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REDUCED LENGTH OF STAY IN CHILDREN WITH DIARRHEA FOLLOWING IMPLEMENTATION OF CLINICAL PATHWAY

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ABSTRACT

Background: *Diarrhea or Acute Gastroenteritis (AGE) is a disease that common found in toddlers at emergency room. The complication of diarrhea such as dehydration may go undetected by parents will affect the treatment and length of stay in the hospital. Decreasing the length of stay in the hospital can be done by implementing clinical pathways. This study aims to examine the effect of implementing clinical pathways on length of stay in children with diarrhea.*

Methods: *This study was a systematic review that used PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) guidelines. Data obtained from Electronic databases Proquest and Scopus that published between 2009-2019 and used English. By using keywords such as clinical pathway, gastroenteritis, and length of stay to find the relevant articles.*

Results: *The search found 610 studies, of which 6 studies were included in the systematic review. These studies conducted majority in USA and 1 study in Australia. Analysis of the studies found out that implemented clinical pathway can decrease length of stay 0.4 days (95% CI 0.04 to 0.7, $p < 0.01$). The decreased of length of stay can increased 2.5% (CI 0.25% to 4.38%) used of medical beds then the bed can be more effective and used by other patients.*

Conclusion: *Implementing clinical pathway in the treatment process of diarrhea towards children not only reduce the length of stay in hospital but also useful in providing patient diagnosed and reduce the bed use per day and year.*

Keywords: *Clinical Pathway, Diarrhea, Gastroenteritis, Pediatric*

INTRODUCTION

Diarrhea is one of most frequent health issues in Indonesia. World Health Organization (WHO) defines diarrhea as the passage of stool more liquid than usual, with frequency up to three times or more per 24 hours. It is caused by microorganisms including germs, virus, parasites, and protozoa which transmitted through fecal-oral route [1,2,3,4]. It is ranked among top 10 common major diseases in Indonesia. Diarrhea has an outbreak potential which may lead to death. In 2016, only 46.4% out of 6.897.463 reported cases in Indonesia received the treatment [5,6,7]. This study aimed to identify the effect of implementation of clinical pathway in management of children with diarrhea on utilization of resources and length of stay in children with diarrhea from emergency unit through inpatient unit which many hospital have had clinical pathway but did not implemented well so it looks that clinical pathway useless for therapy to the patient [8,9]. The use of standardized clinical pathways in developed countries such as Australia, United States of America, United Kingdom is increasingly being used by many hospitals so that they can provide quality services and remain effective and efficient based on patient needs. By

using standardized and evidence-based clinical pathways, it can reduce unwarranted variability in care delivery which can have an impact on poor outcomes in patients and lead to higher costs for patients [9,10,11,12]. The aim of implementing clinical pathway for therapy is to systematic and continuing the therapy,improving clinical pratice ,communication between proessional for therapy planning,decrease variation on therapy, Improve the communication between professional- patient and consumer or patient satisfaction [8,10,13].

METHODS

This systematic review was conducted according to the PRISMA including a checklist to ensure consistent reporting of a systematic review. Articles published in English language were searched in two main databases on March 2019 , Scopus and Proquest, under the topic of “reduced length of stay in children with diarrhea through implementation of clinical pathway”. The key words used in searching for literatures included: *clinical pathway*, *gastroenteritis*, *length of stay*, and *pediatric*. Apart from the two databases, articles were acquired through searching in references to identify relevant articles.

The first stage was searching for literatures and journal which published in English language between 2009 and 2019 to be included in this review and search. Displayed data is information regarding: length of stay in patient with diarrhea, clinical pathway for pediatric cases in emergency unit, effect of clinical pathway implementation on length of stay and cost of care. In the second stage, 610 articles were filtered according to inclusion and exclusion criteria which resulted in 6 relevant articles. The inclusion and exclusion criteria used in this article are as follows:

Inclusion criteria:

- a. Selected articles were articles that addressed relationship between clinical pathway and children with diarrhea as well as its effect on length of stay
- b. Selected articles were full text and published in English language
- c. The articles were published between 2009 and 2019

Exclusion criteria:

- a. Articles were ambiguously written and did not focus on clinical pathway
- b. Articles did not show an accurate writing procedure
- c. Articles were not written in complete and systematic manner

