Dissertation Training

at

UNICEF, Bihar

The Effect of Maternal Complication During Pregnancy on Maternal & Fetal Health Outcomes

By

Miss. Arpita Halder

PG/22/015

Under the guidance of

Dr Sumesh Kumar

PGDM (Hospital & Health Management)

2022-24

International Institute of Health Management Research

New Delhi

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2022-24

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New Delhi

The certificate is awarded to

Miss. Arpita Halder

in recognition of having successfully completed

her Dissertation

in the Department of Public Health

and has successfully completed her Project on

The Effect of Maternal Complication During Pregnancy on Maternal & Fetal Health Outcomes

Date- 15th February to 30th June, 2024

at UNICEF, Bihar, Purnea District

She comes across as a committed, sincere & diligent person who has

a strong drive & zeal for learning.

We wish her all the best for future endeavours.

Training & Development **Zonal Head-Human Resources**

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This is to certify that **Ms. Arpita Halder** student of PGDM (Hospital & Health Management) from the International Institute of Health Management Research, New Delhi has undergone internship training at **UNICEF, Bihar from 15th February to** 30th June.

The Candidate has successfully carried out the study designated to him during internship training and his/her approach to the study has been sincere, scientific, and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his/her future endeavors.

Dr. Sumesh Kumar

Associate Dean, Academic and Student Affairs
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Dr. Sumesh Kumar

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IIHMR, New Delhi

Certificate of Approval

The following dissertation titled "The Impact of maternal complications during pregnancy on maternal & fetal Health Outcomes." at "UNICEF Bihar, Purnea" is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

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Certificate from Dissertation Advisory Committee

This is to certify that **Ms. Arpita Halder**, a graduate student of the PGDM (Hospital & Health Management) has worked under our guidance and supervision. She is submitting this dissertation titled "**The Effect of Maternal Complication During Pregnancy on Maternal &Fetal Health Outcomes**" at "**UNICEF Bihar**" in partial fulfilment of the requirements for the award of the PGDM (Hospital & Health Management).

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

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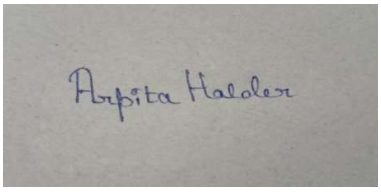
CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **"The Effect of Maternal Complication During Pregnancy on Maternal & Fetal Health Outcomes"** and submitted by **Miss. Arpita Halder,** Enrollment No. **PG/22/015** under the supervision of **Dr Sumesh kumar,** Associate Dean, Academic and Student Affairs, IIHMR Delhi for award of **PGDM** (Hospital & Health Management) of the Institute carried out during the period from **15th February to 30th June,** 2024 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.



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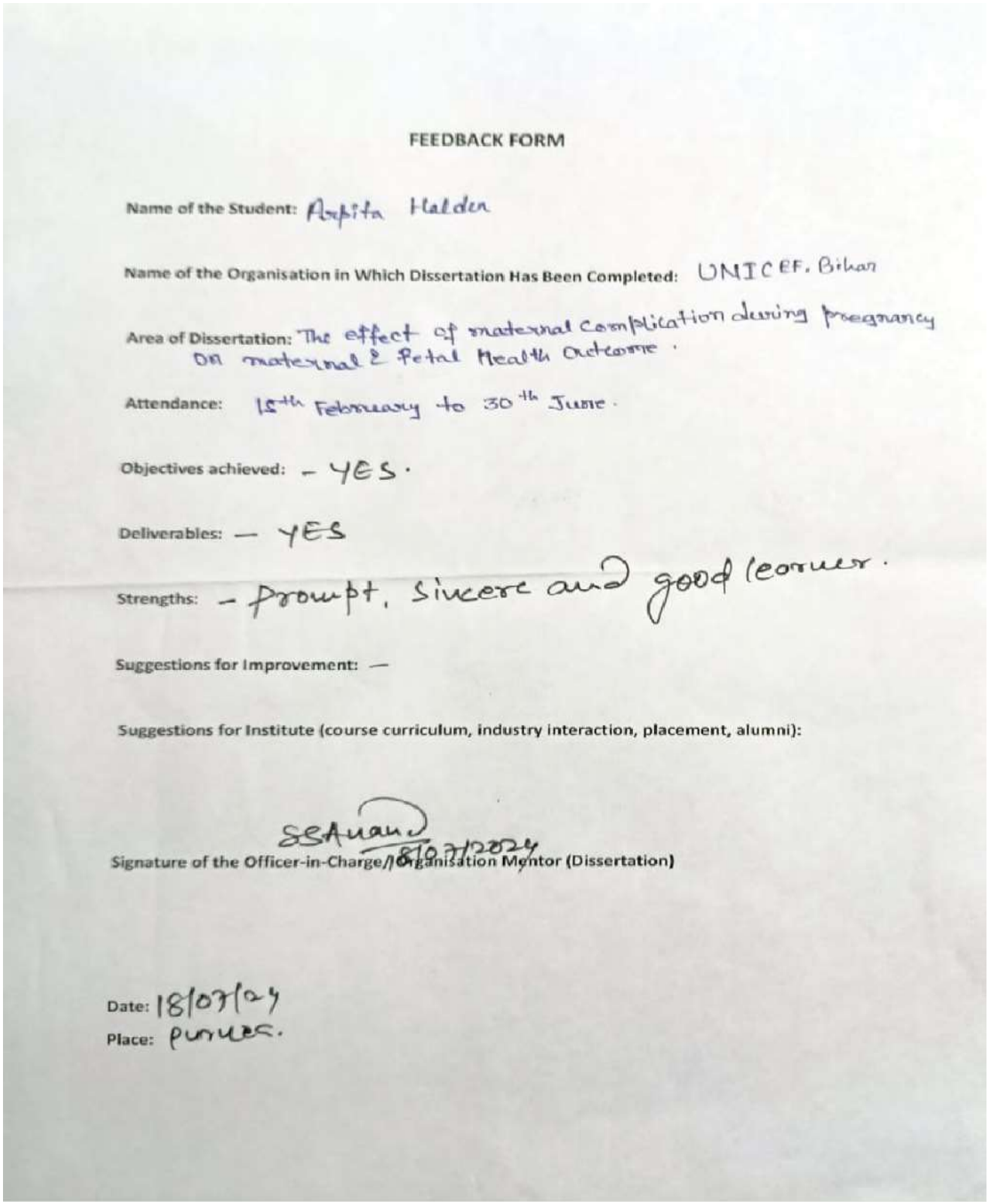

