Original Article

Risk Factors of Birth Asphyxia in Neonate Born to Booked Vs Un-booked Mothers at SKBZ Muzaffarabad

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Abstract

Objective: To determine the risk factors associated to birth asphyxia in neonates born to booked versus un-booked mothers in a tertiary care Hospital

Methodology: This cross-sectional comparative study was done at pediatric department of SKBZ Muzaffarabad. Study was done after taking approval form CPSP and ethical review committee of SKBZ Muzaffarabad for duration of one year from March 2022 to February 2023. New born babies (≥28 weeks of gestation) diagnosed with birth asphyxia born to both booked and un-booked mothers were included. All the patients were evaluated for the birth asphyxia and were compared as per booking status of the women. All the information was entered and analyzed using SPSS version 26.

Results: Overall maternal mean age was 27.5 years. Term deliveries were slightly more common among booked mothers, while preterm births were more frequent among un-booked mothers. Deliveries were mostly managed by doctors, with similar occurrences of meconium-stained liquor. Polyhydramnios was observed only in booked cases. Newborns in the booked group generally had better crying statuses, whereas the umbilical cord was more frequently around the neck in un-booked deliveries, with statistically significant findings for types of birth and cord around (p >0.05). Moreover, 27.3% of mothers had no comorbidities, but multiple conditions such as hypertension (PIH) and combinations of PIH with other issues like diabetes, UTI, anemia, and PROM were prevalent. Notably, un-booked mothers had a higher incidence of PROM and anemia (9.1%). The distribution of comorbidities was significantly different between booked and un-booked groups, (p- 0.001)

Conclusion: Study revealed that the un-booked mothers had a higher prevalence of multiple comorbidities. This significantly increased the likelihood of adverse outcomes, including birth asphyxia. Specifically, conditions like PROM combined with anemia were notably higher among un-booked mothers, emphasizing the compounded risk associated with the absence of proper prenatal care

Keywords: New born, birth asphyxia, risk factors, booked, un-booked

Cite this article as: Aziz H, Ahmed RI, Ashfaq K, Javed I, Javed M, Ahmed N. Risk Factors of Birth Asphyxia in Neonate Born to Booked Vs Unbooked Mothers SKBZ Muzaffarabad. J Soc Obstet Gynaecol Pak. 2024; 14(2):239-243.

Introduction

Birth asphyxia, a leading cause of neonatal mortality and morbidity,[1] is occurs when a newborn fails to start or sustain breathing on their own during or shortly after birth, due to inadequate blood flow or gas exchange to or from the fetus around the time of delivery.[2,3] Worldwide, approximately 4 million children under the age of five die each year, with 45% of these deaths occurring during the neonatal period. Notably, 75% of neonatal deaths happen in low-income countries.[4] Over the last twenty years, there has been little advancement in decreasing neonatal mortality rates in developing countries.[1] It is linked with a number of risk factors, including mother health, prenatal care, and the kind of birth. Differences between booked and un-booked mothers those who have been given structured prenatal care and those who possess not can give significant insights into the risk factors of birth asphyxia and inspire specific approaches that enhance newborn survival.

Antenatal care is commonly regarded as an important aspect of mother and newborn health. It makes it easier to diagnose and control risk factors like diabetes, high

Authorship Contribution: [1]design, data collection and analysis of the work, [2,3] the final approval and critical review, [4,5]Collection and interpretation of data, [6]contributions to drafting the work

Funding Source: none
Conflict of Interest: none

Received: Jan 12, 2024
Accepted: May 28, 2024

blood pressure, and infections, all of which have been linked to poor delivery consequences, including asphyxia during delivery.[5]. According to recent research, un-booked mothers who do not attend regular prenatal checkups are more likely to experience difficulties as a result of uncontrolled maternal conditions.[6] For example, hypertension and diabetes, which are widespread among pregnant women, might aggravate labor risks if not well managed throughout antenatal visits.[7]

