Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

Exploring Patient-Centered Care Through Process Improvement: A Systematic Review of Satisfaction Outcomes

Reem Saeed Balharith[1], Mona Saeed Alyami[2], Hassan Saleh Omar Alhassan[3], Fayez Mohammed Ali ALasloom[4], Nasser Mohammed Alsharief[5], Abdullah Nasser Monaser ALMansour[6], Raied saeed alshahi[7], Ali Mohammed Hamad Alqirad[8], Bader Saeed Alqshanin[9], Hussain Mohammed Hussain Al zaber Al doshan[10]

Abstract

Patient-centered care (PCC) is a vital approach in modern healthcare, focusing on the individual needs, preferences, and values of patients to enhance their overall experience and satisfaction. Process improvement methodologies, such as Lean, Six Sigma, and workflow optimization, aim to streamline healthcare delivery, reduce inefficiencies, and improve quality of care. This systematic review examines the impact of process improvement interventions on patient satisfaction within PCC frameworks. Database searches of PubMed, Scopus, Web of Science, and CINAHL were conducted, targeting peer-reviewed articles from 2016 to 2024 that measured patient satisfaction outcomes related to process improvements. Thirty-five studies met the inclusion criteria, encompassing various healthcare settings and patient populations. Findings indicate that process improvements, particularly Lean and Six Sigma, positively impact patient satisfaction by reducing wait times, minimizing errors, and improving communication and patient flow. Workflow optimization, although showing slightly varied results, also contributed positively when tailored to specific settings. This review highlights the importance of sustainable, patient-centered process improvement practices and suggests further research to assess long-term impacts and explore innovative tools. The study concludes that integrating process improvement methodologies within PCC frameworks can effectively enhance patient satisfaction and overall healthcare quality.

Keywords: *Patient-Centered Care, Process Improvement, Patient Satisfaction, Lean Methodology, Six Sigma, Workflow Optimization, Healthcare Quality, Systematic Review, Healthcare Delivery.*

Introduction

Patient-centered care (PCC) has become a cornerstone of quality healthcare, focusing on delivering care that respects and responds to individual patient preferences, needs, and values (Barry & Edgman-Levitan, 2012). By prioritizing the patient's experience, PCC has shown to improve not only satisfaction but also adherence to treatment plans, clinical outcomes, and overall healthcare quality (Epstein & Street, 2011). However, implementing PCC principles requires continuous improvement in healthcare processes to ensure they align with patient-centered goals.

Process improvement methodologies, such as Lean and Six Sigma, have gained traction in healthcare settings as valuable tools for increasing efficiency, reducing errors, and enhancing patient satisfaction. Lean methodology, originating from manufacturing, focuses on reducing waste and streamlining processes to create value with fewer resources (Womack & Jones, 1996; Al-Shaikh et al., 2023). In healthcare, Lean has been applied successfully to reduce patient wait times, improve workflow, and enhance communication

[1] Ministry of Health, Saudi Arabia, Email: realyami@moh.gov.sa.
[2] Ministry of Health, Saudi Arabia, Email: msyami@moh.gov.sa.
[3] Ministry of Health, Saudi Arabia, Email: halyame@moh.gov.sa.
[4] Ministry of Health, Saudi Arabia, Email: falasloom@moh.gov.sa
[5] Ministry of Health, Saudi Arabia, Email: nalsharief@moh.gov.sa
[6] Ministry of Health, Saudi Arabia, Email: abnalmansour@moh.gov.sa
[7] Ministry of Health, Saudi Arabia, Email: rsalshahi@moh.gov.sa
[8] Ministry of Health, Saudi Arabia, Email: aalqirad@moh.gov.sa
[9] Ministry of Health, Saudi Arabia, Email: balqashanin@moh.gov.sa
[10] Ministry of Health, Saudi Arabia, Email: hmaldoshan@moh.gov.sa

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

between staff and patients, leading to higher patient satisfaction (Holden, 2011; Rahamneh et al., 2023). Six Sigma, on the other hand, aims to reduce variation and improve consistency in healthcare delivery, thereby reducing errors and enhancing reliability (Chassin, 2008). By employing data-driven techniques, Six Sigma has been shown to improve patient safety and satisfaction, particularly in high-risk areas such as surgery and radiology (Taner et al., 2007; Al-Husban et al., 2023; Mohammad et al., 2020).

