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PERSONALITY TRAITS OF PATIENTS SUFFERING FROM CONGENITAL HEART DEFECTS

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ABSTRACT

Introduction: Personality traits of patients suffering from congenital heart defects

The work presents a research project carried out in John Paul II Hospital, The Clinical Department of Cardiac and Vascular Diseases with the Intensive Cardiac Surgeon Division Institute of Cardiology, Collegium Medicum of the Jagiellonian University in Cracow, with participation of patients with congenital heart defects.

We aimed to assess personality traits of clients suffering from congenital heart defects, in a group of women and men, younger, under 40 years old and older than 40 years old, with PFO and ASD before and after surgery.

The aim: identify specific personality traits of patients with congenital heart defects and to check the psychological functioning of patients by examining: the level of anxiety, impulsiveness, tendency to risk-taking, empathy, neuroticism, extraversion, psychoticism and lying.**Material and methods:** We performed a psychological clinical assessment and conducted the psychological tests like EPQ-R(S) by Hans J. Eysenck and Sybil G. Eysenck, IVE by Hans J. Eysenck and Sybil G. Eysenck, STAI by C. D. Spielberger, R. L. Gorsuch, R. E. Lushene describing personality traits of patients.**Results:** Patients (F=29, M=21), adult, with ASD and with PFO, with the level of education: basic, vocational, secondary, incomplete higher, higher; inhabiting: village, city up to 40 thousand residents, a city with a population of 41-61 thousand, and a city with a population of 60 thousand; civil status: single, married, divorced, widow/widower, separated; being: students, unemployed persons, working persons, pensioners, retirees.**Conclusions:** The presented results and their statistical analyses showed specific personality traits of patients with congenital heart defects.**KEY WORDS:** personality, personality traits, congenital heart defects, PFO, ASD, neuroticism, extraversion, psychoticism, lying, impulsiveness, tendency to risk-taking, empathy, anxiety as current state, anxiety as personality trait

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INTRODUCTION

Congenital heart defects are caused by abnormal development of the circulatory system in the fetal life or its inhibition, which may in turn be a consequence of the mother's bad habits during the pregnancy, primarily in the first trimester of pregnancy, such as: viral infections, drugs used; or depend on genetic factors. There are heart defects that do not cause any indisposition [1]. However, there are those that bring to the life of a sick person a number of ailments, which cause that the patient feels badly not only physically, but also mentally. The aim of the article is to identify specific personality traits of patients with congenital heart defects and to check their psychological functioning by examining: the level of anxiety, impulsivity, risk-taking, empathy, neuroticism, extraversion, psychoticism and lying.

The justification for the choice of this topic is the desire to become familiar with specific personality traits of patients with congenital heart defects, curiosity about how ill persons function and are psychologically adapted, the level of

anxiety, impulsivity, risk propensity, empathy, neuroticism, extraversion, psychoticism and lies, examining effects on the occurrence of possible or already existing psychiatric disorders caused by the existence of a heart defect and an attempt to answer the question: *Do patients with congenital heart defects have specific personality traits?*

In the absence of available literature on the subject, the project can be considered pioneering.

CONGENITAL HEART DEFECTS

In order to recognize a heart defect, the physician first of all applies listening to the murmurs created above the heart with a characteristic location and type for a specific defect, as well as the analysis of changes in the image of the heart, electro and phonocardiological changes, or measurement of blood pressure. Example symptoms of congenital heart defects: tremor of a chest, the so-called cat's murmur, sometimes there is also a problem with too high blood pressure of the patient and others. Congenital defects may

cause too slow physical development of the child, while too rapid flow of blood through the lungs may cause frequent respiratory infections [1].

Characteristic symptoms of congenital heart defects are: effort dyspnoea, which may be accompanied by cough caused by stagnation in the lungs. There are also possible disorders of the cerebral circulation, which in turn may cause recurrent loss of consciousness or convulsions [1].

For diagnostics there are also used: one or two-dimensional echocardiography - to detect defects in the atrial septal or inter-ventricular septum; contrast echocardiography, which is particularly useful in the diagnosis of leaks [1].

Depending on the degree of cardiac dysfunction caused by congenital heart disease, ill persons may be at risk of: heart failure, endocarditis, cardiac arrhythmias, often fatal. Treatment of heart defects focuses on surgical treatment. Congenital malformations can be divided into defects without leakage and defects with leakage [1].

CONGENITAL HEART DEFECTS IN ADULTS

Congenital heart defects in adults are divided into:

1. Non-cyanotic heart disease with a leak at the level of:
 - a. the atria,
 - b. the ventricles,
 - c. the great arteries.
2. Cyanotic heart disease with a leak:
 - a. with reduced pulmonary flow,
 - b. Eisenmenger syndrome.
3. Valve defects:
 - a. atrio-ventricular valves,
 - b. valves of arterial trunks.
4. Others:
 - a. pathology of systemic veins,
 - b. lungs veins,
 - c. arterial trunks.

Birth defects that can be found in an adult: bicuspid aortic valve, aortic valve coarctation, valvular stenosis, atrial septal defect, patent ductus arteriosus, ventricular septal defect, Fallot tetralogy, Eisenmenger's syndrome, congenital corrected arterial trunks, left atrioventric valve regurgitation, Ebstein anomaly, Uhl's anomaly, subvalvular narrowing of the left ventricle outflow pathway, Valsava sinus aneurysm, coronary fistula, pulmonary arteriovenous fistula [3].

