**JKPI: Jurnal Konseling Pendidikan Islam**
P–ISSN: 2655-9692
E-ISSN: 2746-5977
Vol.4, No. 2, Juli 2023

# IMPACT OF CLINICAL PATHWAY IMPLEMENTATION OF LAPAROSCOPIC APPENDECTOMY ON LENGTH OF STAY, HOSPITAL COST AND PATIENT HEALTH OUTCOME AT EMC PEKAYON HOSPITAL

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## Abstract

The most important goal in health services is to produce patient health outcomes that benefit patients and continue to prioritize the quality of health services. The results of the interviews conducted found that referrals from insurance agents also decreased due to problems related to the variety of services that have an impact on increasing service costs. The purpose of this study was to determine the impact of implementing a clinical pathway as a tool for quality and cost control on length of stay, hospital costs, patient health outcomes in groups that implement and do not implement clinical pathways. This study took place at the EMC Pekayon Hospital with a population of all medical record files of patients who had a diagnosis of appendicitis with laparoscopic appendectomy surgery in the period 2021 to November 2022 who met the inclusion criteria, namely 69 patients. Clinical pathway is the independent variable and length of stay, hospital cost, patient health outcome is the dependent variable. The research design used is analysis with qualitative in-depth interviews and documentation studies. The results showed that the implementation of the clinical pathway had an impact on the length of stay, hospital costs and patient health outcomes. The implications of this research in theory will prove the impact of the implementation of research variables and managerially will further improve the service evaluation system in hospitals to improve service quality and cost efficiency.

**Keyword**: Clinical pathway, length of stay, costs, patient

***Abstrak***

*Tujuan terpenting dalam pelayanan kesehatan adalah menghasilkan hasil kesehatan pasien yang menguntungkan pasien dan terus memprioritaskan kualitas pelayanan kesehatan. Hasil wawancara yang dilakukan menemukan bahwa rujukan dari agen asuransi juga menurun karena masalah terkait dengan variasi layanan yang berdampak pada peningkatan biaya layanan. Tujuan dari penelitian ini adalah untuk menentukan dampak penerapan jalur klinis sebagai alat untuk kontrol kualitas dan biaya terhadap lamanya hari perawatan, biaya rumah sakit, hasil kesehatan pasien pada kelompok yang menerapkan dan tidak menerapkan jalur klinis. Penelitian ini dilakukan di Rumah Sakit EMC Pekayon dengan populasi semua berkas rekam medis pasien yang didiagnosis dengan apendisitis dengan operasi appendektomi laparoskopi pada periode 2021 hingga November 2022 yang memenuhi kriteria inklusi, yaitu 69 pasien. Jalur klinis adalah variabel independen dan lamanya hari perawatan, biaya rumah sakit, hasil kesehatan pasien adalah variabel dependen. Desain penelitian yang digunakan adalah analisis*

*dengan wawancara mendalam kualitatif dan studi dokumentasi. Hasil penelitian menunjukkan bahwa penerapan jalur klinis berdampak pada lamanya hari perawatan, biaya rumah sakit, dan hasil kesehatan pasien. Implikasi penelitian ini secara teoritis akan membuktikan dampak dari penerapan variabel penelitian dan secara manajerial akan lebih meningkatkan sistem evaluasi pelayanan di rumah sakit untuk meningkatkan kualitas pelayanan dan efisiensi biaya.*

***Kata kunci:*** *Jalur klinis, lama perawatan, biaya, pasien*

## INTRODUCTION

Health services are a multidisciplinary professional collaboration that carries risks, because it involves the safety of a person's body and life. With the development of science and technology and the flow of globalization which continues to change, making people more open to get health services according to their needs. Hospital competition in this globalization era is not only in terms of service quality, but also pays attention to the cost aspect. With a high level of competition, every hospital will follow every effort to maintain its existence, only hospitals that can provide quality health services with relatively low costs can excel in this tight competition. For the patient, looking at it from a cost containment point of view, it means getting a value that is in accordance with health service spending. The most important goal in health services is to produce beneficial outcomes for patients and continue to prioritize the quality of health services (Luis and Moncayo 2017).

