Title: The relationship between self-esteem, sense of self-efficacy and level of illness acceptance, and healthful behaviours in patients with long-term illnesses (type II diabetes, Hashimoto's disease)

Author: Danuta Rode, Magdalena Rode

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ORIGINAL ARTICLE

Danuta Rode
1 · A,B,C,D,E,F
Magdalena Marta Rode
2 · A,B,C,D,E,F

The relationship between self-esteem, sense of self-efficacy and level of illness acceptance, and healthful behaviours in patients with long-term illnesses (type II diabetes, Hashimoto's disease)

BACKGROUND
Hashimoto thyroiditis and type II diabetes are chronic diseases which have adverse consequences impacting emotional and cognitive functioning. Healthful behaviours focused on improvement of one's health or on combating the illness play a key role in psychosocial functioning of a person, particularly one suffering from a long-term illness. The aim of the research was the measurement and analysis of healthful behaviours and the distinction of variables determining healthful behaviours. We attempted to examine the connection between adhering to healthful behaviours, and the level of illness acceptance, self-efficacy and self-esteem, in terms of exhibiting healthful behaviours in the above-mentioned groups of patients.

PARTICIPANTS AND PROCEDURE
The study group consisted of 140 persons (70 persons with type II diabetes, 70 persons with Hashimoto's disease). The following measurement techniques were used: the Health Behaviour Inventory by Z. Juczyński, the General Self-Efficacy Scale by R. Schwarzer and M. Jerusalem adapted for Polish by Z. Juczyński, the Acceptance of Illness Scale by B. J. Felton, T. A. Revenson and G. A. Hinrichsen, and the Self-Esteem Scale by M. Rosenberg.

RESULTS
The results show that for the group of type II diabetes patients self-efficacy constitutes a statistically significant moderate positive predictor of psychological attitude and appropriate eating habits, and is a positive weak predictor of general healthful behaviour and prophylaxis at the tendency level. For Hashimoto's sufferers the sense of self-efficacy is a statistically significant moderate predictor of healthful behaviours.

CONCLUSIONS
The study investigated significant relations between the level of illness acceptance, the sense of self-efficacy and self-esteem, and engagement in healthful behaviour. The sense of self-efficacy determines higher healthful practices in both research groups. The study allowed for a comparison of two groups of long-term illnesses sufferers – type II diabetes, and Hashimoto's disease – in terms of adhering to healthful behaviours, and dependencies between selected psychological variables and patients' preferred healthful behaviours.

KEY WORDS
health behaviour; self-efficacy; Hashimoto thyroiditis; type II diabetes; long-term illness

ORGANIZATION – 1: University of Social Sciences and Humanities, Warsaw, Poland · 2: Institute of Psychology, University of Silesia in Katowice, Katowice, Poland

AUTHORS' CONTRIBUTIONS – A: Study design · B: Data collection · C: Statistical analysis · D: Data interpretation · E: Manuscript preparation · F: Literature search · G: Funds collection

CORRESPONDING AUTHOR – Magdalena Marta Rode, Ph.D., Institute of Psychology, University of Silesia in Katowice, Katowice, Poland, e-mail: magdalena.rode@us.edu.pl

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BACKGROUND

Long-term illnesses have adverse consequences affecting many areas of human functioning, impacting primarily its emotional and cognitive elements (Ogińska-Bulik, 2014). One starts to lose certain personal resources such as the sense of self-worth and self-efficacy, as well as interpersonal relationships, leading to a potential deterioration of the way one deals with the illness itself (Heszen-Niejodek, 2003).

Occurrence of chronic disease implies general health condition deterioration and subsequently secondary health problems (Dixon-Ibarra & Horner-Johnson, 2014; Maddigan et al., 2003). Healthful behaviours focused on improvement of one's health or on combating the illness play a key role in psychosocial functioning of a person, particularly one suffering from a long-term illness. So far, research into this subject has strongly focused on lifestyle and psychology of the ill, as well as on offering assistance in coming to terms with becoming ill (Morris, Shakespeare-Finch, & Scott, 2007; Linley & Joseph, 2008; Linley, Joseph, Harrington, & Wood 2006; Tedeschi & Calhoun, 2007; Ogińska-Bulik, 2013). It is therefore relevant to analyse the connection between psychological variables and the behaviour of persons suffering from long-term illnesses. One of the key elements guiding one's motivation to improve one's health and to fight the illness is the image one has of oneself, one's likes, desires, values, and goals – self-esteem, often referred to as a motivational image of oneself (Brunstein, 2003; Nolen-Hoeksema & Davis, 2004; Rheinberg, 2006). Persons suffering from a long-term illness, who at the same time have a high, stable and mature sense of self-worth, can effectively cope with accepting and adjusting to it (Wojciszke, 2003). Undervaluation of oneself reduces motivation and positive emotional dynamics, thus decreasing the effectiveness of actions taken to combat long-term illness (Nowak & Tomiak, 2004; Szpitalak & Polczyk, 2015).

