Original Article
DOI: https://doi.org/10.70749/ijbr.v3i7.2260

INDUS JOURNAL OF BIOSCIENCE RESEARCH
https://ijbr.com.pk
ISSN: 2960-2793/ 2960-2807

Prevalence of Cardiac Disease in Asymptomatic Pregnant Females Coming to OPD in Tertiary Care Hospital

Aisha Shahid[1], Nighat Ali Shah[1], Memoona Kashaf[1], Sheerin[1], Faiza Falak[1], Ayesha Sattar[1]

[1]Department of Gynae & Obs, JPMC, Karachi, Pakistan

ARTICLE INFO

Keywords: Asymptomatic pregnancy, cardiac disease, echocardiography, antenatal screening, structural heart disease, rheumatic heart disease.

Correspondence to: Aisha Shahid, Department of Gynae & Obs, JPMC, Karachi, Pakistan.
Email: aishashahid538@gmail.com

Declaration
Authors' Contribution: All authors equally contributed to the study and approved the final manuscript.

Conflict of Interest: No conflict of interest.

Funding: No funding received by the authors.

Article History
Received: 08-06-2025 Revised: 08-07-2025
Accepted: 09-07-2025 Published: 15-07-2025

ABSTRACT

Objective: To determine the prevalence of structural cardiac disease among asymptomatic pregnant females presenting to the antenatal outpatient department of a tertiary care hospital. **Study Design:** Cross-sectional study. **Place and Duration of Study:** Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Centre (JPMC), Karachi; conducted over a period of three months from March, 2025 to May, 2025**. Methodology:** A total of 119 asymptomatic pregnant women aged 15–45 years attending routine antenatal checkups were enrolled using non-probability consecutive sampling. Women with known cardiac history, symptomatic heart disease, multiple pregnancies, or pregnancy-induced complications were excluded. After informed consent, participants underwent clinical screening, ECG, and if required, transthoracic echocardiography performed by an experienced cardiologist. Data on demographics, medical history, and clinical symptoms were collected using a structured questionnaire. Prevalence of cardiac disease was documented and analyzed using SPSS version 20. **Results:** Structural cardiac abnormalities were detected in 9 women (7.56%), including rheumatic mitral stenosis (n=3), atrial septal defect (n=2), mitral valve prolapse (n=1), mild pulmonary hypertension (n=1), dilated left atrium with reduced EF 30–50% (n=1), and severe tricuspid regurgitation (n=1)**. Conclusion:** This study demonstrates a notable prevalence of undiagnosed structural cardiac disease among asymptomatic pregnant women. Routine antenatal screening using ECG and echocardiography may play a pivotal role in early diagnosis and prevention of adverse maternal and fetal outcomes, especially in high-risk populations. Incorporating cardiac assessment into antenatal protocols in resource-limited settings should be considered a public health priority.

INTRODUCTION

Pregnancy is a singular physiological condition characterized by profound hemodynamic and hormonal modifications to fulfill the nutritional requirements of the developing fetus. Contributing factors include an increased plasma volume, cardiac output, and heart rate, which impose an added burden on the maternal cardiovascular system, which may, in turn, bring out occult cardiac disease that was clinically silent prior to pregnancy[1-3]. Although symptomatic cardiac disease in pregnancy has been studied in detail, the prevalence of asymptomatic cardiovascular disease (CVD) burden is widely under-recognized, particularly in resource limited settings like Pakistan.

Cardiovascular disease is one of the leading causes of maternal morbidity and mortality globally and is responsible for > 15-25% of maternal deaths due to non-obstetric reasons [4-6]. It is important to be aware that cardiac structural disorders, such as congenital heart disease, valvular heart disease, and cardiomyopathies, can be well tolerated in the early stages of pregnancy, but represent a significant risk to the pregnant woman during labour and the postpartum period[7]. The high prevalence of rheumatic heart disease in developing countries is still existing but underdiagnosed; likely, it may be attributed to lack of regular cardiac study during antenatal follow-up[8]. [9,10]Screening tools like targeted history, clinical examination and basic investigation (ECG, echocardiography) can diagnose CVD early in pregnancy and their prompt intervention can lead to favourable outcomes. However, limited data is available in Pakistan regarding burden of heart diseases in pregnant and eclamptic women attending anc.[11]

The reason behind such an approach is to prevent an unusually severe or fatal complication, especially in unrecognized cases, thus the present study was aimed to find out the incidence of cardiac disease in asymptomatic pregnant women, regular antenatal OPD attendees in tertiary care hospital. The results of this study will assist in formulating a risk stratification and early referral framework to provide cardiology input in early pregnancy leading to better maternal and fetal outcomes.