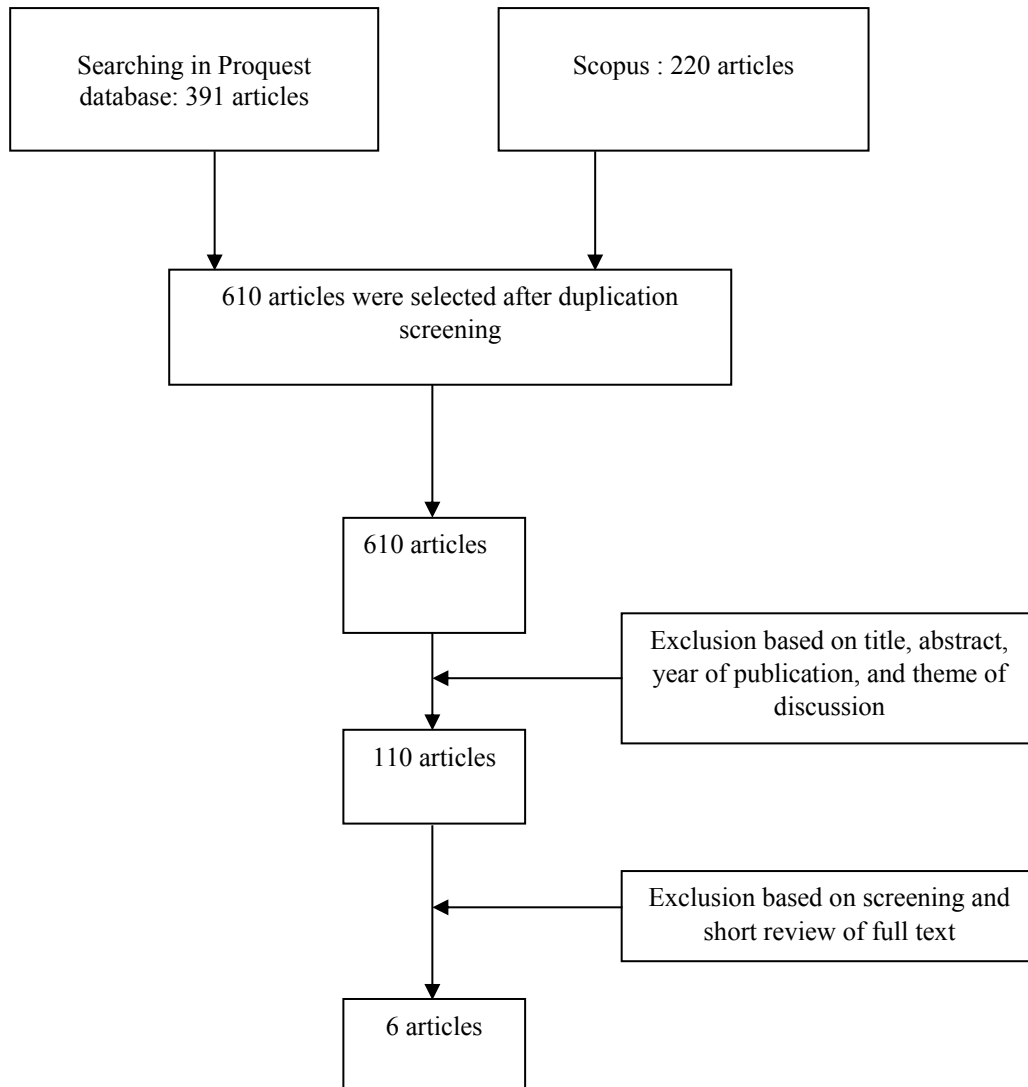


Figure 1. Chart of Literature Searching



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NO	TITLE	PLACE	YEAR	VARIABLE	RESULT
1	Clinical Pathway Produces Sustained Improvement in Acute Gastroenteritis Care [14].	Division of Pediatric Emergency Medicine, Seattle Children's Hospital, 4800 Sand Point Way NE, Seattle, WA 98105	2017	Patient's characteristics Length of stay Clinical pathway Acute Gastroenteritis	Implementation of clinical pathway that emphasized on oral rehydration therapy and Ondansentron reduced use of IV fluids and LOS in children with AGE in pediatric ED
2	Impact of a pilot pathway for the management of gastroenteritis-like symptoms in an emergency department: A case study following a Salmonella outbreak [15].	Canberra, Australia	2015	Length of stay Clinical pathway Acute Gastroenteritis	There was a significant difference in length of stay between the group that was implemented with clinical pathway and the group that was not implemented with it (p <0,001). CLINICAL PATHWAY implementation reduced length of stay in patient with gastroenteritis symptoms
3	The impact of an oral rehydration clinical pathway in a paediatric emergency department [16].	BC Children's Hospital, Vancouver, British Columbia	2010	Length of stay Clinical Pathway Patient's characteristics Acute Gastroenteritis	There was a significant decrease in length of stay in ED up to 24 minutes (95% CI, 17 to 31) following the implementation of Clinical Pathway
4	Evaluation Of A Nurse-Initiated Acute Gastroenteritis Pathway In The Pediatric Emergency Department [17].	Children's National Medical Center, Washington, DC	2017	Length of stay Clinical Pathway Acute Gastroenteritis	Length of stay was shorter after care system initiated by nursing (P b .001) and overall mean of length of stay reduced to 40 minutes (P b .001).
5	Standardized Clinical Pathways for Hospitalized Children and Outcomes [11].	Seattle Children's Hospital, Seattle, Washington	2015	Clinical Pathway Length Of Stay Cost	Implementation of clinical pathway reduced resources utilization and length of stay with the difference between prepathway and post pathway was -0,03 days per month [95% CI -0.05 to -0.02]; p = 0,02),
6	Effect of a pathway bundle on length of stay [18].	Countess of Chester Hospital, Liverpool Road, Chester CH2 1UL, UK	2009	Clinical Pathway Length Of Stay	In general, clinical pathway implementation impact by 0.4 days (95% CI 0.04 to 0.7, p<0.01). the reduction in LoS equates to a saving of 2154 (CI 215 to 3769) bed days per annum or 5.9 (CI 0.6 to 10.3) beds saved each day. This reduced LoS represents an improvement of 2.5% (CI 0.25% to 4.38%)om utility of inpatient bed