The sense of self-efficacy is motivationally significant, constituting one of the fundamental mechanisms of self-regulation of human behaviour. The generalized sense of self-efficacy is perceived as the ability to change one's behaviour, and is tied to such healthful behaviours as exercising regularly, controlling food related attention and behaviour, preventing and abandoning smoking and other addictions (Schwarzer & Fuchs, 1996; Juczyński, 2000). Research results also indicate that pro-health behaviours are highly dependent on the patient's beliefs considering the causal conditions of the illness. Perceiving the illness root in genetic factors diminishes self-efficiency in introducing pro-health lifestyle (Condit et al., 2009); however, research by Nguyen, Oh, Moser and Patrick (2015) showed no differences in pro-health behaviours in terms of genetic and behavioural contribution. It is also moderated by socio-economic status (Carlson et al., 2014), peer and societal influence (Salvy, de la Haye, Bowker, & Hermans, 2012), structural barriers and factors relating to access (Riis, Grason, Strobino, Ahmed, & Minkovitz, 2012), knowledge, motivations and beliefs (Hagger & Chatzisarantis, 2009; Plotnikoff, Costigan, Karunamuni, & Lubans, 2013). Another factor which indirectly, by means of affective states, determines introducing pro-health performance in order to achieve well-being is self-compassion (Zessin, Dickhäuser, & Garbade, 2015; Sirois, Kitner, & Hirsch, 2015). Taking pro-health actions in chronic diseases also depends on the mental state of the person – in particular the occurrence of mental disorders (Xiang, 2016), motivational constructs (e.g. motivational self-efficacy, risk perception, outcome expectancies, goal setting), and volitional constructs (action and coping planning, social support, action control, maintenance and recovery self-efficacy) (Schwarzer, Lippke, & Luszczynska, 2011). The self-regulation approach in health management is currently the most prevalent in explaining the mechanisms of health behaviour's actions (Lansing & Berg, 2014; Mann, de Ridder, & Fujita, 2013). It should be noted that the factors responsible for health-promoting activities are different due to clinical groups.

The relationship between self-esteem, sense of self-efficacy and level of illness acceptance

The aim of the present research was the measurement and analysis of healthful behaviours of persons suffering from type II diabetes and Hashimoto's disease, and the distinction of variables determining their healthful behaviours. We attempted to examine the connection between adhering to healthful behaviours, and the level of illness acceptance, self-efficacy and self-esteem, in terms of exhibiting healthful behaviours in the above-mentioned groups of patients. According to ICD-10, type II diabetes is described as insulin-independent diabetes (caused by hormone secretion disorder of the pancreas), its development caused by lifestyle (obesity, stationary lifestyle) and genetic factors (Otto-Buczkowska, 2003). Hashimoto's disease, a prolonged inflammation of the thyroid (ICD-10 classification: E06 – Thyroiditis), belongs to a group of autoimmune defects of internal secretion glands.

The course of both these diseases is gradual, occurring in increments which often remain imperceptible. The damage caused by Hashimoto's disease and type II diabetes is severe and irreversible. Symptoms of Hashimoto's disease appear gradually, along with the deterioration of the thyroid and a decrease in hormone production, leading to heart disease, infertility, and even coma. Diabetes leads to the development of severe complications: circulatory disorders, diabetic kidney and eye diseases. The treatment of both Hashimoto's disease and type II diabetes is complex and requires the application of several treatment methods. Among these are non-pharmacological

methods such as diet and exercise, as well as pharmacological approaches

For persons in the aforementioned groups regular ingestion of medicine is a necessary condition for maintaining one's wellbeing, and for maintaining the body in relative homeostasis. Hashimoto's and type II diabetes sufferers are to a large extent dependent on ingestible drugs. Dysfunctions of endocrinal secretions require constant monitoring of health through periodic visits to endocrinology/diabetic clinics and performing regular tests. Treating type II diabetes requires one to adhere to doctor's orders, such as weight loss, maintaining a diabetic diet, and increasing physical activity. Hashimoto's disease treatment requires regular ingestion of thyroid hormones, and monitoring of hormone levels and the psychological state of the patient. Hypoactive thyroid and blood sugar disorders are long-term illnesses and require the application of practices aimed at preventing their adverse consequences and complications.

