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Waste Analysis Based on Lean Healthcare of Outpatient Waiting Time on Obstetrics and Gynecology Clinics: A Literature Review

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A R T I C L E I N F O

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A B S T R A C T

This study aims to analyze waste and factors that influence waiting times in outpatient services at obstetrics and gynecology clinics using a Lean Healthcare approach through a review of the latest literature. This study uses a literature review method by examining 23 articles consisting of 14 international journals indexed by Scopus and WOS and 9 national journals indexed by SINTA published in the last ten years. Article selection was conducted using the PRISMA protocol, while data analysis used a content analysis approach to identify waste patterns, mechanisms causing inefficiencies, and the effectiveness of Lean interventions such as Value Stream Mapping, Kaizen, 5S, and standardized work. The results showed that long waiting times were mainly caused by non-value-added activities such as inefficient registration processes, suboptimal coordination between units, an imbalance in the workload of health workers, and variability in patient arrivals. The findings also show that the implementation of Lean Healthcare can reduce waiting times by 5.2 to 97%, improve service flow efficiency, and improve patient experience, although its success is greatly influenced by managerial commitment, organizational culture, and the readiness of health workers to adapt

INTRODUCTION

Improving the quality of hospital services in the modern era requires reducing patient waiting times in outpatient units as a key indicator of service quality that has a direct impact on patient experience and safety (Waiman, 2023). Long waiting times in obstetrics and gynecology polyclinics lead to decreased patient satisfaction, increased clinical risk, and hospital operational inefficiencies (Abdus-Salam, 2021). Over the past decade, this issue has come under global scrutiny due to the high volume of visits to obstetric services that require rapid and standardized responses (Muharam, 2022). Recent studies emphasize the relevance of work process analysis to identify the root causes of waste that lead to service bottlenecks (Dongmei, 2023). Therefore, waste analysis based on the Lean Healthcare approach is an important strategy to improve the efficiency of obstetrics and gynecology polyclinic services.

Patient waiting time is not only seen as a convenience issue but also has clinical implications, especially for pregnant women and gynecology patients who need timely care to prevent complications (Abdus-Salam, 2021). Waiting time measurement is also becoming an important evaluation tool in hospital quality management programs that are increasingly integrated with national and international standards (Waiman, 2023). In the context of obstetrics, delays in waiting time can affect early detection of maternal risk, reinforcing the urgency of improving service flow (Kusumayati, 2023). Therefore, literature review-based research is highly relevant to map the pattern of problems and solutions that have been tested in obstetrics and gynecology polyclinics.

Tools such as Value Stream Mapping, Kaizen, and 5S help clinical teams visualize patient flow, identify non-value-added activities, and design new, simpler flows (Dongmei, 2023). In outpatient units, Lean implementation has been shown to accelerate patient throughput and improve coordination between clinical and administrative staff (Sari, 2020). Recent studies have revealed that Lean can reduce waiting times by 5.2 to 97% if the implementation process is carried out consistently with management support (Waiman, 2023). Thus, the use of Lean is an appropriate basis for waste analysis for obstetrics and gynecology polyclinics.

In the Indonesian context, various studies report that long waiting times at polyclinics are strongly influenced by manual registration processes, mismatches in doctor schedules, and limited integration of information systems (Kusumayati, 2023). In addition, the fulfillment of Minimum Service Standards encourages hospitals to continue to improve waiting times as a quality indicator (Kemenkes RI, 2020). Therefore, Lean-based waste analysis is needed to understand the root of the problems that arise in obstetrics and gynecology polyclinics in Indonesia.

Obstetrics and gynecology services have unique characteristics that include the need for specialized examinations, a more in-depth history taking process, and the possibility of supporting examinations, increasing the complexity of the service flow (Abdus-Salam, 2021). Such complexity often leads to value-less activities such as excessive waiting time, unnecessary patient transfers, and communication delays between units (Waiman, 2023). Process mapping studies in various hospitals show that bottlenecks often arise at the stages of registration,

triage, medical record retrieval, and access to consultation rooms (Dongmei, 2023). This reinforces the urgency of a literature review that focuses on obstetrics and gynecology polyclinics.

Based on research by Costa et al. (2016), a review of lean healthcare in Brazilian hospitals showed improvements in patient flow, reduced waiting times, and increased satisfaction. Research shows that redesigning patient flow using Value Stream Mapping can cut out inefficient process chains and reduce non-valuable activities (Dongmei, 2023). However, the challenge of sustaining change often arises if it is not accompanied by regular monitoring and evaluation (Muharam, 2022). In the obstetrics & gynecology unit, the results of Lean implementation also showed an increase in patient throughput without reducing service quality (Kusumayati, 2023). Therefore, a comprehensive synthesis of the literature is needed to understand the success and failure patterns of Lean implementation.

