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MATERNAL OUTCOMES AMONG WOMEN PRESENTING WITH PLACENTA PREVIA AT TERTIARY CARE HOSPITAL

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Abstract

Background: *Placenta previa is one such major obstetric complication to maternal health, especially where there are low resources, such as in Pakistan. There is limited information about maternal outcomes concerning placenta previa in Pakistan despite the global investigative works.*

Objective: *To evaluate the maternal outcomes and risk factors of women with diagnosed placenta previa in a tertiary care hospital in Mardan, Pakistan.*

Study Design: *A cross-sectional study.*

Duration and Place of the Study: *Department of Obstetrics and Gynecology at Mardan medical complex, Mardan from December 2024 to May 2025.*

Materials & Methods: *A total of 100 pregnant women diagnosed with placenta previa at 28 weeks of pregnancy and above. A standardized proforma was used to collect data on demographic, clinical, and obstetric variables. Maternal outcomes were anemia, postpartum hemorrhage (PPH), and admission to the ICU. The data were analyzed statistically with SPSS 27 using a p-value of less than 0.05 as significant.*

Results*: The average age of the participants was 29.5 ± 4.5 years, and the average BMI was 26.1 ± 2.9 kg/m². Seventy-two percent of the patients showed anemia, 63 percent PPH, and 21 percent ICU admission. Significant correlations were found between anemia and low socioeconomic status (p = 0.032), non-education (p = 0.041), and residency in a rural area. At the same time, PPH was strongly associated with high parity (p = 0.017), a history of cesarean sections (p = 0.028), and being aged 35 years or above (p = 0.045). The women who had hemoglobin levels <9 g/dL and were mothers of advanced age had ICU admissions more often.*

Conclusion: *Placenta previa is related to maternal morbidity to a large extent. The targeted management and early detection of high-risk women in the resource-squeezed environment could enhance the maternal outcomes.*

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INTRODUCTION

Placenta previa is characterized by implantation of the placenta across the lower uterine segment, partially or fully concealing the internal cervical os, and it is an acute obstetric complication that has fatal outcomes (1). This anomalous positioning of the placenta can be very dangerous to both mother and foetus and requires close observation as well as immediate attention (2). The classification of placenta previa includes the definition of the condition according to the extent of cervical os coverage (complete previa when the placenta fully covers the os, partial previa when the placenta has partly occluded the os, marginal previa when the edge of the placenta is touching the os, and low-lying placenta when the placenta is near the os but does not cover it completely) (3). Transvaginal ultrasonography is crucial for accurate diagnosis, as it provides a clearer visual inspection of the placenta's location, particularly after the second and third trimesters (4). Though Trans abdominal ultrasound is an initial screening test, its accuracy is compromised by maternal obesity, foetal presentation, and bladder distension. MR is utilised when the ultrasound result is indeterminate or in cases of imaging-suspected disorders of the placenta accreta spectrum, and detailed anatomical data about the placenta invasion are needed. A fine distinction between these two classifications is crucial in determining clinical management, such as the mode and timing of delivery (5).

Placenta previa epidemiology varies considerably across the globe; it depends on, among other things, the parity, prior rate of caesarean sections, and exposure to prenatal care (6). It is known to have a frequency of 0.3-1% of all pregnancies (7). The prevalence can be higher in low- and middle-income countries, which include Pakistan, because of having low access to family planning services, having higher grand multiparty levels, and poor antenatal treatment (8).

Pakistan specifically poses a distinctive set of issues, as it experiences an excessive burden of infectious diseases, nutrition deficiencies, and the fact that a large number of women give birth at home or in facilities with limited equipment. These are some of the reasons why there is a higher rate of occurrence as well as worse outcomes of placenta previa in the area. The unavailability of extensive national registries and standardized data compilation systems also contributes to the complication of trying to determine the actual prevalence of placenta previa and its related maternal and neonatal morbidities in Pakistan. According to the Global Network Maternal Newborn Health Registry, pregnancy outcomes in Pakistan are among the worst globally, even when compared to other low-resource countries (9).