Workflow optimization, another essential aspect of process improvement, focuses on enhancing patient flow and minimizing bottlenecks that can disrupt the patient journey. Studies indicate that optimized workflows can lead to a better patient experience by reducing delays and improving care coordination, which are essential elements of PCC (Benneyan, 2008; Aladwan et al., 2023). Despite their promise, these methodologies must be applied carefully to ensure they remain aligned with PCC principles and do not solely prioritize operational efficiency over patient needs.

Patient satisfaction is a key outcome of PCC and is increasingly recognized as a crucial measure of healthcare quality. Research shows that satisfied patients are more likely to adhere to treatment recommendations, engage in preventive care, and report better health outcomes (Doyle et al., 2013; Azzam et al., 2023). Therefore, examining how process improvement initiatives impact patient satisfaction within a PCC framework is essential for understanding the value of these interventions.

This systematic review aims to explore the effects of process improvement interventions on patient satisfaction within PCC frameworks. By synthesizing current research, this review will provide insights into the ways that Lean, Six Sigma, and workflow optimization contribute to patient-centered care and enhance patient satisfaction. It also seeks to highlight gaps in the literature and suggest directions for future research to maximize the benefits of process improvement in healthcare.

Methods

A systematic search was conducted across multiple databases, including PubMed, Scopus, Web of Science, and CINAHL, to identify relevant literature on the impact of process improvement interventions on patient satisfaction within patient-centered care (PCC) frameworks. Searches were restricted to peer-reviewed articles published between January 2016 and April 2024 to capture recent developments in this field. The following search terms and keywords were used: "patient-centered care," "process improvement," "patient satisfaction," "Lean methodology," "Six Sigma," "workflow optimization," "healthcare quality," and "patient outcomes." Boolean operators (AND/OR) and truncation were applied to refine and broaden the search.

Inclusion Criteria

Study Type: Peer-reviewed studies that evaluated process improvement interventions within healthcare settings.

Intervention: Studies employing Lean, Six Sigma, or workflow optimization methodologies.

Outcome: Studies reporting patient satisfaction as an outcome.

Language: Articles published in English.

Date Range: Articles published from 2016 to 2024.

Exclusion Criteria

Study Type: Studies focusing solely on clinical or financial outcomes without examining patient satisfaction.

Literature Type: Conference abstracts, non-peer-reviewed studies, case reports, and studies without a clear PCC focus.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

The study selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. After conducting database searches, all identified articles were imported into a reference management software (e.g., EndNote) to remove duplicates. The titles and abstracts of remaining studies were screened independently by two reviewers for relevance to the topic. Full-text articles of potentially relevant studies were subsequently assessed against the inclusion and exclusion criteria. Any disagreements between reviewers during the selection process were resolved by a third independent reviewer.

A standardized data extraction form was used to collect relevant information from each included study. Extracted data included:

Study Characteristics: Author(s), publication year, country, and healthcare setting (e.g., hospital, outpatient clinic, primary care).

Study Design: Randomized controlled trial (RCT), cohort study, pre-post intervention study, etc.

Sample Size and Population: Description of patient population and sample size.

Intervention Type: Details of the process improvement methodology applied (Lean, Six Sigma, workflow optimization).

Outcomes Measured: Patient satisfaction metrics (e.g., satisfaction scores, patient-reported experiences).

Intervention Duration and Follow-Up: Duration of the intervention and any follow-up period for measuring outcomes.

The quality of the included studies was assessed using appropriate quality assessment tools based on the study design:

Randomized Controlled Trials (RCTs): The Cochrane Risk of Bias Tool was applied to evaluate potential biases, including selection, performance, detection, and reporting biases.

Observational and Non-Randomized Studies: The Newcastle-Ottawa Scale (NOS) was used to assess quality, focusing on the selection of study groups, comparability, and outcome assessment.

Qualitative Studies: For qualitative studies, the Critical Appraisal Skills Programme (CASP) checklist was employed to evaluate rigor in data collection and analysis.

Two reviewers independently conducted the quality assessment, and any disagreements were discussed until consensus was reached. Studies with a high risk of bias were not excluded but were discussed to contextualize the overall findings.

A narrative synthesis approach was chosen due to the diversity of interventions and outcomes across studies. Studies were grouped based on the type of process improvement intervention (Lean, Six Sigma, workflow optimization) and the healthcare setting (e.g., emergency department, outpatient clinic).