Several efforts can be made to control health service costs, for quality control and hospital costs can standardize drug formularies, apply clinical pathways and calculate unit costs using the activity based costing method (Barber SL 2019). Hospitals need to develop a service standardization program to reduce variation so that unwanted events can be prevented through a comprehensive service plan. The role of the quality of health services will increase consumer satisfaction that arises after comparing the performance (results) of the product that is considered against the expected performance (Kotler P 2016). In evaluating quality, it is necessary to look at the input aspect in planning all the resources needed to provide quality health services, the process aspect in standardized inter-professional interaction in providing services with consumers, and the output aspect which is the evaluation of the final outcome of health or customer satisfaction (Donabedian, 1968). Implementation of clinical pathways in hospitals in addition to being a hospital accreditation standard, this application is expected to improve continuity and coordination of care so as to produce good patient services.

Integrated care pathways provide multidisciplinary service standards and planning done earlier will increase the chances of patients receiving the right care, in the right place, at the right time (Collins and Leahy 2008). Clinical pathways can contribute to increasing adherence to clinical guidelines (clinical guidelines), improving quality of care, reducing length of stay (LOS), and reducing hospital costs (Bai et al. 2018). Every year, appendicitis affects 10 million Indonesians, currently the morbidity rate for appendicitis reaches 95 per 1000 population which is the highest rate in ASEAN countries and there are several indications for emergency abdominal surgery (Sjamsuhidajat and Jong 2017). To treat appendicitis, the laparoscopic technique is preferred because the surgical incision is smaller, recovery time will be faster, less pain-reducing drugs are needed, but because this method requires more sophisticated tools and more skilled personnel, it requires higher costs. greater for laparoscopic surgery (Zinner, M.J. & Ashley 2003). Length of stay (LOS) can be an indicator of efficiency in reducing treatment costs if the length of

stay is shorter. Several concepts (Schmitt 2017) that can be used to reduce costs that will arise include: maximum length of stay or limits on length of hospitalization days, discharge planning or discharge care plans that are tailored to the patient's health condition, continued stay review, namely an ongoing review medical treatment while the patient is still in the hospital. Efficiency and cost effectiveness, namely services that are cheap, effective, no excessive diagnoses and therapies are also a consideration in setting treatment costs (Leal, Manetti, and Buchanan 2018).

Standardization of service processes in the form of clinical pathways is an important indicator of hospital management efficiency, one of which is by reducing the number of days of hospitalization (LOS) resulting in increased hospital profits with more efficient bed management, shorter hospital stays reducing the cost burden medical services and increase hospital profit margins (Baek et al. 2018). Research conducted at the Nanjing Drum Tower Hospital in patients with gallstones undergoing ERCP obtained a total length of stay of 8 days in the group that had not yet carried out the clinical pathway and one day shorter in the group carrying out the clinical pathway ($P < 0.001$) (Zhang 2019) . Research conducted on bronchiolitis clinical pathways, shows that good clinical governance in all care settings is associated with shorter LOS and lower costs (Bryan et al. 2017). Hospital costs include all activities related to the core business (health) of the hospital. Several efforts can be made to control health service costs, for quality control and hospital costs can standardize drug formularies, apply clinical pathways and calculate unit costs using the activity based costing method (Barber SL 2019). Several research results show that an integrated clinical pathway can improve patient health outcomes, reduce length of stay and reduce hospital costs. Another study (Sena 2019) at Condong Catur Hospital found that the majority of patient outcomes before the implementation of the clinical pathway were in the cured category of 18 patients with a percentage of 90.0%, as well as the outcomes after CP implementation where 100% of the samples were in the cured category.

At EMC Pekayon Hospital, which is a type C private hospital with a capacity of 104 beds in the Bekasi City area, has the highest number of laparoscopic appendectomy operations at SMF surgery, also experiencing problems related to variations which have an impact on increasing costs for services. This has also had an impact on the referral rate from insurance agents which has also decreased so that patients are directed to competitor hospitals. As evidenced by the results of an interview conducted with an Allianz insurance agent, Hany Saputri, with a leader position, the results showed that the high price of various treatment components exceeded the patient's insurance benefits, causing the difference in costs covered by the insurance and the patient's responsibility. The same thing was conveyed by one of Prudential's insurance agency directors, Siti Rositawati, the cost of laparoscopic appendectomy surgery at EMC Pekayon Hospital was Rp. there is a difference in operating costs so that there is an excess of patient payments. However, in the implementation of the clinical pathway there are challenges faced, including awareness problems, workload imbalances, differences in doctors' perceptions, and hospital management that is less than optimal (Fushen, Tj, and Lie 2022). From a qualitative descriptive study involving health professionals in emergency departments and hospital administrators in Ontario, Canada, the results obtained that the inhibiting factors influencing the implementation of clinical pathways were knowledge & intention of individual health professionals, beliefs about consequences and hospital management policy (Jabbour et al. 2018).

