

SOFIA UNIVERSITY “ST. KLIMENT OHRIDSKI”
FACULTY OF PHILOSOPHY
DEPARTMENT “SOCIAL, ORGANIZATIONAL, CLINICAL AND
EDUCATIONAL PSYCHOLOGY”

Dissertation abstract

Doctoral dissertation title:

„Personality profiles of patients with cardiological and cardiosurgical interventions“

The documentation for an application for a habilitation proceedings
for doctor: 3.2. Psychology (Clinical Psychology)

PhD candidate:

Violeta Kamenova Azis

Dissertation supervisor:

Prof. Dr. Sc. Rumyana Krumova-Pesheva

Sofia, 2022

The dissertation is 162 pages long. Consists of introduction, three main chapters, conclusion, references and annex. The data is illustrated in 29 tables and 15 graphs.

The sources cited in the dissertation are 220, 31 in Bulgarian and 189 in foreign languages (English - 179, French - 8 and German - 2); Internet sources - 9.

Scientific Jury:

1. Full Prof., Vanya Lukova Matanova, PhD, DSc, Sofia University (reviewer)
2. Prof. DSc Plamen Petrov Kalchev, Sofia University
3. Prof. Dr. Krasimira Petrova Koleva-Mineva, University of Veliko Tarnovo
4. Assoc. Prof. Pavlina Petkova Petkova, Ph.D., Varna Free University (reviewer)
5. Assoc. Prof. Krasimir Krustev Ivanov, Ph.D., Varna Free University

The dissertation defense will be held online on 20.04.2022, 13.00 o'clock at an open session of the Scientific Jury.

The documents for the defense are available in office 60, Psychology department, Faculty of Philosophy, 3rd floor, South wing, Sofia University "St Kliment Ohridski", as well as at the site of the University – www.uni-sofia.bg.

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Introduction

Cardiac and cardiosurgical interventions are aimed at the health of a large number of patients. They are vital for survival and optimizing health status. Although patients are aware of the irrevocability of the interventions, it occurs as a traumatic event and responds with intense anxiety and tension in the preoperative period. Characteristic of the postoperative period are episodes of prolonged depression.

Patients undergoing cardiological and cardiosurgical interventions undergo a number of hard to tolerate psycho-emotional phases. The ambiguity, the unknown outcome of the intervention and the pain from the procedures intensify the feelings of anxiety and confusion before and after the treatment. The psychological consulting supports the recovery of the patients and provides significant care for emotional balance.

Patients with heart disease awaiting cardiac intervention or surgery fear of both physical and mental annihilation and disintegration. As cardiac function is fundamental, patients experience intense vital endangerment. The ability to symbolize and metaphorize draw back and patients show a response by the type of operatory thinking (*pensée opératoire*). Characteristic of their mental functioning in the preoperative period are the phenomena of alexithymia, where the facts are directly causal, with no psychological or mental processing (Krumova-Pesheva, 2017). Patients show difficulty differentiating and recognizing their experiences. These states are typical in terms of theoretical statements about psychosomatic personality. The associative abilities are reduced and the patient can hardly organize within the time limits of the past, present and future. As a psychological defense mechanism, the projection of future events is impossible.

Sublimation helps to reduce tension, anxiety and pain, but in that moment this mechanism is ineffective as well. In general, all response methods are found to be blocked and ineffective for patients awaiting cardiac surgery (Krumova-Pesheva, 2017).

The purpose of the dissertation is to study and define the individual characteristics of patients with heart disease. It is these characteristics that could be a prerequisite for the development of heart disease that requires surgery. The identification and, if possible, reduction of psychological risk factors has an important role in the prevention and rehabilitation of patients. For the purpose of the study were used - Self-assessment scale for alexithymia from Toronto (TAS-20; Toronto Alexithymia Scale-20), (Bagby et al., 1994a, b), in Bulgaria the scale is standardized by Popov et al. (2016); Index for anxiety sensitivity (ASI; Anxiety Sensitivity Index), (Reiss et al., 1986), the questionnaire is currently in the process of adaptation for use

in Bulgaria by the Bulgarian Institute of Addiction; and The Personality Inventory for DSM-5: (Short 100 items Version of Personality Inventory for DSM-5, PID-5-SF, Maples et al., 2015), translated and adapted for Bulgaria by Kalchev and Koleva (2019).

In order to achieve the objectives of the research, the dissertation is organized in three main parts.

The first part of the dissertation focuses on theoretical approaches for understanding the relationship between personality and disease. The theories of psychosomatics, the views of psychoanalytic psychosomatics, precisely the Paris Psychosomatic School, as well as the theories of the personality of psychocardiology are considered. The mechanisms linking personality to the onset and progression of coronary heart disease are described; followed by the medical explanation for the occurrence and progression of cardiac diseases; types of cardiac diseases and prognosis. The last part is devoted to Covid-19 and the modern interpretations of the impact of the virus and the psychological consequences of the pandemic on heart disease.

The second chapter describes the purpose, hypotheses and objectives, as well as the methodology and design of the study. Summary data on the sample of respondents is included, as well as the questionnaires used. The procedure of the research is described.

The third chapter includes the results of the research presented in tables and graphs; followed by analysis and discussion of the data, connection with the hypotheses and with the theoretical formulation. The limitations of the study are presented, as well as future opportunities and recommendations.

In the last part are included conclusions, contributions from the research, publications related to the dissertation, references and appendix (the questionnaires used for the purpose of the study).

Chapter I. Theoretical approach

1.1. Psychosomatic theories

The first chapter of the dissertation consists of the concepts for the relationship between personality and the specific development of the disease. A historical overview of psychosomatic theories has been made, divided into four main groups according to the understanding of the symptoms of the disease:

1. Theories of the specific personality, according to which certain personality traits are predisposition to a disease.
2. Theories of the specific model of response, according to which diverse emotional patterns and reactions of stress are transmitted transgenerationally through different organs. Each person has a specific pattern of stress response, with some being dominated by gastrointestinal reactions, while others by cardiovascular symptoms.
3. Theories of specific conflict, according to which the ineffective resolution of internal unconscious conflict can become a symptom.
4. Theories of non-specificity where the basis of psychosomatic reactions and diseases is the state of alexithymia - the inability to recognize and express feelings.

Central to theories of nonspecificity is the theory of alexithymia. Sifneos is considered to be the first to define the term "alexithymia" literally - "no ability to read emotional life" (Sifneos, 1994). In this concept pivotal is the understanding of the influence of psychological factors, namely the inability to express emotions, feelings and recognize them in others. This condition is thought to be the result of a significant psycho-emotional deficit. Such patients are extremely literal; experience operatory thinking (*pensée opératoire*); reduced or no capacity for mentalization. They are incapable of symbolization and are rarely in contact with their inner world.

1.2. Paris Psychosomatic School

This section describes the work of the guardians of the Psychosomatic School of Paris (The Paris Institute of Psychosomatics- IPSO) Pierre Marty, Michel de M'Uzan, Christian David and Michel Fain, as well as some of the contemporary followers of their concepts - Marilia Aisenstein, Claude Smadja and Catalina Bronstein.

In order to understand the concepts of IPSO and to distinguish it from other schools, it is important to appreciate the importance of the role of the economic dimension of psychic life. For Pierre Marty, instinct becomes drive when it comes to representations. Instincts support/sustain the psychosomatic economy. This view of Marty is related to the idea of good or poor mentalization, which determines whether somatizations are reversible or not. Marty

considers the existence of both life and death instincts, but unlike the former, which has an autonomous existence, the instinct for death operates after the instinct for life fails (Bronstein, 2011).