PARTICIPANTS AND PROCEDURE

RESEARCH QUESTIONS

The following research questions were formulated:

1. Which group of long-term illness sufferers type II diabetics or Hashimoto's diseases sufferers will show more healthful behaviours?
2. Are there differences in illness acceptance levels between Hashimoto's disease and type II diabetes sufferers?
3. Do illness acceptance, self-efficacy and self-esteem levels determine the level of healthful behaviours?

PARTICIPANTS

One hundred fifty-six persons took part in the study. Results of 140 individuals were included in the study, including 70 persons with medically diagnosed type II diabetes, and 70 persons with medically diagnosed Hashimoto's disease. Persons who suffered from both type II diabetes and hypoactive thyroid were excluded from the study. Participants were from Śląskie, Małopolskie and Opolskie voivodships in Poland.

There were 35 male and 35 female subjects suffering from type II diabetes. The age range for this group was 31–68 years (M = 52.10, SD = 11.40). There were 54 female and 16 male subjects suffering from hypothyroidism (Hashimoto). The gender inequality stems from the fact that thyroid disorders affect mostly women (Ponichtera & Borowiak, 2008). The age range for this group was 23–62 years (M = 48.20, SD = 12.80). The time since the patient's illness diagnosis ranged from 5 to 10 years (M = 7.44, SD = 3.64).

ETHICS

This research project was reviewed and approved by the Scientific Research Ethics Commission of the Institute of Psychology of the University of Silesia.

RESEARCH PROCEDURE

Research was conducted in Voivodship Endocrinology Clinics (Voivodship Specialist Clinic Workgroup) and Diabetes Clinics, upon receiving the expressed consent of the directors of said clinics. Participation was voluntary and anonymous. Patients were informed of the aim and method of research. Most of the time there were two meetings with each patient. Part of the research was conducted by Dawid Newski in the course of preparation of his Masters dissertation entitled "The relationship between select personality traits and the level of illness acceptance, and healthful behaviours in patients suffering from long-term illnesses".

RESEARCH TOOLS

1. Health Behaviour Inventory (Inwentarz Zachowań Zdrowotnych) by Z. Juczyński

The Inventory consists of 24 statements describing various health-related behaviours. The general level of healthful behaviours is determined on the basis of the frequency of each behaviour as stated by the subject. The Inventory specifies 4 categories of healthful behaviours: appropriate eating habits, prophylaxis, healthful practices, and positive psychological attitude. The subject rates each behaviour based on the last 12 months. The answers provided allow for the determination of the general indicator of healthful behaviour tendency. Individual results are also related to specific sub-scales of the questionnaire. Internal consistency of the Health Behaviour Inventory was determined based on Cronbach's α, which is .85 for the entire Inventory, and between .60 and .65 for each of the four sub-scales.

2. General Self-Efficacy Scale (GSES) R. Schwarzer, M. Jerusalem adapted for Polish by Z. Juczyński

The Scale was created by Schwarzer and Jerusalem, translated into Polish and adapted for Polish by Juczyński (2009). It refers to the concept of expectations and the sense of self-efficacy formulated by Bandura (1977). Efficacy is defined as a sense of control exerted over actions being taken. The sense of self-efficacy can be determined with regards to a specific activity, i.e. coping with a long-term illness. The results are given by summation over all answers, resulting in a general sense of self-efficacy indicator. Cronbach's α coefficient is .85. The scale reliability, assessed by the test-retest method (5-week interval), is .78, and

the discriminatory power coefficient is .85. The tool was validated before it was used for this study.

3. The Acceptance of Illness Scale (AIS) B. J. Felton, T. A. Revenson and G. A. Hinrichsen adapted for Polish by Z. Juczyński

The scale was designed by Felton and Revenson (1984) and contains statements describing negative consequences of poor health. Increased level of illness acceptance causes better adjustment and diminished sense of psychological discomfort. The results are given by summation over all answers, resulting in a general illness acceptance indicator. Cronbach's α coefficient is .85. The scale reliability, assessed by the test-retest method (4-week interval), is .64. The measurement tool was translated into Polish and validated by Z. Juczyński.

