RESEARCH ARTICLE

Selected psychological predictors of medication adherence in the older adults with chronic diseases

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Abstract

Aim: The main goal of the study was to assess the significance of selected psychological factors related to the adherence to medication recommendations among the older adults with chronic diseases.

Design: It was designed as a cross-sectional study, aimed at assessing the importance of selected psychological factors in complying with medication recommendations among older adults.

Methods: The study involved 345 older adults with chronic diseases, assessed the importance of selected psychological factors, such as: health locus of control, stress coping and mindfulness in adhering to medication recommendations older persons. To answer the research questions, we performed frequency analyses, basic descriptive statistics analyses together with the Kolmogorov–Smirnov test, Student's *t* tests for independent samples, monofactorial analysis of variance in the intergroup diagram, analysis correlation with the Pearson correlation coefficient, Spearman's rank correlation ρ analysis and stepwise linear regression analysis.

Results: The study identified psychological predictors of medication adherence, which explained 12% of the variability. An emotion-oriented coping proved to be the most important factor. Additionally, powerful other health locus of control and mindful attention were shown to have a positive effect.

KEYWORDS
adherence, health locus of control, mindfulness, older adults, psychological factors, stress coping

1 | INTRODUCTION

Data on the demographics of the world reveal that the global population is ageing at a rapid rate. According to the Eurostat report from 2018, by 2080 the percentage of European Union residents aged 65 and older will increase to 29.1% of the total population, compared with 19.4% in 2017. The share of this age group in the general population is described by the old age index, which in 2018 was 17.5% (by comparison, in 1990 older persons constituted 10% of the population). The report "The State of Aging and Health in America in 2013" (Centers for Disease Control & Prevention, 2013) forecasts that by 2030, the number of adults aged 65 or older in the United States will more than double to around 72 million and constitute 20% of the nation. At the same time, a quarter of all Americans

and two out of three older Americans are diagnosed with several chronic diseases and the treatment of this population accounts for 66% of the country's healthcare budget.

According to the findings of the European Health Interview Survey carried out in 2014, most older people suffer from hypertension, joint diseases, coronary artery disease, diabetes and thyroid disease (Information on the situation of the older adults from Statistics Poland, 2018). The growing tendency for societies to age entails the need to develop the best standards of care for the older persons, who often suffer from several diseases at once. One of the conditions for effective treatment is the patient's cooperation with medical staff, especially nurses and, in particular, meticulous adherence to medication recommendations (Annema et al., 2009; Perrella et al., 2018; Riles et al., 2014).

The term adherence was used for the purposes of this study. The definition of this concept has changed over the years, but currently, it is defined as the patient's conscious and voluntary involvement in the therapeutic process. The term is not the same as compliance, which also refers to compliance with recommendations, but in terms of low involvement and implies the patient's fault (Ho et al., 2009; Riles et al., 2014).

Medication non-adherence in elderly people is a serious public health problem. It is estimated that poor medication adherence may occur in 50% of older people. Consequently, it significantly increases the morbidity, burden on the healthcare system and healthcare costs. While older adults do not have more problems following medical recommendations solely because of age, they usually have a greater burden of comorbidity and are therefore more likely to have adverse effects of treatment and polypharmacy than younger adults (Gellad et al., 2011; Hughes, 2004; Osterberg & Blaschke, 2005).

2 | BACKGROUND

From a therapeutic point of view, the timely start of treatment is vital, along with the appropriate drug regime and continuation of therapy. This aspect seems to be particularly important in the case of older people struggling with multi-morbidity and multi-medication, which may reduce adherence rates (Hughes, 2004; Walsh et al., 2019). A review of the literature from recent years has revealed a small number of reports on the relationship between psychological factors and adherence to medication regimens in older persons. The PubMed, PsychINFO and HealthSource databases were searched, but no meta-analysis was found regarding the relationship between mental traits, personality and adherence levels in older adults. This was one of the most significant reasons why we decided to address this subject in our study.

