

Maternal and Fetal Dynamics in Referral Obstetric Cases: A Tertiary Care Center StudySagar R Kacha¹, Vishal Prajapati², Mitul Patel³, Paras Majithia^{4*}¹Assistant Professor, Department of Obstetrics and Gynaecology, GMERS Medical College, Vadnagar, Gujarat, India²Assistant Professor, Department of Obstetrics and Gynaecology, GMERS Medical College, Vadnagar, Gujarat, India³Assistant Professor, Department of Obstetrics and Gynaecology, GMERS Medical College, Valsad, Gujarat, India⁴Assistant professor, Department of Obstetrics and Gynaecology, GMERS Medical College, Porbandar, Gujarat, India

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Abstract:**Introduction:** Exploring the outcomes of obstetric referrals offers insights into the complexities faced by expectant mothers and healthcare systems. Understanding maternal and fetal dynamics in referred cases is essential for tailoring interventions, optimizing care, and enhancing overall maternal and neonatal health.**Material and Methods:** This cross-sectional observational study conducted at a prominent Tertiary Care Center in Gujarat delves into the complexities of antenatal and intra-natal cases among obstetric referrals. The research, spanning from January 2022 to April 2022, focuses on patients with a gestational age surpassing 24 weeks and excludes gynecological referrals and postpartum cases for specificity. With a sample size of 120 patients selected through systematic random sampling, the study meticulously examines various parameters, including sociodemographic intricacies, reasons for referral, and maternal and neonatal outcomes. The data were analyzed utilizing the SPSS version 22.1 statistical software to interpret categorical variables such as age-category, maternal outcomes, and neonatal outcomes as proportions.**Results:** In our study of 120 referred obstetric cases, diverse outcomes unfolded. The majority (30.83%) underwent Vaginal Delivery, while 47.67% opted for Lower Segment Cesarean Section (LSCS). Notably, 3.33% experienced Vaginal Birth After Cesarean (VBAC), and 2.50% underwent Hysterectomy. Maternal complications included 5% with Postpartum Hemorrhage, 9.17% with Puerperal Pyrexia, and 1.67% each for Sepsis, maternal death, Wound Gaping, and Pelvic Abscess. Concerning neonatal outcomes, 3.33% required Neonatal Intensive Care Unit (NICU) stays, 2.50% had Intrauterine Death (IUD), and 59.67% experienced maternal-side stays.**Conclusion:** In conclusion, our study unravels the intricate tapestry of referred obstetric cases, emphasizing diverse delivery modes, maternal complications, and neonatal outcomes. The findings shed light on the multifaceted challenges within tertiary care, guiding targeted interventions for improved maternal and neonatal health.**Keywords:** Referred Obstetrics, Maternal Outcomes, Neonatal outcome.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Maternal and fetal health constitute paramount priorities in the realm of obstetric care, reflecting the intricate interplay between the well-being of the expectant mother and the developing fetus. [1,2] In the context of tertiary care centers, where complex and high-risk pregnancies are often referred for specialized management, understanding the fetomaternal outcomes becomes pivotal. [3]

Gujarat, a vibrant state in western India, witnesses a diverse demographic and epidemiological profile,

presenting a unique backdrop for obstetric studies.[4,5] The decision to refer a pregnant woman to a tertiary care center is often a result of identified risks, complications, or the need for specialized interventions. [6] Consequently, the study seeks to investigate the spectrum of obstetric cases arriving at the tertiary care center, exploring the underlying reasons for referral and their implications on the health of both the expectant mother and the fetus.

Furthermore, the significance of studying fetomaternal outcomes in referred obstetric cases extends beyond the immediate clinical implications. [7] It provides a lens through which healthcare systems can evaluate the efficiency and effectiveness of the referral process. Understanding the outcomes of referred cases aids in assessing whether the transfer of patients to tertiary care centers aligns with the intended goal of improving maternal and fetal outcomes. [8] Identification of potential areas for improvement in the referral process, such as timeliness, communication, and coordination between primary and tertiary care providers, can contribute to refining the overall obstetric care continuum. [9]

In the contemporary landscape of obstetrics, where the dynamics of maternal health are constantly evolving, a comprehensive investigation into fetomaternal outcomes in referred cases is essential for evidence-based practice. [10] This cross-sectional observational study aims to delve into the nuanced landscape of referred obstetric cases in a tertiary care center in Gujarat, shedding light on the multifaceted determinants that influence the outcomes for both mother and child.