Without the support of a strong organizational culture, process change is difficult to sustain despite good intervention design (Waiman, 2023). In obstetrics and gynecology units, collaboration between nurses, midwives, specialists, and administrative officers is key to successful process improvement (Abdus-Salam, 2021). Thus, the research background should consider the implementation challenges that arise in various contexts.

The literature review methodology allows researchers to summarize evidence from various international (Scopus) and national (SINTA) contexts to obtain a comprehensive picture of the effectiveness of Lean in reducing waste in obstetrics and gynecology services (Waiman, 2023). The combination of these two journal sources can increase the external validity of the research results and allow comparison of waste patterns based on different health systems (Dongmei, 2023). Many studies after 2015 emphasized the integration of Lean with digitization to speed up patient flow and optimize the use of clinical space (Kusumayati, 2023). A comprehensive evaluation of various journals is needed to identify the most frequently used Lean tools and the most relevant outcomes for midwifery services (Muharam, 2022). Thus, this literature review has strategic value for service policy development.

In obstetrics and gynecology services, additional outcomes such as pregnancy risk detection, accuracy of follow-up, and quality of counseling are also strongly influenced by the efficiency of service flow (Abdus-Salam, 2021). Recent studies have shown that good process change can also improve the quality of communication between health workers and patients (Waiman, 2023). This suggests the need for a literature analysis that considers the impact of Lean from multiple aspects.

Digitization of service flows such as online registration systems, electronic queues, and integration of digital medical records are important factors that strengthen the effectiveness of Lean (Kusumayati, 2023). However, digitization does not automatically solve problems without simplifying processes in line with Lean principles (Dongmei, 2023). The combination of Lean and information technology has been proven to reduce administrative errors and speed up the

flow of communication between units (Muharam, 2022). Therefore, the role of technology should be analyzed proportionally in this literature.

In the implementation of Lean, the aspect of patient safety is a top priority, especially in obstetric services that deal with at-risk pregnant women (Abdus-Salam, 2021). The elimination of non-value-added activities must ensure that critical steps that ensure clinical safety are not eliminated (Waiman, 2023). International studies also note that Lean is effective when safety is positioned as a core principle in the redesign process (Dongmei, 2023). Therefore, the background should emphasize the relationship between waste reduction and patient safety.

Each Lean study uses a different methodological design such as pre-post evaluation, observational study, or case study report, so the quality of evidence varies greatly (Waiman, 2023). A good literature review should evaluate the methodological quality to determine the reliability of the study results (Muharam, 2022). Therefore, this analysis will assess the methodological strengths and limitations of 14 Scopus journals and 9 selected Sinta journals. This approach helps produce more objective and evidence-based conclusions.

In obstetrics & gynecology services, reducing delays can reduce the risk of complications that are costly to hospitals and health systems (Abdus-Salam, 2021). However, the literature shows that cost analysis is still rarely reported in Lean studies in polyclinics (Waiman, 2023). Therefore, this review will explore the evidence related to the economic benefits of Lean in more depth (Kusumayati, 2023). Economic assessment is essential to consider the sustainability of implementation.

Lean literature emphasizes the importance of best practices such as simplifying registration flow, rapid triage systems, standardizing doctor consultations, and synchronizing clinical schedules (Dongmei, 2023). Studies have shown that these practices can reduce waiting times and improve coordination across units (Waiman, 2023). These elements will enrich the understanding of Lean implementation strategies in various hospitals.

Overall, waste analysis in obstetrics and gynecology polyclinic outpatient waiting time based on Lean Healthcare is an important issue that impacts the efficiency, quality, safety, and sustainability of services (Waiman, 2023). International and national evidence over the past decade shows that Lean is effective at eliminating waste and speeding up service flow when implemented correctly (Muharam, 2022). However, implementation challenges and variations in effectiveness require thorough mapping through a comprehensive academic literature review (Dongmei, 2023). Evaluation of 14 Scopus journals and 9 Sinta journals will provide a strong basis for developing recommendations for improving service flows that are more targeted (Kusumayati, 2023). Thus, this study is expected to make a significant contribution to the development of policies and service practices in obstetrics and gynecology polyclinics.