Placenta previa poses significant threats to mothers, with a wide range of life-threatening diseases presenting complications. The most frequent presenting symptom is antepartum hemorrhage that is frequently painless and recurrent and causes maternal anemia and blood transfusions (10). Prolonged blood loss may trigger the development of hypovolemic shock, disseminated intravascular coagulation, and even a maternal death. Additionally, the most notable risk factor of the placenta accreta spectrum disorders is a placenta previa, which is the condition in which the places are attached or penetrated abnormally by the myometrium. The risk of a massive obstetric hemorrhage associated with placenta accrete is very high, and hysterectomies may be needed in most of the cases; the chances of maternal morbidity and mortality are increased (11).Another frequent complication is preterm labour and delivery, as it is a common factor to attempt to stop bleeding or spontaneous preterm rupture of the membrane. As a result, women with placenta previa are all too often placed in intensive care units so that their condition can be checked and treated carefully. The long-term sequelae that mothers may face include psychological trauma, recurrent anemia, and an elevated chance of developing complications with future pregnancies, besides the direct risks that were being contemplated. Placenta previa is not limited to the acute period and may put a woman at risk of reproductive health and consequences for her general well-being in the years that follow (12).

The most recent literature highlights the persistent difficulties in managing placenta previa and its

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outcomes for the mother. A set of systematic studies [2020-2024] pointed to the rising rates of placenta previa all over the world and increasing caesarean section rates of delivery due to the increased maternal age at birth. Research has also been aimed at perfecting diagnostic practices, such as using magnetic resonance imaging to effectively gauge the invasion of the placenta and utilize that information to inform surgical formulations. Evidence has also addressed the use of prophylactic measures like foetal maturation of the alpha lung with antenatal corticosteroids as well as tranexamic acid to combat vaginal bleeding during caesarean section. In addition, the effectiveness of prophylactic hypo gastric artery occlusion in reducing blood loss in patients at risk of peripartum hemorrhages has been tested (13). At the regional level, the situation in South Asia, encompassing both India and Bangladesh, also reflects the ones occurring in Pakistan, as anemia is widespread during pregnancy, there is a high rate of postpartum hemorrhage, and access to quality obstetric care is not sufficient. An Indian study found that placenta previa contributed to major causes of morbidity and death among mothers, especially those living in rural settings with poor access to blood transfusion solutions.

Certain risk factors for placenta previa have been consistently identified in various studies as key factors. A previous caesarean section is one of the most significant risk factors, as the risk increases with each successive caesarean operation. The risk is also increased by uterine scarring due to earlier surgeries, such as dilation and curettage. Another established factor is advanced maternal age, particularly in women aged 35 years and above. Changes in endometrial receptivity or frequent multiple pregnancies have also been linked to the possibility of ART increasing the risk of placenta previa. Smoking during pregnancy is one of the risk factors, potentially due to incomplete growth and vascularization of the placenta (13). The risk is also elevated by multiparity and several prior pregnancies, which may be due to the effect of progressive damage and changes in the placental-uterine implantation. Furthermore, a prior history of placenta previa significantly increases the likelihood of experiencing the same issue in subsequent pregnancies. Some of the risk factors that are modifiable, such as the pre-pregnancy body mass index, diabetes, hypertension, smoking, substance abuse, induced terminations, and depression, can all be managed by making healthier choices and more hygienic lifestyle behaviors, like proper antenatal care (13). Management and early recognition of such risk factors help to reduce the occurrence of placenta previa and its severity.