Material and Methods

This cross-sectional observational study spanned a comprehensive timeframe from January 2022 to April 2022, unfolding within the Department of Obstetrics and Gynecology at a prominent Tertiary Care Center in Gujarat. This center, analogous to the aforementioned example, stands as a pivotal referral point for obstetric cases originating from diverse healthcare settings, including Primary Health Centers (PHCs), Community Health Centers (CHCs), Sub-District Hospitals (SDHs), and private hospitals across the region. Our research honed in on the intricacies of antenatal and intra-natal cases, focusing specifically on patients referred to our center with a gestational age surpassing 24 weeks.

To ensure the study's specificity and relevance, gynecological referrals and postpartum cases were deliberately excluded from the purview. The sampling methodology adopted a meticulous approach, incorporating a sample size of 120 patients chosen through systematic random sampling. The randomization process took place at the registration counter, where every third patient from the registration book was selected. In cases where the selected patient was unavailable, the subsequent immediate patient was included, employing a systematic and unbiased approach to random sampling.

A comprehensive set of parameters was scrutinized through a meticulously crafted, pre-tested study tool administered by interviewers. This encompassed a wide array of data points, including patient status, reasons precipitating referral, sociodemographic intricacies, prevailing medical comorbidities, gestational age, mode of delivery, neonatal outcomes, birth weight, and maternal outcomes. The communication of the fetomaternal prognosis to both patients and their relatives was undertaken with utmost clarity and transparency. All collected data were diligently entered into a computer-based spreadsheet to facilitate organized and efficient analysis. For statistical interpretation, categorical variables, such as age-category, maternal outcomes, and neonatal outcomes, were presented as proportions and subjected to rigorous analysis using the SPSS version 22.1 statistical software. This methodological rigor ensures a robust foundation for elucidating the multifaceted factors influencing fetomaternal outcomes within our referred obstetric cases, thereby contributing valuable insights to the broader landscape of maternal-fetal medicine.

Results

In our study, majority of the study participants (45.83%) were in the 21-25 years range, emphasizing the early to mid-reproductive years. Close behind, the 26-30 years age group constitutes 30.83%, offering insights into late reproductive age obstetric cases. Noteworthy subsets include those below 20 years (7.50%) and pregnancies beyond 30 years (15.83%). In our study, 54.16% are primiparous (experiencing their first pregnancy), and 45.83% are multiparous (with more than one previous childbirth).

Within our study, notable patterns emerge in obstetric causes, with anemia playing a substantial role at 30.83%, underscoring its significant impact. Previous Cesarean sections contribute significantly at 15.83%, pointing to a noteworthy trend in our cohort. Hemorrhage, representing 7.5%, stands as a substantial factor warranting careful consideration. Additionally, preterm labor and Pregnancy-Induced Hypertension (PIH) contribute 13.33% and 15%, respectively, further elucidating the multifaceted nature of our study population. Oligohydramnios and malpresentation collectively account for 15%, emphasizing their combined influence on fetomaternal outcomes. Cephalopelvic Disproportion (CPD) plays a role in 4.17% of cases, signifying its relevance within our obstetric landscape.