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Attendance: 15th February to 30th June.

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Deliverables: — YES

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Suggestions for Improvement: —

Suggestions for Institute (course curriculum, industry interaction, placement, alumni):

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Acknowledgment

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I would like to express my sincere gratitude towards my mentor **Dr. Sumesh Kumar**, (**Associate Dean, Academic and Student Affairs, IIHMR Delhi,)** who helped me immensely throughout the tenure of my internship. He inspired me greatly to work in this project with his valuable guidance, support, interest, encouragement, involvement, and advice.

It is my radiant sentiment to place on record my best regards, and deepest sense of gratitude **to Dr. Sutapa Bandyopadhyay Neogi, (Director, IIHMR Delhi)** for her careful and precious guidance which was extremely valuable for my study both theoretically and practically.

I perceive this opportunity as a big milestone in my career development. I will strive to use the gained skills and knowledge in the best possible way and continue to work on their improvement to attain desired career objectives. Hope to continue cooperation with all of you in the future.

Sincerely,

Arpita Halder

PG/22/015

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Acronyms

S.No	Acronyms	Full Form
1	MMR	Maternal Mortality Ratio
2	IMR	Infant Mortality rate
3	SBA	Skill Birth Attendance
4	AWC	Anganwadi Centre
5	AWW	Anganwadi Workers
6	ANM	Auxiliary Nurse and Midwife
7	ASHA	Accredited Social Health Activists
8	AWH	Anganwadi Helper
9	HRP	High Risk Pregnancy
10	PROM	Premature rupture of membrane
11	APH	Antepartum Hemorrhage
12	PPH	Postpartum Hemorrhage
13	LSCS	Lower segment cesarean section
14	BMI	Body Mass Index
15	SNCU	Sick Newborn Care Unit
16	ANC	Antenatal care
17	PNC	Postnatal care
18	IYCN	Infant & Young Child Nutrition
19	MCP	Mother Child Protection card
20	SDG	Sustainable Development Goals

Organization Profile

UNICEF works to promote and protect the rights of children across India. We have spent 74 years in India working to improve the lives of children and their families.

UNICEF India is committed in its continued support to the Government in this extraordinary journey of development to reach every child everywhere in India. Our goal is to enable every child born in India to have the best start in life, to thrive and to develop to her or his full potential. To achieve this we use our technical expertise together with partners to tackle the root of several, deeply entrenched structural challenges.

We have been present in India for 74 years. UNICEFs key strength lies in our evidence-based technical expertise that informs policy action and implementation, while at the same time building the capacity of partners. With some 450 staff members working in 17 states that together cover 90 per cent of India's child population - largest field presence among UN agencies – we are well positioned to reach the country's most vulnerable children.

UNICEF believes, All children have a right to survive, thrive and fulfill their potential – to the benefit of a better world.

