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Depressive symptoms, sexual satisfaction and satisfaction with a relationship in individuals with type 2 diabetes and sexual dysfunctions

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Summary

Aim. The level of sexual satisfaction constitutes a significant factor affecting satisfaction with a relationship, particularly in the case of people with chronic diseases (like type 2 diabetes), sexual dysfunctions and depressive symptoms. The aim of the conducted research was to verify a moderating role of intensified depressive symptoms in relation to sexual satisfaction and relationship quality, as well as the relationship between these variables in the group of individuals with type 2 diabetes and sexual dysfunctions. We also examined which aspects of sexual satisfaction and relationship quality the participants were the most satisfied with.

Method. Finally, 93 persons (38 women) with type 2 diabetes and with at least one sexual dysfunction took part in the research. Three questionnaire methods were applied in the research: the Sternberg Triangular Love Scale, the Sexual Satisfaction Scale and the Beck Depression Inventory.

Results. The results showed differences in the level of individual aspects of sexual satisfaction and components of satisfaction with a relationship. Intensified depressive symptoms turned out to be a moderator in the relationship between sexual satisfaction and relationship quality in the case of general and specific indicators.

Conclusion. The higher the satisfaction with controlling sexual contacts in people with type 2 diabetes and high-intensity of depressive symptoms, the more satisfied they are with emotional and physical intimacy with a partner. People with low-intensity of depressive symptoms who assume their influence on sexual contacts with a partner to be low, are found to be more motivated to search for them.

Key words: type 2 diabetes, sexual satisfaction and satisfaction with a relationship, depressive symptoms

Introduction

The fulfillment of sexual needs can significantly affect a person's well-being. The literature shows that a number of people having problems with this domain increases. This concerns both women and men. The problems in sexual sphere may arise from somatic and psychological disorders or constitute a psychological response to disease. In most cases somatic and psychological factors are combined with one another. In the face of a growing number of people with chronic diseases, it appears crucial to study this group in terms of their sexual life and satisfaction with this area. Sexual dysfunctions are more common in the group of type 2 diabetes than in a global population. The research shows that frequency of sexual dysfunctions grows together with an increase of body mass and with age [1]. These difficulties among individuals with type 2 diabetes might be caused by microangiopathic and macroangiopathic changes, neurological changes, hormonal imbalance, psychological factors associated with the chronic character of the disease and the side effects of medications [2].

All the phases of sexual reaction might be affected by sexual dysfunctions. In men, the most common type of sexual impairment is the erectile dysfunction, in addition, the difficulties include problems with ejaculation and achieving orgasm as well as the decrease of sexual desire [3, 4]. In women, the problems may include lack of sexual desire, pain during intercourse caused by insufficient vaginal lubrication, decreased sensitivity of genital organs and problems with achieving orgasm [5].

In the group of individuals with chronic diseases the risk of depression is estimated at 4.0%, while in the general population at about 2.8% [6]. The highest proportion of individuals with depressive disorders concerns people with diabetes [6], especially those suffering from type 2 diabetes. According to the results of the *Diabetes Attitudes, Wishes and Needs 2* (DAWN2), in Poland 19.2% of patients probably suffer from depression and 56.7% live under intense pressure because of the disease and its complications [7].

The consequences of a chronic disease, including depressive symptoms, affect sexual satisfaction, which is related to the subjective evaluation of the degree of satisfaction with a persons' own sexual life, their sexuality [8] and sexual relations [9]. Moreover, it is conditioned by numerous variables which also determine the relationship quality, which is lower in the case of people with depression. According to Davis [10], sexual satisfaction might be considered as physical satisfaction, emotional satisfaction or satisfaction provided by the sense of control. Satisfaction with a relationship analyzed from the perspective of Sternberg's theory of love [11] is implied by three factors, namely passion, intimacy and commitment. Sexual satisfaction and satisfaction with a relationship are related to one another [12, 13]. Nevertheless, the direction of this relation is not explicitly defined. Some of the studies confirm that the level of sexual satisfaction constitutes a significant factor affecting satisfaction with a relationship [14, 15], whereas others reveal a reverse dependence – satisfaction with a relationship implies satisfaction with the sexual sphere [16–18].