ATRIAL SEPTAL DEFECT ASD

Latin: *defectus septi interatrialis*, English: atrial septal defect – ASD

Atrial septal defects can be divided into:

- a. secondary opening, occurring in about 70% of patients with congenital heart disease - ASD II,
- b. primary opening - partial loss of the atrio-ventricle septum, occurring in about 15% of patients with congenital heart defects - ASD I,
- c. main vein, occurring in about 7% of patients with congenital heart defects - ASD sv,

d. coronary sinus, occurring in about 1% of patients with congenital heart defects - ASD cs [3].

ASD is one of the most common heart defects in adults, it is twice as common in women as in men, also in combination (about 30%) with trisomy 21 in the Down Syndrome [3].

The leakage of oxygenated blood from the left to the right atrium is caused by the loss of the atrial septum [3].

SIGNS AND SYMPTOMS OF CONGENITAL HEART DEFECTS OF ADULTS

Patients with congenital heart disease usually do not report any complaints or report only minor discomforts. These defects are most often diagnosed at the moment of echocardiographic examination, less frequently by means of magnetic resonance or computed tomography. At the age of about 40, patients experience reduced physical capacity to cope with exercise, palpitations, atrial fibrillation. Over the years and uncontrollable heart defects, symptoms such as fatigue, dyspnoea, enlarged liver, central cyanosis, edema may appear [3].

Patients may be qualified for percutaneous surgical operation closing the defect, whereas patients with a small leak do not require any recommendations or special treatment. The latter can take advantage of all the charms of life, taking up activity in sport, pregnancy is also not contraindicated, the solution without the need of Cesarean cutting; on the other hand, pharmacologically treated persons may be exposed to danger while diving or being at high altitudes [3].

PATENT FORAMEN OVALE PFO

Latin: *foramen ovale apertum*, English: patent foramen ovale PFO

PFO occurs in about 20% or even 30% of adults, most often it is diagnosed accidentally, during additional tests in patients at a young age after a stroke. PFO may lead to leakage from the right to the left atrium, possibly causing embolism, especially in the presence of an atrial septal aneurysm.

One of the visible symptoms of the obstruction of the orifice can be asymptomatic stroke at an early age [3].

VENTRICULAR SEPTAL DEFECT

Latin: *defectus septi interventricularis*, English: ventricular septal defect VSD

Diagnosed in about 10% of patients with congenital heart defects, consisting of leakage of blood oxygenated from the left to the right ventricle, and sometimes to the right atrium. Uncontrolled can lead to heart failure [3].

PATENT DUCTUS ARTERIOSUS PDA

Latin: *ductus arteriosus persistens*, English: patent ductus arteriosus - PDA

Congenital heart defect, associated with complications arising during the rubella, from which a pregnant woman

suffered - I trimester of pregnancy, consisting of the connection of the left pulmonary artery with the aorta. Characteristic symptoms are: leakage, exercise dyspnoea, palpitations [3].

TETRALOGY OF FALLOT

Latin: *tetralogia Falloti*, English: tetralogy of Fallot

The most common cyanosis defect after the patient reaches the first year of life. Patients complain about symptoms such as in the case of previous heart defects as well as chest pains. Characteristic symptoms may also be: rod-shaped squares, pronounced nails [3].

EISENMENGER SYNDROME

Latin: *syndroma Eisenmengeri*, English: Eisenmenger syndrome

If untreated, it can lead to pulmonary arterial hypertension. It exists as a complication of diagnosed congenital malformations, most of them being leaky. Patients report a feeling of lack of air, sometimes also fainting, unconsciousness [3].

RIGHT VENTRICULAR OUTFLOW TRACT OBSTRUCTION

It involves the development of changes in the pulmonary valve [3].

LEFT VENTRICULAR OUTFLOW TRACT OBSTRUCTION

This is the most common defect in approximately 2% of adults with congenital heart disease and this is the so-called bicuspid valve, occurring about 4 times more often in men [3].

AORTIC COARCTATION

Latin: *coarctatio aortae; stenosis isthmi aortae*, English: aortic coarctation

This disadvantage is primarily the narrowing of the aorta. 2-5 times more often in men compared to women, often combined with Turner syndrome. Hypertension, as well as headaches, are characteristic for this defect [3].

The congenital heart defects highlighted above are only some of the existing ones.

HEART DEFECTS WITHOUT LEAKAGE

The following are briefly discussed heart defects without leakage, such as: stenosis of the main aorta, congenital pulmonary stenosis, dextrocardia and Ebstein syndrome [1].

Narrowing of the main artery

Congenital narrowing of the pulmonary artery

Dextrocardia

Ebstein syndrome

HEART DEFECTS WITH LEAK

This section will discuss heart defects with leakage such as: ventricular septal defect, atrial septal defect, persistent arterial duct Botalla [1]

Ventricular septal defect - Defectus septi ventriculorum, consists in the flow of blood from the left to the right ventricle, which may cause its growth, as well as increased blood flow through the small circulation. A characteristic symptom is the appearance of a loud systolic murmur. To diagnose this disadvantage, one can use a radiological examination that can determine the widening of the pulmonary artery trunk as well as an electrocardiographic examination indicating the total or partial block of the right bundle of the His bundle [1].

