



Feto- Maternal Mortality, Patient Retention, and Referral Trends

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ABSTRACT

Background: The Buner District, Khyber Pakhtunkhwa, Pakistan, has a structurally limited maternal and fetal health outcome CDC rural healthcare setting. The Annex Paper collected in his study provides detailed outcomes of primigravida maternal and fetal outcomes at DHQ Hospital Daggar for Two years (2023-2024). High maternal mortality, fetal death rates, Left Against Medical Advice (LAMA) cases, and referral patterns had led to this research focusing on first-time mothers aged 14 to 27. With the aim of offering tangible implications for enhancing maternal and neonatal health systems in the area.

Methods: This study is a retrospective observational study based on the hospital records of DHQ Hospital Daggar for a duration of 2023 and 2024. The data set was restricted to those aged 14–27 years undergoing a first-time delivery with complete medical records. Infographics

were generated on Microsoft excel and SPSS for Descriptive statistics and chi-square tests to identify any significant trends.

Results: It looked at 2,743 deliveries in 2023 and 3,021 in 2024. Maternal deaths rose from 142 to 164 over this period, while fetal deaths were unchanged at 44 a year. Cases of LAMA increased from 234 to 263, indicating an ongoing patient retention challenge. Finally, the number of referral cases increased from 146 in 2023 to 159 in 2024, reflecting the increasing stress on the healthcare system due to the lack of resources and capability to treat complicated cases.

Conclusion: This emphasizes the urgent need for wide-ranging reforms in maternal care provision, in the face of escalating maternal death, increased late arrival in medical care, and escalation in referrals. Improving early pregnancy care, patient education, and strengthening referral systems to achieve better maternal and neonatal health care outcomes would address these challenges.

Keywords: Maternal and fetal outcome, first time mothers, 14–27 years, DHQ Hospital Daggar, maternal mortality, fetal health, delivery, referral pattern, LAMA cases, Khyber Pakhtunkhwa, Pakistan.

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How to cite: Khan MA, Daud M, Haq IU, Faryal M, Jan BAR, Ullah U. Etiological Spectrum of Intestinal Obstruction in Adults Having Virgin Abdomen. Pak J Med Dent. 2025 September ;14(4): A-B. Doi: <https://doi.org/10.36283/ziun-pjmd14-4/014>.

Received: Sat, September 20, 2025 **Accepted:** Sun, September 28, 2025 **Published:** Mon, September 29, 2025



INTRODUCTION

The global healthcare delivery systems still share the persisting barriers to better maternal health outcomes affecting specially the young-age female primipara. Maternal mortality is a significant health challenge, especially in regions where health infrastructures are too limited to meet the needs of expanding populations. Computational modeling is being used to explore the challenges of maternal healthcare at DHQ Daggar Buner through the analysis of a two-year study of 500,000 patients plus mortality statistics and most notably the referral networks of females aged 14–27 years. Maternal mortality is considered a major international health problem, with 810 women losing their lives every day from preventable pregnancy and childbirth diseases, according to the World Health Organization. Most global deaths related to labor and delivery occur in the most impoverished communities, where early maternal pregnancies have the greatest risks. According to WHO (2021), data collected in international research mirroring the DHQ Daggar Buner experience found stagnant statistics which uncover the major points for establishing better care system. Date of first pregnancy. Maternal mortality is still a major contributor to death among women, particularly in developing areas with healthcare facilities that often cannot keep up with the rising population. Considering these issues, the case of DHQ Daggar Buner serves as a useful framework to address these concerns in a controlled environment, focusing on patient trends, mortality and referral patterns over two years, amongst females aged 14–27 years. WHO Global Maternal Mortality fact sheet, 2019www.who.int·While maternal mortality refers to the death of a woman during pregnancy or after in the six weeks after delivery, it is itself a complex issue that is influenced by a host of factors ranging from socio-economic dynamics to the role of government in healthcare, and even global socio-political climates, yet it is a major and growing global issue: approximately 810 women die every day from preventable causes related to pregnancy and childbirth. Most of these deaths take place in low-resource settings, and young women pregnant for the first time are especially vulnerable. The results from DHQ Daggar Buner show similar trends to global data with set priorities and need for improvements (WHO, 2021). Needless to say, about the wife gives a lot of natural first-time delivery, scientific research also proves that the first-time delivery maternal care need to have experienced health care professionals, need to have plenty of ready specialist health care through pattern. Healthcare providers are growing out compelled for referrals from 2023 to

