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Original Research Article

Evaluating the impact of the "LaQshya" initiative on maternal care in operating rooms: A retrospective observational study

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Abstract

Background: Maternal mortality remains a major challenge in low- and middle-income countries like India. To address gaps in obstetric care, the Ministry of Health and Family Welfare, Government of India, launched the "LaQshya" initiative to improve the quality of care in labour rooms and maternity operation theatres (OTs). This study evaluates the impact of the LaQshya initiative on maternal outcomes in a tertiary care hospital.

Materials and Methods: A retrospective observational study was conducted over 8 months comparing outcomes from the pre-implementation phase (May–August 2024) and the post-implementation phase (September–December 2024) of the LaQshya initiative. Key metrics included adverse anesthesia events, drug stock-outs, patient satisfaction scores, WHO Safe Surgical Checklist compliance and critical equipment downtime. Paired t-tests and chi-square tests were used for data analysis.

Results: Implementation of the LaQshya initiative significantly improved outcomes. Adverse anesthesia events decreased from 7.3 to 2.3 per 100 cesarean sections. Drug stock-outs reduced from 5 to 1 per month, patient satisfaction scores rose from 62% to 92%, WHO checklist compliance improved from 56% to 95%, and critical equipment downtime decreased by 75%.

Conclusion: The LaQshya initiative demonstrated substantial improvements in maternal care, highlighting the importance of quality improvement programs in reducing morbidity and mortality. The findings support the scalability of LaQshya to other healthcare facilities.

Keywords: Maternal health, Quality improvement, Program evaluation, Caesarean section, Perinatal care, Health policy.

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1. Introduction

Maternal mortality continues to be a major global health concern, particularly in low- and middle-income countries. According to the World Health Organization (WHO), approximately 810 women die daily from preventable pregnancy-related causes, which underscores the scale of the problem.[1,2] India, with its vast population, has made progress in addressing maternal and neonatal health challenges, but the situation remains dire in many parts of the country. As of 2020, the maternal mortality ratio in India stood at 113 per 1,00,000 live births.[3] These figures, while representing some improvements, highlight the continued difficulties, which include inadequate infrastructure, limited medical resources, and inconsistent implementation of standardised care protocols.[4] These systemic challenges call for targeted interventions to improve the quality of care, especially in high-risk obstetric settings.

To address these persistent issues, the Government of India launched the "LaQshya" (Labor Room Quality Improvement Initiative) program in 2018. LaQshya aimed to improve the quality of care in labour rooms and maternity operation theatres in public healthcare facilities by focusing on key areas such as infrastructure enhancement, infection control, staffing, and adherence to standardised evidence-based practices, such as the WHO Safe Surgical Checklist.[5] By improving hygiene practices and strengthening infection

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prevention protocols, LaQshya sought to reduce the incidence of infections that could lead to severe complications. Furthermore, the initiative sought to address the issue of insufficient healthcare staff by ensuring that hospitals were appropriately staffed with trained professionals, particularly in critical care areas like labour rooms and operating theatres.[6]

Additionally, LaQshya focused on improving patient experience by ensuring that healthcare facilities were well-equipped and capable of managing obstetric emergencies efficiently. Regular training sessions for healthcare providers were integrated into the initiative to keep them updated on the latest evidence-based practices, thus helping to ensure that patient care was consistent and safe.[7] Studies from other countries have highlighted the importance of such initiatives in improving patient safety, reducing complications, and enhancing the overall quality of care in obstetric settings. These results underscore the importance of quality improvement programs like LaQshya, especially in resource-constrained settings, where the impact of such interventions can be profound.[8,9]

