Original Article

Obstetric Hysterectomy at a Tertiary Care Center in Odisha: Clinical, Social, and Epidemiological Risk Factors

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Abstract

Background: Obstetric hysterectomy (OH) is a life-saving procedure for antepartum, peripartum, and postpartum hemorrhage, but its high incidence in developing countries, like India, suggests a need for better understanding of contributing factors. This study aimed to identify the epidemiological, social, and obstetric risk factors for OH at a tertiary care hospital in Odisha. **Methods:** This two-year, hospital-based study analyzed medical records of all women who underwent OH for obstetric reasons. Data on patient demographics, socioeconomic status, and medical history were collected. The current data only supports correlation, not causation or magnitude of risk. **Results:** Out of 4,758 deliveries, 54 women underwent OH, an incidence of 11.35 per 1,000 deliveries. Most patients were young (21-29 years), illiterate (66.7%), below poverty line (87%), rural residency (63%), and had not received antenatal care (72.2%). Uterine rupture was the most common indication (57.4%), followed by primary postpartum hemorrhage (31.5%). The procedure was life-saving for mothers but had a high perinatal mortality rate, with 59.3% resulting in stillbirth. Common complications included pyrexia and urinary tract infections. **Conclusion:** The high rate of OH in this region is primarily driven by socioeconomic disparities and a lack of access to primary healthcare, leading to severe, late-stage complications like uterine rupture. Strengthening antenatal care and public health education are crucial for reducing the need for this life-altering procedure and improving both maternal and perinatal outcomes.

Keywords: *Hysterectomy, postpartum hemorrhage, uterine rupture, maternal mortality, perinatal mortality*

Introduction

Maternal mortality remains a global health tragedy that disproportionately affects poor, rural women in developing countries, with over half a million maternal deaths and millions of permanent disabilities occurring worldwide each year. This stark disparity in mortality risk highlights a critical failure in healthcare systems to prevent and manage severe obstetric complications. In an effort to combat these devastating, life-threatening outcomes, Obstetric Hysterectomy (OH) has emerged as a crucial, last-resort procedure to save lives from severe, uncontrolled postpartum hemorrhage and other catastrophic complications like uterine rupture. While life-saving, this intervention results in the irreversible loss of reproductive potential, underscoring the urgency of understanding its underlying drivers in high-incidence settings.

The incidence of OH is significantly higher in developing countries (1 to 5 per 1000 deliveries) than in developed ones (approximately 1 per 1000) [1]. In India, reported rates vary, but they are notably high in tertiary care centers, with some studies showing an incidence of up to 2.65 per 1000 deliveries [2]. A majority of these cases are unbooked patients referred from rural areas, indicating a systemic failure in primary care [3]. The procedure is associated with high rates of maternal morbidity and mortality, and its long-term psychological and social impacts on young women and their families are significant [4].

While the established risk factors for OH, such as postpartum hemorrhage, prior cesarean deliveries, and grand multiparity, are well-documented, a significant knowledge gap remains [5,6]. There is a lack of comprehensive, institution-specific studies that integrate and analyze epidemiological, social, and obstetric factors simultaneously. The existing data in Odisha, for example, shows correlations between unbooked patient status, low socioeconomic status, and rural residence, but it fails to explain the causal pathways [6].

This study aimed to address this gap by systematically identifying and quantifying the relative contribution of the

epidemiological, social, and obstetric risk factors associated with a relatively high incidence of obstetric hysterectomy among women delivering at a tertiary care hospital in Odisha over a two-year period. The findings will provide a robust, evidence-based foundation for developing targeted clinical protocols and public health policies to strengthen the entire maternal healthcare system in the region.

Materials and methods

This hospital-based study was conducted in the Department of Obstetrics and Gynecology of a tertiary care hospital over a period of two years.

Study Population
All women came to the department with complain and indication of obstetric hysterectomy over a study period were taken into consideration. Based on the study inclusion and exclusion criteria, the cases were included

Inclusion Criteria
A woman who underwent an OH was defined as any patient who had a hysterectomy for any indication-emergency or elective-during pregnancy, peripartum, or puerperal periods, or due to complications following a termination of pregnancy at the study hospital within the designated study timeframe. The procedure was performed by consultant, senior resident under supervision were included.

Exclusion Criteria
o   Hysterectomy performed for non-obstetric reasons, such as fibroids or malignancy.
o   Incomplete hospital data

The research protocol was approved by the Institutional Ethics Committee (IEC) before any data collection began.