The high variation in laparoscopic appendectomy at EMC Pekayon Hospital causes the length of stay in the hospital to be non-uniform and the high cost to be a burden for

patients. The low commitment of the Doctor in Charge of the Patient (DPJP) in providing health services in accordance with the Clinical Pathway set by the hospital in accordance with minimum service standards based on evidence-based knowledge of a disease diagnosis, makes the services provided inefficient. From the 2020 data before the implementation of the integrated clinical pathway laparoscopic appendectomy, a variation of the patient's length of stay was obtained from 4-5 days, which should be done with a laparoscopic procedure (minimally invasive surgery) the average length of stay is shorter than the open appendectomy surgery technique because the incision is minimal so that recovery is faster quickly (Zinner, M.J. & Ashley 2003). The hospital cost obtained from the data billing section before the implementation of the clinical pathway for inpatients with appendicitis with laparoscopic appendectomy surgery in class III was ± Rp. 81,259,195.- to 84,322,026, ± Rp. 65,669,500.- to Rp. 70,247,457.-.

## METHOD

This study uses a research design study of conformity analysis of the implementation of clinical pathways in EMC Pekayon Hospital with qualitative methods to find out how it impacts, not only examines whether there is an influence or not, so that it can be submitted to the management of the hospital where the research takes place in making strategic decisions. This study was grouped into two categories, namely the implementing group and the non-implementing group. The secondary data obtained was compared between the length of stay, hospital cost and patient health outcomes (the dependent variable).

The population in this study were all medical record files of inpatients with a diagnosis of appendicitis with a laparoscopic appendectomy procedure after the implementation of the integrated clinical pathway for the period 2021 – November 2022. After knowing the population size, they were grouped based on groups that implemented the clinical pathway and groups that did not implement the clinical pathway. The clinical pathway is designed to standardize the process of laparoscopic appendectomy care with an emphasis on standard investigations and therapy, reducing hospital costs and length of stay. The technique of taking the population by first making the population criteria in this study, namely:

1. Inclusion criteria

a. The diagnosis of appendicitis in the
medical record file must be a single case
or there is no secondary diagnosis and
without complications.

b. Undergo an operative procedure with a
laparoscopic appendectomy technique

c. He is an inpatient who is treated in the
Orchid and Magnolia inpatient wards.

2. Exclusion Criteria

a. Diagnosis is accompanied by secondary
disease and complications of action

b.Patients who received conservative

measures or conventional appendectomy

surgery techniques

c. Is an outpatient

The population taken in this study were those that met the inclusion criteria, totaling 69 patients. In this study, secondary data was collected from patient medical record files in the form of patient summary sheets/forms and integrated clinical pathway forms for appendicitis patients using data collection techniques using observation/observation, study documentation and in-depth interviews.

After all the required data had been collected, the research continued to conduct data recap and data processing based on the results of the analysis of the variable length of stay, hospital costs and patient health outcomes, which aimed to study the differences in the average variables of the two groups. Furthermore, a comparison of the results of the analysis of the documentation study with the matrix analysis of the results of in-depth interviews with source triangulation was carried out.

Table 1. Research Procedure

| Tahapan Penelitian | Prosedur | Hasil |
|---|---|---|
| Pengumpulan data kualitatif | • *Indepth interview*<br>• *Expert source triangulation* 3 informan | • Data rekaman dan transkrip *indepth interview*<br>• Foto *indepth interview* |
| Analisis data kualitatif | • Analisis pertanyaan sesuai tema<br>• Kategorisasi pendapat informan | Transkrip *indepth interview* |
| Hasil data kualitatif | Pedoman *indepth interview* | Matriks analisis yang merupakan reduksi dari hasil *indepth interview* |
| Pengumpulan data lapangan | Studi dokumentasi dengan menggunakan *checklist* studi dokumentasi melihat data rekam medis, data billing dan formulir *integrated clinical pathway* | Populasi data sebanyak 69 periode Januari 2021 sampai dengan November 2022 |
| Hasil data kualitatif (2) | Metode *indepth interview* vs hasil pengumpulan data lapangan | Perbandingan hasil *source triangulation* dengan hasil pengumpulan data lapangan |