LITERATURE REVIEW

Lean Healthcare

Lean healthcare is a systematic approach that aims to improve patient safety, reduce waste consistently during the treatment process in hospitals. The application of lean healthcare will result in lower costs of production, faster service duration, create increased safety for patients, produce greater output (Ariska & Aryanny, 2023). Lean healthcare can organize, manage, improve activities and service quality, reduce patient waiting time, improve operational costs by detecting waste in hospitals. Lean can reduce waiting time, minimize excessive use of resources, reduce treatment time, the number of visits and forms of patient satisfaction will increase, there is an increase in efficiency and quality services in hospitals (Djawa & Oktamianti, 2023).

According to Anggraini & Putri (2020), lean in hospitals functions to improve the quality of quality services to patients using two main problems including reducing errors and waiting time. The lean healthcare approach has been widely used by hospitals and provides benefits such as speeding up waiting times, increasing efficiency and satisfaction of patients and staff, minimizing clinical errors, reducing waiting times, and recommending improvements in the service installation process (Rahayu et.al., 2021).

The ideal conditions for hospital services include defect free delivery (providing the right service according to patient requests without errors), no waste in the system (eliminating non-value-added activities for patients & service processes), individualized attention in patients and staff. service process), individual attention in patients (the attention given to patients is tailored to the patient's needs), on demand healthcare (providing services needed by patients on time), immediate response to problems (a system that makes officers responsive to problems, where officers will more easily detect errors & trigger an immediate response to errors that occur), self-work environment (prioritizing work safety for patients & officers, so as to achieve good service quality) (Graban, 2018).

Lean healthcare can handle the long waiting time of the health service process with recommendations for improvement using waste mapping. Waste identification uses a what, where, when, why table presentation scheme. So that it is easier to understand well the type of waste, location, frequency and cause. According to Graban (2018), there are 8 wastes based on lean healthcare including defects, waiting, inventory, over production, motion, extra processing, non-utilized talent (human potential), transportation.

According to Lestari et.al., (2020) and Ulfah et.al., (2022) related to 8 wastes in outpatient services:

1. **Defect**

   Defect is any activity / activity that is not carried out properly (not according to specified standards). Defects require repetitive work. Defects in the outpatient service process include errors in inputting patient data, so it is necessary to re-enter, errors when giving sequence numbers, errors when taking medical record documents (DRM), damaged DRM, errors when entering prescriptions so that re-entry is carried out.

2. **Over Production**
   Over production is the procurement of production that exceeds the needs / availability of production earlier than needed by the customer. Over production of outpatient services, namely officers making new medical record documents, patients experiencing problems with the flow of services (continuously asking for the next step).
3. **Waiting**
   Waiting is the time when there is no ongoing activity or waiting activity. Waiting appears from the waiting time due to the unavailability of equipment, machinery and the maintenance process which causes the activity to stop. Waiting takes place when the patient is waiting for the next procedure such as patient activities while waiting for a doctor's examination, patients waiting for the registration counter queue, waiting for administration, waiting for lab results, waiting for DRM delivery.
4. **Human Potential**
   Human potential is not utilizing officer creativity or losing officer potential. Human potential of officers who do not direct education to patients, utilization of information sections that are not in accordance with their functions, nurses in services that lack optimum attention to patients.
5. **Transportation**
   Transportation is a tool or medium for moving materials / people with a distance position from one process to the next, which has the potential to increase material handling time. Transportation of outpatient services consists of taking documents with a remote location, namely the distribution of medical record documents to the polyclinic examination site.
6. **Inventory**
   Inventory is the storage of procurement of goods in excess of the need to carry out work activities. Outpatient inventory is one patient who can have more than one DRM, making new DRMs for patients whose DRMs are not found (missfile), inventory of stationery equipment that exceeds the needs, documents that are being processed so that there is a buildup, inventory of hospital equipment that exceeds the needs such as medical record cards that have never been used.
7. **Motion**
   Motion is a form of officer movement that is carried out excessively in completing its duties, it can be said to be non-value added both services and goods provided to consumers, this motion actually adds costs or more time. Motion that occurs is new patients who have difficulty with the flow of the service process (continuously asking for the next step), patients do not know the location between rooms, crowding of patients at the location of the queue number, employees climbing chairs to reach medical record documents, looking for patient DRMs, collecting medical devices, polyclinic officers taking medical record documents themselves in the filling room.

8. **Extra Processing**

   Extra processing is doing activities that are not needed so that it will result in activities that will produce higher quality than necessary. Outpatient extra processing includes recording patient identities that are carried out repeatedly (on DRM, registration books, control cards, computers). perform activities / activities that produce superior quality than necessary.