The Effect of Maternal Complication During Pregnancy on Maternal & Fetal Health Outcomes

Abstract: Background: Maternal complications during pregnancy present significant public health challenges, particularly in regions with limited healthcare resources. This study aims to assess the prevalence and impact of maternal complications on maternal and fetal outcomes at Sadar Hospital, Purnia, Bihar. **Methods:** A cross-sectional study was conducted over four months, involving 420 pregnant women aged 15-49 years. Data were collected on various maternal complications and their outcomes. Statistical analyses were performed to determine the prevalence, risk factors, and associations between complications and adverse outcomes. **Results:** The study found a high incidence of maternal complications, with the most common being premature rupture of membranes, anemia, and severe anemia. Postpartum hemorrhage and infections were the most frequent maternal outcomes. The majority of complications occurred among women aged 19-35 years, with both primigravida and multigravida women being significantly affected. Comparative studies from Ethiopia and Bangladesh revealed similar challenges, highlighting the global nature of maternal health issues. **Conclusion:** The findings underscore the urgent need for improved antenatal care, skilled obstetric services, and nutritional interventions. Effective management strategies for common complications, particularly postpartum hemorrhage and infections, are critical. Enhancing access to care and implementing targeted, evidence-based interventions can significantly improve maternal and fetal health outcomes.

Introduction: Maternal health remains a significant global health challenge, with an estimated 223 deaths per 100,000 live births reported globally in 2020. Over the past two decades, approximately 1.3 million maternal deaths have been recorded among Indian women, constituting 12% of the global maternal mortality burden. Despite some progress, the majority of maternal deaths are attributed to direct medical causes and complications during pregnancy. In India, the maternal mortality ratio (MMR) has declined from 113 deaths per 100,000 live births (2016-2018) to 103 deaths per 100,000 live births (2017-2019), and currently stands at 97 deaths per 100,000 live births. Nevertheless, a significant proportion of these deaths occur among women aged 15-49 years. India aims to reduce its MMR to 70 per 100,000 live births by 2030, in alignment with the Sustainable Development Goals (SDGs).

Maternal complications during pregnancy represent a critical public health concern worldwide, profoundly influencing the well-being of both mothers and their unborn children. A high-risk pregnancy, characterized by conditions that threaten the health or life of the mother or fetus, often necessitates specialized care from specially trained providers. Various factors can elevate the risk of complications, ranging from pre-existing health conditions to issues that develop as the pregnancy progresses. Key high-risk factors include maternal age under 18 or over 35, height under 145 cm, severe anemia (hemoglobin < 7 gm/dl), gestational diabetes, preeclampsia/eclampsia, gestational hypertension, antepartum hemorrhage (APH), grand multiparity, multiple pregnancies, malpresentation, previous lower segment cesarean section (LSCS), Rh incompatibility, and infections.

Despite advancements in antenatal care, the alarming rate of maternal deaths persists, with approximately 800 women losing their lives every day due to pregnancy-related complications, according to WHO data from 2020. Adverse outcomes, such as postpartum hemorrhage (PPH), infection, and maternal death, highlight the severity of these issues. For fetuses, complications can result in birth asphyxia, miscarriage, and stillbirth, further underscoring the urgency of

addressing maternal health concerns. Antenatal care and institutional delivery emerge as crucial strategies for mitigating these risks.

This study at Sadar Hospital in Purnia, Bihar, serves as a tertiary healthcare facility catering to a diverse population. Bihar, one of India's most populous states, faces numerous challenges in maternal and child healthcare, including limited access to quality healthcare services, high rates of maternal morbidity and mortality, and a lack of awareness about maternal health issues. This makes Sadar Hospital a vital institution in addressing these healthcare challenges and providing essential services to pregnant women.

Addressing maternal complications during pregnancy is paramount to improving maternal and fetal health outcomes. This study at Sadar Hospital, Purnia, Bihar, aims to shed light on the prevalence and impact of these complications, providing a foundation for targeted healthcare interventions and policy initiatives aimed at enhancing maternal and child health in the region. This study aims to estimate the effect of maternal complications during pregnancy on maternal and fetal outcomes among women aged 15-49 in Purnia, Bihar. To achieve this, the study will focus on the following specific objectives: (1) To assess the prevalence of various maternal complications during pregnancy. (2) To identify potential risk factors affecting maternal health during pregnancy. Understanding and addressing these risks are essential for improving maternal and fetal outcomes, highlighting the importance of comprehensive prenatal care and targeted interventions. This study aims to explore the multifaceted nature of high-risk pregnancies, examining the underlying causes, associated risks, and the critical role of healthcare providers in managing these complex cases.

Methodology:

- **Study Design:** A cross-sectional study was conducted among deliveries at GMCH Hospital, spanning from February,24 to May,24
- **Study Area:** Medical College in Purnea, Bihar
- **Study Population**: Pregnant women who were identified as high-risk pregnancies/complications during pregnancy at Sadar Hospital.
- **Inclusion criteria:** Pregnant women aged between 15-49 years who had at least one complication during their antepartum period.
- **Exclusion criteria:** Pregnant women aged between 15- 49 years who have not had any complications during their antepartum period.
- **Sample size and sampling:** $\mathbf{n = Z^2 p (1 – p) / e^2}$

  Where 'z' is the confidence interval of 95% (z score- 1.96), 'p' is the prevalence of the proportion population from the previous study (57%), and 'e' is the margin of error of 5%.

  The sample size of this study is 377

To facilitate operational ease and ensure sufficient data for robust analysis, the sample size was adjusted to 420 participants. This adjustment accounts for potential non-responses and ensures the sample remains representative of the target population.