The studies available in the literature on individuals with type 2 diabetes in different age groups show that sexual dysfunctions significantly affect a relationship's quality

[12, 19, 20]. People with problems with the sexual sphere are less content with their relationships and also have a lower level of sexual satisfaction [21–24].

The aim of the conducted research was to analyze relationships between intensified depressive symptoms, sexual satisfaction and relationship quality (satisfaction with a relationship) in the group of individuals with type 2 diabetes and sexual dysfunctions. We verified a moderation role of intensified depressive symptoms in relation to sexual satisfaction and relationship quality. We also examined which aspects of sexual satisfaction and relationship quality the participants were the most satisfied with.

Material

120 persons with type 2 diabetes took part in the research (including 50 women). All of the participants declared experiencing at least one sexual dysfunction. All of them expressed their oral consent to participate in the research. During the stage of filling in the questionnaires, 20 persons decided to withdraw as they considered the subject to be too personal for them. In the case of seven received questionnaires 20% of data was missing, and thus we removed them from the analysis. Consequently, the statistical analysis involved the material obtained from a group of 93 (including 38 women). The mean age was 57.90 (SD = 5.91). Mean BMI was 33.19 (SD = 1.87). Among women, 44.7% declared two sexual dysfunctions, whereas the remaining female subjects only one. 26.3% of the subjects experienced failure of genital response (vaginal dryness) with pain during sexual intercourse (dyspareunia) and 18.4% reported low sexual desire and orgasmic disorders. 26.3% of women declared low sexual desire, 15.8% – failure of genital response, 10.6% dyspareunia, and 2.6% vaginismus (vaginal muscle spasm which makes vaginal penetration impossible). Among men, 56.4% reported two sexual dysfunctions, whereas the remaining male subjects only one. 38.2% experienced failure of genital response (erectile dysfunction) and low sexual drive, 18.2% – failure of genital response (erectile dysfunction) and orgasmic disorder (delayed ejaculation or its lack), 18.2% reported low sexual desire, 16.4% – failure of genital response, and 9% – orgasmic disorders.

Study subjects completed education on the following levels: 36% – secondary education, 26% – vocational education, 38% – higher education. All the subjects were in relationships (74% were married). 8% of subjects did not have children, 10% lived alone. 56% of the subjects lived in a big city, 30% – in a small town and 14% – in a village. 34% of the subjects were working people, 28% were on disability benefit, and 18 were retired.

The tools used for the purpose of the research included a survey collecting sociodemographic data as well as data concerning the disease course and the diagnosed sexual dysfunctions. Tools with confirmed psychometric properties were applied as well. Relationship satisfaction was measured with the Sternberg Triangular Love Scale [25]. The questionnaire consists of 36 items related to 3 components – intimacy, passion and commitment. The items are evaluated on a 5-point scale. Sexual satisfaction was assessed with the Sexual Satisfaction Scale created by Davis [10]. The questionnaire comprises 21 items evaluating sexual satisfaction in 3 subscales – physical satisfaction,

emotional satisfaction and satisfaction related to the feeling of control. The subject evaluates each of the 21 items on a 5-point scale. In the case of both questionnaires, global results were also calculated. The accuracy of the first instrument in the presented research was $\alpha = 0.93$ for the general result, $\alpha = 0.93$ for the intimacy scale, $\alpha = 0.86$ for the passion scale, and $\alpha = 0.79$ for the commitment scale. The accuracy of the second instrument in the presented research was $\alpha = 0.91$ for the general result, $\alpha = 0.72$ for the emotional satisfaction scale, $\alpha = 0.89$ for the physical satisfaction scale and $\alpha = 0.78$ for the scale of satisfaction related to the sense of control. Intensification of depressive symptoms was measured with the Beck Depression Inventory (BDI) [26]. It contains 21 items scored on a scale value of 0 to 3. The accuracy of the instrument in the presented research was satisfactory ($\alpha = 0.92$). This questionnaire is still used in research in many countries.

Results

The data were processed with the statistical package SPSS 24. To conduct the assumed analyses descriptive statistics were calculated. We used the Student's t-test for the dependent samples, Pearson correlation coefficient (r) and conducted hierarchical regression analyses. In calculations, we also used the PROCESS macro by Hayes [27]. Table 1 shows means, standard deviations, and correlations between variables.

