

ORIGINAL ARTICLE

Gestational age at the diagnosis of fetal neural tube defects in a Tertiary Care Hospital.

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ABSTRACT... Objective: To determine the frequency of pregnant women presenting with fetal neural tube defects diagnosed after 20 weeks of gestation at a tertiary care hospital. **Study Design:** Cross-sectional study. **Setting:** Sir Ganga Ram Hospital, Lahore. **Period:** 01 Feb 2025 to 01 Aug 2025. **Methods:** A total of 150 pregnant women aged 19–40 years with ultrasound-confirmed fetal neural tube defects were included using non-probability consecutive sampling. Demographic data including maternal age, parity, gestational age, education level, and socioeconomic status were recorded. Data were analysed using SPSS version 20. Chi-square test was applied and p-value ≤ 0.05 was considered statistically significant. **Results:** Out of 150 cases, 61.3% were diagnosed after 20 weeks of gestation. The mean maternal age was 29.47 ± 5.25 years. Majority of women were above 25 years of age (86.66%), belonged to low socioeconomic status (74%), and were illiterate (43%). Late diagnosis showed significant association with maternal age ($p=0.009$), parity ($p=0.006$), education ($p=0.0005$), and socioeconomic status ($p=0.00003$). **Conclusion:** Fetal neural tube defects are frequently diagnosed after 20 weeks of gestation, particularly in women with low literacy, low socioeconomic status, and advanced maternal age. Strengthening preconception counselling, promoting folic acid supplementation, ensuring early antenatal booking, and expanding first-trimester screening services are critical strategies to reduce the burden of neural tube defects.

Key words: Neural Tube Defects, Gestational Age, Late Diagnosis, Folic Acid, Pakistan.

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INTRODUCTION

Neural tube defects (NTDs) are severe congenital malformations resulting from failure of closure of the neural tube during the third and fourth weeks of embryonic development.¹ They include anencephaly, spina bifida, and encephalocele, and are responsible for substantial neonatal mortality, long-term disability, and psychological and financial burden on families.² Despite advances in prenatal screening and preventive strategies, NTDs continue to be a major public health concern, particularly in low- and middle-income countries.³ The prevalence of NTDs varies globally due to genetic, nutritional, environmental, and socioeconomic factors.^{1,4}

Countries with mandatory folic acid fortification and structured prenatal screening programs have reported significant reductions in incidence.⁵ In contrast, developing countries continue to experience higher prevalence rates due to poor maternal nutrition, limited access to healthcare, and low awareness regarding preconception care.⁶ In Pakistan, the reported prevalence of NTDs is approximately 13.9 per 1,000 births, which is considerably higher than in many developed regions.⁷ Early detection of NTDs through first-trimester

ultrasonography and maternal serum alpha-fetoprotein screening allows timely counseling, medical decision-making, and management.⁸ However, many women in Pakistan present late for antenatal care due to illiteracy, poverty, cultural barriers, and inadequate healthcare infrastructure.^{6,9} Late diagnosis limits management options and increases complications. The rationale of the study was to determine the frequency of fetal neural tube defects diagnosed after 20 weeks of gestation and to identify associated demographic factors.⁷

METHODS

This cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Sir Ganga Ram Hospital, Lahore, 01 Feb 2025 to 01 Aug 2025. A total of 150 pregnant women aged 19–40 years with ultrasound-confirmed fetal neural tube defects were included via non-probability consecutive sampling. The sample size was calculated using 95% confidence level and 8% margin of error, taking expected percentage of late diagnosis. Exclusion criteria included women with multiple gestations or those who did not provide informed consent. Ethical approval was obtained from the Institutional Ethics Review Committee (ERC) (189-Synopsis/ERC)01.25).

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Informed consent was taken from all participants. Data collection involved a pre-designed proforma capturing maternal age, parity, education, and socioeconomic status. Gestational age was determined by LMP or early ultrasound scans. Data analysis was performed using SPSS version 20. Quantitative variables like age were expressed as mean \pm SD, while qualitative variables were expressed as frequencies and percentages. Chi-square test was used to determine associations, with $p \leq 0.05$ considered significant.

RESULTS

A total of 150 women with NTDs were studied. The mean maternal age was 29.47 ± 5.25 years. Late diagnosis (after 20 weeks) occurred in 92 (61.3%) cases. Demographic analysis showed significant associations with education and economic status.

DISCUSSION

The present study revealed that 61.3% of fetal neural tube defects were diagnosed after 20 weeks of gestation, indicating delayed presentation and inadequate utilization of early antenatal screening services.^{6,8} These findings are consistent with reports from other developing countries where late booking, limited access to healthcare facilities, and poor maternal awareness remain major challenges. Moin et al. reported similar trends in local tertiary hospitals where late presentation significantly limits management options.⁶ In contrast, developed countries with established screening programs report detection rates exceeding 90% in the first and early second trimesters.¹⁰

Maternal education showed a strong association with

late diagnosis ($p=0.0005$). Educated women are more likely to seek early antenatal care, understand the importance of routine anomaly scans, and adhere to folic acid supplementation.⁷ Socioeconomic status also played a significant role ($p=0.00003$). Women from low-income households were more likely to present late, consistent with findings from Ethiopia and India, which demonstrated that poverty limits access to diagnostic facilities and timely referrals.^{1,9} Advanced maternal age and primigravidity were also significantly associated with late diagnosis, matching findings in international literature discussed by Liu et al.⁴ Strengthening early antenatal registration, improving access to screening services, and enhancing community awareness regarding the 20-week morphology scan are essential to improve outcomes in our setting.

CONCLUSION

Fetal neural tube defects are frequently diagnosed after 20 weeks of gestation in our population. Late diagnosis is strongly associated with maternal age, parity, low education, and low socioeconomic status. Targeted public health strategies are needed to encourage early antenatal booking.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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TABLE-I

Frequency of late diagnosis and socio-demographic characteristics (n=150)

Variable	Categories	Frequency (n)	Percentage (%)
Gestational Age	≤ 20 Weeks	58	38.7%
	> 20 Weeks	92	61.3%
Maternal Education	Illiterate	65	43.3%
	Primary to Matric	85	56.7%
Socioeconomic Status	Low Income	111	74.0%
	Middle/High Income	39	26.0%

TABLE-II

Factors associated with diagnosis after 20 weeks

Demographic Factor	Total (N=150)	Diagnosis >20 Weeks	P-Value
Maternal Age (>25)	130	84 (64.6%)	0.009
Education (Illiterate)	65	51 (78.5%)	0.0005
Socioeconomic (Low)	111	79 (71.2%)	0.00003

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AUTHORSHIP AND CONTRIBUTION DECLARATION

1	Hina Akhtar: Data collection, data analysis, paper writing.
2	Naila Yasmeen: Discussion writing, review of manuscript.
3	Attia Mustafa: Data collection, paper writing.
4	Saba Anjum: Data entry.
5	Amna Zia Eusaph: Discussion writing, critical review.
6	Hina Masood: Study supervision.