## RESULT AND DISCUSSION

Table Conclusion of Key Informant Analysis Matrix related to Themes

| Dimensi Pertanyaan | Informan 1 | Informan 2 | Informan 3 |
|---|---|---|---|
| Pengertian *clinical pathway* | (+) Efek dukung (sesuai) | (+) Efek dukung (sesuai) | (+) Efek dukung (sesuai) |
| Dampak implementasi *clinical pathway* | (+) Efek dukung (sesuai) | (+) Efek dukung (sesuai) | (+) Efek dukung (sesuai) |
| Manfaat konkrit implementasi *clinical pathway* | (+) Efek dukung (sesuai) | (+) Efek dukung (sesuai) | (+) Efek dukung (sesuai) |

Based on the reduction or conclusion above, it explains that the triangulation informants know about the meaning of a clinical pathway which is a guideline used to carry out clinical management of certain diseases in collaboration, functions as a standardization of clinical practice that facilitates service to patients. This understanding is in accordance with the clinical pathway theory which is a standard in multidisciplinary and evidence-based services, carried out within a certain time limit and produces positive outcomes in the patient's condition, planning done earlier will increase the chance of the patient receiving the right care, in the right place, at the right time (Collins and Leahy 2008). The three triangulation informants also knew about the positive impacts of implementing clinical pathways, namely achieving quality control, cost control, eliminating variances so that the treatment process became relatively standardized and more predictable. The impact of this implementation is in accordance with the theory that a measure of the quality of health services can be seen from clinical outcomes that consider the success of all multidisciplinary aspects of care, related complications, rehabilitation, and recurrence experienced by patients for the same disease condition (Porter 2017); service efficiency is used to reduce costs that will arise, including: maximum length of stay or limits on the length of hospitalization days, discharge planning or discharge care plans that are adjusted to the patient's health condition, continued stay review, namely medical studies conducted while the patient is still hospitalized (Schmitt 2017); cost efficiency and effectiveness, namely services that are cheap, effective, no excessive diagnoses and therapies are also a consideration in setting treatment costs (Leal et al. 2018). In addition, triangulation informants know about the concrete benefits of implementing a clinical pathway, namely achieving quality control, cost control, reducing service variances that vary between one doctor and another so that the treatment process is relatively standard, standard inputs and outcomes can also be predicted, including days of care so as to achieve an increase in service quality. The concrete benefits of this implementation are consistent with the theory that the implementation of a clinical pathway can reduce variation due to standardization of the treatment process that can be used as a reference for doctors, improve quality of care by realizing quality control and cost control, and maximizing clinical outcomes for certain patient groups (Lawal et al. 2016). In addition, the three triangulation informants knew the dimensions of the questions regarding the factors supporting the successful implementation of the clinical pathway, namely DPJP compliance, the intention and understanding of professional health workers to implement this clinical pathway, policies issued by management to comply with implementing the clinical pathway, both in terms of drug use and examination. support so that costs can be standardized. The three triangulation informants were able to answer according to all the existing keywords. This is consistent with the theory that clinical pathways can contribute

to increasing adherence to clinical guidelines, improving quality of care, reducing length of stay (LOS), and reducing hospital costs (Bai et al. 2018); factors that influence the implementation of clinical pathways are knowledge & intentions of health professionals, beliefs about consequences and hospital management policies (Jabbour et al. 2018); efforts that can be made in controlling health service costs, for quality control and hospital costs can standardize drug formularies, apply clinical pathways and calculate unit costs using the activity based costing method (Barber SL 2019).