4. Self-Esteem Scale (SES) M. Rosenberg

The SES questionnaire by Morris Rosenberg allows one to obtain the global self-esteem indicator. Self-esteem is defined as a positive or a negative approach to the self, understood as a form of global evaluation of oneself which remains fairly stable in adults (Dzwonkowska, Łachowicz-Tabaczek, & Łaguna, 2008, p. 7). The reliability of the Polish version, determined by Cronbach's α coefficient, falls between .81 and .83. There are distinct norms for men and women, for three different age groups: adolescents, young adults, and adults.

Normal distribution for variables being measured was assessed; the skewness and kurtosis for the majority of variables being measured were within the range $< -1 : 1 >$. This confirmed the normal distribution of variables. Illness acceptance and the sense of self-efficacy were notable exceptions, both being characterized by leftward leptokurtic distribution. The Mann-Whitney *U* test was used to analyse the differences in variables in both groups. Intergroup differences in healthful behaviours and self-esteem were evaluated using two-factor ANOVA variance analysis with gender differentiation. Individual variables as determinants of adherence to healthful behaviours were assessed by means of forced entry and stepwise regression analysis. The tool was translated into Polish and validated before it was used for the study.

RESULTS

The relationship between self-esteem, sense of self-efficacy and level of illness acceptance

ADHERENCE TO HEALTHFUL BEHAVIOURS IN PATIENTS TREATED FOR TYPE II DIABETES, AND HASHIMOTO'S DISEASE SUFFERERS

A two-factor ANOVA variance analysis was employed to determine whether there are significant differences between Hashimoto's disease sufferers and persons treated for type II diabetes in terms of adherence to healthful behaviours. The factors were the illness (type II diabetes vs. Hashimoto's), and gender (female vs. male). General healthful behaviours and four dimensions (*appropriate eating habits, prophylaxis, positive psychological attitude, healthful practices*) were dependent variables.

A statistically significant main effect of the illness type was observed only for two dimensions: appropriate eating habits, and positive psychological attitude (Table 1). Type II diabetics scored higher on appropriate eating habits, while Hashimoto's sufferers showed higher positive psychological attitude. There was also a statistically significant effect of type of illness and gender interaction on appropriate eating habits (Table 2). For men, diabetics scored higher for appropriate eating habits than patients with thyroid deficiency – Hashimoto illness ($p < 0.050$). There was no such difference in the female group.

Table 1

Summary of F statistics for effect of main illness type on healthful behaviours

	Type II diabetes		Hashimoto		$F(1, 112)$	p	η^2
	M	*SD*	*M*	*SD*			
Healthful behaviours	89.56	15.07	88.83	13.27	1.64	.240	.016
Appropriate eating habits	22.36	4.41	21.92	4.55	6.32	.050	.056
Prophylaxis	23.01	4.07	22.97	4.25	0.25	.680	.004
Positive psychological attitude	22.32	4.01	20.02	3.46	0.45	.030	.025
Healthful practices	21.78	5.02	20.97	4.01	0.19	.590	.001

Note. *M* – mean, *SD* – standard deviation, *F* – ANOVA analysis statistic, *p* – significance, η^2 – eta.

Table 2

Summary of F statistics for effect of illness and gender interaction on healthful behaviours

	Type II diabetes			Hashimoto		$F(1, 112)$	p	η^2
	Gender	*M*	*SD*	*M*	*SD*			
Healthful behaviours	M	87.34	15.82	81.83	12.53	0.12	.790	.004
	F	91.89	12.36	91.02	12.39			
Appropriate eating habits	M	22.03	4.79	17.76	2.80	5.33	.040	.051
	F	22.02	4.01	21.86	4.53			
Prophylaxis	M	21.98	4.43	21.81	4.62	0.06	.790	.011
	F	23.96	3.46	23.71	4.21			
Positive psychological attitude	M	22.79	3.78	21.98	3.73	0.09	.850	.003
	F	23.40	4.02	23.10	3.32			
Healthful practices	M	20.58	5.61	21.63	4.65	2.54	.210	.027
	F	22.80	4.37	21.01	3.92			

Note. M – mean, *SD* – standard deviation, *F* – ANOVA analysis statistic, *p* – significance, η^2 – eta, M – male, F – female.

Next the authors assessed whether there were differences in levels of illness acceptance between persons with type II diabetes and Hashimoto's disease sufferers. The Mann-Whitney *U* test was used, with illness type as an independent variable (diabetes vs. thyroid) and the level of illness acceptance as a dependent variable. There were statistically significant intergroup differences for participants overall, as well as for females and males (Table 3). Type II diabetes patients exhibited lower levels of illness acceptance than ones with a thyroid disorder.

