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PREVALENCE AND PROFILE OF CONGENITAL HEART DISEASES AND PULMONARY HYPERTENSION

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ABSTRACT

The prevalence of congenital heart diseases, especially ventricular septal defect, and its relationship with pulmonary hypertension highlight the need for an integrated approach and early interventions to improve clinical outcomes and quality of life of patients. These conditions, which represent a significant challenge for neonatal public health, require both identification and appropriate management to prevent serious complications. The objective of this study was to analyze the relationship between the various types of congenital heart disease and the risk of developing pulmonary hypertension. For this, a bibliographic search was adopted as a procedure, searching for and selecting scientific studies published between the years 2020 and 2024 in the SciELO and LILACS databases. The inclusion criteria included studies that discussed the chronic use of benzodiazepines and its relationship with other substance use disorders, while the exclusion criteria eliminated publications without empirical data or focused on specific samples. Through the analysis of the results, as a conclusion, it was found that the relationship between congenital heart diseases and pulmonary hypertension is strongly influenced by the type and severity of cardiac anomalies, and early diagnosis and personalization of interventions are essential to improve the prognosis and quality of life of patients.

Keywords: Congenital Heart Diseases. Pulmonary Hypertension. Prevalence.

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INTRODUCTION

The prevalence and profile of congenital heart disease and pulmonary hypertension reveal the importance of addressing these conditions in an integrated manner. Congenital heart defects, which account for about 40% of birth defects, represent a considerable challenge in neonatal public health. Ventricular septal defect, one of the most common forms, has a prevalence of 3.07 per 1000 live births, which demonstrates its significant occurrence (Freitas *et al*., 2024). These heart diseases can be divided into cyanotic, such as tetralogy of Fallot, and acyanotic, such as the ventricular septal defect itself, often identified soon after birth (Linhares *et al*., 2021).

Pulmonary hypertension emerges as a complication in many patients with congenital heart disease, being particularly prevalent in Eisenmenger syndrome, a serious condition that results from prolonged increased pulmonary blood flow (Santana *et al.,* 2024). Pulmonary hypertension is associated with increased vascular resistance, overloading the right ventricle and leading to serious clinical consequences if not treated properly (Martins *et al*., 2023). This scenario reinforces the need for early interventions that can not only identify congenital heart diseases, but also prevent complications such as pulmonary hypertension.

The treatment of pulmonary hypertension related to congenital heart defects includes both drug and non-drug approaches, with new therapies emerging that offer hope for improving clinical outcomes (Freitas *et al*., 2024). Early identification of these conditions, combined with proper management, is essential to promote a better quality of life for affected patients. This highlights the interrelationship between the prevalence of congenital heart disease and pulmonary hypertension, and the impact of these conditions on neonatal and pediatric public health (Santana *et al.,* 2024).

In this context, the objective of this study was to analyze the relationship between the various types of congenital heart diseases and the risk of developing pulmonary hypertension.

METHODOLOGY

This study was conducted through a narrative review of the literature to analyze the relationship between the various types of congenital heart disease and the risk of developing pulmonary hypertension. For this, the SciELO, PubMed and LILACS

databases were used, covering publications from different areas of health, with a focus on cardiology and respiratory diseases.

The inclusion criteria for the selection of articles were: studies published between 2020 and 2024, which addressed the prevalence and profile of congenital heart diseases and their relationship with the development of pulmonary hypertension; studies that discussed therapeutic interventions and clinical management of these conditions; and articles that brought empirical data on the prevalence of congenital heart disease in different populations.

Review articles prior to 2020, publications that did not present empirical data, studies focused only on rare cases or non-representative populations (such as isolated studies in specific regions), and studies that did not directly address the interrelationship between congenital heart disease and pulmonary hypertension were excluded.

The selected articles were analyzed qualitatively, with emphasis on their methodologies, samples, and results, allowing a comprehensive view of the available evidence on the relationship between these conditions. The analysis of the studies allowed us to identify patterns in the prevalence of congenital heart disease and in the development of pulmonary hypertension, as well as gaps in current knowledge, suggesting the need for further research in certain areas.

RESULTS AND DISCUSSION

The relationship between congenital heart disease (CHD) and the risk of developing pulmonary hypertension (PH) is widely discussed in the literature. Kaemmerer *et al.* (2020) highlight that the different characteristics and complexity of CHD directly impact the hemodynamics of patients, which influences the risk of PH. In their study, they point out that patients with pretricuspid and posttricuspid shunts have different risk profiles. Posttricuspid shunts, such as atrial septal defect, are often associated with an increase in lung pressure due to excessive flow to the lungs, while more complex forms of CHD, which involve multiple structural abnormalities, are associated with an elevated risk of PH. This complexity reinforces the importance of early interventions for better clinical management of these patients (Kaemmerer *et al.*, 2020).

In consonance, Busse *et al.* (2022) also discuss how CC-related structural anomalies influence the development of PH. They propose a classification of patients

based on the risk of PH, subdividing them into three categories: low risk, risk of pre- or post-capillary PH, and manifest PH. Patients with left-to-right shifts, for example, are more prone to precapillary PH due to volume overload in the pulmonary arteries, while those with left heart obstructions tend to develop post-capillary PH. The classification proposed by Busse *et al.* (2022) highlights the need for personalized monitoring and treatment strategies, considering the diversity of mechanisms that lead to PH in different types of CHD.

The studies by Kaemmerer *et al.* (2020) and Busse *et al.* (2022) agree on the severity of PH in patients with CHD, emphasizing that the condition worsens the clinical prognosis and is associated with worse outcomes and quality of life. Kaemmerer *et al.* (2020) point out that a significant proportion of patients with CH associated with CHD are in WHO classes III and IV, reflecting severe functional limitations. Busse *et al.* (2022), in turn, reveal that a considerable number of patients with manifest PH are unaware of their condition, pointing to the lack of knowledge about the risk related to CHD and the need for greater education and awareness among patients and health professionals.