Atrial septal defect - Defectus septi atriorum - ASD, consisting of a complete absence of atrial septum - with a very severe heart defect or partial omission of the oval hole valve [1].

PSYCHOLOGY IN CARDIOLOGY - PSYCHOCARDIOLOGY

Cardiology has its achievements in the work of psychologists. Already in 1961 a psychological studio was established thanks to Zdzisław Askanas, who was tasked with a holistic approach to the treatment and rehabilitation of patients with ischemic heart disease. Currently, heart disease is one of the most serious epidemiological problems. Cardiovascular disease is one of the most common causes of death (about 400 people per 100,000 people). Most often, these are such diseases in which the participation of psychological factors has been detected [4].

Psychocardiology deals primarily with the course of treatment or rehabilitation of cardiological disorders, as well as the psychosocial factors themselves affecting the emergence of the above-mentioned disorders. It also focuses primarily on improving the patient's quality of life. Psychocardiology has developed over the years. W. Harvey already pointed out in his works how much influence emotions have in the emergence of cardiological problems. One by one W. Osler described factors such as time pressure, today you could say workaholicism; that may affect coronary vascular changes to a greater extent than lack of moderation in food and drink [5].

Cardiology has its achievements in the work of psychologists. It should be mentioned that Poland was one of the first countries to focus on psychological problems of patients suffering from cardiovascular diseases [5].

Already in 1961, on the initiative of Professor Askanas, the first psychological laboratory was established in the department of cardiology, whose task was a holistic approach to the treatment and rehabilitation of patients with coronary heart disease [6, 7].

Thanks to Professor Zdzisław Askanas /1910-1974/, a Polish doctor, cardiologist, academic teacher at the Medical Faculty of the Medical University of Warsaw, the creator and the first Head of the First Chair and Clinic of Cardiology at the Medical University of Warsaw, in

1962 the founder of the Central Cardiovascular Disease Clinic, and in 1965 the founder of the Institute of Cardiology in Warsaw introduced many innovative methods in cardiology. Professor Askanas was a teacher of many outstanding Polish cardiologists. He also created the Warsaw Academic School of Cardiology, in which his students were concentrated [6, 7].

Throughout his life he was characterized by great enthusiasm for his actions, dedication to work and consistency. Professor Askanas's desperation resulted in very effective teaching, many thematically diverse scientific works, and above all extremely caring, patient-oriented care, development of very specialized care for initially internist patients, which has been focused on cardiological patients over the years [6, 7].

It was on the initiative of professor Asnanas in the Cardiology Clinic in Warsaw that a multidisciplinary team was created, dealing with all cardiological patients, consisting of doctors, nurses, diagnostics, epidemiologists, rehabilitators and psychologists [6, 7].

The use of psychological methods in cardiology and their gradual implementation were dealt with by: doc. Stanisław Siek), Henryka Ostrowska, Jan Tylka, Barbara Dębska, Józef Latoch and Marek Mordyński [6, 7].

The efforts of the team of prof. Askanas aimed at early rehabilitation of cardiac patients and quickly restoring their full fitness [6, 7].

The scientist's achievements have been noticed not only in Poland but also abroad, and are still used in modern cardiology [6, 7].

Psychological intervention in a cardiological patient is based on the patient's own work, which requires a lot of involvement in the process of change; conducted therapy by professionals, including interviews with the patient, regarding family structure, psychosocial factors [5].

The development of ischemic heart disease, as a model cardiological disease, is associated with deepening depression as well as stress, low level of support or low socioeconomic status [5].

It is necessary to remember how cardiological therapy of the patient affects his mental state. We can mention a number of psychopathological disorders, such as: disorders: consciousness, mood (manic, depressive), sleep, sometimes also psychotic - e.g. after using cardiological drugs [8].

PERSONALITY DETERMINANTS OCCURRING IN PATIENTS WITH CONGENITAL HEART DEFECTS

In psychology, the concept of type A personality is known. type A behaviour pattern, considered to be one of the causes of cardiovascular disease. This is one of the psychological risk factors of the above-mentioned group of somatic diseases. The creators of the theory are Friedman and Rosenman. Patients with this type of behaviour are ambitious, focused on success, achieving everything that is possible in the shortest possible time, often hostile, with excessive reactivity, they are often hostile to other people

regardless of the situation, as one of temperamental traits, expressiveness. Type A behaviour is most common in people with coronary artery disease and may be the cause of a heart attack [4].

However, the question is what personality traits are characterized by adults suffering from congenital heart disease? There are very few such studies.

Of course, not only psychological factors have an impact on the development of health-related illnesses, but also the lifestyle is of great importance here. These include: cigarette smoking, a rich diet, raising cholesterol levels, stress and inability to deal with it, lack of support from loved ones and the environment in which patients live and work [4].

The tasks that should be completed are primarily the health education of patients. Psychological help is needed not only because personality traits or other psychological factors are risk factors for cardiovascular disease, but also because the treatment and rehabilitation themselves are a source of stress [4].

There are known studies on the rehabilitation of patients after myocardial infarction. It is important to remember that the rehabilitation of a cardiac patient involves work in an interdisciplinary team: cardiologists, psychologists, and physiotherapists. It should also be remembered how important psychological assistance is to the patient before starting treatment, during hospital treatment, but also after leaving hospital. Psychological therapy is carried out in this case in order to minimize the negative effects of the disease, establish an attitude towards illness and health, solve family problems or professional problems [4].

