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THE ROLE OF CLINICAL PATHWAY IN IMPROVING HOSPITALS COST EFFICIENCY

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ABSTRACT

Background: *Clinical Pathway (CP) is a method of clinical documentation that reflects clinical practice standards for physicians, nurses and other members of healthcare team. Clinical pathways are collaborative guidelines for treating patients focused on diagnosis, clinical problems and stages of care. The advantage is any intervention given and the development of the patient recorded systematically based on the time criteria set and is expected to improve the quality of service and to lower hospital costs. The aim of this narrative review is to assess the role of CP in improving the efficiency of hospital costs.*

Methods: *Narrative review was performed by analyzing the scientific articles obtained through Electronic Library provided by the University of Indonesia through online database list and chooses Science Direct as a search. The keywords used in the search were "Clinical Pathway and Hospital Cost". Search strategy was conducted by searching for articles related to CP role on hospital cost efficiency. Articles were selected using inclusion criteria and through several stages.*

Results: *Acquired as many as 1.324 articles conducted search through Science Direct. From the results of the screening finally 4 scientific articles were chosen relevant to the topic of writing and the criteria of inclusion or exclusion. After the analysis, it was found that the use of CP in the management of patients can lower hospital costs.*

Conclusions: *Implementation of clinical pathway for the management of patients in hospital can improve hospital cost efficiency.*

Keywords: *clinical pathway, efficiency, hospital Cost*

BACKGROUND

The costs required for the health sector are increasing every year, which is about 10-20% of Gross Domestic Product (GDP) in most developed countries, so efficiency improvements are urgently needed [1]. In Switzerland, the cost for health sector reached € 35.3 billion in 2005 or equals to 11.6% of its GDP and increased by € 36.6 billion in 2007, while the United States (US) spent 15.3% of its GDP. The greatest cost for health sector came from hospital care services. In Switzerland, €12.3 billion or 35% of the total cost of the health sector spent in hospitals. Surgery took up about a third of all hospital costs [2].

Hospitals should be able to provide quality services and at the same time must also be able to make efficient use of resources. The healthcare industry is under financial pressure to manage more effectively and efficiently because the replacement of payment patterns that have been using the Fee for Service (FFS) mechanism into a Prospective Payment System (PPS) based on Diagnosis Related Groups (DRG) that is widely used to pay inpatient care [3].

The challenge is increasing with the advancement of science and technology and also the demands of society to get quality healthcare. Therefore, a lot of health services are looking for innovation to provide quality care at an affordable cost [1]. The Evidence Base Medicine (EBM) can be linked with clinical practice in the hospital by practice of Clinical Pathway (CP) [5] [4]. Clinical pathway is a multidisciplinary treatment plan that has details treatment steps in patients with specific clinical problems based on EBM that can identify appropriate clinical interventions and time frames in achieving the expected clinical outcomes for a homogeneous group of patients [6] [5].

The concept of CP was introduced for the first time at New England Medical Center (Boston, USA) in 1985 by Karen Zander and Kathleen Bower [6]. In the US, CP emerged after the introduction of Diagnosis Related Groups (DRG), the first widespread diagnosis classification system based on bundled payments for each treatment episode [4]. Clinical pathway development should be associated with indications or procedures. To achieve better efficiency and quality, CP should include patients with high risk, high volume, high cost, and problem prone problems, as well as the course of the disease so the results can be estimated [8]. This narrative review assessed the role of CP in improving the cost efficiency of hospitals by conducting an analysis of some relevant research results. This narrative review is expected to present substantial and concise evidence to provide a framework for healthcare organizations considering CP as a tool to improve patient care cost efficiencies in hospitals.

METHOD

Search Strategy

The study conducted in the form of narrative review with the implementation of literature search strategies related to the topic of writing. Furthermore, the literature obtained will be assessed to know the role of CP in improving hospital cost efficiency as the purpose of this narrative review. The search was completed by searching for published literature in accredited journals. Literature search was conducted in December 2017 through Electronic Library provided by the University of Indonesia through online database list and choosed Science Direct as a search. The keywords used in the search were "Clinical Pathway and "Hospital Cost".

Inclusion and Exclusion Criteria

Screening was conducted in three stages. In the first stage, researcher assessed its relevance based on the review of the title and publishing year limited from 2007 to 2017 (10 years). In the second stage, screening was conducted through the evaluation of the abstract, and then in the third stage all the remaining publications were relevant to screening based on a review of full text. Articles were selected based on desired criteria, while articles that were not relevant to the writing topic excluded. Selected articles were evaluated using inclusion and exclusion criteria (table 1).