Despite extensive research on placenta previa, there are still significant knowledge gaps, particularly in Pakistan. Few local data exist on the actual incidence, risk factors, and maternal outcome of placenta previa. Most studies fail to distinguish between various forms of placenta prevalence or diseases affecting the placental implants. In Pakistani hospitals, the absence of comprehensive information impedes the development of targeted interventions and evidence-based guidelines for managing placenta previa. In addition, further studies are essential to address the cost-effectiveness of various management approaches, such as conservative management versus early delivery, and the maternal outcomes of interventions, including cell salvage. The nature of challenges and resource limitations in the context of healthcare providers in Pakistan will have to be understood to ensure that adequate measures can be devised to decrease maternal morbidity and mortality linked to the condition of placenta previa. The influence of socioeconomic variables, cultural practices, and healthcare availability on the occurrence and outcome of placenta previa in Pakistan requires further investigation.

With caesarean section being a known risk factor of maternal morbidity and mortality in the case of the condition, placenta previa, the study could not be more timely or more needed in the region of Pakistan. Pregnancy and its complications are a subject of concern to the world population (14). Pakistan is among the worst states in the statistics of the pregnancy outcomes (15). Maternal health has even more challenges because of the patriarchal nature of Pakistani society, religious beliefs, and underutilized resources (16). This study aims to help fill the knowledge gap and

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analyse maternal outcomes in a comprehensive manner for women with placenta previa attending a tertiary care hospital in Pakistan. This investigation will provide informative solutions to placenta previa through management, complications, risks, and presentation, thereby impacting maternal care. This study aims to identify maternal outcomes of women diagnosed with placenta previa at a tertiary care hospital, which will supply evidence-based information to clinicians involved in future clinical practice and maternal outcomes in Pakistan (17). In one study, a few of the women who attended with reduced foetal movements during the third trimester had placenta previa (18). According to another study, postpartum hemorrhage is one of the primary causes of maternal mortality and morbidity in the whole world (19).

MATERIALS AND METHODS

This cross-sectional study was carried out at the Department of Obstetrics and Gynecology, Mardan Medical Complex, Mardan from December 2024 to May 2025 following formal approval from the Institution ethics review board and the College of Physicians and Surgeons Pakistan. The research aimed at achieving the objectives consisted of a descriptive research method using a block design, which was conducted to examine the maternal outcomes of women who developed placenta previa at Mardan Medical Complex, a tertiary care hospital located in Mardan, Khyber Pakhtunkhwa, Pakistan. The researcher narrowed down the choice of a research design, as a cross-sectional approach would enable them to estimate the prevalence of different maternal outcomes at one point in time and give an overview of the placenta previa burden in this particular group of people. The type of design was especially suitable for providing initial figures of data and ideas about the relationships between placenta previa and adverse maternal health outcomes. The research was conducted in the Department of Obstetrics & Gynecology of the hospital, where a pertinent population of patients and the required clinical information were available.

Its study spanned six months, and it commenced as soon as it had cleared the ethical permits of the hospital, as well as the College of Physicians and Surgeons of Pakistan. This period has enabled a sufficient sample size to be gathered, meeting the study goals without being too cumbersome in data collection. The intended population was the pregnant population aged between 18 and 40 whose placenta previa conditions were confirmed following pregnancies exceeding 28 weeks. The age range was selected to represent the typical age group of those who are reproductive, and the gestational age cutoff was used to limit the collection to cases with clinically significant placenta previa. The method used to recruit participants was a non-probability consecutive sampling approach In turn, consecutive sampling was employed, which involved enrolling all eligible patients included in the study at the time of its implementation, thereby reducing selection bias while increasing sample representativeness.

In this study, we have calculated the sample size of 100 participants with the calculation tool provided by WHO, based on the data assumptions of the proportion of ICU admission in women with placenta previa of 10.38 percent, a margin of error of 6 percent, and a 95 percent confidence interval. The statistical power in the calculation of the sample size was sufficient to draw significant differences in maternal outcomes. Inclusion criteria were that the participants must be aged 18-40 and have a confirmed diagnosis of previa placenta as confirmed through ultrasound after week 28 of pregnancy. Women who had prior coagulation disorders, hysterectomies, or the presence of uterine fibroids were not included because these conditions had the potential of masking the evaluation of maternal outcomes concerning placenta previa.

