MATERNAL RISK FACTORS IN THE DEVELOPMENT OF CONGENITAL HEART DISEASE: A CLINICAL STUDY

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Abstract: *Congenital heart disease (CHD) remains one of the most common congenital anomalies and a leading cause of neonatal morbidity and mortality worldwide. This study aimed to evaluate the role of maternal risk factors in the development of CHD. A total of 150 patients with confirmed CHD and their mothers were included. Data were collected through retrospective medical record analysis and structured questionnaires. The findings demonstrated that advanced maternal age, metabolic disorders, infections during pregnancy, harmful habits, and uncontrolled medication use significantly increase the risk of CHD. The results highlight the importance of early screening and preventive strategies in high-risk populations.*

Keywords: *congenital heart disease, maternal risk factors, prenatal period, TORCH infections, epidemiology*

Introduction

Congenital heart disease represents a major global health burden, affecting approximately 8–10 per 1,000 live births. Despite significant advances in prenatal diagnostic techniques, including fetal echocardiography and advanced imaging modalities, the etiology of CHD remains complex and multifactorial. Current evidence suggests that both genetic predisposition and

environmental influences contribute to its development. Among these, maternal-related risk factors during pregnancy play a crucial role in disrupting normal cardiac embryogenesis.

Previous studies have identified several potential maternal risk factors, including advanced maternal age, pre-existing chronic diseases, infections, exposure to teratogenic agents, and adverse environmental conditions. However, the combined effect and relative contribution of these factors remain insufficiently understood, particularly in developing healthcare settings. Therefore, investigating these associations is essential for improving early detection and prevention strategies.

Aim

The aim of this study was to assess the impact of maternal risk factors on the development of congenital heart disease and to determine their clinical significance.

Materials and Methods

This study was conducted on 150 children diagnosed with congenital heart disease and their mothers. A combined retrospective and prospective design was used. Clinical data were obtained from hospital records, while additional information was collected questionnaires administered to mothers.

Maternal variables analyzed included age, presence of chronic diseases (such as diabetes mellitus and hypertension), history of infections during pregnancy (particularly TORCH infections), medication use, lifestyle factors (smoking and alcohol consumption), and environmental exposure.

Statistical analysis was performed using standard methods, including descriptive statistics, correlation analysis, and regression modeling to identify significant associations between maternal risk factors and CHD occurrence.

Results

The analysis revealed that 28% of mothers were older than 35 years, and this group demonstrated a higher incidence of CHD in their offspring. Maternal

diabetes mellitus was identified in 22% of cases, while 18% had a history of arterial hypertension, both of which were significantly associated with adverse fetal cardiac development.

Infectious diseases during pregnancy were reported in 26% of mothers, with TORCH infections being the most prevalent. Uncontrolled medication use during pregnancy was observed in 31% of participants, indicating a substantial exposure to potential teratogenic effects. Lifestyle-related risk factors included smoking in 19% and alcohol consumption in 11% of mothers.

Additionally, 24% of participants were exposed to unfavorable environmental conditions, such as living in industrial areas. Notably, the presence of multiple risk factors in combination was associated with a markedly increased likelihood of CHD development, supporting the multifactorial nature of the disease.

Conclusion

The findings of this study confirm that maternal risk factors play a significant role in the development of congenital heart disease. Advanced maternal age, metabolic disorders, infections, harmful habits, and environmental exposures were identified as key contributors. The combined effect of these factors substantially increases the risk of CHD.

These results emphasize the need for comprehensive preconception care, enhanced prenatal screening programs, and targeted monitoring of high-risk pregnancies. Strengthening preventive strategies and raising awareness among women of reproductive age may significantly reduce the incidence of congenital heart disease.

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