RESULTS

The first stage was searching for literatures which published in English language between 2009 and 2019 to be included in this review. Displayed data is information regarding: length of stay in patient with diarrhea, clinical pathway for pediatric. In the second stage, 610 articles were filtered according to inclusion and exclusion criteria which resulted in 6 relevant articles:

A study which in Division of Pediatric Emergency Medicine, Seattle Children's Hospital, reveals 30.519 patients who met the criteria. There was no significant difference between the groups before and after the implementation of clinical pathway in association with age, sex, or race/ethnicity. The group with clinical pathway implementation reveals reduced length of stay in ED and by providing immediate oral rehydration reveals significant data. There were challenges in implementation of clinical pathway, including opinion and practice of preferring administration of IV fluid over oral rehydration therapy [11].

A study which conducted on 688 patients in Children's National Medical Center, Washington provided clinical pathway implementation for patients with acute gastroenteritis. Throughout the study, 25% patients who met the criteria were provided with treatment based on clinical pathway. 61% of admitted patients were provided with care which complied with nursing care guideline. The result revealed that there was a significant increase in physician's visitation to ensure the patient was able to be discharged which reduced length of stay (144 minutes; standard deviation [SD], 124 minutes) and (131 minutes; SD, 134 minutes) in the control group. There was a lower rate of utilization of diagnostic test in the intervention group, including order for laboratory examination (9.7% compared to 19.9%; OR, 0.43; 95% CI, 0.27-0.68). Hence, length of stay was 46 minutes shorter for patients who were provided with nursing care based on clinical pathway and initiation of nursing care by nurses (P b .001) [17].

A study which conducted in Canberra, Australia for 8 days involved 110 patients (7.4%) with gastroenteritis symptoms. In the same period, 1383 (92.6%) patients with gastroenteritis symptoms (not related with salmonella) were assigned into control group (n = 73, 66.3%) prior to the implementation of Gastroenteritis clinical pathway, and the rest of them were assigned into intervention group (n = 37, 33.6%). The impact of clinical pathway implementation on length of stay in patients with Gastroenteritis visiting ED was observed, provided with treatment, and discharged from ED. Generally, there was a significant decrease in length of stay in ED from 16.4 hours into 4.1 hours in the intervention group (\pm Standard Deviation 12.3 (\pm 18.5)), with abnormal distribution of variables; it was also revealed that there was a significant difference in length of stay between the intervention and control group (U = 496.5; P <0.001) [15].

In a study conducted in BC Children's Hospital, Vancouver, British Columbia, the inclusion criteria were 3808 cases of pre-clinical pathway implementation and 2902 cases of post-Clinical Pathway implementation. Data which collected by each clinical pathway team by using segmented regression reveals the length of stay prior to clinical pathway implementation was stable from time to time with average of 3.3 days per case; there was a decline in LOS about - 0.03 day (or 43 minutes) per visiting patient per month after clinical pathway implementation (95% CI -0.05 to -0.02; p value representing slope difference between time period = 0.02; R² = 0.97), which amount to 8.6 hours per year [16].

11.816 children who met the criteria were involved in three periods of study (5057 participants in pre-implementation period; 3322 participants in transition period; and 3437 participants in post-implementation period) in Seattle Children's Hospital, Seattle, Washington. Proportion of subject to lost LOV data was 4%. Agreement of case involvement between each extractor paired data was very huge, with Kappa Cohen coefficient of 0.8, 0.8 and 0.62 in pre-implementation, transition, and post-implementation of clinical Pathway respectively. There was a significant decline in length of stay of patients who were provided with oral rehydration therapy based on clinical pathway. The difference

between pre-implementation, post-implementation, and transmission was 24 minutes in average; 95% CI from 32 minutes into 17 minutes) [11].