Table 1. Inclusion and Exclusion Criteria

INDICATOR	DESCRIPTION
• <i>Participant (P)</i> :	Patients undergoing hospitalization, whether under surgery or not. There was no limit on the diagnosis of the disease.
• <i>Intervention (I)</i> :	Management of the disease using the prevailing CP in the hospital where the study was conducted.
• <i>Comparison (C)</i> :	Standard management, without using CP
• <i>Outcome (O)</i> :	Effect of CP usage was assessed through process with outcome in the form of hospital cost which spent by patient during hospital treatment.
• <i>Study Design (S)</i> :	Only original publications were included, while expert opinions, comments and editorials were excluded. Studies without comparison groups were also excluded. There was no limit to the research designs applied during the screening process

RESULTS

There were 1.324 articles in the Science Direct database. The first stage of screening by looking at the title and year of publication, there were 112 articles to be viewed abstract, then the remaining 14 articles to be seen full text, if obtained mismatch with research criteria it would be excluded. At the end of the screening there were 4 articles that were suitable for the narrative review (chart 1)

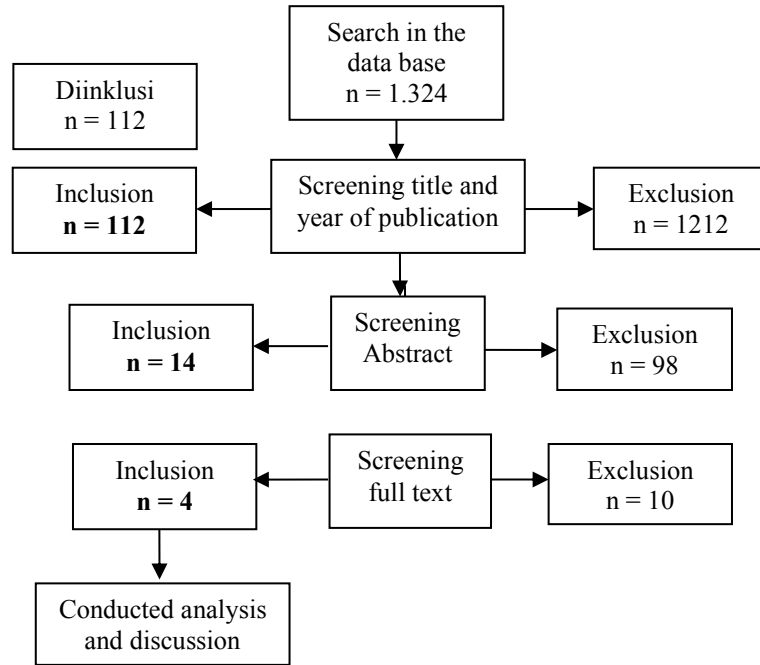


Chart 1. Screening Flow

The four articles were international journals from China, Canada, USA (Hartford and Los Angeles). The cases used were head and neck cancer, endocrine surgery (unilateral thyroid lobectomy, total thyroidectomy, parathyroidectomy), Ventilator-associated pneumonia (VAP), and stroke. The research design of these four studies were all cohorts (table 2).

Table 2. Characteristics of Articles

Title	Author/ Year	City/ Country	Research design	Diagnosis /intervention
Cost-effectiveness analysis of a postoperative clinical care pathway in head and neck surgery with microvascular reconstruction	Dautremont et al, 2013	Canada	Cohort	head and neck cancer
Clinical Pathways Improve Hospital Resource Use in Endocrine Surgery	Kulkarni et al, 2011	Los Angeles	Cohort	Endocrine Surgery
Length of Stay and Hospital Costs Associated with a Pharmacodynamic-Based Clinical Pathway for Empiric Antibiotic Choice for Ventilator-Associated Pneumonia	Nicasio et al, 2010	Hartford	Cohort	Ventilator-associated pneumonia (VAP)
Evaluation of clinical pathway in acute ischemic stroke: A comparative study	Zhao et al, 2016	China	Cohort	Stroke

All articles compared variable hospital cost between groups that using CP and non-CP. Besides hospital cost, LOS was also an important variable that was rated by all authors in addition to some other variables. A systematic description of the analysis of the variables assessed by each researcher was described in detail in Table 3. The decrease in hospital costs as a result of the expected implementation of CP in decreasing hospital costs without deteriorating the quality of care seen in all articles. All authors found a difference in hospital costs in the CP group compared with non-CP.

Author/ Year	Sample (n)		Variables	Results		
	CP	Non-CP		CP	Non-CP	Description
Dautremont <i>et al.</i> , 2013	62	56	• Hospital cost	\$16,564	\$22,733	Cost reduction \$6,169 (27,1%)
			• LOS (days)	14.1	21.3	$P < 0.001$
			• Return to OR (n)	8.9%	16.1%	$P = 0.28$
			• Readmission to ICU (n)	5.4%	12.9%	$P = 0.20$
			• Time to decannulation (days)	8.2	13.6	$P < 0.001$
			• Pneumonia (n)	17.9%	30.6%	$P = 0.10$
Kulkarni <i>et al.</i> , 2011	256	425	• Hospital cost	\$17,313	\$21,941	$P < 0.001$
			• LOS (days)	1.1	2.2	$P < 0.001$
			• Laboratory examination (n)	7.8	29.1	$P < 0.001$
			• Pharmaceutical costs (n)	0.4	1.3	$P < 0.001$
			• Complications (5,1%)	1.9%	7.1%	$P < 0.005$
Nicasio <i>et al.</i> , 2010	94	73	• Hospital cost (week I)	\$24,501	\$28,106	NS
			• Hospital cost (week II)	\$12,231	\$20,947	$P < 0.001$
			• LOS (days)	11	24	$P < 0.001$
			• Antibiotics cost	\$482	(\$535)	$P = 0,45$
Zhao <i>et al.</i> , 2016	299	728	• Hospital cost	\$ 1776	\$2433	$P < 0.001$
			• LOS (days)	17.2	21.4	$P < 0.001$
			• Clinical outcome (improvement)	216 Patient (72.7%)	401 Patient (55.1%)	$P < 0.001$

