The influence of obstetrician experience stages on the outcome of Eracs surgery and its impact on professional satisfaction and managerial aspects

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Abstract

This study aims to examine the impact of obstetricians' clinical decision-making autonomy on the effectiveness of implementing the Enhanced Recovery After Caesarean Section (ERACS) protocol in obstetric care. ERACS is an evidence-based approach designed to optimize preoperative, intraoperative, and postoperative phases, aiming not only to accelerate physical recovery but also to enhance healthcare efficiency and patient-centered service quality. A quantitative method was employed using Partial Least Squares Structural Equation Modeling (PLS-SEM), involving 140 obstetricians actively engaged in ERACS procedures across various hospitals in Indonesia. The results reveal that physicians' clinical experience in each phase of the procedure significantly affects patient outcomes. Furthermore, decision-making autonomy strengthens this relationship, highlighting the direct influence of professional authority on care quality and recovery efficiency. In addition, awareness of postoperative quality indicators (ObsQoR awareness) is shown to positively influence both professional satisfaction among obstetricians and broader managerial performance in hospitals. These findings emphasize the need for empowering clinicians and promoting continuous training programs that support structured, evidence-based recovery protocols like ERACS. By bridging clinical excellence, patient experience, and organizational efficiency, this research contributes to the advancement of a more integrated and sustainable ERACS implementation framework in obstetric practice. It offers practical insights for healthcare policy and hospital management aimed at improving maternal outcomes through collaborative and autonomous clinical pathways.

Keywords: ERACS, Clinical autonomy, Patient outcomes, ObsQoR, Professional satisfaction, Managerial efficiency

Introduction

Enhanced Recovery After Surgery (ERAS), particularly in caesarean procedures known as Enhanced Recovery After Caesarean Section (ERACS), is becoming an increasingly relevant approach in modern obstetric practice. Every year, millions of women around the world undergo caesarean procedures, including in Indonesia, where the prevalence of caesarean delivery reaches 17.6% of total deliveries (Riskesdas, 2018). This high rate demands the implementation of protocols that can accelerate patient recovery, reduce postoperative complications, and improve the efficiency of health services. ERACS is an evidence-based multimodal protocol that includes minimal pain management, reduced surgical stress, and improved postoperative mobility, which has been shown to be effective in various types of surgery, but its implementation in obstetrics is limited (Mondal et al., 2023; Li et al., 2023).

Previous studies have shown that the implementation of ERACS can provide significant benefits in reducing complications and accelerating postoperative healing. For example, a study by Uhud et al. (2023) found that implementing ERACS in caesarean patients can reduce infection rates and improve patient satisfaction. Oktavia et al. (2023) also noted that the implementation of ERACS in hospitals in Jakarta had a positive impact on cost efficiency and duration of care. However, implementation challenges remain high, such as limited trained human resources, unprepared facilities, and low awareness of recovery indicators such as Obstetric Quality of Recovery (ObsQoR). This gap suggests the need for a new approach that considers important variables such as operator (obstetrician) satisfaction, managerial aspects, patient experience, and clinical autonomy in medical decision-making (Raharja & Aini, 2023; Purnaningrum, 2023; Moghavvemi et al., 2025).

Based on this description, this study aims to identify factors that influence the successful implementation of ERACS in obstetrics, especially in caesarean section

patients. The main focus is on the variables of operator satisfaction and managerial aspects, as well as the moderating role of physician autonomy and awareness of ObsQoR in improving patient outcomes. This study is expected to contribute novelty in the form of an integrative model of ERACS implementation based on patient experience in three phases (preoperative, intraoperative, and postoperative), as well as strengthening clinical autonomy to support optimal recovery.

Methods

This research paradigm uses a quantitative and positivist approach with the assumption that reality can be measured objectively through indicators that are defined and tested statistically The object of research is the relationship between Obstetrician Autonomy Patient Outcome of ERACS Procedure Obstetrician Professional Satisfaction Managerial Aspect and ObsQoR Awareness in the context of ERACS in obstetric patients, especially caesarean section The research objective is to analyze the effect of physician autonomy on the outcome of ERACS procedures professional satisfaction managerial aspect and patient awareness Data collected through online questionnaires with purposive sampling techniques based on relevant criteria Data were collected through an online questionnaire with purposive sampling technique based on relevant criteria The number of indicators is 40 so that a minimum of 400 respondents are needed Data analysis using PLS SEM with outer and inner model reliability validity tests and bootstrapping for significance Advanced analysis includes PLSpredict CVPAT and IPMA to determine improvement priorities based on performance and construct importance.