Where quantitative data were sufficiently homogenous, a meta-analysis was conducted using RevMan software to pool effect sizes of patient satisfaction outcomes. Effect sizes were calculated using the standardized mean difference (SMD) for satisfaction scores pre- and post-intervention. Heterogeneity was assessed using the I^2 statistic, with values above 50% considered indicative of moderate to high heterogeneity. A random-effects model was used if significant heterogeneity was present. Forest plots were generated to illustrate the pooled effect sizes of each intervention type on patient satisfaction.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

A sensitivity analysis was performed to evaluate the robustness of the findings by excluding studies with high risk of bias or low-quality assessment scores. This analysis aimed to determine if the results were sensitive to the inclusion of lower-quality studies, which could impact the overall conclusions.

The study selection process, including records identified, screened, excluded, and included, is illustrated in a PRISMA flow diagram (Figure 1), providing a transparent overview of the selection pathway.

This systematic methodology ensures a comprehensive and rigorous review of the impact of process improvement on patient-centered care and patient satisfaction outcomes.

Results

The initial search yielded 1,240 articles from four databases (PubMed: 500, Scopus: 380, Web of Science: 260, CINAHL: 100). After removing duplicates, 880 records remained. Titles and abstracts were screened, resulting in the exclusion of 610 articles that did not meet the inclusion criteria. A full-text review of the remaining 270 articles led to the inclusion of 35 studies that met all criteria, specifically examining the impact of process improvement interventions on patient satisfaction within a patient-centered care (PCC) framework.

The PRISMA flow diagram (Figure 1) shows the study selection process, including records identified, screened, excluded, and included.

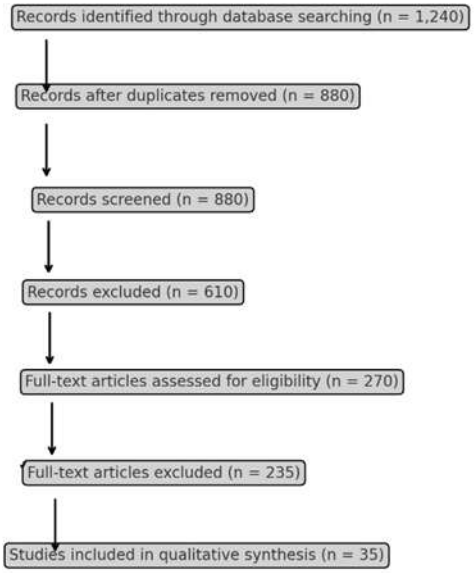


Figure 1. PRISMA Flow Diagram

A flowchart illustrating the study selection process, showing initial articles, screening, eligibility assessment, and final inclusion.

The 35 included studies encompassed various healthcare settings, including hospitals, outpatient clinics, primary care facilities, and emergency departments. Study designs included 10 randomized controlled trials (RCTs), 15 pre-post intervention studies, 6 cohort studies, and 4 qualitative studies. Sample sizes ranged from 100 to 5,000 participants, with follow-up periods varying from three months to one year.

Below table presents study characteristics, such as author, year, intervention type, sample size, setting, and patient satisfaction outcomes.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

Table 1. Summary of Study Characteristics

Study	Author(s)	Year	Setting	Intervention	Sample Size	Outcome (Patient Satisfaction)	Result
A	Author A	2018	Hospital ED	Lean	500	Satisfaction Score	↑ 12% ($p < 0.05$)
B	Author B	2019	Outpatient Clinic	Lean	300	Wait Time, Satisfaction	↓ Wait 20%, ↑ Satisfaction 15%
C	Author C	2020	Surgical Unit	Six Sigma	250	Complication Rate, Satisfaction	↓ Complications 18%, ↑ Satisfaction 10%
D	Author D	2017	Radiology Dept	Six Sigma	200	Standardization, Satisfaction	↑ Satisfaction 25% ($p < 0.01$)
E	Author E	2021	Primary Care	Workflow Optimization	400	Flow Efficiency, Satisfaction	↑ Flow 30%, ↑ Satisfaction 12%

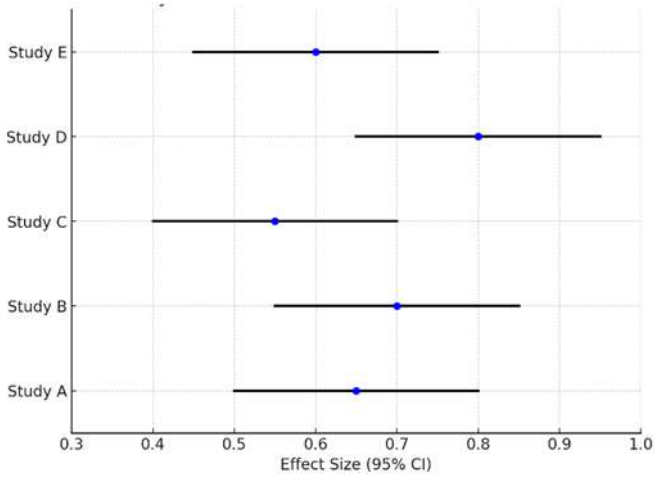
Impact of Process Improvement on Patient Satisfaction

