

THE IMPLEMENTATION AND OUTCOME OF CLINICAL PATHWAY: A SYSTEMATIC REVIEW

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ABSTRACT

Background: Clinical pathways provide detailed guidance for each stage in the management of a patient, such as treatments and interventions, with a specific condition over a given time period. Clinical pathway implementation has the potential to standardize treatment and improve outcomes. The purpose of this study was to explore the implementation and outcome of clinical pathway.

Subjects and Method: This was a systematic review which carried out by searching articles from 2000 to 2018 in PubMed, BMC, Science Direct and Indonesian Health Economics Journal databases. The keywords for this review included clinical pathway, care maps, care pathway, integrated clinical pathway, implementation, and evaluation. The data were analyzed by PRISMA method.

Results: Clinical pathway affected patients, medical staffs, and hospital management. The impact of clinical pathway on patients included: (1) reduced length of stay; and (2) reduced total cost of hospitalization. Clinical pathway increased communication, knowledge, teamwork among hospital staffs, and quality of health care service for patients.

Conclusion: Good implementation of clinical pathway affects patients, medical staffs, and hospital management. Clinical pathway can improve quality of health services in the hospital.

Keywords: clinical pathway, implementation, evaluation, health service, hospital

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BACKGROUND

Hospitals have an obligation to provide safe, quality and effective services while prioritizing the interests of patients in accordance with the standards of service from the hospital. The primary goal of health care providers was to produce profitable outcomes not only for patients but also health care providers and the community. Achieving the desired outcome depend on the quality of hospital services.

Efforts to continuously improve service quality and efficiency in the health care system at the hospital were always carried out. The quality

of services, efficiency, and accessibility of health services were some of the priorities in health service management (Asmirajanti et al., 2018). One of the efforts made by hospitals and other health care providers to improve service quality and cost efficiency was to use Clinical Pathway.

Clinical pathway (CP) also known as critical pathway, care maps or integrated clinical pathway, was a multidisciplinary treatment plan and based on clinical practice that was used in groups of patients with certain diagnoses designed to minimize service delays, optimize resource utilization and maximize service quality

(Ismail et al., 2012). CP was a tool in health services that formulated the work of a multidisciplinary team where each medical person joined in the team can analyze their respective roles and responsibilities. CP map the course of the disease and the pattern of care that would be received by the patient and aimed to make the right doctor do the right treatment, care was given at the right time so that good treatment results can be achieved.

CP was a collection of medical opinions that contained the stages of care for patients. CP was made up of the latest evidence based which obtained from systematic reviews and input from multidisciplinary teams, to describe the optimal treatment stages intended for patients who have certain specific conditions or were undergoing certain treatment procedures.

The use of CP has several main advantages, namely, improving the quality of evidence-based service services, the services provided were multidisciplinary, increasing the level of care of medical personnel to patients, as an effective communication tool between medical personnel and medical personnel-patients, as a basis for planning medical services according to patient needs, outcome oriented, used as a consistent documentation

standard that would provide the basis for medical audits at the hospital.

Although there were many benefits from the use of CP, there were still many hospitals or other health care providers who cannot run CP properly and correctly. The main purpose of this study was to find out what factors influence and the impact of applying clinical pathways on medical personnel, hospitals and patients.

SUBJECTS AND METHOD

1. Study Design

This study was used Systematic review by using the PRISMA method. Online databases used were Pubmed, ScienceDirect, BMC (BioMed Central), and Indonesian Health Economics Journal with keywords "clinical pathway" OR "critical pathway" OR "care maps" AND "development" OR "implementation" OR "evaluation" AND "Multidisciplinary", "development and implementation of clinical pathways", AND "development, implementation of clinical pathway", "evaluation", and "clinical pathway" carried out the addition of sentences in the keywords "implementation of clinical pathway". Articles used from 2000 to 2018 which obtained 1217 articles with the application of inclusion criteria, 11 articles were selected with full text and assessed for their feasibility.