Studies on the assessment of adherence to therapeutic recommendations conducted for a period lasting more than a dozen years have shown that systematic use of medications and undergoing the recommended forms of therapy is a major problem for many patients. This is true regardless of the type of disease and

availability of healthcare (Osterberg & Blaschke, 2005; Partridge et al., 2003; Ruddy et al., 2009). For various reasons (patient-related, healthcare system-related, socio-economic, therapy-related and disease-related factors), there is a rising tendency not to follow the doctor's recommendations (Hughes, 2004; Kardas et al., 2013; Srivastava et al., 2013). This non-adherence becomes one of the reasons for failure of the treatment, deterioration of disease symptoms, complications, increase in the frequency of hospitalization and even mortality (Bender et al., 2006; Culig & Leppee, 2014; Ghidei et al., 2013; Perry et al., 2018; Rasmussen et al., 2007; Walsh et al., 2019). The most common forms of non-adherence are as follows: failing to start or delaying the start of treatment, unintentional or intentional skipping of single doses of a drug, changing the frequency of taking a drug, periodically taking a different dose than the recommended one, breaks in treatment lasting several days or longer, premature termination and discontinuation of treatment (Ghidei et al., 2013; Lam & Fresco, 2015; Nguyen et al., 2014; Restrepo et al., 2008).

The authors of this article paid special attention to the psychological predictors of medication adherence which are not very explored. These are subjective factors that affect the way people perceive, interpret and deal with reality. Thus, they also participate in decision-making and motivational processes, including in relation to medical recommendations (Gruszczyńska et al., 2019; Sioni & Mathur, 2015; Tominaga et al., 2018).

We were guided in our choice by that psychological factors were connected with health and characterized by varying levels of stability. The most stable is stress coping defined as a response to a specific situation and is a relatively permanent, individual choice of how to respond to a difficult situation in a particular way (Endler & Parker, 1990; Folkman & Lazarus, 1985). As an example of the research on the impact of stress coping may be tested by Weaver et al. (2005) model which indicates that using of avoidance-oriented strategies is associated with lower levels of adherence and, consequently, higher levels of viremia in HIV-positive patients during HAART therapy.

Next in the order is health locus of control (Wallston et al., 1978) and the most modifiable is mindful attention (Brown & Ryan, 2003). Due to the relationship with body awareness (e.g. sensitivity to stimuli coming from the body) and awareness of emotions and needs, it may be an important factor in the process of treatment and medication adherence.

The main objective of the study is to assess the importance of selected psychological factors probably associated with medication adherence in the older adult group.

2.1 | Research question

The research questions were as follows: (a) Whether and how strong stress coping, health locus of control and mindful attention affects medication adherence? (b) How do demographic factors affect medication adherence?

3 | THE STUDY

3.1 | Design

It was designed as a cross-sectional study, aimed at assessing the importance of selected psychological factors, such as health locus of control, stress coping, mindful attention in complying with medication recommendations among older persons. We considered it important to isolate those psychological predictors that favoured adherence. The study was conducted in five randomly selected primary healthcare centre outpatient clinics in Silesia in Poland. We asked to participation into the study each person over 60 years of age who had an appointment with doctors during the period from January to March 2019. Finally, the study involved 345 older adults, who had been diagnosed with a chronic diseases at least 6 months earlier. We exclude from the study people with no recommendations for continuous medication during the preceding half a year, who are not able to read and write independently. Additional exclusion criteria were as follows: diagnosis of dementia; mild cognitive impairment; and mental disorders that prevent from controlling medication alone, such as the current major depressive episode, psychotic disorder. Respondents completed questionnaires during their stay in the primary healthcare centre.

3.2 | Measures

Respondents completed their own questionnaires. Demographic, clinical, psychological and adherence data were collected using standardized tools and our own questionnaire.

