MINISTRY OF EDUCATION AND RESEARCH

BABES-BOLYAI UNIVERSITY

FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCE

DOCTORAL SCHOOL FOR APPLIED COGNITIVE PSYCHOLOGY

DEPRESSION IN DIABETES:

RELATIONSHIP WITH DIABETES DISTRESS, ILLNESS PERCEPTION AND COGNITIVE-EMOTIONAL COPING

PHD THESIS

-SUMMARY-

Ph.D Candidate:

ANDREIA S. MOCAN

Scientific Supervisor:
Professor ADRIANA S. BĂBAN, Ph.D

CLUJ-NAPOCA
2017

Table of Content

KEY WORDS: diabetes mellitus, depression, diabetes distress, illness perception, life stress, cognitive coping strategies

C H A P T E R 1:

THEORETHICAL BACKGROUND

Depression is common in diabetes with a prevalence as twice as in people without diabetes (Anderson, Freedland, Clouse, Lustman, 2001). Depression was found to be higher in people diagnosed with diabetes when compared to people with diabetes but unaware of having the disease (Nouwen, Nefs, Caramlau, Connock, Winkley, Lloyd, et al 2011). Depression is associated with sub-optimal self-care behaviours regarding diet, physical activities and medication adherence particularly in individuals undergoing multiple insulin injection per day (Gonzales, Peyrot, McCarl, Serpa, Mimiaga, Safren, 2008; Lin, Katon, von Korrf, Rutter, Simon, Oliver, et al, 2004; Katon, von Koor, Ciechanowski, Russo, Lin, Simon, et al, 2004; Koompmas, Pouwer, Bie, 2009; Surwit, Tilburg, Parekh, Lane, Feinglos, 2005). The increased level of depression present in diabetes patients recommended the need for screening of depression by the medical team (Roy & Lloyd, 2012). However, this recommendation was dropped when demonstrated that 70% of the diabetes patients identified as having depression were not depressed when screened with structural interview (Fisher, Skaff, Mullan, Arean, Mohr, Masharani, et al, 2007). Fisher (2010) showed that poor diabetes control was associated with diabetes distress and not depression, while Schmitt (2015) showed that depression has a negative impact on glycemic control only if the relation is mediated by diabetes distress. Diabetes distress is a common emotional distress associated to diabetes and is experienced in relation to the burden of self-care, interpersonal relationships with family and friends, to care givers and medical health team and to emotional burden of diabetes (Polonsky et al, 2005). Both, depression and diabetes distress were found to be associated to illness perception (Skinner, Khunti, Carey, Dallosso, Heller, Davies, 2014) and coping mechanisms (Thorpe, Fahey, Johnson, Deshpande, Thorpe, Fisher, 2013).

Leventhal's Common Sense Model of Self-Regulation (CS-SRM) (Leventhal, Leventhal, Breland, 2011) explains the peoples' beliefs and understanding of their health by developing a cognitive and emotional representation of the health threat. In diabetes, lliterature on illness perception suggests that self-care behaviour, glycaemic control, depression and diabetes distress are shaped by patients health beliefs (Polly, 1992). Perceiving diabetes as an emotional burden can contribute to both diabetes distress and depression. Understanding the interaction between illness perception,

diabetes distress and depression can help develop efficient coping mechanism for preventing both emotional moods. Moreover, these interactions can be influenced by different aspects of everyday life such as other stressors beside diabetes, previous depression or socio-demographic factors. The relationship between the three concepts was not previously analyzed, especially in the context of other factors such as life stress or previous depression.

Two coping styles were largely investigated in diabetes: problem-focused strategies and emotional –focused strategies (Clarke & Goosen, 2009). Problem focus-stategies were found to be negativelly associated to depression while emotion-focused had a positive association (Burns, Deschenes, & Schmitz, 2016). Both of these two dimensions are composed by a variety of emotional –cognitive and behavioral strategies without a clear delimitation between them. Cognitive-emotional regulation coping reffers to the conscious cognitive way of coping to the unpleasant emotions (Garnefski, Kraaij, & Spinhoven, 2001).

Motivation for the present thesis:

A different prevalence and pattern of factors might be associated to depression in Romanian type 2 diabetes patients than in other developed countries due to a different socio-cultural and economical environment. Identifing this pattern might help preventing depression. Moreover, in these patients, diabetes distress has not been previously investigated. In order to asses diabetes distress, a validated questionniare was needed. Due to its impact, it is important to find which of the illness peception domains has the higher influence on the patients and on the relationship between diabetes distress and depression. Beside diabetes, other life events, such as problems with the family or at job, can represent a risk factor. So far, the relation between depression, illness perception and diabetes distress was not investigate in the context of other stress factors of everyday life. Beside the way people repesent their diabetes, identifying the way they cope with the illness is important. Coping mechanisms can act as both risk factors or protective factors in relation with depression. Previous, the main focus of the coping mechanisms were problem and emotional strategies. Cognitive strategies were not investigated in relation to depression in type 2 diabetes patients. Knowing which of the cognitive coping stategies characterise type 2 diabetes patient might help prevent depression. Further, these stategies can be included in education or counseling session for newly diagnosed type 2 diabetes patients.

C H A P T E R 2.

O B J E C T I V E S   O F   T H E   T H E S I S

The main objective of the present research was to evaluate depressive symptoms in type 2 diabetes patients and to investigate the factors that influence and increase the risk of developing depressive symptoms in these patients. More specific, we aimed:

1) to determine the prevalence of depression in type 2 diabetes patients;

2) to investigate the socio-demographic, clinical, biological and psychological factors associated to depression;

3) to assess the relation between diabetes distress, illness perception, life events and depression in people with type 2 diabetes; and to

4) to evaluate the contribution of cognitive-emotional coping strategies to depression.