- **Sampling strategy:**

  To ensure a robust and representative sample, this study employed a simple random sampling technique to access records from the Antenatal Care (ANC) and Labour rooms at Sadar Hospital in Purnia, Bihar. Initially, records were meticulously reviewed to identify eligible participants, focusing on pregnant women who experienced maternal complications. From these identified records, women were randomly selected to ensure

a diverse and representative sample, thereby mitigating selection bias. Comprehensive histories of the selected participants were then extracted from the registration logbooks and individual cards, facilitated by a structured and pre-tested data extraction tool. A detailed checklist was used during data extraction to ensure systematic documentation of all relevant information, including variables related to maternal complications, demographic details, antenatal care, and birth outcomes. Prior to full-scale data collection, the data extraction tool was pre-tested to ensure its reliability and validity, allowing for necessary adjustments. This structured approach to sampling and data collection ensured thorough and accurate documentation of critical information, providing a solid foundation for the study's subsequent analysis and findings.

- **Dependent Variable**: Maternal and fetal outcomes (e.g., maternal mortality, maternal morbidity, fetal birth weight, neonatal complications).
- **Independent Variable**: Maternal complications during pregnancy (e.g., Age of the woman, height of the woman, Anemia, gestational diabetes, preeclampsia, gestational hypertension, placental abnormalities, preterm labor, etc.)

Result: During the four-month study period, a total of 2,053 deliveries were recorded. Out of these, 418 cases were diagnosed with maternal complications, resulting in an incidence rate of 20.36%

Total deliveries	Maternal complication	Percentage
2053	420	20.36

Table 1: Percentage of total Maternal complication

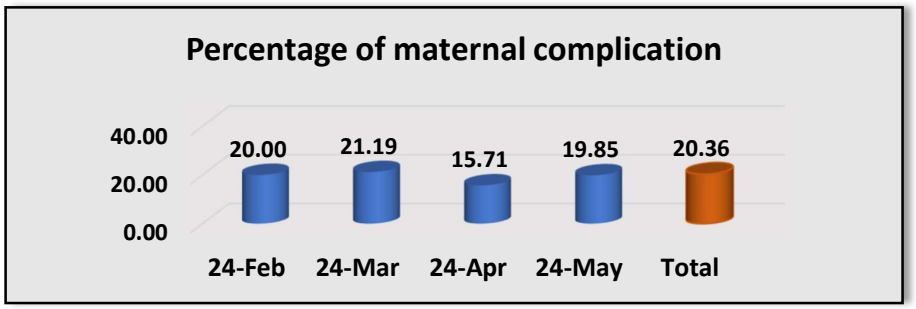

Figure 1: Percentage of maternal complication

The analysis of maternal complication rates over four months shows variability, with February at 20.00%, March peaking at 21.19%, April dropping to 15.71%, and May rising to 19.85%. The overall average was 20.36%. These results highlight the need for ongoing monitoring and effective interventions to reduce maternal complications.

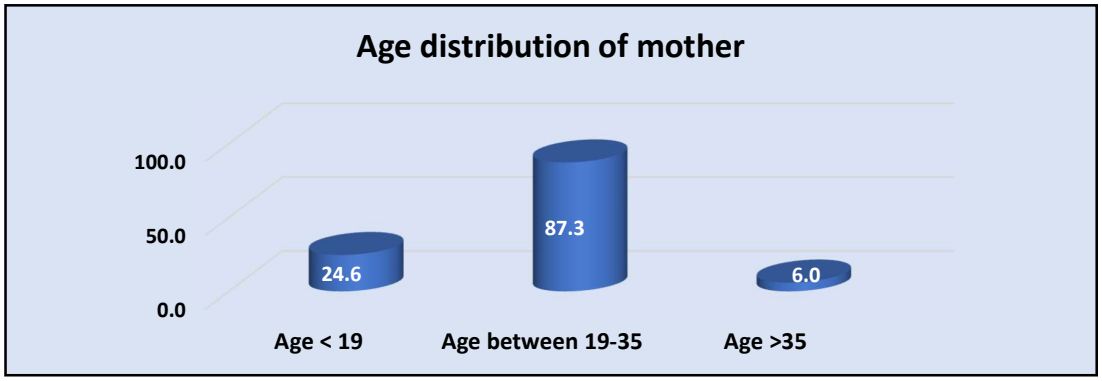

Figure 2: Age distribution of mother

This study analyzed the distribution of maternal complications across different age groups within the sample population. The majority of the participants, 87.3%, were in the age group of 19-35 years. A proportion, 27.99%, were below 19 years of age. Additionally, 6% of the participants were above 35 years of age. This age distribution provides insights into the prevalence of maternal complications among different age groups within the study population.