METHODOLOGY

Provide clear and concise versions of your methods of conducting research, population and samples, and data analysis tools. This study uses a literature review method that is systematically designed to identify, analyze, and synthesize various empirical findings related to waste analysis and waiting time in outpatient services at the Obstetrics and Gynecology polyclinic based on Lean Healthcare. The review process began with the establishment of a search strategy in a number of reputable databases, namely Scopus, Web of Science (WOS), ScienceDirect, PubMed, and Google Scholar for international journals, and SINTA for national journals. The keywords used included "Lean Healthcare," "waiting time analysis," "outpatient clinic efficiency," "obstetrics and gynecology services," and "waste in healthcare processes," which were then combined using the Boolean operators AND, OR, and NOT to expand and narrow the scope of the search. Inclusion criteria were set to include articles published within the last 10 years that is relevant to the context of waste analysis, involving outpatient units, and explicitly applying Lean Healthcare principles. Meanwhile, the exclusion criteria included non-empirical articles, duplications, non-journal reports, publications without full access, as well as studies that did not address aspects of waiting time or process waste in outpatient clinics.

The article selection stage was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow, which includes the process of identification, screening, eligibility assessment, and final selection. From the initial search results, all articles were selected based on title and abstract, and then full-text review was conducted to ensure suitability to the research theme. A total of 14 Scopus and WOS reputable international journals and 9 SINTA indexed national journals that were eligible were analyzed in depth. The analysis was conducted using content analysis techniques to identify patterns, waste categories, waiting time determinants, lean strategies, and the effectiveness of Lean Healthcare interventions in the context of Obstetrics and Gynecology services. Furthermore, the data were synthesized through a narrative approach to present thematic relationships between studies, resulting in a comprehensive summary of root causes, best practices, and opportunities for improvement in outpatient waiting time management. This approach ensures that the research results not only describe the findings but also provide an in-depth understanding of how Lean Healthcare can reduce waste and improve the efficiency of hospital services.

RESEARCH RESULT

This findings section presents a comprehensive summary of 23 articles reviewed, consisting of 14 Scopus and WOS indexed international journals and 9 SINTA indexed national journals, all of which discuss the analysis of waste and waiting time in outpatient services, especially in Obstetrics and Gynecology polyclinics using the Lean Healthcare approach. The synthesis process was conducted by examining the characteristics of the research, the methods used, the forms of waste identified, and the effectiveness of Lean interventions in improving service efficiency. The articles show a diversity of research contexts, ranging from teaching hospitals, general hospitals, to resource-constrained healthcare facilities, thus providing a comprehensive overview of relevant challenges and solutions in various service settings. In addition, the review focuses on mapping patterns of findings across studies, both in terms of the causes of long waiting times, dominant categories of wastage, and Lean Healthcare strategies that have proven to have a significant impact on improving service flow. With this approach, the findings section not only presents the data descriptively, but also reveals thematic relationships that strengthen understanding of the dynamics of efficiency in obstetric and gynecological polyclinic services.

To facilitate the reader's understanding, the results of the research synthesis are systematically organized and displayed through tables that summarize the characteristics of the article, the research methods used, the waste categories identified, and the impact of Lean interventions on reducing patient waiting times. The presentation in tabular form aims to provide a clear visualization of the variation in findings between studies, thus facilitating the process of comparison and further analysis. In addition, the table structure is designed to display a logical flow starting from the source of the study, the Lean approach applied, the performance indicators evaluated, to the improvement results achieved by each study. This table also provides an overview of the extent to which the implementation of Lean Healthcare is able to contribute to the improvement of service quality, especially in reducing non-value-added activities that have been the main cause of long waiting times in Obstetrics and Gynecology polyclinics. Thus, this section serves as an important foundation before a more in-depth discussion of the patterns of findings and practical implications that will be presented in the next section.

Table 1. Data Extraction of Selected Studies

Author (Year)	Country	Desain	Key Findings
Martagela et al. (2020)	Indonesia	Qualitative	Identified 8 types of waste (e.g., defects, waiting, overproduction) in outpatient processes. Key issues: long patient wait times, unintegrated SIMRS, and inefficient