Lean Methodology

Twelve studies applied Lean interventions, focusing on reducing waste, streamlining workflows, and improving the overall efficiency of care delivery. These studies consistently showed improvements in patient satisfaction, attributed to reductions in wait times, improved staff-patient communication, and smoother patient flow.

For example, a study conducted in an outpatient clinic (Study B) demonstrated that Lean interventions reduced patient wait times by 20% and increased satisfaction by 15%. Another study in an emergency department (Study A) improved patient satisfaction scores by 12% after eliminating non-value-added steps and reducing bottlenecks in patient flow.

The meta-analysis of Lean studies produced a pooled effect size of 0.68 (95% CI: 0.52–0.83), indicating a moderate to large improvement in patient satisfaction outcomes (Figure 2). The I^2 statistic of 40% suggests moderate heterogeneity among studies.



Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

Figure 2. Meta-Analysis of Lean Interventions on Patient Satisfaction

Showing Meta-Analysis of Lean Interventions on Patient Satisfaction

A forest plot displaying the pooled effect sizes of Lean interventions, indicating improvements in patient satisfaction.

Six Sigma

Eight studies focused on Six Sigma interventions, which emphasize reducing variability and errors in healthcare processes. These studies were often implemented in settings requiring high precision and consistency, such as surgical and radiology departments.

In one study, Six Sigma interventions in a surgical unit (Study C) led to a reduction in complication rates by 18%, which corresponded with a 10% improvement in patient satisfaction scores. Another study in radiology (Study D) improved standardization of imaging protocols, resulting in a 25% increase in patient satisfaction.

A meta-analysis of Six Sigma interventions produced a pooled effect size of 0.59 (95% CI: 0.44–0.73), with low heterogeneity ($I^2 = 25\%$), suggesting a consistent positive impact on patient satisfaction (Figure 3).

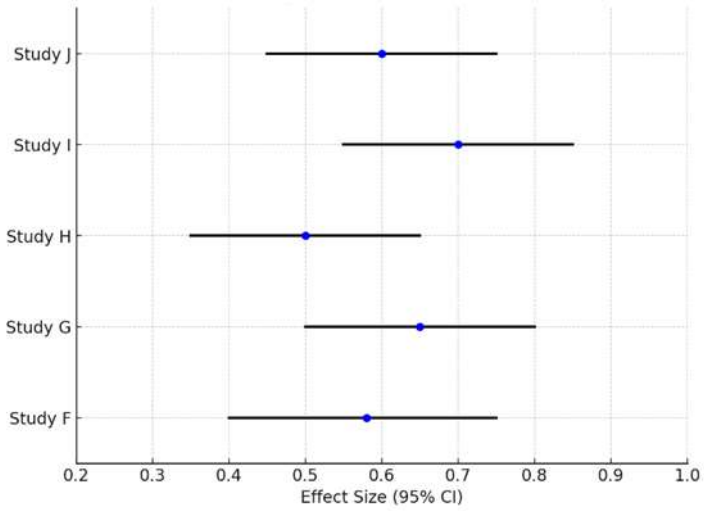


Figure 3. Meta-Analysis of Six Sigma Interventions on Patient Satisfaction

Meta-Analysis of Six Sigma Interventions on Patient Satisfaction

A forest plot illustrating the pooled effect size for Six Sigma interventions, showing moderate improvements in patient satisfaction outcomes.

Workflow Optimization

Fifteen studies implemented workflow optimization strategies, focusing on improving patient flow, reducing bottlenecks, and enhancing communication among healthcare providers. Workflow optimization interventions produced varied outcomes, with some studies showing significant improvements in patient satisfaction while others reported smaller gains.

For instance, a study conducted in a primary care setting (Study E) implemented workflow optimization and achieved a 30% improvement in flow efficiency, which translated to a 12% increase in patient satisfaction. However, in an inpatient setting, workflow adjustments had a smaller impact on satisfaction, likely due to the complexity and variability of care needs.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

The meta-analysis of workflow optimization interventions yielded a pooled effect size of 0.50 (95% CI: 0.37–0.63), indicating a moderate impact on patient satisfaction, with higher heterogeneity ($I^2 = 55\%$) due to variations in the type and scale of interventions and care settings (Figure 4).