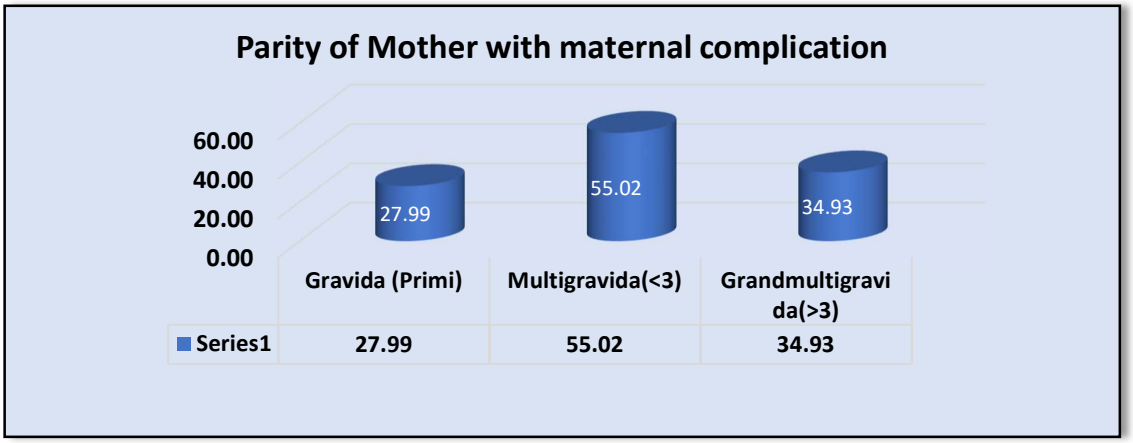

Figure 3: Parity of Mother with maternal complication

The analysis also included the parity of the participants. The incidence of maternal complications among primigravida women was 27.99%. Multigravida women accounted for 55.02% of the cases, while grand multigravida women constituted 34.93% of the cases. This distribution highlights the relationship between parity and the prevalence of maternal complication in the study population.

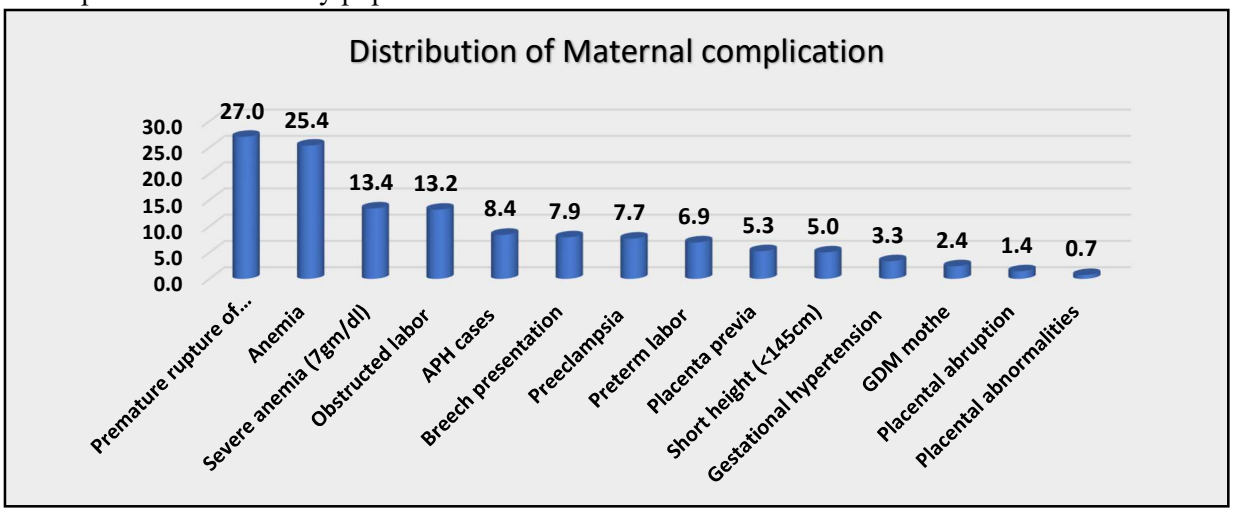

Figure 4: Distribution of Maternal complication

The most prevalent complication was premature rupture of membranes (PROM), affecting 27.0% of the cases, followed by anemia at 25.4% and severe anemia (hemoglobin 7g/dl) at 13.4%. Obstructed labor occurred in 13.2% of cases, while antepartum hemorrhage (APH) was seen in 8.4%. The breech presentation was recorded in 7.9%, preeclampsia in 7.7%, and preterm labor in 6.9%. Placenta previa was noted in 5.3%, short stature (height <145 cm) in 5.0%, and gestational hypertension in 3.3%. Gestational diabetes mellitus (GDM) affected 2.4%, placental abruption 1.4%, and other placental abnormalities 0.7% of the participants.