All women meeting the inclusion criteria were identified from the departmental and hospital records, including surgical registers and discharge summaries. The study investigated several variables, including maternal age, parity, gravidity, residence, booking status, and prior medical history. The dependent variable was the occurrence of an obstetric hysterectomy (yes/no), while the independent variables were the various epidemiological, social, and obstetric factors that could influence this outcome. No new laboratory investigations were conducted; instead, relevant data such as hemoglobin levels and blood transfusion volumes were extracted from existing medical records. For the purpose of analyzing risk factors related to the timing of presentation, the duration of labor for each participant was extracted from the medical records and categorized. Based on standard obstetric protocols, prolonged labor was specifically defined as any labor duration greater than 18 hours from the onset of regular uterine contractions to delivery, while a normal duration was defined as less than 18 hours.

All data were entered into a statistical software package for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the variables.

Results

A total of 4,758 deliveries occurred during the study period at the study hospital. Vaginal births constituted the majority at 55% (2,617 cases), with Caesarean sections accounting for 45% (2,141 cases) (**Table 1**).

Table 1: Incidence of delivery types

Incidence	Numbers	%
Vaginal	2617	55
Caesarean section	2141	45
Total	4758	100

The study's findings reveal a demographic profile of young women, predominantly between the ages of 21 and 29, with a history of multiple pregnancies. The participants faced significant socioeconomic challenges, as evidenced by the high rates of illiteracy (66.7%), low socioeconomic status (as per National Food Security Act (NFSA) 2013) (87.0%), and rural residency (63.0%). A notable majority were also unbooked for medical services (72.2%), which highlight a potential barrier to healthcare access. Despite these challenges, a majority of the participants (64.8%) were immunized. Clinically, the data indicates that a significant number of these women experienced prolonged labor (38.9% between 18-36 hours) and did not have any interference during the process. Furthermore, nearly a third of the participants had a history of a previous Cesarean section (**Table 2**).

Table 2: Sociodemographic and clinical parameters of study participants.

Sociodemographic and clinical parameters		Number	%
Age (year)	<20	2	3.7
	21-29	38	70.4
	30-39	13	24.1
	>40	1	1.9
Parity	Nullipara	0	0.0
	1	4	7.4
	2	20	37.0
	3	22	40.7
	>4	8	14.8
Literacy	Literate	18	33.3
	Illiterate	36	66.7
Booked	Yes	15	27.8
	No	39	72.2
Habitat	Rural	34	63.0
	Urban	20	37.0
SES	Below poverty line	47	87.0
	Above poverty line	7	13.0
Immunized	Yes	35	64.8
	No	19	35.2
Labor (hours)	<18	10	18.5
	18-36	21	38.9
	37-48	7	13.0
	>48	4	7.4
Interference	Yes	17	31.5
	No	37	68.5
Previous surgery	Previous cesarean section	16	29.6
	Medical abortion	4	7.4
	Manual placenta removal	1	1.9

Based on the provided data, the primary reason for surgical intervention was ruptured uterus, and the most common surgical procedure performed was a subtotal hysterectomy. Uterine rupture was the most frequent indication for surgery, accounting for 57.4% of cases. The second leading indication was Primary Postpartum Hemorrhage (PPH) at 31.5%. Other less common indications included secondary PPH, septic abortion, and choriocarcinoma. The vast majority of patients (94.4%) underwent a subtotal hysterectomy. A total hysterectomy was performed in a small number of cases

(5.6%). Associated surgical procedures for injuries to other organs were rare, with bladder repair occurring in 5.6% of cases and intestinal repair in only 1.9% (**Table 3**).

Table 3: Indications and subsequent surgical management

Indications and subsequent surgical management		Number	%
Indication	Rupture uterus	31	57.4
	Primary PPH	17	31.5
	Secondary PPH	2	3.7
	Septic abortion	3	5.6
	Choriocarcinoma	1	1.9
Surgical management	Subtotal	51	94.4
	Total	3	5.6
	Associated bladder repair	3	5.6
	Associated intestine repair	1	1.9

The most frequent complication observed was pyrexia, which affected 37.0% of the participants. Other notable complications included urinary tract infections (14.8%), wound infections (11.1%), and shock (9.3%).A significant majority of patients required a blood transfusion, with 44.4% receiving 2 units and an additional 27.8% receiving 1 unit. Overall, 98.1% of the participants received at least one unit of blood. Nearly half of the patients (46.3%) had a hospital stay of less than 10 days, while 25.9% stayed between 11 and 15 days.

The perinatal mortality rate was exceptionally high at 64.8% (35 out of 54 total outcomes). This devastating outcome was overwhelmingly driven by stillbirths, which accounted for 32 cases (59.3%). An additional 3 cases (5.6%) resulted in neonatal death, further contributing to the total fetal loss. Conversely, only 19 neonates (35.2% of cases) survived the immediate perinatal period. This stark disparity confirms that while obstetric hysterectomy is highly effective as a life-saving measure for the mother, the underlying severe obstetric pathology (predominantly uterine rupture) often compromises fetal viability before surgical intervention can be successfully executed. Maternal mortality was low, with various causes such as septicemia, DIC, metastasis to the lung, and renal failure each contributing 1.9% to the overall mortality (**Table 4**).