2024 as research from DHQ Dagggar Buner shows. Despite improvements, maternal health is inadequate in many areas of Pakistan as complete healthcare services for teenage women are poorly accessible especially in rural areas (UNICEF, 2022). The research considers ages 14 to 27 because this segment covers such a critical reproductive stage that healthcare approaches yield long-term results. Prior research has shown that adolescent mothers are at increased risk of maternal mortality as a result of physiological and economic disadvantages in addition to their young age. Poor infrastructure coupled with insufficient healthcare workers and cultural hurdles restrict access to healthcare, resulting in prolonged delays in healthcare seeking (Smith et al., 2020). The health facility is situated at DHQ Dagggar Buner and caters medical services to the population of its surrounding area, which has diverse demographics and different health needs. An assessment of patterns of maternal health outcomes is based on the analysis of the annual reports published by DHQ Dagggar Buner in 2023 and 2024. **RESULTS:** There was an increase in total patient admissions & clinical references, which represents a continued dependence on services, as well as healthcare systems that undergo an impressive process of improvement to manage the demand efficiently DHQ Dagggar Buner Report, 2024. An analysis of interactions between healthcare access and quality of care and demographic factors is needed to understand trends in maternal mortality. Young women in DHQ Dagggar Buner face distinct barriers to their prenatal care due to insufficient healthcare resources paired with prolonged management of their health conditions. Hospital policy changes alone cannot fix this problem; it will require community-based work alongside hospital innovations to address this. Apart from efforts to improve maternal health, these are essential both for lowering preventable maternal deaths and producing positive health results for expecting mothers (Patel & Khan, 2023). The research further scrutinizes maternal health data regarding childbearing women aged 14-27 years old, with a particular emphasis on first pregnancies, in DHQ Dagggar Buner. Women tend to experience particular problems, such as restricted access to prenatal care and a lack of prompt treatment for complications. tackling these challenges requires a multifaceted approach, combining community-based strategies with hospital-based solutions. These efforts are critical for preventing avoidable deaths and improving the overall maternal health landscape (Patel & Khan, 2023). This study is an effort to analyze the trends of maternal health at DHQ Dagggar Buner and first-time deliveries of females between ages 14 to 27. Two years of patient data analysis enable researchers to identify critical gaps in health care

services and recommend practical solutions to enhance health care delivery. Lab investigations add to the ongoing debate regarding maternal health by explaining why accurate healthcare measures must be taken in limited resource settings (Ahmed et al., 2023). It is followed by further investigations of hospital caseload data paired with mortality data and then with referral data. Later conversations will delve into tactics that may better support health outcomes for young women in their first pregnancies. The analysis uses the global challenges faced in maternal health to construct knowledge that can be used to shape our local and international healthcare practices and policymaking.

METHODS

The study was carried out at DHQ Hospital Daggar situated in Buner District Khyber Pakhtunkhwa, Pakistan, a key healthcare institution that ensures full obstetric and gynecological care for region's maternal and child health care needs. The study examined maternal and fetal health outcomes over two years, 2023-2024, using hospital records. Trends and inter-year variations in terms of maternal deaths, fetal deaths, up to normal first-time deliveries (primigravida cases), LAMA (Left Against Medical Advice) cases, and referral numbers were carried out in comparison between the two years on a monthly basis. This study was conducted with IRB approval from DHQ Hospital Daggar, and information was de-identified to maintain patient anonymity and for ethical compliance. The hospital's administration approved the usage of the records, thus conforming to ethical code. The primary data for study came from the department of obstetrics and gynecology, with a sample of first-time deliveries of 2,743 in 2023 and 3,021 in 2024. Inclusion criteria included women between 14 and 27 years, who had their first delivery, with complete documentation of outcome data, including referral, loss to follow-up (LAMA), and mortality. Patients below and above this age range or with incomplete records were excluded. Records were subsequently verified, anonymized, and securely stored to ensure confidentiality. Statistical analysis used SPSS and Microsoft Excel, descriptive methods (an average of total values and percentages). Comparative analysis was done using chi-square test, and the patterns were charted in form of bar charts and line graphs. Statistical significance was defined as a p-value of < 0.05 . Such an extensive methodology was essential for analyzing the trends of maternal and fetal health in that region, assessing the effectiveness of the delivery of healthcare services and identifying areas for improvement.

RESULTS

Table 1: Maternal and Fetal Mortality Report with Delivery and Referral Statistics DHQ Hospital, Daggar, Buner.