1.3. Constructs in psychoanalytic psychosomatics

The constructs in psychoanalytic psychosomatics are considered - Regression, Somatization via regression, Irregularity of mental functioning, Somatization by instinctual diffusion, Essential depression, Projective reduplication, Operatory thinking / operatory life / functioning (pensée opératoire), The Ideal Ego, Mentalization and their meaning for psychological functioning and personality organization of the individual.

1.4. Psychocardiology. Concept of the personality-heart disease relationship.

This part includes a brief history of the psychocardiology, as a contemporary method for understanding the relationship between the psyché and the "heart". The roots of psychocardiology date back to the 1920s with the research on psychosocial factors that can endanger heart health. Concepts of the relationship between personality traits and the occurrence and progression of cardiovascular disease, in particular CHD (coronary heart disease) are discussed. The Type A personality construct (Friedman, Howard & Booth-Kewley, 1987), with features of anger and hostility (Friedman & Rosenman, 1959) largely associated with predisposition to cardiovascular disease is described (Chida & Steptoe, 2009; Myrtek, 2001; Delunas, 1996). The analysis of the components of type A suggests that hostility in the individual is the main cause of the disease.

Type D personality, or "distress personality," is a term first defined and proposed by Denollet in 2000 (Denollet, 2000). Researchers note that individuals with cardiovascular disease often experience emotional and interpersonal difficulties. Characteristics of type D consist of two stable personality structures - negative affect (NA) and social inhibition (SI), which are related to neuroticism and introversion (Denollet, 2005).

Marin & Miller (2013) investigated predisposition to interpersonal sensitivity (IS) as a potential risk factor for deteriorating health and developing CHD. IS is defined as "a stable character trait characterized by constant concern about negative social evaluation" (Marin & Miller, 2013). There is currently no psychometric tool exclusively developed to measure IS, but Marin & Miller argue that evidence of IS can be found in studies examining concepts such as susceptibility to rejection, social anxiety and avoidance, social and psychological barriers, shyness, obedience, introversion and Type D.

1.5. Mechanisms linking personality to coronary heart disease (CHD)

There are five models described by Smith et al. (2004), which associate personality with the emergence of CHD:

- model of psychophysiological reactivity
- model of psycho-social vulnerability
- transactional model
- model of health behavior
- model of constitutional vulnerability

One Bulgarian (Papancheva, 2011) and several world studies linking the personality with the occurrence and progression of heart disease are synthesized in the study.

1.6. Medical concept for cardiovascular disease development

Cardiovascular diseases are the leading cause of morbidity and mortality in Bulgaria and worldwide (WHO, 2020). The main factor for their occurrence, development and complications is atherosclerosis. Plaques composed of cholesterol, blood cells, calcium and other substances are formed in the vessels that supply vital organs as a result of the atherosclerotic process. The development of atherosclerosis begins in early childhood. There are various theories about the causes of atherosclerotic plaques. The most common theories are the endothelial destruction of blood vessels and the role of LDL cholesterol oxidative stress on the vascular wall. Atherosclerosis is a systemic disease that affects all the arteries in the human body. In the text below types of heart disease and some typical symptoms are listed.

1.6.1. Cardiac surgeries and cardiac interventions

A brief presentation of the medical procedures implemented at the University Hospital Lozenets - cardiological interventions and cardiac surgeries.

1.7. Covid-19, stress and cardiovascular disease (CVD). Psychological aspects.

Concerns related to Covid-19 lead to the avoidance, withdrawal and non-compliance with health recommendations for the prophylaxis and prevention of CVD. Due to the comorbid distribution of Covid-19 and CVD, patients have to recover from two diseases in parallel, leading to complications for them, for significant others and for the healthcare professionals.

Chapter II. Empirical research organization

The suggested assumptions about the personality traits and capacities of patients who have undergone invasive cardiological and cardiac interventions, compared to the general population are based on the theoretical review. This chapter of the dissertation presents the research method that aims to collect data to support or refute the hypotheses.

2.1. Purpose of the dissertation

The purpose of the study is to examine the levels of some clinical markers and maladaptive personality traits in patients with invasive cardiological and cardiosurgical interventions. To compare the patients to a control group of individuals who have not undergone such interventions, and to collate the levels of the clinical markers in the period before and after the outbreak of the Covid-19 pandemic, which was linked to various measures to control the spread of the virus, both in hospital and outside. In addition, the study aims to identify specific personality traits that could be used as markers of predisposition for CVD.

2.2. Research tasks

The objectives of this study are:

- to measure the levels of some clinical markers and maladaptive personality traits in patients with invasive cardiological and cardiosurgical interventions;
- to compare the levels of measured clinical markers and maladaptive personality traits between patients with invasive cardiac interventions, cardiac surgeries and non-clinical group;
- to compare the levels of measured clinical markers and maladaptive personality traits in patients with invasive cardiac interventions and cardiac surgeries before and after the beginning of Covid-19 pandemic;

2.3. Research hypotheses

Based on the considered theoretical framework and in accordance with the goals and objectives of the study, the following hypotheses are obtained:

1. It is assumed that patients with invasive cardiac interventions and cardiac surgeries show certain personality traits that are somewhat predisposition to specific heart diseases.
2. Patients who underwent cardiac interventions and/or surgeries show higher levels of alexithymia and its two factors compared to subjects in the control group.
3. Patients who underwent cardiac interventions and/or surgeries show higher levels of anxiety sensitivity compared to subjects in the control group.

4. Patients who underwent invasive cardiac interventions and/or cardiac surgeries are expected to have higher levels of the following facets than those in the control group:

- A. Emotional lability
- B. Depressivity
- C. Withdrawal
- D. Intimacy avoidance

5. Individuals surveyed between July 2020 and September 2021 are expected to show significantly higher levels of Detachment and Psychoticism than those surveyed earlier due to the Covid-19 pandemic and the measures related.

2.4. Respondents

A total of 149 people took part in the survey. During responses encoding appeared that 7 of them gave non-systematic answers, so these were removed from the database. The statistical processing of the others was performed after analysis of asymmetry and data excess (more details are presented in Chapter III), which identified weak asymmetry in several variables. Therefore, calculating the standardized Z-values at variables with asymmetric distribution, the answers of 7 more respondents were removed from the database. Thus, the final number of participants data presented in this study is 135.

Of all subjects, 48 underwent invasive cardiac intervention, another 41 underwent cardiac surgery, and the remaining 46 were part of the control group. A total of 65 participants were men and 69 - women, one respondent failed to indicate their gender. The majority of participants have completed the questionnaires after July 2020 - a total of 103 participants; the remaining 32 were included in the survey before July 2020.

The information about the sample is more valuable compared to the three separate studied groups. Of the patients who underwent invasive cardiac interventions, 25 were men, and 23 - women. Their average age is 56.79 (SD = 9.73), with the youngest participant being 35 years old and the oldest being 82 years old. A total of 16 participants in this group answered the questionnaires before July 2020, and the remaining 32 joined the study after July 2020.

