

Systematic Review: The Influence of Clinical Pathway Implementation on Length of Stay and Patient Outcome of Stroke Infarct Patients

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ABSTRACT

At present, focus of health services is shifting to Patient Centered Care, where healthcare is directed towards controlled clinical strategy management, so that health organizations are more efficient without sacrificing the quality of services given. The European Pathway Association suggests that Clinical Pathway (CP) is seen as a tool to improve the quality and efficiency of evidence-based treatment and is used as communication tool among professionals to manage and standardize results-oriented treatment. CDC states 87% of stroke are stroke infarction which is serious cause of long-term disability. This study used systematic review, articles downloaded from online databases such as ProQuest, Scopus and national journal, papers published from 2010 to 2020, with keywords clinical pathway, length of stay (LOS), patient outcome, and stroke. In this study, author used 11 papers, 8 papers were observational studies, 3 papers were experimental studies. All papers were based on statistical analysis. There are 7 studies conducted in abroad and 4 studies are from Indonesia. There were 7 papers that provided positive information that showed significant results about the relationship between CP implementation with LOS and patient outcome, meanwhile 4 papers stating there was no relationship between CP implementation with LOS and patient outcome. Based on the results, a positive relationship was found between CP implementation with LOS and patient outcome in stroke patients. This needs to start from the process of preparing CP which involves multidiscipline, socialization, and control of all parties involved.

Keywords: *Clinical Pathway, LOS, Patient Outcome, Stroke*

1. INTRODUCTION

The current health care system has become Patient Centered Care, but there are also major challenges where the resources are limited and the health financing is no longer free for service, so hospital administrators must find ways to provide high quality but also efficient patient-centered health services. Hospitals play a role in regulating the provision of quality services, in which the current health system is looking for ways to maximize clinical efficiency but not compromise service quality. An example of this role is in the implementation of clinical pathway [1].

Clinical pathway or what is known as integrated care pathway, care maps, critical pathway is an evidence-

based multidiscipline treatment plan in the form of a gradual approach to management of patients with specific diseases, consisting of measurable service activities, based on specific time and service targets. Clinical pathway is based on universal clinical guidelines which are translated into hospital protocols. Clinical pathway was first implemented in the United States in 1980, which is currently used by many hospitals to standardize service processes, promote work among professionals with the aim of reducing service variations, measuring costs, and increasing patient outcomes [2].

The development of Clinical Pathway establishment and implementation in hospitals must also be supported by the evidence of the effectiveness of Clinical Pathway in hospital service settings, especially in relation to length

of stay and patient outcomes. Rotter et al, 2010 conducted a systematic review of the effects of clinical pathway in hospitals, and concluded that the implementation of the clinical pathway has the potential to reduce complication during hospitalization, increase the documentation among health care providers, although there is no evidence that suggests a difference in readmission rates and death rates. While the systematic review conducted by Deneckere et al., 2012, found the effect of clinical pathway on increasing staff knowledge, interpersonal documentation, communication and team relationships. Thus, this study aims to see the relationship between clinical pathway implementation with length of stay and patient outcome [3].

2. METHODS

This study used a systematic review based on the PRISMA (Preferred Reporting Items for Systematic Reviews & Meta-Analyses) protocol. The papers were downloaded from online databases such as ProQuest, Scopus, and National Journal. The download process was carried out independently by the author. The inclusion criteria for entering the desired literature were a) papers in English or in Indonesian, b) papers in the form of research results and systematic reviews published from 2010 to 2020, with the keywords: clinical pathway, length of stay (LOS), patient outcome, and stroke. Meanwhile, the exclusion criteria were a) papers with the previous keywords, but they were the results of clinical trial studies, b) inappropriate year span and c) inappropriate language criteria.

Based on keywords only, from two online databases, 400.887 papers were found. The papers were downloaded in February 2020. The author filtered the selected papers by using time limit, only selecting paper published from 2010 to 2020 to make the review more updated, resulting in 450 papers. Furthermore, the author made exclusion criteria which were the type of source and subject. After using the criteria mentioned above, the number was reduced to 27 papers. Next, the author choose the title, read the abstract and full text papers to determine 11 papers in the qualitative study. The process of selecting papers in this review is presented in Figure1.