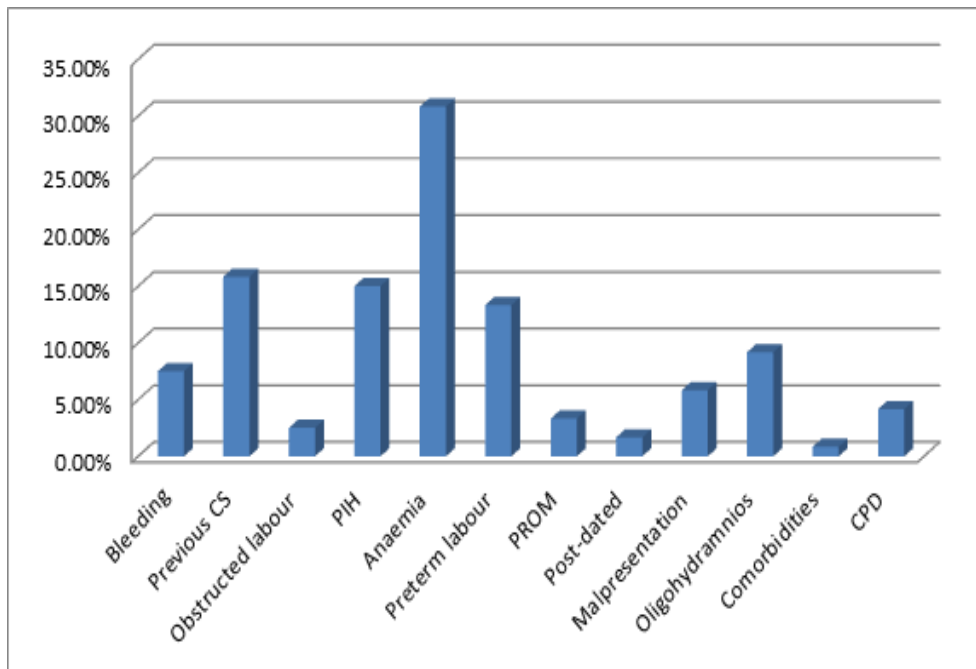


Figure 1: Causes of Referral

Our study results found that (28 cases, 23.33%) of obstetric cases referred to a tertiary care center were originated from Primary Health Centers, (41 cases, 34.17%) from Community Health Centers, (11 cases, 9.17%) from District Hospitals, (3 cases, 2.50%) from Medical Colleges, and a substantial (37 cases, 30.83%) from Private Hospitals.

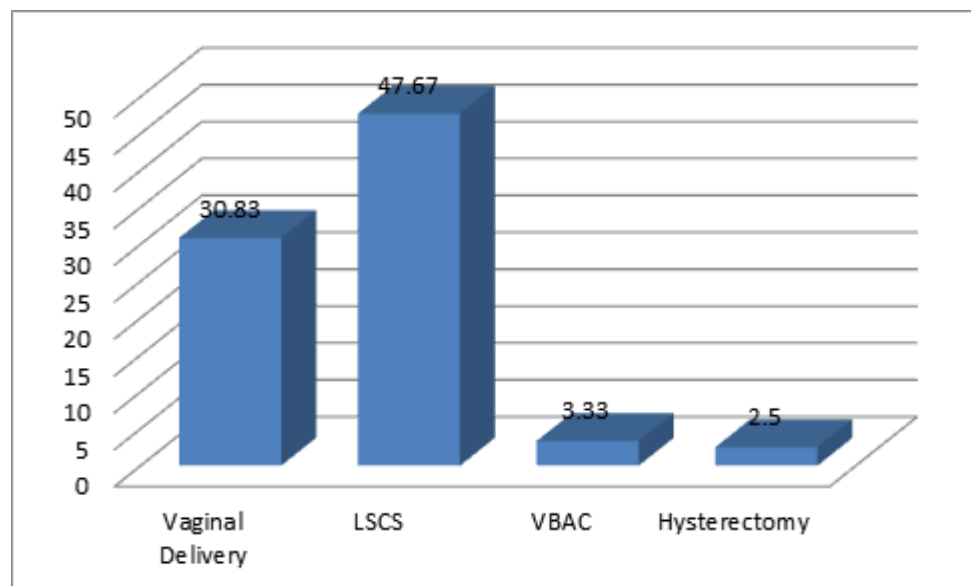


Figure 2: Mode of delivery (% of cases)

Among the 120 patients referred to the higher center in our study, 100 cases resulted in deliveries, showcasing a spectrum of delivery modes. Notably, 37 cases (30.83%) experienced Vaginal Delivery, while the majority, accounting for 47.67% (56 cases), underwent Lower Segment Cesarean Section (LSCS). Additionally, Vaginal Birth After Cesarean (VBAC) constituted 3.33% (4 cases), and Hysterectomy was performed in 2.50% of cases (3 cases).