Results

1.Descriptive analysis

Based on the descriptive statistics of the various indicators in this study, it is generally seen that the mean values for almost all variables are above 4.0, indicating a high level of perception or judgment from the respondents towards the aspects measured.

Overall, the data show that respondents' perceptions of the various aspects of obstetric care are quite high and tend to be uniform, with little variation between items. However, the deviation from normal distribution suggests the need for a non-parametric statistical approach in further data processing.

2.Indicator reliability

Table 1: Reliability test results

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Results
Intraoperative Obstetrician Outcome	0,715	0,391	0,823	Reliable
Managerial Aspect	0,735	0,487	0,849	Reliable
ObsQoR Awareness	0,815	0,618	0,889	Reliable
Obstetrician Satisfaction	0,823	0,611	0,894	Reliable
Obstetrician Autonomy	0,763	0,529	0,863	Reliable
Patient Outcome	0,824	0,540	0,883	Reliable
Post Operative Obstetrician Outcome	0,849	0,488	0,888	Reliable
Pre-operative Obstetrician experience	0,766	0,520	0,865	Results

Overall, the reliability of the constructs in this study is adequate to very good, especially in terms of Cronbach's Alpha and Composite Reliability (rho_C). Some low rho_A values need further attention, perhaps by considering revising or strengthening items on related constructs in future research. But in general, this data shows that the instruments used are reliable enough to measure the research variables.

3.Construct validity

Table 2 Validity test results

Variable	Average variance extracted (AVE)
Intraoperative Obstetrician Outcome	0,539
Managerial Aspect	0,653
ObsQoR Awareness	0,727
Obstetrician Satisfaction	0,738
Obstetrician Autonomy	0,678
Patient Outcome	0,655
Post Operative Obstetrician Outcome	0,570
Pre-operative Obstetrician experience	0,681

All variables have AVE values > 0.50, indicating convergent validity has been met. This means that the indicators in each construct represent the same concept, and valid instruments are used to measure doctors' perceptions and experiences of ERACS implementation.

4.Discriminant validity

In general, the relationships between constructs, such as between Intra Operative Obstetrician Outcome and other constructs, as well as between Obstetrician Satisfaction, ObsQoR Awareness, and Managerial Aspect, showed HTMT values between 0.26 and 0.87, indicating good discriminant validity and absence of multicollinearity. The highest HTMT values were between Patient Outcome and Managerial Aspect (0.865) and with Obstetrician Satisfaction (0.870) within the tolerance limit.

However, the interaction between the construct "Obstetrician Autonomy" and other constructs through moderated variables showed HTMT values that exceeded the limit, viz:

1. Obstetrician_Autonomy × Post-Operative Obstetrician Outcome dengan Autonomy = 1,055
2. Obstetrician_Autonomy × Intra Operative Outcome dengan Autonomy = 1,039
3. Obstetrician_Autonomy × Pre-operative Experience dengan Autonomy = 1,008

Overall, the model has good discriminant validity, but the interaction results need to be scrutinized in the interpretation of the moderation model.

Table 3 R-Square

	R-square	R-square adjusted
Intra Operative_Obstetrician Outcome	0,480	0,468
Managerial _Aspect	0,475	0,468
Obstetrician _Satisfaction	0,534	0,527
Patient Outcome	0,415	0,384
Obstetrician experience instead of outcome	0,511	0,504

Based on the results of the analysis in Table 3, the model has a fairly good explanatory power for the dependent variable, with the highest R-square value in Obstetrician Satisfaction (0.534) and the lowest in Patient Outcome (0.415). Other variables such as Obstetrician Experience (0.511), Intra Operative Outcome (0.480), and Managerial Aspect (0.475) showed explanatory power between 47% and 51%. The adjusted R-square values ranged from 0.384 to 0.527, supporting that the model has moderate to strong explanatory power.