To ensure ethical vindication, the hospital's ethical review panel and the College of Physicians and Surgeons, Pakistan, granted ethical approval prior to data collection, ensuring that the research adhered to ethical rules and principles. The informed consent of all participants was obtained, along with an elaborate explanation of the study's purpose, procedures, potential risks, and benefits, which was provided to the subjects. Data were

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collected for each patient in a standardized pro forma to ensure the uniformity and comprehensiveness of data collection. The collected data consisted of several demographic and clinical variables, including age, BMI, social and financial status, parity, predisposition to placenta previa (type and severity), and other related maternal outcomes. Interesting maternal outcomes were anemia (hemoglobin level lower than 11 g/dL), postpartum hemorrhage (blood loss more than 500 ml by the weight of the pads method), and admission to the ICU (because of complications).

Data **were entered and analyzed** using **IBM SPSS version 27**. Quantitative variables such as age, BMI, hemoglobin levels, and blood loss were presented as **Mean ± SD or Median**, depending on the distribution of the data. Employing a retrospective approach required meticulous data retrieval from hospital records to ensure the accuracy and completeness of the extracted information. **Statistical significance was set at $p < 0.05$.**

RESULTS

Participant Characteristics

Table -1: Participant Characteristics (N = 100)

Characteristic	Value
Gestational Age at Diagnosis	≥ 28 weeks
Age (years)	Mean ± SD: 29.5 ± 4.5 (Range: 16.9 – 39.3)
Age < 35 years	73%
BMI (kg/m²)	Mean ± SD: 26.1 ± 2.9
BMI Category	Majority normal or overweight
Parity	
– Primiparas	30%
– Parity = 2	40%
– Parity > 3	30%
Education Level	
– Educated	55%
– Uneducated	45%
Socioeconomic Status	
– Low income	50%
– Middle income	43%
– High income	7%
Place of Residence	
– Rural	50%
– Urban	50%
Gestational Age at Presentation	Mean ± SD: 34.8 ± 1.8 weeks (Range: 30.1 – 39.5)

The sample analysis was done on 100 pregnant women diagnosed with placenta previa at or after 28 weeks of pregnancy. The average age of the participants was 29.5 ± 4.5 years (aged 16.9 to 39.3 years). Most (73%) of the women were under 35 years old. The average BMI was 26.1 (2.9 kg/m²), and the majority of women were in the normal or overweight range.

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In terms of parity, 30 percent were primiparas, whereas 40 percent were already pregnant twice. Thirty percent of the study subjects had a parity level greater than 3. Fifty-five percent of the respondents were educated, and 45 percent were uneducated. Socioeconomic status (SES): 50 percent were low-income earners, 43 percent were middle-income earners, and only 7 percent were high-income earners.

The proportion dedicated to the place of residence was also close to equality, with 50 percent of the respondents living in the countryside and 50 percent living in the city. The average age at presentation was 34.8 weeks (SD 1.8 weeks; range, 30.1-39.5 weeks).

The mean hemoglobin (Hb) level of the sample was 10.21 ± 3.3 g/dL, which ranged from 7.0 g/dL to 13.3 g/dL. The average calculated amount of blood lost during delivery was 521.5 ± 144.2 mL, with a range of 208 mL to 915 mL.

Maternal Outcomes

Placenta previa had maternal complications, which were prevalent. There are 100 patients:

- Seventy two patients had anaemia (Hb < 11 g/dL).