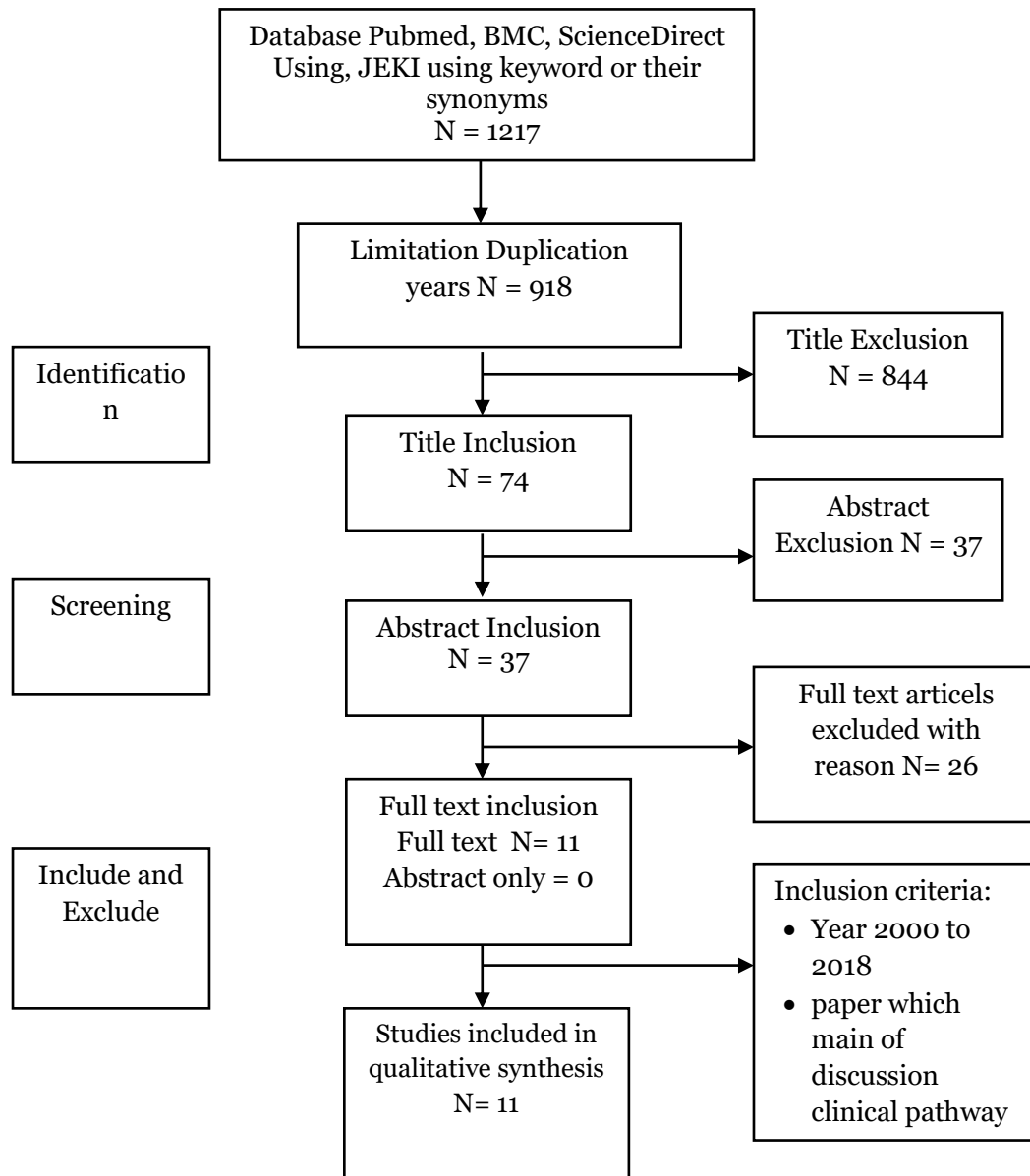


Figure 1. PRISMA method flowchart

2. Inclusive and Exclusive criteria

The entry journal and assessed for feasibility in this study was a journal that showed the factors that influence the application and impact of the application of CP to medical personnel, hospitals and patients. This included barriers that can be encountered in implementing and impacting the implementation of CP. Journal which was not included was a journal

that did not show the factors that influence the application and impact of the use of CP.