On the other hand, Costa *et al.* (2024) highlight that common defects, such as ventricular and atrial septal defects, can cause increased blood flow to the lungs, leading to PH due to overload on the right side of the heart. Right ventricular hypertrophy arises as a response to increased pressure in the pulmonary arteries, aggravating the risk of PH. This analysis corroborates the observations of Kaemmerer *et al.* (2020) and Busse *et al.* (2022), which emphasize the need for early diagnosis and appropriate interventions to mitigate the impacts of PH in patients with CHD.

In addition, Costa *et al.* (2024) draw attention to the importance of prenatal care and lifestyle modifications to reduce the risk of CHD and, consequently, PH. Factors such as maternal smoking, alcohol use, and obesity during pregnancy are mentioned as possible contributors to the development of CHD and its complications, including PH. Thus, Costa *et al.* (2024) complement previous studies by suggesting that prevention and education are essential not only to treat but also to prevent the progression of PH.

The study by Ito (2024) reinforces previous observations by indicating that the risk of PH in patients with CHD depends on both the type and severity of the defect. Defects such as those of the ventricular septum and atrial septum are particularly problematic, as they cause increased blood flow to the lungs, leading to vascular

remodeling and increased pulmonary vascular resistance. Ito (2024) underlines the importance of understanding these relationships in order to develop more effective treatment strategies, especially in children, in whom the prevalence of CHD-associated PH may be particularly high if diagnosis or treatment is delayed.

Torres *et al.* (2024) explore how structural anomalies, such as patent ductus arteriosus persistence, can exacerbate volume overload in the lungs, contributing to the development of PH. The persistence of this abnormal connection between the aorta and the pulmonary artery significantly increases the risk of PH in patients with CHD. Torres *et al.* (2024) emphasize the need for rigorous monitoring and early interventions to prevent the progression of PH, corroborating the findings of Ito (2024), who also point to the importance of close and continuous follow-up of these patients to avoid severe outcomes.

The studies by Kaemmerer *et al.* (2020), Busse *et al.* (2022), Costa *et al.* (2024), Ito (2024) and Torres *et al.* (2024), therefore, converge in the understanding that the diversity of congenital heart diseases directly influences the development of pulmonary hypertension. Early identification and appropriate management of these conditions are key to improving patients' quality of life and survival, highlighting the need for individualized treatment strategies and increased awareness of the associated risks.

FINAL CONSIDERATIONS

The objective of this study was to identify and analyze the relationship between the various types of congenital heart diseases and the risk of developing pulmonary hypertension. It has been shown that different cardiac anomalies, such as intracardiac shunts and patent ductus arteriosus, directly contribute to pulmonary overload and increased pressure in the pulmonary arteries, significantly influencing the prognosis of patients. The study reinforces the importance of early diagnosis and the implementation of appropriate therapeutic interventions for the clinical management of these cases.

However, the research had some limitations. The lack of specific data on population subgroups and genetic factors associated with congenital heart disease may have limited the full understanding of the variability in the risk of pulmonary hypertension among different patients. In addition, the absence of longitudinal data precludes a more detailed assessment of the progression of pulmonary hypertension over time.

For future research, it is suggested that longitudinal studies be carried out that follow patients over several years, in order to better understand the evolution of pulmonary hypertension in individuals with different types of congenital heart diseases. In addition, it is recommended to investigate the influence of genetic and environmental factors on the relationship between congenital heart disease and pulmonary hypertension, which could provide a more comprehensive view and allow more effective prevention and treatment strategies.

REFERENCES

1. Busse, A., et al. (2022). Healthcare status of adults with pulmonary hypertension due to congenital heart disease. *Cardiovascular Diagnosis and Therapy*, 12(6), 840.

2. Costa, F. A., et al. (2024). Fatores de riscos associados à ocorrência de cardiopatias congênitas: uma revisão da literatura. *Revista Ibero-Americana de Humanidades, Ciências e Educação*, 10(6), 2890-2894.

3. Freitas, A. P., et al. (2024). Cardiopatia congênita: comunicação interventricular e suas manifestações no recém nascido. *Contribuciones a Las Ciencias Sociales*, 17(7), e8051-e8051.

4. Ito, A. E. W. (2024). Avaliação da prevalência, causas e tratamento de doenças cardíacas congênitas em bebês e crianças. *Caderno de Anais Home*.

5. Kaemmerer, H., et al. (2020). Pulmonary hypertension in adults with congenital heart disease: real-world data from the international COMPERA-CHD registry. *Journal of Clinical Medicine*, 9(5), 1456.

6. Linhares, I. C., et al. (2021). Importância do diagnóstico precoce das cardiopatias congênitas: uma revisão integrativa. *Revista Eletrônica Acervo Científico*, 35, e8621-e8621.

7. Martins, L., et al. (2023). Hipertensão pulmonar no adulto com cardiopatia congênita: tratamento atual. *Revista da Sociedade de Cardiologia do Estado de São Paulo*, 33(1), 22-28.

8. Santana, N. A. A., et al. (2024). Revisão de literatura da hipertensão pulmonar associada a cardiopatia na Síndrome de Eisenmenger. *Studies in Health Sciences*, 5(2), e4001-e4001.

9. Torres, E. E. T., et al. (2024). Hiperfluxo pulmonar nas cardiopatias congênitas: revisão integrativa. *Brazilian Journal of Implantology and Health Sciences*, 6(6), 1317-1329.