However, while LaQshya has been widely implemented across India, there remains a gap in understanding its specific impact in high-volume tertiary care centers. This study aims to fill that gap by evaluating the impact of the LaQshya initiative in a tertiary care hospital. It will focus on several key outcomes that directly reflect the quality of care provided in these settings, including adverse anaesthesia events, drug stock-outs, patient satisfaction score, WHO checklist compliance, and critical equipment downtime. These factors provide a comprehensive picture of the challenges faced in labour rooms and maternity operation theatres. Improvements in adverse event rates would suggest that LaQshya is effectively reducing complications, while increased patient satisfaction would reflect a better overall care experience. Monitoring drug stock-outs and equipment downtime will offer insight into the initiative's success in addressing some of the more systemic issues related to resource management and infrastructure. By evaluating the LaQshya initiative in a tertiary care hospital, this study will provide important data that can guide future healthcare policies and quality improvement programs.[10,11]

2. Materials and Methods

After obtaining the institutional ethics committee approval, this retrospective observational study was conducted with the goal was to assess the impact of the LaQshya initiative on key maternal outcomes. The study covered a eight-month period, from May to December 2024. It was divided into two phases: the pre-implementation phase (May–August 2024) and the post-implementation phase (September–December 2024).

2.1. Inclusion criteria

1. Women who underwent elective caesarean sections during the study period.
2. Patients with complete medical records available for review.
3. Women who delivered in the maternity operation theatre during the study period.
4. Patients who provided informed consent for the use of their data for research purposes.

2.2. Exclusion criteria

1. Women undergoing surgeries outside the maternity operation theatre.
2. Patients with incomplete or missing medical records.
3. Emergency caesarean sections.

The sample size is determined based on the historical data of the institution and the expected effect sizes of the LaQshya initiative. Given the expected improvements in key outcomes such as adverse anaesthesia events and patient satisfaction scores (based on prior similar interventions), a conservative effect size of 20-25% improvement was assumed.

Sample size formula:

$$n = (2* (Z\alpha/2 + Z\beta)^2 * \sigma^2) / \delta^2$$

Where:

n = required sample size per group,
$Z\alpha/2$ = Z-value for a 95% confidence level (1.96),
$Z\beta$ = Z-value for 80% power (0.84),
σ^2 = estimated variance of the outcome measure,
δ = minimum clinically significant difference (effect size).

The standard deviation (σ) of key continuous variables (e.g., adverse anesthesia events) was taken from prior institutional data, and the minimum clinically significant difference (δ) was defined as a 20-25% reduction in adverse events and a similar improvement in patient satisfaction scores. Based on these assumptions, the calculated sample size per group was approximately 100–120 patients to detect statistically significant differences with 80% power and a 95% confidence level. The total sample size across both groups was estimated to be around 200–240 patients, ensuring adequate power of the study.

As this was a retrospective analysis, randomisation was not possible. The control group consisted of patients from the pre-implementation phase, allowing for a comparison between outcomes before and after the LaQshya initiative was implemented. Selection bias was minimized by including all consecutive cases from both phases. The analysis was conducted by investigators who were not involved in the LaQshya intervention implementation, helping to mitigate potential bias in outcome assessments. Data for the study were gathered from hospital records, patient satisfaction

surveys, and departmental reports on drug stock levels and equipment performance. Five key outcomes were evaluated, each defined as follows:

1. Adverse anaesthesia events: These were defined as any complications related to anaesthesia during or after the caesarean section. This category included allergic reactions or drug toxicity, issues with intubation or ventilation, and complications such as low blood pressure, bradycardia, or respiratory distress that were directly linked to anaesthesia. The incidence of these events was recorded per 100 caesarean sections in both phases.
2. Drug stock-outs: A drug stock-out was defined as the unavailability of essential medications for more than 24 hours within a given month. Essential medications included those critical for obstetric care, such as antibiotics, pain relievers, and anaesthetic drugs etc. The frequency of drug stock-outs was monitored on a monthly basis and compared.
3. Patient satisfaction score: Patient satisfaction score was measured through a structured questionnaire that focused on various aspects of the care experience, such as communication with healthcare providers, pain management, cleanliness, and the overall experience at the hospital. Patients were asked to rate their satisfaction on a questionnaire.
4. WHO safe surgical checklist compliance: Compliance with the WHO Safe Surgical Checklist was measured by the percentage of caesarean sections in which the checklist was fully followed. This checklist is a widely recognised tool that helps improve patient safety by ensuring that key steps are not overlooked during the surgery.
5. Critical equipment downtime: This outcome was defined as the total time each month that essential medical equipment, such as anaesthesia machines, foetal monitors, and surgical instruments, was unavailable due to maintenance or malfunctions. The amount of downtime was recorded monthly, and the total downtime in both phases were compared.