However, the question arises: What personality traits are characteristic of adults suffering from a congenital heart defect? There are very few such studies. There are studies on the personality traits of children, adolescents suffering from congenital heart defects, but there is a lack of studies on the personality traits of adults and their impact on quality of life. There are known studies showing a lower level of extroversion (causing a worsening of emotional functioning) in people aged 15-20 years suffering from congenital heart defects, compared to healthy people. Patients were examined to determine the level of extraversion, diligence, agreeableness, openness and neuroticism. It was also shown that girls achieved high scores in conscientiousness, while boys achieved low scores in neuroticism; as well as the fact that sick youth are less socially and emotionally adapted than healthy youth. It has also been shown that a higher level of extraversion is a good predictor of a higher level of quality of life, better emotional and social functioning. Similarly with the obtained low level of neuroticism or a higher level of conscientiousness. It was also shown that patients could not cope with stress. Most importantly, the above research helps in predicting the quality of life of patients in the future [9].

Personality traits such as optimism or conscientiousness, openness to experience are "cardioprotective" to a large extent prevent the development of cardiovascular

diseases. Optimism is one of the positive personality traits, understood as a tendency to anticipate good experiences in the future, protecting against coronary heart disease, especially in the elderly. These patients also reported less pain after surgery. Conscientiousness is a predictor of longevity in healthy people. The same applies to openness to experience [10].

Due to the fact that the work is pioneering, research hypotheses have been adopted on the basis of the correlation between the occurrence of cardiovascular diseases and personality type A.

THE AIM

Objective: To show personality traits typical of patients with congenital heart defects.

The aim of the work is to resolve the issue of personality specifics, and thus the different characteristics of people who suffer from congenital heart defects. Therefore, the following questions should be answered: Is there a relationship between personality traits and the occurrence of a congenital heart defect? What personality traits are characteristic for patients with congenital heart defects?

Adopted hypotheses:

Personality traits in psychological terms of patients with congenital heart defects.

Patients with congenital heart disease are characterized by high extraversion and low anxiety.

Patients with congenital heart disease are characterized by high empathy and low psychoticism.

Patients with congenital heart defects are characterized by low impulsivity and low risk propensity.

Women with congenital heart disease are characterized by low psychoticism and high anxiety as a condition.

Men with congenital heart defects are characterized by high levels of neuroticism, high levels of lying and average level of empathy.

MATERIALS AND METHODS

The examined group are patients with congenital heart defects, adult men, adult women, and the research area is John Paul II Hospital In Cracow, The Clinical Department of Cardiac and Vascular Diseases with the Intensive Cardiac Supervision Subdivision, Institute of Cardiology, Collegium Medicum of the Jagiellonian University in Cracow, John Paul II Hospital. The study involved 50 adults, including 29 women and 21 men, undergoing surgery In John Paul II Hospital In Cracow in the field of heart defects such as ASD and PFO, in age groups 0-19 years, 20-34, 35-49, 50-64, 65-74, 75-89 and over 90 years, with the level of education: basic, vocational, secondary, incomplete higher, higher; inhabiting: village, city up to 40 thousand residents, a city with a population of 41-61 thousand, and a city with a population of 60 thousand; civil status: single, married, divorced, widow/widower, separated; being: students, unemployed persons, working persons, pensioners, retirees.

The research was carried out personally by psychologist Adrianna Skoczek. Psychometric analysis was performed by quantitative and qualitative interpretation of psychological tests along with statistical calculation using the Statistica 12 program.

USED METHODS

Psychological tests:

EPQ-R (S) - Hans J. Eysenck and Sybil G. Eysenck [2]; consisting of 48 questions, examines the level of neuroticism, extraversion, psychoticism, lies

IVE - Hans J. Eysenck and Sybil G. Eystenck [11] consists of 54 questions, examines impulsiveness, risk-taking, empathy

STAI C. D. Spielberger, R. L. Gorsuch, R. E. Lushene [12] - consisting of 40 questions, examines the level of anxiety as a state and as a trait

STATISTICAL ANALYSIS TOOLS

In the studies, qualitative and quantitative traits were assessed. The analysis of each of them has its own specificity, which consists in applying adequate statistical tools to comparisons. In order to characterize the structure of the variables studied, basic descriptive statistics were calculated in the form of position and variability measures. The verification of the normality of distributions of the analysed variables was carried out using the Shapiro-Wilk test. In order to determine the strength of the link between the variables, the vectors of the Spearman's rank correlation coefficients were calculated. Non-parametric Significance Test of Mann-Whitney U Differences was used as well as nonparametric analysis of Kurskall-Wallis variance and multiple comparison tests. The structure index was calculated for variables measured in rank and nominal scales. A significance level of 0.05 was assumed for all analyses. All analyses were performed using the Statistica v.12 package.

RESULTS

The analysis of the test results was started from the short characterization of the analysed sample due to the qualitative variables for which the structure indices were calculated.

42% of men and 58% of women participated in the study (Fig.1).

40% of respondents declared their secondary education, 26% vocational, 22% higher, and 6% basic and incomplete higher (Fig. 2).

50% of respondents declared a village as a residence, 24% a city over 61 thousand residents and 14% city to 41 thousand residents and 12% city from 41-61 thousand residents (Fig. 3).