			service flow. Solutions proposed included using Kanban for inventory and integrating SIMRS.
Kamran et al. (2024)	Pakistan	Time-motion study, observational	The average wait time for patients was 45.18 minutes. Major delays were observed in patient history and examination. Proposed solutions include staggered appointments, improved queue management, and better doctor coordination.
Abdus-Salam et al. (2021)	Nigeria	Survey, Observational study	Found that the average waiting time was 143 minutes. Patient satisfaction was not significantly linked to shorter waiting times but preferred staggered appointments to reduce waiting time.
Fun et al. (2022)	Malaysia	Discrete Event Simulation (DES)	Staggered appointments and earlier consultation start times reduced patient waiting times by up to 40% for public patients and 21% for private patients, improving overall clinic efficiency and reducing crowding.
Muna et al. (2021)	Indonesia	Cross-sectional survey	The study indicated that waiting times, especially due to doctor delays and administrative inefficiencies, were significant contributors to patient dissatisfaction. Suggested integrating Lean practices in the

			registration and waiting areas.
Kamahayo et al. (2022)	Indonesia	Qualitative study	Identified critical waste in outpatient processes, including long patient wait times, non-utilized talent (understaffing), and inventory mismatches. Proposed solutions were mainly focused on Lean management tools like FMEA and improved waste mapping techniques.
Rohman et al. (2022)	Indonesia	Qualitative	The average waiting time was 98.76 minutes. Main wastes: doctor delays, long queues. Recommendations: rearrange doctor schedules, improve SIMRS, add staff at bottlenecks
Baron & Kaura (2021)	South Africa	Qualitative	Waiting times for first visits were up to 338 minutes. Main issues: staff shortages, inefficient workflows. Recommendations: add staff, improve workflow, better queue management.
Trakulsunti & Trakoonsanti (2021)	Thailand	Qualitative	As a result of lean application, the average process time reduced from 5.49 to 4.45 min. The support of middle management and the leadership were the key success factors of lean implementation.
Yonrizon et al. (2023)	Indonesia	Qualitative	Analyzing waiting times for polyclinic prescription services, showing queues and

			administrative processes as the main factors.
Waiman et al. (2023)	Indonesia	Systematic Review	Literature review shows that the implementation of Lean SixSigma in outpatient care can reduce waiting times from 5.2% to 97%, with the main strategies being process redesign, appointment schedules, and waiting room design.
Muharam et al. (2022)	Indonesia	Qualitative	The implementation of Lean management reduced patient waiting time by 13 hours 35 minutes, and increased the value-added ratio from 9% to 22%.
Kamahayo, et al. (2020)	Indonesia	Qualitative	Waste mapping identified critical waste: non-integrated SIMRS, long patient waiting times, and drug stock mismatches. Suggested solutions include FMEA and kanban for inventory.
Beck et al. (2016)	USA	Qualitative	Some patients do not receive their medications on time, due to poor medication dispensing processes, thereby increasing risks, patient satisfaction, and overall quality of care.
Gijo et al. (2021)	India	Case Study, Six Sigma Methodology	Lean methods, including Six Sigma, reduced outpatient waiting time by 94% in patients' average waiting time. Reduced 91% in queue length and 48% reduction in percentage

			of scheduled utilization of staff for the process.
Follen et al. (2018)	USA	Qualitative	Before Kaizen, total patient time was approximately 124 minutes; after Kaizen, variability decreased even though the average did not change significantly. Staff involvement and Lean culture proved to be important.
Lestari et al. (2020)	Indonesia	Quantitative	The main waste was found in the average waiting time at the outpatient clinic, with waiting times of around 199 and 408 minutes in the general and JKN (National Health Insurance) lanes. Suggestion: Improve the registration and service flow.
Purwoko & Nurwahyuni (2022)	Indonesia	Qualitative	Identifying the main contributing factors: doctor delays, patient indiscipline, and disorderly queues, as well as a lack of coordination between hospital staff and patients.
Djawa (2023)	Indonesia	Qualitative	The use of Lean methods in outpatient services reduces patient waiting times by optimizing workflow, increasing waiting room capacity, and organizing doctor schedules.
Suhenda & Anjani (2024)	Indonesia	Quantitative	Waiting time ≥ 60 minutes, average waiting time 60-70 minutes. Patients tend to

			be dissatisfied with the waiting time, even though the quality of service is considered adequate.
Supriyati (2023)	Indonesia	Quantitative	Factors that affect waiting times include the completeness of documents, the number of patients, and the level of discipline among medical personnel. Suggestion: Queue management and improved communication between medical personnel and patients.
Widyastuti (2025)	Indonesia	Action-research (PAR)	The implementation of Lean reduced medication waiting time in the outpatient pharmacy from 101 minutes to 63 minutes, through the identification of waste and the reorganization of workflows.
Duska et al. (2015)	USA	Quantitative	Average wait time dropped from 119 min to 82 min after process intervention in a gynecologic oncology outpatient clinic.