Table 1. **Means, standard deviations, and correlations between variables**

	1	2	3	4	5	6	7	8	9
1. Intensification of depressive symptoms									
2. Satisfaction with a relationship	-0.339**								
3. Sexual satisfaction	-0.341**	0.241*							
4. Intimacy	-0.416**	0.755**	0.147						
5. Passion	-0.105	0.758**	-0.066	0.243*					
6. Commitment	-0.197	0.620**	0.652**	0.292**	0.298**				
7. Physical satisfaction	-0.369**	0.162	0.839**	0.175	-0.135	0.465**			
8. Emotional satisfaction	-0.261*	0.055	0.559**	-0.017	-0.056	0.309**	0.119		
9. Satisfaction related to the sense of control	-0.113	0.338**	0.861*	0.148	0.071	0.727**	0.649**	0.311**	
M	21.18	3.40	2.59	3.82	2.70	3.66	2.50	2.36	2.91
SD	13.24	0.56	0.49	0.86	0.83	0.91	0.80	0.53	0.58

The analysis of differences between a declared sexual satisfaction level in the examined aspects showed statistically significant differences between physical satisfaction and satisfaction related to the sense of control ($t(92) = -6.34$; $p < 0.001$), emotional satisfaction and satisfaction associated to the sense of control ($t(92) = -8.38$; $p < 0.001$). No statistically significant differences were found with respect to physical and emotional satisfaction ($t(92) = 1.88$; $p = 0.063$). We observed that in the case of indicators of relationship's quality, the declared level of intimacy differs from the level of passion ($t(92) = 10.98$; $p < 0.001$) and commitment ($t(92) = 2.18$; $p = 0.033$), similarly, the level of passion differs from the level of commitment ($t(92) = -11.39$; $p < 0.001$).

While sexual satisfaction (general result) correlates positively with satisfaction with a relationship (general result), it correlates negatively with intensified depressive symptoms. Satisfaction with a relationship also correlates negatively with intensified depressive symptoms. Emotional satisfaction correlates negatively with intensified depressive symptoms and positively with commitment. Physical satisfaction correlates negatively with intensified depressive symptoms and positively with commitment. Satisfaction with the sense of control correlates positively with commitment.

We began the further part of results compilation with an analysis in which satisfaction with a relationship (general result) was a dependent variable, sexual satisfaction (general result) was a predictor, and intensified depressive symptoms served as a moderator. The calculations were made while controlling the impact of the following variables: sex, age and duration of the disease (covariates). A model with an interaction component turned out to match well ($F(6.86) = 4.55$; $p < 0.001$, it explained 23% of variance of the dependent variable. The interaction effect of sexual satisfaction and intensification of depressive symptoms was statistically significant ($b = 0.02$; $t = 2.90$, $p = 0.004$; 95% CI = [0.01; 0.04]), and its inclusion in the model significantly improved the level of explained variance ($\Delta R2 = 0.07$; $F = (1.86) = 8.42$; $p = 0.004$). Simple slopes analysis showed that with low level of depressive symptoms ($M - 1\ SD$), the level of sexual satisfaction (general result) is not statistically significantly associated with satisfaction with a relationship ($b = -0.06$; $t = -0.48$, $p = 0.627$; 95% CI [-0.33; 0.20]). In the case of an average intensity of depressive symptoms (equal to M), a significant positive correlation between variables ($b = 0.24$; $t = 2.03$, $p = 0.045$; 95% CI [0.01; 0.48]) was observed. It was similar in the case of high value ($M + 1SD$) of intensified depressive symptoms ($b = 0.55$; $t = 3.03$, $p < 0.003$; 95% CI [0.19; 0.91]). Figure 1 shows the results.

The next stage involved moderation analyzes in which individual components of satisfaction with a relationship were a dependent variable, components of sexual satisfaction were an independent variable, and intensification of depressive symptoms served as a moderator. The calculations were made while controlling the impact of the following variables: sex, age and duration of the disease (covariates). Analyzes showed that the intensity of depressive symptoms is a moderator of the relationship between satisfaction associated with the sense of control and intimacy, and also of the relationship between satisfaction associated with the sense of control and passion. Figures 2 and 3 show the results.