METHODOLOGY

This was a cross-sectional study, undertaken at the Department of Obstetrics and Gynaecology, JPMC Karachi for 06 months from March, 2025 to May, 2025. Aim of study was to find out the incidence of Cardiac Disease among asymptomatic pregnant women, attending ante-natal O.P.D. A non-probability consecutive sampling method was implemented, and 119 eligible pregnant women were included. The sample size was estimated using the WHO STROBE statement size calculator keeping 95% confidence level and absolute precision of 4% with hypothesized rate of cardiac disease of 5.2% in pregnant asymptomatic females.

Women in the age group of 15-45 years attending the OPD for routine antenatal checkups for being asymptomatic were a part of the study. Exclusion criteria included refusal to participate, diagnosed history of cardiac disease or intervention, clinical features suggestive of heart failure, twin or multiple pregnancies, pregnancy-related diabetes, gestation-related hypertension, and arrhythmias on ECG at booking or follow-up visits. A structured questionnaire was used to collect the information from the participants including, demographic data (age, gravida, para, residence area, level of education), personal medical history (diabetes, hypertension, thyroid disorder, smoking status, and family history of cardiac diseases) after taking personally informed, written consent. Also, the presence of cardiac related symptoms, including fatigue, dyspnea, orthopnea, palpitations, chest pain, edema, and dizziness was screened.

All participants had an ECG performed and those with abnormal or equivocal ECG were referred for transthoracic echocardiography. Cardiologist with at least 5 years of experience in echocardiography performed the echocardiogram. Cardiac disease was considered as any structural abnormality comprising of congenital heart diseases, rheumatic heart diseases or isolated valvular lesions diagnosed by echocardiography. Anonymity and confidentiality of all participants was preserved in the study. Ethical permission was obtained before collecting the data, none of the patients underwent any harm or were exposed to financial expenses due to the study.

RESULTS

A total of 119 asymptomatic pregnant women were involved in the study. Most of them inherited with the profile of 21–30 years of age. Out of these 60.5% were parous and 39.5% were primigravida. 68% of the study population lived in urban and 32% were settled in rural area. Education profile indicated 74% of the respondents had received secondary or higher-secondary education, 26% did not attend any school. (Table 1)

Upon medical history analysis, 8.4% of volunteers had hypertension, 7.6% had diabetes mellitus and 4.2% had thyroid disease. A family history of cardiac disease affected 13.4% of women, and personal smoking was found in 10.9%. (Table 2)

During clinical symptom assessment, 24.3% reported inexplicable fatigue, 17.6% had occasional palpitations, and 12.6% had mild exertional dyspnea, despite being classified as asymptomatic to heart diseases. (Table 3) All 119 individuals had ECG; 18 cases had ECG findings that had implications for further assessment. These were sent for transthoracic echocardiography.

On echocardiography, 9 cases (7.56%) of structural heart disease were detected which were not diagnosed earlier. These included 3 cases of mild rheumatic mitral stenosis, 2 congenital atrial septal defects, 1 mitral valve prolapse, 1 case of mild pulmonary hypertension, 1 case with dilated left atrium and reduced ejection fraction (30–50%), and 1 with severe tricuspid regurgitation.

These results suggest although symptomless, a significant prevalence of structural cardiac disease (5.04%) among pregnant women is clinically relevant. This emphasizes the need for systematic cardiac screening to be incorporated into standard protocols of antenatal care, especially in a resource-poor and high-risk environment.

Table 1

Demographic Profile

Variable	Frequency
Mean Age (years)	27.8 ± 4.6
Multigravida (%)	60.5%
Primigravida (%)	39.5%
Urban Residents (%)	68%
Rural Residents (%)	32%
Secondary Education or Above (%)	74%
No Formal Schooling (%)	26%

Table 2

Medical & Family History

Variable	Frequency (%)
Hypertension	8.4
Diabetes Mellitus	7.6
Thyroid Disorder	4.2
Family History of Cardiac Disease	13.4
Smoking	10.9