3. RESULTS

In this study, the author used 11 papers, 8 papers used observational research, and 3 papers used experimental research. All papers were based on statistical analysis. 7 studies were conducted overseas and 4 studies were from Indonesia. The studies were carried out mostly in Indonesia, 2 in Italy, 1 in Japan, 1 in Korea, 1 in China, 1 in United Kingdom, and 1 in Australia. Of all papers, there were 7 papers that provided positive information which showed a significant relationship between the implementation of Clinical Pathway with length of stay and patient outcome, while there were 4 papers that stated that there was no relationship between CP implementation with length of stay and patient outcome. Several papers in this study show the importance of CP development process, the introduction of CP, to the implementation of CP. The synergy of all management, hospitals, clinical champions, neuroscientists and multidiscipline teams is the key to the successful development and application of Clinical Pathway. Meanwhile, knowledge, attitudes, competence, cooperation, commitment, policies, and infrastructure support the implementation of CP to run well. CP implementation can significantly reduce length of stay by improving service coordination, reducing service fragmentation and cost, improving service documentation, so that the patient outcome becomes better, in the form of decreased complication, increased patient satisfaction, and better patient outcome. Reviews of each article can be seen in Table 1.

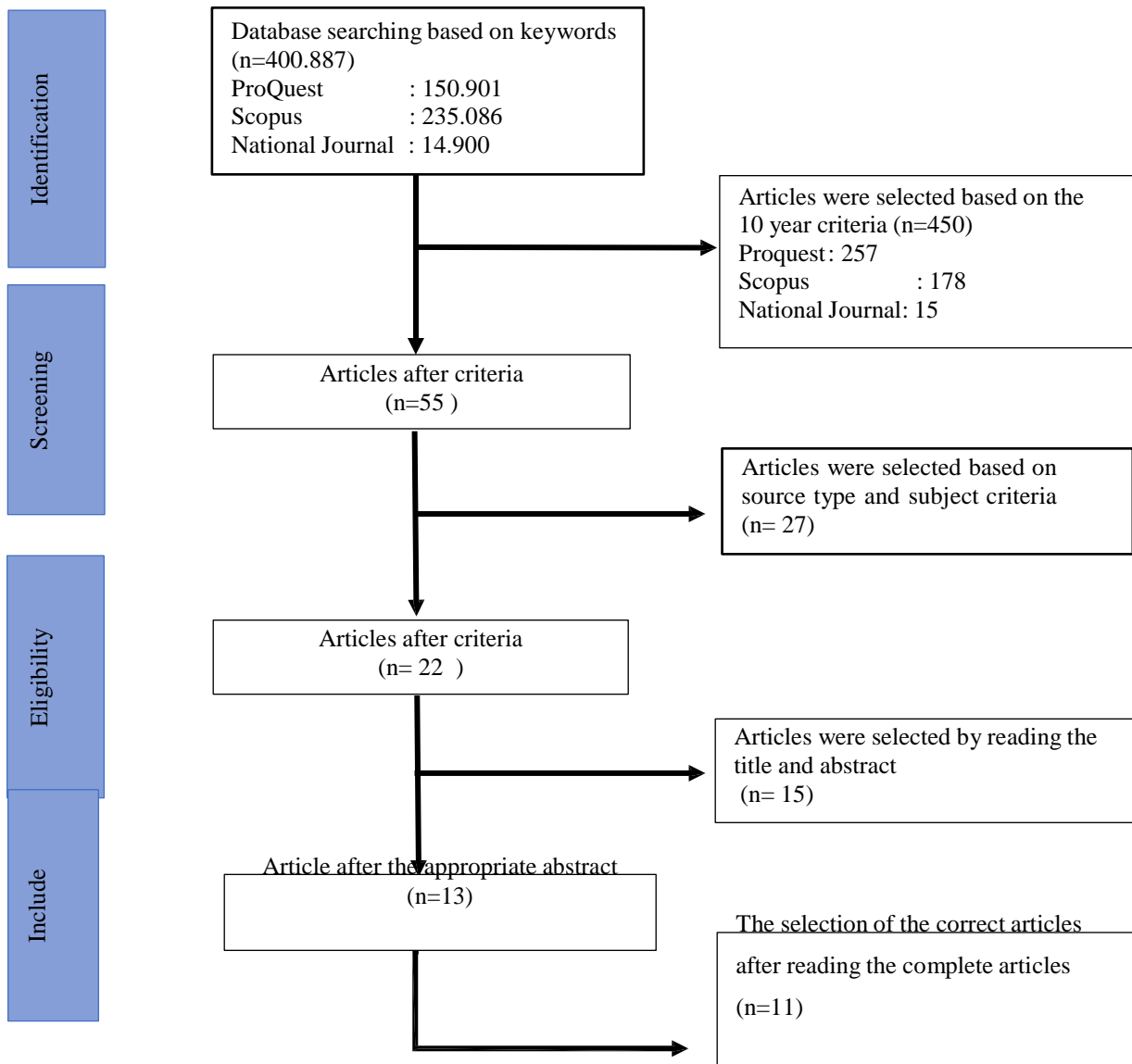


Figure 1. Flow chart of study select

Table 1. Summary of the Papers

No.	Journal Title	Authors, year, country	Research Design	Variable	Analysis	Result
1.	Ischemic stroke : Clinical Pathway impact [4]	Antonio Giulio de Belvis et al, 2018, Italy	Pre-post retrospective observational	Independent variable: Implementation Clinical pathway Dependent Variable: Patient flow, Length of stay, readmission, 30-days mortality	Unpaired t-test, χ^2 test or Fisher exact test	An increase context-sensitive in-patient numbers with more severe cerebrovascular