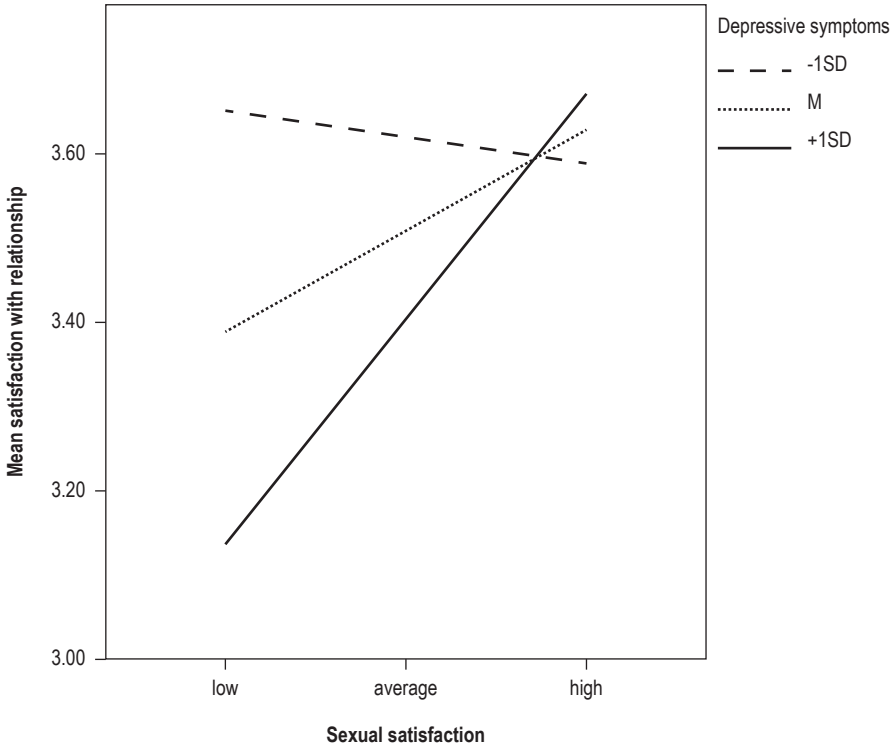

Figure 1. **The relationship between sexual satisfaction and quality of a relationship for various levels of intensification of depressive symptoms – the interaction effect**

In the first case, a well-matched model with an interaction component ($F(6.86) = 6.13$; $p < 0.001$) explained 30% of variance of the dependent variable. The interaction effect of satisfaction associated with the sense of control and intensification of depressive symptoms was statistically significant ($b = 0.03$; $p = 0.002$; $t = 3.26$, $p = 0.016$; 95% CI [0.01; 0.05]), and its inclusion in the model significantly improved the level of explained variance ($\Delta R2 = 0.09$; $F = (1.86) = 10.63$; $p = 0.002$). Simple slopes analysis showed that with low level of depressive symptoms, the level of satisfaction related to the sense of control is not statistically significantly associated with intimacy ($b = – 0.3$; $t = – 1.88$, $p = 0.07$; 95% CI [-0.77; 0.02]). No significant relationships were observed in the case of average intensification of depressive symptoms ($b = 0.23$; $t = 0.73$, $p = 0.811$; 95% CI [-0.24; 0.30]). In the case of high level of depressive symptoms we noted a significant ($b = 0.44$; $t = 2.56$, $p = 0.012$; 95% CI [0.10; 0.78]), positive relationship between satisfaction associated with the sense of control and intimacy.

In the second case, a well-matched model with an interaction component ($F(6.86) = 4.21$; $p < 0.001$) explained 22% of variance of the dependent variable. The interaction effect of satisfaction associated with the sense of control and intensification of depressive symptoms was statistically significant ($b = 0.04$; $t = 4.48$, $p < 0.001$; 95%