From the group of patients who underwent invasive cardiac interventions, 17 participants were male, 23 - female, and one participant failed to indicate their gender and age. The mean age of the participants was 69.8 years (SD = 6.17), with the youngest participant being 52 years old and the oldest being 80. Although participants generally belong to the same age group like the cardiological patients, the mean shows that cardiac surgery patients are generally older. Of

these, 17 respondents gave their answers before July 2020, and the remaining 23 after that period.

Among the subjects in the control group, 23 were men and 23 were women. Their average age was 48.46 years (SD = 5.42), with the youngest participant at 35 years and the oldest - at 56. Again, there is an age difference between the groups - the control subjects are the youngest. All of them took part in the study in 2021.

2.5. Procedure

The study was conducted during the period from 2019 to 2021, including, at Lozenets University Hospital. Patients of the Cardiology Clinic and the Cardiac Surgery Clinic participate on a voluntary basis and are informed that their data will be used for scientific purposes and remain completely anonymous. Patients who agreed to participate fill in the questionnaires on paper.

The participants in the control group were gathered outside the hospital and their participation was also voluntary and anonymous. They are informed that the data are collected for scientific purposes only and will not be considered individually. Those who agreed to participate fill in the questionnaires on paper.

2.6. Methods and methodology

The empirical study presented in this paper is based on intergroup quasi-experimental research design - the levels of the studied variables were measured by standardized quantitative instruments both in a clinical sample of patients who underwent invasive cardiac interventions or cardiac surgeries as well as in a group of individuals that did not have any similar interventions.

The subjects were divided into three groups according to the levels of the independent (or grouping) variable (presence of invasive interventions):

1. Patients who underwent invasive cardiac intervention;
2. Patients who have undergone cardiac surgery;
3. Control group of individuals who have not undergone invasive cardiac intervention and/or cardiac surgery.

The dependent variables measured and levels compared for the three groups of subjects are:

1. Alexithymia;
2. Anxiety sensitivity;
3. Negative affect (includes anxiety; emotional lability; separation insecurity);

4. Detachment (includes anhedonia; intimacy avoidance; withdrawal);
5. Antagonism (includes deceitfulness; grandiosity; manipulativeness);
6. Disinhibition (includes distractibility; impulsivity; irresponsibility);
7. Psychoticism (includes eccentricity; perceptual dysregulation; unusual beliefs and experiences).
8. Additional maladaptive personality traits (Hostility; Perseveration; Lack of affect control; Submissiveness; Depressivity; Suspiciousness; Attention seeking; Callousness; Rigid perfectionism; Risk-taking).

2.7. Instrumentarium

This chapter consists of descriptions and data on the factor structure and psychometric qualities of the questionnaires used. For the purposes of the study, well-established instruments were selected, which are widely used in literature and practice on a global scale, but are adapted and standardized for use among the Bulgarian population - Toronto Alexithymia Scale (TAS-20; Toronto Alexithymia Scale-20)., (Bagby et al., 1994a, b), in Bulgaria the scale is standardized by Popov et al. (2016), Anxiety Sensitivity Index (ASI; Anxiety Sensitivity Index), (Reiss et al., 1986), currently the questionnaire is in the process of adaptation for use in Bulgaria by the Bulgarian Institute of Addictions; and Personality Inventory for DSM-5 (Short 100 items Version of Personality Inventory for DSM-5, PID-5-SF, Maples et al., 2015) translated and adapted for Bulgaria by Kalchev & Koleva (2019).

Chapter III: Data analysis and interpretation of the results of the empirical study

3.1. Results of the empirical research

This chapter consists of the descriptive statistics of the three groups of respondents for each variable of the three questionnaires. Information about the outliers removed from the groups is given.

Cardiac patients

In the group of patients who underwent invasive cardiac interventions, descriptive statistics showed a slight asymmetry on the scales Anxiety sensitivity, Depressivity, Cognitive and Perceptual Regulation, Stubbornness and Irresponsibility. Therefore, the standardized Z-values for these variables were calculated and larger than three units were removed. A minimum number of outliers has been removed, as the group of subjects is expected to show specific personality traits that do not correspond to the normal distribution - asymmetry in some of the variables is an expected result. In order to keep reliable data that provide information about the

specifics of cardiac patients, only outliers with an unusual result for the whole group were removed. In this case, these are the data of one subject with an unusually high score on the Depressivity scale, in which case a clinical manifestation of depression may distort the results, and the data of one subject with an unusually high score on the Irresponsibility scale. **Table 7** presents the descriptive statistics for the group after removing the outliers in the Anxiety sensitivity, Alexithymia and five domains of the DSM-5 personality questionnaire; **Table 8** also provides detailed descriptive statistics for all PID-5 domains.

Table 7. Descriptive statistics on anxiety sensitivity, alexithymia, and the five PID-5 domains of patients undergoing cardiac interventions

	Mean	SD	Min.	Max.	Asymmetry	Excess
Anxiety sensitivity	36,08	9,655	21	67	1,165	1,851
Difficulties identifying feelings	28,48	9,344	13	48	0,444	-0,644
Externally oriented thinking	12,38	2,994	5	21	0,206	1,07
Alexithymia	49,81	10,634	21	74	0,409	0,745
Negative affect	39,25	11,736	12	67	0,267	-0,002
Detachment	17,56	6,098	8	34	0,782	0,196
Psychoticism	8,94	6,799	0	26	0,909	0,059
Antagonism	20,06	9,436	2	44	0,544	-0,02
Disinhibition	11,69	6,141	0	25	0,145	-0,488

Table 7 shows that most variables are almost symmetrically distributed and without undue excess. Only on the scale of Anxiety sensitivity the respondents show a tendency for rather low results:



Figure 1. Frequency distribution of responses of patients undergoing cardiac intervention on Anxiety sensitivity scale.

It is possible that Anxiety sensitivity is one of the dimensions by which patients have certain specifics.

Table 8. Descriptive statistics for all PID-5 facets

	Mean	SD	Min.	Max.	Asymmetry	Excess
Anxiety	5,48	3,142	0	12	0,244	-0,556
Emotional lability	5,25	2,283	0	10	0,215	-0,091

Hostility	5	2,585	0	10	0,231	-0,666
Perseveration	4,58	2,592	0	10	0,322	-0,388
Separation insecurity	5,25	3,199	0	11	0,015	-0,971
Suspiciousness	5,27	2,819	1	11	0,205	-1,024
Submissiveness	3,52	2,492	0	11	0,611	0,569
Rigid Perfectionism	4,9	2,897	0	12	0,234	-0,25
Anhedonia	2,04	1,957	0	8	0,9	0,414
Depressivity	1,31	1,904	0	8	1,693	2,531
Intimacy avoidance	2,98	2,245	0	10	0,945	1,443
Restricted affectivity	8,12	2,506	0	12	-0,926	1,281
Withdrawal	3,1	2,495	0	9	0,451	-0,873
Eccentricity	4,25	3,021	0	11	0,639	-0,184

Perceptual and cognitive Dysregulation	1,65	2,207	0	8	1,388	1,01
Unusual Beliefs & Experiences	3,04	2,851	0	11	0,963	0,219
Attention Seeking	4,21	2,633	0	11	0,275	-0,133
Callousness	1,67	2,066	0	8	1,451	1,271
Deceitfulness	2,15	2,124	0	7	0,983	-0,123
Grandiosity	4,37	2,367	0	10	0,555	-0,145
Manipulativeness	3,5	2,164	0	9	0,71	0,474
Risk taking	4,17	2,644	0	12	0,568	0,51
Distractibility	4,88	3,16	0	12	0,487	-0,479
Impulsivity	4,88	3,285	0	12	0,408	-0,841
Irresponsibility	1,94	1,706	0	7	0,933	0,65

Cardiac surgery patients

In the group of patients who underwent cardiac surgery, descriptive statistics showed a slight asymmetry on the scales Anxiety Sensitivity, Suspiciousness, Anhedonia, Depressivity, Withdrawal, Perceptual and Cognitive Dysregulation, Unusual Beliefs and Experiences, Psychoticism, Callousness, Deceitfulness, Antagonism. Therefore, the standardized Z-values for these variables were calculated and larger than three units were removed. Again, a minimum number of outliers has been removed in order keep reliable data that provide information about the specifics of cardiac surgery patients. In this case, these are the data of one respondent with an unusually high score on the Anhedonia scale, one person with an unusually high score on the Depressivity scale and one with an unusually high score on the Withdrawal scale. **Table 10** presents the descriptive statistics for the group after removing the outliers in the Anxiety sensitivity, Alexithymia and five domains of the DSM-5 personality questionnaire.