Hypothesis testing

Table 4 Hypothesis testing

No.	Hypothesis	Standardized Coefficient	p-value	CI 5.0%	CI 95.0%	Result
H1	*Pre-operative obstetrician experience → Intra-operative obstetrician outcome*	0.522	0	0.426	0.622	Supported

H2	*Pre-operative obstetrician experience → Post-operative obstetrician outcome*	0.35	0	0.221	0.473	Supported
H3	*Pre-operative obstetrician experience → Patient outcome*	-0.005	0.475	-0.15	0.135	Not Supported
H4	*Intra-operative obstetrician outcome → Post-operative obstetrician outcome*	0.436	0	0.295	0.579	Supported
H5	*Intra-operative obstetrician outcome → Patient outcome*	0.133	0.099	-0.046	0.292	Not Supported
H6	*Post-operative obstetrician outcome → Patient outcome*	0.224	0.032	0.046	0.443	Supported
H7	*Obstetrician autonomy × Pre-operative obstetrician experience → Intra-operative obstetrician outcome*	-0.134	0.004	-0.205	-0.04	Supported
H8	*Obstetrician autonomy × Intra-operative obstetrician outcome → Patient outcome*	-0.206	0.029	-0.384	-0.023	Supported
H9	*Obstetrician autonomy × Post-operative obstetrician outcome → Patient outcome*	-0.106	0.127	-0.257	0.046	Not Supported
H10	*Obstetrician autonomy × Pre-operative obstetrician experience → Patient outcome*	0.116	0.129	-0.039	0.296	Not Supported
H11	*Patient outcome → Obstetrician satisfaction*	0.644	0	0.536	0.74	Supported
H12	*Patient outcome → Managerial Aspect*	0.601	0	0.486	0.707	Supported
H13	*ObsQoR awareness → Obstetrician satisfaction*	0.148	0.027	0.026	0.276	Supported
H14	*ObsQoR awareness → Managerial Aspect*	0.149	0.039	0.012	0.289	Supported

H1: Pre-operative Obstetrician Experience → Intra-operative Obstetrician Outcome

Pre-operative experience had a significant positive effect on intra-operative outcome (β = 0.522; p = 0.000), reflecting the importance of communication, empathy, and patient involvement before surgery (Fredriksson et al., 2024; Deherder et al., 2022; Purnaningrum, 2023; Dou et al., 2024). These findings are in line with the PLS-SEM approach (Hair et al., 2022; Sarstedt et al., 2022; Cohen, 1988).

H2: Pre-operative → Post-operative Outcome

Pre-operative experience also had a positive effect on post-operative outcome (β = 0.350; p = 0.000), supporting that early education and empathy impact post-operative recovery (Fredriksson et al., 2024; Kingma, 2021; Purnaningrum, 2023; Dou et al., 2024;

Biyazin et al., 2022).

H3: Pre-operative → Patient Outcome

There was no significant effect (β = -0.005; p = 0.475), suggesting that patient outcomes are more determined by other factors, such as clinical quality and postoperative support (Dou et al., 2024; Kingma, 2021; Purnaningrum, 2023; Biyazin et al., 2022; Becker et al., 2022).

H4: Intra-operative → Post-operative Outcome

The significant relationship (β = 0.436; p < 0.001) indicates intra-operative effectiveness strongly influences the quality of the postoperative phase (Holmstrom et al., 2021; Dou et al., 2024; Mondal et al., 2023; Hair et al., 2022; Becker et al., 2022).

H5: Intra-operative → Patient Outcome

The relationship was positive but not significant (β = 0.133; p = 0.099), as patient outcomes are also influenced by external factors such as social support and advanced care (Rosenstein et al., 2015; Lukewich et al., 2022; Becker et al., 2013; Hair et al., 2018).

H6: Post-operative → Patient Outcome

Significant (β = 0.224; p = 0.032), indicating the importance of empathic communication, pain control, and postoperative education (Gausman et al., 2019; Imarengiaye & Imarengiaye, 2024; Ciechanowicz et al., 2019; Hair et al., 2022; Sarstedt et al., 2022).

H7: Autonomy × Pre-operative → Intra-operative

Negatively significant (β = -0.134; p = 0.004), suggesting high autonomy without control may reduce intra-operative team collaboration (Dou et al., 2024; Mondal et al., 2023; Hair et al., 2022; Oliver et al., 2022; Schwed et al., 2024; Deherder et al., 2022).

