

OVERWEIGHT AND OBESITY: RAISING AWARENESS OF THE PROBLEM IN ADULTS WITH CONGENITAL HEART DISEASE IN EASTERN SLOVAKIA

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Aim The aim of this study was to evaluate the prevalence of overweight and obesity in a population of adults with congenital heart disease in eastern Slovakia.

Material and method Due to the current epidemiological situation, all relevant data were obtained from medical reports only. Records of 41 adult patients, referred between April, 2020 and March, 2021 to the registry of the Eastern Slovakia Institute of Cardiovascular Diseases, (VUSCH) Kosice, Slovakia were analyzed retrospectively.

Results Increasing rate of overweight in adult patients with congenital heart disease ($p < 0.001$).

Conclusion To the best of our knowledge this is the first study conducted in Slovakia, estimating the prevalence of overweight and obesity in adults with congenital heart disease. Our study confirmed the presence of overweight in ACHD, however, with lower incidence compared to the healthy population, implying that the growing obesity pandemic is also affecting ACHD in eastern Slovakia and more attention is required in this high-risk group.

Key words: adults with congenital heart disease, obesity, overweight

Introduction

Obesity is nowadays considered a worldwide epidemic and is perceived as one of the most important health problems the world is facing. It is associated with major risk factors for a number of chronic diseases, including cardiovascular diseases such as heart disease and stroke, which are the leading causes of death worldwide [14, 21]. The objective of our study was to determine the prevalence of overweight and obesity in adults with congenital heart disease (ACHD) in Eastern Slovakia. CHD covers a wide spectrum of conditions, from simple heart defects with excellent prognosis to complex heart defects, which require invasive procedures. Owing to the medical and technological advances, many patients survive to adulthood [7]. Congenital heart disease has been modified from a fatal disease into chronic disease [19]. Follow-up recommendations in this group of patients vary depending on the severity of the congenital abnormality, nevertheless life-long regular follow-ups are advised [4]. Furthermore, patients with congenital heart diseases often have exercise limitations, which may cause them to be uniquely predisposed to obesity [11]. Along with the preexistent condition, obesity may further increase the risk of other cardiovascular diseases [5], thus in the study, we aimed to find the prevalence of obesity in patients with CHD. Over the last decade many international studies were conducted, in which the researchers sought to determine the prevalence of obesity in a cohort of ACHD compared with a matching healthy population. The results of a retrospective analysis indicated that ACHD have a similar prevalence of overweight and obesity, compared with controls [20].

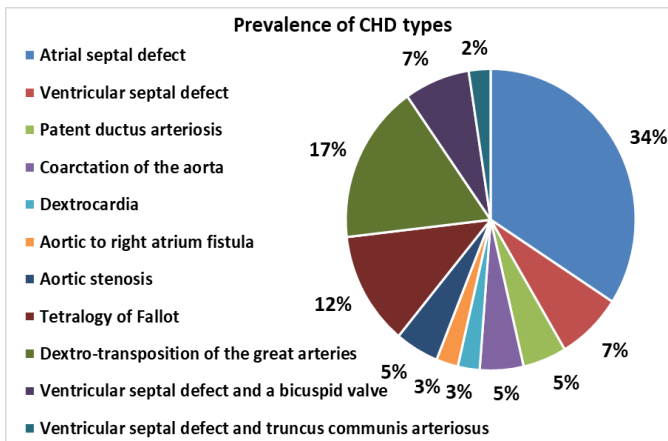
Methods and patients

All medical records of patients were referred between April, 2020 and March, 2021 to the registry of the Eastern Slovakia Institute of Cardiovascular Diseases, (Východoslovenský ústav srdcových a cievnych chorôb) Kosice, Slovakia. The data has been obtained according to the Declaration of Helsinki, and the hospital ethics review board approved the protocol. Due to the current pandemic outbreak of coronavirus disease 2019 (COVID-19), infection prevention and control measures have been implemented in our outpatient care. Ambulatory care was provided to patients requiring urgent medical care. Therefore, all relevant data were obtained from medical reports only. The data were analyzed retrospectively and used patient's cohorts with CHD from the registry. CHD was defined as one or more problems with the heart's structure that exist since birth [7]. The total of 41 patients with CHD were registered in this study. The research group consists of subjects with various types of structural abnormalities - simple or complex, including those who underwent surgical reconstruction. Characteristics of the research group were as followed: 14 patients with an atrial septal defect, 3 patients with a ventricular septal defect, 2 patients with a patent ductus arteriosus, 2 patients with coarctation of the aorta, 1 patient with dextrocardia, 1 patient with an aortic to right atrium fistula, 2 patients with aortic stenosis, 5 patients with Tetralogy of Fallot, 7 patients with dextrotransposition of the great arteries, 3 patients with a combination of a ventricular septal defect and a bicuspid valve, and 1 patient with a ventricular septal defect and truncus communis arteriosus. Majority of the patients underwent corrective surgery. The prevalence of CHD types is presented in Figure 1. Lean control were 41 healthy subjects matched for age and sex, who did not suffer any chronic medical condition.