events and an increase in patient transfers from the Stroke to Neurology Unit within three days (70 percent, $p = 0.25$) were noted. Clinical pathway implementation led to an increase in patient flow from the Emergency Department to dedicated specialized wards such as the Stroke and Neurology Unit (23.7 percent, $p < 0.001$). Results revealed no statistically significant decrease in readmission rates within 30 days (5.7 percent, $p = 0.85$) and no statistically significant differences in 30-day mortality
2.	Assessment of the Implementation of Critical Pathway in Stroke Patients: A 10-Year Follow-Up Study [5]	Yun Jeong Jang et al, 2020, Korea	Observational: Retrospective study	Independent variable: Implementation Clinical Pathway Dependent Variable: sex, cause of stroke, location of lesion, sides of hemiplegia due to stroke, past medical history of patients, complications occurring before discharge from the hospital, and types of discharge	Independent t-test, Chi-squared test	Evaluated the effect of implementation of CP to stroke patients for 10 years. CP implementation enables better application of evidence-based interventions and guidelines and provide initial care in the form of comprehensive, organized, and more specific rehabilitative care for stroke patients
3.	Implementing Cough Reflex Testing in a Clinical Pathway for Acute Stroke: A Pragmatic Randomised Controlled Trial [6]	Makaela Field , Rachel Wenke, Arman Sabet, Melissa Lawrie, Elizabeth Cardell, 2018, Australia	Pragmatic randomised control trial	Independent variable: Clinical Pathway Dependent Variable : CRT, pneumonia rates, LOS, Clinical Satisfaction	Independent t tests	Embedding CRT (Cough Reflex Testing (CRT) as part of a clinical pathway did not result in any statistically significant difference in the primary outcomes of pneumonia at 3 months and length of acute inpatient stay. Meanwhile, positive patient satisfaction and only minor increases in clinician time and cost, make implementation of a CRT pathway a potentially feasible and useful addition for clinical bedside swallowing assessment for acute stroke patients.