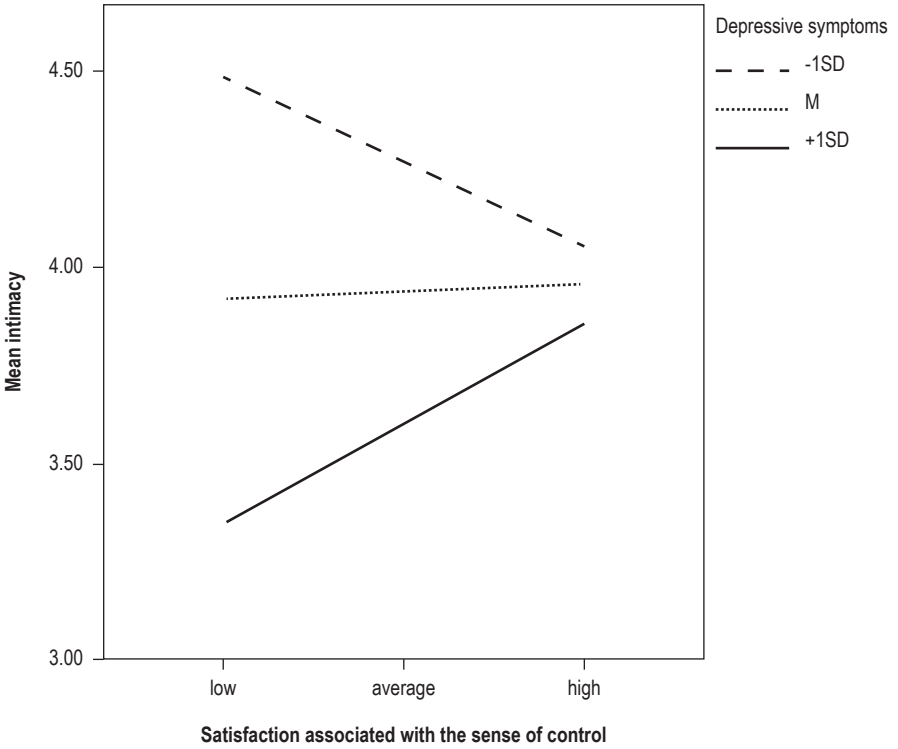

Figure 2. **The relationships between satisfaction associated with the sense of control and intimacy for various levels of intensification of depressive symptoms – the interaction effect**

CI [0.02; 0.06]), and its inclusion in the model significantly improved the level of explained variance ($\Delta R2 = 0.18$; $F(1.86) = 20.12$; $p < 0.001$). Simple slopes analysis showed that with low level of depressive symptoms, the level of satisfaction associated with the sense of control is significantly and negatively connected with intimacy ($b = -0.59$; $t = -2.80$, $p = 0.006$; 95% CI [-1.01; – 0.17]). No significant relationships were observed in the case of average intensification of depressive symptoms ($b = 0.01$; $t = 0.03$, $p = 0.974$; 95% CI [-0.28; 0,29]). In the case of high level of depressive symptoms, we noted a significant and positive relationship ($b = 0.59$; $t = 3.29$, $p < 0.001$; 95% CI [0.23; 0.96]).

Discussion

Satisfactory sexual life is one of the foundations of maintaining a relationship [28], it strengthens partner relationships [29], and is also associated with satisfaction with a relationship and mental well-being. In the case of people with chronic diseases and sexual dysfunctions, sexual satisfaction may be reduced, which in turn may