Data extraction and baseline examination

Due to the current epidemiological situation, all needed data were extracted from medical records. Height and weight were measured, and body mass index (BMI) (kg/m^2) was calculated as weight (kg) divided by the square of height (m^2). Overweight was defined by a BMI of 25 to 29.9 kg/m^2 and obesity was defined by BMI ≥ 30 kg/m^2 [15].

Figure 1 Prevalence of CHD types



Statistical analysis

Data were processed using methods of descriptive and inductive statistics, depending on the type and number of monitored variables. For the purpose of inductive statistics, we assumed that our data represent a random sample of the relevant population. Statistical analysis was performed using MedCalc 18.2.1. (MedCalc Software, Ostend, Belgium). All values are presented as mean \pm SD. Within group comparisons the Wilcoxon's signed rank test was used. Correlations were evaluated by Pearson's correlation as appropriate. All of the statistical tests were considered statistically significant with a p value $p < 0.001$. Characteristics of both study groups are presented in Table 1.

Results

From the medical records we have selected those patients who undergo regular check-ups. We have obtained their height and weight measurements and calculated the body mass index (BMI) value. The median age of adult patients with congenital heart disease and control group was 30.4 (18 - 50) years old and 34 (18 - 50) years old, respectively.

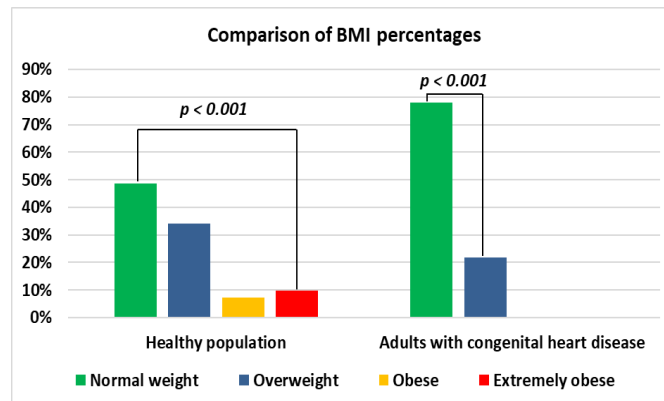
Adult patients with congenital heart disease had statistically a lower percentage of overweight compared to the control group (21.4 % and 33.3 %, $p < 0,001$). Additionally, neither of the ACHD patients had a BMI value above 30 kg/m^2 , which would indicate obesity. However, comparing to the control group, 7.32 % of the individuals from the healthy population presented a BMI value above 30 kg/m^2 . Additionally, up to 9.76% individuals had an BMI value above 35 kg/m^2 indicating extreme obesity. Comparison of BMI results is presented in Figure 2. The correlation between weight and BMI in the groups were as

followed: $r = 0.7$ in ACHD and $r = 0.8$ in the healthy population.

Discussion

Obesity and overweight are not only a matter of aesthetics, but above all health. According to statistics, the scale of the problem is growing, and obesity has been recognized as one of the most serious civilization diseases of the 21st century [1].

Figure 2 Comparison of BMI percentages



The latest studies report a significant increase in rates of overweight and obesity amongst patients with CHD [2]. The importance of this research and monitoring of adult patients with congenital heart disease, is that neglected overweight and obesity can lead to further health complications such as; hypertension, dyslipidemia, coronary heart disease, or myocardial infarction [8, 10, 13]. Not only is it associated with a list of co-morbidities, but also cardiac changes. These changes are not limited to patients with congenital heart disease. It has been proven that obesity is associated with cardiac chamber enlargement and dysfunction in structurally normal hearts. A decrease of left ventricle ejection fraction, diastolic dysfunction, thickening of the interventricular septum, increase of the left ventricle mass are just some of the early cardiac changes observed in overweight and obese patients [1]. Therefore, addressing obesity and overweight early is essential to avoid preventable acquired heart disease in patients already burdened with structural heart disease [6, 12].