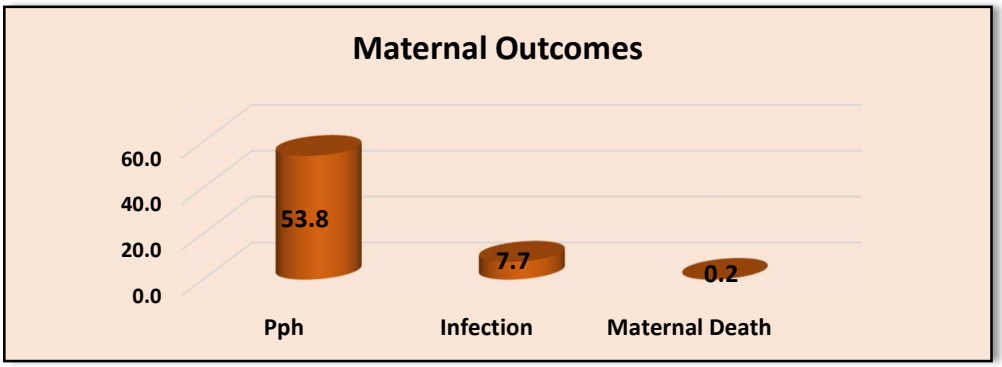

Figure 5: Percentages of Maternal Outcomes

The study found that among participants with maternal complications, over half experienced postpartum hemorrhage, and a smaller proportion suffered from infections. These results highlight the importance of effective management and preventive measures for these maternal outcomes.

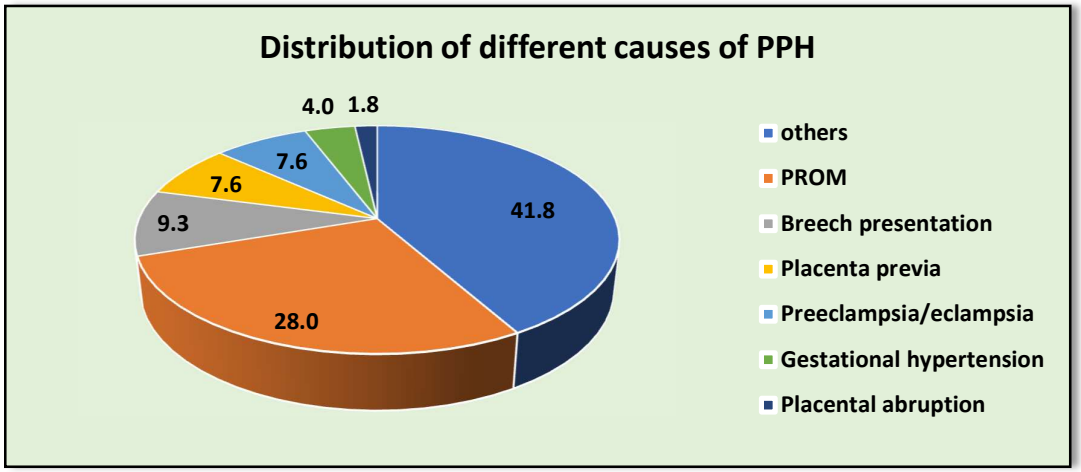

Figure 6: Distribution of different causes of PPH

The distribution of causes of postpartum hemorrhage (PPH) among participants with maternal complications varied significantly. The leading cause, categorized as "Unknown," accounted for 41.8% of cases. Premature rupture of membranes (PROM) followed closely at 28.0%, while breech presentation and placenta previa each contributed 9.3% and 7.6%, respectively. Both preeclampsia/eclampsia and gestational hypertension were responsible for 7.6% and 4.0% of cases, respectively, with placental abruption being the least frequent cause at 1.

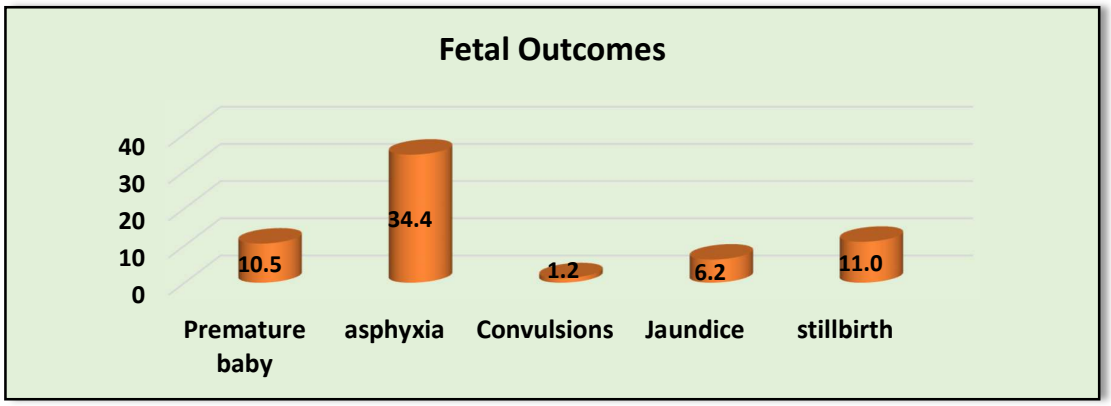

Figure 7: Percentages of Fetal Outcomes

Fetal outcomes varied significantly among participants in the study. Asphyxia was the most prevalent issue, affecting 34.4% of newborns, followed by stillbirths at 11.0%. Premature births accounted for 10.5% of cases, while jaundice was reported in 6.2%. Convulsions were less frequent, observed in 1.2% of infants.