3. PICO

The problem (P) focused on this research was to conclude the factors that can influence the development and application of CP, the advantages and disadvantages of applying CP to both medical personnel, hospitals and patients. The purpose (O) of this study was to know clearly the factors that

influence the application of CP so that the implementation can be carried out well and to determine the impact of the use of CP on medical personnel, hospitals and patients. This research

was conducted in three stages: (1) searching for and collecting literature, (2) analyzing and evaluating the literature found, and (3) categorizing and summarizing the literature.

Table 1. Selected publication articles through PRISMA method

No	Journal Title	Journal Author	Place of Journal	Data base	Method	Variabel
1	Clinical care pathway strengthens interprofessional collaboration and quality of health service: a literature review	ismirajanti, M. et al. (2018)	Indonesia	Elsevier	Systematic Review	Length of Stay, Cost Effectiveness, quality of care
2	Integrated Clinical Pathway Regarding Care of Children with Typhoid Fever	Said, K. M., Abd El-Sadik, B. R. and Mahmoud, F. S. (2017)	Egypt	IOSR Journal of Nursing and Health Science	A quasi experimental research	nurse characteristic, patient characteristic, nurse knowledge
3	Clinical pathways in China - an evaluation	e, J. A. and Yang, W. (2015)	China	International Journal of Health Care Quality Assurance	Mixed methods	Length of Stay, total drug & examination cost, cost per day
4	Better Interprofessional Teamwork, Higher Level of Organized Care, and Lower Risk of Burnout in Acute Health Care Teams Using Care Pathways	Deneckere, S. et al. (2013)	Belgium	Medical care	A Cluster Randomized Controlled Trial	Team work, Multidicpline team
5	Care pathways lead to better teamwork: Results of a systematic review	Deneckere, S. et al. (2012)	Belgium	Elsevier	Systematic Review	Team work, interprofessoal team
6	Clinical Pathways: Development and Implementation at a Tertiary Hospital in Malaysia	Ismail, A. et al. (2012)	Malaysia	International Journal of Public Health Research	Research	Clinical pathway development, clinical pathway implementation
7	A systematic review and meta-analysis of the effects of clinical pathways on length of stay, hospital costs and patient outcomes	Rotter, T. et al. (2008)	German & Netherlands	EMC Health Services Research	Systematic review & Meta-analysis	Length of Stay, Medical Cost, Patient Outcomes
8	Factors influencing the implementation of clinical guidelines for health care professionals: A systematic meta-review	Francke, A. L. et al. (2008)	Netherlands	EMC Medical Informatics and Decision Making	A Systematic meta-review	Factors that influence CP, characteristics of the guidelines, implementation strategy, of professionals, patient & environmental.
9	Clinical Pathways - An Evaluation of its Impact on the Quality of Care in an Acute Care General Hospital in Singapore	Cheah (2000)	Singapore	Singapore Medical Journal	A Prospective non-randomised and uncontrolled study	Average Length of Stay, Morbidity, Mortality, Readmission rate, Complication Rate
10	Cost Treatment of Dengue Hemorrhagic Fever (DHF) in hospitalization Based on Clinical Pathway at Hospital X, Jakarta	Rejeki, V. M. M. and Nurwahyuni, A. (2017)	Indonesia	Jurnal Ekonomi Kesehatan Indonesia	Quantitative research with cross setional approach	Cost Treatment, Unit Cost, Length Of Stay
11	The Evaluation of Implementation of Acute Appendicitis Clinical Pathway on Patient Bill	Nimah, K. and Nurwahyuni, A. (2017)	Indonesia		Mixed methods with purposive sampling	Length of Stay, Patient Hospital Bill