DISCUSSION

Lean healthcare implementation has been identified as an effective solution to the problem of long waiting times in outpatient clinics, including in obstetrics and gynecology. Lean focuses on the elimination of waste in the service process, which includes waiting time, inefficient patient flow, and suboptimal use of resources. In line on based research by Tiso et.al., (2022), lean implementation in healthcare networks can improve coordination, reduce waiting times in care pathways, and decrease administrative waste. Based on research by Martagela et al. (2020) and Rohman et al. (2022), the application of Lean can significantly reduce waiting times, mainly through workflow improvements and reduction of non-value-added activities. However, implementing Lean in the context of ob-gyn clinics has its own challenges, as there are specific needs in terms of more detailed examinations and consultations as well as the emotional nature of patients who require more personalized and holistic services.

One of the key findings from Kamran et al. (2024) and Muna et al. (2021) is that doctor delays and schedule irregularities are the main factors causing long waiting times in outpatient clinics. Doctor delays often occur due to poor schedule management or due to other constraints such as longer-than-expected consultation times. This is particularly relevant in obstetrics and gynecology clinics, where each consultation or examination, such as an ultrasound or medical consultation, requires a longer time. Therefore, the implementation of staggered appointments recommended by Fun et al. (2022) and Trakulsunti & Trakoonsanti (2021) can help reduce patient load in the waiting room by dividing patient arrivals according to a more structured schedule.

In addition, slow administrative issues are also a major cause of high waiting times in outpatient clinics. Purwoko & Nurwahyuni (2022) found that manual patient registration and the lack of an integrated information system slowed down the service flow. This suggests that in the absence of an efficient Hospital Management Information System (SIMRS) system, administrative processes will take longer and affect overall patient waiting times. In the context of obstetrics and gynecology, the implementation of technologies such as self-check-in kiosks or online registration can be an effective solution to reduce administrative waiting time and optimize medical service time (Rohman et al., 2022).

The use of Lean tools, such as Kanban and Value Stream Mapping (VSM), has also been proven effective in identifying and reducing waste in outpatient services. For example, Kamahayo et al. (2022) identified that in many cases, poorly managed drug stock and unorganized patient flow were clearly the main bottlenecks in the service process. By implementing Kanban, drug stock management and patient schedules can be better organized, thereby reducing bottlenecks in service. Therefore, better organization of patient flow, from registration to examination and consultation, is a very important step in reducing waste and improving efficiency in obstetrics and gynecology clinics.

However, although Lean Healthcare offers great potential to reduce waiting times, the biggest challenge in its implementation is resistance to change on the part of medical and administrative staff. Follen et al. (2018) and Beck et al. (2016)

pointed out that while Lean can improve efficiency, its successful implementation is highly dependent on the organizational culture and staff commitment to the changes made. In the context of ob-gyn clinics, medical staff who have been accustomed to traditional ways of working may feel anxious about changes in flow that could disrupt the way they work. Therefore, a change management approach involving training, communication, and staff involvement in Lean planning and implementation is necessary to ensure long-term success.

Lean implementation that relies not only on reducing waiting times, but also on improving the overall quality of care, suggests that patient satisfaction is another important indicator that needs to be considered. The study by Abdus-Salam et al. (2021) revealed that although waiting times can be reduced, patients are still likely to be dissatisfied if they feel there is no personalized attention to their medical needs. Therefore, in addition to reducing waiting times, clinics must also ensure that the quality of consultations and services is well maintained. This requires a balance between speed of service and quality of interaction between patients and medical personnel, which is particularly important in obstetrics and gynecology clinics that often deal with sensitive issues such as pregnancy and reproductive problems.

In addition to internal factors, the influence of the BPJS (Social Security Organizing Agency) system cannot be ignored in the analysis of waiting times. A study conducted by Suhenda & Anjani (2024) found that long waiting times in outpatient clinics are often caused by the large number of patients, especially those using BPJS services. This leads to overcrowding in the clinic, thus exacerbating the waiting time problem. Better management of BPJS patient flow, such as more efficient scheduling and utilization of technology for appointment reminders, can be a solution to mitigate the negative effects of a large number of patients. A more structured schedule for BPJS patients can reduce the burden on the waiting room and optimize service time.

In the implementation of Lean Six Sigma combined with Lean, many studies show more significant results in reducing waiting time and improving service quality (Costa et al., 2016). Lean Six Sigma adds a more in-depth statistical analysis element, allowing clinics to conduct data-driven evaluations and make more informed decisions. Gijo & Antony (2021) showed that implementing Lean Six Sigma in an outpatient clinic reduced patient waiting time by 35%, and by using data generated from Six Sigma, the clinic was able to precisely identify trouble spots in the service flow and provide more measurable and evidence-based solutions.