The data were analysed using descriptive statistics to summarize the sample characteristics and the outcomes. Paired t-tests were used to compare continuous variables, such as the rate of adverse anesthesia events per 100 patients, between the two phases. For categorical variables, such as compliance with the WHO checklist, chi-square tests were applied. A p-value <0.05 was considered statistically significant.

3. Results

During the pre-implementation phase, adverse events occurred at a rate of 7.3 per 100 cesarean sections. However, in the post-implementation phase, this rate dropped substantially to 2.3 per 100 cesarean sections ($p < 0.001$) as shown in the **Table 1**. **Figure 1** illustrates a clear decline in adverse events each month after LaQshya was implemented, reflecting the initiative's positive impact on anaesthesia safety. In the pre-implementation phase, the hospital experienced an average of 5 drug stock-outs per month. After the implementation, the frequency of stock-outs dropped to just 1 per month ($p<0.001$). **Figure 2** clearly shows the reduction in drug stock-outs following the implementation of LaQshya, with a marked decline starting in September. Patient satisfaction saw a significant increase, rising from 72% in the pre-implementation phase to 92% in the post-implementation phase ($p < 0.001$). The **Figure 3** shows a steady increase in patient satisfaction throughout the study period, with a sharp rise in scores starting from September after LaQshya was implemented. The pre-implementation compliance rate was 56%, but by the end of the post-implementation phase, it had increased to 95% ($p<0.001$) as seen in **Table 1**. The **Figure 4** demonstrates a steady increase in compliance with the WHO checklist, with the most significant improvements occurring after the implementation of LaQshya, reaching 95% in December. Prior to the initiative, the average downtime was 24 hours per month. By the post-implementation phase, this dropped to just 6 hours per month, a 75% reduction ($p<0.001$). The line graph (**Figure 5**) shows a significant reduction in critical equipment downtime, with a steady decline throughout the study period following LaQshya's implementation.

Table 1: Comparison of key metrics before and after implementation of the Laqshya scheme in maternity operating theatre

Metric	**Pre- Implementation Months**				**Average**	**Post- Implementation Months**				**Average**	**p-value**
	May	June	July	August		September	October	November	December		
Adverse Anaesthesia Events *	8	7	6	8	7.3	3	2	2	2	2.3	<0.001
Drug Stock Outs	5	5	6	4	5	2	2	1	1	1	<0.001
Patient Satisfaction Score (%)	70	74	72	73	72	82	85	90	92	92	<0.001
Checklist Compliance (%)	50	55	58	60	56	70	80	90	96	95	<0.001
Equipment Downtime#	25	24	23	22	24	20	18	10	6	6	<0.001
*(per 100 C sections), # (hours/month)											

