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Type D personality, levels of depression and anxiety, and disease acceptance in cardiac patients

Osobowość typu D a poziom depresji i lęku oraz akceptacja choroby u pacjentów kardiologicznych

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Abstract

Introduction and objective: To assess the relationship between type D personality and the severity of symptoms of depression and anxiety, as well as disease acceptance in cardiac patients. **Materials and methods:** The study involved 102 participants (63 men and 39 women). The patients were divided according to the presence of type D personality (group 0 – without, group 1 – with type D), gender (group 0 – men, group 1 – women), and cardiac diagnoses (group 1 – with ischaemic heart disease, group 2 – with ischaemic heart disease and circulatory failure). The Type D Scale-14 (DS-14) was used to assess type D personality; the Hospital Anxiety and Depression Scale (HADS) was used to assess symptoms of anxiety and depression; and the Acceptance of Illness Scale (AIS) was used to examine disease acceptance. The author's questionnaire was used to collect the necessary sociodemographic data. **Results:** 36% of respondents meet the criteria for type D personality. AIS scores correlated negatively with age and disease duration, both components of the DS-14 scale. Both DS-14 subscales were negatively correlated with AIS and positively correlated with HADS-A and HADS-D, while DS-14 (Ne) was positively correlated with age. Individuals without type D personality traits had higher scores on the AIS and lower scores on the HADS-A and HADS-D. However, in the social inhibition subscale, women scored higher. **Conclusions:** Individuals with type D personality have more difficulty accepting their illness and are characterised by higher levels of depression and anxiety. Women exhibit stronger social inhibition. Younger individuals, with a shorter history of illness, accept the disease more easily.

Keywords: acceptance of illness, cardiovascular diseases, type D personality

Streszczenie

Wprowadzenie i cel: Ocena związku osobowości typu D z nasileniem objawów depresji i lęku oraz akceptacją choroby u chorych kardiologicznych. **Materiał i metody:** W badaniu wzięły udział 102 osoby (63 mężczyzn i 39 kobiet). Pacjentów podzielono ze względu na obecność osobowości typu D (grupa 0 – bez niej, grupa 1 – z nią), płeć (grupa 0 – mężczyźni, grupa 1 – kobiety) oraz rozpoznanie kardiologiczne (grupa 1 – z chorobą niedokrwienną serca, grupa 2 – z chorobą niedokrwienną serca i niewydolnością krążenia). Do oszacowania nasilenia cech osobowości typu D użyto skali osobowości typu D (Type D Scale-14, DS-14), do oceny objawów lęku i depresji – Szpitalnej Skali Lęku i Depresji (Hospital Anxiety and Depression Scale, HADS), do zbadania akceptacji choroby – Skali Akceptacji Choroby (Acceptance of Illness Scale, AIS). Niezbędne dane socjodemograficzne zebrano za pomocą autorskiego kwestionariusza. **Wyniki:** Spośród badanych 36% spełniało kryteria osobowości typu D. Wyniki w skali AIS korelowały ujemnie z wiekiem i czasem trwania choroby, obiema składowymi skali DS-14. Wyniki w obu podskalach DS-14 korelowały ujemnie z wynikami w AIS, dodatnio z HADS-A i HADS-D, a wyniki w podskali DS-14 oceniającej negatywną emocjonalność korelowały dodatnio z wiekiem. Osoby bez cech osobowości typu D cechowały wyższe wyniki w AIS oraz niższe w HADS-A i HADS-D, a w podskali DS-14 dotyczącej hamowania społecznego kobiety uzyskały wyższy wynik. **Wnioski:** Osoby

z osobowością D trudniej akceptują swoją chorobę oraz cechuje je wyższy poziom depresji i lęku. U kobiet występuje silniejsze hamowanie społeczne. Osoby młodsze, z krótszym wywiadem chorobowym łatwiej akceptują chorobę.

