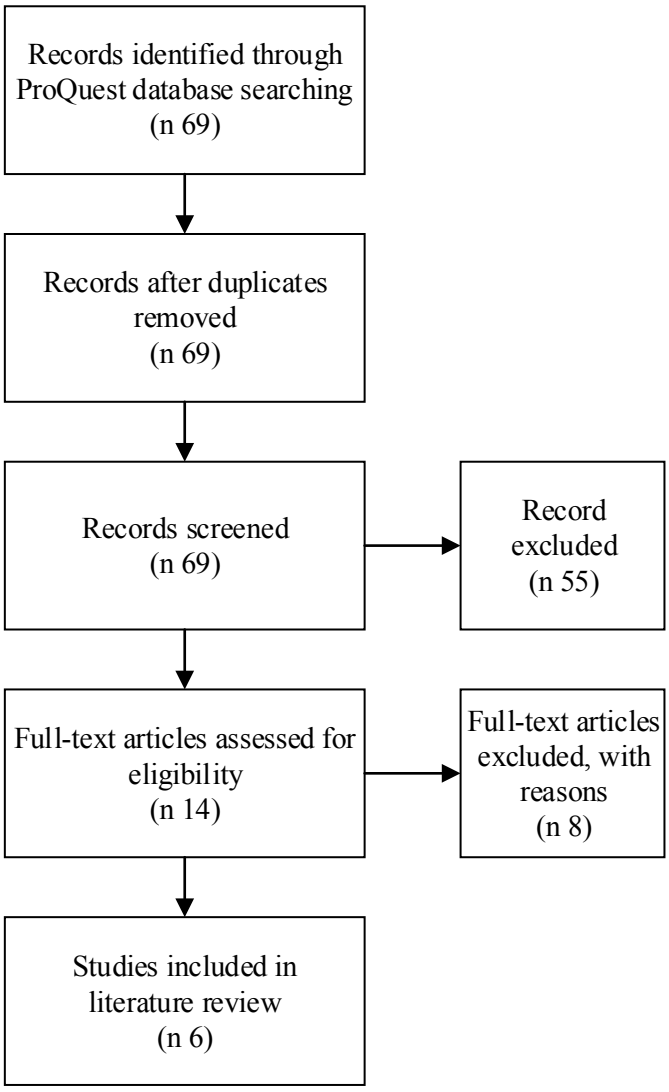
We include all type of study design with any implementation of Clinical Pathways providing any data for length of stay (LOS), readmissions and mortality, with comparison or control group.

We exclude comparison data that use clinical pathway in every groups without at least one comparison group not using clinical pathway. We also exclude any data with no significancy or p-value provided.

Search Result

There were total 1937 articles found in the database search. From first to fourth stage, we filtered the result to 26 articles and then we evaluate manually the rest of the articles for eligibility to review study. At the end of screening, there were 6 articles that were suitable for literature review (Figure 1).

Figure 1. Screening Flow using PRISMA Protocol



RESULTS

The six final articles we study are international journal, from USA, Belgiu, Australia, India and China, all published in 2018 as we limit the period. The results including description of articles are presented in Table 2.

Table 2. Descriptions of Articles & Research Results

No	Article Title	Author/ Year	Research Location	Research Design	Diagnosis / Intervention	Sample (n)		Outcome	Result		Description
						CP	Non-CP		CP	Non-CP	
1	Impact of the Implementation of the Croup Clinical Standard Work Pathway in the Urgent Care and Emergency Department Setting in Academic Pediatric Center	Anyouzoa JM / 2018	USA	Retrospective Cohort	Croup Clinical Pathway implementation	5917	2101	LOS in Emergency Department (min, mean)	137.63	127	P = 0.0022
								LOS in Urgent Care (min, mean)	77.64	73.64	P = 0.1284
2	The Effectiveness of a Clinical Pathway in Liver Surgery: a Case-Control Study	Ovaere S / 2018	Belgium	Observational, cohort, case-matched	Liver Surgery Clinical Pathway implementation	74	155	LOS post-op in non-matched group (day, median)	4	8	p < 0.001
								Readmission in non-matched group (%)	2.7	5.2	0.62
								LOS post-op in matched-groud (day, median)	4	6.5	p < 0.001
								Readmission in Matched group (%)	0	2	1.0
3	Post-operative managem	Gerard RR / 2018	USA	Observational, retrospect	Post-operative pathway	42	91	LOS (day, mean)	5.7	5.3	P = 0.55