Table 3. Description of Research Results

DISCUSSION

Medical decision-making in hospitals has evolved from opinion-based to scientific evidence. This decision-making was known as evidence based practice. The emergence of recent studies which were the demands of daily clinical practices make health professionals difficult to keep up with the progress. Clinical pathway is a tool that provides the best evidence-related link and clinical practice available today. Clinical pathways provide recommendations, processes and time frames for the management of certain medical conditions or interventions in patients [9].

Clinical pathway provides a high standard of care for the patient and ensures cost savings are an important trend in current medicine [10]. This narrative review outlines how CP's role in improving hospital cost efficiency. We have analyzed four scientific articles and found that the use of CP in patient management can significantly decreased the patient's hospital costs [11, 12].

Dautremont et al. [13] found that hospital patient costs in the postoperative CP group were more efficient than non-CP, with an average hospital cost ratio of \$ 16,564: \$ 22,733, resulting in an average hospital cost reduction of \$ 6,169 (27.1%). While Zhao et al [11] found that the hospital costs were almost the same for the CP group (\$ 24.50) and the non-CP group (\$ 28.106) in the first week of treatment, but significantly lower ($P < 0.001$) for the CP group in the second week (\$ 12,231: \$ 20,947). More importantly, the reduction in hospital costs was achieved by not compromising the quality of care, even increasing clinical outcomes and reducing complications [10].

The most important part of these hospital cost savings is achieved through significant LOS reductions. Length of stay can be considered as an important marker of resource consumption. Limiting LOS after surgery not only benefited the patient, but also hospital management in terms of cost efficiency. Many studies have shown that LOS is highly correlated with total hospital costs and was a major component of patient care costs [14].

In this narrative review, of the four articles undertaken the CP role assessment of LOS and LOS obtained after CP application was found to be significantly shorter than the non-CP group [11, 12, 13, 15]. According to Kulkarni et al. [12] most of the savings came from a reduction in bed costs of 47% which was a LOS function, the other came from a variety of sources related to the postoperative care phase.

Kulkarni et al. [12] found that CP implementation could also decrease pharmaceutical costs by 45% ($p < 0.001$), reportedly the number of non-routine drugs received was 1.3 for the group of non-CP patients vs 0.4 for CP, decreased 73% with $P < 0.0001$. The most common non-routine drugs were calcium gluconate and intravenous antibiotics given after the first postoperative day. While Nicasio et al. [15] received the total cost of antibiotic use almost the same between the patient group (\$ 535 vs \$ 482) with $P = 0.45$, however the patients in the CP group had short LOS resulting in lower hospital costs without increased use of antibiotics. Kulkarni et al. [12] also found a reduction in the number of postoperative laboratory examinations by 73% (non-CP 29.1 vs CP 7.8) with $P < 0.0001$.

In addition to the increasing hospital cost efficiency, LOS was also associated with a patient's quality of life, with reduced risk of iatrogenic events or greater psychological trauma. A longer length of stay may also delay postoperative adjuvant therapy, which in turn may affect the prognosis of the disease [12].

Having CP available to all involved healthcare workers can ensure that all know the goals of intervention planning and daily plans for patients. It can facilitate communication among busy healthcare providers and reduce the need to confirm routine care through a doctor that can cause delays. CP score lies in ensuring that all interventions and investigations are scheduled optimally, to reduce unnecessary delays. This means fewer complications and more efficient patient care planning [12].

Zhao et al. [12] reported from 216 patients (72.7%) in CP group had much better clinical outcomes compared to 401 patients (55.1%) in non-CP group ($P < 0.001$), whereas the incidence rate total complications in CP group were 19.1% and 20.9% in non-CP group ($P > 0.05$). This was in line with a study conducted by Dautremont et al. [12] patients in CP group had an incidence rate of pneumonia, complications requiring Readmission to ICU, and complications requiring lower surgical retraction, although this reduction was not statistically significant.

On the other hand, Zhao et al. [12] also found the same results, namely the overall complication rate was 5.1% (non-CP 7.1% vs CP 1.9%; $P < 0.005$). The overall readmission rate within 72 hours was 1.0% (non-CP 41.4% vs. CP 0.39%), which was also not statistically significant.

CONCLUSION

Hospital costs are a huge economic burden on the health sector, so it is important to develop an innovative strategy to optimize hospital cost efficiency. This narrative review has shown that the application of Clinical Pathway (CP) in patient management could improve hospital cost efficiency compared to non-CP. Clinical pathway could improve adherence to service standards by implementing



evidence-based quality indicators in treating patients, and may also serve as a useful tool for narrowing the gap between clinical practice and EBM.

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