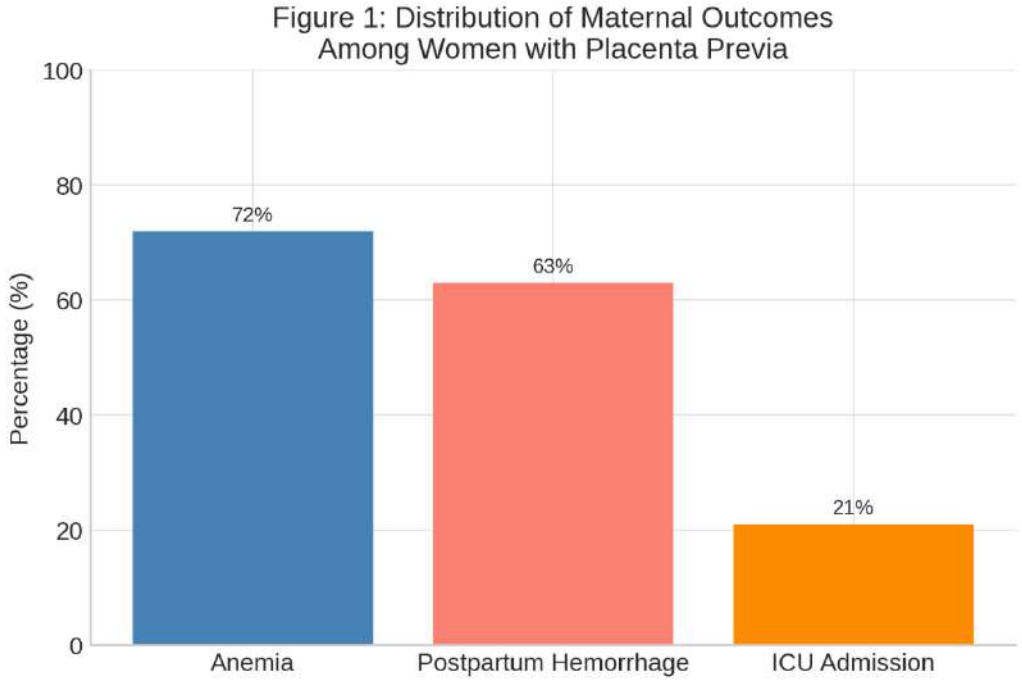
Postpartum haemorrhage (PPH), defined as a loss of more than 500 mL, occurred in 63 (63%) of the cases.

Hemorrhagic shock or the necessity of invasive monitoring forced 21 (21%) patients to be admitted to the ICU.

Clinical Parameters

The **distribution of maternal outcomes** is summarized in Table-2

Maternal Outcome	Frequency (n)	Percentage (%)
Anemia (Hb <11 g/dL)	72	72%
Postpartum Hemorrhage	63	63%
ICU Admission	21	21%



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Maternal Outcomes Stratification