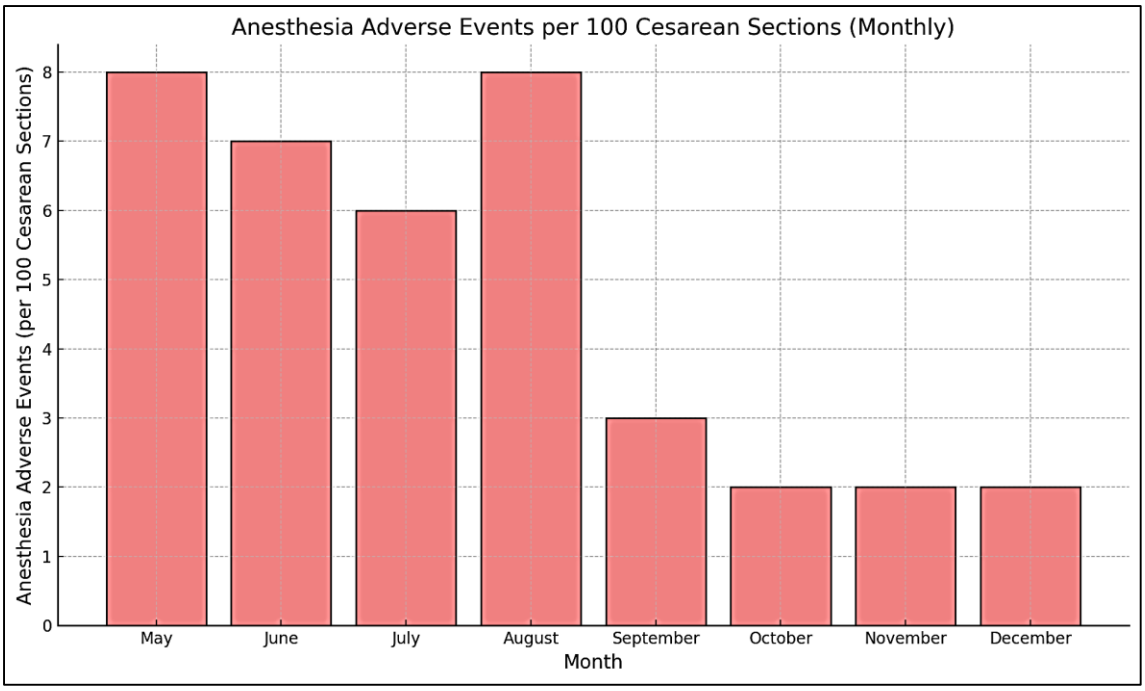

Figure 1: Adverse events per 100 cesarean sections

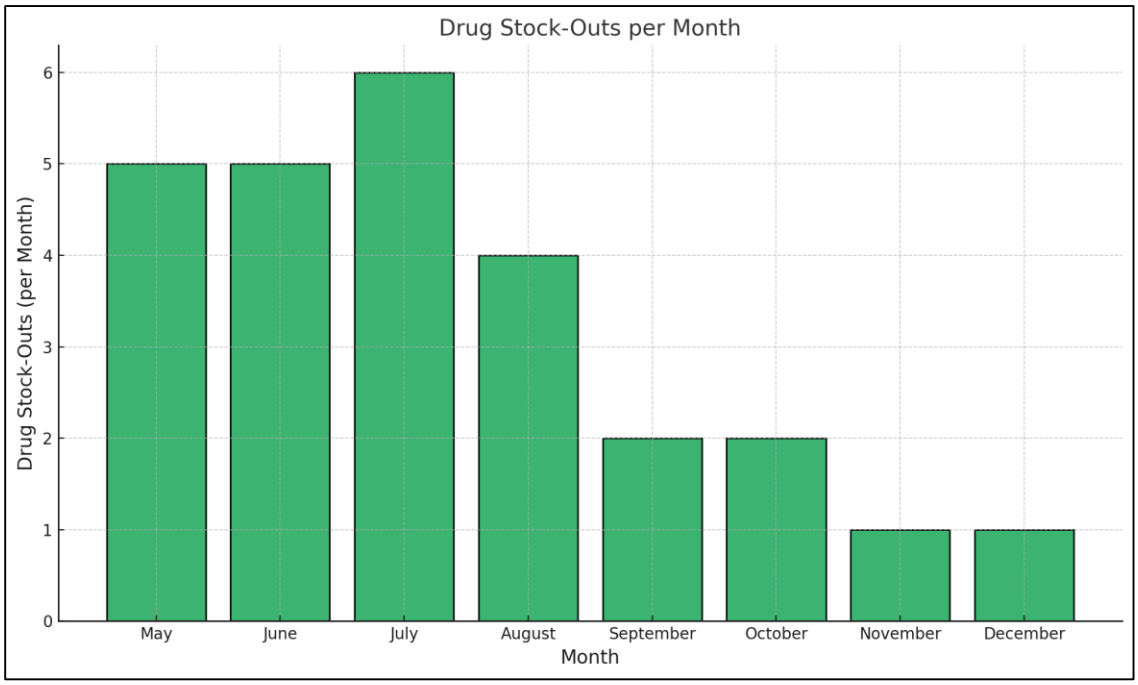