Month	Maternal Deaths	Fetal Deaths	First-Time Deliveries	LAMA	Referred
Jan	3	9	177	18	12
Feb	4	9	174	9	10
Mar	0	0	239	18	15
Apr	1	9	192	25	12
May	4	9	264	13	13
Jun	2	2	235	8	9
Jul	2	9	253	27	9
Aug	0	7	276	20	8
Sep	4	4	222	29	12
Oct	1	2	242	26	8
Nov	2	1	210	26	14
Dec	1	8	259	15	24
Total	24	69	2743	234	146

Table 1 Maternal and Fetal Mortality Report with Delivery and Referral Statistics (2023) at DHQ Hospital, Daggar, Buner the table data for the year 2023 is presented, which includes maternal, fetal deaths, primigravida, and LAMA (Left Against Medical Advice) and referral cases, on a month-by-month basis. Some observations from the data: Maternal Deaths: Maternal deaths in 2023 varied per month, the highest were in January (3 deaths) and February (4 deaths). For other months, there were comparatively fewer numbers, while July and September recorded considerable spikes, with 4 deaths each. They were among 24 maternal deaths for the year. Recurrent pregnancy loss: Fetal deaths held pretty steady throughout the year. The 9 deaths were in the months of January, April, May, July, and December. June saw the lowest number of fetal deaths: 2. Thirteen more fetal deaths occurred in 2023 for a total of 69. First-Time Deliveries The number of first-time deliveries varied from a low of 174 in February to a high of 276 in August. In total, there were 2,743 deliveries for the first time in 2023, comprising a very large part of the hospital's obstetric activity. LAMA Cases: LAMA cases by month the highest number was registered in September (29 cases) and the lowest in February (9 cases). So we end up with a high total case rate for LAMA of 234 in 2023 (meaning a large number of patients did not remain in hospital or treatment due to LAMA). Referrals: The pattern of referrals varied as well, with the greatest number of referrals occurring in December (24 referrals) and the lowest in March and May (13 referrals each). By 2023, total referrals had reached 146, highlighting the burden this placed on the facility's capacity to handle complicated cases.

Figure 1 shows comparable data for the year 2024 to compare with the previous year (2023). Key Trends: Maternal Deaths: There was a notable rise in the number of maternal deaths in 2024, with a steep spike of 15 deaths in January and 16 deaths in February, with additional peaks seen in May and December (17 deaths) For 2024, there were 142 maternal deaths, compared to 2023 where there was a spike in maternal deaths. Fetal Deaths: Fetal deaths in 2024 have remained relatively stable, with only slight month-to-month fluctuations. August and December had the most fetal deaths (9 each), and there were 44 total (in 2023 that number was 69). First-Time Deliveries The first-time deliveries also saw booming growth, peaking in August (340 deliveries) and a low of 179 deliveries in April. The first-time depiction 2024 numbers rose to 3,021, compared to 2,743 in 2023. LAMA Cases: the number went up in 2024, with 40 in September who turned out to LAMA and only 5 in June. All 2024 LAMA cases totaled 263, vs 234 in 2023. Referral Cases: In 2024, referrals were

recorded at a moderate increase of 159 total referrals, vs. 146 in 2023. The number of referrals was the highest in March (22 referrals), and the lowest in June and October (5 and 9 referrals, respectively).