RESULTS

1. The Development and Implementation of Clinical Pathway

The implementation of CP made hospitals have standard planning in caring for patients so that services became more effective, service quality was maintained and service costs were under control. Therefore, the application of CP was one of the important points for the hospital. 8 steps taken in the preparation of CP, namely: (1) Making a selection of a diagnosis or procedure; (2) Identification of stakeholders who play a role in the prepara-

tion of CP; (3) Establish a multidisciplinary team; (4) Conducting maintenance flow mapping; (5) Evaluating and collecting data; (6) CP Development; (7) Dissemination and application of CP; (8) Conduct ongoing evaluations of CP that have been implemented (Davis, 2005; Lavelle, Schast and Keren, 2015). Good documentation played an important role, and must be made by each medical staff in a scientific discipline (Scottish Government executive health department, 2003).

2. That affect the development and implementation of clinical pathways

Evans-Lacko et al (2010) explained the factors that influence the development and application of CP which were divided into 3 stages, namely at the stage of making CP, implementing CP and evaluating CP. According to Francke et al (2008), there were 5 factors that would influence the implementation of CP, namely (1) the characteristics of CP; (2) selection of strategies to be used in implementing CP; (3) characteristics of professional medical personnel. Lack of awareness, understanding, and the disapproval of medical professionals on the contents of CP would lead to the disruption of the CP application; (4) characteristics of patients and (5) characteristics of the environment (hospital).

3. Factors that inhibit the implementation of the clinical pathway

Inhibiting factors can occur at the level of hospital staff (medical staff), the level of health service organizations (hospital management and hospital resources) or at the level of external factors (government policies and patient characteristics). Obstacles can also arise because of the differences in thinking between members of the multidisciplinary team, unrecorded variations, lack of support from hospital staff in implementing CP, and lack of direction and support from senior medical personnel. Lack of knowledge, awareness and familiarity of medical personnel (doctors or nurses) related to CP, the contents of CP, the process of disease travel and disease treatment procedures would

be the obstacles in the application of CP (Evans-Lacko et al., 2010; Ismail et al., 2012; Said, Abd El-Sadik and Mahmoud, 2017; Asmirajanti et al., 2018)

A study conducted in China, found two major obstacles in the process of implementing CP, the first obstacle came from hospital management who were passive in conducting CP socialization programs. The second obstacle came from the doctor, the implementation of CP would reduce the bonus income, where 70% of the doctor's bonus income in China every month was based on the number of prescribed drugs and medical test given (Evans-Lacko et al., 2010; He and Yang, 2015).

4. The impact of applying clinical pathways to medical personnel, hospitals and patients

a. Knowledge of medical personnel
Regarding the impact of the application of CP on medical personnel. Said, Abd El-Sadik and Mahmoud (2017), conducted a study of CP typhoid fever in pediatric patients. Studies conducted emphasized on the level of nurses' knowledge of CP, the content of CP, the application of CP and evaluation of CP typhoid fever. The results of the study statistically showed a significant difference after the implementation of CP, namely (1) an increase in nurses' knowledge about CP; (2) increasing knowledge of nurses about typhoid fever; (3) increasing nurses' knowledge about multidisciplinary teams and (4) after the implementation of CP disease education by medical personnel to

patients and families, the success increased.

Increased knowledge of medical personnel was also found in a study conducted by Deneckere et al, it was found that the application of CP increased the competence and knowledge of medical staff (Deneckere et al., 2012, 2013).

b. Length of stay (LoS)

In 2015, He and Yang conducted a CP study in China, the results showed that in the first year after the implementation of CP LoS patients and total treatment costs showed a significant decrease, but in the second year after the implementation of CP, the length of stay was not showing significant changes while the total cost of care increased compared to the first year (He and Yang, 2015).