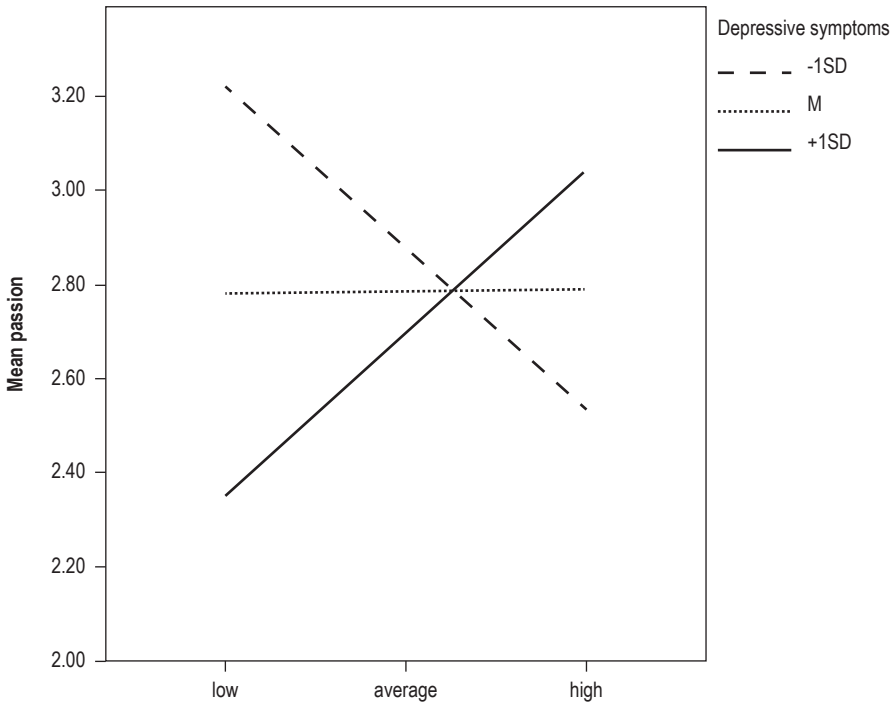

Figure 3. **The relationships between satisfaction associated with the sense of control and passion for various levels of intensification of depressive symptoms – the interaction effect**

imply a lower satisfaction with a relationship. Similarly, depressive symptoms may have a negative effect on satisfaction with life, including sexual domain and quality of a relationship.

The results of the conducted research showed that in the group with type 2 diabetes and sexual dysfunctions, the participants had a sense of influence on their sexual contacts with a low level of satisfaction with the very sexual contacts at the same time. They also more often experienced emotions associated with fear or anxiety in sexual context (physical and emotional satisfaction). Lawrance and Byers [30] point out that sexual satisfaction is conditioned by a balance of benefits and costs associated with remaining in a sexual relationship with another person (this person's expectations), a sense of equality of benefits and costs of both partners, and a quality of non-sexual aspects of a relationship. Lower physical and emotional sexual satisfaction may arise from the need to adapt one's lifestyle to the requirements of diabetes and the consequences of this disease. People with type 2 diabetes may find themselves less attractive due to obesity, which affects 90% of patients. They may also feel reluctant to expose their body because of traces after injections or infusion sets for insulin delivery. Moreover,

the medications taken by diabetics may affect their libido. Those people may feel helpless and convinced about not having influence on their sexual life and possibilities in this matter. Their disease can serve as an argument for avoiding contacts, which may result in more satisfaction with the sense of control and having influence on sexual contacts. The research by Copeland et al. [21] showed that middle-aged women with diabetes are less satisfied with the sexual sphere of their lives than healthy women, which is particularly visible in women treated with insulin. In regard to men with diabetes, their quality of sexual life may be lower as a result of dysfunctions, whereas the symptoms of depression may be on more intense [31].

In the context of overall functioning of people who have partners, it is important to be content with their relationships. The results of this research showed that from that point of view, people with diabetes are most satisfied with a level of intimacy, described as positive emotions and behaviors leading to closeness, attachment of partners, their mutual respect and understanding. Emotions which build up intimacy are also linked to the ability of communicating. As the relationship progresses, trust evolves, which is reflected in the willingness to entrust the other person with one's secrets and in sharing one's own fears, weaknesses, problems or dilemmas. Thanks to such an openness, people with diabetes can count on their partner's support in difficult situations without worrying about the durability of their relationship or negative opinions. When it comes to the lower level of satisfaction in the examined group, it concerns actions taken to take care of the durability of the relationship and keeping it over time, and thus actions taken for the sake of a partner. People with diabetes, especially those with a history of complications, preoccupied with their disease, may realize that they do not devote enough time to their partner and his or her affairs. They are least satisfied with those aspects of a relationship which are associated with seeking physical intimacy through sexual contacts. As it was previously mentioned, people with diabetes may avoid sexual contacts because they consider themselves less physically attractive to their partners.

People with type 2 diabetes who are more satisfied with the sexual domain are also more satisfied with their relationship with a partner. People with intensified depressive symptoms are less satisfied with relationships and have lower sexual satisfaction.

A higher level of emotional and physical satisfaction related to sexual intercourse and a higher level of intimacy in a relationship among people with type 2 diabetes are associated with lower level of depressive symptoms. People who are more satisfied with the actions taken for their relationship have a higher level of emotional and physical satisfaction as well as satisfaction associated with the sense of influence on sexual contacts.