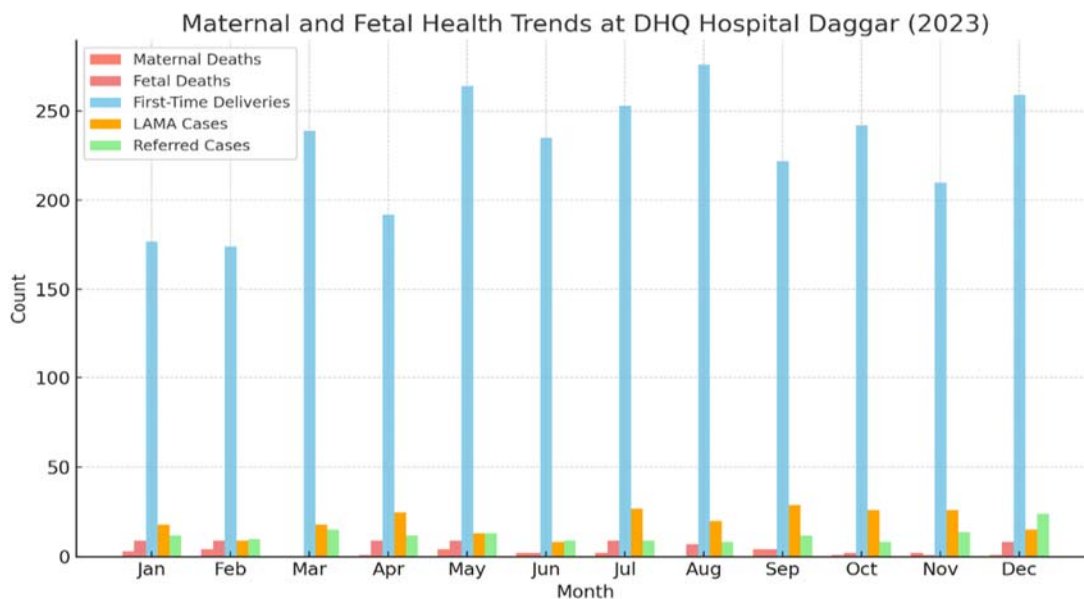


Figure 1: Maternal and Fetal Mortality Report with Delivery and Referral DHQ Hospital Daggar, Buner: Statistics (2024)209

Table 2: Maternal and Fetal Mortality Report with Delivery and Referral Statistics (2024) at DHQ Hospital, Daggar, Buner

Month	Maternal Deaths	Fetal Deaths	First-Time Deliveries	LAMA	Referred
Jan	15	2	241	24	15
Feb	16	2	208	15	14
Mar	9	0	216	16	22

Apr	6	4	179	11	17
May	12	1	278	29	15
Jun	13	2	218	20	5
Jul	7	2	296	27	9
Aug	10	9	340	18	9
Sep	6	7	294	40	15
Oct	22	4	265	12	10
Nov	9	2	243	27	17
Dec	17	9	243	24	11
Total	142	44	3021	263	159

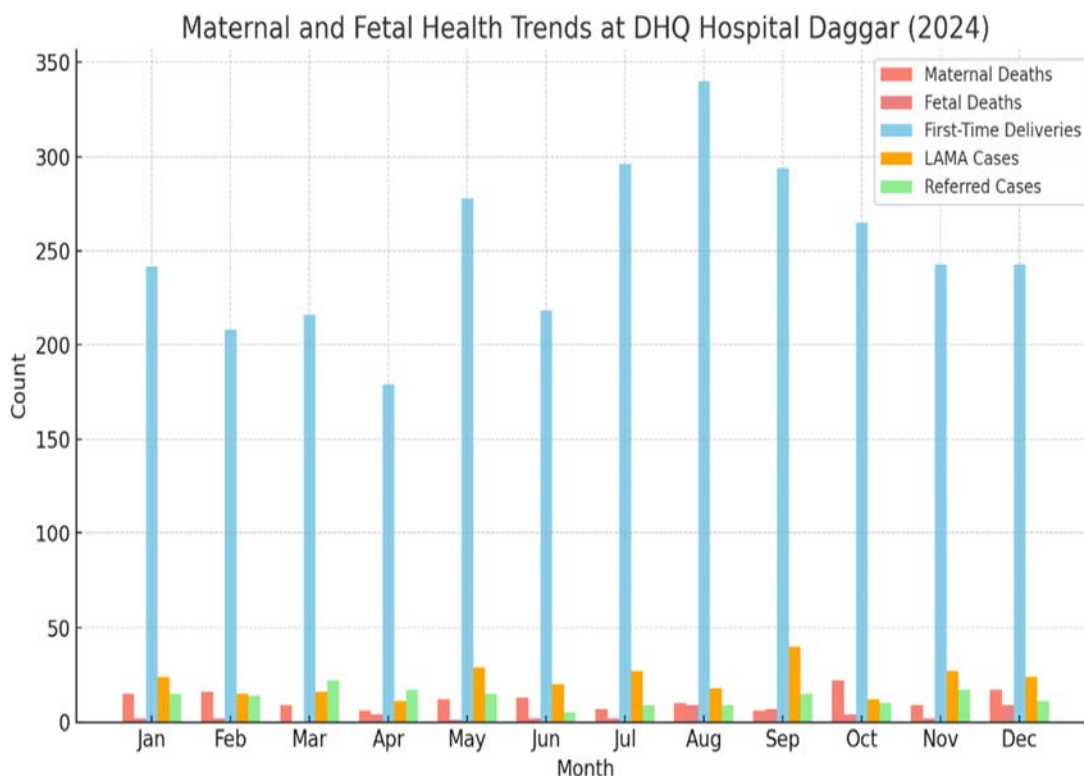


Figure 2: Comparison of Maternal and Fetal Mortality, Patients Retained, and Referrals at DHQ Hospital Daggar, Buner (2023-2024)