The tools included the following:

The Medication Adherence Questionnaire (MAQ) (Morisky et al., 1986) evaluates adherence to medication recommendations. MAQ has been "validated" on different groups of patients with different levels of education and is the most widely used adherence scale (Culig & Leppee, 2014). The tool consists of four dichotomic questions. The questions relate to forgetfulness and reasons for failing to take prescribed medication. The respondent scores 0 points for each affirmative answer and 1 point for each negative answer. The range of the final score is between 0–4 points. For research purposes, low (0–1), medium (2–3) and high (4) adherence levels can be distinguished (Morisky et al., 2008). We used the Polish version of the questionnaire (Jasińska et al., 2009). Moderate internal consistency was found (Cronbach's $\alpha = 0.63$). Toll et al. (2007) demonstrated two factors in their research. The first was related to unintentional non-adherence (forgetting), the other to purposeful non-adherence (connected with a subjective assessment of how the individual feels at that moment).

Multidimensional Health Locus of Control Scale (MHLC) (Wallston et al., 1978) was adapted to the Polish context by Juczyński (2009). The Cronbach alpha of the MHLC scale was within the range 0.54–0.74. The scale contains 18 statements and includes beliefs about general expectations in three areas of the internal health locus of control: internal health locus of control—control over my own health depends on me; the powerful other health locus of control—my own health is the result of the influence of others, especially medical staff; and chance health locus of control—health is decided by chance or other external factors. The respondent expresses their attitude towards the presented statements. The results for each of the scales lie in the range 6–36 points. The higher the score, the stronger the belief that a factor affects one's health.

The Coping Inventory for Stressful Situations, (CISS) (Endler & Parker, 1990), adapted to Polish conditions by Strelau et al. (2009). For the task-oriented coping and emotion-oriented coping scales, values of the Cronbach's α coefficient were obtained in the range of 0.82–0.88, while for the avoidance-oriented coping scale the values ranged from 0.74–0.78. The CISS consists of 48 items that assess reactions in a stressful situation. The respondent marks an appropriate number on a five-point scale and refers to each statement specifying the frequency of a reaction (where 1—never, 2—very rarely, 3—sometimes, 4—often and 5—very often). Methods of coping with stress are shown in the form of three subscales: 1—Task-oriented coping is used by persons who take action to solve a problem according to the cognitive transformation theory an attempt to alter the problem causing the distress and think how to best handle the problem/by cognitive reappraisal.; 2—Emotion-oriented coping characterizes people who tend to concentrate on themselves and their own emotions; and 3—Avoidance-oriented coping characterized by the effort to avoid dealing with the stressor, that is, thinking, cognition or experience of stressful situations. Additionally, in the last subscale, two forms of avoidance were distinguished: distraction seeking and social diversion.

The Mindful Attention Awareness Scale (MAAS) (Brown & Ryan, 2003), adapted to the Polish context by Radoń (2014), is used to examine the disposition towards mindfulness. The Cronbach alpha of the MAAS scale was within the range 0.8–0.85. Mindfulness is defined in the MAAS as a "receptive state of attention which, through the awareness of current experiences, observes what is happening" (Brown & Ryan, 2003). The questionnaire consists of 15 statements that describe daily experiences regarding mindfulness. The task of the respondent is to assess the frequency of experiencing them on a 6-point scale, where 1 means "almost always" and 6 "almost never." The overall result obtained in the test lies in the range 15–90 points. The higher the score, the more mindful the respondent is. All statements in the questionnaire reflect the level of mindfulness, not directly but by describing experiences where this disposition does not occur. Some validation studies indicate a two-factor structure of mindfulness assessed by MAAS (Cebolla et al., 2013), while most of them, as in the Polish studies, show only one factor (Black et al., 2012).

3.3 | Analysis

To answer the research questions, we performed analysis using parametric tests because our data met all assumptions (George &

Mallory, 2019). We performed frequency analyses, basic descriptive statistics analyses together with the Kolmogorov–Smirnov test, Student's *t* tests for independent samples, one-way analysis of variance for independent samples, Pearson's *r* correlation. Only one distribution was close to the Gaussian distribution, which was for the MAAS. For the remaining variables, the Kolmogorov–Smirnov test result was statistically significant. After testing the skewness of the distributions, we decided that the values in the range −2 to +2 were not significantly asymmetric in relation to the mean. This applied to all the examined variables; therefore, we carried out statistical analyses using parametric tests, after meeting the other requirements for these tests.