Figure 2: Drug stock-outs per month

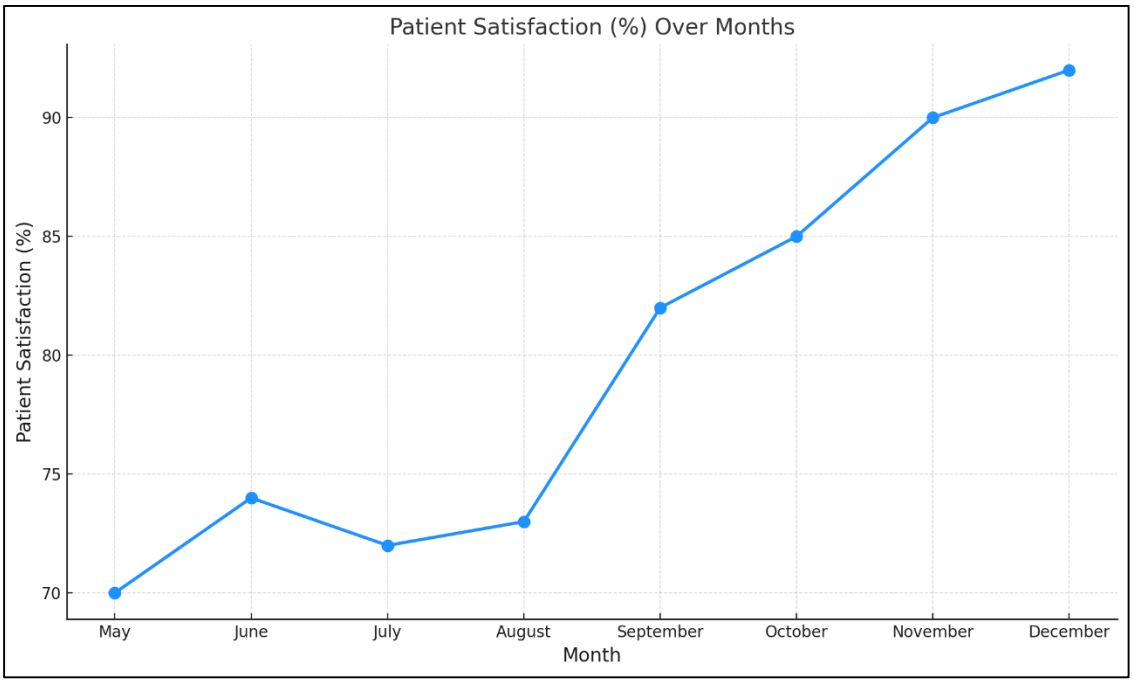

Figure 3: Patient satisfaction score

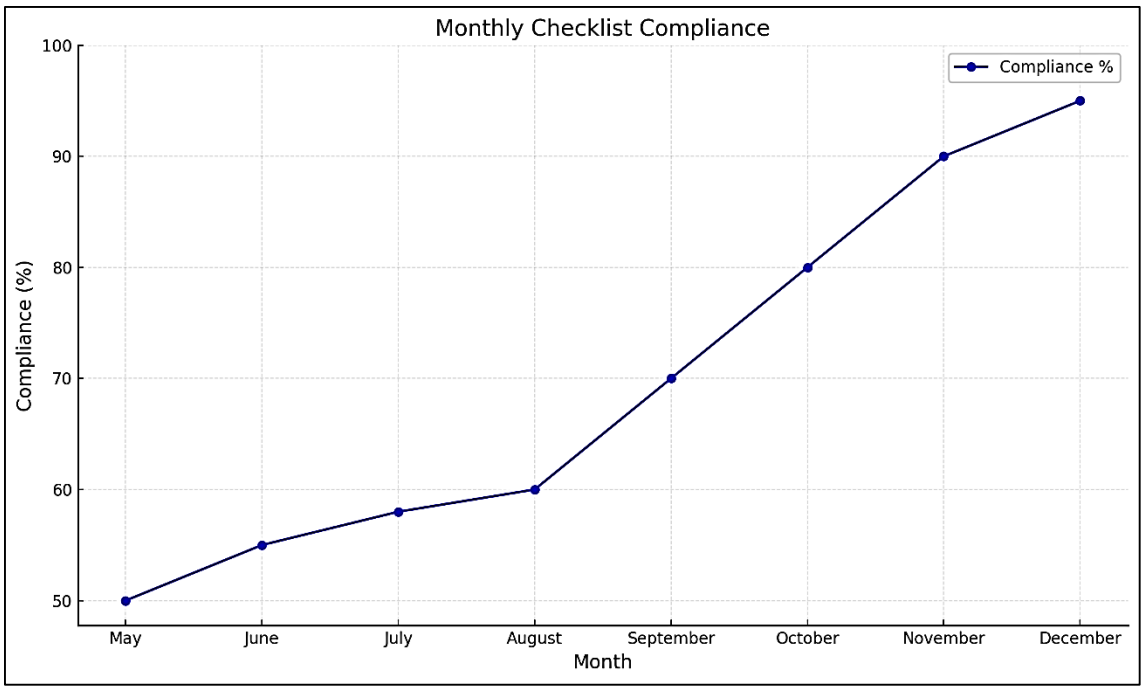