Table 10. Descriptive statistics on Anxiety sensitivity, Alexithymia, and the five PID-5 domains of patients undergoing cardiac surgery

	Mean	SD	Min.	Max.	Asymmetry	Excess
Anxiety sensitivity	36,46	11,559	19	70	1,109	1,683
Difficulties identifying feelings	27,61	8,769	13	52	0,287	0,166
Externally oriented thinking	12,24	2,447	7	17	-0,416	-0,218

Alexythimia	49	10,519	29	82	0,585	1,239
Negative affect	36,51	12,55	14	64	-0,057	-0,409
Detachment	16,37	5,389	8	32	0,692	0,293
Psychoticism	8	6,376	0	26	0,984	0,817
Antagonism	18,44	8,643	2	38	0,137	-0,594
Disinhibition	9,83	5,244	0	20	0	-0,65

After excluding the outliers from the group of patients with cardiac surgery only a slight positive asymmetry on the scale Anxiety sensitivity was shown:



Figure 5. Frequency distribution of responses of patients who underwent cardiac surgery on the Anxiety sensitivity scale

Control group of respondents

In the control group descriptive statistics show a slight asymmetry on the scales Anxiety Sensitivity, Depressivity, Withdrawal, Perceptual and Cognitive Dysregulation, Unusual Beliefs and Experiences, Psychoticism, Rigid Perfectionism, Deceitfulness, Manipulativeness and Irresponsibility. Therefore, the standardized Z-values for these variables were calculated and larger than three were removed. Again, a minimum number of outliers has been removed to prevent valuable data from being excluded. Only the answers of one respondent with an unusually high score for Anxiety sensitivity and one with an unusually high score on the Depressivity scale were removed from the sample. **Table 13** presents the descriptive statistics for the group after removing the outliers in the Anxiety sensitivity, Alexithymia and five domains of the DSM-5 personality questionnaire.

Table 13. Descriptive statistics for Anxiety sensitivity, Alexithymia and the five PID-5 domains of the Control group

	Mean	SD	Min.	Max.	Asymmetry	Excess
Anxiety sensitivity	32,67	7,037	20	50	0,119	-0,24
Difficulties identifying feelings	23,93	10,73	12	48	0,759	-0,339
Externally oriented thinking	9,57	2,81	5	15	0,142	-0,805

Alexythimia	40,11	12,646	20	64	0,283	-0,956
Negative affectivity	37,52	10,842	12	67	0,567	0,729
Detachment	16,37	5,074	8	32	0,847	0,814
Psychoticism	8,28	5,909	1	27	1,302	2,215
Antagonism	18,74	8,328	2	37	0,328	-0,013
Disinhibition	10,83	5,953	0	29	0,702	1,119

Table 13 shows that after removing the outliers, a positive asymmetry on the Psychoticism scale is still observed - the control group tend to show rather low results in this domain.

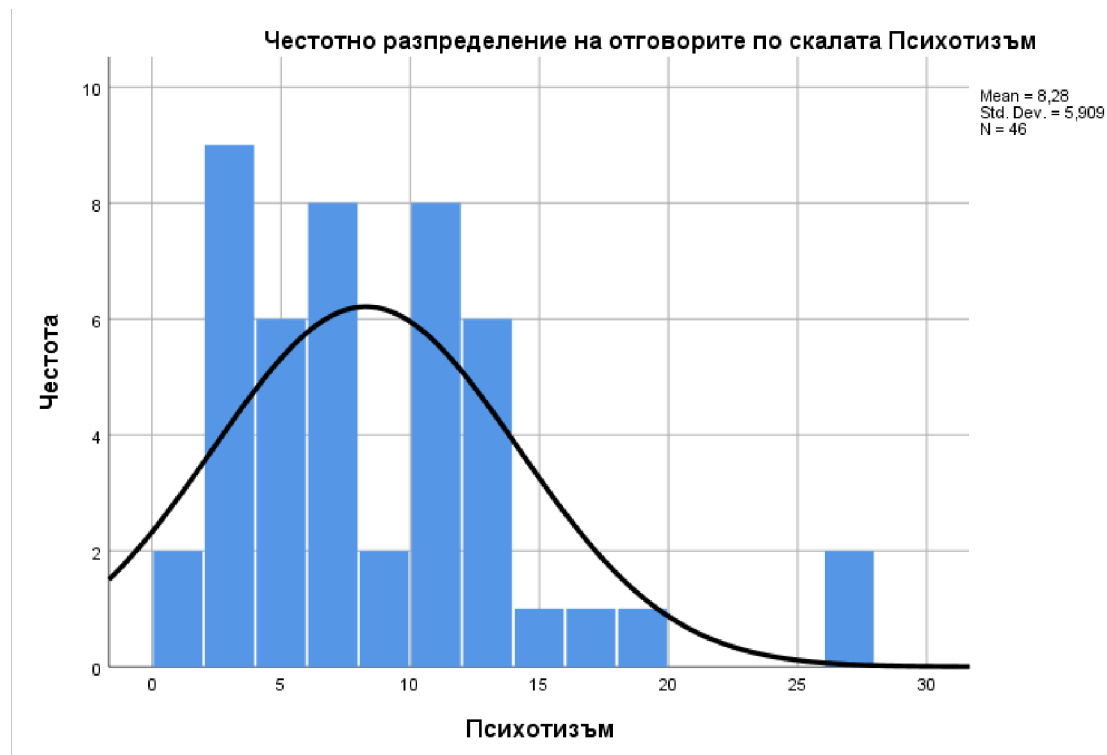


Figure 9. Frequency distribution of responses of the control group on the Psychoticism scale

3.2. Results analysis and discussion

In order to comment on Hypothesis 1, which assumes that patients with invasive cardiac interventions and cardiac surgeries show certain personality traits that might be a predisposition to specific heart disease, a comprehensive comparison of the scores of the three groups on each variable is conducted. The comparisons are divided into two parts - the first, relating to the scales of the Self-Assessment Scale for Alexithymia – TAS-20, the Anxiety Sensitivity Index and the five main domains of the DSM-5 questionnaire, and the second - presenting results on all facets of PID-5.