Many studies in the span of the last decade have been increasing the awareness of obesity in individuals with congenital heart disease. The newest study, a systematic literature review conducted by Willinger et. Al was published in September of 2021. The research team collected the total of 30 research studies, in which the patients met the inclusion criteria. The key features of the target population were a combination of congenital heart disease or congenital heart defect and overweight or obesity or adiposity or body constitution. The study focused on all age groups. The results were alarming, demonstrating that the ongoing obesity pandemic is also affecting the CHD population [20].

Physical activity is an additional problem that this particular group is facing. Reports have shown low rates of physical activity and a higher obesity rate in patients

with congenital heart disease [17]. Many doctors and patients still have a conservative attitude when speaking about physical activity in these patients [19].

In the context of the global threat of the obesity epidemic, primary and secondary prevention of overweight and obesity should be extended in all patient groups [3, 18]. All the current scientific reports and the presented research results indicate that in the further studies of patients with congenital heart disease, particular attention should be paid to the problem of overweight and obesity. With these results, we hope to raise awareness of the issue and encourage not only patients, but also specialists to educate during individual consultations, to promote a healthy lifestyle and to pay more attention to the problem [9, 16].

Limitations and Further Research

It is important to note, that due to the current epidemic situation, we have met many limitations. Restrictions imposed by the current situation limited the ability to exert sophisticated statistical data. Thus, in further research, it is required to include not only a greater number of patients, but additional health details such as blood pressure or lipid levels.

In our study we have only obtained weight and height parameters from each patient, a further more precise investigation should be conducted, including the analysis of fat distribution as well as the body composition. BMI is based on both lean and fat mass and consequently carries the risk of classifying muscular patients as overweight [20].

Conclusion

To the best of our knowledge this is the first study conducted in Slovakia, estimating the prevalence of overweight and obesity in adults with congenital heart disease. Our study confirmed the presence of overweight in ACHD, however, with lower incidence compared to the healthy population, implying that the growing obesity pandemic is also affecting ACHD in eastern Slovakia and more attention is required in this high-risk group.

Table 1 Characteristics of study groups

	Healthy population		Adults with CHD		p value
	M	SD	M	SD	
Number of females (n)	23	.	24	-	< 0.001 *
Number of females (n)	18	.,	17	-	< 0.001 *
Age (years)	33.95	7.39	30.46	6.91	< 0.001 *
Weight (kg)	78.23	16.77	66.29	12.75	< 0.001 *
Height (cm)	172.88	8.57	170.27	10.74	< 0.001 *
BMI (kg/m ²)	26.40	4.67	22.70	2.96	< 0.001 *

*M = Mean value; SD = Standard Deviation; *Statistically significant*

Abbreviations: ACHD – adults with congenital heart disease, BMI – body mass index, CHD – congenital heart disease

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NADVÁHA A OBEZITA: ZVYŠOVANIE POVEDOMIA O PROBLÉME U DOSPELÝCH S VRODENOU CHOROBOU SRDCA NA VÝCHODE SLOVENSKA

Cieľ Cieľom tejto štúdie bolo vyhodnotiť prevalenciu nadváhy a obezity v populácii dospelých s vrodenou chorobou srdca na východnom Slovensku.

Materiál a metodika Vzhľadom na aktuálnu epidemiologickú situáciu boli všetky relevantné údaje získané iba z lekárskej správy. Retrospektívne boli analyzované záznamy 41 dospelých pacientov, ktorí boli od apríla 2020 do marca 2021 v registri Východoslovenského Ústavu Srdcových a Cievnych Chorôb.

Výsledky Zvyšujúca sa miera nadváhy u pacientov s vrodenou chorobou srdca ($p < 0.001$).

Záver Podľa našich informácií, toto je prvá štúdia uskutočnená na Slovensku, ktorá odhaduje prevalenciu nadváhy a obezity u dospelých s vrodenou chorobou srdca. Naša štúdia potvrdila prítomnosť nadváhy v tejto skupine ľudí, avšak s nižším výskytom v porovnaní so zdravou populáciou. Toto implikuje, že rastúca pandémia obezity ovplyvňuje aj dospelých s vrodenou chorobou srdca na východnom Slovensku a tejto vysoko rizikovej skupine treba venovať zvýšenú pozornosť

Kľúčové slová: dospelí s vrodenou chorobou srdca, nadváha, obezita

We hereby declare that the authors do not have a potential conflict of interest

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