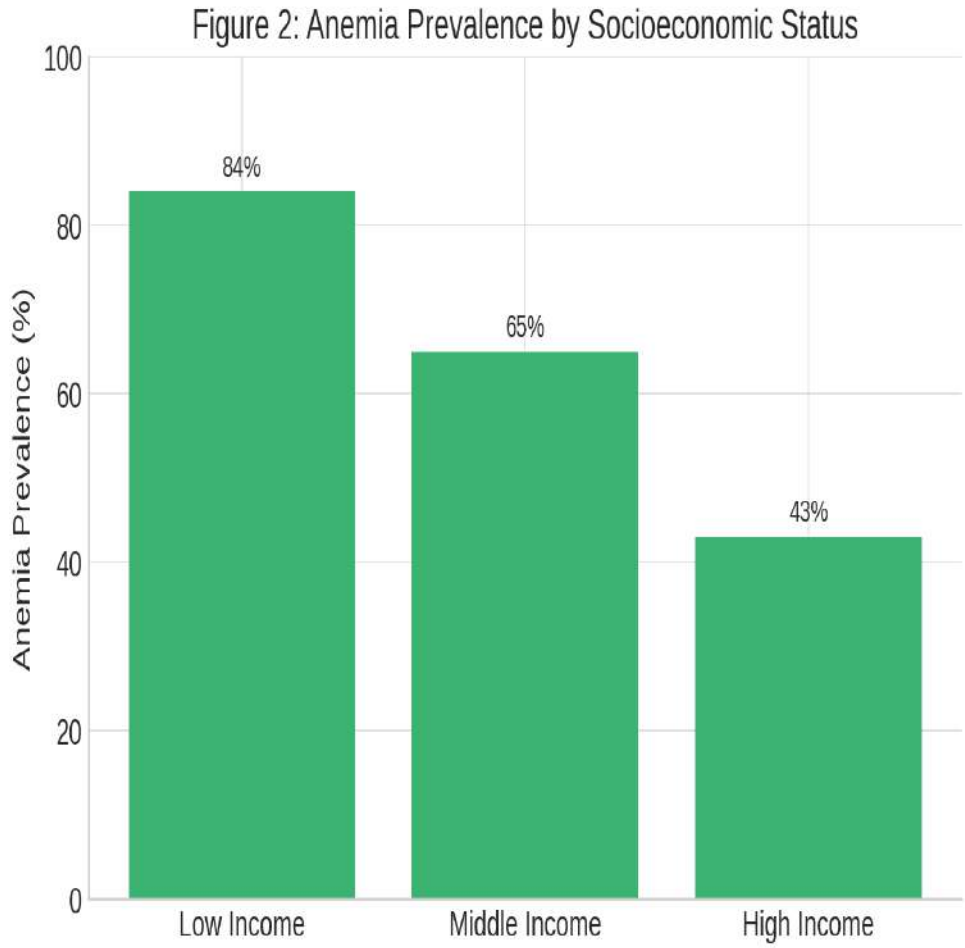
Relevant demographic and obstetric characteristics grouped maternal outcomes to determine relevant associations:

Anaemia

The prevalence of anaemia was found to be higher among the lower SES group of women (84%) than the middle (65%) and high SES groups (43%) (p = 0.032).

Women who were not educated were more likely to have anaemia than educated women (80 vs 65%, p = 0.041).

Higher prevalence of anaemia was associated with women living in rural areas compared with those in urban areas, which did not attain statistical significance (p = 0.09).



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Postpartum Haemorrhage (PPH)

More women with higher parity (> 3) experienced PPH (78%) compared to those with parity of 2 (56%) (p = 0.017).

There was a significant relationship between the occurrence of PPH and the history of caesarean section (p = 0.028).

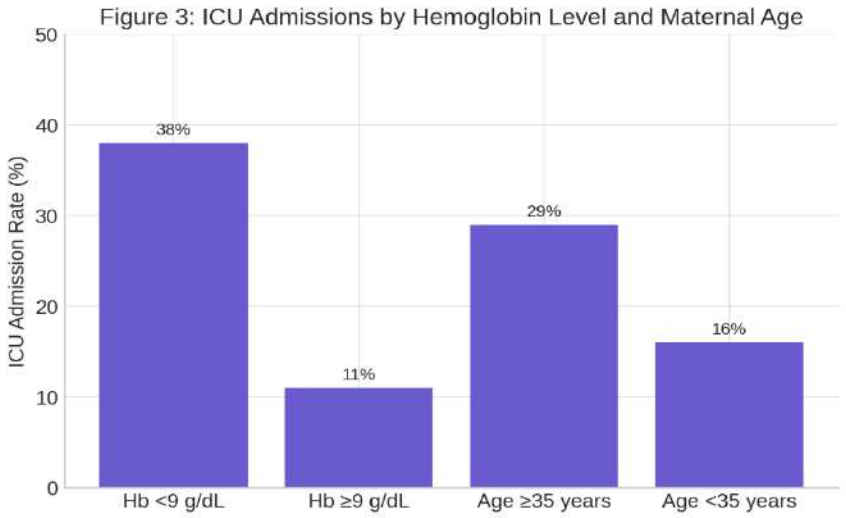
PPH was more prevalent among women falling under the age category of 35/75 years (75%) as compared to those less than 35/75 y (60%) (p = 0.045).