Intergroup differences were examined by dispersion analysis to identify the variables where difference between patients and controls is observed:

Table 16. Significant differences on the scales of Anxiety sensitivity, Alexithymia and the five domains of PID-5 in the three studied groups

	F-value	Significance (p)
Anxiety sensitivity	2,17	0,12
Difficulties identifying feelings	2,87	0,06
Externally oriented thinking	14,91	0,00
Alexithymia	10,34	0,00
Negative affect	0,63	0,53
Detachment	0,72	0,49
Psychoticism	0,26	0,77

Antagonism	0,44	0,65
Disinhibition	1,13	0,33

Table 16 reveals that there are significant differences between the three study groups on all scales of the Alexithymia Self-Assessment Scale, but not on the Anxiety sensitivity index and the domains of the DSM-5 questionnaire. To investigate which groups had significant differences in these variables, post-hoc tests were performed using the Bonferroni method, which showed that intergroup differences were significant only on the Externally Oriented Thinking and General Alexithymia scales, with differences between the control group and both clinical groups. The results are presented in **Table 17**.

Table 17. Intergroup comparison between the averages of the three studied groups on the scales Anxiety sensitivity, Alexithymia and the five domains of PID-5

		Mean	Mean Control group	Significance (p)
Externally oriented thinking	Cardiological patients	12,28	9,57	0,000
	Cardiosurgical patients	12,24		0,000
Alexithymia	Cardiological patients	49,81	40,11	0,000
	Cardiosurgical patients	49,00		0,001

Table 17 shows that patients who underwent invasive cardiac intervention and cardiac surgery had higher levels of externally oriented thinking and alexithymia than the control subjects. No differences were found between the two groups of patients.

Due to the procedural specifics of the study, the number of participants is the maximum possible. However, as an additional option, a re-analysis was performed when duplicating the data - the answers of each subject were placed for second time in the database to check the results of the same study with a larger sample:

Table 19. Significant differences in all PID-5 facets in the three studied groups in an artificially doubled sample

	F-value	Significance (p)
Anxiety	0,022	0,979
Emotional lability	5,377	0,005
Hostility	3,125	0,046
Perseveration	5,098	0,007
Separation insecurity	0,530	0,589
Suspiciousness	4,814	0,009
Submissiveness	2,157	0,118
Rigid Perfectionism	1,477	0,230
Anhedonia	0,289	0,749
Depressivity	0,409	0,665
Intimacy avoidance	3,786	0,024
Restricted affectivity	1,444	0,238
Withdrawal	2,831	0,061

Eccentricity	3,055	0,049
Perceptual and Cognitive Dysregulation	0,214	0,808
Unusual Beliefs & Experiences	0,071	0,931
Attention Seeking	0,088	0,916
Callousness	0,468	0,627
Deceitfulness	0,218	0,805
Grandiosity	2,628	0,074
Manipulativeness	0,028	0,973
Risk taking	3,351	0,037
Distractibility	2,414	0,091
Impulsivity	2,913	0,056
Irresponsibility	0,671	0,512

Table 19 shows many statistically significant differences when doubling the sample. A difference was identified on the following scales:

- Emotional lability
- Hostility
- Perseveration
- Suspiciousness
- Intimacy avoidance
- Eccentricity
- Risk taking

The differences on the scales Withdrawal ($p = 0.061$), Grandiosity ($p = 0.074$) and Impulsivity ($p = 0.056$) are marginally significant.

Table 20 presents the averages of the statistically significant difference of two patient groups and the control group for the 7 variables when doubling the sample. The intergroup comparison was performed via Bonferroni method.

Table 20. Differences in the averages of the three studied groups for PID-5 facets in an artificially doubled sample

	Group	Mean	Mean control group	Significance (p)
Emotional lability	<u>Cardiological patients</u>	<u>5,25</u>	<u>4,39</u>	<u>0,043</u>
	<u>Cardiosurgical patients</u>	4,15		1,000
Hostility	<u>Cardiological patients</u>	5,00	4,30	0,174
	<u>Cardiosurgical patients</u>	4,12		
Perseveration	<u>Cardiological patients</u>	4,58	4,11	0,550
	<u>Cardiosurgical patients</u>	3,41		0,186
Suspiciousness	<u>Cardiological patients</u>	5,27	4,89	0,892
	<u>Cardiosurgical patients</u>	4,12		0,129
Intimacy avoidance	<u>Cardiological patients</u>	<u>2,98</u>	<u>2,17</u>	<u>0,021</u>
	<u>Cardiosurgical patients</u>	2,71		0,256
Eccentricity	<u>Cardiological patients</u>	4,25	3,59	0,289

	<u>Cardiosurgical patients</u>	3,27		1,000
Risk taking	<u>Cardiological patients</u>	4,17	3,80	0,931
	<u>Cardiosurgical patients</u>	3,22		0,349

Table 20 shows that only two of the identified differences are between patients and control subjects - those between the Emotional lability and Intimacy avoidance facets. According to intergroup comparisons, patients who underwent cardiac interventions were more emotionally unstable and avoided intimacy to a greater extent than healthy subjects. No differences were found between patients who underwent cardiac surgery and control subjects.

Table 21 presents the identified intergroup differences between the two patient groups, according to the ANOVA double-sample analysis and the Bonferroni post-hoc analysis:

Table 21. Differences in the means of the two patient groups on PID-5 facets in the artificially doubled sample

	Mean cardiological patients	Mean cardiosurgical patients	Significance (p)
Emotional lability	<u>5,25</u>	<u>4,15</u>	<u>0,007</u>
Hostility	5,00	4,12	0,062
Perseveration	4,58	3,41	0,29
Suspiciousness	<u>5,27</u>	<u>4,12</u>	<u>0,007</u>
Intimacy avoidance	2,98	2,71	1,000
Eccentricity	4,25	3,27	0,052
Risk taking	<u>4,17</u>	<u>3,22</u>	<u>0,031</u>

Table 21 shows the significant difference between the two patient groups in the facets Emotional Lability, Suspiciousness and Risk Taking; the difference in the facets Hostility and Eccentricity remain only marginally significant. This means that patients who have undergone

cardiac intervention are more emotionally unstable, more suspicious, and more likely to take risks than patients who have undergone cardiac surgery.

These results support Hypothesis 2- people who have undergone invasive cardiac intervention and / or cardiac surgery have higher levels of alexithymia.

Regarding to Hypothesis 3, which distinguishes between patients and control subjects in terms of their Anxiety sensitivity - no statistically significant differences were found and this hypothesis did not confirm.

Regarding Hypothesis 4 where the patients who underwent interventions and/or surgeries are expected to be dominated by emotional lability, depressivity, withdrawal and intimacy avoidance compared to the control group, only some of the criteria are confirmed and they are valid only for the group of patients who had cardiac interventions. No such trend was observed in the cardiac surgery group.

All analyzes also support Hypothesis 1, as alexithymia - and in particular, externally oriented thinking - has indeed been identified as a dimension by which the patients differ from the control group. However, the interpretation of the results, needs more analysis as compared to the norm, the patients do not report different results, which is not valid for the control group.

To test the fifth hypothesis, a series of Student's T-tests for independent samples were conducted, which compared the scores for each variable respecting the date of completion. The respondents were divided into two groups – those who filled in the questionnaires before July 2020 and those who joined the study after that. Regarding the period of participation significant difference appears only in the scale External Oriented Thinking. However, the differences contradict the expectations - those who completed the questionnaires before July 2020 scored an average score on the scale $M = 12.85$ ($SD = 2.464$), and those after July 2020 have a mean $M = 10.90$ ($SD = 3.078$). It is very likely that this difference is due to the fact that all respondents from the control group were included in the study in 2021. Therefore, the same series of T-tests were repeated on the data from both groups of patients, excluding those collected by the control group. When removing the data of the control group no significant difference from the response period was found. There is only a marginally significant difference in the Impulsivity facet.