46% of the female respondents were married, 30% of male respondents were married, 10% were in bachelor and 8% were maids, 4% were divorced and 2% were widows (Fig.4).

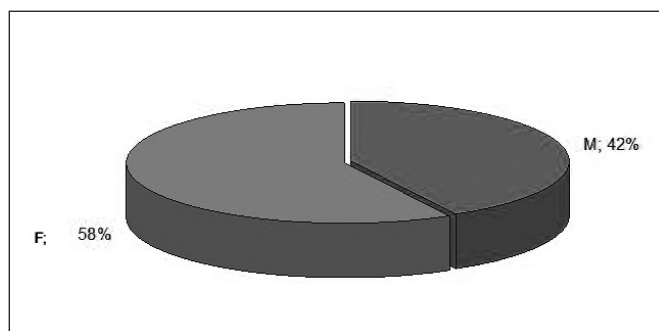


Fig. 1. Sex

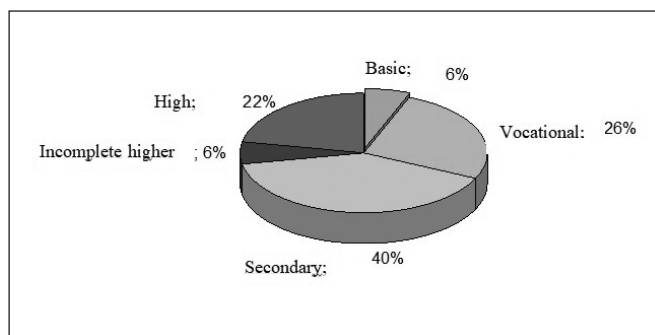


Fig. 2. Level of education

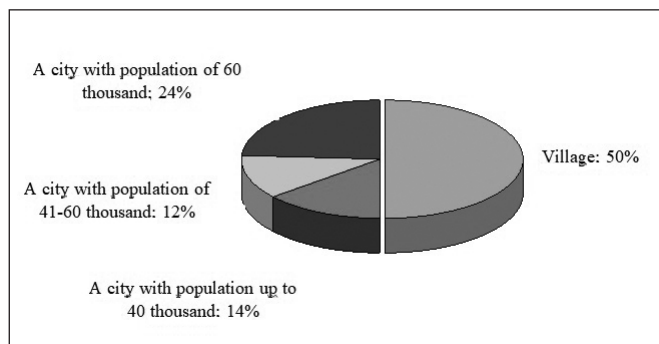


Fig. 3. Place of residence

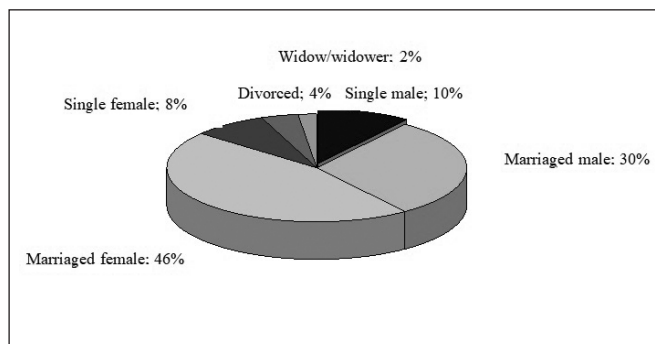


Fig. 4. Marital status

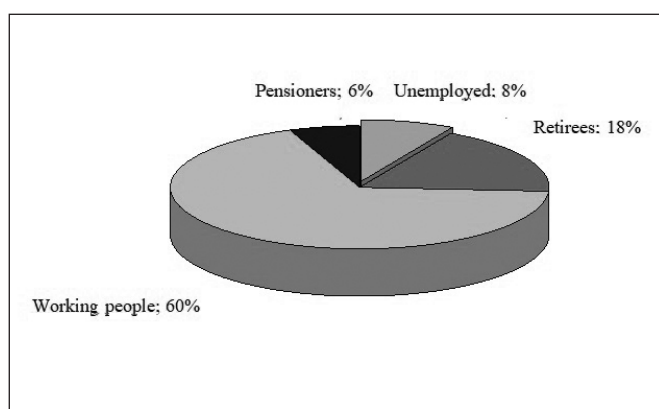


Fig. 5. Work

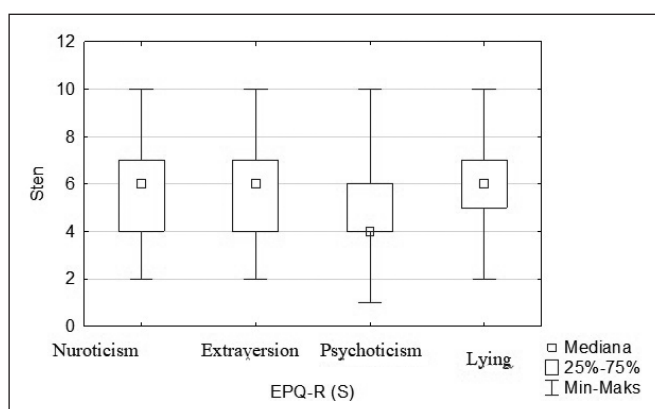


Fig. 6. Categorized box chart of EPQ-R(S) results obtained in the whole group.

68% of respondents were working people, 18% were pensioners and 8% were unemployed and 6% were retired (Fig. 5).