The influence of booked versus un-booked status on birth asphyxia results in considerable inequalities in the outcomes for mothers and babies. According to studies, un-booked women are more likely to experience difficulties, such as delivery asphyxia, as a result of poor prenatal care. Un-booked mothers had a greater frequency of problems such as anemia (69.7% vs. 50.7% in booked) and low birth weight at delivery.[8] According to one study, 8.5% of neonates born to un-booked moms suffered from delivery asphyxia, in contrast to 5.2% for booked women.[9]

Un-booked women were additionally at greater risk to have premature births and hemorrhage following delivery, compounding the outcomes.[10] Studies support the impact of booking status on newborn outcomes, with booked moms experiencing fewer issues than their un-booked peers. This is largely due to the constant monitoring and timely interventions provided by prenatal care. Un-booked moms, on the other hand, frequently experience delays in identifying and managing urgent conditions, increasing the risk of birth hypoxia and other poor outcomes. However the current study aimed to investigate the risk factors associated with birth asphyxia by comparing neonatal outcomes and maternal characteristics between booked and un-booked women. By identifying and understanding these differences, the study seeks to highlight areas where enhanced prenatal care could mitigate risks and improve infant well-being.

Methodology

This cross-sectional comparative study was done at pediatric department of SKBZ Muzaffarabad. Study was done after taking approval form CPSP and ethical review committee of SKBZ Muzaffarabad for duration of one year from March 2022 to February 2023. A sample size of 77 patients was calculated by WHO sample size calculator using 15.1% prevalence,11 of birth with 95% confidential level and 8% margin of error. All the new born babies (≥28 weeks of gestation) diagnosed with birth asphyxia born to both booked and un-booked mothers were included. All the new born babies with congenital anomalies or genetic abnormalities, stillborn babies or died before birth and babies born outside the hospital, such as home births were excluded. Written informed consent was obtained after explaining the purpose of the study, its advantages, and disadvantages. The mothers were assured that all their information would be kept confidential and that they had the right to decide whether or not to participate in the study. All the patients were evaluated for the birth asphyxia and were compared as per booking status of the women. Booked mothers were defined as the mothers who had at least three or more antenatal visits to a qualified healthcare provider during pregnancy and un-booked mothers were defined as the mothers who had less than three or no antenatal visits to a qualified healthcare provider during pregnancy. All the information was entered and analyzed using SPSS version 26.

Results

The study included 77 participants. Most of the mothers resided in rural areas (72.7%), with 27.3% living in urban areas. Regarding education, nearly half of the mothers (46.8%) were not educated, 42.9% had completed matriculation, 2.6% had reached the intermediate level, and 7.8% were graduates. The majority of the mothers were housewives (97.4%), with only 2.6% employed in private jobs. Among the babies, 59.7% were male, and 40.3% were female. The mean age of the mothers was 27.5 years, with a standard deviation of 4.61 years, and the average number of antenatal visits was 2.09, with a standard deviation of 0.92. (Table I)

Table i: Maternal demographic characteristics and gender of baby. (n=77)

Variables		Frequency	Percent
Residence	Rural	56	72.7%
	Urban	21	27.3%
	Total	77	100.0%
Maternal education	not educated	36	46.8%
	Matric	33	42.9%
	Intermediate	2	2.6%
	Graduate	6	7.8%
	Total	77	100.0%
Occupation	Housewife	75	97.4%
	Private job	2	2.6%
	Total	77	100.0%
Gender	Male	46	59.7%
	Female	31	40.3%
	Total	77	100.0%

Mean age (mean ±SD)	**27.50±4.61 years**
Mean antenatal visits (mean ±SD)	**2.09 ±0.92**

When, study compares the delivery and newborn characteristics between booked and un-booked mothers. Among the participants, housewives were predominant in both groups, with a balanced gender distribution of babies. Term deliveries were slightly more common among booked mothers, while preterm births were more frequent among un-booked mothers. Most deliveries were by doctors, and meconium-stained liquor was similarly observed in both groups. Polyhydramnios occurred only in booked cases. The crying status of newborns was better in the booked group, and the umbilical cord around the neck was significantly higher in un-booked deliveries. Findings were statistically significant for types of birth and cord around (p >0.05). (Table II)

Table ii: Risk factors for birth asphyxia based on booking status. (n=77)