Table 3

Clinical Symptoms

Symptom	Frequency (%)
Fatigue	24.3
Palpitations	17.6
Dyspnea on exertion	12.6

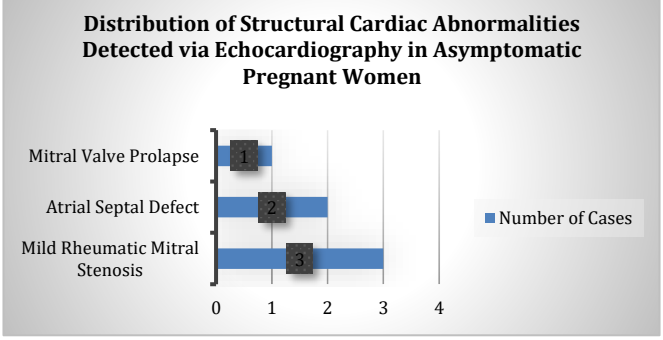
Table 4

Cardiac Abnormalities Detected by Echocardiography

Diagnosis	Number of Cases
Mild Rheumatic Mitral Stenosis	3
Atrial Septal Defect	2
Mitral Valve Prolapse	1
Mild Pulmonary Hypertension	1
Dilated Left Atrium with EF 30–50%	1
Severe Tricuspid Regurgitation	1
Total	9

Figure 1

Distribution of Structural Cardiac Abnormalities Detected via Echocardiography in Asymptomatic Pregnant Women



DISCUSSION

The discovery of structural cardiac abnormalities in 7.56% of asymptomatic pregnant women in the study highlights the silent scourge of CVD in pregnancy. This is consistent with findings of previous regional studies in which echocardiographic screening was 3.8–6.3% for structural cardiac defects in antenatal apparently healthy patients[13,14]. Such latent entities, as the mild rheumatic lesion or the congenital (particularly septal) defect, constitute important dangers in pregnancy, Labor, and the puerperium under the stress of gestational hemodynamic. A major feature of our study is the fact that all diagnosed cases were clinically silent and only found on a case-market basis following ECG and echocardiography. This also highlights the limitations of symptom-based detection and confirms those in international literature that symptom alone are not sensitive predictors for potential underlying cardiac pathology in pregnancy[15]. The British Society of Echocardiography and World Heart Federation support echocardiographic screening in high-burden populations in which rheumatic heart disease (RHD) is still common[16,17].

Additionally, the Pakistan Registry of Echocardiographic Screening suggests that even low resource centres should consider targeted prenatal cardiac evaluations, particularly with access to a tertiary centre service[13]. Our study contributes to this literature by emphasizing the ease of performing screening protocols, particularly in women who may present with subtle clinical findings such as fatigue or palpitations. Prompt diagnosis and cardiology referral can potentially help reduce maternal morbidity, as suggested by multicentre observational data that has already found less adverse cardiac events in pregnancy when structural defects are diagnosed early[18].

Our findings have other important public health implications. Cardiovascular causes are a major contributor to maternal mortality in low- and middle-income countries like Pakistan due to late diagnoses and absence of organized referral systems.[19] Antenatal echocardiographic screening, especially in high-risk or low-resource populations, has been demonstrated to save lives and can be cost-effective after factoring the outcomes of undiagnosed disease[20].

This study had several strong points, such as its prospective nature, the use of standardized instruments, and the involvement of uniform specialists; however, it also had limitations. These limitations comprise a small sample size and the single-centre nature of the study and may not allow generalization of our findings. However, our results compare favourably with other "developed" countries and internationally and it seems likely that, at this level of hospital care, routine antenatal cardiac screening is worthwhile

CONCLUSION

This study demonstrates a substantial burden (7.56%) of structural cardiac disease in asymptomatic pregnant women who were identified only by selective screening. The results highlight the inadequacy of clinical assessment as a method of determining the causes of hypertensive disorders in pregnancy, particularly in areas with a high burden and limited resources. To minimize maternal and fetal complications early detection, referral and appropriate management are the key goals, which can be achieved by inclusion of routine ECG and echocardiography in antenatal visits. Because most cardiac diseases in pregnancy are asymptomatic, proactive screening is crucial for better outcomes. Prospective, multicentre studies are needed before these findings can be generalized to relevant populations and incorporated into national screening protocols.