For data recorded on rank scale non-parametric analysis had to be performed, therefore we used Spearman's rank correlation. To summarize the analysis, we performed linear regression analysis. Because we wanted to include in model only those predictors, that are useful to predict the outcome variable, we performed the analysis using stepwise method. The classic threshold, $\alpha = 0.05$, was set as the level of significance; however, statistical probability results of $.05 < p < .1$ were interpreted as significant at the statistical trend level.

3.4 | Ethics

According to the opinion of the competent Bioethical Committee, the study obtained consent no. KNW/0022/KB/170/17 and was not considered a medical experiment. It was prepared and carried out in accordance within generally applicable legal and ethical standards, with particular emphasis on the principles of conducting clinical trials laid down in the Helsinki Declaration.

4 | RESULTS

The study involved 345 older persons, aged 61–88 years (mean = 70.03; median = 69; SD 5.81). Most of them were women (74.5%), urban residents (89%) with high school education (42.9%), married (54.5%), with at least one child (85.2%) and religious (94.5%). The detailed data are presented in Table 1.

The diagnosis of chronic diseases and Body Mass Index (BMI) were taken into consideration. A large proportion of the respondents were cardiologic (38%) and overweight or obese (mean = 27.55; median = 26.99; SD 4.57). Table 2 shows the number of individual diagnoses. Table 3 contains basic descriptive statistics along with an assessment of the normality of the distribution of variables.

4.1 | The variables depending on the gender of the respondents

Current knowledge in the area of health psychology indicates the importance of gender for many psychological factors and health behaviours. Due to the significant predominance of women among

TABLE 1 Demographic data

	N	%
Gender		
Female	257	74.5
Male	88	25.5
Place of residence		
Urban	307	89
Rural	38	11
Education		
Primary school	23	6.7
Vocational school	67	19.4
Secondary school	148	42.9
Higher education	106	30.7
Employment		
In work	29	8.4
Out of work	316	91.6
Marital status		
Single	23	6.7
Divorced	21	6.1
Widowed	110	31.9
Married	188	54.5
Cohabitant	3	0.9
Number of children		
0	53	15.4
1	80	23.2
2	127	36.8
3	56	16.2
4	23	6.7
5	3	0.9
6	2	0.6
8	1	0.3
Faith		
Non-believer	19	5.5
Believer	326	94.5

TABLE 2 Dominant chronic disease

Disease	N	%
Cardiological disease	131	38
Oncological disease	16	4.6
Haematological disease	24	7
Haematological disease after haematopoietic cell transplantation	5	1.4
Musculoskeletal disease	21	6.1
Rheumatoid arthritis	40	11.6
Diabetes	50	14.5
Thyroid disease	21	6.1
Other	37	10.7

TABLE 3 Descriptive statistics of the MAQ, MHLC, CISS, MAAS results

Variable	M	Me	SD	Sk.	Kurt.	Min.	Max.	K-S	p
Adherence	2.74	3	1.17	−0.65	−0.49	0	4	0.21	<.001
Unintentional non-adherence	0.81	1	0.80	0.36	−1.36	0	2	0.28	<.001
Purposeful non-adherence	0.45	0	0.65	1.15	0.14	0	2	0.39	<.001
Internal control	24.52	25	4.83	−0.38	0.22	7	36	0.08	<.001
Influence of others	24.60	24	4.89	0.10	0.03	10	36	0.06	.002
Chance	21.92	22	4.97	−0.04	−0.48	9	35	0.06	.014
Task-oriented coping	53.61	54	9.63	−0.30	0.60	23	85	0.05	.023
Emotion-oriented coping	43.35	44	8.99	−0.06	−0.03	20	72	0.07	.001
Distraction seeking	20.56	21	5.37	−0.03	−0.30	8	35	0.06	.003
Social diversion seeking	16.45	17	4.02	−0.13	−0.34	5	25	0.06	.002
Avoidance-oriented coping	45.27	46	8.85	−0.21	−0.08	17	68	0.07	<.001
Mindful attention	61.49	62	12.04	−0.17	−0.33	29	90	0.04	.200

Abbreviations: KS, Kolmogorov–Smirnov test result; Kurt., kurtosis; M, mean; Me, median; min and max., lowest and highest distribution value; p, significance; SD, standard deviation; Sk., skewness.

the respondents, the results for men and women were evaluated in terms of the studied variables (Hernandez et al., 2018).