Słowa kluczowe: akceptacja choroby, choroby sercowo-naczyniowe, typ osobowości D

INTRODUCTION

Among individuals with a diagnosis of cardiovascular disease, a significant percentage meet the criteria for type D personality. It is considered one of the variants of normal personality (Denollet, 2005; Ogińska-Bulik, 2009), and its presence is conducive to experiencing negative emotions and avoiding social contacts. Cardiovascular diseases, despite effective treatment, remain one of the most common causes of death in developed countries. The continued increase in the incidence of the disease mandates the search for factors that affect the functioning and acceptance of the disease in patients with these diagnoses. Among the factors that significantly influence mental performance are anxiety and depressive symptoms.

According to a large meta-analysis, one in four patients with coronary artery disease (CAD) exhibit a behavioural pattern belonging to a stress personality – type D (Kupper and Denollet, 2018). A Polish study estimated the prevalence of type D personality in patients after myocardial infarction at 46.5%, compared to 34.8% in the general population of healthy people in Poland (Ogińska-Bulik, 2014). The concept of type D personality emerged as an attempt to clarify the role of psychosocial determinants of somatic diseases as a response to the enormous interest in the personality determinants of somatic health among researchers in the second half of the 20th century (Ogińska-Bulik, 2009). According to its creator, Johann Denollet (1998), the type D behavioural style consists of negative affectivity and social inhibition (Kupper et al., 2013; Spindler et al., 2009). The presence of a stress personality promotes the experience of negative emotions such as hostility, anger, fear, jealousy, and the avoidance of social contact due to lack of self-acceptance and fear of rejection. The permanently felt threat and emotional tension associated with it cause difficulties in establishing strong interpersonal relationships, and promote the occurrence of depression, low self-esteem, and exhaustion. Despite effective treatment, cardiovascular diseases remain one of the most common causes of death in developed countries, and the continued increase in their incidence mandates the search for new factors that influence and modify their course, as well as promote disease acceptance in patients with these diagnoses (Leu et al., 2019).

Important factors with a documented position in the literature that significantly determine the mental performance of cardiac patients include common depressive and anxiety symptoms (Burkauskas et al., 2016; Schiffer et al., 2008). Depressive disorders have been proven to be an independent risk factor for CAD and have a negative impact on its course (Akosile et al., 2023).

However, regardless of the presence of depression, the adverse effect of stress personality on the prognosis of CAD and the severity of atherosclerotic lesions in the coronary vessels has been noted by many authors (Denollet et al., 2018; Leu et al., 2019; Piegza et al., 2021; Svansdottir et al., 2013; Wang et al., 2018).

Taking this into account, the authors of the present study undertook the task of examining the impact of type D personality on the severity of depressive and anxiety symptoms as well as disease acceptance in cardiac patients.

MATERIALS AND METHODS

The study included 102 patients (63 men and 39 women), with a mean age of 65.471 years (*SD* ±10.567). Patients were divided into two groups based on the presence of type D personality (group 0 – without it, group 1 – with it), gender (group 0 – men, group 1 – women), and cardiac diagnosis (group 1 – with CAD, group 2 – with CAD and heart failure – HF).

To preserve the homogeneity of the entire study group, seven subjects who were diagnosed only with heart failure were excluded from the analysis, taking into account cardiological diagnoses in relation to all parameters studied. As a result, group 1 included 51 subjects, and group 2 included 44 subjects. The diagnoses established by cardiologists during hospitalisation served as a guide; heart failure was graded on the New York Heart Association (NYHA) scale, and all patients were between levels II and IV of this scale. The Type D Scale-14 (DS-14) was used to assess type D personality, the Hospital Anxiety and Depression Scale (HADS) was used to assess symptoms of depression and anxiety, and the Acceptance of Illness Scale (AIS) was used to measure illness acceptance.