No	Article Title	Author/ Year	Research Location	Research Design	Diagnosis / Intervention	Sample (n) CP	Sample (n) Non-CP	Outcome	Result CP	Result Non-CP	Description
	ent of perforated appendicitis: Can Clinical Pathway improve outcomes			ive Cohort	following Perforated Acute Appendicitis			Readmissions (%)	7.1	14.3	P = 0.39
4	Implementation of a whole of hospital sepsis Clinical Pathway in a cancer hospital: impact on spesis management, outcomes and costs	Thursky K / 2018	Australia	Observational, Cohort	Sepsis Clinical Pathway implementation	212	111	ICU LOS (day, mean)	2.8	4.9	P < 0.05
								Sepsis-related mortality (%)	5	16.2	P < 0.05
								30-day all cause mortality (%)	7.4	18.9	P < 0.05
5	Adapted ERAS Pathway vs. Standard Care in Patients with Perforated Duodenal Ulcer – a Randomized Controller Trial	Mohsina S et al / 2017	India	Prospective Cohort, RCT	ERAS pathway in Perforated Duodenal Ulcer	50	49	LOS (day)	5.36	9.78	P < 0.0001
6	Can single disease payment system based on Clinical Pathway reduce hospitalization costs in rural area? A case study of uterine leiomyma in Anhui, China	Peng J et al / 2018	China	Cross Sectional	Abdominal hysterectomy based on pathway in uterine leiomyoma	1432*		LOS (day)	9.960	8.830	P < 0.01

Notes:
CP = Clinical Pathway after implementation
Non-CP = Clinical Pathway before implementation
LOS = length of stay, in days (day) or minutes (min)
ICU = intensive care unit
ERAS = enhanced recovery after surgery
*only total number of patients data provided

Length of Stay
Hospitalization conditions are vary among the articles but most of them show significant positive impact to length of stay. In study number 1, length of stays are both increased in emergency and urgent care unit with significant impact to emergency ($p = 0.0022$) but not urgent care ($p = 0.1284$). Study number 2 show cases of surgery with non-matched analysis, and matched analysis comparing same number of comparison groups with specific criteria. Non-matched analysis result improved hospital stay by half. Matched analysis result shortened hospital stay by 2.5 days. Study number 3 analyze the impact of pathway in post-operative condition and result with insignificant impact. Study number 4 show cases of hospitalization with sepsis-onset and ICU stay, resulting significant ICU LOS. The study also analyzed inpatient stay after sepsis onset but the significance is not clearly stated. Study number 5 analyze the length of stay after implementation of peri-operative pathway and results significant reducement by 4.41 days ($p < 0.0001$). Finally, study number 6 show the condition in rural areas similar to developing country with implementation of clinical pathway for surgery and also related with DRG payment system implementation. The result shows lower length of hospital stay in pathway group.

Readmissions
Studies with readmission results are fewer than study with length of stay results. Only 2 studies produce readmissions data but both show insignificant result. Study number 2 show similar readmission rate for both matched and non-matched groups, while study number 3 show decrease readmission by about half (14.3 vs 7.1%) though this did not reach statistical significance. Additionly, study number 5 stated that there is no readmissions, however there is no data provided.

Mortality
Study number 4 is the only article providing proper mortality data with significance value. The results are significant lower mortality rate in sepsis-related mortality (5 vs 16.2%, $p < 0.05$) and 30-days-all-cause mortality (7.4 vs 18.9%, $p < 0.05$).