In most statistical analyses of the variables, no significant differences were found in relation to gender. In terms of the health locus of control, one statistically significant result according to gender was found. The level of the powerful other health locus of control was higher in the group of men ($t = −2.29$, $p = .023$). The results in avoidance-oriented coping ($t = 2.34$; $p = .020$), especially on the scale of seeking social diversion ($t = 2.92$; $p = .004$), were higher in the group of women. A higher level of mindful attention was recorded in the group of women ($t = 2.15$; $p = .32$). It is worth noting that the strength of the effects of the differences between the groups was low (Cohen's $d = 0.27–0.33$).
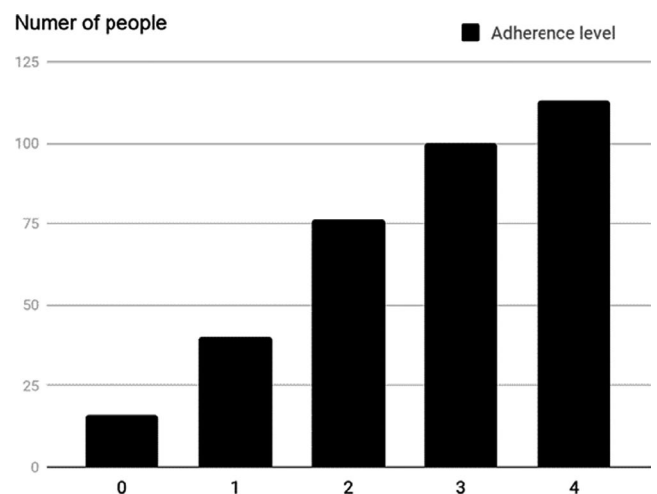
4.2 | Adherence

The distribution of the results of the adherence level in the respondents is demonstrated in the histogram in Figure 1. The results were categorized into three groups (Morisky et al., 2008): low results (56 respondents, constituting 16.2% of the study group), medium results (176 respondents, 51%) and high results (113 respondents, 32.8%).

Adherence and the health locus of control, stress coping and mindful attention.

Table 4 shows only statistically significant correlation results.

Additionally, the scores obtained by subjects who obtained low, medium or high results on the adherence scale were summarized. We performed a series of one-way analyses of variance in the intergroup diagram. Table 5 shows statistically significant results for the internal health locus of control, powerful other health locus of control, emotion-oriented coping, social diversion and mindful

FIGURE 1 Adherence level of the studied group

attention. A post hoc analysis was necessary for these variables using the Sidak tests.

In the case of the internal health, locus of control and the powerful other health locus of control one statistically significant difference were noted. In both cases, higher scores were recorded in the group of respondents whose adherence level was high and this group was statistically significantly different from those who displayed a low adherence level. In turn, the group with average results did not differ from the two other groups, even at the level of statistical tendency.

In terms of emotion-oriented coping, two statistically significant differences were observed. The lowest results were recorded in the group of subjects with a high level of adherence. This group was statistically significantly different both for the group of subjects with low scores and the group with average scores for adherence. These

TABLE 4 Relationship between the level of adherence and the level of control, stress coping and mindful attention