C H A P T E R 3

S T U D Y   1:
VALIDATION OF THE ROMANIAN VERSION OF DIABETES DISTRESS SCALE[1]

3.1. Introduction

Diabetes distress is a construct which is gaining more importance in predicting diabetes outcomes and explaining depressive symptoms in diabetes (Talbot & Nouwen, 2000) Diabetes distress was found to have a high prevalence, between 13.88% and 44.6% (Chew, Shariff-Ghazali, & Fernandez, 2014) among diabetes patients. Diabetes distress was found to be linked to glycaemic control, self-care activities (Fisher et al., 2007; Gonzales et al, 2008) and medication adherence (Aikens, 2012). For measuring diabetes distress The Diabetes Distress Scale (DDS) is a whidelly used scale and has been shown to be associated to metabolic control and diabetes self-management (Polonsky et al, 2005; Schmitt et al, 2015). To our knowledge, so far, there is no data published on its psychometric characteristics for Romanian diabetes patients.

---

[1]Parts of this study were published: Mocan, A., Băban, A. (2015) An useful tool for diabetes emotional distress assessment: validation of the Romanian version of Diabetes Distress Scale. *Rom J Diabetes Nutr Metab Dis*. 22(4):425-431

3.2. Aim:

The aim of the present study was to validate the Diabetes Distress Scale and to examine the psychometric properties of the scale.

3.3. Material and methods:

3.3.1. Participants

A total number of 529 patients, both type 1 and type 2 diabetes subjects, aged 18 or older and fluently speaking Romanian were included in the study. Patients with active anxiety, dementia, substance abuse or psychotic diseases were excluded.

3.3.2. Measurements

Demographical characteristics such as age, sex, education, social status were self-reported. Clinical and biological characteristics of the participants were collected from the medical charts of the patients.

Diabetes Distress Scale (DDS) is a 17-items questionnaire (Polonsky et al., 2005) which assesses diabetes emotional distress. DDS includes four dimensions: distress related to healthcare team; self-care and diabetes management related distress; the interpersonal distress dimensions and distress related to the burden of diabetes. A cut-off point of >2 represented diabetes distress (Fisher, Hessler, Polonsky, & Mullan, 2012). *Beck Depression Inventory II (BDI-II)* was used to assess depressive symptoms (Beck, Steer, & Brown, 1996; David, Dobrean, & Sucala, 2012). *Summary of Diabetes Self-Care Activities* (*SDSCA*) (Toobert, Hampson, & Glasgow, 2000) is a multidimensional questionnaire of diabetes self-care behaviours and management.

3.3.3. Statistical analysis methods:

Exploratory factor analysis and confirmatory factor analysis were used to test the forced four, three and one factor fit of a predefined structure model. To establish internal consistency for DDS-Ro, we used Cronbach's alpha and split-half analysis. In order to examine the predictive validity, Pearson's correlation was used to assess the relation between BDI-II, SDSCA and DDS-Ro. A p value < 0.05 was considered significant.

3.4. Results:

3.4.1. Sociodemographic and clinical data

The majority of the participants were women (56.9%) diagnosed with type 2 diabetes (93.6%), 53.9% of patients scored below 2 at DDS-Ro. The scores for the DDS-Ro for the present sample range from 1 to 4.82. Results are displayed in Figure 1.
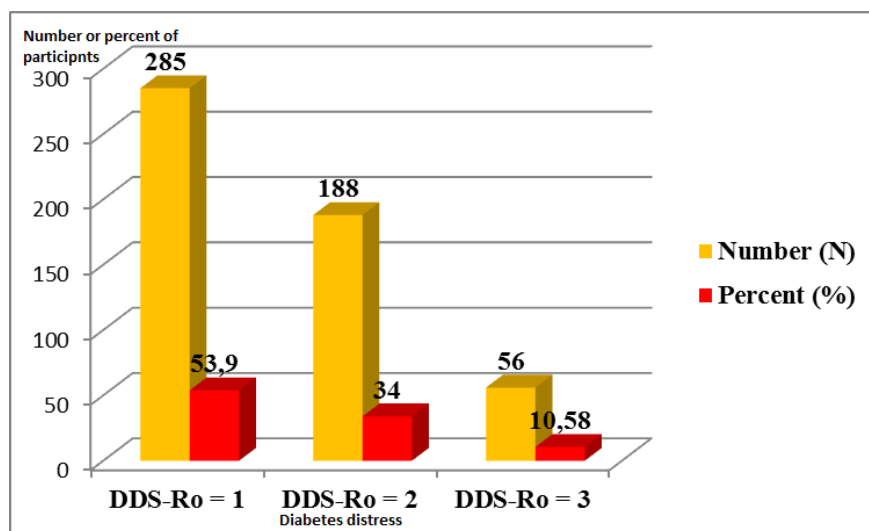

Figure 1. Scores reached by the participants at the DDS-Ro

3.4.2. Validity and reliability

Exploratory factor analysis showed best results for four-factor model. The factor loadings ranged from 0.321 to 0.862, with the lowest value being for item 16. The CFI= 0.882 of confirmatory factor analysis was below the acceptable level, indicating moderate fit (REMSEA = 0.073). All of the model parameters were significant at the $p < 0.05$ level. All data for exploratory factor analysis and factor loadings are showed in Table 1.

Table 1. Exploratory factor analysis showing factor loadings of the items of DDS-Ro

Factors of DDS-Ro	Component			
	1	2	3	4
1. Feeling that diabetes is taking up too much of my mental and physical energy every day.		.752		
2. Feeling that my doctor doesn't know enough about diabetes and diabetes care.	.728			
3. Feeling angry, scared, and/or depressed when I think about living with diabetes.		.673		
4. Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.	.862			
5. Feeling that I am not testing my blood sugars frequently enough.			.543	
6. Feeling that I am often failing with my diabetes routine.			.807	
7. Feeling that friends or family are not supportive enough of self-care efforts (e.g. planning activities that conflict with my schedule, encouraging me to eat the "wrong" foods).				.572
8. Feeling that diabetes controls my life.		.756		
9. Feeling that my doctor doesn't take my concerns seriously enough.	.788			
10. Not feeling confident in my day-to-day ability to manage diabetes.			.394	
11. Feeling that I will end up with serious long-term complications, no matter what I do.		.376		
12. Feeling that I am not sticking closely enough to a good meal plan.			.655	
13. Feeling that friends or family don't appreciate how difficult living with diabetes can be.				.729
14. Feeling overwhelmed by the demands of living with diabetes.		.637		
15. Feeling that I don't have a doctor who I can see regularly enough about my diabetes.	.463			
16. Not feeling motivated to keep up my diabetes self- management.			.321	
17. Feeling that friends or family don't give me the emotional support that I would like.				.817

Cut-off sore for factor loadings >0.3

The reliability for the entire scale and for the four subscales that it contains reaches a Cronbach level that range from 0.708 to 0.824 (see Table 2). Also, split-half analysis has a high reliability of 0.840.