H8: Autonomy × Intra-operative → Patient Outcome

Negatively significant (β = -0.206; p = 0.029), as high autonomy may reduce the person-centered care approach (Kingma, 2021; Fredriksson et al., 2024; Sarstedt et al., 2022; Chin et al., 2020; Ciechanowicz et al., 2019; Biyazin et al., 2022).

H9: Autonomy × Post-operative → Patient Outcome

Not significant (β = -0.106; p = 0.127), presumably because the postoperative phase is more influenced by non-physician personnel and service management (Lukewich et al., 2022; Uhud et al., 2023; Ciechanowicz et al., 2019; Raharja & Aini, 2023; Hair et al., 2022; Memon et al., 2020).

H10: Autonomy × Pre-operative → Patient Outcome

Not significant (β = 0.116; p = 0.129), suggesting that pre-operative experience without effective communication has no impact on patient outcomes (Oktavia et al., 2023; Sharkiya, 2023; Imarengiaye & Imarengiaye, 2024; Sarstedt et al., 2022; Fredriksson et al., 2024; Quinn et al., 2021).

H11: Patient Outcome → Obstetrician Satisfaction

Strongly significant (β = 0.644; p = 0.000), suggesting that patient clinical success increases physician job satisfaction (Wrench et al., 2020; Sultan et al., 2021; Nelson et al., 2021).

H12: Patient Outcome → Managerial Aspect

Significant (β = 0.601; p = 0.000), indicating that good patient outcomes improve managerial efficiency and effectiveness (Wilson et al., 2019; Wrench et al., 2020; Sultan et al., 2021).

H13: ObsQoR Awareness → Obstetrician Satisfaction

Significant (β = 0.148; p = 0.027), suggesting that awareness of obstetric recovery measurement tools increases professional satisfaction (Gugino et al., 2021; Wrench et al., 2020).

H14: Managerial Aspect → Patient Outcome

Significant (β = 0.218; p = 0.029), reinforcing that good management contributes directly to improved patient outcomes (Wrench et al., 2020; Sultan et al., 2021; Nelson et al., 2021; Wilson et al., 2019; Porter, 2010).

Importance-Performance Mapping Analysis (IPMA)

Table 5 Importance-Performance Mapping Analysis (IPMA)

Construct	Importance (Total Effect)	Performance
Obstetrician_Autonomy	0,307	73,060
Intra Operative_Obstetrician Outcome	0,231	74,327
Post Operative_Obstetrician Outcome	0,224	71,120
Pre-operative_Obstetrician experience	0,193	74,205

Based on the IPMA results, the Obstetrician_Autonomy construct has the greatest influence on Patient Outcome (importance 0.307) despite its moderate performance (73.060), so improvements in this aspect have the potential to have a significant impact. The Intra Operative Outcome construct has the second-highest importance (0.231) and highest performance (74.327), indicating a good condition that needs to be maintained. Pre-operative Experience had the lowest importance (0.193) with high performance (74.205), while Post-Operative Outcome showed moderate importance (0.224) but the lowest performance (71.120), indicating the need for improvement. This finding confirms the importance of increasing physician autonomy as a top priority in improving patient outcomes.

Discussion

In this study, the relationship between variables in the Enhanced Recovery After Caesarean Section (ERACS) model was tested using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, which allows the analysis of relationships between latent variables in complex models. Bootstrapping techniques were used to assess the statistical significance of these relationships (Hair et al., 2018).

The results of the analysis showed that Pre-Operative Obstetrician Experience had a significant influence on Intra-Operative Obstetrician Outcome ($\beta = 0.522$; $p < 0.001$) and Post-Operative Obstetrician Outcome ($\beta = 0.350$; $p < 0.001$), confirming that obstetrician experience before surgery plays an important role in shaping clinical performance both during and after surgery. However, its effect on Patient Outcome was not significant ($\beta = -0.005$; $p = 0.475$), in line with Raharja & Aini's (2023) findings that early experience does not directly impact patient outcomes.