	Pearson correlation	Adherence	
		Female	Male
Internal control			
Pearson	0.169	0.141	0.264
Correlation	0.002	0.025	0.013
Influence of others			
Pearson	0.180	0.185	0.201
Correlation	0.001	0.003	0.061
Chance			
Pearson	−0.038	−0.034	−0.038
Correlation	0.488	0.588	0.727
Task-oriented coping			
Pearson	0.049	0.049	0.066
Correlation	0.369	0.579	0.543
Emotion-oriented coping			
Pearson	−0.274	−0.279	−0.271
Correlation	<0.001	<0.001	0.011
Distraction seeking			
Pearson	−0.063	−0.038	−0.152
Correlation	0.244	0.551	0.161
Social diversion			
Pearson	0.003	0.002	−0.027
Correlation	0.952	0.980	0.803
Avoidance-oriented coping			
Pearson	−0.038	−0.012	−0.139
Correlation	0.488	0.855	0.200
Mindful attention			
Pearson	0.231	0.241	0.187
Correlation	<0.001	<0.001	0.080

TABLE 5 Health locus of control, stress coping and mindful attention depending on the level of adherence

Adherence level score	M	SD	
Internal locus of control			
Low	23.24 a	4.44	$F(2, 337) = 4.44$
Mean	24.30 ab	4.88	$p = .013$
High	25.4 9b	4.79	
Influence of others			
Very low	23.13 a	4.49	$F(2, 337) = 4.81$
Low	24.46 ab	4.63	$p = .009$
High	25.5 6b	5.29	
Chance			
Very low	21.67	5.35	$F(2, 337) = 0.13$
Low	22.05	4.87	$p = .876$
High	21.86	4.98	
Task-oriented coping			
Very low	52.91	9.22	$F(2, 338) = 0.60$
Low	53.32	8.81	$p = .548$
High	54.41	11.00	
Emotion-oriented coping			
Very low	46.36 a	9.31	$F(2, 338) = 16.39$
Low	44.79 a	8.04	$p < .001$
High	39.59 b	9.11	
Distraction seeking			
Very low	20.55 ab	5.31	$F(2, 338) = 3.99$
Low	21.27 a	5.24	$p = .019$
High	19.45 b	5.46	
Social diversion			
Very low	16.20	4.19	$F(2, 338) = 0.47$
Low	16.65	3.96	$p = .624$
High	16.24	4.04	
Avoidance-oriented coping			
Very low	44.93	8.80	$F(2, 338) = 2.26$
Low	46.21	8.53	$p = .106$
High	43.96	9.26	
Mindful attention			
Very low	58.21 a	9.75	$F(2, 338) = 7.79$
Low	60.33 a	12.37	$p < .001$
High	64.96 b	11.83	

Note: The letter indices indicate statistically significant differences at the level of $p < .05$. Sidak post hoc tests.

two groups, in turn, did not differ from each other even at the level of statistical tendency.

In terms of social diversion, one statistically significant difference was noted. The highest score on this scale was recorded in the group of people with medium adherence. This group was statistically significantly different from the group of subjects with a high level of adherence. On the other hand, the group with a low level of adherence did not differ from both these groups, even at the level of statistical tendency.

In terms of mindful attention, the highest results were observed in the group with a high level of adherence. This group was statistically significantly different from the group with low and medium adherence results. In turn, these groups did not differ from each other, even at the level of statistical tendency.

When it comes to other variables, no differences were noted, even at the level of statistical tendency. Statistical analyses of most of the examined demographic and clinical variables did not show significant correlations with adherence.

4.3 | Variables explaining the adherence level

Linear regression analysis was performed using the stepwise method. Three variables were included in the model—the level of emotion-oriented coping, the level of influence of others and mindful attention, $F(3, 334) = 16.36$; $p < .001$. This model explained the 12% variation in the adherence level. The highest percentage of

variation was attributed to the emotion-oriented coping. The results are summarized in Table 6.

Again, in the group of women, three variables have been included in the model—the level of emotion-oriented coping, the level of internal health locus of control and mindful attention, $F(3, 247) = 14.27$; $p < .001$. This model explained 13.7% of the variation in the adherence level. The highest percentage of variation was attributed to the emotion-oriented coping. The results are summarized in Table 7.