Table 2. Internal consistency for entire DDS-Ro and for the four dimensions of the scale

Subscales	Cronbach's Alpha
DDS-Ro Emotional - F1	0.775
DDS-Ro Physician - F2	0.798
DDS-Ro Management - F3	0.708
DDS-Ro Interpersonal relationship - F4	0.733
DDS-Ro Total	0.824
	Split-half
DDS-Ro Total	0.840

*DDS-Ro –diabetes distress scale for Romanian patients

3.5. Discussion and Conclusion:

The results of the current study showed that the Romanian version of the DDS-Ro has satisfactory psychometric properties. The Romanian version of the Diabetes Distress Scale can be used for the screening of diabetes distress in diabetes individuals in clinical setting and for future research.

C H A P T E R 4

S T U D Y 2.

PREVALENCE AND RISK FACTORS TO DEPRESSIVE SYMPTOMS IN TYPE 2 DIABETES2[2]

4.1. Introduction:

In order to explain the increased risk of depressive symptoms in diabetes, both physiological mechanisms, such as inflammatory processes (Laake, Stahl, Amiel, Petrak, Sherwood, Pickup, et al., 2014) or increased glucose level (Lustman, Anderson, Freeland, de Groot, Carney, Clouse, 2000) and „psychological burden of diabetes" hypothesis, have been proposed (Talbot, 2000). Diabetes burden involves difficulties in the daily regimen management, fear of complications, feeling of being overwhelmed by

---

[2] Parts of this study were published: Mocan, A.S., Iancu, S.S., Duma, L., Mureseanu, C., Băban, A.S. (2016) Depression in Romanian patients with type 2 diabetes: prevalence and risk factors. *Clujul Medical*. 89(3):371-377

diabetes, poorly perceived social support. Previous studies analysed depression and its risk factors, but so far, we do not have such data in respect to Romanian type 2 diabetes patients.

4.2. Aim:

The aim of the present study was to: 1) determine the prevalence of depressive symptoms in a sample of type 2 Romanian diabetes patients and to 2) investigate the relation between socio-demographic, clinical, biological, lifestyle, previous depression, diabetes distress and present depressive symptoms.

4.3. Material and methods:

4.3.1. Participants

A total number of 150 outpatients from Centre for Diabetes, Nutrition and Metabolic Diseases – Emergency Clinical County Hospital Cluj were recruited in the study at baseline. Of these, four patients failed to complete all the questionnaires and two refused to give the consent to access their medical data. Of 150 participants at baseline, 6 participants were excluded and in the end, 144 type 2 patients were included in the study.

4.3.2. Measurements

Sex, age, education, social-status, previous depressive symptoms and treatment for depression were self-reported. Clinical and biological characteristics were collected from the medical charts of the patients. To assess the depressive symptoms of the patients, Beck Depression Inventory Second Edition (BDI-II) was used (Beck, et al., 1996). To identify the symptoms of depression, the cut-off score of ≥ 14 was used (David, Dobrean, & Sucala, 2012). Diabetes Distress Scale (Polonsky et al., 2005) was used to aseess the emotional burden of the illness. Higher score represent higher diabetes distress (Fisher et al, 2012).

4.3.3. Statistical analysis methods

Mean, standard deviation and frequency were used for descriptive statistics of the general sample. Independent t-test, Mann-Withney U-test and χ^2 were used to compare characteristics for females and males, for depressed and non-depressed group.

Pearson correlation was used to assess the association between the risk factors and depressive symptoms. Second, linear regression was applied. Model 1 included sociodemographic variables; Model 2 contained diabetes characteristics; Model 3 consisted of lifestyle characteristics; Model 4, included previous depression; Model 5, included diabetes distress.

4.4. Results:

The prevalence of depressive symptoms in our study was 12.6% (18 participants). Model 1 (socio-demographics), Model 2 (diabetes related factors) and Model 3 (life style related factors) showed no significant association between depressive symptoms and the investigated factors. Previous depressive symptoms were independently associated with present depression both in Model 4 and 5. Model 5 showed the independent contribution of diabetes distress to present depressive symptoms. When diabetes distress was added to the analysis, in the 5th Model, both employment and increased number of diabetes complications became significant. Table 1 shows the factors associated with present depressive symptoms.