Rotter et al (2008) conducted a systematic and meta-analysis reviews of the application of CP. 12 of the 17 journals reviewed, LoS was found to

be significantly shortened. In the CP hemorrhagic fever study, after one year of application CP reduced LoS from 5.32 days to 3.95 days while in CP Appendicitis there was a reduction of LoS by 37% (Cheah, 2000; Nimah and Nurwahyuni, 2017; Rejeki and Nurwahyuni, 2017).

Asmirajanti et al (2018) conducted a study on CP pelvic fractures, total knee arthroplasty, neck and head surgery, pneumonia in infants and esophagectomy by comparing the mean LoS and cost effectiveness in groups that applied CP and groups that did not apply CP, there was a decrease in LoS in the group which applied CP. The same thing was found in the study conducted by Deneckere et al. The use of CP would increase the return of patients, in the group which used CP, 80% of patients were returned and groups which did not use CP, 45% of patients were returned (Deneckere et al., 2012).

Table 2 Comparison of the average length of stay and cost effectiveness for patients who applied CP

	Diagnosis		Sample
	Intervention/pre	Control/post	P value
Hip fracture ⁸	56 group	56 group	< 0.05
Total knee arthroplasty ¹⁸	208 patients	192 patients	0.0073
Head and neck surgery ¹³	56 patients	62 patient	< 0.001
Infant with pneumonia ¹⁹	25 patients	25 patients	< 0.05
Esophagectomy ²⁰	12 patients	12 patients	< 0.05

c. Multidisciplinary team and nursing care

The application of CP gave positive results to nursing care to patients in the form of increasing medical care provided by medical personnel and hospital facilities, more organized nursing levels, influencing documen-

Source: Asmirajanti et al. (2018) tation of care performed by multiple professions, reducing the occurrence of medication prescribing errors by up to 30%, significantly increasing documentation the return of patients by 19%, follow-up of patients increased, communication between medical personnel and patients was more

established and CP improved clinical contact with medical personnel to patients (Deneckere et al., 2012, 2013; Asmirajanti et al., 2018).

The implementation of CP would introduce evidence-based care, improve communication between professions, increase commitment to teamwork, support training for medical personnel and maximize the use of resources while prioritizing service quality efficiently (Deneckere et al., 2012, 2013; Ismail et al., 2012; Asmirajanti et al., 2018).

d. Readmission and Complications

From the review conducted in several articles, the application of CP helped hospitals to provide effective and efficient care so that fewer complications occurred, minimize treatment delays, errors in care and duplication of interventions (Asmirajanti et al., 2018). But in the research conducted by Rotter et al and Cheah, there were no significant differences in the occurrence of readmission and complications between before and after the application of CP, CP also had no effect on short-term results, mortality and morbidity (Cheah, 2000; Rotter et al., 2008).

e. The cost of treatment

The application of CP will increase the awareness of doctors about cost control by avoiding drug administration and examinations that were not needed so that the cost of hospitalization would be significantly lower, reduced LoS would certainly have an impact on decreasing maintenance costs (Rotter et al., 2008; Ismail et al., 2012; Asmirajanti et al., 2018). This

was slightly different from the study conducted by He and Yang (2015), in the first year of CP implementation, it was found that the cost of treatment decreased in heart disease patients and acute appendicitis but it increased in the second year so that the total cost increased by around 18.4% (He and Yang, 2015).

In a study conducted by Nimah and Nurwahyuni (2017) in acute CP appendicitis, there were differences between the bills of patients which according to CP and not according to CP. The difference in average bills occurred with average bills: general monitoring, investigation, room bills, drug bills and medical management. After implementing CP, the patient bills were lower than before, the magnitude of the difference in the outcome variable was caused by the compliance of medical personnel to CP.