REFERENCES

1. Kazma JM, van den Anker J, Allegaert K, Dallmann A, Ahmadzia HK. Anatomical and physiological alterations of pregnancy. *J Pharmacokinet Pharmacodyn*. 2020;47(4):271-285. https://doi.org/10.1007/s10928-020-09677-1
2. Jee SB, Sawal A. Physiological changes in pregnant women due to hormonal changes. *Cureus*. 2024;16(3):e55544. https://doi.org/10.7759/cureus.55544
3. Parrettini S, Caroli A, Torlone E. Nutrition and metabolic adaptations in physiological and complicated pregnancy: focus on obesity and gestational diabetes. *Front Endocrinol (Lausanne)*. 2020;11:611929. https://doi.org/10.3389/fendo.2020.611929
4. Kotit S, Yacoub M. Cardiovascular adverse events in pregnancy: A global perspective. *Glob Cardiol Sci Pract*. 2021;2021(1):e202105. https://doi.org/10.21542/gcsp.2021.5
5. Prasad D, Prasad RV, Choudhary MK, Kumari K. Cardiovascular disease in pregnancy and its outcome: A prospective study. *J Family Med Prim Care*. 2023;12(11):2714-2720. https://doi.org/10.4103/jfmpc.jfmpc_507_23
6. Warner ED, Farhan S, Bierowski M, Sahawneh F, Oliveros E, Pirlamarla P, et al. Trends in cardiovascular complications of pregnancy: A nationwide inpatient sample analysis. *Am J Med Sci*. 2023;366(5):337-346. https://doi.org/10.1016/j.amjms.2023.09.001
7. Aluru JS, Barsouk A, Saginala K, Rawla P, Barsouk A. Valvular heart disease epidemiology. *Med Sci (Basel)*. 2022;10(2):32. https://doi.org/10.3390/medsci10020032
8. Choi EY, Kim ES, Kim JY, Song MK, Kim SH, Noh CI. Pregnancy outcomes in patients with structural heart disease: a single center experience. *Cardiovasc Diagn Ther*. 2021;11(1):81-90. https://doi.org/10.21037/cdt-20-786
9. Bozkaya VÖ, Oskovi Kaplan ZA, Özgü E, Engin Ustun Y. Screening and evaluation of newly diagnosed cardiovascular diseases in first-trimester asymptomatic pregnant women in a tertiary antenatal care center in Turkey. *Anatol J Cardiol*. 2020;23(2):99-104. https://doi.org/10.14744/AnatolJCardiol.2019.55267
10. Hameed A, Karaalp IS, Tummala PP, et al. Impact of screening echocardiography in pregnancy. *J Am Coll Cardiol*. 2020;75(23):2859–2869. https://doi.org/10.1016/j.jacc.2020.04.009
11. Javed M, Fatima M, Rehman A. Prevalence of undiagnosed cardiac disease in pregnant women. *Pak Heart J*. 2021;54(1):29-33. https://www.pakheartjournal.com/index.php/phj/article/view/22
12. Malik S, Qureshi N, Ahmed K. Echocardiographic screening in asymptomatic antenatal women: Experience from a tertiary hospital in Pakistan. *J Ayub Med Coll Abbottabad*.

2023;35(1):88-92. https://jamc.ayubmed.edu.pk/index.php/jamc/article/view/11135
13. Aziz W, Bhatti S, Qureshi S, et al. Pakistan Registry of Echocardiographic Screening in Asymptomatic Pregnant Women. *JACC Adv*. 2024;3(12_Part_2):101215. https://doi.org/10.1016/j.jacadv.2024.101215
14. Kumar S, Prasad D. Prevalence of Cardiac Disease in Asymptomatic Antenatal Women. *Int J Obstet Gynaecol Res*. 2023;10(1):45-48. https://www.ijogr.org/html-article/10196
15. Desai DK, Moodley J. Silent cardiac disease in pregnancy. *Cardiovasc J Afr*. 2020;31(3):153-158. https://doi.org/10.5830/CVJA-2020-018
16. British Society of Echocardiography. Echocardiography in Pregnancy: Guidelines and Best Practices. 2022. https://bsecho.org
17. Zühlke L, Karthikeyan G, Engel ME, et al. Clinical outcomes in RHD screening: WHF recommendations. *Nat Rev Cardiol*. 2023;20(6):407–419. https://doi.org/10.1038/s41569-023-00940-9
18. Magder LS, Varner M, Carpenter M. Cardiovascular risk prediction in pregnancy: outcomes in screened vs. unscreened populations. *Obstet Gynecol*. 2021;138(4):637–644. https://doi.org/10.1097/AOG.0000000000004521
19. AbouZahr C, Wardlaw T. Maternal mortality causes and strategies in LMICs. *Lancet Glob Health*. 2021;9(3):e302–e303. https://doi.org/10.1016/S2214-109X(20)30599-6
20. Arvind B, Kiran R. Cost-effectiveness of antenatal cardiac screening in India: a modeling approach. *BMC Pregnancy Childbirth*. 2022;22(1):218. https://doi.org/10.1186/s12884-022-04532-2.