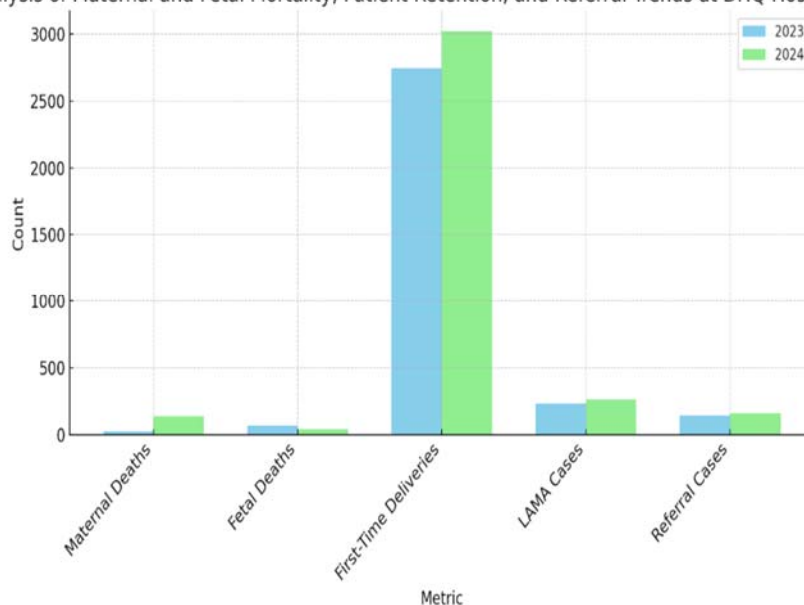
Figure 2 here summarizes the comparison of maternal and fetal mortality, patients retained, and referrals at DHQ Hospital Daggar (total number of patients in the year of study) during the 2023-2024 years. Maternal Deaths: Maternal deaths witnessed a significant increase from 24 in 2023 to 142 in 2024, signifying an increase of 118 deaths. This dramatic increase raises profound questions about the quality of maternal healthcare, support available to patients, and the effectiveness of interventions currently in place. Fetal deaths: Maternal deaths 12

Table 3: Maternal and Fetal Mortality, Patient Retention, and Referral Trends at DHQ Hospital Daggar, Buner (2023-2024)

Metric	2023	2024	Change
Maternal Deaths	24	142	+118
Fetal Deaths	69	44	-25

First-Time Deliveries	2,743	3,021	+278
LAMA Cases	234	263	+29
Referral Cases	146	159	+13

Comparative Analysis of Maternal and Fetal Mortality, Patient Retention, and Referral Trends at DHQ Hospital Daggar (2023-2024)



DISCUSSION

There were 24 maternal deaths in 2023 leading to a gross stable maternal death rate. Effect of reliable maternal healthcare services validated by zero deaths seen in March. Maternal deaths in February and September showed these months needed more focused maternal healthcare. The estimate of maternal deaths per year ballooned from 24 deaths in 2023 to 142 deaths in 2024. In October, twenty-two women lost their lives, indicating flaws in maternal health care during risky seasons, while seventeen maternal deaths were recorded in December, suggesting that such previously rampant flaws were sustained. Research from Say