Next we assessed whether there were differences in the sense of self-efficacy between type II diabetes and Hashimoto's diseases sufferers. The Mann-Whitney *U* test was employed with illness type (type II diabetes vs. Hashimoto's) as an independent variable, and the sense of self-efficacy as a dependent variable. The calculations were performed for the population as a whole, and with gender differentiation.

There was no statistically significant intergroup difference for the population, or for female and male groups (Table 4). The sense of self-efficacy was similar for type II diabetes patients and for Hashimoto's disease sufferers.

The next step of the analysis was establishing the determining factors of healthful behaviours for patients with type II diabetes and Hashimoto's disease sufferers. To do this we employed a series of regression analyses with healthful behaviours as the dependent variables, and other variables as independent variables (i.e. illness acceptance, self-efficacy, self-esteem). We assessed whether illness acceptance is a predictor of adhering to healthful behaviours. The results show that for both type II diabetics and Hashimoto's sufferers illness acceptance is not a determinant of healthful behaviour (Tables 5 and 6).

It was assumed that the sense of self-efficacy would be a determinant of adhering to healthful behaviours in the groups being studied (Tables 7 and 8).

The results of regression analysis using the "forced entry" method show that for the group of type II diabetes patients self-efficacy constitutes a statistically significant moderate positive predictor of psychological attitude and appropriate eating

Table 3

Summary of U statistic for the effect of illness type on illness acceptance

	Gender	Type II diabetes		Hashimoto		*U*	*p*
		M	*SD*	*M*	*SD*		
Illness acceptance	O	27.51	6.22	35.01	5.71	710.00	.001
	M	26.52	6.17	34.60	3.45	65.59	.010
	F	26.91	6.05	34.23	6.15	289.00	.001

Note. M – mean, SD – standard deviation, *U* – Mann-Whitney's *U* test statistic, *p* – significance, O – overall, M – male, F – female.

Table 4

Summary of U statistic for the effect of the illness type on the sense of self-efficacy

	Gender	Type II diabetes		Hashimoto		*U*	*p*
		M	*SD*	*M*	*SD*		
Sense of self-efficacy	O	32.01	3.31	31.10	3.97	1462.11	.480
	M	31.82	3.74	31.68	3.41	169.01	.940
	F	32.03	3.57	31.82	4.17	567.00	.490

Note. M – mean, S*D* – standard deviation, *U* – Mann-Whitney's *U* test statistic, *p* – significance, O – overall, M – male, F – female.

Table 5

Summary of regression coefficients for "forced entry" method for the relationship between illness acceptance and healthful behaviours of patients with type II diabetes

Explained variable		Non-standardized coefficients		Standardized coefficients	*F*(1, 53)	R^2	*p*
		B	Standard error	β			
Healthful behaviour (general)	(const.)	75.81	9.32	.26	2.41	.06	.170
	Illness acceptance	0.51	0.34				
Appropriate eating habits	(const.)	20.02	2.92	.24	2.54	.12	.150
	Illness acceptance	0.17	0.13				
Prophylaxis	(const.)	20.80	2.76	.15	0.80	.05	.400
	Illness acceptance	0.13	0.10				
Positive psychological attitude	(const.)	21.00	2.56	.20	1.82	.05	.210
	Illness acceptance	0.22	0.12				
Healthful practices	(const.)	18.01	3.32	.21	1.65	.07	.260
	Illness acceptance	0.16	0.14				

habits, and is a positive weak predictor of general healthful behaviour and prophylaxis at the tendency level. For Hashimoto's sufferers the sense of self-efficacy is a statistically significant moderate predictor of healthful behaviours. It might be suggested that a higher sense of self-efficacy results in higher scores for overall healthful behaviours and appropriate eating habits for this group, while also being related to prophylaxis and the maintenance of a positive psychological attitude during illness.

Self-esteem was considered to be an important determinant of healthful behaviours in ill persons, particularly ones suffering from long-term illnesses. Accounting for different functions played by self-esteem – protection from fear (Greenberg, Pyszczynski, & Solomon, 1986), stress and misfortune (Baumeister et al. 2003) or maintaining alertness (Roese & Olson, 2007) – this variable was included in the study. The results are given in Tables 9 and 10.