Table 4: Postoperative Complications, Blood Transfusion, and Outcomes of Study Participants

Postoperative follow up parameters		Number	%
Complications	Pyrexia	20	37.0
	UTI	8	14.8
	Wound infection	6	11.1
	Shock	5	9.3
	RTI	4	7.4
	Paralytic ileus	3	5.6
	Renal failure	1	1.9
Blood transfusion (Units)	0	1	1.9
	1	15	27.8
	2	24	44.4
	3	9	16.7
	4	2	3.7
	5	1	1.9
	>5	2	3.7
Duration of hospital stay(days)	<10	25	46.3
	11-15	14	25.9
	16-20	12	22.2
	>20	3	5.6

Mortality associated with OH	Septicemia	1	1.9
	DIC	1	1.9
	Metastasis to lung	1	1.9
	Renal failure	1	1.9
Perinatal mortality	Still birth	32	59.3
	Neonatal death	3	5.6

Discussion

The findings of this study provide a critical, institution-specific perspective on the epidemiology and clinical drivers of obstetric hysterectomy (OH) in Odisha, India, and align with broader trends in low- and middle-income countries. The overall incidence of 11.3 per 1000 deliveries observed at our tertiary care center is significantly higher than rates reported in developed nations, where the incidence is around 1 per 1000 deliveries or even lower [1]. This high local incidence is consistent with other reports from developing countries, such as Nigeria (3.8 per 1000) and Niger (0.89%), reflecting the profound impact of limited resources and healthcare access [8,9]. The high rate at our facility also aligns with the established pattern that tertiary referral hospitals receive a disproportionate number of severe, late-stage cases from peripheral or rural areas, which inflates the observed incidence compared to studies conducted in general populations or urban centers [7].

The demographic profile of the study participants—predominantly young, illiterate women from low socioeconomic and rural backgrounds–are a recurring theme in the literature on OH in developing countries [10]. The finding that a majority of patients (72.2%) were unbooked is particularly significant. This lack of antenatal care is a major risk factor for poor maternal outcomes and, as our data suggests, it creates a dangerous pathway where preventable complications are left unaddressed until they require a last-resort intervention like OH [10,11]. The high rate of illiteracy (66.7%) and low socioeconomic status (87%) further corroborates findings that link low education and income to a lack of awareness and delayed presentation for care [12].

The study's most striking finding is that uterine rupture was the most frequent indication for OH, accounting for 57.4% of cases. This deviates from some studies in India that cite postpartum hemorrhage (PPH) as the leading cause [8,10,11,13]. Critically, this observation must be interpreted in the context of the study center's high overall CS rate, which was 45% of all deliveries (**Table 1**). A prior Caesarean section was present in 29.6% of the OH cohort (**Table 2**), aligning with literature that identifies the scarred uterus as a major risk factor for rupture [8,14]. This strong correlation suggests a dangerous pathway in our regional context: a high background CS rate combined with the prevalent issue of unbooked patients from rural areas leads to unsupervised labor trials in women with scarred uteri. This results in severe, late-stage complications like uterine rupture, necessitating emergency OH, rather than more common complications like PPH from atony. This highlights a need for targeted policy to improve both appropriate CS delivery practices and focused risk-stratified antenatal care.

The high-stakes nature of the procedure is reflected in the outcomes. Our observed maternal mortality rate was 7.6% (4 deaths in 54 cases). This figure, while positioned at the lower end of rates reported by other developing nations, is nonetheless substantial and directly reflects the catastrophic state of the patients upon arrival, rather than classifying the rate as simply "low." This outcome validates OH as a critical, life-saving measure in a tertiary care setting managing "near-miss" events, but simultaneously highlights

the devastating failure of the primary healthcare system that allowed cases to progress to such a critical stage [15,16].

The necessity for the procedure was often preceded by factors like prolonged labor (present in ~59% of cases lasting over 18 hours) and unbooked status (72.2%), suggesting delayed access to care was a key intermediate driver. Furthermore, the success in saving the mother's life came at a tragic cost to the fetus, with a devastatingly high perinatal mortality rate of 64.8% (35 total deaths), a direct consequence of the underlying severe obstetric pathology (e.g., uterine rupture) that compromised fetal viability before surgical intervention.