Intensified depressive symptoms turned out to moderate some of the relationships between sexual satisfaction and satisfaction with a relationship. First of all, a higher level of general sexual satisfaction is a predictor of a higher level of overall satisfaction with a relationship in the case of people with average or high level of depressive symptoms. In this group, satisfaction with a relationship equated with satisfactory sexual life indicates a low degree of autonomy in evaluating relationships in relation to the value ascribed to sexual contacts. In such a situation, a lower ability to have sex and derive pleasure from it (implied by sexual dysfunctions) may have a negative

influence on a relationship, bonds with a partner or self-esteem [32]. High level of depressive symptoms may also lead to difficulties in evaluating partners' expectations which are not related to sex and cause problems with communicating one's feelings, needs, and expectations to a partner.

A higher level of general sexual satisfaction was not accompanied by a higher satisfaction with a relationship among people with low level of depressive symptoms (or without symptoms). It means, that in the case of this group a level of general satisfaction with a relationship is implied to a greater extent by its non-sexual aspects. People without or with low level of depressive symptoms, in their relationship with a partner may focus more on aspects such as mutual satisfaction of individual non-sexual needs related to personal development, engagement in achieving common goals or goals of a partner, developing a bond based on mutual understanding of a partner's needs or improving communication with a partner. Thus, being successful in these areas may affect a higher perceived quality of a relationship, regardless of the success in the sexual sphere and the satisfaction with this sphere. People without depressive symptoms may also be able to talk to their partners about problems with sex, which are due to their dysfunctions.

Second of all, a higher level of satisfaction related to the sense of control implies a higher level of satisfaction related to emotional intimacy between partners and a lower level of fear and sexual anxiety, but only in people with high level of depressive symptoms. This means that people from this group may trust they partners more and confide in them,when they feel they can "control" sexual intercourse.

Finally, a higher level of satisfaction related to the sense of control is negatively correlated with a level of passion in the case of people with low level of depressive symptoms and positively correlated in the case of people with high level of depressive symptoms. In the case of people with low level of depressive symptoms, the sense of little influence on decisions regarding physical contacts is associated with a higher motivation to make them. This result may appear surprising, however, it may reflect longing for an erotic aspect of a relationship. On the other hand, in the case of people with high level of depressive symptoms the sense of influence on when and whether the contact will take place increases their motivation to physical intimacy due to the feeling of safety in the relationship with a partner, who adjusts himself/herself responsively to all the needs and limitations. Results of the analysis of the moderation role of depressive symptoms in the relationship between sexual satisfaction and relationship quality complement previous studies in this field. This area requires, however, further exploration.

The results of the presented research may serve as a starting point to further search concerning relationships in the described field (see *Limitations and further directions of the research*) and be used in practice among the people working with patients with diabetes as well as among the people with diabetes and their partners. The area concerning the significance of complications of type 2 diabetes related to the sexual sphere together with its other consequences or comorbid diseases, such as depression, should constitute an integral part of an overall attitude to work with a person with diabetes. Its importance should be emphasized in the process of diagnosis and treat-

ment and should be discussed more often in education of people with diabetes and their partners. The disease and its complications exhaust not only the resources of the patients but also of their partners. Therefore, building up proactive resources (owing to the acquired knowledge) is very valuable.

It should be noted that collecting information regarding not only emotional state and sexual dysfunctions but also data related to the consequences of their co-occurrence in the case of a particular person and a particular relationship would make it possible to involve in the right moment of a treatment process a sex therapist, who could work with both partners. Thus, both partners would be able to receive support during a difficult time for their relationship.

Limitations and further directions of the research

The presented research is part of the broader study on sexuality of people with type 2 diabetes in terms of quality of life. The research available in the literature is focused mainly on the description of sexual dysfunctions. The limitations of the presented research set the direction for further work in this area. In further research, the obtained results should be compared with a group without diabetes and with other chronic diseases. It would be also desired to compare these results with the results of a group of people with type 2 diabetes with normal weight and without sexual dysfunctions. In further research it would be advisable to control other socio-demographic and medical variables (associated to the process of adapting to a role of a sick person) apart from age, sex and duration of the disease, i.e., a type of applied treatment.

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