Furthermore, Intra-operative Obstetrician Outcome had a significant effect on Post-Operative Obstetrician Outcome ($\beta = 0.436$; $p < 0.001$), but not on Patient Outcome ($\beta = 0.133$; $p = 0.099$). In contrast, Post-operative Obstetrician Outcome showed a significant effect on Patient Outcome ($\beta = 0.224$; $p = 0.032$), reinforcing the importance of quality monitoring and care in the recovery phase (Becker et al., 2022).

Regarding moderating variables, Obstetrician Autonomy negatively moderated the relationship between Pre-Operative Experience and Intra-operative Outcome ($\beta = -0.134$; $p = 0.004$) as well as between Intra-operative Outcome and Patient Outcome ($\beta = -0.206$; $p = 0.029$). This suggests that high autonomy may attenuate the positive effect of physician experience or performance on clinical outcomes. However, autonomy did not show a significant moderating effect on other relationships, including with Patient Outcome, through either Pre- or Post-operative experience.

Patient Outcome has a significant influence on Obstetrician Satisfaction ($\beta = 0.644$; $p < 0.001$) and Managerial Aspect ($\beta = 0.601$; $p < 0.001$). This suggests that the clinical success of patients contributes greatly to improving physician professional satisfaction as well as the overall efficiency and effectiveness of the hospital managerial system (Sarstedt et al., 2022; Lukewich et al., 2022).

In addition, ObsQoR Awareness has a significant effect on Obstetrician Satisfaction ($\beta = 0.148$; $p = 0.027$) and Managerial Aspect ($\beta = 0.149$; $p = 0.039$). This suggests that awareness of the quality of patient recovery drives physician job satisfaction and improved hospital managerial performance, as found by Biyazin et al. (2022) and Sharma et al. (2022).

From this analysis, it can be concluded that the most influential factor on Patient Outcome is Post-Operative Obstetrician Outcome and the negative moderation of Obstetrician Autonomy on intraoperative performance. Meanwhile, a physician's preoperative experience was not shown to have a direct impact on patient outcomes. Improving the quality of postoperative care, increasing awareness of ObsQoR, and proportionally managing clinical autonomy are key to effectively strengthening ERACS implementation.

Based on the results of PLS-SEM analysis of the ERACS (Enhanced Recovery After Caesarean Section) model, this study concluded that Post-Operative Obstetrician Outcome was the most significant factor in influencing Patient Outcome, confirming the

importance of quality of care and recovery after surgery. Although Pre-Operative Obstetrician Experience has an important role in shaping physician performance during and after the procedure, its direct influence on patient clinical outcomes was not significant. Meanwhile, Obstetrician Autonomy showed a negative moderating effect in two important pathways, namely between preoperative experience and intraoperative performance, and between intraoperative performance and patient outcomes. This suggests that undirected autonomy may attenuate the positive impact of clinical experiences or decisions on patient success.

Conclusion

This study demonstrates that the effectiveness of ERACS implementation in obstetric care is primarily determined by the quality of postoperative management and the structured integration of patient-centered recovery protocols. While pre-operative obstetrician experience significantly improves intra-operative and post-operative physician performance, its direct impact on patient outcomes is not evident. Instead, patient outcomes are more strongly shaped by postoperative clinical performance and the organizational capacity to support consistent recovery practices.

Furthermore, obstetrician autonomy, although essential for clinical judgment, shows a paradoxical effect when not guided by standardized protocols—reducing the positive influence of experience and intra-operative performance on patient outcomes. These findings highlight the importance of balanced autonomy, where clinical freedom is supported by evidence-based pathways to optimize consistency and safety.

Patient outcomes were also shown to be strong predictors of both professional satisfaction and managerial effectiveness, emphasizing that improving clinical success directly contributes to organizational quality and workforce well-being. Additionally, awareness of ObsQoR plays an important role in strengthening both physician satisfaction and managerial performance, indicating its value as an essential monitoring and evaluation tool in ERACS pathways.

Overall, this research underscores the need for hospitals to enhance postoperative care quality, strengthen clinician awareness of recovery indicators, and calibrate clinical autonomy within structured ERACS protocols. Together, these elements form a comprehensive framework that can improve maternal outcomes, elevate physician satisfaction, and reinforce hospital managerial performance in a sustainable manner.

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