The specific causes of death (septicemia, DIC, renal failure) are typical of multi-system failure following massive hemorrhage and infection. The high rate of blood transfusion (98.1% of patients receiving ≥1 unit) further underscores the critical hemodynamic status of these referred patients, establishing transfusion as an essential component of stabilizing these emergencies [15,16]. Postoperatively, common morbidities mirrored international findings for high-risk obstetric surgery, with pyrexia (37.0%) being the most frequent complication, followed by urinary tract (14.8%) and wound infections (11.1%). Crucially, the success in saving the mother's life came at a tragic cost to the fetus, with a devastatingly high perinatal mortality rate of 64.8% (35 deaths, including stillbirths and neonatal deaths), a direct consequence of the catastrophic underlying conditions like uterine rupture rather than the hysterectomy itself [8,17].

The data on postoperative complications also mirrors the existing literature. Pyrexia, affecting 37.0% of participants, was the most common complication, which is a finding consistent with other studies that cite fever or febrile morbidity as a frequent sequela of the surgery [18]. Other complications, such as urinary tract infections and wound infections, are also common postoperative morbidities following hysterectomy [19,20]. The high incidence of shock (9.3%) underscores the critical state of the patients upon arrival at the hospital, often due to massive blood loss from the primary obstetric emergency [21,22].

A particularly crucial finding from our study is the high rate of blood transfusion. The fact that 98.1% of patients required at least one unit of blood highlights the severity of the life-threatening hemorrhage that necessitated the hysterectomy. This is a consistent theme in the literature, where blood transfusion is considered a necessary and common intervention to improve the patient's hemodynamic status and their ability to withstand the surgery [15]. The high transfusion rate reinforces the concept that OH is performed in dire, last-resort circumstances.

Finally, the study's perinatal outcomes present a tragic but well-documented picture. The stillbirth rate of 59.3% and a neonatal death rate of 5.6% result in a devastatingly high perinatal mortality rate. This finding is consistent with studies that found rates as high as 75% and 93.4% in cases of emergency obstetric hysterectomy, particularly those due to uterine rupture [7,17]. This high perinatal mortality is not a direct result of the hysterectomy itself but is a consequence of the severe obstetric emergency (e.g., uterine rupture or massive hemorrhage) that compromises the fetus before surgical intervention can take place to save the mother's life [21].

Study Limitation

The primary limitations of this study stem from its retrospective, single-group, descriptive design, which restricts the analysis to establishing mere correlations and prevents the quantification of true risk factors (e.g., calculation of Odds Ratios) by lacking a comparative control group from the general delivery population.

Furthermore, the data suffers from referral bias inherent to a tertiary care center, meaning the high incidence rate (11.3 per 1,000) is likely inflated and not generalizable to the wider population of Odisha. Reliance on retrospective medical records introduces potential information bias due to incomplete documentation, particularly regarding critical timelines or the specifics of labor management in referred cases. Finally, the focus solely on short-term outcomes means the study fails to capture the long-term psychological and social burden resulting from the irreversible loss of fertility following the hysterectomy.

Future research must transition from descriptive correlation to analytical causation by prioritizing a multi-center case-control study across Odisha to precisely quantify the Odds Ratios associated with key modifiable risk factors, such as unbooked status and prior Cesarean section. Crucially, targeted health systems research is required to audit the quality of C-section practices and map the referral pathways for high-risk patients, investigating the systemic failures that link the high background C-section rate to the catastrophic incidence of uterine rupture. Finally, prospective cohort studies are essential to evaluate the long-term psychological, social, and quality-of-life impacts of emergency hysterectomy on the surviving, predominantly low-SES mothers, providing the evidence base for effective post-procedure ounselling and rehabilitation programs.

Conclusion

The high incidence of obstetric hysterectomy (OH) at this tertiary care center is a public health issue rooted in socioeconomic and geographical disparities. The study found that most patients undergoing OH were unbooked, from rural areas, and had low literacy levels. The leading cause of OH was uterine rupture, a finding that highlights the severe consequences of delayed medical care in this region. The study concludes that while OH is life-saving, its frequent use indicates a systemic failure in the maternal healthcare system. To reduce its incidence, there must be a focus on strengthening primary healthcare services and improving access to antenatal care to prevent and manage high-risk pregnancies before they become critical emergencies.

Declarations

Acknowledgement

Financial support

Conflict of interests

No conflict of interest declares.

Author Contribution

Katyayani Panda, Bipin Bihari Pradhan: Conceptualization, methodology, investigation, data curation, and visualization.

Katyayani Panda, Bipin Bihari Pradhan, Manas Ranjan Kar, Nihar Ranjan Mohanty, Madhusmita Mohanty: Data curation, writing-review and editing, methodology, and investigation.

Katyayani Panda, Bipin Bihari Pradhan, Manas Ranjan Kar, Nihar Ranjan Mohanty: data curation, writing-review and editing, investigation, formal analysis and supervision.

Sashibhusan Dash: Data curation, writing, Methodology, review and editing.

All authors approved the final version of manuscript.

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