Among the 120 referred patients in our study, maternal and fetal outcomes varied. Postpartum Hemorrhage (PPH) occurred in 5% (6 cases), Sepsis in 1.67% (2 cases), and there was one maternal death, constituting 0.83%. Puerperal Pyrexia affected 9.17% (11 cases), Wound Gaping and Pelvic Abscess each accounted for 1.67% (2 cases and 1 case, respectively). Concerning neonatal outcomes in our referred obstetric cohort, 3.33% (4 cases) required Neonatal Intensive Care Unit

(NICU) stays, indicating a need for specialized care post-delivery. Intrauterine Death (IUD) was observed in 2.50% (3 cases), emphasizing the unfortunate occurrence of fetal demise in select

instances. Additionally, a notable 59.67% experienced maternal-side stays, shedding light on the multifaceted outcomes for both mothers and newborns in our study.

Table 1: Maternal and fetal outcome

Outcome	Number (n=120)	Percentage (%)
PPH	6	5%
Sepsis	2	1.67%,
Maternal deaths	1	0.83%,
Puerperal pyrexia	11	9.17%
Wound gaping	2	1.67%
Pelvic abscess	1	0.83%
NICU stay	4	3.33%
IUD	3	2.50
Motherside stay	71	59.67%

Discussion

Exploring the outcomes of referred obstetric cases provides crucial insights into the challenges faced by both expectant mothers and healthcare systems. Understanding the complexities of these cases, including maternal and fetal outcomes, allows for targeted interventions to improve referral processes, optimize care, and enhance overall maternal and neonatal health.

In our study, most referred cases were 21-25 years (45.83%), emphasizing early to mid-reproductive age. The 26-30 years group constituted 30.83%, offering insights into late reproductive age, with subsets <20 years (7.50%) and >30 years (15.83%). Comparing with Prakash et al. [11], our trends align closely, with a higher proportion in the 21-25 years range. Our parity distribution matches Prakash et al. [11], indicating 54.16% primiparous and 45.83% multiparous cases. Akaba et al.'s [12] Nigerian study highlights age disparities, with minimal cases <20 years and a significant number without antenatal care. Bansal et al.¹³ and Jakhar et al. [14] contribute perspectives, emphasizing age distributions and referral patterns. Bansal et al. [13] observes most cases between 24-29 years, while Jakhar et al. [14] notes a significant number of referred patients in the 21-30 years age group. Study by Pandya and Patel [15] reported that 64% referred cases belonged to age group of 21-30 years, which is also comparable to our study. These comparisons highlight obstetric case complexity across studies, reflecting demographic and regional variations.

Regarding obstetric causes for referral, anemia emerged as a major contributor at 30.83%, underscoring its substantial impact on maternal health. Previous Cesarean sections played a significant role in 15.83% of cases, indicating a noteworthy trend in our study population. These findings align with broader trends observed in the studies [11,16,17], emphasizing the importance of addressing anemia and considering the implications of previous Cesarean sections in obstetric care. In

Ambreen et al.'s [18] study, 68% of patients presented with labor pains, while 15% had a previous scar. In Jakhar et al.'s [14] study, the majority were referred for labor pain (36.29%) and previous Cesarean section (11.44%). Gupta et al. [19] reported referrals for anemia (18.05%), hypertensive disorders of pregnancy (22.27%), and mal-presentations (15.19%). Panchal and Patel [15] noted common causes as anemia (15%) and hypertensive disorders of pregnancy (15%). Akaba et al.'s [12] study highlights severe pre-eclampsia/eclampsia (26.8%), CPD/obstructed labor (22.0%), and premature rupture of membranes (17.9%) as main obstetric indications for referral.

The multifaceted nature of our study population is evident in the distribution of various obstetric causes, including hemorrhage, preterm labor, and Pregnancy-Induced Hypertension (PIH). The combined influence of oligohydramnios and malpresentation on fetomaternal outcomes is noteworthy, constituting 15% of cases. Overall, our study underscores the complexity of obstetric cases and the diverse factors influencing referrals to a tertiary care center. The findings emphasize the need for tailored healthcare interventions, particularly in addressing anemia and the implications of previous Cesarean sections, to enhance maternal and fetal outcomes in referred cases.