4.6. Discussion and Conclusion:

In clinical settings these patients should be encouraged by the health care team to continue to go to work and family members while diabetes related complications should be prevented. Also continuous screening for diabetes distress and previous depression should be performed along with the screening of depressive symptoms

Table 1. Models introduced in regression analysis to assess depressive symptoms

Factors	Model 1 $R^2 = 0.057$ Demographic			Model 2 $R^2 = 0.140$ Diabetes related			Model 3 $R^2 = 0.160$ Lifestyle related			Model 4 $R^2 = 0.226$ Previous MDD			Model 5 $R^2 = 0.485$ Diabetes Distress		
	B	t	p	B	t	p	β	t	P	B	t	p	β	t	p
Age	-0,149	-1,058	0,293	-1,073	-1,073	0,286	-0,159	-1,052	0,296	-0,127	-0,868	0,388	-0,103	-0,840	0,403
Sex	0,163	1,514	0,133	1,808	1,808	0,074	0,218	1,849	0,068	0,101	0,823	0,413	0,041	0,403	0,688
Employment stats no vs. yes	-0,157	-1,111	0,269	-1,373	-1,373	0,173	-0,185	-1,216	0,227	-0,176	-1,190	0,237	-0,276	-2,227	0,029
Education	0,032	0,292	0,771	0,645	0,645	0,521	0,058	0,503	0,616	0,026	0,235	0,815	0,048	0,516	0,607
Diabetes Duration (years)				-1,362	-1,362	0,177	-0,167	-1,160	0,249	-0,182	-1,304	0,196	-0,233	-1,992	0,060
Number of Insulin Years				0,602	0,602	0,548	0,089	0,539	0,591	0,085	0,534	0,595	0,105	0,791	0,432
Treatment				0,569	0,569	0,571	0,055	0,372	0,711	0,014	0,099	0,922	-0,054	-0,448	0,655
Number of Diabetes Complications				1,613	1,613	0,110	0,154	1,301	0,197	0,168	1,461	0,148	0,236	2,447	0,017
HbA1c				0,411	0,411	0,682	0,097	0,795	0,429	0,043	0,358	0,721	0,018	0,182	0,856
BMI							-0,091	-0,805	0,423	-0,054	-0,487	0,627	-0,052	-0,571	0,569
Cigarette number/day							0,052	0,453	0,652	0,042	0,381	0,704	0,078	0,851	0,397
Alcohol consumption no vs. yes							0,095	0,820	0,415	0,073	0,644	0,521	0,090	0,953	0,344
Number of Comorbidities							0,160	1,345	0,182	0,069	0,577	0,566	-0,038	-0,378	0,706
Previous Depressive Symptoms										0,297	2,551	0,013	0,239	2,448	0,017
Diabetes Distress													0,540	6,085	0,000

BMI- body mass index; MDD – previous depression;

C H A P T E R 5

S T U D Y 3.

DOES ILLNESS PERCEPTION MODERATES THE RELATIONSHIP BETWEEN DIABETES DISTRESS AND DEPRESSION IN TYPE 2 DIABETES PATIENTS?

5.1. Introduction:

Negative thinking patterns can produce and maintain negative mood and can affect individual's response to life events (Teasdale, 1983; Calmes & Roberts, 2007). Self-regulation model (Leventhal, Leventhal, Contrada, 1997) postulates that personal representation of the disease influences the psychological and behavioral response to illness. Beliefs about diabetes develop shortly after diagnosis (Lawson, Bundy, & Harvey, 2008) and tend to be stable for the next years. Also, diabetes impact seen as perceived diabetes consequences predicted diabetes distress at 4-months and depression at 3-years follow-up form diagnosis (Skinner, Hampton, & Fife-Schaw, 2002; Skinner et al, 2014). In order to help people with diabetes prevent depression, a clearer comprehension on the relationship between these three factors is needed. Moreover, beside diabetes, other problems of everyday life can be the cause for depressive symptoms and they should be accounted for when depression is evaluated.

5.2. Aim:

In line with the above remarks, the present study aimed 1) to investigate the associations of diabetes distress and depressive symptoms with glycaemic control and 2) to explore the relationship of illness representation as a moderator between diabetes distress and depressive symptoms in the context of life stress and previous history of depression.

5.3. Material and Method:

5.3.1. Participants

A total of 431 patients with type 2 diabetes from the Center for Diabetes, Nutrition and Metabolic Diseases at the Emergency Clinical County Hospital Cluj, Romania were enrolled in the study. Data were collected between 1st of January 2014 and 31st December 2015.

5.3.2. Measurements

Socio-demographics, previous depression and treatment for current depression were self-reported. Clinical and biological data were collected from the medical charts. The negative events were analyzed as one single variable, Life Stress (Black, Markides & Miller,1998; Kraaij, Arensman & Spinhoven, 2002). Illness Perception Questionnaire – Revised (Moss-Morris, Weinman, Pertie, Horne, Cameron, Buick, 2002) was used to determine the illness representation. Diabetes Distress Scale (DDS-Ro) (Polonsky et al., 2005, Mocan & Baban, 2015) was used to investigate ddiabetes emotional distress... To assess depressive symptoms, Beck Depression Inventory II (BDI-II) (Beck , et al., 1996) was used.

5.3.3. Statistical analysis methods

Descriptive statistics were calculated to characterize the sample. The association between HbA1c and BDI-II, DDS-Ro was investigated using Pearson correlations and linear regression analysis. To assess the relationship between life stress, diabetes distress, illness perception and depression a two-step analysis approach was used. In the first step, linear multiple regression analysis was used to determine the association between depressive symptoms, sociodemographic, clinical and illness perception dimensions Afterwards, when the moderator relation was established, hierarchical multiple linear regression models were used to determine the moderating effect of illness perception consequences on the relation between diabetes distress and depressive symptoms in the presence of socio-demographic, clinical, biological and life stress factors.

5.4. Results:

Regression analysis failed to show any association between HbA1c and depressive symptoms. Diabetes distress was weakly associated with HbA1c. Regression analysis used for assessing the relationship between depressive symptoms and illness perception, showed that only perceived illness consequences ($\beta = 0.20$, standard error = 0.08, $p = 0.02$) were significantly associated with depressive symptoms and was therefore included in further analyses. After the moderating equation was establish regression analysis with controlled confounders was performed. Data are shown in Table 1.

5.5. Discussion and Conclusion:

The present study showed that depression in individuals with diabetes is influenced by a cumulative effect of different factors linked or not to the disease. First of all, lower education interferes with peoples' perception of diabetes consequences. Also lower education is expressed when diabetes distress and life stressors are positively associated to depression. The link between depression and diabetes distress was influenced by illness perceived consequences that acted as a moderator between the two. In clinical practice, diabetes distress should be considered as a normal stage in the struggle to adjust and to better adhere to diabetes management and life style, and should not be confused with depression. In order to prevent depression, diabetes distress along with perceived diabetes consequences should be addressed from the moment of diagnosis when efficient coping strategies should be presented to all patients.