Based on a documented study of clinical pathway laparoscopic appendectomy patient data for the period 2021 to November 2022, 8 patients (21%) in the CP group were not implemented with a length of stay of 5 days because there were additional complaints of nausea vomiting in 3 patients, additional complaints of nausea vomiting and abdominal colic in 3 patients, additional complaints of nausea vomiting and panic disorder in 1 patient, additional complaints of nausea vomiting and obesity in 1 patient. In addition, there were 30 patients (79%) in the CP group who were not implemented with a length of stay of 4 days because there were additional complaints of nausea vomiting in 17 patients, additional complaints of nausea vomiting and obesity in 8 patients, additional complaints of nausea vomiting and abdominal colic in 5 patients. . Whereas 31 patients (100%) in the implemented CP group with a diagnosis of appendicitis without additional complaints had a length of stay of 3 days. In addition, a documentary study showed readmission in the unimplemented CP group, namely IP patients readmission due to abdominal colic 2 days after the patient was discharged and DPU patients readmission due to abdominal colic on the same date as the patient's discharge date. Whereas 31 patients (100%) in the implemented CP group with a diagnosis of appendicitis without additional complaints had a cured patient health outcome. In addition, the documentation study also shows differences in average hospital costs in accordance with the addition of length of stay so that there is an increase in room costs, visit costs. In addition, additional complaints were found in patients and also variations in laboratory examinations, radiological examinations, use of equipment and use of drugs outside of the clinical pathway in the non-implemented clinical pathway group which also increased hospital costs.

The average length of stay (LOS) in the implemented clinical pathway group was shorter, namely 3 days, compared to the non-implemented clinical pathway group, which was 4.21 days. From the results of the documentation study, it was shown that 8 patients (21%) in the CP group were not implemented with a length of stay of 5 days because there were additional complaints of nausea vomiting in 3 patients (AD, LNK, RDP), additional complaints of nausea vomiting and abdominal colic in 3 patients ( RS, RAA, BDR), additional complaints of nausea and panic disorder in 1 patient (GE), additional complaints of nausea and obesity in 1 patient (AP). In addition, there were 30 patients (79%) in the CP group who were not implemented with a length of stay of 4 days because there were additional complaints of nausea vomiting in 17 patients (DS, IS, BAN, LTA, SD, AM, ABK, WAW, RD, DPA, EP, HPS, EA, ZH, JF, RTP, MS), additional complaints of nausea vomiting and obesity in 8 patients (SLP, MS, RES, IR, WR, LCS, YDS, BFP), additional complaints of nausea vomiting and abdominal colic in 5 patients (AW, IP, DPU, IN, NTE). Whereas 31 patients (100%) in the implemented CP group with a diagnosis of appendicitis without additional complaints had a length of stay of 3 days. This can be interpreted that the implementation of the laparoscopic appendectomy clinical pathway at EMC Pekayon Hospital has succeeded in making the length of stay standardized, so setting the length of stay can be a means of controlling quality of service.

The results of this documentation study are also suitable for obtaining a supporting effect

from the results of in-depth interviews conducted with triangulation informants (source triangulation), namely: informant 1 knows about the impact of the implementation of the clinical pathway on the length of stay, namely achieving an increase in service quality, input- process-outcome standard so that the day of treatment can be predicted; Informant 2 knows the impact of the implementation of the clinical pathway on the length of stay, namely quality control and cost control are achieved where the return plan and the drugs given can be predicted so that the service becomes quality; Informants 3 heads of the medical committee know the impact of the implementation of the clinical pathway on the length of stay, namely to obtain prime measurable results within a certain time span, supporting effective and high-quality services.

The results of this documentation study and the results of in-depth interviews with triangulation informants are in accordance with several previous studies, including research conducted at the Nanjing Drum Tower Hospital in patients with gallstones undergoing ERCP, the total length of stay was 8 days. in the group that had not yet implemented a clinical pathway and one day shorter in the group implementing a clinical pathway (P <0.001) (Zhang 2019); clinical pathways can contribute to increasing compliance with clinical guidelines (clinical guidelines), improving quality of care, reducing length of stay (LOS), and reducing hospital costs (Bai et al. 2018); standardization of service processes in the form of clinical pathways is an important indicator of hospital management efficiency, one of which is by reducing the number of days of hospitalization (LOS) resulting in increased hospital profits with more efficient bed management, shorter hospital stays reducing the burden of costs medical services and increase hospital profit margins (Baek et al. 2018).

In addition, the results of this documentation study and the results of in-depth interviews with triangulation informants are in accordance with the theoretical studies used in this study, namely efficiency and improving service quality used to reduce costs that will arise, including: maximum length of stay or limitation of length of stay in hospital, discharge planning or discharge treatment plan that is adjusted to the patient's health condition, continued stay review, namely medical studies conducted while the patient is still in hospital (Schmitt 2017). Thus it can be concluded that the implementation of a clinical pathway has a positive impact on achieving efficiency and quality service through standardizing the length of stay.