To determine predictors in the group of men, only two variables were included in the model—the level of emotion-oriented coping and the number of children, $F(2, 84) = 5.88$; $p = .004$. This model explained 10.2% of the variation in the adherence level. A larger percentage of variation was explained by the emotion-oriented coping (Table 8).

In the whole group and in the group of men and women, other psychological, demographic or clinical variables were added to the model because it was not a statistically significant predictor of the dependent variable.

TABLE 6 Results of the regression analysis for adherence level

	B	*SE*	*Beta*	*t*	*p*
(Constant)	2.14	0.58		3.67	<.001
Emotion-oriented coping	−0.03	0.01	−0.23	−4.22	<.001
Influence of others	0.04	0.01	0.17	3.27	.001
Mindful attention	0.02	0.01	0.15	2.80	.005

TABLE 7 Results of the regression analysis for the adherence level in the group of women

	B	*SE*	*Beta*	*t*	*p*
(Constant)	1.99	0.63		3.17	.002
Emotion-oriented coping	−0.03	0.01	−0.25	−4.06	<.001
Influence of others	0.05	0.01	0.20	3.38	.001
Mindful attention	0.02	0.01	0.17	2.83	.005

TABLE 8 Results of the regression analysis for the adherence level in the group of men

	B	*SE*	*Beta*	*t*	*p*
(Constant)	4.28	0.67		6.36	<.001
Emotion-oriented coping	−0.05	0.02	−0.35	−3.20	.002
Number of children	0.27	0.12	0.23	2.17	.033

5 | DISCUSSION

The study identified three of the most important predictors of adherence: emotion-oriented coping, powerful other health locus of control and mindful attention, which together explained the 12% adherence variation. Chronic diseases are a source of stress in human life. Long-term treatment, the nuisance of taking medications, regular visits to the doctor and economic problems related to the cost of medicines (this is particularly acute in the case of older adults) are just some of many stressors (Vancampfort et al., 2017). On the other hand, recovery may depend on how a person adapts to this situation. The style of coping with stress is a response to a specific situation and is a relatively permanent, individual choice of how to respond to a difficult situation in a particular way (Endler & Parker, 1990; Folkman & Lazarus, 1985).

In this study, the emotion-oriented coping proved to be the most distinct predictor of adherence. The less that the respondents focused on emotions in a stressful situation, the more likely they were to follow the medication regimen (higher adherence). In our study, this relationship is visible both in the whole group of respondents and the groups divided according to gender and it explains the highest percentage of adherence variability. Similar results were obtained in the studies of Hwang et al. (2018) on people on haemodialysis. It was confirmed that non-adherence was higher in patients with an emotion-oriented coping compared with patients with a task-oriented coping. A focus on coping with negative feelings is not conducive to a task-oriented coping to recovery. At the same time, our research did not show any significant relationship between the level of adherence and the task-oriented coping. Further verification of the hypothesis about such a relationship would seem important to further research, since many studies indicate a link between the task-oriented coping and a higher degree of adherence to medication recommendations (Brito et al., 2016; Vélez-Vélez & Bosch, 2016). We suppose that the cultural differences of the respondents, the health situation (type of disease) and the importance attached to the disease situation may be of great importance.

In the studied group of older people, we demonstrated a correlation between high compliance with medication recommendations and a powerful other health locus of control. Similar results were obtained by other authors (Náfrád et al., 2017). This is also consistent with the work of Cottrell et al. (2013) and Percival et al. (2012), who, after conducting a study on people with heart disease, showed that acceptance of the disease, a positive attitude to the treatment process and the belief that the treatment brings health benefits, fosters adherence to the medication regimen.

The external style may predispose an individual to greater openness to using the help of others (friends, family, neighbours). This is especially important for older people. In the studied group of men, it was shown that the level of adherence positively correlated with the number of children. It is believed that it may be a specific manifestation of the powerful other health locus of control in men. This hypothesis should be adopted with great caution because of the relatively small number of men participating in the study and the conclusions of other studies which suggest that it is not merely the having a partner or children that favours adherence to recommendations, but the

quality of social relationships and perceived social support (Martire & Helgeson, 2017; Wyszomirska et al., 2014). At the same time, Wu et al. (2008) demonstrated that a social support deficit in older people is not conducive to adherence (Gerlach et al., 2017; Wu et al., 2012).