The comparison consisting only the data of the patient groups shows a significant difference in Grandiosity, among all 25 facets of the PID-5 questionnaire. Patients who filled in before July 2020 had an average $M = 3.45$ ($SD = 1.94$), and the participants in the study later had an average $M = 4.46$ ($SD = 2.335$).

This study was conducted to analyze personality traits related to the individual's ability to respond to psychological and emotional distress manifesting certain maladaptive behavior, and the relationship of these variables with the genesis and course of cardiac disease. Although the interaction between these phenomena is complex and impossible to explain by a single research design, the study of personality differences between patients with cardiac disease and healthy subjects may contribute to the development of theories related to the psychosomatics of cardiovascular disease.

Based on the presented theoretical overview five hypotheses were made in the present study, most of which support the collected data:

1. It is assumed that patients with invasive cardiac interventions and cardiac surgeries show certain personality traits that are a predisposition to specific heart diseases.

This general hypothesis is supported by the analysis of the following hypotheses - indeed, personality differences were found between patients and healthy subjects. Of course, this is not a longitudinal study that traces the development of people with specific personality traits, but the increased levels of several maladaptive personality traits, in the perspective of these and previous studies on the psychogenesis of cardiovascular disease, and somatic complaints in general, can be interpreted somewhat as a predisposition to the development of heart disease.

2. Patients who underwent cardiac interventions and/or surgeries show higher levels of alexithymia and its two factors compared to subjects in the control group.

The analyzes support Hypothesis 2, as they do show higher results of patients on the subscales Difficulties in identifying and describing feelings and Externally oriented thinking, as well as on the general scale for Alexithymia, compared to those of the control group. This allows alexithymia to be isolated as one of the distinctive personality traits of patients who have developed cardiovascular disease requiring cardiac intervention or cardiac surgery.

3. Patients who underwent cardiac interventions and/or surgeries showed higher levels of Anxiety sensitivity compared to subjects in the control group.

However, Anxiety sensitivity is not one of the hallmarks of these patients. No increased levels were found in patients who underwent cardiac interventions or in those who underwent cardiac surgery.

4. Patients undergoing invasive cardiac intervention and/or cardiac surgery are expected to have higher levels of the following facets than those in the control group:

- A. Emotional lability
- B. Depressivity
- C. Withdrawal

D. Intimacy avoidance

The data analyses for Hypothesis 4 are contradictory. The patients did show higher emotional lability and a higher tendency to avoid intimacy, but found themselves with the same levels of depressivity and withdrawal as the control subjects. Moreover, the difference in facets Emotional lability and Intimacy avoidance is observed only in one of the patient groups - of those who underwent invasive cardiac intervention. Partial support for this hypothesis is provided only by artificially doubling the sample size, so it should be mentioned that the hypothesis is not fully supported, but rather there are grounds to assume that when expanding the sample hypothesis will be confirmed.

In this case, we can assume that other distinctive personal characteristics of patients (at least those that undergone invasive intervention) are emotional lability and the tendency to avoid intimacy. No other difference was identified among the many personality dimensions examined through the DSM-5 questionnaire, even after artificial doubling the data.

5. Individuals surveyed between July 2020 and September 2021 are expected to show significantly higher levels of Detachment and Psychoticism than those surveyed earlier due to the Covid-19 pandemic and related measures for control the spread of the infection.

The data do not give grounds to assume that the respondents who participated during the peak of the pandemic differ in any personal characteristics from those who participated earlier. Therefore, we cannot confirm the assumption that the Covid-19 pandemic is related to the personal dispositions of the population, but before rejecting this entirely, the limitations of the research method should be discussed, which could be the reason for the lack of statistically significant results.

Discussion of the results obtained will begin with differences in alexithymia between patients and control group. It is clear that Hypothesis 2 supports theories of non-specificity (Sifneos, 1994), according to which psycho-emotional deficits such as alexithymia adversely affect the emotional processing and symbolization of the subject, which in turn could be a prerequisite for somatization. Individuals with high levels of alexithymia are characterized by operatory functioning and reduced or no mentalization, which means that symbolization is very difficult for them. The connection with their inner world is severely disturbed or missing. Meaning that ineffective psychological processing is observed.

Following the members of the Paris Psychosomatic School, we assume that in patients with cardiac disease, any psychological arousal cannot be optimally processed by the psychic apparatus through symbols and verbalization. On the contrary, it remains as excitement in the body, unexpressed, causing changes at the somatic level. In this sense, alexithymics are prone

to destructive body processes due to their inability to drain nervous excitement in a verbal and symbolic way. Hence, it is expected that they are more likely to develop diseases, such as cardiovascular disease, as well as that overall patients with chronic diseases are more likely to show higher alexithymia levels than healthy people.

Given the quasi-experimental design of the study, we cannot conclude a causal relationship. Cardiovascular diseases are obviously related, but it is not clear what the direction of their relationship is. Alexithymia is considered to be a stable personality disposition that we do not expect to change significantly over time - especially without therapeutic intervention - and therefore it is not very likely that patients will have higher alexithymia due to their experiences with the disease. However, alexithymic manifestations have also been considered as a result of psychological defense (Aisenstein, 2006), which means that they may be a consequence of the disease.

Therefore, a useful improvement in research design would be the inclusion of a third group of participants for comparison. Examination of patients suffering from a chronic disease from birth or having experienced invasive interventions of another nature (for example, after an accident) could give another point of view. If the levels of alexithymia are higher in such group of patients, we can assume that both in them and in patients with cardiovascular disease, alexithymia manifestations are defensive or mixed. But if there is no difference between the control group and these additional patient groups in terms of alexithymia, we can conclude with greater confidence that alexithymia is a predisposition to the development of psychosomatic diseases, including cardiovascular.

The causal relationship of the variables may be valid for any differences identified here between patients and control group.

The case with increased levels of Emotional lability is similar. According to the theories of Selye (1982) and Cannon-Bard (1927) about the relationship between human experiences, the influence of environment and stimuli and homeostasis in the body, the result, indicating stronger emotional lability in patients, is quite expected. It is logical that the homeostasis of individuals who are more emotionally labile will be easily - and therefore more often - disturbed by stressors. Such a chronic imbalance in the body systems is a clear predisposition for the development of somatic complaints.

Higher levels of emotional lability also support the psychosocial vulnerability model (Smith et al., 2004). On one hand, it is possible that people who have experienced more conflict and negative events and those who have less social support and more stressful work may be more emotionally unstable. But on the other hand, it is again necessary to question the direction of

the possible causal link between personality traits and illness: it is possible that emotional lability is a factor in the increased perception of experiencing stress from work, more family conflicts and lower satisfaction, which the study of Smith et al. (1988) discovered. It is also possible that lability is caused by patients' experiences of long-term treatment and chronic illness, as well as the associated increased risk of complications and death - few people would maintain mental stability in the face of such a challenge.