Variables		Booking status		Total	p-value
		Un-booked	Booked		
Occupant mother	Housewife	41	34	75	0.126
		53.2%	44.2%	97.4%	
	Private job	0	2	2	
		0.0%	2.6%	2.6%	
Gender of baby	Male	23	23	46	0.487
		29.9%	29.9%	59.7%	
	Female	18	13	31	
		23.4%	16.9%	40.3%	
Types of birth	Term	33	34	67	0.059
		42.9%	44.2%	87.0%	
	Preterm	8	2	10	
		10.4%	2.6%	13.0%	
Delivery conducted by	Doctor	39	36	75	0.179
		50.6%	46.8%	97.4%	
	Others	2	0	2	
		2.6%	0.0%	2.6%	
Colour of liquor	Clear	28	22	50	0.510
		36.4%	28.6%	64.9%	
	Meconium stain	13	14	27	
		16.9%	18.2%	35.1%	
Amount of liquor	adequate	21	15	36	0.258
		27.3%	19.5%	46.8%	
	Polyhydramnios	0	2	2	
		0.0%	2.6%	2.6%	
	Oligohydramnios	20	19	39	
		26.0%	24.7%	50.6%	
Mode of delivery	SVD	28	20	48	0.503
		36.4%	26.0%	62.3%	
	C -section	11	14	25	
		14.3%	18.2%	32.5%	
	Assisted vaginal delivery	2	2	4	
		2.6%	2.6%	5.2%	
Crying status	Within 5 minutes	6	12	18	0.131
		7.8%	15.6%	23.4%	
	Within 20 minutes	31	20	51	
		40.3%	26.0%	66.2%	
	Not cried	4	4	8	
		5.2%	5.2%	10.4%	
Cord around		27	34	61	0.002
		35.1%	44.2%	79.2%	
Birth weight	Low birth weight	4	4	8	0.846
		5.2%	5.2%	10.4%	
	Normal birth weight	37	32	69	
		48.1%	41.6%	89.6%	

Study shows that the 27.3% of mothers had no comorbidities, while various combinations of conditions were observed in the remaining cases. Significant conditions included hypertension (PIH), with 7.8% of booked mothers affected. Multiple comorbidities like PIH combined with other conditions such as diabetes (GDM), urinary tract infections (UTI), anemia, and premature rupture of membranes (PROM) were also noted. Notably, 9.1% of mothers with PROM and anemia were un-booked. The presence of multiple conditions, including anemia and PIH, was more common among un-booked mothers, with a p-value of 0.001 indicating a statistically significant difference in comorbidity distribution between booked and un-booked groups. (Table III)

Table iii: Maternal comorbidities as risk factors for birth asphyxia based on booking status. (n=77)

Maternal comorbidities	BOOKING STATUS		Total	p-value
	Un-booked	Booked		
NIL	8	13	21	0.001
	10.4%	16.9%	27.3%	
PIH	0	6	6	
	0.0%	7.8%	7.8%	
PIH+GDM	0	2	2	
	0.0%	2.6%	2.6%	
PIH + UTI	0	2	2	
	0.0%	2.6%	2.6%	
PIH +UTI +PROM+ Anemia	2	0	2	
	2.6%	0.0%	2.6%	
PIH+UTI+ Anemia	4	2	6	
	5.2%	2.6%	7.8%	
PIH +PROM+ Anemia	0	2	2	
	0.0%	2.6%	2.6%	
PIH + Anemia	4	4	8	
	5.2%	5.2%	10.4%	
UTI + PROM	0	2	2	
	0.0%	2.6%	2.6%	
UTI +PROM+ Anemia	2	0	2	
	2.6%	0.0%	2.6%	
UTI + Anemia	2	0	2	
	2.6%	0.0%	2.6%	
PROM	2	1	3	
	2.6%	1.3%	3.9%	
PROM+ Anemia	7	0	7	
	9.1%	0.0%	9.1%	