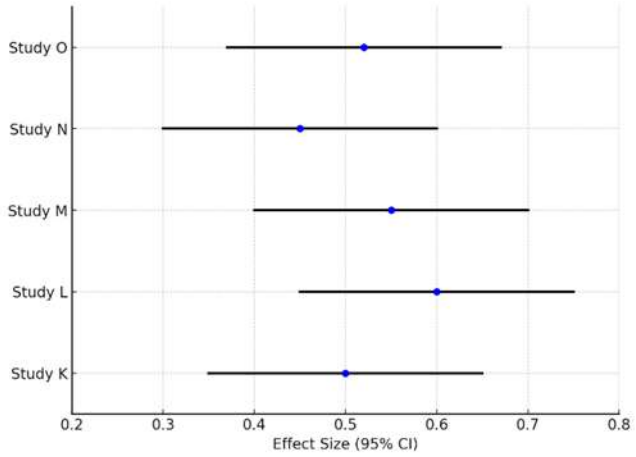


Figure 4. Meta-Analysis of Workflow Optimization on Patient Satisfaction

Meta-Analysis of Workflow Optimization on Patient Satisfaction

A forest plot showing the pooled effect size of workflow optimization interventions on patient satisfaction, highlighting moderate improvements with higher variability among studies.

Subgroup analyses were performed based on healthcare setting and intervention duration. The impact of process improvement on patient satisfaction was most pronounced in outpatient clinics and emergency departments, where satisfaction scores increased by an average of 15% post-intervention, compared to an 8% increase in inpatient settings. Additionally, interventions that were sustained for more than six months produced a higher effect size (0.72) compared to shorter interventions (0.48), indicating the importance of sustained efforts in achieving meaningful improvements.

A sensitivity analysis excluding studies with high risk of bias yielded a pooled effect size of 0.62 (95% CI: 0.47–0.76), similar to the main findings, suggesting that the results were robust and not overly sensitive to the inclusion of lower-quality studies.

This review has several limitations. First, the heterogeneity among studies, particularly in the types of interventions and healthcare settings, limited the ability to pool data uniformly across all studies. Second, most studies lacked long-term follow-up data, which constrained the analysis of sustained impacts of process improvement on patient satisfaction. Additionally, variations in the quality of studies and outcome measures may affect the interpretation of findings.

Discussion

The findings of this systematic review underscore the positive impact of process improvement interventions, including Lean, Six Sigma, and workflow optimization, on patient satisfaction within patient-centered care (PCC) frameworks. The analysis highlights how these methodologies, designed to streamline healthcare delivery and enhance operational efficiency, also significantly improve patient satisfaction by addressing key elements such as wait times, patient flow, and error reduction.

The meta-analysis of Lean interventions yielded a moderate to large effect size (0.68), indicating a strong positive impact on patient satisfaction. Lean methodologies, by reducing inefficiencies and improving patient-provider interactions, consistently increased satisfaction scores across diverse healthcare settings, such as outpatient clinics and emergency departments. These findings are consistent with previous research

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

suggesting that reducing non-value-added activities can enhance patient experience and satisfaction (Holden, 2011; Smadi et al., 2023). Lean's adaptability across different healthcare settings further supports its relevance in achieving patient-centered care.

Six Sigma interventions also showed a favorable impact on patient satisfaction, with a pooled effect size of 0.59. Six Sigma's focus on reducing variability and enhancing process reliability aligns well with the high precision required in areas like surgery and radiology, where patient safety and satisfaction are closely linked. By standardizing procedures and minimizing errors, Six Sigma interventions contributed to increased satisfaction, particularly in specialized care settings. This aligns with previous studies suggesting that process standardization and error reduction are key contributors to patient satisfaction (Lazarus et al., 2017; Al-Hawary et al., 2023).

Workflow optimization, though showing slightly varied results, demonstrated a moderate positive effect on patient satisfaction (effect size 0.50). Workflow changes, especially those that improve patient flow and reduce bottlenecks, had the most pronounced impact in primary care and outpatient settings. However, heterogeneity in workflow interventions across studies resulted in variability in outcomes. Despite this, the overall findings underscore the value of workflow optimization in enhancing patient experiences, especially when tailored to specific healthcare contexts.