Regarding the two-way relationship between psychosocial factors and emotional lability, the conclusions are close to the transactional model (Smith et al., 2004), according to which emotionally labile people are more reactive, which has its echo in the body. In the present case, however, unlike the transactional model, hostility is not included in the constellation of variables. No link has been found between heart disease and hostility, despite the model of psychophysiological reactivity (Williams et al., 1985). This result may be due to the peculiarity of research tools - it is possible that the patients are not aware with their hostile tendencies and therefore they do not mark them in the self-assessment questionnaire. But it is also possible that something else lies beneath the hostility observed by previous researchers – could be behavioral manifestation or a defense mechanism controlled by other personality dispositions, which, unlike hostility, are more common in patients.

An example of such a hidden trait is the intimacy avoidance and related features. This is the second facet to identify differences between patients and controls. Again, it is questionable whether patients' illness, the risk to their health, the interventions they have undergone and their bodily scars, as well as the withdrawal that the psychic apparatus often exhibits in trauma are the reasons to increase intimacy avoidance tendency. But the relationship is also expected to be in the opposite direction. First of all, speaking of people with increased levels of alexithymia, it is logical to discuss that they are likely to be distanced: intimacy requires a connection with both other people mental world and their own, requires sharing and highly emotional experiences, which can be overwhelming for people with difficulty identifying and describing feelings. It is therefore logical for alexithymic people to avoid intimacy, which could also reflect their health via many mediating factors. For example, individuals who are open for intimacy are more likely to have better social support, more satisfying relationships with family and friends, and more resources to cope with distress.

As mentioned in Chapter 1, interpersonal sensitivity (IS) has been identified as a potential risk for deteriorating health and developing CHD (Marin & Miller, 2013). Raikkonen et al. (2001) found positive relation between social anxiety and the development of hypertension among middle-aged women and this correlates with the results of Nakaya et al. (2005) on the positive

relationship between introversion and cardiovascular disease. Thus, we can say that avoiding intimacy is a potential predisposition for the development of psychosomatic problems.

It is important to discuss another detail of the results: the significant differences found in the facets of the DSM-5 questionnaire are valid only for the group of patients who underwent cardiac interventions. It is noteworthy that the patients who underwent cardiac surgery did not differ from the control subjects. However, this lack of statistical significance is probably due to one of the methodological limitations - the insufficient sample size. The group of cardiac intervention patients consists of 48 people; however, artificial duplication of data is needed to find statistically significant results. Most likely the explanation for the lack of specific characteristics in cardiac surgery patients is the small size of their group - 41 respondents. This is also supported by the fact that the alexithymic manifestations are the same for the two patient groups. They both show increased alexithymia levels compared to control subjects.

However, the other expectations in the research project are not supported. No marginally significant differences were found when doubling the sample on the Depressivity and Withdrawal scales. As mentioned above such markers of mental well-being as depression and withdrawal are difficult to study during a global crisis. It is possible that the expected increase in these dispositions among the general population during the Covid-19 pandemic has affected the results. But one must also question the extent to which depression and withdrawal are predisposition or consequence of heart disease. It is possible that these are phenomena observed in individuals with unresolved conflicts, supporting the idea of Frankl (2001) and theories of specific conflicts in general. But it is also possible that they are the result of chronic illness and health concerns, which to some extents are typical for all respondents during the current situation.

Therefore, the essential depression, studied by Marty (1966) cannot be identified as a factor in cardiac diseases. But this does not exclude it as a factor in other diseases, as it is associated with energy lack rather than cardiovascular system overload.

It appears that patients do not show increased levels of anxiety sensitivity. This may again be due to the overall change during the pandemic. But it can also be related to the relationship between anxiety sensitivity and alexithymia. Anxiety sensitivity is a specific characteristic that requires mentalization capacity. All questions from the Anxiety Sensitivity Index require a certain degree of self-reflection and sensitivity to emotions in order to complete, which is not typical for people with alexithymic manifestations, namely – operatory functioning and difficulties in identifying and describing feelings. In other words, it would be contradictory to confirm Hypothesis 2 and Hypothesis 3 at the same time. It is logical to rethink the theoretical

premise and to assume that cardiovascular disease is probably predominantly related to vague anxiety, stemming partially from external events and factors, as well as from the inability of the individual process emotions.

Regarding the last Hypothesis 5, it is worth recalling that the increased risk of coronary heart disease in patients exposed to stress is widely recognized. But in the current study, there are no differences between those who completed the questionnaires before and during the pandemic. Interpreting this result, it is important to stress that in the research are being analyzed stable personality dispositions, not characteristics for subjective well-being or severity of somatic disease. It is expected that stable personality traits will not change depending on the pandemic, but rather be a resource for dealing with tension during the crisis and reflect on the symptoms and health of the subject. However, it is worth mentioning that a larger study on somatic symptoms and diseases of the cardiovascular system, in the light of subjective well-being and mental suffering, would probably have more significant results and various conclusions.

3.3. Limitations and opportunities for future research

After summarizing the supported and unsupported hypotheses of the study, in order to be able to generalize the interpretations and conclusions based on the results, it is appropriate to discuss the limitations in the design and procedure of the study. In order to complete an objective and precise interpretation of the result the possibility that some of the results are due to latent variables and unforeseen influences must be taken into account.

The first limitation is the suboptimal sample size. Unfortunately, this limitation of the study is entirely external - its design was planned before the unforeseen outbreak of a global epidemic, given that the researcher collecting data would have free access to patients who have undergone cardiac interventions and cardiac surgeries. There are many factors that adversely affected the number of respondents:

- 1) regardless of the policies of the hospitals, many people postpone and avoid seeking hospital care for fear of Covid-19 (Angelov, 2020);
- 2) several times during the peaks of the pandemic the planned hospital admissions of patients were suspended (BNT News, 2021);
- 3) serious measures have been taken to restrict the access of visitors to all hospital patients (MH, 2020);
- 4) and a strict social distance is also recommended for patients with cardiac problems in order to minimize the risk of infection (MMA, 2020).

The specifics of the period in which the patients are examined should be considered. This is a particularly sensitive period, as they are still undergoing hospital treatment. It is possible that this creates the preconditions for insincere answers, at least due to the lack of energy in patients, which is required to fill in such long questionnaires. It is worth considering to continue the study in collaboration with patient organizations and medical institutions for continuing treatment or dispensary care, so as to gather patients to participate during a better period.

Another limitation due to the unpredictable external impact of the Covid-19 pandemic is that almost all study participants were surveyed during the global crisis. Even if we assume that part of the sample - patients with cardiac problems - are characterized by higher depression, anxiety sensitivity etc., it is possible that this difference will be covered by the general influence of the global health crisis. In a period when the population is in a bad mental state, it is more difficult to identify intergroup differences. Of course, there is no guarantee that the results would be different in another situation, but it is still recommended that this study be repeated at a time when the impact of the crisis has been contained and enough time has passed for citizens to recover.

Also, the impact of the pandemic, is included as a variable in the fifth hypothesis. But the division of respondents before and after September 2020 may not be optimal. However, it is in the early months of the crisis - March to June 2020 – when the general anxiety among the population was the highest. Therefore, it is likely that the group of people studied before the peak of the pandemic will include those who have already experienced its severe impact. The division of the sample of respondents who filled in before and after the beginning of March 2020 is also suboptimal, as it would form a group of less than 20 participants, exclusively patients.