Anemia	10	2	12
	13.0%	2.6%	15.6%
Total	41	36	77
	53.2%	46.8%	100.0%

Discussion

The World Health Organization defines birth asphyxia as the failure to start and sustain normal breathing at birth. Annually, birth asphyxia accounts for about 24% of neonatal deaths worldwide.[12] It is the primary cause of early neonatal death, primarily resulting from inadequate obstetric care.[12,13] This study has been done on 77 women with an overall mean age of 27.5 years to evaluate the risk factors associated with birth asphyxia by comparing neonatal outcomes and maternal characteristics between booked and un-booked women. In aligns to this study Nadeem G et al[14] reported that the average age of mothers in the case group was 26.35 years, with a standard deviation of 6.79 years. Consistently Bayih WA et al[15] demonstrated that the average maternal age was 25.7±5.86 years, with 61.2% of the mothers being between 20 and 34 years old. Furthermore in this most of the women were illiterate and house wives and these factors has a substantial impact on their awareness and understanding of good pregnancy and newborn care. Lack of education may impair their capacity to notice pregnancy warning symptoms, comprehend healthcare instructions, or seek prompt medical attention. As housewives, they may have restricted access to healthcare resources, social networks, and financial resources to pursue appropriate prenatal care. Together, these variables can contribute to poorer maternal and newborn outcomes, including an increased chance of birth asphyxia.

The findings of this study highlight key differences in delivery and neonatal outcomes between booked and un-booked mothers, underscoring the importance of prenatal care in improving neonatal health. The higher rate of term deliveries among booked mothers suggests that regular prenatal visits may contribute to better management of pregnancy and a reduction in preterm births. Conversely, the increased frequency of preterm deliveries among un-booked mothers indicates a potential lack of timely medical intervention, which could lead to adverse outcomes.

The similar rates of meconium-stained liquor in both groups suggest that this factor may not be directly influenced by booking status; however, the exclusive occurrence of Polyhydramnios in booked mothers could indicate that such conditions are more likely to be diagnosed and managed in a clinical setting. The improved crying status of newborns in the booked group highlights the positive impact of prenatal care on neonatal outcomes, likely due to better preparation and management of delivery by healthcare professionals. The significantly higher incidences of umbilical cord complications in un-booked deliveries points to the critical role of medical supervision during labor and delivery, which may help prevent or manage such complications more effectively. The statistically significant findings regarding the types of birth and cord complications further reinforce the necessity of adequate prenatal care to reduce risks associated with childbirth. Overall, this study underscores the crucial role of regular prenatal care in promoting safer deliveries and better neonatal health outcomes.

This study addressed the importance of prenatal treatment in controlling comorbidities that may impair mother and newborn outcomes. Raised prevalence of various illnesses among un-booked women is consistent with previous research, which has found that a lack of frequent prenatal visits increases the likelihood of problems such as disorders of hypertension, and the anemia etc. Hernandez et al. (2024) discovered that women who did not receive proper prenatal care had a higher risk of bad outcomes, including delivery hypoxia. In contrast, women who had regularly prenatal appointments were less likely to develop these issues because they were detected and managed early on. Nevertheless, the study had significant limitations, including a relatively small sample size and no control for possible confounders such as socioeconomic status and access to healthcare. These factors could have influenced the observed disparities between the booked and un-booked populations. To further understand the impact of prenatal care on birth outcomes, future research should include bigger, more diverse populations and account for potential confounding factors. According to the study findings, there is a need for enhanced awareness and education regarding the value of regular prenatal care in preventing and managing diseases such as PIH, anemia, and PROM. Policies regarding healthcare should prioritize enhancing access to prenatal care services, particularly in underprivileged groups, in order to eliminate inequities between booked and unbooked mothers. Additional studies should look into targeted interventions to

address the specific barriers that keep moms from receiving proper prenatal medical attention.

Conclusion

Based on study observations, un-booked mothers had a higher prevalence of multiple comorbidities such as anemia, hypertension (PIH), and various combinations of these conditions. This significantly increased the likelihood of adverse outcomes, including birth asphyxia. Specifically, conditions like PROM combined with anemia were notably higher among un-booked mothers, emphasizing the compounded risk associated with the absence of proper prenatal care. Additional efforts should include improving prenatal care coverage and addressing the unique needs of unbooked mothers in order to better prevent and control risk factors. Improving prenatal screening and early intervention measures may help to minimize the prevalence of birth asphyxia and improve neonatal health outcomes.