DESCRIPTIVE STATISTICS

The median age in the analyzed group is 47 years, the minimum age is 22 years and the maximum age is 68 years.

TEST RESULTS FOR THE ENTIRE SAMPLE

The analysis of the results allowed to state that the highest sten scores in the EPQ-R (S) test occurred in the neurotics median = 6, the extraversion median = 6 and the median

lie = 6 (mean results). The highest results in the IVE test occurred in the case of empirical median = 6.5 (high score) and in the STAI test the highest score occurred for anxiety as sten 5 (average score).

TEST RESULTS FOR MEN

The analysis of the results allowed to state that the highest sten scores in the EPQ-R (S) test occurred in the median = 6 (median results). The highest results in the IVE test occurred in the case of empirical median = 6 (average score) and in the STAI test the highest score occurred for anxiety as sten 6 (average score).

Table 1. Value p for multiple (double-sided) comparisons; Sten (Sheet6) Independent variable (grouping): EPQ-R (S)

Variable	Average	Median	Minimum	Maximum	Standard deviation	Coefficient of variation
age	46.28	47.00	22.00	68.00	12.48	26.96

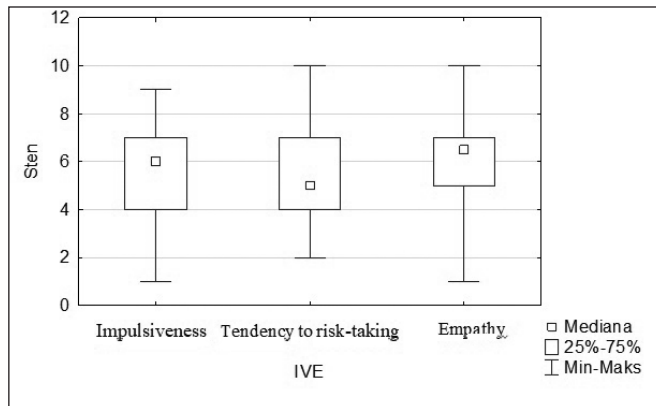


Fig. 7. Categorized box chart of IVE results obtained in the whole group.

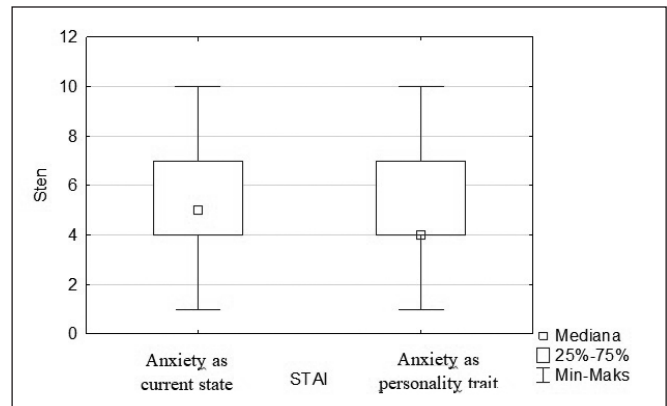


Fig. 8. Categorized box chart of STAI results obtained in the whole group.

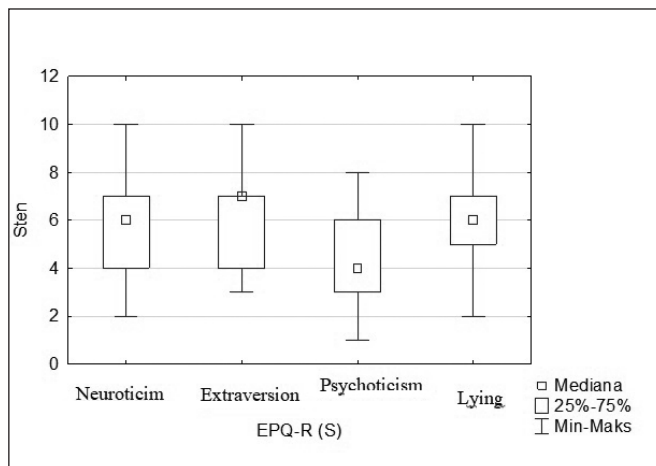


Fig. 9. Categorized box chart of EPQ-R(S) results obtained in the group of man.

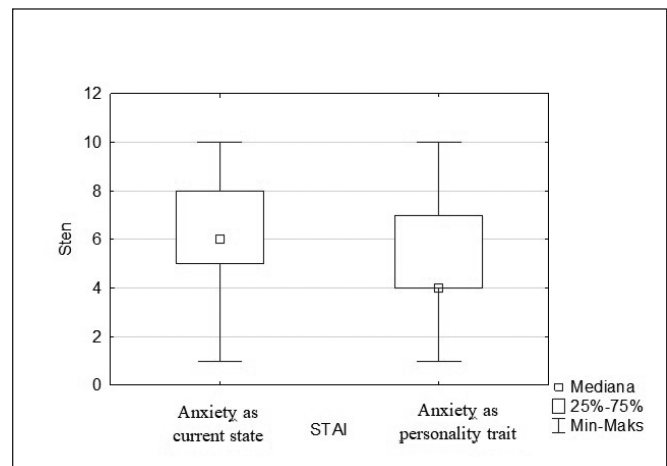


Fig. 10. Categorized box chart of EPQ-R(S) results obtained in the group of woman.