ICU Admission

The number of patients admitted to the ICU was significantly higher in women with Hb < 9 g/dL (38%) compared to those with Hb> 9 g/dL (11%) (p = 0.004).

We found a significant relationship between ICU admission and a previous history of caesarean section (p = 0.036).

- A higher rate of ICU admission was noted, too, when the mother was advanced (at least 35 years of age) (p = 0.022).



Statistical Analysis

The continuous variables, such as age, BMI, and gestational age, were normally distributed, as confirmed by the Shapiro-Wilk test. Categorical variables were tested using chi-squares. Fisher's exact test was applied in places where the expected cell counts were <5. All the analyses were deemed statistically significant with a p-value of < 0.05.

Summary Table – Key Associations

Variable	Outcome	p-value
SES (Low vs. High)	Anemia	0.032
Education Status	Anemia	0.041
Parity ≥3	PPH	0.017
Age ≥35 years	ICU Admission	0.022
Hb <9 g/dL	ICU Admission	0.004
Prior Cesarean	PPH & ICU Adm.	0.028, 0.036

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DISCUSSION

This paper has helped explain severe maternal outcomes in women with placenta previa in a tertiary care setting and showed a high rate of anemia, postpartum bleeding, and subsequent intensive care unit transfers. The numeric correlations between adverse events and the following risk factors—advanced maternal age, large parity, low socioeconomic status, and prior caesareans—enhance the multifactor interactions in the case of placenta previa (4). It shows that an appropriate risk assessment integrated into the management of such high-risk obstetric patients is highly needed in order to prevent maternal morbidity, with strategies based on individual circumstances. In our research, anemia was observed in a large proportion of the women with placenta previa, which is in line with the known fact that placenta previa is linked to higher risks of bleeding. The observed rate of postpartum haemorrhage also highlights the risk of haemorrhage attributed to placenta previa, which is consistent with the available literature indicating that placenta previa contributes to the cause of PPH (12)(3). A substantial proportion of ICU admissions in such patients highlights the severity of the complications that might develop and require intensive care and follow-up (7).

The maternal outcomes that will be identified in this study, particularly those related to anemia, postpartum hemorrhage, and ICU admission, can serve as a benchmark for comparison with recent findings from both local and international studies, specifically those published between 2020 and 2025. In comparison to research conducted in similar situations in Pakistan and other low- and middle-income countries, certain similarities and differences have been revealed, which should be taken into account. Studies that were carried out in Pakistan have already reported high prevalences of anemia in pregnant women with placenta previa as well (2). Some studies have attributed the causes of anemia to factors such as inadequate nutritional status and low availability of iron supplementation during

antenatal practices. Similarly, other reports in India and other LMICs have reported high rates of PPH in women having placenta previa, indicating difficulties in managing obstetric hemorrhage in resource-poor settings. The differences can occur due to variations in sample sizes, study designs, and the individual peculiarities of the populations under investigation. In addition, variations in the healthcare base, access to timely interventions, and the utilization of evidence-based guidelines in protocols to manage placenta previa may also lead to disparities in reported outcomes. The fact that a previous caesarean section is linked with a higher risk of placenta previa represents a conclusion with profound support as well.