The average hospital cost for the implemented clinical pathway group is Rp. 75,186,419, compared to the non-implemented clinical pathway group, which is Rp. 78,699,026, where the documentation study data shows that the difference in average hospital costs also corresponds to the addition of length of stay. so that there is an additional room fee, visit fee. In addition, additional complaints were found in patients and also variations in laboratory examinations, radiological examinations, use of equipment and use of drugs outside of the clinical pathway in the non-implemented clinical pathway group which also increased hospital costs. This means that it can be concluded that at EMC Pekayon Hospital, the existing variants cause significant differences, causing hospital costs to swell. From the results of the documentation study, it was shown that 8 patients (21%) in the CP group were not implemented with a length of stay of 5 days because there were additional complaints of nausea vomiting in 3 patients (AD, LNK, RDP), additional complaints of nausea vomiting and abdominal colic in 3 patients ( RS, RAA, BDR), additional complaints of nausea and panic disorder in 1 patient (GE), additional complaints of nausea and obesity in 1 patient (AP). In addition, there were 30 patients (79%) in the CP group who were not implemented with a length of stay of 4 days because there were additional complaints of nausea vomiting in 17 patients (DS, IS, BAN, LTA,

SD, AM, ABK, WAW, RD, DPA, EP, HPS, EA, ZH, JF, RTP, MS), additional complaints of nausea vomiting and obesity in 8 patients (SLP, MS, RES, IR, WR, LCS, YDS, BFP), additional complaints of nausea vomiting and abdominal colic in 5 patients (AW, IP, DPU, IN, NTE).

The results of this documentation study are in accordance with the results of in-depth interviews conducted with the three triangulation informants (source triangulation) which provided a supporting effect, namely: informant 1 knew about the impact of the implementation of the clinical pathway on hospital costs, namely standardizing services so that costs appear to be efficient; Informant 2 knows the impact of the implementation of the clinical pathway on hospital costs, namely quality control and cost control achieved where the cost side aspect is clearly very controlled; Informant 3 knows the impact of the implementation of the clinical pathway on hospital costs according to the function it was formed, namely for service quality control and cost control, so it controls costs because each service guideline resource is the same.

The results of this documentation study are in contrast to previous research, including research on pediatric patients who are hospitalized with asthma, resulting in cost savings from each case that implements a clinical pathway (Bartlett et al. 2017); research on clinical pathway endoscopic retrograde cholangiopancreatography obtained the results of decreased hospital costs (Zhang 2019); research on clinical pathway hepatectomy in cases of hepatocellular carcinoma where the hospital cost decreased significantly after the implementation of the clinical pathway.

This is also in accordance with the theoretical studies used in this study, namely the benefits of clinical pathways, one of which is for efficiency and cost effectiveness, namely services that are cheap, effective, no diagnoses and excessive therapy are also a consideration in determining treatment costs (Leal et al., 2018). This means that it can be concluded that at EMC Pekayon Hospital, the existing variants cause significant differences, causing hospital costs increase.

The average patient health outcome in the form of readmission or morbidity rates (not yet recovered) from the implemented clinical pathway group was smaller, namely 0 (not found) from the non-implemented clinical pathway group, namely 0.05. The documentation study showed that there were only 2 cases of readmission patients in the non-implemented CP group, namely IP readmission patients due to abdominal colic 2 days after the patient was discharged (05 July 2021) and DPU patient readmission due to abdominal colic on the same date as the patient's discharge date (03 February 2022). Whereas 31 patients (100%) in the implemented CP group with a diagnosis of appendicitis without additional complaints had a cured patient health outcome. This can be interpreted that the implementation of the clinical pathway for laparoscopic appendectomy at EMC Pekayon Hospital does not really affect the patient's clinical output because doctors have followed medical procedures according to professional standards and medical audits are often held on cases that pose potential problems, for example multi-diagnosis cases, cases with days of hospitalization. long, complicated cases. So the quality of service is not solely measured by the implementation of the clinical pathway, there are other factors such as the competence of human resources, the completeness of medical facilities and equipment, etc.

The results of this documentation study are in accordance with the results of in-depth interviews conducted with the three triangulation informants (source triangulation) which provide a supporting effect, namely: informant 1 knows about the impact of the implementation of the clinical pathway on patient health outcomes, i.e. achieved quality

improvement services, relatively standard care processes, standard inputs and predictable outcomes; Informant 2 knows the impact of the implementation of the clinical pathway on patient health outcomes, namely quality becomes more standardized, surgical wound infections are very minimal or even non-existent; informant 3 knows the impact of the implementation of the clinical pathway on patient health outcomes, namely clinical governance to be good, supporting effective and high-quality services to obtain excellent measurable results.