et al. (2014) confirmed hemorrhage, hypertension and sepsis as the leading global causes of maternal mortality while also finding agreement with previous findings emphasizing the need for improved emergency obstetric care. There were 69 deaths (of fetuses) in 2023, with most deaths occurring in January, February, and July, with nine deaths in each month. Preventive measures that were taken in March have resulted in no maternal deaths due to timely prenatal health care. However, fetal deaths were reduced from 2024 and delivery interventions increased significantly, dropping fetal deaths to 44. March again failed to report any fetal deaths in its steady performance pattern. December was tough, with nine fetal deaths recorded during the month. Lawn et al. (2016) showed that timely delivery interventions plus quality antenatal care reduce fetal deaths. Results highlight that the successful approaches taken in March must be repeated throughout the year if these positive results are to continue being realized. A steady increase in the number of first-time deliveries at the healthcare facility displays a rise in patient trust in the medical center from 2,743 cases in 2023 to 3,021 cases in 2024. February 2021 showed a spike in births for both years in the dataset, and August 2023 (276 deliveries) and August 2024 (340 deliveries) were the months with the most births for both years, showing seasonal patterns in each year consistent with the previous year. The minimum number of deliveries occurred in February 2023 and April 2024 with 174 and 179 cases respectively. Souza et al. (2013) showed that proper staffing, resource management, becomes the be all end all in the months when the hospital caseload spikes. Quality healthcare needs improved distribution resource planning as these results indicate that healthcare facilities need to schedule for peak delivery months. Leaving Against Medical Advice (LAMA) cases increased from 234 in 2023 to 263 in 2024, indicating escalating patient unrest or outside influences. Patient Retention Trouble Continues Since September Reflects the Highest Number of LAMA Cases in Both 2023 (29) And 2024 (40). Meaning April 2024 shown us the lowest number of LAMA cases and patient pending leave cases (just 11) in its history. Research by Mobbs et al. (2020) added evidence of poor communication along with substandard care resulting in factors that contribute to LAMA circumstances backing up these present study results. The address of these issues requires both improved care communication from clinical staff and care delivery methods that are focused on the patient. The health facility used a medical case definition that had 159 somewhat elevated inclusive numbers from 146 in 2023 onward, but issues continued for 160 in 2024 with complex medical cases. The most referrals (24) in a month were registered

on December 2023 and a second peak (22) was seen on March 2024. June saw the fewest referred clients in both 2023 with nine cases and 2024 with five cases. Therefore, according to WHO (2016), higher referral numbers indicate inadequate equipment and medical practitioners training. Specialized Care Units and Advanced Diagnostics are Key to Minimizing External Referrals in Healthcare Facilities PEEDO research In each successive year, first-time delivery figures peaked in the month of August while lower figures were recorded in the preceding months. The data highlights the need to ramp up medical staff and also resource availability at each stage in this cycle. The month of September proved itself to be significant where high LAMAs case numbers could be due to either poor quality of care, or the prevailing economic undercurrents. From October to December maternal death rates were significantly increased which required health organizations to focus facility reviews [36]. By making strategic healthcare programs that respond to seasonal footprints, better outcomes are possible. For 2024, Improved measures included a 36% decrease in fetal deaths, and a 10% increase in first-time successful delivery rates indicating better prenatal & delivery medical treatment. The number of new mothers who died during this time has increased by a staggering 491%. The evolution of LAMA and referral cases strong indicates the urgent need for integrated systemic health system transformation. It is time for medical care professionals to take action so that every single patient may enjoy high quality healthcare services. Maternal healthcare protocols must be fortified, particularly for high-risk months October and December. Risk-setting tools such as maternal death audits combined with Emergency obstetric care training programs Enhanced prenatal care together with better fetal tracking during December contribute to maintaining reduced fetal death rates. Adding exit interviews and socioeconomic support programs aimed at patients yields increased LAMA Case reduction. Properly financed infrastructure in specialized care units and to support telemedicine, 674 constitute indispensable investments allowing reduction of referral fees. To determine the emerging patterns, businesses need to track the medical data over time as well as long-term scientific research that is updated regularly, so that they can take decisions accordingly and improve the quality of healthcare outcomes.

Emphasis should be placed on early diagnosis and intervention through strengthened primary healthcare systems. There is a need to implement consistent training programs for medical staff regarding the study's subject matter. Institutions should collaborate to establish standardized treatment protocols across facilities. Limited data exists on long-term outcomes

in the study area, indicating a need for longitudinal studies. Further research should focus on multicenter trials involving diverse demographic groups to improve generalizability. Qualitative studies exploring patient and healthcare provider perspectives could offer deeper insights into barriers and facilitators related to the study topic.

FUNDING

None.

CONFLICT OF INTEREST

None.

ETHICAL APPROVAL

This study was approved by Combined Military Hospital Lahore, Ethical Review Committee (Approval No: A/36/EC/547/2023).

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to the administration and staff of Hayatabad Medical Complex, Timergara Teaching Hospital, LRH Lady Reading Hospital, and Bannu Medical College for their support and cooperation throughout the course of this study. Special thanks to all the patients and clinical teams who participated in and contributed to this research.

AUTHORS' CONTRIBUTIONS

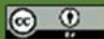
JK: Conceptualization, data collection, manuscript drafting, **NW:** Study design, corresponding author, critical revision. **HZ:** Supervision, data analysis, literature review, **AZ & IU:** Data collection and patient interviews, **SA:** Statistical assistance and literature review, **KN & NH:** Data entry, formatting, and proofreading, **FJ:** Contribution to manuscript writing and review. All authors have read and approved the final version of the manuscript.

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