The DS-14, developed by Johann Denollet, contains 14 questions, each of which can be scored from 0 to 4. Scores are calculated separately for the Ne (negative emotionality) component and the HS (social inhibition) component. The scale is used to assess the severity of stress personality traits, with higher scores on each dimension indicating greater severity of type D personality traits. Type D personality is diagnosed in individuals who score ≥10 on each dimension (Ogińska-Bulik, 2009).

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The HADS is a commonly used self-report tool for assessing the presence of depressive and anxiety symptoms. It consists of 14 questions, seven of which relate to symptoms of anxiety (HADS-A) and seven to symptoms of depression (HADS-D). The higher the score (with a maximum of 3 points possible for each question), the greater the severity of depressive and anxiety symptoms. A score of 8–10 points indicates borderline symptoms, while 11–21 points indicate marked symptom severity (Stern, 2014; Zigmond and Snaith, 1983).

The AIS was used to assess disease adaptation, consisting of eight statements about the specific difficulties and limitations in perceiving the disease. It can be scored from 8 to 40, with a lower total score indicating poorer acceptance of the disease and adaptation to it, as well as a stronger sense of discomfort about experiencing it. A total score of 8–19 indicates low acceptance of the disease, 20–35 indicates a medium level of acceptance, and 36–40 indicates a high level of acceptance, with no psychological discomfort associated with the presence of somatic illness in the context of the present study (Felton et al., 2009).

For the purposes of the study, a proprietary questionnaire was developed to collect sociodemographic data, as well as information about the course of the underlying disease, comorbidities, and administered treatment. The study included only those subjects who were assessed by the consulting psychiatrist as capable of giving informed consent to participate, who signed such consent, and who did not suffer from significant cognitive impairment that would prevent cooperation during the study. The presence of cognitive impairment was assessed using the Montreal Cognitive Assessment scale version 7.2.

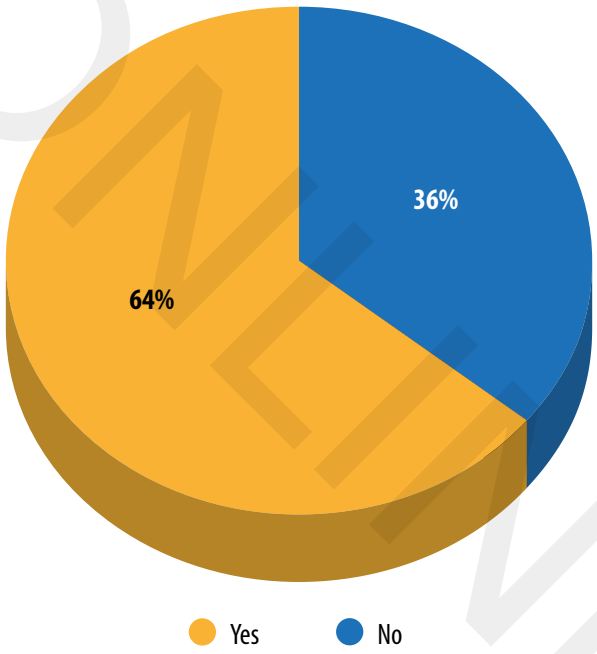

Fig. 1. Prevalence of type D personality in the study group

Age:	
• min	36
• max	91
• median	65.471
Sex:	
• women	39
• men	63
Education:	
• primary	11
• vocational	31
• secondary	43
• higher	17
Diagnosis:	
• coronary heart disease	95
• heart failure	44
Treatment performed:	
• coronary angioplasty	83
• coronary artery bypass	25

Tab. 1. Sociodemographic characteristics of the study group

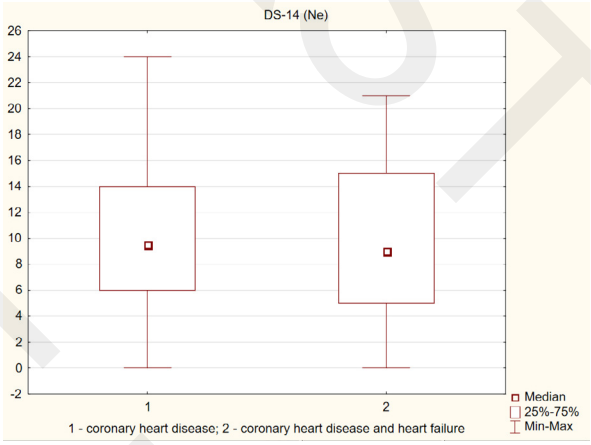

Fig. 2. Differences in the severity of negative emotions [DS-14 (Ne) subscale] by diagnosis (group 1 and group 2)