Figure 4: WHO safe surgical checklist compliance (%):

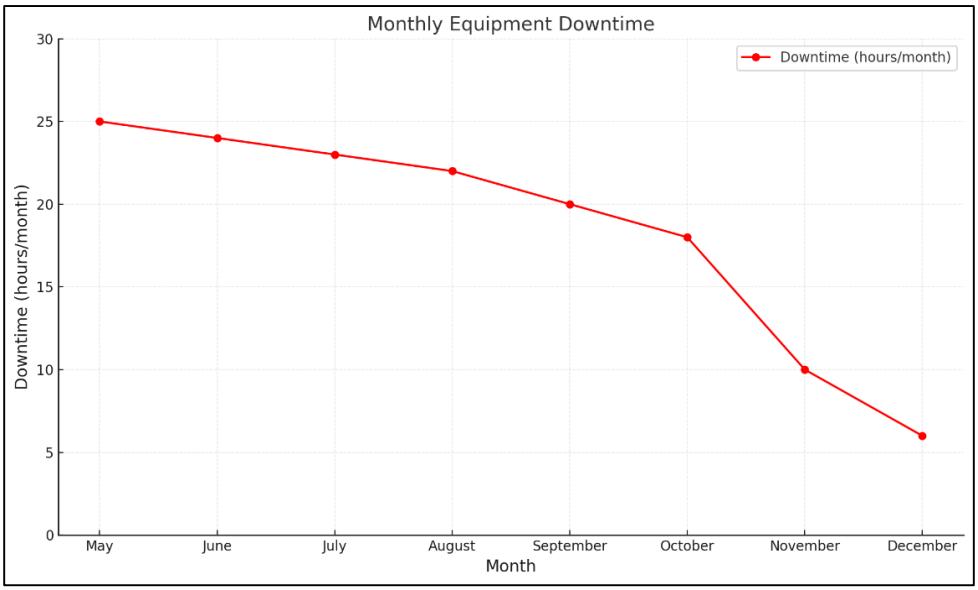

Figure 5: Critical equipment downtime (hours/month)