The overall effect of introducing this pathways has a tendency to decrease LOS, implementing clinical pathways can reduce LOS by 0.4 days (95% CI 0.04 to 0.7, $p < 0.01$). Patients with 2 diagnoses (63.0% of all pre-lane cases and 63.4% of all post-lane cases), a reduction in LOS equals savings of 2154 (CI 215 to 3769) bed days per year or 5.9 (CI 0,6-10,3) use of a bed, so the bed can be more effective and used by other patients. This reduced LOS showed an increase of 2.5% (CI 0.25% to 4.38%) in the use of medical beds. With this, the use of the clinical pathway can be useful in providing care to patients diagnosed and reducing the length of treatment and bed use per day and per year [18].

Result of systematic review of 6 selected articles revealed the impact of implementation clinical pathway on length of stay children with diarrhea

DISCUSSION

Result of systematic review of 6 selected articles revealed a significant correlation between clinical pathway implementation and length of stay in patients visiting ED or admitted in inpatient unit. Several studies which conducted in ED for toddlers with diarrhea suggest that early implementation provided better result in length of stay and patient's outcome at discharge. Some studies even report that the implementation shortened length of stay in ED. And reducing the cost of care from patients treated by using the clinical pathway.

The systematic review was conducted by comparing length of stay between before and after the implementation of clinical pathway. From the results obtained from each study conducted in different countries, the use of standardized clinical pathways can reduce the length of treatment and can also provide better results because it prevents poor results in patients and excessive use of costs to patients.

Diarrhea is a common health issue affecting toddlers. Despite high level of food and environmental hygiene [1,2,19,20]. the prevalence of diarrhea in Indonesia is still quite high [5]. Therefore, it is imperative to develop a standardized treatment in providing the service. In health service, implementation of clinical pathway may reduce length of stay, sustainability and standardized care as well as improve patient's outcome. Clinical pathway implementation tackling long stays in hospital will reduce risks of patient harm, disability and unwarranted cost, particularly for those who are intrinsically vulnerable because they have mild or moderate frailty and/or cognitive disorder, and for whom a different, more positive outcome can be achieved if the right steps are taken very early in their admission [12].

In Bhakti Rahayu General Hospital Denpasar, diarrhea in toddlers ranks fifth among 10 major diseases requiring hospitalization in either emergency department or inpatient unit. In this study, authors conducted an in-depth interview with the leader of clinical pathway team, pediatrician, Head of Emergency Department and Head Nurse of Bhakti Rahayu General Hospital Denpasar. Interview with leader of clinical pathway team reveals that clinical pathway which applied in this hospital was developed based on clinical practice guideline of pediatrics and had been discussed in a meeting between medical committee, nursing committee, pharmacist, and nutritionist in order to establish an integrated clinical pathway;. From the results of evaluating clinical pathway implementation found patients who treated by using clinical pathways, the duration of patient care is significant enough with the clinical pathway, whereas for patients who do not use it, the length of treatment becomes longer or the same as those using clinical pathways. Interview with pediatrician reveals that clinical pathway is used to provide service for toddlers affected by diarrhea, however, in some cases it is not applicable, especially when patient with similar diagnosis has drastic changes in his condition, only then clinical pathway is not applied in providing the service. But pediatricians convey that the use of clinical pathways make it easier for them to determine the stages of subsequent patient care and evaluate the patient's health status so

that it is more efficient in its implementation. Interview with head of emergency department reveals that clinical pathway is applicable and can be used in the first treatment when the patient comes to the emergency unit, making it easier in determining therapy and reporting to a pediatrician if the patient continues to be hospitalized. Head nurse claimed that implementation of clinical pathway facilitated caregivers in providing orientation for patient, handover between shift, and inquiring physician's order of therapy and evaluating officers in the delivery of services to patients, so that patients who are treated with gastroenteritis receive care as well as nursing care listed on the clinical pathway. Hence, it helps in providing care for patient. Therefore, based on the interviews with related units, it can be concluded that clinical pathway implementation had a significant impact on patient services, reduced length of stay through standardized treatment which resulted in better outcome in toddlers with diarrhea.

CONCLUSION

Implementation of clinical pathway across several health conditions impact on decreased length of stay and costs of therapy, These results suggest an approach that implementation clinical pathway is giving a better therapy than without clinical pathway by enhance the value of care by decreasing length of stay, costs and resource utilization for therapy to the patient. It is important in the future study there is a policy that implementation of clinical pathway in children with diarrhea or in other cases should be used by clinician and caregiver for giving therapy to every patient so it would give better therapy for the patient.

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