In our study of 120 referred cases, 30.83% had Vaginal Delivery, 47.67% underwent Lower Segment Cesarean Section (LSCS), 3.33% had Vaginal Birth After Cesarean (VBAC), and 2.50% underwent Hysterectomy. Comparing our findings to Ambreen et al.'s [18] study, notable disparities arise in the mode of delivery. In our study, the predominant mode was LSCS, representing a higher percentage at 47.67%, whereas Ambreen et al. [18] reported a higher proportion of abdominal deliveries (62%). The variation could be attributed to differences in healthcare settings, patient populations, or clinical practices, highlighting the influence of regional and institutional factors on

delivery modes. Our study's emphasis on the prevalence of Cesarean sections suggests potential areas for intervention or improvement in obstetric care, warranting further investigation into the underlying reasons for these disparities and their impact on maternal and neonatal outcomes.

In our study of 120 referred patients, notable maternal complications included 5% with Postpartum Hemorrhage, 9.17% experiencing Puerperal Pyrexia, and 1.67% each for Sepsis, maternal death, Wound Gaping, and Pelvic Abscess. Comparing these outcomes with findings from other relevant studies provides a comprehensive understanding of maternal complications. In Jakhar et al. [14], a higher ICU admission rate (5.3%) was observed, with diverse complications such as antepartum eclampsia, PPH, and exploratory laparotomy. Goswami and Makhija [20] showcased a lower ICU admission rate (12.34%), while Charu et al. [21] observed a higher rate (8%). Ambreen et al. [18] noted various complications, with PPH at 46%, differing significantly from our study. In Bansal et al. [11], postoperative complications were highlighted, including a substantial portion experiencing fever. Prakash et al. [11] reported maternal deaths (2.5%) and diverse complications, including PPH, septicaemia, wound gaping, and puerperal pyrexia. Disparities across studies [11,13,21] underscore the influence of regional and demographic factors on obstetric outcomes, emphasizing the need for tailored interventions to address the distinct challenges observed in different healthcare settings.

The neonatal outcomes in our referred obstetric cohort revealed 3.33% (4 cases) requiring Neonatal Intensive Care Unit (NICU) stays, underscoring the need for specialized post-delivery care. Intrauterine Death (IUD) was observed in 2.50% (3 cases), highlighting the unfortunate occurrence of fetal demise. Moreover, a significant 59.67% experienced maternal-side stays, providing insights into the multifaceted outcomes for both mothers and newborns in our study. Comparatively, in the Ambreen et al. [18] study, perinatal complications included 36% with a low APGAR score, 34% with meconium-stained liquor, and 23% with fetal growth restriction, emphasizing diverse challenges faced by newborns. The Bansal et al. [13] study explored the association between maternal age groups and baby outcomes due to obstructed labor, revealing varied results across age categories. In Prakash et al.'s [11] study, 77% of neonates were shifted to the mother's side, and 18% were admitted to the NICU, providing additional perspectives on neonatal care strategies. These diverse findings underscore the need for tailored interventions to address the unique challenges observed in different healthcare settings and maternal age groups.

While our study provides valuable insights into obstetric referrals, there are limitations to consider. The cross-sectional design restricts the ability to establish causation, offering snapshots rather than longitudinal perspectives. The study's single-center focus may limit generalizability to diverse healthcare settings. Additionally, the exclusion of gynecological referrals and postpartum cases narrows the scope, potentially missing comprehensive insights.

Conclusion

In summary, our study reveals nuances in obstetric referrals, emphasizing age-specific trends, significant causes, and delivery mode disparities. Anemia and previous Cesarean sections stand out as crucial intervention areas. The intricate interplay of factors like oligohydramnios and malpresentation highlights the need for a nuanced tertiary care approach. Variances in delivery modes with Ambreen et al. underscore regional influences on practices. Maternal complications, such as Postpartum Hemorrhage and Puerperal Pyrexia, vary across studies, reflecting regional and demographic differences. Neonatal outcomes stress the importance of specialized post-delivery care, particularly in NICU stays and Intrauterine Deaths in referred cases.

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