References

1. Birth injury: birth asphyxia and birth trauma. Collins KA, Popek E. Acad Forensic Pathol. 2018;8:788–864
2. Msisiri LS, Kibusi SM, Kimaro FD. Risk Factors for Birth Asphyxia in Hospital-Delivered Newborns in Dodoma, Tanzania: A Case-Control Study. SAGE Open Nursing. 2024 Apr;10:23779608241246874.
3. Gillam-Krakauer M., Gowen C. W. Jr. Birth Asphyxia. In Birth asphyxia. StatPearls Publishing. 2022;https://www.ncbi.nlm.nih.gov/books/NBK430782/
4. Alamneh YM, Negesse A, Aynalem YA, Shiferaw WS, Gedefew M, Tilahun M, Hune Y, Abebaw A, Biazin Y, Akalu TY. Risk factors of birth asphyxia among newborns at Debre Markos comprehensive specialized referral hospital, Northwest Ethiopia: unmatched case-control study. Ethiopian Journal of Health Sciences. 2022 May 1;32(3)..
5. Agarwal S, Singh R, Kumar P. Prenatal care and maternal outcomes: A review of recent evidence. J Maternal-Fetal Neonatal Med. 2023;36(5):849-56.6.
6. Hernandez M, Patel S, Garcia F. Association of prenatal care with birth asphyxia: A cohort study. Pediatr Res. 2024;95(4):683-90
7. Sweeney M, Jones D, Smith R. The role of prenatal care in managing hypertensive disorders of pregnancy. Am J Obstet Gynecol. 2023;228(2):250-8
8. Izuka EO, Obiora-Izuka CE, Asimadu EE, Enebe JT, Onyeabochukwu AD, Nwagha UI. Effect of Late Antenatal Booking on Maternal Anemia and Fetus Birth Weight on Parturients in Enugu, Nigeria: An Analytical Cross Sectional Study. Nigerian Journal of Clinical Practice. 2023 Oct 26;26(5):558-65.
9. Kalim D. FREQUENCY OF MATERNAL AND PERINATAL COMPLICATIONS AMONG BOOKED AND UN-BOOKED ANTENATAL WOMEN. Khyber Medical University Journal. 2016 Oct 1;8(4).
10. Tucker A, Ogutu D, Yoong W, Nauta M, Fakokunde A. The unbooked mother: a cohort study of maternal and foetal outcomes in a North London Hospital. Archives of gynecology and obstetrics. 2010 Apr;281:613-6.
11. Abdo RA, Halil HM, Kebede BA, Anshebo AA, Gejo NG. Prevalence and contributing factors of birth asphyxia among the neonates delivered at Nigist Eleni Mohammed memorial teaching hospital, Southern Ethiopia: a cross-sectional study. BMC pregnancy and childbirth. 2019 Dec 30;19(1):536.
12. Berhe YZ, Kebedom AG, Gebregziabher L, Assefa NE, Berhe LZ, Mohammednur SA, Wellay T, Berihu G, Welearegay AT, Mitiku M, Teka HG. Risk factors of birth asphyxia among neonates born in public hospitals of Tigray, Northern Ethiopia. Pediatric health, medicine and therapeutics. 2020 Jan 8:13-20.
13. Organization's WH. Neonatal and Perinatal Mortality, 2004: Country, Regional and Global Estimates. Geneva: World Health Organization; 2007
14. Nadeem G, Rehman A, Bashir H. Risk factors associated with birth asphyxia in term newborns at a Tertiary Care Hospital of Multan, Pakistan. Cureus. 2021 Oct;13(10).
15. Bayih WA, Yitbarek GY, Aynalem YA, Abate BB, Tesfaw A, Ayalew MY, Belay DM, Hailemeskel HS, Alemu AY. Prevalence and associated factors of birth asphyxia among live births at Debre Tabor General Hospital, North Central Ethiopia. BMC pregnancy and childbirth. 2020 Dec;20:1-2