The results of in-depth interviews with triangulation informants are in accordance with several previous studies where the implementation of clinical pathways can improve patient health outcomes, including the application of process aspects with integrated clinical pathways, it is hoped that service quality can be improved at affordable and predictable costs, as well as reducing patient readmissions at home sick (Shanti Rosalina et al. 2018); Another study (Sena 2019) at Condong Catur Hospital found that the majority of patient outcomes before the implementation of the clinical pathway were in the cured category of 18 patients with a percentage of 90.0%, as well as the outcomes after CP implementation where 100% of the samples were in the cured category. The results of this in-depth interview are in line with the theoretical studies used in this study, namely a measure of the quality of health services can be seen from clinical outcomes that consider the success of all multidisciplinary aspects of care, related complications, rehabilitation, and recurrence experienced by patients for the same disease condition (Porter 2017 ).

The results of the documentation study between the implemented clinical pathway group and the non-implemented clinical pathway group were not too influential where there were only 2 patient cases. This is also in accordance with several other relevant studies used in this study, including research related to clinical pathway endoscopic retrograde cholangiopancreatography which showed no significant differences in clinical outcomes, re-admission (Zhang 2019); research related to inpatient cases of asthma patients in children showing no effect on re-admission rates by implementing clinical pathways (Bartlett et al. 2017). Thus it can also be concluded that the implementation of the clinical pathway for laparoscopic appendectomy at EMC Pekayon Hospital has no effect on the patient's clinical output because doctors have followed medical management according to professional standards and medical audits are often held on cases that pose potential problems, for example multi-diagnosis cases, cases with days of hospitalization. long term, cases with complications, so patient quality is not solely assessed or measured by standardization of patient health outcomes

## CONCLUSION

In accordance with the research that has been done, it was found that the average length of stay (LOS) in the implemented clinical pathway group showed an effective length of stay of 1.21 days, where the group's average was shorter, namely 3 days than the clinical group. pathway is not implemented, namely 4.21 days. The reason for the length of stay is due to the fact that patients still have additional postoperative complaints and patient requests. This means that the clinical pathway of laparoscopic appendectomy has an impact on the length of stay. This can be interpreted that the implementation of the laparoscopic appendectomy clinical pathway at EMC Pekayon Hospital has succeeded in making the length of stay standardized, so setting the length of stay can be a means of controlling quality of service. Thus it can be concluded that the implementation of a clinical pathway has a positive impact on achieving efficiency and quality service through standardizing the length of stay.

The average patient health outcome in the form of readmission or morbidity rates (not yet cured) from the implemented clinical pathway group was smaller, namely 0 (not found) from the non-implemented clinical pathway group, namely 0.05, but in terms of the number of cases there were very few, only 2 patient cases. The reason for this higher patient health outcome is due to the fact that patients still have additional complaints after hospitalization which are still related to the diagnosis during hospitalization. This means that the clinical pathway for laparoscopic appendectomy has an impact on patient health outcomes. This can be interpreted that the implementation of the clinical pathway for laparoscopic appendectomy at EMC Pekayon Hospital does not really affect the patient's clinical output because doctors have followed medical procedures according to professional standards and medical audits are often held on cases that pose potential problems, for example multi-diagnosis cases, cases with days of hospitalization. long, complicated cases. So the quality of service is not solely measured by the implementation of the clinical pathway, there are other factors such as the competence of human resources, the completeness of medical facilities and equipment, etc.

The average hospital cost for the implemented clinical pathway group showed a cost effectiveness of Rp. 3,512,607.-, where the group's average cost was Rp. 75,186,419 less than the non-implemented clinical pathway group, which was Rp. 78,699,026.-. The reason for this higher hospital cost is due to the patient factor where additional complaints are found in patients and also the doctor's compliance factor in variations in laboratory examinations, radiological examinations, use of equipment and use of drugs outside of the clinical pathway in the clinical pathway group which is not implemented and also makes the hospital costs increase. This means that it can be concluded that at EMC Pekayon Hospital, the existing variants cause significant differences, causing hospital costs increase.

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