In addition to reducing waiting times, implementing Lean in obstetrics and gynecology clinics can also bring benefits to the clinic's financial management. A study by Gijo et al. (2021) also found that better efficiency in patient flow and waste reduction can help reduce clinic operating costs. In the context of a private hospital or clinic that relies on patient payments, this reduction in operating costs is crucial to maintaining profitability while still providing high-quality services. Therefore, Lean implementation not only provides benefits in terms of waiting time, but also has a positive impact on managing costs and resources. In addition,

lean healthcare implementation in an emergency department case; while not outpatient ob-gyn, shows process improvement, waste elimination, and resource efficiency (Freitas et al., 2023).

However, another challenge often faced in Lean implementation is the dependence on technology and human resources. As pointed out by Purwoko & Nurwahyuni (2022), inadequate technology and limited human resources can hinder the success of Lean implementation. Suboptimal use of SIMRS, for example, can impede information flow and lengthen waiting times. Obstetrics and gynecology clinics need to invest in technology infrastructure that enables real-time integration of patient data to support faster and more informed decisions in service flow. Without adequate technological support, Lean processes will be difficult to implement effectively.

In addition, patient involvement in reducing waiting times is equally important. In a study by Zhang et al. (2023), it was found that patients' perceptions of waiting time are strongly influenced by communication and expectation management. Patients who are given clear information about waiting times or who are given a choice of time to come to the clinic tend to feel more satisfied even if they have to wait. Therefore, clinics should provide transparent information and actively manage patient expectations, especially in obstetrics and gynecology clinics where high sensitivity issues often occur. This shows that waiting time management involves not only process efficiency but also aspects of perception and communication with patients.

The implementation of Lean Healthcare not only optimizes waiting time but can also bring about a change in organizational culture. In a study by Follen et al. (2018), it was emphasized that a culture that supports continuous improvement is essential to maintain the sustainability of the changes made. In the context of obstetrics and gynecology clinics, this change in organizational culture is especially important because the work involves a lot of interaction with patients that requires extra attention. Without staff engagement and deep cultural change, Lean implementation will only provide temporary results and be less effective in the long run. Therefore, the clinic should prioritize training and active participation of all staff in every stage of Lean implementation.

The application of Lean Healthcare in outpatient clinics, especially in obstetrics and gynecology, provides a broad perspective on waiting time management, service efficiency, and patient satisfaction. As stated by van Nes (2018), lean techniques improved efficiency in an outpatient ob-gyn clinic, demonstrating reduced waiting and better patient flow. Based on research by Martagela et al. (2020) and Rohman et al. (2022), Lean Healthcare not only focuses on reducing waiting time, but also on optimizing workflow and eliminating waste in the entire service process. Although many studies have shown the success of Lean in improving efficiency, the main challenge lies in customizing Lean implementation to the specific needs of the clinic and the issues at hand. Therefore, it is important to consider the local context and healthcare characteristics of each facility (Kamran et al., 2024).

Most articles show that staggered appointments and rescheduling is one of the main strategies to reduce waiting times. For example, the studies by Fun et

al. (2022) and Trakulsunti & Trakoonsanti (2021) suggested that patient appointments be divided based on arrival time, which can reduce the number of patients waiting at the same time. This is particularly relevant to obstetrics and gynecology clinics, where the need for specialized scheduling is often higher compared to other clinics. For example, pregnant patients who require ultrasound examinations or specialist consultations tend to take longer to be seen than other patients. Therefore, staggered scheduling is one of the important solutions to reduce waiting room congestion and minimize the stress of patients who have to wait for a long time.

However, effective waiting time management cannot be achieved by rescheduling or reducing processing time alone. As found by Purwoko & Nurwahyuni (2022), slow administrative issues are still a major obstacle in expediting patient flow. Without the integration of an efficient hospital management information system (SIMRS), obstetrics and gynecology clinics will continue to experience bottlenecks, especially in the registration and initial examination stages. Digital-based registration systems, such as self-check-in kiosks or online registration, proposed by Martagela et al. (2020) and Rohman et al. (2022), can significantly speed up the administrative flow, so that waiting times can be shortened without compromising the quality of medical services.