Statistical analysis

The computer programmes Excel and Statistica version 13.3 were used in the analysis of the data. The normality of the distributions was assessed using the Shapiro–Wilk test. Associations between variables were determined using Spearman's rank correlation coefficient. The significance of differences was tested using the *U* Mann–Whitney test. The level of statistical significance was set at $\alpha \leq 0.05$.

RESULTS

The criteria for type D personality were met by 36% of the subjects (Fig. 1). Sociodemographic characteristics of the study participants are shown in Tab. 1. There were no differences between patients with CAD and those with CAD and HF with regard to both components of type D personality (Figs. 2 and 3). Scores on the AIS correlated negatively with age, disease duration, and both components of stress personality (Tab. 2). Both stress personality subscales correlated positively with HADS-A and HADS-D. Negative emotionality appeared to be

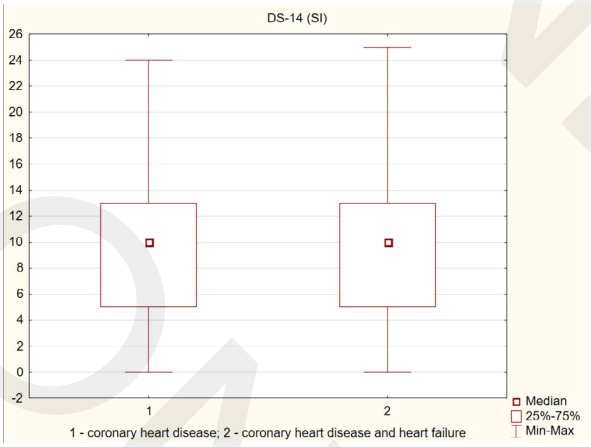

Fig. 3. Differences in the severity of social inhibition [DS-14 (SI) subscale] by diagnosis (group 1 and group 2)

	DS-14 (Ne)	DS-14 (HS)	HADS-A	HADS-D	Age	Disease duration [years]
AIS	–0.236*	–0.204*	–0.168	–0.194	–0.350*	–0.249*
DS-14 (Ne)		0.473*	0.568*	0.314*	0.223*	0.147
DS-14 (HS)			0.298*	0.223*	0.152	0.067
HADS-A				0.355*	–0.012	0.084
HADS-D					0.166	0.045
Wiek						0.396*

AIS – Acceptance of Illness Scale; **DS-14 (Ne)** – negative affectivity; **DS-14 (HS)** – social inhibition; **HADS-A** – level of anxiety on the Hospital Anxiety and Depression Scale (HADS); **HADS-D** – level of depression on the HADS scale.
* $p \leq 0.05$.