Table 1. Regression analysis between investigated factors and depressive symptoms

	Model 1 $R^2 = 0.06$ Socio-demographics				Model 2 $R^2 = 0.07$ Clinical and biological				Model 3 $R^2 = 0.08$ Life stress				Model 4 $R^2 = 0.25$ Psychological				Model 5 $R^2 = 0.31$ Previous depression			
	B	SE	beta	p	β	SE	beta	p	β	SE	beta	p	β	SE	beta	p	β	SE	beta	p
Age	0.6	0.04	0.07	0.10	0.07	0.04	0.08	0.08	0.07	0.04	0.08	0.07	0.08	0.03	0.08	0.02	0.06	0.03	0.06	0.06
Education	-1.5	0.5	-0.1	0.00	-1.5	0.5	-0.1	0.004	-1.6	0.5	-0.1	0.003	-1.3	0.4	-0.1	0.004	-1.4	0.4	-0.1	0.002
Sex	2.0	0.7	0.1	0.00	2.3	0.7	0.1	0.001	2.0	0.7	0.1	0.005	1.4	0.6	0.08	0.03	0.5	0.6	0.03	0.4
Diabetes complications (number)					1.7	0.7	0.1	0.02	1.6	0.7	0.1	0.03	0.5	0.7	0.03	0.4	0.4	0.6	0.02	0.5
BMI					0.08	0.08	0.05	0.3	0.08	0.07	0.05	0.2	0.07	0.07	0.04	0.2	0.09	0.06	0.06	0.1
Life stress									1.37	0.6	0.09	0.04	1.4	0.6	0.09	0.02	0.3	0.6	0.02	0.6
DDS-Ro													3.2	0.5	0.2	0.001	3.06	0.5	0.2	0.001
IPconsequences													0.2	0.08	0.1	0.003	0.2	0.07	0.1	0.007
Moderator IP consequences													0.2	0.09	0.1	0.01	0.1	0.09	0.08	0.06
Previous depression																	5.7	1.1	0.2	0.001

BMI- body mass index; DDS-Ro – Diabetes distress Scale Romanian version; Ipconsequences – illness perception consequences;

C H A P T E R   6

S T U D Y 4.

ASSOCIATION OF COGNITIVE-EMOTIONAL REGULATION STRATEGIES TO DEPRESSIVE SYMPTOMS IN TYPE 2 DIABETES PATIENTS[3]

6.1. Introduction:

Cognitive emotional regulation coping refers to the cognitive part of the coping, and helps us manage our feelings, keep control over emotions and prevent us getting overwhelmed (Thompson, 1994). Since individuals' cognitions are associated to emotions and behaviours, type 2 diabetes patients might have a distinct cognitive style that can be beneficial for a better adjustment to the illness and may prevent depression. The characteristics of cognitive style in these patients is unclear and to our knowledge, no study has investigate it in relation with depression.

6.2. Aim of the study:

The purpose of the present study was to identify the cognitive – emotional regulation strategies that are related to depressive symptoms in people with type 2 diabetes in the context of sociodemographic, clinical and psychological factors such as diabetes distress, perception of illness consequences and previous depression.

6.3. Material and method:

6.3.1. Participants

A total number of 354 consecutive outpatients visiting the Center for Diabetes, Nutrition and Metabolic Diseases Cluj, Romania between December 2014 and January 2015 that fulfilled the selection criteria were enrolled.

---

[3]Parts of this study were published: Mocan A.S, Iancu S.S., Baban A.S. Association of cognitive-emotional regulation strategies to depressive symptoms in type 2 diabetes. Rom J Intern Med. doi: 10.1515/rjim-2017-0037. [Epub ahead of print]

6.3.2. Measurements

Socio-demographics, previous depressive symptoms and treatment for depression were self-reported. Clinical and biological data were collected from the medical charts.

Illness Perceived Consequences (IP consequences) were assessed using Illness Perception Questionnaire – Revised (IPQ-R) (Moss-Morris et al, 2002). To assess diabetes distress, the Romanian version (DDS-Ro) of Diabetes Distress Scale (DDS) was used (Mocan & Baban, 2015; Polonsky et al., 2005). Beck Depression Inventory II (BDI-II) was used to assesses depressive symptoms (Beck et al, 1996). The cut-off point from which we considered depressive symptoms was 14 (Shehatah, Rabie, & Al-Shahry, 2010; Pellegrini, Bordea, & Valceanu, 2013). Cognitive emotional regulation questionnaire (CERQ) is a self-reported questionnaire assessing cognitive coping mechanism (Garnefski, et al., 2001; Garnefski, van den Kommer, Kraaij, Teerda, Legerstee, Onstein, 2002). Due to the weak reliability, New Perspective dimension was not introduced into the analysis

6.3.3. Statistical analysis methods

To characterize the sample, descriptive statistics were used. To better understand the context of diabetes and in order to have a better overview of the interaction between investigated factors and depression, multiple logistic regression was used with the aim to analyse the association of the following category of factors: socio-demographic, clinical and biological, psychological factors and cognitive coping strategies in relationship to depressive symptoms.

6.4. Results:

Low level of education, increased distress, complications and comorbidities and previous history of depression were characteristic for the depressive symptoms group. Lower positive reappraisal and increased catastrophizing were associated with increased likelihood of experiencing depressive symptoms (see Table 1).