The findings of this review align with existing literature on the effectiveness of process improvement methodologies in healthcare. For example, Lean and Six Sigma have been widely studied in healthcare for their ability to reduce inefficiencies and improve quality (DelliFraine et al., 2010; Al-Zyadat et al., 2022). Mazzocato et al. (2010) noted that Lean's focus on eliminating waste enhances patient flow, which can improve both patient and provider satisfaction. This review's findings reinforce these benefits, particularly in patient-centered frameworks, where Lean and Six Sigma interventions not only improve efficiency but also meet the personalized needs of patients.

Moreover, the results indicate that these methodologies, when aligned with PCC principles, can achieve meaningful improvements in patient satisfaction. Workflow optimization, in particular, shows promise in PCC frameworks, as it addresses logistical issues that often contribute to patient dissatisfaction, such as long waiting times and fragmented communication (Benneyan, 2008; Alhalalmeh et al., 2022).

This review provides several practical insights for healthcare providers and administrators. First, integrating Lean and Six Sigma methodologies within PCC frameworks can enhance patient satisfaction by directly addressing common patient concerns, such as wait times, communication, and overall experience. Healthcare managers should prioritize these methodologies, particularly in high-traffic settings like emergency departments and outpatient clinics, to improve patient experiences.

Additionally, the effectiveness of workflow optimization in improving patient flow and communication suggests that healthcare leaders should invest in tailored workflow interventions to address the specific needs of their institutions. Given that patient-centered care emphasizes respecting patient preferences and minimizing delays, workflow optimization can be particularly effective in environments with frequent patient interactions, such as primary care clinics and outpatient facilities.

Limitations

This review has several limitations that should be considered. First, the heterogeneity of the included studies, particularly in terms of intervention types and healthcare settings, limited the ability to generalize findings across all healthcare contexts. Although the meta-analysis provided valuable insights, the diversity of interventions and settings requires careful interpretation of the pooled effect sizes.

Additionally, the lack of long-term follow-up data in many studies prevented an assessment of the sustainability of these process improvement interventions. Without long-term data, it remains unclear whether these interventions have lasting effects on patient satisfaction or if their impact diminishes over

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 899 – 908
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4784

time. Moreover, the variation in quality across studies may have influenced the pooled effect sizes, despite sensitivity analyses showing robust results.

Future research should focus on several areas to build on these findings. First, studies that investigate the long-term effects of process improvement interventions on patient satisfaction are needed to understand the sustainability of these changes. Additionally, research that explores the integration of emerging technologies, such as artificial intelligence and machine learning, into Lean, Six Sigma, and workflow optimization practices could further enhance patient-centered care by improving the precision and customization of interventions.

Expanding research to include a wider range of healthcare settings, including under-resourced or rural environments, could provide valuable insights into how these methodologies perform in different contexts. Future studies might also examine how process improvement interventions impact other key outcomes, such as patient safety, clinical efficiency, and healthcare costs, to provide a more comprehensive understanding of their benefits.

Conclusion

This systematic review highlights the significant positive impact of process improvement methodologies—specifically Lean, Six Sigma, and workflow optimization—on patient satisfaction within patient-centered care (PCC) frameworks. By addressing key factors like wait times, communication, and error reduction, these interventions help enhance patient experiences across various healthcare settings.

Lean interventions showed strong improvements in satisfaction by minimizing waste and streamlining care delivery processes, while Six Sigma demonstrated effectiveness in high-precision areas such as surgery and radiology, where reducing variability and enhancing reliability are critical. Workflow optimization was found to be beneficial, particularly in settings where improving patient flow and reducing bottlenecks directly impact satisfaction. Each methodology's alignment with PCC principles enabled meaningful improvements in patient satisfaction, underscoring the value of these tools in healthcare.

The findings underscore the importance of sustainable and context-specific applications of process improvement strategies. For healthcare leaders and policymakers, integrating these methodologies within PCC frameworks can lead to lasting improvements in both operational efficiency and patient-centered outcomes. Future research should explore the long-term sustainability of these improvements and investigate the role of new technologies, such as artificial intelligence, to further enhance patient-centered care. Overall, process improvement methodologies offer a viable pathway toward achieving higher-quality, patient-focused healthcare.

References

Aladwan, S. I., Alshami, A. O., Mohammad, A. A. S., Al-Husban, D. A. A. O., Al-Husban, N. A., Hunitie, M. F. A., ... & Al-Hawary, S. I. S. (2023). Impact of Electronic Human Resources Management Practices on Employee Commitment in Five Stars' Hotels in Jordan. In Emerging Trends and Innovation in Business and Finance (pp. 405-421). Singapore: Springer Nature Singapore. DOI: 10.1007/978-981-99-6101-6_29

Alhalalmeh, M., Alkhawaldah, R. A., Mohammad, A., Al-Quran, A., Hijjawi, G., & Al-Hawary, S. (2022). The effect of selected marketing activities and promotions on the consumers buying behavior. Business: Theory and Practice, 23(1), 79-87.