In the group of type II diabetes patients self-esteem is a statistically significant moderate predictor of general healthful behaviours, positive psychological attitude, and appropriate eating habits. In the Hashimoto's group, self-esteem is a statistically significant moderate determinant of positive psychological attitude, and, similarly to diabetics, is a weak predictor of prophylaxis.

DISCUSSION

The study was designed to, on the one hand, establish the level of healthful behaviours in long-term sufferers of type II diabetes and Hashimoto's disease and, on the other hand, to determine whether there are significant dependencies between the sense of self-efficacy, the level of illness acceptance, self-esteem, and healthful behaviours of diabetics and patients with hypoactive thyroid.

Table 6

Summary of regression coefficients for "forced entry" method for the relationship between illness acceptance and healthful behaviours of Hashimoto's disease sufferers

Explained variable		Non-standardized coefficients		Standardized coefficients	$F(1, 53)$	R^2	p
		B	Standard error	β			
Healthful behaviour (general)	(const.)	84.02	10.71	.05	0.15	.02	.710
	Illness acceptance	0.15	0.38				
Appropriate eating habits	(const.)	21.62	3.79	−.04	0.05	.01	.910
	Illness acceptance	−0.08	0.15				
Prophylaxis	(const.)	23.16	3.61	.03	0.01	.02	1.000
	Illness acceptance	0.07	0.12				
Positive psychological attitude	(const.)	19.43	2.75	.19	1.56	.06	.250
	Illness acceptance	0.12	0.11				
Healthful practices	(const.)	21.01	3.42	.08	0.19	.02	.710
	Illness acceptance	0.09	0.13				

Table 7

Summary of regression coefficients for "forced entry" method for the relationship between the sense of self-efficacy and healthful behaviours of patients with type II diabetes

Explained variable		Non-standardized coefficients		Standardized coefficients	$F(1, 56)$	R^2	p
		B	Standard error	β			
Healthful behaviour (general)	(const.)	61.62	17.10	.23	2.81	.06	.100
	Sense of self-efficacy	0.91	0.60				
Appropriate eating habits	(const.)	14.03	4.32	.15	2.66	.02	.010
	Sense of self-efficacy	0.17	0.12				
Prophylaxis	(const.)	14.51	4.80	026	3.33	.05	.090
	Sense of self-efficacy	0.28	0.16				
Positive psychological attitude	(const.)	11.21	4.42	.37	7.51	.15	.010
	Sense of self-efficacy	0.42	0.16				
Healthful practices	(const.)	20.98	5.97	.04	0.02	.04	.940
	Sense of self-efficacy	0.06	0.21				

Table 8

Summary of regression coefficients for "forced entry" method for the relationship between the sense of self-efficacy and healthful behaviours of Hashimoto's disease sufferers

Explained variable		Non-standardized coefficients		Standardized coefficients	$F(1, 56)$	R^2	p
		B	Standard error	β			
Healthful behaviour (general)	(const.)	4.91	12.67	.39	10.04	.15	.001
	Sense of self-efficacy	1.35	0.43				
Appropriate eating habits	(const.)	10.61	4.57	.37	5.01	.06	.020
	Sense of self-efficacy	0.32	0.13				
Prophylaxis	(const.)	8.87	4.20	.40	11.94	.17	.010
	Sense of self-efficacy	0.51	0.12				
Positive psychological attitude	(const.)	13.30	4.21	0.34	7.90	.15	.030
	Sense of self-efficacy	0.29	0.10				
Healthful practices	(const.)	14.98	4.35	0.16	1.57	.05	.160
	Sense of self-efficacy	0.23	0.13				

Table 9

Summary of regression coefficients for "forced entry" method for the relationship between self-evaluation and healthful behaviours of patients with type II diabetes

Explained variable		Non-standardized coefficients		Standardized coefficients	$F(1, 56)$	R^2	p
		B	Standard error	β			
Healthful behaviour (general)	(const.)	56.65	11.97	.39	7.60	.13	.001
	Self-evaluation	1.10	0.45				
Appropriate eating habits	(const.)	13.01	3.82	.33	6.01	.14	.040
	Self-evaluation	0.27	0.14				
Prophylaxis	(const.)	15.89	3.76	.30	3.90	.17	.100
	Self-evaluation	0.20	0.13				
Positive psychological attitude	(const.)	12.84	3.21	.34	10.92	.15	.001
	Self-evaluation	0.29	0.10				
Healthful practices	(const.)	14.90	4.35	.24	2.61	.05	.150