Table 1

Five Model Factors Associate to Depressive Symptoms (Logistic Regression)

Variables OR (95%C I)	Model 1 Sociodemographic	Model 2 Clinical	Model 3 Psychological	Model 4 Coping	Model 5 Final
Age, years	1.01 (0.97-1.04)	-	-	-	-
Sex	1.39 (0.75-2.56)	-	-	-	-
Education level	0.62 (0.44-.89)*	0.45 (0.28-0.73)*	0.64 (0.42-0.96)*	0.74 (0.47-1.15)	-
Time since diagnosis, years	-	1.01 (0.93-1.19)	-	-	-
Treatment	-	1.13(0.75-2.29)	-	-	-
Diabetes complications (n)	-	0.89 (0.38-2.04)	-	-	-
Comorbidities (n)	-	1.65 (1.07-2.56)*	1.12 (0.78-1.59)	-	-
BMI, kg/m^2	-	1.03 (0.96-1.11)	-	-	-
HbA1c, mmol/mol	-	0.99 (0.96-1.01)	-	-	-
IPCconsequences	-	-	1.78 (1.22-2.6)**	1.92(1.24-2.95)**	2.02 (1.34-3.06)**
DDS	-	-	1.94 (1.39-2.69)**	1.56 (1.06-2.31)*	1.53 (1.07-2.19)*
Previous depression	-	-	4.36 (2.16-8.77)**	3.91(1.84-8.31)**	4.18 (2.03-8.63)**
CERQ self-blame	-	-	-	1.35 (8.55-2.14)	-
CERQ Acceptance	-	-	-	8.36 (0.54-1.27)	-
CERQ Rumination	-	-	-	1.09 (0.60-1.97)	-
CERQ Positive Refocusing	---	-	-	0.76 (0.49-1.16)	-
CERQ Planning	-	-	-	0.95 (0.51-1.63)	-
CERQ Reappraisal	-	-	-	0.53 (0.31-0.98)*	0.49 (0.34-0.71)**
CERQ-Catastrophizing	-	-	-	1.88(1.22-2.88)**	2.08(1.47-2.93)**
CERQ Other Blame	-	-	-	0.44 (0.80-1.64)	

Note. OR = odd ratio; CI = 95% confidence interval; IPQ –Illness Perception Questionnaire; DDS-Ro = Diabetes Distress Scale; CERQ – Cognitive-Emotional Regulation Questionnaire

* P-value < .05; **p-value < .01.
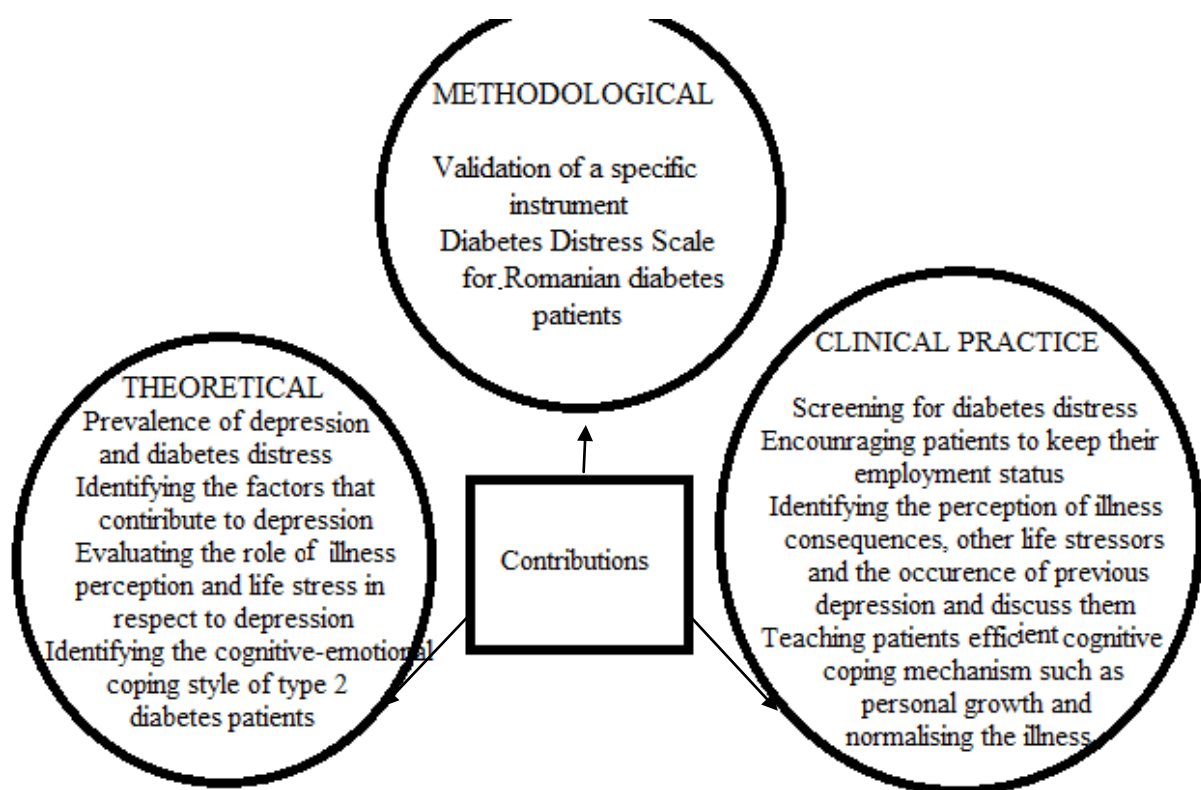
6.5. Discussion and Conclusion:

The present study shows that higher catastrophizing and lower positive reappraisal are associated to higher depressive symptoms in the context of negative perception of illness consequences, diabetes distress and history of previous depression. In diabetes, catastrophizing, refers to the exaggerated threat felt by people that stresses the terror of living with the illness and the need to manage it. Positive reappraisal refers to giving a personal meaning to a negative event, such as enhanced wisdom or personal growth (Folkman & Moskowitz, 2000). Overall, these findings suggest that catastrophizing coping style acts as a predictor for the presence of depressive symptoms while positive reappraisal has a protective role even in the presence of psychological factors of diabetes as negative perception of illness consequences, diabetes distress and previous history of depression. Using efficient coping strategies should be part of intervention for individuals diagnosed with diabetes.