Tab. 2. Spearman's rank correlation matrix

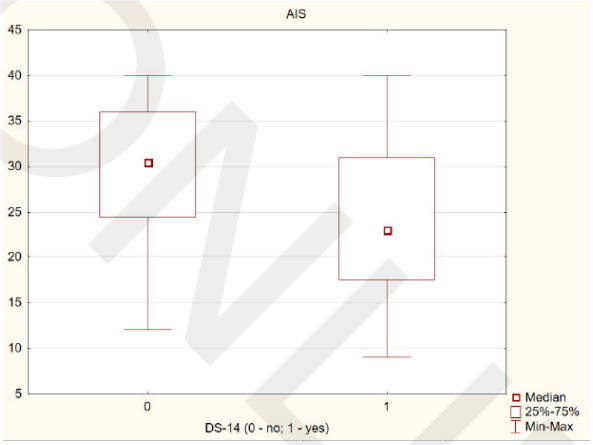

Fig. 4. Differences in illness acceptance by the presence of stress personality

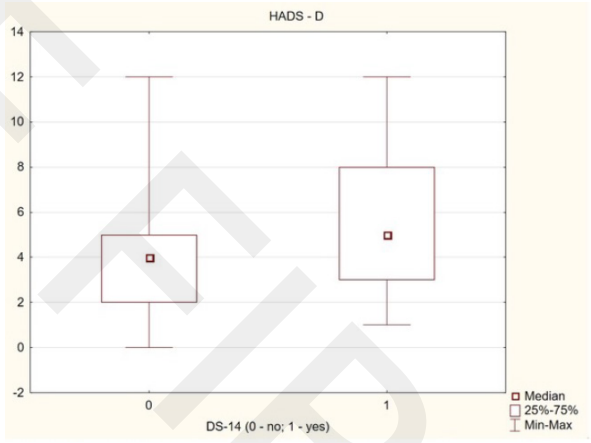

Fig. 5. Differences in the severity of depressive symptoms depending on the presence of stress personality

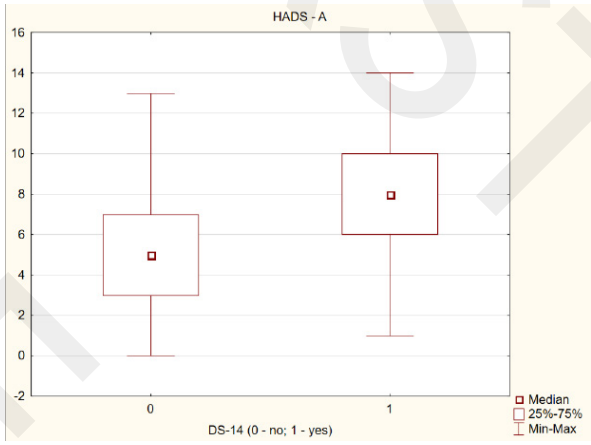

Fig. 6. Differences in the severity of anxiety symptoms depending on the presence of stress personality

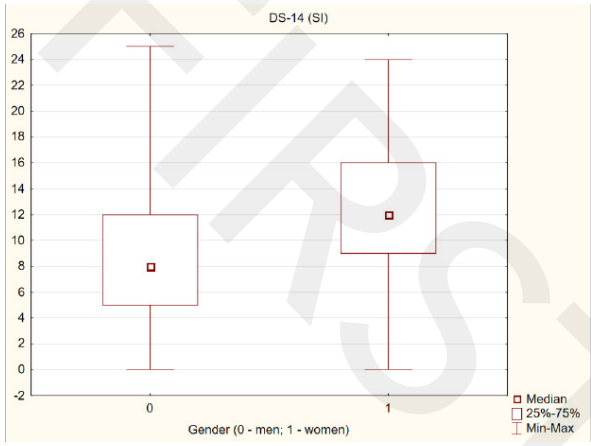

Fig. 7. Differences in the severity of social inhibition by gender

positively related to age (Tab. 2). Differences in disease acceptance due to the presence of stress personality are shown in Fig. 4. Individuals without type D personality traits had higher levels of disease acceptance, i.e. higher scores on the AIS. Those without type D personality traits achieved lower scores on the HADS-D and HADS-A (Figs. 5 and 6). Both subscales of the stress personality test correlated positively with the HADS-A and HADS-D. Women scored higher than men on the social inhibition subscale (Fig. 7).