The implication of these observations would relate to clinical practice and how the maternal health care is run, for instance, the logistics of conducting an early detection of placenta previa with a regular antenatal screening programme, and how this should come into force in terms of how the peripartum planning process is carried out to minimize the rates of maternal morbidities. Placenta previa can be detected early enough through an ultrasound examination; this can be planned well in advance. Specifically, an obstetrician can schedule a cesarean birth before labor occurs, which can significantly reduce the risk of hemorrhage. Keen observation of women with conditions like placenta previa, along with the timely administration of iron supplements, is crucial to prevent severe anemia and its associated comorbidities (12). Moreover, the likelihood of postpartum hemorrhage should be mitigated by having blood products, uterotonic drugs, and qualified clinical staff readily available (20). The study findings suggest that there is a need for targeted actions to curb the adverse outcomes of placenta previa, including iron supplementation, blood transfusion programs, and skilled birth attendants, which is a requirement especially in resource-constrained environments (12).The issue of poor access to quality antenatal care (including access to ultrasound services) can be addressed to enable early diagnostics of a prevailing placenta condition and enable corrective measures on time.

These findings must be viewed in the light of the the study's strengths and limitations. The single-center nature of the study and the comparatively small sample size of 100 women may limit the

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transferability of the study findings to other settings. Limitations of being limited to one tertiary care hospital may cause selection bias, as the study cannot be considered representative of the entire population of women with placenta previa in the community. The study is also retrospective, and therefore, it can contribute to the incorrectness of the results, even if it may result in recall bias or incomplete data. Nonetheless, there are also certain strengths of the study that should be noted, such as the use of real-world data, which was obtained through a tertiary care hospital operating in a high-burden area. This then provides considerable insight into the issues and problems associated with handling placenta previa in an environment where the condition is not uncommon. The results of the collected data represent real-life clinical experiences and outcomes in a busy obstetric unit, making the findings more relevant to those working in a province with similar facilities.

Some suggestions may be made based on the research to improve maternal outcomes in women with placenta previa. Improvements in antenatal screening procedures are important for detecting placenta previa early enough. This can be achieved by expanding access and availability of ultrasound services, especially in underserved locations, as well as ensuring that healthcare practitioners are adequately prepared in the interpretation of ultrasound findings. Better care in high-risk pregnancy is also necessary. This also encompasses the creation of standard procedures for treating women with placenta previa, including the incorporation of evidence-based practices focused on the process of monitoring, intervention, and planning of delivery. Preparedness for postpartum hemorrhage should also be enhanced (in particular, by establishing blood banks in easily accessible locations and training medical personnel to use sophisticated methods of obstetric hemorrhage management). Since the generalizability of single-center studies is limited, there is an evident need for multi-center studies to define the broad epidemiological patterns in Pakistan. These studies would provide a better understanding of the occurrence, risk factors, and outcomes of placenta previa in various regions and healthcare facilities (21).

Realistically, it is significant to note that the results of the current study emphasize the importance of identifying and managing maternal risks in women who do manage to exhibit the prevalence of placenta previa. The study's results highlight the importance of early diagnosis, proper planning during the peripartum period, and preparation for potential complications, including postpartum hemorrhage. Such results can be used to implement specific interventions and develop better management strategies to maximize obstetric outcomes and minimize maternal morbidity or mortality in cases of placenta previa in Pakistan or comparable contexts (10).

CONCLUSION

The research identifies a high burden of placenta previa abnormalities in maternal complications of a tertiary care facility in Pakistan. The incidence of anemia, postpartum haemorrhage, and intensive care unit admissions is very high, pointing to the need to identify early the risk areas of women, especially those with high maternal age, high parity, poor economic status, and those who have had cesarean sections in the past. This evidence underscores the need to enhance antenatal care services and access to diagnostic imaging procedures, including ultrasound, and to introduce guidelines for planning and delivery based on risks to mitigate this occurrence. In addition, it is possible to include interventions to address modifiable risk factors, such as anemia, and establish preparedness for obstetric emergencies, thereby minimizing maternal morbidity and mortality. It is proposed that studies involving future multicenter trials be conducted with larger sample sizes, as some are proposed, to generalize these findings and inform national guidelines on how to manage placenta previa in resource-constrained environments.

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AUTHORS CONTRIBUTION

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Critical Review: Shah Hassan, Sidra
Final Approval of version: Zubeda Yasmeen Kausar
All authors have reviewed and approved the final manuscript

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