C H A P T E R 7

PERSONAL CONTRIBUTIONS

In the present thesis the Romanian version of the Diabetes distress Scale for Romanian diabetes patients was translated and validated which can be used bot for medical settings and for research purposes. The present study is also the first to report on the prevalence of diabetes distress in Romanian type 2 patients and suggest that diabetes distress should be screen in along with the screening of depression. The second study of the thesis (Mocan et al, 2016) is the first to analyses the contribution of socio-demographic and psychological factors to depressive symptoms in Romanian type 2 diabetes patients. The results suggested future directions of research and the need that the health-care team should encourage more the patient to keep their employment status. An important contribution can be seen in the third study which emphasizes the importance of illness perceived consequences that strengthen the relationship between diabetes distress and depressive symptoms. Also, the third study draws attention to other

life stressors, beside diabetes, that contribute to depressive symptoms. Life stress, conceptualized as stress related to job/family/social environment was associated to depressive symptoms only in the absence of previous depression. The last study of the present thesis was the first to focus on cognitive-emotional coping patterns in type 2 diabetes as risk factors regarding depressive symptoms. Increase catastrophizing and decrease positive strategies were found to increase the risk of depression. Based on the present findings, special trainings for people with diabetes that integrated efficient coping strategies which focus on decatastophizing diabetes, finding a personal and positive perspective of the illness, could be useful in prevention of depressive symptoms in clinical settings.

METHODOLOGICAL

Validation of a specific
instrument
Diabetes Distress Scale
for Romanian diabetes
patients

THEORETICAL
Prevalence of depression
and diabetes distress
Identifying the factors that
contribute to depression
Evaluating the role of illness
perception and life stress in
respect to depression
Identifying the cognitive-emotional
coping style of type 2
diabetes patients

Contributions

CLINICAL PRACTICE

Screening for diabetes distress
Encouraging patients to keep their
employment status
Identifying the perception of illness
consequences, other life stressors
and the occurence of previous
depression and discuss them
Teaching patients efficient cognitive
coping mechanism such as
personal growth and
normalising the illness

References:

1. Aikens, J. E. (2012). Prospective Association Between Emotional Distress and Poor Outcomes in Type 2 Diabetes. *Diabetes Care*, 2472-2478.

2. Anderson R.J., Freedland K.E., Clouse R.E., Lustman P.J., The Prevalence of Comorbid Depression in Adults with Diabetes: A Meta-Analysis. 2001. 24:1069-1078. (2001). *Diabetes Care, 24*, 1069-1078.

3. Beck , A. T., Steer, R. A., & Brown, G. K. (1996). *"Manual for the Beck Depression Inventory-II".* San Antonio: TX: Psychological Corporation.

4. Black, S. A., Markides, K. S., & Miller, T. Q. (1998). Correlates of depressive simptomatology among older community-dwelling Mexican Americans: The Hispanic EPESE. *Journal of Gerontology: Social Science, 53B*(4), 198-208.

5. Burns, R. J., Deschenes, S. S., & Schmitz, N. (2016). Association between coping strategies and mental health in individuals with type 2 diabetes: A prospective analyses. *Health Psychology, 35*(1), 78-86.

6. Calmes, C., & Roberts, J. E. (2007). Repetitive thought nd emotional distress: rumination and worry as prospective predictiors of depressive and anxious symptomatology. *Cognitive Therapy and Research, 30*, 343-356.

7. Chew, B. H., Shariff-Ghazali, S., & Fernandez, A. (2014). Psychological aspects of diabetes care: Effecting behavioral changein patients. *World Journal of Diabetes, 5*(6), 796-808.

8. Clarke, D., & Goosen, T. (2009). The mediating effect of coping strategies in the relationship between automatic negative thoughts and depression in a clinical sample of diabetes patients. *Personality and Individual Differences, 46*(4), 460-464.

9. David, D., Dobrean, A., & Sucala, M. (2012). *BDI II - Inventarul de depresie BECK: Manual.* Cluj-Napoca: RTS.

10. Fisher, L., Skaff, M. M., Mullan, J. T., Arean, P., Mohr, D., Masharani, U., et al,. (2007). Clinical depression versus distress among patients with type 2 diabetes. Not just a question of semantics. *Diabetes Care, 30*, 542-548.

11. Fisher, L., Mullan, J. T., Arean , P., Glasgow, R. E., Hessler, D., & Masharani, U. (2010). Diabetes distress but not clinical depression or depressive symptoms is associated with glycemic control in both cross-sectional and longitudinal analyses. *Diabetes Care, 33*, 23-28.

12. Fisher, L., Hessler, D. M., Polonsky, W. H., & Mullan, J. (2012). When Is Diabetes Distress Clinically Meaningful? Establishing Cut Points for Diabetes Distress Scale. *Diabetes Care*, 35:259-264.

13. Folkman, S., & Moskowitz, J. T. (2000). Positive affect and other side of coping. *Am Psychol, 55*(6), 647-654.

14. Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life eventes, cognitive emotional regulation and emotional problems. *Personality and Individual Differences, 30*, 1311-1327.

15. Garnefski, N., van den Kommer, T., Kraaij, V., Teerda, J., Legerstee, J., & Onstein, E. (2002). The relation between cognitive emotional regulation strategies and emotional problems:Comparison between clinical and non-clinical sample . *European Journal of Personality, 16*, 403-420.

16. Gonzales, J. S., Peyrot, M., McCarl, L. A., Serpa, L., Mimiaga, M. J., & Safren, S. A. (2008). Depression and diabetes treament nonadherence: A meta-analysis. *Diabetes Care, 31*(12), 2398-2043.

17. Katon, W., Von Korff, M., Ciechanowski, P., Russo, J., Lin, E., Simon , G., et al,. (2004). Behavioral and clinical factors associated with depression among individuals with diabetes. *Diabetes Care, 27*(4), 914-920.

18. Koopmans, B., Pouwers, F., de Bie, R. A., & et al. (2009). Depressive symptoms are assocated with physical inactivity in patients with type 2 diabetes. The DIAZOB Primary Care Diabetes Study. *Family Practice, 26*(3), 171-173.