DISCUSSION

Clinical pathway (CP) was a way to manage, monitor and record services to patients, also known by other names such as: care maps, critical pathways, integrated clinical pathway or critical care pathway was a treatment plan that described in detail about every important stage of health services, for patients with certain clinical problems. CP must contain a clear statement of the purpose of the services provided and the important elements of evidence-based care, best practices and expectations of patients, as a communication facilitation tool, the sequence of care paths that would be carried out by multidisciplinary teams and those received by patients, documentation, monitoring results

and evaluation of the results of care and identification of resources (Panella, Marchisio and Stanislao, 2003).

The application of CP can have a number of impacts on medical staff, hospitals and patients. Impacts found include; CP can reduce patient LoS, increase knowledge, competence of medical personnel related to CP and disease, knowledge of medical personnel about multidisciplinary teams and medical care to be provided. The use of CP in treating patients also caused more organized nursing care, increasing collaboration between medical professions so as to minimize the possibility of duplication of interventions and prescribing errors by doctors.

The use of CP can reduce the possibility of burnout in medical personnel. In this study, it was found that the application of CP would increase the workload of nurses' medical personnel. This was happened because in the application of CP, there were several forms that must be filled (Deneckere et al., 2012; Nimah and Nurwahyuni, 2017).

The application of CP is an effective way as an educational tool for medical personnel, patients and families that would have a good impact on the quality of care for the patients. The standard of care provided and the reduced length of stay for patients would affect the income of the hospital but at the same time the costs that must be paid by the patient would decrease.

Some obstacles that occurred were due to the lack of understanding, readiness and support from related HR. The successful implementation

of CP as a cost control quality control tool was highly dependent on the related human resources, because HR would carry out both quantity and quality. Strong commitment from all staff can also obtain from the sufficient of socialization and evaluation. Linking service data (based on CP) to hospital expenditures and income can be used as a way to further increase the commitment of all hospital staff, so that the staff can find out the impact of successful CP implementation not only related to patient service quality, but also hospital operational finance (Cheah, 2000; Nimah and Nurwahyuni, 2017).

At the stage of socializing the implementation of CP, communication between all parties involved was an important factor in the successful implementation of CP. All staff related to the implementation of CP must understand the important role of each and the importance of the success of CP for hospitals. Multidisciplinary teams, case managers, doctors and other health personnel have an important role in the successful implementation of CP if they understand their duties and obligations.

The form of support from the management and the leadership of the hospital for the successful implementation of CP can be done by giving direction and examples to all relevant staff. The responsibility for the successful implementation of CP was a shared responsibility, starting from the hospital leadership to the staff who implemented the CP.

The occurrence of variations in the application of CP can also hampered the application of CP. CP was a

device that was flexible/not rigid. Therefore, evaluation of CP must always be done in order to adjust to the development of new science and patient characteristics. The clinical pathway that successfully implemented would bring benefits to both patients and hospitals. Eliminating unnecessary actions, decreasing length of stay, increasing knowledge and reducing treatment costs can be achieved when the treatment was standardized. The quality of service to patients was the main goal of hospitals so standardization must focus on improving the quality which focusing on cost control thereafter. The leadership and commitment of all stakeholders held a crucial point in implementing CP so that the best clinical care and management system can be achieved.