A third limitation that can be pointed out is related to the questionnaires used. The DSM-5 questionnaire used to measure most of the psychological variables in the study is legitimately adapted for use in the Bulgarian socio-cultural environment and shows good psychometric qualities. However, its version is aimed at studying adolescents, not adults. Compared to the original version of the respective adult form, the questionnaire used has identical facets. Also, the issues in the original tool for adolescents and adults differ minimally, but still this is a potential limitation that should be mentioned. In future research on the subject, it is recommended to use an adult tool, if one has already been adapted.

In order to study the results for a larger sample, repeated analysis of variance was performed on an artificially doubled sample - the data of each subject from the three groups was included

in the sample twice. In this case, there is a change in the results, and almost all marginally significant differences turn out to be significant.

Recommendations

There are several recommendations in conclusion to the study from a research point of view. The first corresponds to those mentioned in section 3.3. - Methodological limitations. In order for the results to be reliable, it is essential to collect a larger sample and n to ensure that the sample represents well the entire study group. Second, it is important to use standardized measuring instruments designed for the specific group of adult subjects. It is recommended that the re-examination be performed at a later stage, when the effects of the Covid-19 pandemic have been predominantly overcome. As for the comparison between the levels of the studied psychological variables before and after this pandemic, the current results of individuals who filled in the questionnaires after the beginning of March 2020 could be compared with samples already collected in other studies before this date.

The second part of the research recommendations concerns the interpretations. In order to be more confident in the conclusion that personality differences between patients and healthy subjects are predisposition and not results of cardiovascular disease, it is important to include a third or even fourth study group with similar experience of the studied patients, but without a doubt for psychosomatization.

As for the theoretically significant conclusions from the study, several recommendations can be made, most of which have already been covered in previous publications:

- It is important to emphasize the need for multidisciplinary work in the treatment of somatic complaints (not only physicians but also psychologists and psychotherapists).
- Regarding the identified links between psychological problems such as depression, anxiety, social isolation and accompanying personality traits such as intimacy avoidance, alexithymia and emotional lability, and the development of diseases in healthy people and complications in those already ill, screening and psychotherapeutic intervention should be obligatory in treatment. In this regard providing affordable psychological and medical assistance for the patient is fundamental in the treatment of cardiovascular disease.
- It is important to continue efforts to study the specific predispositions to psychosomatic illnesses, and the specific interventions and resources that could support treatment by strengthening psychological resources and capacities.

Summary

From the results obtained, supported and unsupported hypotheses, several general conclusions can be drawn both about theory and treatment of psychosomatic diseases - in particular, cardiovascular ones - and about the necessity of future research on the topic and method optimization:

- The etiology of the disease is related to psychogenic factors; the present study provides information precisely on cardiovascular disease.
- Patients with cardiovascular disease are characterized by higher levels of alexithymia, which include difficulty in identifying and describing feelings and propensity for operatory thinking. These alexithymic manifestations are associated with difficulties in verbalization, symbolization, mentalization and emotional processing, and thus emphasize that all these dispositions are in a dynamic relationship not only with mental but also with physical health.
- Patients suffering from cardiovascular disease are not characterized by abnormal anxiety sensitivity; this is probably due to their difficulty in processing emotions.
- Patients suffering from cardiovascular disease are characterized by a higher degree of emotional lability and a greater tendency to avoid intimacy.
- Additional information is necessary on hypotheses about the causal relationship between alexithymia, emotional lability and intimacy avoidance on one hand and somatic complaints on the other. Such information could be provided through future studies involving groups of patients who have also undergone long term treatment or invasive medical intervention, but who are not expected to show specific personality traits affecting their health.

All these conclusions are only part of the theoretical knowledge relating psychosomatic diseases and their etiology. However, they support the idea that a medical approach to psychosomatics focused on somatic grievances is insufficient for explaining, restoring and maintaining the patient's health. The conclusions support the psychoanalytic approach, emphasizing on the somatization in the mental functioning of the patient and the analysis of this process. Whether it is somatization by regression (Aisenstein, 2006), harm caused by unprocessed emotions and the corresponding vegetative arousal in the body, or conversion as a way to resolve internal conflict, it is clear that diseases must be considered in the context of the psychological and personal characteristics of the patient, and their treatment should be adapted to whether there are indications of psychosomatics.

Conclusion

The material aims to provide accessible and detailed overview of the theories explaining the relationship between psychological processes and somatic complaints. The main conclusion reached going through a discussion of the fundamental mind-body relationship, the nature of psychosomatic complaints, different perspectives on their ontogenesis, various specific factors affecting somatic diseases, triggered partly - if not entirely - by psychological distress, conflict, deficits or suboptimal functioning protection, as well as through an overview of the various cardiac problems and their characteristics, was that there are specific personality traits that are predispositions for the development of cardiovascular disease.

An empirical research was conducted, collecting data from nearly 150 subjects, divided into three groups - two of patients suffering from cardiovascular disease and one of healthy subjects, using three standardized instruments. The purpose of this study is to examine as many of the potential personality differences between groups as possible, thus helping to identify personality characteristics related to specific diseases. A total of 29 personality traits were studied.

However, methodological limitations specific to the situation in Bulgaria do not allow collecting a sufficient sample size. As a result, the identified differences between the groups are primarily on the Alexithymia scale and its subscales for difficulties in identifying and describing emotions and externally oriented thinking, and partial support for assumptions about differences between the facet Emotional lability and Intimacy avoidance. Expectations for differences between patients and control subjects in terms of anxiety sensitivity, depressivity and withdrawal are not justified, as well as expectations for differences between individuals who participated in the study before the peak of the Covid-19 pandemic in September 2020 and after.

However, the overall results of the study provide support for the assumption that psychosomatic illnesses - to which cardiovascular disease is largely assumed - are related to psychogenic factors.

Higher reactivity to stressful stimuli, as evidenced by emotional lability, difficulty in the processes of mentalization, verbalization, symbolization and emotional processing, which leads to alexithymia and social isolation, which contributes to the intimacy avoidance, are probably some of these psychogenic factors.

According to this conclusion, recommendations are given for the practical work with patients suffering from cardiovascular or other psychosomatic diseases considered. The most important of these, already given by a number of researchers, therapists and physicians, is that multidisciplinary work, involving psychologist/psychotherapist and providing affordable psychological and psychotherapeutic help for patients are crucial in the treatment of such a disease.

The development of modern medicine and integrative health care is moving in this direction anyway, but the process is slow. In general Freud also made the same recommendation, discovering the psychogenic origin of the incomprehensible hysteria. At present in Bulgaria finding qualified medical care and staff with a good modern education is becoming an increasing problem.

For this reason, increased research interest and distributing research results and conclusions among government institutions, hospitals and the general population is essential for adequate response to the problems that a large number of hospitalized patients are facing.

Contributions:

1. The present study traces a configuration of psychological preconditions that could be a predisposition for the development and progression of heart disease requiring cardiac intervention or cardiac surgery.
2. The present study is the first in Bulgaria to correlate and investigate the psychological impact of Covid-19 in cardiovascular patients.
3. The dissertation presents and describes the differences in the Bulgarian and world experience in relation to psycho-emotional and psychosocial factors and the progression of cardiovascular disease.
4. The dissertation examines the nature and research approaches to psychosomatic diseases, integrating psychosocial factors that contribute to and are related to the development and progression of cardiovascular disease.
5. The importance of counseling and psychotherapy for patients with heart disease during Covid-19 is presented, which has the potential to develop specialized care and contribute to their support and recovery.
6. The dissertation has significant informational value in connection with improving the awareness and training of health professionals involved in the therapy of cardiovascular patients.

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