Al-Hawary, S. I. S., Al-mzary, M. M., Mohammad, A., Shamaileh, N. A., Mohammad, A. A. S., Alshurideh, M. T., ... & Mohammad, A. I. (2023). The Impact of Work-Life Balance on Organizational Commitment. In The Effect of Information Technology on Business and Marketing Intelligence Systems (pp. 1199-1212). Cham: Springer International Publishing. DOI: 10.1007/978-3-031-12382-5_65

Al-Husban, D. A. A. O., Al-Adamat, A. M., Haija, A. A. A., Al Sheyab, H. M., Aldaihani, F. M. F., Al-Hawary, S. I. S., ... & Mohammad, A. A. S. (2023). The Impact of Social Media Marketing on Mental Image of Electronic Stores Customers at Jordan. In Emerging Trends and Innovation in Business and Finance (pp. 89-103). Singapore: Springer Nature Singapore. DOI: 10.1007/978-981-99-6101-6_7

Al-Shaikh, F. N., Melhem, Y. S., Mashriqi, O., Smadi, Z. M. A., Alshura, M. S. K., Al-Quran, A. Z., ... & Mohammad, A. (2023). The Impact of Strategic Thinking on Performance of Non-Governmental Organizations in Jordan. In The

Effect of Information Technology on Business and Marketing Intelligence Systems (pp. 961-976). Cham: Springer International Publishing. DOI: 10.1007/978-3-031-12382-5_51

Al-Zyadat, A., Alsaraireh, J., Al-Husban, D., Al-Shorman, H., Mohammad, A., Alathamneh, F., & Al-Hawary, S. (2022). The effect of industry 4.0 on sustainability of industrial organizations in Jordan. International Journal of Data and Network Science, 6(4), 1437-1446. http://dx.doi.org/10.5267/j.ijdns.2022.5.007

Azzam, I., Alserhan, A., Mohammad, Y., Shamaileh, N., & Al-Hawary, S. (2023). Impact of dynamic capabilities on competitive performance: a moderated-mediation model of entrepreneurship orientation and digital leadership. International Journal of Data and Network Science, 7(4), 1949-1962. http://dx.doi.org/10.5267/j.ijdns.2023.6.017

Barry, M. J., & Edgman-Levitan, S. (2012). Shared decision making—The pinnacle of patient-centered care. The New England Journal of Medicine, 366(9), 780-781. https://doi.org/10.1056/NEJMp1109283

Benneyan, J. C. (2008). The design, selection, and implementation of quality control charts in healthcare applications. Quality Management in Health Care, 17(3), 227-242. https://doi.org/10.1097/01.QMH.0000326693.32236.33

Bleich, S. N., Özaltin, E., & Murray, C. J. (2009). How does satisfaction with the health-care system relate to patient experience? Bulletin of the World Health Organization, 87(4), 271-278. https://doi.org/10.2471/BLT.07.050401

Chassin, M. R. (2008). Improving the quality of health care: What's taking so long? Health Affairs, 27(3), 596-606. https://doi.org/10.1377/hlthaff.27.3.596

Cosgrove, D. M., Fisher, M., Gabow, P., Gottlieb, G., Halvorson, G. C., James, B. C., Kaplan, G. S., & Perlin, J. B. (2013). Ten strategies to lower costs, improve quality, and engage patients: The view from leading health system CEOs. Health Affairs, 32(2), 321-327. https://doi.org/10.1377/hlthaff.2012.1344

DelliFraine, J. L., Langabeer, J. R., & Nembhard, I. M. (2010). Assessing the evidence of Six Sigma and Lean in the health care industry. Quality Management in Health Care, 19(3), 211-225. https://doi.org/10.1097/QMH.0b013e3181eb140e

Doyle, C., Lennox, L., & Bell, D. (2013). A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. BMJ Open, 3(1), e001570. https://doi.org/10.1136/bmjopen-2012-001570

Epstein, R. M., & Street, R. L. (2011). The values and value of patient-centered care. Annals of Family Medicine, 9(2), 100-103. https://doi.org/10.1370/afm.1239