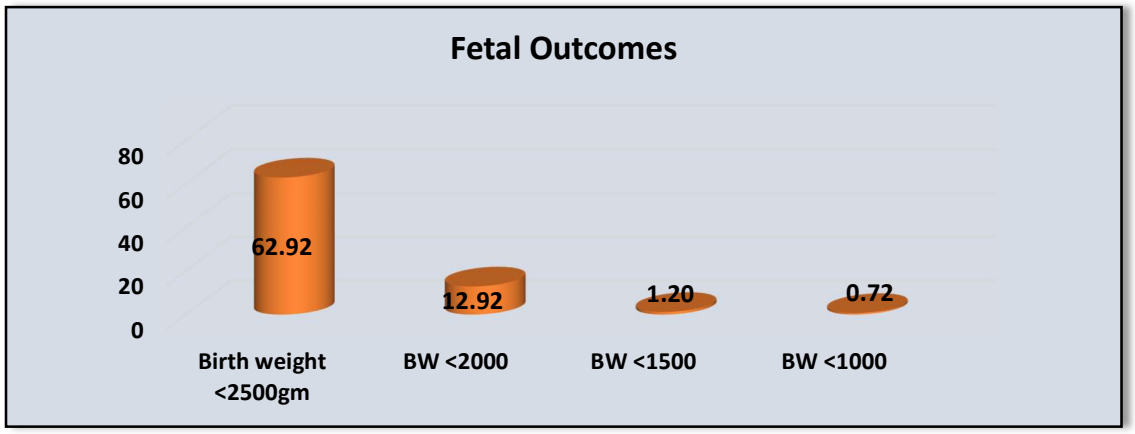

Figure 8: Percentages of Fetal Outcomes

Additionally, a substantial proportion of newborns had low birth weights, with 62.92% weighing less than 2500 grams, 12.92% less than 2000 grams, 1.20% less than 1500 grams, and 0.72% less than 1000 grams. These findings underscore the range of fetal health challenges encountered, emphasizing the importance of comprehensive prenatal and neonatal care strategies to mitigate these outcomes.

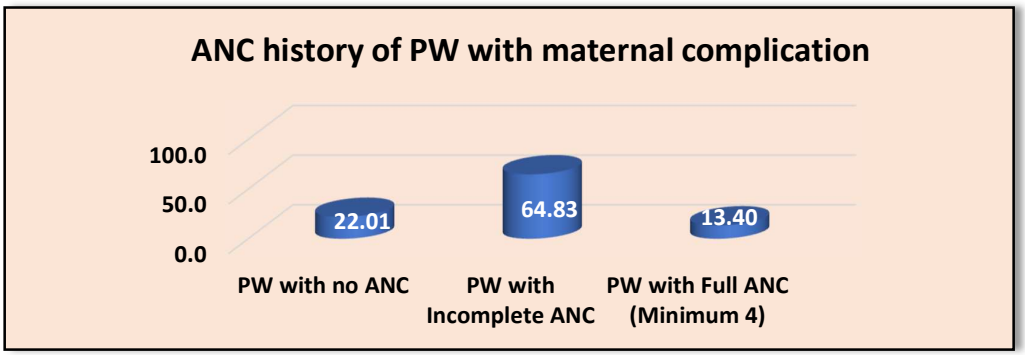

Figure 9: ANC history of Pregnant Women with maternal complication

Among pregnant women experiencing complications, the distribution of antenatal care (ANC) history revealed significant variations. A notable 22.0% received no ANC, while 64.8% had incomplete ANC. Only 13.4% of women received full ANC, meeting the minimum requirement of four visits. These statistics underscore the critical need for improving ANC coverage and adherence among pregnant women to potentially mitigate maternal complications.

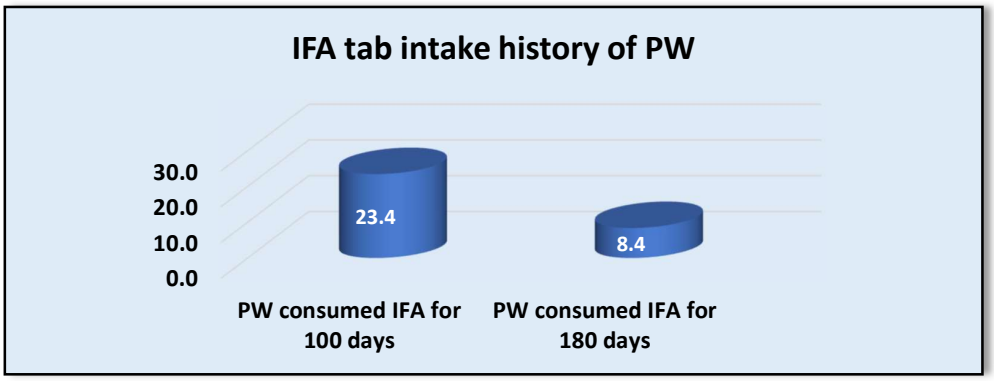

Figure 10: IFA tab intake history of Pregnant Women

Among pregnant women experiencing complications, the intake of iron and folic acid (IFA) tablets varied significantly. Approximately 23.4% of women consumed IFA tablets for 100 days, while 8.4% consumed them for 180 days. These figures highlight the importance of sustained IFA supplementation throughout pregnancy to potentially reduce maternal complications.