4.	Effect on completion of clinical pathway for improving Clinical Indicator : Cases of hospital stay, mortality rate, and comprehensive volume ratio [7]	Hiroki Furuhashi, Kenji Araki, Taisuke Ogawa, Mitsuru Ikeda, 2017, Japan	Retrospective cohort study	Independent variable: Completing clinical pathway Dependent Variable: Reduction length of stay, medical treatment for preventing complication	Chi-squared test	Clinical indicators increase in proportion to the completion rate for CP. Data analysis showed that length of stay (LoHS) was shorter in patients with CP. Complications often occur when there is a deviation from CP Clinical indicators improved in proportion to completion rate for CP, and that there was a difference of rates by department in the patients for whom all medical treatments on CP were implemented.
5.	Pengaruh penerapan nursing clinical pathway terhadap lama hari rawat pasien stroke non hemoragic [8]	Fitrianola Rezkiki, Surya dharma, Yasmi, 2017, Indonesia	Non-equivalent post-test only control group design	Independent variable: Nursing clinical pathway Dependent variable: Length of day of care	Independent T test and linear regression test	It shows that there is a significant effect on the average length of day of care for non-hemorrhagic stroke patients who are given nursing clinical pathway and those who are not given intervention, with a p value of 0.001 (p value \leq 0.05)
6.	Evaluasi proses pengembangan dan penerapan clinical pathway kasus stroke iskemik akut di rumah sakit Antapura Kota Palu [9]	Diah Mutiasari, Rizaldi Taslim Pinzon, Gunadi, 2017, Indonesia	Mixed Method	Independent variable: Development and application of clinical pathways for ischemic stroke cases Dependent variable: Process analysis	Analisis Kualitatif dan analisis kuantitatif	The application of clinical pathways can reduce mortality at 7 days of hospitalization (OR = 0.10, 95% CI: 0.01-0.95). The average length of day of stay in this study was 6.7 days for all ischemic stroke patients using clinical pathways. The synergy of all hospital management, clinical champions, neuroscientists and multidisciplinary teams is the key to the successful development and application of clinical pathway.
7.	Analisis Implementasi Clinical Pathway kasus stroke berdasarkan Ina CBGs di Rumah Sakit Stroke Nasional Bukittinggi 2011 [10]	Anferi Devitra, 2011, Indonesia	Qualitative with descriptive analytic	Independent variable: Complete medical records Dependent variable: Workload, knowledge, work partner motivation, limited human resources	Input, process, output	There is no fixed procedure policy for the implementation of the Clinical Pathway, a Clinical Pathway team has not been formed, the commitment of all parties is not sufficient
8.	Implementasi Clinical Patway Tahun 2018 Dalam Upaya Untuk	Arroyan Wardhana, Sri Rahayu, Ahdun Triguno, 2018,	Qualitative with analytical description	Independent variable: Clinical Pathway Implementation	Input, process, output	CP implementation is based on hospital accreditation, but needs to be optimized, the CP format needs to be uniformed, and monitoring evaluation has not been going well, the quality of

	Meningkatkan Mutu Pelayanan di Rumah Sakit Umum Daerah Koja [11]	Indonesia		Dependent variable: Quality of service at the hospital		patient services includes LOS, the accuracy of supporting examinations and the drugs used are in accordance with the implementation of the CP .
9.	Compliance with clinical pathways for inpatient care in Chinese public hospitals [12]	Xiao Yan He , M. Kate Bundorf , Jian Jun Gu ,Ping Zhou1 and Di Xue, 2015, Chinese	Observational	Independent variable: Clinical Pathway Dependent variable: Compliance with clinical pathway	KPI, data coded, calculate data	Evidence-based clinical pathways can be used to improve the quality of care, reduce costs and reduce inappropriate variation in clinical practice. But this study found have low compliance against the 5 specified CP (pneumonia, AMI, heart failure, SC, type2 DM). It was found that hospitals often did not provide treatment consistent with clinical pathways
10.	A Cluster randomized trial to assess the effect of Clinical Pathways for patients with stroke : result of the Clinical Pathway for effective and appropriate care study [13]	Massimillano Panella, Sara Marchisio, Romeo Brambilla, Kris Vanchaecht, Francesco di Stanislao, 2012, Italy	Multicenter cluster randomized trial	Independent variable: Clinical pathway Dependent variable : Outcome of patient	The Fisher exact and Kruskal-Wallis tests	The main findings of this study were that the treatment provided using CP to stroke patients was significantly more effective and that there was an improved outcome. It found that there was more organized care and access to a stroke unit was higher in the CP group However, it cannot be assessed long-term outcomes such as patient satisfaction, quality of life, the presence of confounding factors, namely comorbidities
11.	Can clinical audits be enhanced by pathway simulation and machine learning? An example from the acute stroke pathway [14]	Michael Allen, Kerry Pearn, et al, 2018, United Kingdom	Qualitative with analytical description	Independent Variable: Variation of Care Dependent variable : Stroke pathway, patient characteristic	Computer simulation modelling and machine learning.	The stroke clinical audit reports on thrombolysis usage (percentage of patients receiving thrombolysis) and time to thrombolysis. Interhospital variation in use of thrombolysis may be due to (1) differences in stroke pathway, (2) differences in patient population characteristics or (3) differences in clinical decision making