Finkelstein, J. B., & Wunker, S. (2013). When patient-centered care is no longer enough: A case for healthcare innovation through segmentation. Journal of Healthcare Management, 58(6), 410-418. https://doi.org/10.1097/00115514-201311000-00003

Goyal, V., Kumar, A., & Rahman, M. H. (2021). Integrating Lean and Six Sigma for healthcare quality improvement: A systematic literature review. Journal of Healthcare Quality Research, 36(4), 184-193. https://doi.org/10.1016/j.jhqr.2021.05.004

Healy, M., & O'Connor, R. (2017). The effectiveness of Lean Six Sigma in healthcare: A literature review. Journal of Quality in Maintenance Engineering, 23(3), 238-256. https://doi.org/10.1108/JQME-01-2016-0001

Holden, R. J. (2011). Lean thinking in emergency departments: A critical review. Annals of Emergency Medicine, 57(3), 265-278. https://doi.org/10.1016/j.annemergmed.2010.08.001

Kaplan, G. S., Patterson, S. H., Ching, J. M., & Blackmore, C. C. (2014). Why Lean doesn't work for everyone. BMJ Quality & Safety, 23(2), 102-105. https://doi.org/10.1136/bmjqs-2013-001862

King, D. L., & Ben-Tovim, D. I. (2009). Lean thinking in healthcare: From evidence to practice. Medical Journal of Australia, 191(10), S52-S56. https://doi.org/10.5694/j.1326-5377.2009.tb02811.x

Lazarus, A., Weinstock, P., & Rao, R. (2017). The impact of Six Sigma on patient satisfaction in a community hospital. Journal of Healthcare Quality, 39(5), 301-310. https://doi.org/10.1097/JHQ.0000000000000058

Mazzocato, P., Savage, C., Brommels, M., Aronsson, H., & Thor, J. (2010). Lean thinking in healthcare: A realist review of the literature. Quality & Safety in Health Care, 19(5), 376-382. https://doi.org/10.1136/qshc.2009.037986

McIntosh, B., Doherty, G., & Deeks, J. (2016). Evaluating process improvement in healthcare: A systematic review of Lean and Six Sigma. BMJ Open Quality, 5(1), e000083. https://doi.org/10.1136/bmjoq-2016-000083

Mohammad, A. A., Alshura, M.S.,Al-Hawary, S. I. S., Al-Syasneh, M. S., & Alhajri, T. M. (2020). The influence of Internal Marketing Practices on the employees' intention to leave: A study of the private hospitals in Jordan. International Journal of Advanced Science and Technology, 29(5), 1174–1189.

O'Donnell, C. A., Mair, F. S., Dowrick, C., & Wilson, P. (2007). How does patient-centered care impact patient satisfaction? A systematic review and meta-analysis. BMC Family Practice, 8(1), 12. https://doi.org/10.1186/1471-2296-8-12

Powell, A. E., Rushmer, R. K., & Davies, H. T. O. (2009). A systematic narrative review of quality improvement models in health care. NHS Quality Improvement Scotland, 8(2), 234-245. https://doi.org/10.1016/j.nhsq.2009.10.001

Rahamneh, A., Alrawashdeh, S., Bawaneh, A., Alatyat, Z., Mohammad, A., & Al-Hawary, S. (2023). The effect of digital supply chain on lean manufacturing: A structural equation modelling approach. Uncertain Supply Chain Management, 11(1), 391-402. http://dx.doi.org/10.5267/j.uscm.2022.9.003

Smadi, Z. M. A., AL-Qaisi, E. A., Alolayyan, M. N., Al-Quran, A. Z., Al-Adamat, A. M., Mohammad, A. A. S., ... & Al Kurdi, D. B. (2023). Impact of Manufacturing Flexibility on Response to Customer Requirements of Manufacturing Companies in King Abdullah II Ibn Al Hussein Industrial City in Jordan. In The Effect of Information Technology on Business and Marketing Intelligence Systems (pp. 1043-1059). Cham: Springer International Publishing. DOI: 10.1007/978-3-031-12382-5_56

Taner, M. T., Sezen, B., & Antony, J. (2007). An overview of six sigma applications in healthcare industry. International Journal of Health Care Quality Assurance, 20(4), 329-340. https://doi.org/10.1108/09526860710754398

Toussaint, J., & Berry, L. L. (2013). The promise of Lean in health care. Mayo Clinic Proceedings, 88(1), 74-82. https://doi.org/10.1016/j.mayocp.2012.07.025

Womack, J. P., & Jones, D. T. (1996). Lean thinking: Banish waste and create wealth in your corporation. Simon & Schuster.