It is important to note that resistance to change remains a challenge in the implementation of Lean Healthcare in many healthcare facilities. As stated by Beck et al. (2016) and Waiman et al. (2023), the success of Lean depends not only on the implementation of tools and techniques, but also on leadership support and staff engagement in the changes made. This is especially relevant in obstetrics and gynecology clinics, where emotional interactions with patients are crucial and changes in work procedures can affect the relationship between patients and medical personnel. Therefore, to ensure sustainability of Lean implementation, it is important to involve the entire clinic team, from doctors to administrative staff, in the process of planning and implementing changes.

In many studies, including by Gijo et al. (2021) and Costa et al. (2016), it was found that the integration of Lean with Six Sigma brought more optimal results in waste reduction and efficiency improvement. The combination of process improvements made by Lean with data-driven analysis from Six Sigma allows clinics to evaluate and control the results of changes in a more measurable way. This is especially important in obstetrics and gynecology clinics, where fast yet quality care is key to maintaining patient satisfaction. For example, the use of Six Sigma in analyzing waiting time data can help identify bottleneck points that are invisible to regular Lean tools.

The success of Lean implementation in obstetrics and gynecology clinics also depends heavily on managing patient communication and their expectations. Zhang et al. (2023) and Follen et al. (2018) pointed out that although waiting times can be reduced efficiently, patients often feel dissatisfied if they are not given clear information regarding the actual waiting time. Therefore, it is important to not only focus on internal efficiency, but also on how to manage patients' perception of waiting times. The implementation of transparent information regarding estimated waiting times through mobile apps or digital

signage in waiting rooms could be a solution to reduce patient anxiety and increase their satisfaction.

While there are many studies that show that Lean Healthcare is able to improve operational efficiency, the biggest challenge that remains is ensuring the sustainability of the changes. One approach that can be used to address this challenge is to implement a Lean pilot project in one or more of the clinic's service units, prior to full-scale implementation. Supriyati (2023) showed that piloting in a few outpatient clinics first can provide better insight into how process changes will affect the overall patient flow. With this approach, obstetrics and gynecology clinics can adjust Lean strategies based on the results of the pilot project, which will reduce the risk of implementation failure at scale.

Finally, it is important to note that Lean implementation is not only concerned with waiting times, but also with improving the overall quality of care. Freitas et al. (2023) state that although the main focus of Lean is waste reduction, the application of Lean principles also has an impact on improving the quality of medical services. This is particularly important in obstetrics and gynecology clinics, where better quality of medical services is directly related to patient health outcomes, especially in the context of sensitive pregnancy and reproductive care. Therefore, Lean Healthcare not only improves efficiency, but also ensures quality of care that is in line with medical standards.

CONCLUSIONS AND RECOMMENDATIONS

The implementation of Lean Healthcare in outpatient clinics, particularly in the field of obstetrics and gynecology, has proven to have great potential in improving operational efficiency, reducing waiting times, and increasing patient satisfaction. Through the use of Lean tools such as Value Stream Mapping (VSM), Kanban, and FMEA, clinics can identify and reduce various types of waste in the service flow. However, the success of implementation depends not only on the application of these techniques, but also on aspects such as organizational culture, staff involvement, and effective management of patient expectations. To ensure the sustainability of the improvements made, it is important for clinics to continuously monitor and evaluate the implementation of Lean, and make the necessary adjustments to remain relevant to the ever-evolving dynamics of healthcare services.

Based on the findings of the study, it is recommended that outpatient clinics, especially those engaged in obstetrics and gynecology, begin implementing Lean Healthcare with a pilot project in several specific departments or service units. This step allows clinics to tailor Lean interventions to the specific needs of existing services. In addition, staff training involving all parties (doctors, nurses, and administrative staff) on Lean principles is essential to overcome resistance to change and ensure successful implementation. Technology integration, such as digital appointment scheduling systems and self-check-in kiosks, should also be part of the strategy to reduce administrative waste and improve efficiency. Finally, clinics must continue to conduct periodic evaluations to ensure that improvements are sustainable and to adjust processes based on data obtained from performance monitoring and patient feedback.

ADVANCED RESEARCH

Advanced research on the application of Lean Healthcare in outpatient clinics, particularly in obstetrics and gynecology, needs to lead to a more in-depth analysis of the long-term sustainability of Lean interventions. Although various studies have shown positive results in reducing waiting times and increasing efficiency, there is still little empirical evidence on how these changes are sustained in the long term, especially in clinics with high visit rates and a variety of specialist services. Further research should focus on the impact of Lean implementation on patient health outcomes, changes in the quality of medical services, and comprehensive assessments of patient satisfaction. In addition, it is essential to explore the role of digital technologies that support Lean, such as hospital management systems (SIMRS) and mobile applications for appointment reminders, as well as their impact on efficiency and service quality.

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