REFERENCE

- Asmirajanti, M. et al. (2018) 'Clinical care pathway strengthens interprofessional collaboration and quality of health service: a literature review', *Enfermería Clínica*, 28, pp. 240–244. doi: 10.1016/S1130-8621(18)30076-7.
- Cheah, J. (2000) 'Clinical Pathways – An Evaluation of its Impact on the Quality of Care in an Acute Care General Hospital in Singapore', *Singapore Med J MMed (Public Health)*. Wales, 41(7), pp. 335–346. Available at: <https://pdfs.semanticscholar.org/694a/bd761328a10a0793b4b8cadb2b1c9042949f.pdf> (Accessed: 28 May 2018).
- Davis, N. (2005) *Integrated Care Pathways a guide to good practice*. Edited by N. Davis. Wales: National Leadership and innovation agency for healthcare. Available at: [www.-agaaoi.cymru.nhs.uk](http://www.agaaoi.cymru.nhs.uk) (Accessed: 22 November 2018).
- Deneckere, S. et al. (2012) 'Care pathways lead to better teamwork: Results of a systematic review', *Social Science & Medicine*, 75(2), pp. 264–268. doi: 10.1016/j.socscimed.2012.02.060.
- Deneckere, S. et al. (2013) 'Better Interprofessional Teamwork, Higher Level of Organized Care, and Lower Risk of Burnout in Acute Health Care Teams Using Care Pathways', *Medical Care*, 51(1), pp. 99–107. doi: 10.1097/MLR.ob013e3182763312.
- Evans-Lacko, S. et al. (2010) 'Facilitators and barriers to implementing clinical care pathways', *BMC Health Services Research*, 10(1), p. 182. doi: 10.1186/1472-6963-10-182.
- Francke, A. L. et al. (2008) 'Factors influencing the implementation of clinical guidelines for health care professionals: A systematic meta-review', *BMC Medical Informatics and Decision Making*, 8(1), p. 38. doi: 10.1186/1472-6947-8-38.
- He, J. A. and Yang, W. (2015) 'Clinical pathways in China – an evaluation', *International Journal of Health Care Quality Assurance*, 28(4), pp. 394–411. doi: 10.1108/IJHCQA-09-2014-0096.
- Ismail, A. et al. (2012) 'Clinical Pathways: Development and Implementation at a Tertiary Hospital in Malaysia', *International Journal of Public Health Research*, 2(2), pp. 153–160. Available at: [The 5th International Conference on Public Health
Best Western Premier Hotel, Solo, Indonesia, February 13-14, 2019 | 685
<https://doi.org/10.26911/theicph.2019.05.33>](http://journal-</p></div><div data-bbox=)

- article.ukm.my/5590/1/vol%25202%2520no%25202%25202012_20.pdf (Accessed: 10 December 2018).
- Lavelle, J., Schast, A. and Keren, R. (2015) 'Standardizing Care Processes and Improving Quality Using Pathways and Continuous Quality Improvement', *Curr Treat Options Peds*, 1, pp. 347–358. doi: 10.1007/s40746-015-0026-4.
- Nimah, K. and Nurwahyuni, A. (2017) 'Evaluasi Implementasi Clinical Pathway Apendisitis Akut Terhadap Tagihan Pasien Di Rumah Sakit X'.
- Panella, M., Marchisio, S. and Stanislao, A. F. Di (2003) 'Reducing clinical variations with clinical pathways: do pathways work?', *International Journal for Quality in Health Care*, 15(156), pp. 509–521. doi: 10.1093/intqhc/mzg057.
- Rejeki, V. M. M. and Nurwahyuni, A. (2017) 'Cost of Treatment Demam Berdarah Dengue (DBD) di Rawat Inap Berdasarkan Clinical Pathway di RS X Jakarta', *Jurnal Ekonomi Kesehatan Indonesia*, 2(2). doi: 10.7454/eki.v2i2.2146.
- Rotter, T. et al. (2008) 'A systematic review and meta-analysis of the effects of clinical pathways on length of stay, hospital costs and patient outcomes', *BMC Health Services Research*, 8(1), p. 265. doi: 10.1186/1472-6963-8-265.
- Said, K. M., Abd El-Sadik, B. R. and Mahmoud, F. S. (2017) 'Integrated Clinical Pathway Regarding Care of Children with Typhoid Fever', *IOSR Journal of Nursing and Health Science*, 6(2), pp. 1–12. doi: 10.9790/1959-0602040112.
- Scottish Government executive health department (2003) *Effective Interventions Unit Developing and Implementing Integrated Care Pathways (Guide 2: Developing Integrated Care Pathways)*. Scotland. Available at: www.drugmisuse.isdscotland.org/eiu/intcare/intcare.htm (Accessed: 22 November 2018).