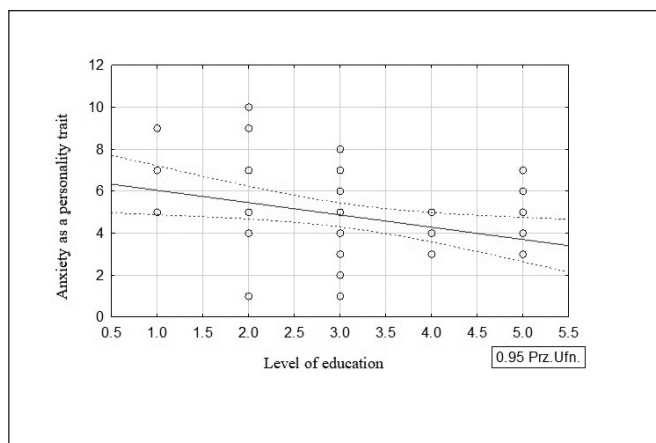


Fig. 11. Correlation of Spearman's rank order (level of education and anxiety as a trait). The correlation coefficients determined are significant with $p < .05000$.

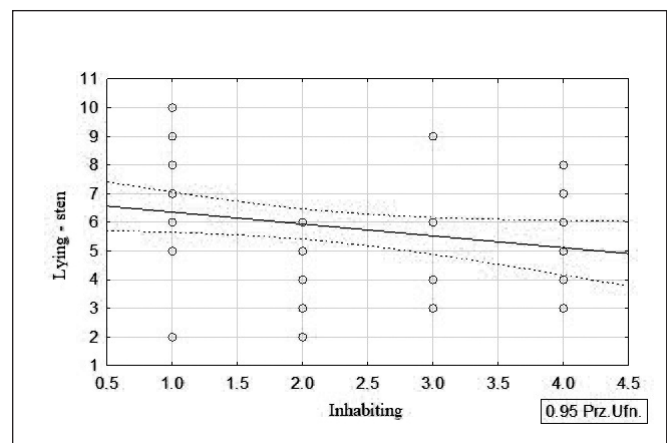


Fig. 12. Correlation of Spearman's rank order (inhabiting and lying trait). The correlation coefficients determined are significant with $p < .05000$.

TEST RESULTS FOR WOMEN

The analysis of the results allowed to state that the highest sten scores in the EPQ-R (S) test occurred in the extraversion median = 7 (high result). The highest results in the IVE test occurred in the case of empathy median = 7 (high result) and in the STAI test the highest score occurred for anxiety as a state and as a trait 6 (average score):

1. Neuroticism is clearly the strongest characteristic of people with congenital heart defects.
2. Extraversion is characteristic of people suffering from congenital heart disease.
3. Psychotism is not characteristic of people with congenital heart defects.
4. The lie is characteristic of people with congenital heart defects.

Subsequent analyses were aimed at verifying whether there are significant differences between the results converted into stents for individual EPQ-R (S), IVE and STAI tests. For this, Anova Kruskal-Wallis and the Mann-Whitney U test for the STAI test were used (Tab. 1).

Kruskal-Wallis test: $H(3, N = 200) = 11.63656$ $p = 0.0087$ (Fig. 6).

The analysis provided the basis for finding significant differences $H(3, N = 200) = 11.63$ $p = 0.0087$. In the analyzed group extraversion was significantly higher than psychotism $p = 0.046$ and the results of the lie were statistically significantly higher than psychotism.

There were no significant differences between item values in the IVE test: $H(2, N = 150) = 4.28$; $p = 0.12$ (Fig. 7).

There were no significant differences between item values in the STAI test: $p = 0.09$ (Fig. 8-9).

The same analyses were carried out by women and men:

1. Empathy is clearly the strongest characteristic of women with congenital heart defects.
2. Neuroticism is characteristic of women with congenital heart defects.

There were no significant differences in the case of women between items in the EPQ-R (S) test. Kruskal-Wallis test: $H(3, N = 116) = 5.52$ $p = 0.14$ (Fig. 10):

1. A high level of psychotism is characteristic of men suffering from congenital heart disease.
2. Extraversion is not a characteristic feature for men with congenital heart defects.

The analysis provided the basis for finding significant differences $H(3, N = 84) = 8.80$; $p = 0.032$. In the analyzed group extraversion for men was significantly higher than psychotism $p = 0.027$ and the results of the lie were statistically significantly higher than psychotism:

1. A lie is characteristic of women with congenital heart defects.
2. Impulsivity is not a characteristic feature of women suffering from congenital heart disease.

There were no significant differences between the items' values for women in the IVE test: $H(2, N = 87) = 2.31$ $p = 0.31$.

Inclination to risk is characteristic for men with congenital heart disease.

There were no significant differences between the items' values for men in the IVE test: $H(2, N = 63) = 1.85$ $p = 0.40$

Anxiety as a condition is characteristic of women suffering from congenital heart disease.

In the case of women, the results of the variable anxiety as a state were statistically significantly higher than the results of anxiety as a trait $p = 0.032$.

1. Anxiety as a trait is not a characteristic feature for men with congenital heart defects.

In men, there were no significant differences between the results of anxiety variables as a state and anxiety as a trait of > 0.05 .

Subsequent analyzes were aimed at verifying whether gender significantly differentiates the results of EPQ-R (S), IVE and STAI.