Table 10

Summary of regression coefficients for "forced entry" method for the relationship between self-evaluation and healthful behaviours of Hashimoto's disease sufferers

Explained variable		Non-standardized coefficients		Standardized coefficients	$F(1, 56)$	R^2	p
		B	Standard error	β			
Healthful behaviour (general)	(const.)	71.89	12.97	.18	1.40	.08	.230
	Self-evaluation	0.49	0.48				
Appropriate eating habits	(const.)	21.49	4.90	−.04	0.04	.03	.870
	Self-evaluation	−0.04	0.15				
Prophylaxis	(const.)	14.97	4.61	.22	3.30	.05	.040
	Self-evaluation	0.22	0.13				
Positive psychological attitude	(const.)	12.30	3.24	.40	9.39	.15	.010
	Self-evaluation	0.29	0.12				
Healthful practices	(const.)	14.90	4.35	.24	2.61	.05	.150
	Self-evaluation	0.21	0.13				

Analysis of healthful behaviours practised by patients with type II diabetes and Hashimoto's disease sufferers allowed us to establish differences in practice of appropriate eating habits, and positive psychological attitude. Diabetics exhibited appropriate eating habits more frequently than Hashimoto's sufferers. One may assume this to be a result of several factors: a more rigorous medication regime allowing for a reduction of the number of life-threatening blood sugar drops (Zanuso, Jimenez, Pugliese, Coriglano, & Balducci, 2010; Redekop et al. 2002; Sieradzki & Kokoszka, 2004), maintaining an appropriate body mass to avoid the problem of obesity (Bradley & Speight, 2000; Kurowska & Szomszor, 2011), and serious consequences of not adhering to appropriate eating habits faced by diabetics – much more serious than for patients suffering from hypoactive thyroid. Patients receiving treatment for type II diabetes experience direct consequences of failing to medicate (i.e. hypoglycaemia, hyperglycaemia), which is not the case for Hashimoto's sufferers. For Hashimoto's disease sufferers the key element of stabilizing their health is stress avoidance and coping with stress. This is supported by research results – an increase in healthful behaviours in the form of a positive psychological attitude indicates that patients try to avoid stress, strong emotions, and difficult and depressing situations. Accounting for the fact that the triggering factor for Hashimoto's disease (as for every autoimmune disease) may be stress or psychological disorders, sufferers consciously avoid strong emotional stimuli as they familiarise themselves with their disease (Brakebusch & Heufelder, 2015).

The effect of type interaction between illness and gender on appropriate eating habits was present only in the male group, while it was not observed for the female group. The lack of differences for both female groups may be medical or psychological in nature. Both illnesses require weight control and a significant level of appropriate eating habits. Hypoactive thyroid, much like diabetes, requires one to follow an appropriate dietary regime. Due to social pressures – wanting to have a slim and attractive figure, and the wish to be desired – women may have a predisposition to appropriate eating habits even without doctor's intervention. Based on our results, it may be stated that the differences resulting from healthful behaviours for men suffering from type II diabetes, and Hashimoto's, are to a large extent a result of medical advice, which is more restrictive for type II diabetes (i.e. the necessity of minimizing the threat to health and life of the patient), and not due to social attractiveness conditions, as may be the case for women.

Research results show that patients with type II diabetes exhibit a lower level of illness acceptance than persons suffering from hypoactive thyroid, regardless of gender. Lower illness acceptance is associated with decreased long-term illness adaptation, and thus with less efficient coping mechanisms. It is assumed that today diabetes is one of the most psychologically taxing long-term illnesses (Tatoń, 1992; Coffey, Brandle, Zhou, & Marriott, 2002; Bonenberg, 2012). This is a result of, among other factors, the dai-

ly monitoring of blood sugar levels and controlling other physiological parameters, requiring significant self-control and self-discipline from diabetics. These requirements are far greater than those faced by patients with hypoactive thyroid, which, while requiring daily hormone ingestion, entails less frequent check-ups. Greater involvement and self-control, together with diabetes-related complications, makes diabetes much more difficult to accept.