Discussion: The findings from this study provide a comprehensive overview of the maternal complications and outcomes experienced by women at Sadar Hospital, Purnia, Bihar, during the study period. The high incidence of maternal complications, 20.36%, underscores the significant public health challenge posed by these conditions in this region.

The most prevalent maternal complication identified was premature rupture of membranes (PROM), affecting 27.0% of the participants. This high prevalence is concerning as PROM is associated with various adverse outcomes, including infection and preterm birth, and necessitates prompt medical attention. Anemia, observed in 25.4% of the cases, and severe anemia (hemoglobin 7g/dl) in 13.4%, highlight the ongoing nutritional and health challenges faced by pregnant women in this area. Addressing anemia through nutritional interventions and routine screening could substantially improve maternal and fetal outcomes.

Obstructed labor, affecting 13.2% of the participants, further indicates the need for improved access to timely and effective obstetric care. The presence of breech presentations (7.9%) and placenta previa (5.3%) among the complications emphasizes the importance of skilled birth attendants and access to emergency obstetric care.

The study also revealed significant maternal outcomes associated with these complications. Postpartum hemorrhage (PPH) was the most common maternal outcome, affecting 53.8% of the women with complications. This high incidence of PPH is alarming and highlights the critical need for effective management strategies during and after delivery. Strengthening the capacity of healthcare providers to manage PPH and ensuring the availability of necessary medical supplies and medications are essential steps in reducing maternal mortality.

Infections, affecting 7.7% of the participants, also present a considerable risk to maternal health. This underscores the importance of maintaining sterile conditions during delivery and providing appropriate postpartum care to prevent infections.

The distribution of maternal complications across different age groups and parity levels provides additional insights. The majority of complications occurred among women aged 19-35 years (87.3%), which is the most common reproductive age group. This indicates the need for targeted interventions in this demographic to reduce the burden of maternal complications. Furthermore, the study found that primigravida women had a complication rate of 27.99%, multigravida women 55.02%, and grand multigravida women 34.93%. These findings suggest that both first-time mothers and those with multiple pregnancies are at significant risk for maternal complications.

Comparing these results with similar studies conducted in different regions provides valuable context. A study in Ethiopia aimed to assess adverse pregnancy outcomes and their associated factors, reporting a magnitude of adverse pregnancy outcomes at 28.3%, with a 95% confidence interval (25.7–30.9). The most frequently recorded obstetric complications in Ethiopia were obstructed labor (7.4%), retained placenta (5.3%), and hypertensive disorders of pregnancy (2.4%). Additionally, stillbirths (10%), malpresentation (3%), and prematurity (2.3%) were common fetal/neonatal complications. Independent predictors of adverse pregnancy outcomes included home delivery and low birth weight.

In Bangladesh, studies conducted in hospitals in Matlab and Chandpur revealed that at least 2.9% of all pregnant women suffer from severe maternal complications, and 6.5% experience less severe maternal complications. These findings highlight the prevalence of maternal health issues in diverse contexts and emphasize the need for improved healthcare infrastructure and targeted interventions.

Additionally, the prevalence of high-risk pregnancies among Indian women was reported at 49.4%, with 33% having a single high-risk factor and 16.4% having multiple high-risk factors. Pregnant women from Meghalaya and Manipur had notably high rates of high-risk factors at

67.8% and 66.7%, respectively. Furthermore, 31.1% of women had short birth spacing, and 19.5% had adverse birth outcomes during their last birth.

These comparative findings underscore the global nature of maternal health challenges, with common complications and predictors observed across different regions. Both studies highlight the critical need for improving access to skilled obstetric care and enhancing antenatal and postnatal services to address and mitigate these complications. By learning from diverse contexts and implementing evidence-based interventions, healthcare systems can better support maternal and fetal health, ultimately reducing the incidence and impact of adverse pregnancy outcomes.

Conclusion: This study underscores the significant public health challenge of maternal complications, highlighting the urgent need for improved antenatal care, skilled obstetric services, and nutritional interventions. The findings emphasize the critical importance of effective management strategies for common complications such as postpartum hemorrhage and infections, particularly during and after delivery.

The age and parity distribution of complications suggests a need for targeted interventions tailored to both first-time mothers and those with multiple pregnancies. Comparative insights from other regions reveal similar maternal health challenges, indicating that these issues are not isolated but rather part of a global concern.

Overall, enhancing access to skilled care, improving antenatal and postnatal services, and implementing targeted, evidence-based interventions are essential to reduce maternal and fetal complications. Addressing these challenges comprehensively can significantly improve maternal and fetal health outcomes and improve overall public health.

Reference:

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