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DISCUSSION

As speculated by the authors of the present study, cardiac patients have a high representation of stress personality (36%). Similar data have been reported by other researchers (Denollet, 2005; Kupper and Denollet, 2018; Ogińska-Bulik, 2009). In the present study, participants included those with CAD (group 1) and those with CAD and HF (group 2). No differences were observed between the groups regarding any parameter analysed. However, this could have been due to the small number of subjects participating in the study and the relatively small number of patients with type D personality. Many authors have recognised and described an association between type D personality traits and an adverse CAD course (Denollet et al., 2013; Kupper and Denollet, 2018; Starrenburg et al., 2013). In addition, type D is also a distinct risk factor for anxiety and depressive symptoms (Starrenburg et al., 2013).

The association between type D personality and prognosis in cardiac patients has been confirmed in an extensive meta-analysis, although it appears to have prognostic value only in patients with CAD, as opposed to those with HF (Grande et al., 2012). A recent meta-analysis of 19 cohort studies published in 2023, regarding the estimation of the effect of type D personality profile traits on adverse cardiac events in cardiac patients, showed that the presence of type D personality predicted adverse events in CAD patients, while the evidence regarding HF patients was inconclusive (Lodder et al., 2023).

Type D personality is a defined risk factor for both the onset and development of CAD. Studies point to its role in the aetiology of CAD, mainly due to the higher prevalence of hypertension and greater severity of coronary atherosclerosis, as well as in prognosis, as the risk of in-stent restenosis in patients with type D personality is more than doubled (Kupper and Denollet, 2018). The two traits, Ne and HS, which comprise the type D personality construct, positively correlate with adverse cardiovascular events and cardiac death/myocardial infarction in patients with CAD, while separate high scores on the Ne or HS scales show no such correlation. Regardless of depressive symptoms, type D personality remains an important predictor of CAD progression (Denollet et al., 2013).

Cardiac patients with type D personality are more likely to develop other cardiovascular conditions and major adverse cardiovascular events, are more susceptible to psychological stress, and have lower health-related quality of life (Pedersen and Denollet, 2003). In addition, pharmacotherapy and invasive treatment appear to provide less benefit in cardiac patients with type D personality. Previous studies have suggested that physiological hypersensitivity and activation of pro-inflammatory cytokines may be responsible for the negative impact of type D personality on cardiovascular prognosis in patients with CAD (Martens et al., 2007). The risk of adverse cardiovascular events is three times higher in patients with type D personality, with this association being more pronounced in patients with CAD than in those with HF. Possible reasons for these adverse effects include hypothalamic–pituitary–adrenal axis hypersensitivity, abnormal autonomic and inflammatory regulatory processes, and high levels of oxidative stress (Denollet and Conraads, 2011). Although another study showed that patients with type D personality had a significantly higher risk of non-fatal cardiac incidents compared to patients without type D personality during the five years following coronary artery bypass grafting, there was no significant difference in the total number of deaths (Raykh et al., 2022). Questions have been raised as to whether type D personality is a stable contributor to the development of cardiovascular disease, or whether it is rather a manifestation of its progression. Studies confirm that type D personality is a stable construct influencing the onset and progression of cardiovascular disease, independent of other variables, and emphasise the need to screen for type D personality in patients with such diseases in order to identify high-risk patients and improve secondary prevention (Martens et al., 2007). The presence of type D personality in patients with CAD is associated with endothelial dysfunction in men, as measured by flow-dependent dilation of the brachial artery, which is a significant predictor of CAD exacerbation. Cardiac patients with type D personality have been shown to have higher levels of superoxide anions produced by macrophages, elevated levels of oxidative stress, and higher levels of pro-inflammatory cytokines, including TNF-α, compared to patients without type D personality (Denollet et al., 2018).

The information cited has not gone unnoticed by the cardiology community, as the European Society of Cardiology (ESC) has addressed the issue of emotional disorders and personality traits affecting the development of CAD in its guidelines. The ESC's 2021 guidelines on cardiovascular disease prevention in clinical practice emphasise the need to screen for anxiety, depression, and type D personality, as these factors may play a crucial role in assessing both the risk and prognosis of CAD (Visseren et al., 2022).