4. Discussion

The findings from this study demonstrate that the LaQshya initiative has had a significant positive impact on maternal care, leading to noticeable improvements in several key areas. These include a reduction in adverse anaesthesia events, drug stock-outs, and critical equipment downtime, as well as increased patient satisfaction and better adherence to the WHO Safe Surgical Checklist. One of the most striking results of the LaQshya initiative was the sharp decrease in adverse anaesthesia events from 8.5 per 100 caesarean sections to just 2.3 per 100 caesarean sections ($p < 0.001$). This marked improvement suggests that LaQshya helped strengthen anaesthesia safety protocols. This is consistent with findings from previous studies, which noted that structured quality improvement programs led to fewer anaesthesia complications during caesarean sections.[12] It is likely that LaQshya contributed to this improvement by enhancing both individual and team accountability, resulting in more consistent and safer anaesthesia practices. Other studies have also demonstrated that focusing on anaesthesia safety can reduce the occurrence of adverse events, especially when proper monitoring and standardised procedures are emphasized.[13] Also, there was significant reduction in drug stock-outs, dropping from an average of five stock-outs per month before the intervention to just one per month afterward. This is a crucial finding, as drug shortages can directly affect the quality of care. The reduction in stock-outs aligns with previous studies, which highlighted the importance of efficient inventory management systems in reducing shortages and improving drug availability.[14] By improving communication between hospital management and suppliers, LaQshya likely addressed many of the root causes of stock-outs.[15]

Patient satisfaction saw a significant improvement, rising from 72% in the pre-implementation phase to 92% after LaQshya was introduced ($p < 0.001$). This suggests that the initiative had a positive effect on the overall patient experience. Several factors could have contributed to this improvement, such as better communication, improved pain management, and a more compassionate approach to patient care. Previous similar studies found that targeted interventions to improve care protocols often result in higher patient satisfaction scores.[16] LaQshya's focus on better communication between healthcare providers and patients, along with an emphasis on pain relief and emotional support, may have played a key role in this increase in satisfaction. This is a strong indication that the initiative has positively impacted both clinical and interpersonal aspects of care. One of the most significant improvements observed was in the compliance with the WHO Safe Surgical Checklist, which increased from 56% before LaQshya to 95% afterward. The WHO checklist is a key tool for ensuring surgical safety, and its use has been shown to reduce surgical errors and improve patient outcomes.[18] These findings are consistent with previous studies, which showed that the implementation of the WHO checklist led to significant improvements in surgical safety across multiple healthcare settings.[19] The increase in checklist compliance can likely be attributed to LaQshya's emphasis on standardised protocols and improved team coordination during surgeries. Previous studies have underscored the effectiveness of such initiatives in improving both surgical safety and overall team performance.[20] The reduction in critical equipment downtime is another important outcome of the LaQshya initiative from 24 hours per month to just 6 hours per month, a remarkable 75% reduction. This improvement mirrors findings from previous studies which emphasised that regular maintenance and rapid response to equipment issues are essential in minimising downtime and ensuring that essential care equipment remains functional.[21] The reduction in downtime is particularly important in obstetric care, where delays in using critical equipment can have serious implications for patient safety.

This study has several strengths, including its comprehensive approach to evaluating multiple outcome measures in maternal care. By comparing pre- and post-implementation data, we were able to clearly assess the impact of LaQshya on key indicators of care quality. However, there are some limitations to this study. As an observational study, it cannot definitively rule out other factors, beyond the LaQshya initiative, that could have contributed to the observed improvements. Additionally, the study was conducted at a single institution, which may limit the generalisability of the results. Future research, including randomised controlled trials and multi-center studies, involving both elective and emergency caesarean sections is needed to further confirm these findings and explore the potential for scaling LaQshya to other settings.

5. Conclusion

Overall, the LaQshya initiative has had a substantial positive impact on several critical aspects of maternal care, including anaesthesia safety, drug availability, patient satisfaction score, surgical safety, and equipment reliability. These findings supports the idea that structured quality improvement programs can significantly enhance clinical outcomes. Moving forward, it is important to continue refining and implementing such initiatives to maintain and further improve the quality of care for mothers. Further research will also be necessary to explore the long-term sustainability of these improvements and the broader applicability of the LaQshya initiative in other healthcare settings.

6. Source of Funding

None.

7. Conflict of Interest

None.

8. Ethical Approval

Ethical No.: IEC/2022/2/08.

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