19. Kraaij, V., Arensman, E., & Spinhoven, P. (2002). Negative life events and depression in elderly persons: A Meta-Analysis. *Journal of Gerontology: Psychological Science, 57B*(1), p.87-p94.

20. Laake, J. S., Stahl, D., Amiel, S. A., Petrak, F., Sherwood, R. A., Pickup, J. C., et al,. (2014). The association between depressive symptomsand systemic inflammation in people with type 2 diabetes> Findings from the South London Diabetes Study. *Diabetes Care, 37*, 2186-2192.

21. Lawson, V. L., Bundy, C., & Harvey, J. N. (2008). The development of personal models of diabetes in the first 2 years after diagnosis: a prospective longitudinal study. *Diabetic Medicine, 25*(4), 482-490.

22. Leventhal, H., Leventhal, E. A., & Breland, J. Y. (2011). Cognitive scienc speacks to the "Common-Sense" of chronic illness management. *Annals of Behavioral Medicine, 41*(2), 152-163.

23. Leventhal, H., Leventhal, E. A., & Contrada, R. J. (1997). Self-regulation, health and behavior: A perceptual-cognitive approach. *Psychology and Health, 13*, 717-733.

24. Lin, E. H., Katon, W., Von Korff, M., Rutter, C., Simon, E. G., Oliver, M., et al,. (2004). Relationship of depression and diabetes slef-care, medication adherence and preventive care. *Diabetes Care, 27*, 2154-2160.

25. Lustman, P. J., Anderson, R. J., Freedland, K. E., de Groot, M., Carney, R. M., & Clouse, R. E. (2000). Depression and poor glycemic control. A meta-analytic review of the literature. *Diabetes Care, 23*, 934-942

26. Mocan, A. S., & Baban, A. (2015). An useful tool for diabetes emotional distress assessment: validation of the Romanian version of Diabetes Distress Scale. *Romanian Journal of Diabetes Nutrition and Metabolic Diseases, 22*(4), 425-431.

27. Moss-Morris, R., Weinman, J., Petrie, K., Horne, R., Cameron , L., & Buick, D. (2002). The revised Illness Perception Questionnaire (IPQ-R). *Psychology and Health, 17*(1), 1-16.

28. Nouwen, A., Nefs, G., Caramlau, I., Connock, M., Winkley, K., Lloyd, C. E., et al,. (2011). Prevalence of Depression in Individuals with Impaired Glucose Metabolism or Undiagnosed Diabetes: A Systematic Review and Meta-Analysis for the European Depression in Diabetes (EDID) Research Consortium. *Diabetes Care, 34*(3), 752-762.

29. Pellegrini, A., Bordea , E., & Valceanu, D. (2013). Unemployment and depression - Survey regarding the presence and level of severe depression among the unemployed vs employees. *Management in Health, 17*(4), 35-39.

30. Polly, R. K. (1992). Diabetes health beliefs, self-care behaviors, and glycemic control among older adults with non-insulin-dependent diabetes mellitus. *Diabetes Educator, 18*(4), 321-327.

31. Polonsky , W., Fisher, L., Earles, J., Dudl, R. J., Lees, J., Mullan, J., et al,. (2005). Assessing Psychosocial Distress in Diabetes. Development of the Diabetes Distress Scale. *Diabetes Care*, 28:626–631.

32. Roy, T., & Lloyd, C. (2012). Epidemiology of depression and diabetes. a ssystematic review. *Journal of Affective Disorsders, 142*, S8-S21.

33. Schmitt, A., Reimer, A., Kulzer, B., Haak, T., Gahr, A., & Hermanns, N. (2015). Negative association between depression and diabetes control only when accompanied by diabete-specific distress. *Journal of Behavior Medicine, 38*(3), 556-564.

34. Shehatah, A., Rabie, M. A., & Al-Shahry, A. (2010). Prevalenve and correlates of depressive disorders in elderly with type 2 diabetes in primary health care settings. *Affect Disord, 123*(1-3), 197-201.

35. Skinner , T. C., Hampton, S. E., & Fife-Schaw, C. (2002). Personality, personal model beliefs and self-care in adolescents and young adults with type 1 diabetes. *Health Psychology, 21*, 61-70.

36. Skinner, T. C., Khunti, K., Carey, M. E., Dallosso, H., Heller, S., & Davies, M. J. (2014). Sability and predictive utility, over 3 years, of the illness beliefs of individuals recently diagnosed with type 2 diabetes mellitus. *Diabetic Medicine, 31*, 1260-1263.

37. Surwit, R. S., van Tilburg, M. A., Parekh, P. I., Lane, J. D., & Feinglos, M. N. (2005). Treatment regimen determine the relation between depression and glycemic control. *Diabetes Research and Clinical Practice, 69*, 78-80.

38. Talbot, F., & Nouwen, A. (2000). A review of the relationship between depression and diabetes in adults: is there a link? *Diabetes Care*, 23: 1556-1562.

39. Teasdale, J. D. (1983). Negative thinking in depression: Cause, effect, or reciprocal relationship? *Advances in Behavior Research and Therapy, 5*(1), 3-25.

40. Thompson, R. A. (1994). Emotiona regulation: a theme in a search of definition. in F. N.A., *The development of emotion regulation: behavioral and biological consideration.* (Vol. 59, pg. 25-52). Monographs of the Society for Research in Child Development.

41. Thorpe, C. T., Fahey, L. E., Johnson, H., Deshpande, M., Thorpe , M. J., & Fisher , E. B. (2013). Facilitating healthy coping in patients with diabetes: a systematic review. *Diabetes Educator, 39*(1), 33-52.

42. Toobert, D. J., Hampson, H. E., & Glasgow, R. E. (2000). The Summary of Diabetes Self-Care Activities Measure. Results of 7 Studies and a Revised Scale. *Diabetes Care*, 943-950.