The analysis of the results did not give grounds for stating that the sex significantly differentiates the results of EPQ-R (S), IVE and STAI tests $p > 0.05$.

Another analysis aimed at verifying whether the age is significantly statistically related to the results of tests carried out for this purpose, the Spearman rank correlation coefficient was applied.

There were no statistically significant associations between age and results of the analyzed tests $p > 0.05$.

Another analysis aimed at verifying whether education is significantly statistically related to the results of tests carried out for this purpose, the Spearman's rank correlation coefficient was applied.

Correlation of Spearman's rank order. The correlation coefficients determined are significant with $p < .05000$

The analysis allowed to find a statistically significant negative average correlation between the variables Education & Anxiety as a trait - sten $R = -0.39$; $p = 0.005$. Along with the increase in the level of education, the level of anxiety as a trait decreases (Fig. 11).

Another analysis aimed at verifying whether education is significantly statistically related to the results of tests carried out for this purpose, the Spearman's rank correlation coefficient was applied.

Correlation of Spearman's rank order. The correlation coefficients determined are significant with $p < .05000$

The analysis made it possible to find a statistically significant negative average correlation between the variables Place of location & Lie - sten $R = -0.33$; $p = 0.02$. With the increase in the place of residence, the level of the variable lie decreased (Fig. 12).

Another analysis aimed to verify whether marital status significantly differentiates the analyzed results of EPQ-R (S), IVE and STAI tests

Analysis of the results did not give grounds for stating that marital status significantly differentiates the results of the analyzed tests by $p > 0.05$.

The next analysis was to verify whether the work significantly differentiates the analyzed results of EPQ-R (S), IVE and STAI tests

The analysis of the results did not give grounds for stating that the work significantly differentiates the results of the analyzed tests by $p > 0.05$.

DISCUSSION

The analysis of the research results allowed to state that the highest sten results in the EPQ-R (S) test occurred in neu-

roticism, extraversion and a lie. The highest results in the IVE test occurred in the case of empathy, while in the STAI test the highest results occurred for anxiety as a condition.

In the case of men, they obtained the highest sten scores in the EPQ-R (S) test on the lie scale. The highest results in the IVE test occurred in the case of empathy, while in the STAI test the highest results occurred for anxiety as a condition.

In the case of women, they obtained the highest results in the EPQ-R (S) test on the extraversion scale. The highest results in the IVE test occurred in the case of empathy, and in the case of the STAI test the highest results occurred for anxiety as a condition and as a trait:

1. Neuroticism is clearly the strongest characteristic of people with congenital heart disease.
2. Extraversion is characteristic of people suffering from a congenital heart disease.
3. Psychoticism is not characteristic of people with congenital heart disease.
4. Lying is characteristic of people with congenital heart disease.
5. Empathy is clearly the strongest characteristic of women and men with congenital heart disease.
6. Neuroticism is characteristic of women with congenital heart disease.
7. A high level of psychoticism is characteristic of men suffering from a congenital heart disease.
8. Extraversion is not a characteristic feature for men with congenital heart disease.
9. Lying is characteristic of women with congenital heart disease.
10. Impulsiveness is not a characteristic feature of women suffering from congenital heart disease.
11. Anxiety as a condition is characteristic of women suffering from a congenital heart disease.
12. Anxiety as a trait is not a characteristic feature of men with congenital heart disease.

The analysis gave rise to significant differences. In the analyzed group, extraversion for men was significantly higher than psychoticism and the results of lies were statistically significantly higher than psychoticism. There were no significant differences between the values of items for women in the IVE test. Tendency to risk is characteristic for men with congenital heart disease. There were no significant differences between the values of items for men in the IVE test.

In men, no significant differences were found between the results of the variables anxiety as a condition and anxiety as a trait $p > 0.05$. Analysis of the results did not give grounds to conclude that gender significantly differentiates the results of the EPQ-R (S), IVE and STAI tests $p > 0.05$. There were no statistically significant correlations between age and the results of the analyzed tests $p > 0.05$. As the level of education increases, the level of anxiety as a feature decreases. Place of residence influenced the level of the variable lie. Analysis of the results did not give grounds to state that marital status significantly differentiates the results of the analyzed tests $p > 0.05$. The analysis of the

results did not give rise to the conclusion that the work significantly differentiates the results of the analyzed tests $p > 0.05$.

CONCLUSIONS

Research on the relationship between congenital heart defects and personality traits of people suffering from congenital heart defects are very important in the everyday practice of every doctor. The well-being of a patient with a congenital heart disease requires interdisciplinary care consisting of specialists from various fields, such as doctors, nurses, midwives, physical therapists, psychologists, and nutritionists [5].

Due to scarce scientific data on this issue, and mainly concerning ischemic myocardial disease, as a model unit in cardiology, activities that could lead to the establishment of the aforementioned relationship should be intensified. This subject is dealt with in psychocardiology focused on: health promotion, psychoprophylaxis, facilitating the prevention, early detection and treatment of cardiological diseases, alleviating the consequences of diagnosis, therapy of cardiological diseases. The activities of psychocardologists are also directed at the education of members of a multidisciplinary, cooperating therapeutic team; conducting scientific research in the field of psychology, sociology and medicine, because the results of the above-mentioned individual studies can contribute to the emergence of effective methods in the fight against cardiovascular diseases [5].

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Conflict of interest

Authors declare no conflict of interest

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