4. DISCUSSIONS

4.1 Clinical Pathway and stroke

Stroke is a global epidemic and a major health care problem because it can cause death rates that vary between countries and geographies. Every year, 15 million people around the world suffer from stroke episodes, of which 5 million people die, and the other 5 million are left permanently disabled, causing new burdens for families and communities.

The Clinical Pathway was first developed in the United States in 1980 through the collaborative efforts of doctors, nurses, pharmacists and other staff with the aim of improving the outcomes and the treatment quality of patients. The flow in the Clinical Pathway provides the patient's journey during treatment, which involves the coordination of services, in order to obtain time-based health services and measurable results. Clinical pathway is designed to reduce variability in the treatment.

Several studies have shown that the application of clinical pathway can reduce the variability of clinical practice and improve outcomes, so it is hoped that the treatment with measured activities is achieved so it can increase the efficiency of treatment and reduce costs.

4.2 Clinical pathway and service efficiency

In the current era of service, the existence of limited resources requires hospital administrators to be able to provide high-quality patient-centered health services but also maximize clinical efficiency. The initiatives to improve the service quality while still paying attention to efficiency have been developed, such as in the theory of Six Sigma and Lean Management. Clinical pathway is an evidence-based treatment map regarding service activities with a multidiscipline approach in a certain disease condition. Clinical pathway is used to translate universal clinical guidelines into local protocols to influence clinical practice.

4.3 Implementation of Clinical Pathway for length of stay and patient outcome

Clinical pathway has been implemented in many health systems and is mainly used in hospitals to reduce clinical variation by standardizing the treatment process, promoting interprofessional teamwork, reducing treatment cost, and improving patient outcome. Clinical Pathway is generally implemented as a web-based tool to support clinical decision-making process. The evidence on the effectiveness of CP in the hospital setting has been equivocal. Based on the Cochrane systematic review of the effects of clinical pathway in hospitals by Rotter et al (2010), it was concluded that CP has the potential to reduce complication in hospital, improve documentation among health care providers, but there was no significant difference in readmission and mortality rates. Of all articles, there were 9 articles that provided positive information which showed a significant relationship between the implementation of Clinical Pathway with length of stay and patient

outcome, while there were 2 articles that stated that there was no relationship between CP implementation with length of stay and patient outcome.

5. CONCLUSION

Based on the results of the systematic review analysis, it was found that there was a positive relationship between the implementation of Clinical Pathway with length of stay and patient outcome in patients with stroke infarction. The comprehensive implementation of CP starts from the process of preparing and developing Clinical Pathway involving multidiscipline, based on evidence, all parties associated with patient care, adequate socialization, holistic implementation, monitoring and evaluation which is carried out regularly. CP can significantly reduce the length of stay and increase the patient outcome by improving service coordination, reducing service variation, and improving the completeness process of service documentation. By decreasing length of stay, the implementation of CP can also reduce treatment costs and complications due to long hospitalizations. Holistic implementation of Clinical Pathway is recommended to increase the effectiveness of services in the hospital.

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