The study revealed a potential overlap between anxiety, depression, and one of the type D personality traits, negative emotionality, particularly in relation to worry and ruminations. Worry was found to be mainly associated with anxiety, while ruminations were primarily linked to depression and negative emotionality. Therapeutic modalities, such as metacognitive therapy, may affect levels of worry and ruminations, potentially resulting in lower levels of anxiety, depression, and negative emotionality, thereby improving the cardiovascular prognosis in patients with CAD (Tunheim et al., 2022).

Screening for type D personality in patients early after interventional percutaneous procedures can be used to identify those at higher risk for depression and anxiety 10 years post-procedure (Al-Qezweny et al., 2016).

The presence of anxiety or depressive disorders, or anxiety and depressive symptoms, along with type D personality

prior to cardioverter defibrillator implantation, has been associated with poorer health status in cardiac patients (Starrenburg et al., 2013). In the general population, the negative affectivity of type D personality has been associated with anxiety, depression, and higher stress levels, while resting cardiac output has been connected with both negative affectivity and social inhibition, which make up the type D personality construct (Howard and Hughes, 2012). Type D personality has not only been shown to contribute to poorer initial health status in cardiac patients but also to worsen their rehabilitation outcomes compared to patients without stress personality traits (Pelle et al., 2008). Another study reported a reduced health-related quality of life in patients with type D personality and CAD and HF, both during rehabilitation and over the subsequent two years. The presence of anxiety, depressive symptoms, and received social support may influence this association (Staniute et al., 2015).

In the present study, AIS scores correlated negatively with age, duration of illness, and both components of the DS-14 scale. This suggests that individuals without type D personality traits score higher on the AIS, i.e. they have greater insight into the disease, a better understanding of its nature, and an easier time enduring the health limitations it causes. Type D personality has been linked to significantly poorer perceptions of the consequences of illness, a longer duration, a reduced sense of symptom control and more symptoms, and a greater focus on disease-related complaints. The essence of these complaints is less understood by patients with type D personality traits compared to those without (Williams et al., 2011).

As mentioned above, many studies have confirmed the association of type D personality with poor quality of life and psychological distress in cardiac patients. A higher number of shocks correlates with increased depressive and anxiety symptoms, worse functioning, poorer disease acceptance, and diminished quality of life in patients with implantable cardioverter defibrillators (Karczewska and Młynarska, 2021). Similar relationships have been observed in dialysis patients. In a Chinese study, the presence of a type D personality was found to be a predictor of poor quality of life, poorer perception of illness, and feelings of lower social support in chronically dialysed patients (Li et al., 2017). It is also worth mentioning that in the cited study, the prevalence of type D personality was 35.6%, which was higher than the prevalence in patients with chronic heart disease (Denollet et al., 2009) and similar to that obtained in the present study. Disease acceptance can be considered a preventive factor against the onset of anxiety and depression symptoms, also in patients with diabetes, especially type 1 (Badura-Brzoza et al., 2022).

LIMITATIONS OF THE STUDY

The main limitation of the study was the small group of participating patients and the relatively low correlation rates, which warrant cautious interpretation of the findings. Type D personality criteria were met by 36% of the subjects. In the future, the authors of this paper plan to conduct a study with a larger group of cardiac patients, which, according to the available data, is expected to yield a higher number of patients with stress personality and allow for more reliable results.

CONCLUSIONS

1. Individuals with type D personality find it more difficult to accept their illness and are characterised by higher levels of depression and anxiety.
2. Women have stronger social inhibition.
3. Younger individuals with a shorter medical history tend to accept their illness more easily.

Conflict of interest

The authors report no financial or personal relationships with other individuals or organisations that might adversely affect the content of the publication and claim ownership of this publication.

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Author contribution

Original concept of study; final approval of manuscript: MP, JP. Collection, recording and/or compilation of data: KPK, ŁK, AS. Analysis and interpretation of data: MP, PGD, JP. Writing of manuscript: MP, KPK. Critical review of manuscript: PG.

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