In our study, mindfulness was another factor that influenced adherence. Adherence has been shown to increase the correlativity to mindful attention. Studies by other authors also suggest a relationship between mindfulness and higher disease acceptance, a higher level of adherence to medication recommendations and thus a better quality of life in chronic diseases (Çetin & Aylaz, 2018; Kerrigan et al., 2018; Lima et al., 2016; Merkes, 2010; Salmoirago-Blotcher & Carey, 2018). Greater mindfulness to what is happening to the human body means responding to its needs. Research indicates that better knowledge about one's own disease, its symptoms, treatment methods and management favours higher adherence to medication recommendations (Vélez-Vélez & Bosch, 2016).

The results of the study have practical implications. Health locus of control and coping is relatively stable constructs; therefore, it is important that doctors should take them into account when in direct contact with the patient and to choose suitable interventions when giving recommendations and cooperating with the patient. Long-term treatments specific to chronic diseases can be conducive to developing trust in the medical staff and in the doctor who has looked after the patient for many years. For people with powerful other health locus of control, the belief that medical staff have an impact on their health is very high. The particular sensitivity of people with an powerful other health locus of control to any kind of message from the medical staff can promote either positive or negative attitudes towards the treatment and adherence to the recommendations. This largely depends on the method of self-presentation, communication, the content of speech and on the doctors' and nurses' recommendations. Bearing this in mind, medical staff who intentionally use appropriate methods of communication are able to positively influence adherence. On the other hand, patients are particularly susceptible to communication-related iatrogenic errors (Vélez-Vélez & Bosch, 2016; Wallston et al., 1978). In the case of low adherence, a psychological consultation and/or cooperation between a doctor and a psychologist may be helpful (both in the case of permanent and modifiable features). In contrast, mindfulness is a psychological process that can be developed through exercise or meditation (Pagnini & Phillips, 2015; Posner, 2011). Mindfulness training can simultaneously reduce the symptoms of some somatic diseases and have a positive effect on adherence (Salmoirago-Blotcher & Carey, 2018). The best way to assess the relevance of this research is to test the effectiveness of interventions based on the conclusions of the study (Conn et al., 2009), which will be the next stage of our work.

6 | CONCLUSIONS

Summarizing the results of our research indicates the two most important conclusions. First, emotion-oriented coping with stress proved to be a factor that reduces the level of adherence to medication recommendations among older persons. Secondly, powerful

other health locus of control and a higher level of mindful attention were the factors that favourably affected adherence to medication recommendations in the examined group of older adults.

Implications for practice:

- The results that powerful other health locus of control is a predictor of adherence can be treated as optimistic, because patients with powerful other health locus of control expect specific medical advices, recommendations which are accepted as adapted to their health problems and this is the most common, patient-matching medical–staff relationship. Specially, nurses can give in promoting and maintaining medication adherence.
- Specially nurses can give in promoting and maintaining medication adherence, because they have frequent contact with the patients.
- Methods of self-presentation, communication, the content of speech and on the doctors' and nurses' recommendations have a particularly strong impact on patients with powerful other health locus of control
- In the case of low adherence, mindfulness training and psychological consultation and/or cooperation between a medical staff and a psychologist may be helpful (both in the case of permanent and modifiable features).

6.1 | Limitations

The authors of this study are aware of the limitations of this research. First is the lack of clinical variables that may be linked to adherence and psychological predictors (e.g., severity of symptoms, multiple and frequency of taking medication). We did not include the clinical data Questions in the self-questionnaire to keep it as short as possible.

It was dictated by the specifics of the study group, expanding the survey could adversely affect the reliability of the entire research. We should remember that most of the studied group, as much as 74.5%, were women, which means generalizing the results for the whole group requires caution.

CONFLICT OF INTEREST

None reported.

DATA AVAILABILITY STATEMENT

We declare that upon request, data will be provided.

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