DISCUSSION
In study number 1, the environment of Emergency and Urgent Care require for quick response to patient condition. Implementing Clinical Pathway may somehow interrupt this flow of quick response of medical team. The result of study showed that there is a significant LOS increase in emergency service. This might because of the requirement to execute every single step in the pathway in patient care. In fact, the resources used are also increased significantly [7].

In study number 2, the cases here are Clinical Pathway implementation on surgical procedures, with aim to analyze hospital stay and postoperative morbidity. The result shows that the Clinical Pathway implementation show significant positive impact to median hospital stay but without increasing post-operative readmission rates [8]. Surgical pathways are quite common nowadays, and reference show that there is substantial evidence that Clinical Pathway lead to various improvements in clinical care in surgery, and their widespread use should be encouraged [9]

Study number 3 is conducted on specific post-operative clinical management protocol for perforated acute appendicitis (PAA). This pathway implements four recommendations for patients after the surgery. While the trend of numbers is improving, the data actually show statistically no significant outcome. And in the end researchers recommend that approaches to the management of PAA need to be evaluated [10].

Study number 4 is applied to non-surgical patients, which is sepsis condition. The study demonstrates using a paper-based clinical pathway with SIRS-based sepsis definition and this results significantly improved ICU LOS and importantly improvement in mortality rates both sepsis-related and 30-days-all-cause mortality [11]. This study adds another literature showing the effectiveness of clinical pathways in reducing mortality.

Study number 5 showing significant reduction in hospital stay but furthermore also showing more improvement to other clinical outcome related to the use of ERAS protocol/pathway including earlier functional recovery of bowel functions, earlier resumption of oral feeds and earlier mobilization [12].
Study number 6 show significant improvement in LOS but mostly the study discuss the beneficial use of clinical pathway for hospital in controlling hospitalization cost and standardizing diagnosis and treatment procedures [13].

Based on the reviews above, most of the study shows that clinical pathway give significant positive impact to length of stay. However, the data considering impact to readmissions and mortality probably still lacking and need to find more research. For now, we can say that implementing Clinical Pathway should be worth it at least to improve the hospitalization length of stay in inpatient department. This will also contribute more to hospital involved in DRG reimbursement system such as JKN in Indonesia, to save cost while improving patient outcome. Implementation in Emergency or urgent care however might need to be evaluated more by hospital.

This study along with those literatures study we review have limitations in analyzing the impact of clinical pathway to hospital outcome and effectiveness. Some of the studies relied on restrospective information from clinical and administrative data from the institution, so the results might not generalize to other institutions conditions. Different hospital or institutions might have different resources that influence the clinical pathway used and its outcome. Remember that clinical pathway is made according to the resources and capacity available in the hospital [2]. Another limitation is the absence of compliance to clinical pathway data, so we can't rule out other factors such as change in practice that might contribute to the difference in outcome. This study search the publication within year 2018 but the studies might include cases or patients from longer past periods. While longer periods usually give more sample data, we need to keep the study period relevant to current practice within the literatures.

To be consideration, there are other factors that may contribute to Clinical Pathway implementation. Study by McConnell (2014) gives some example of other factors such as senior management support, ongoing education, training tailored to the needs of each professional group and organizational cultural change have influence to the implementation of Clinical Pathway, which usually consist of multidisciplinary team [14].

CONCLUSION

Clinical pathway contribute to improving length of stay and probably readmission and mortality. However, many factors can influence both the clinical pathway and also the outcome on patient care and hospital management. Clinical Pathway might be one of the more direct thing to patient care outcome, but the complexity of many factors may confound the outcome of study, therefore it cannot be generalized. We recommend hospital to evaluate its environment and available resources first, before implementing Clinical Pathway based on literature reviews. Our review compiles the study in current

time, objectively in period of year 2018. This study adds compiled information about the relation between clinical pathway and patient care outcome for current medical condition and might encourage health institution and other research to make use clinical pathways more.

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CONFLICT OF INTEREST
The authors report no declarations of interest. The authors are responsible for the content and writing of this article.

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