The study investigated significant relations between the level of illness acceptance, the sense of self-efficacy and self-esteem, and engagement in healthful behaviour. The sense of self-efficacy – the belief that one is able to cope with the challenges of the illness – determines higher healthful practices in both research groups. For the type II diabetes group the sense of self-efficacy is a predictor of positive psychological attitude and appropriate eating habits, as well as a predictor for general healthful practices and prophylaxis at the tendency level. Positive psychological attitude – avoidance of strong emotions and depressing situations – is conditional on an internal sense of being able to achieve one's goals, and on greater engagement in the chosen course of action, even in the face of increasing health problems (Rodgers, Conner, & Murray, 2008). Research conducted on an extended health beliefs model showed that strong belief in one's ability to control diabetes and self-efficacy in taking illness-prevention actions resulted in an awareness of the beneficial nature of actions taken, while reducing perceived barriers related to a particular form of treatment (Starowicz, 2009; Woodcock, 2007). Appropriate eating habits, in turn, affect the course of diabetes, limiting the adverse consequences and complications of this illness. In Hashimoto's disease sufferers the sense of self-efficacy effectively improves general healthful behaviours, appropriate eating habits, prophylaxis, and positive psychological attitude. High sense of self-efficacy may favour behaviours related to self-control of physiological parameters, and to shaping an objective image of the illness, as well as serving as motivation for healthful actions in terms of prevention and eating habits.

Self-esteem is a factor influencing the likelihood of adopting healthful behaviours. The results show that higher self-esteem is associated with more healthful behaviours in patients being treated for type II diabetes (general healthful behaviours, appropriate eating habits, prophylaxis, positive psychological attitude). The fact that self-esteem is a predictor for some healthful behaviours points to its relevance, as well as to the consistency of the research hypothesis with other studies (Dzwonkowska et al. 2008; Diener & Diener, 1995; Furnham & Cheng, 2000; Fila-Janowska 2009; Szpitalak & Polczyk, 2015) accepting that self-esteem predisposes one towards positive affect and avoidance of strong negative emotions, and suggesting that it may influence goal achievement and life satisfaction. High self-esteem and belief in self-efficacy translates into an increased engagement with particular activity, i.e. maintaining a diet, and physical and psychological activity of patients. The results obtained in this study confirm studies by Baumeister et al. (2003), pointing to high self-esteem as a predictor of longevity and physical health due to active utilization of resources helpful in overcoming obstacles.

The relationship between self-esteem, sense of self-efficacy and level of illness acceptance

The study allowed for a comparison of two groups of long-term illnesses sufferers – type II diabetes and Hashimoto's disease – in terms of adhering to healthful behaviours, and dependencies between selected psychological variables and patients' preferred healthful behaviours. While the study does not allow for the generalization of results to the population of diabetics and endocrinological disorder sufferers, they nevertheless allow for a better understanding of the relationship between the sense of self-efficacy, self-esteem and illness acceptance, and healthful behavioural practices.

The obtained results allow for at least a partial consideration of introducing psychological care into the therapy of Hashimoto's and type II diabetes sufferers. The problems faced by patients, as well as their capabilities, necessitate the application of various forms of such care. A prolonged somatic illness often hinders or even prohibits the full realization of an individual's developmental tasks, leading to psychological crises, and obstructing the progress of therapy. Both type II diabetics and thyroid disorders sufferers would benefit from psychological consultations directed at developing new skills and activities in the patient and her immediate family (support group). Psychological support should aim at developing healthy behaviours in the patient, and reducing unhealthy tendencies (i.e. inappropriate diet, unhygienic lifestyle). This course of therapy is particularly relevant for diabetics, whereas Hashimoto's sufferers ought to focus on coping with emotional stress (anxiety, helplessness, anger, regret). It is necessary that both groups work towards strengthening their motivation and hopefulness with regards to the treatment by, among other means, health education – the acquisition of an adequate view of one's illness and one's capabilities. These actions may be undertaken as part of individual or group therapy.

LIMITATIONS OF THE STUDY

Finally we need to mention the limitations of this study and resultant future lines of inquiry. While the correlation analysis yielded a lot of information, it would be advisable to conduct qualitative studies involving patients with type II diabetes and Hashimoto's disease sufferers. Individual interviews would

extend our biographical knowledge of these illnesses, and psychological functioning of those afflicted, for different illness stages. The study did not consider the significance of the length of the illness, its stages, the symptoms being experienced, adverse consequences, illness dynamics or social support – factors that probably influence psychological variables and patients' coping with an illness. Another significant factor worth researching is the positioning of the health locus of control in research groups, allowing assessment of the overall sense of influence subjects feel they have over their own health (Cheng et al. 2016).

We believe that research into coping abilities of long-term illness sufferers should be extended to cover analyses of factors related to competent coping with difficult situations. We could then identify protective resources which could be included in healthful behaviours of long-term illness sufferers.

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