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Emotional Dynamics of Persons with Type 2 Diabetes and Their Potential Role in Treatment Adherence: Insights from a Clinical Psychodynamic Perspective

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Abstract

The aim of the present study is to test some differences between persons with and without type 2 diabetes (T2D) on depression, defense mechanisms and unconscious ego-damaged related strategies, and to investigate their potential role in treatment adherence. Twenty-six persons with T2D and 25 healthy controls matched for age and gender were enrolled and assessed using Self-Care Inventory-Revised, Beck Depression Inventory-II, Defense Mechanism Inventory and Projective Envy Technique. Mann-Whitney U tests and bivariate correlations were performed. Healthy controls reported higher depression (somatic-affective) ($r = 0,51$) and lower reversal ($r = -0,36$) and mania ($r = -0,36$) compared to persons with T2D. A medium-high negative correlation effect was found between treatment adherence and depression ($r_s = -0,49$), while a medium positive correlation with principalization ($r_s = 0,48$) emerged. Results shed new light on the potential role of unconscious repressive defense mechanisms in the relationship between depression and diabetes and its impact on adherence. Therefore, some insights are provided concerning diabetes as an internal symbolic object.

Keywords: diabetes; depression; clinical psychology; defense mechanisms; adherence; unconscious.

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Introduction

In recent years the link between potentially problematic emotions and somatic disease has been highlighted by the literature, especially with respect to rare and chronic diseases (Caputo, 2014; Catalano et al., 2018; Conversano, 2019; Langher et al., 2010; Martino et al., 2018; Martino, Langher, et al., 2019; Merlo, 2019; Stanton, Revenson, and Tennen, 2007). Among chronic diseases, diabetes constitutes a major health risk with high morbidity and mortality rates (World Health Organization, 2016), with an overall estimate expected to rise to 552 million by 2030 (Whiting et al., 2011). Chronic stress and negative emotions seem to play a relevant role in the onset, course and treatment efficacy of type 2 diabetes (T2D) (Heianza et al., 2015; Martino, Bellone, et al., 2019; Martino, Catalano, et al., 2019). Moreover, negative emotions such as depression, hostility and anger seem to be associated with worse glycaemic control and higher HbA1c levels (Lane et al., 2000; Whithorth et al., 2016). This is particularly important considering the large number of patients who are not able to correctly adhere to such treatments (Fukuda and Mizobe, 2017; Settineri et al., 2019), thus increasing hospitalization, medical expense and mortality (Ho et al., 2006).

Although several studies have investigated the link between negative emotions and adherence and lifestyle in diabetic condition (e.g. Guicciardi et al., 2014), Pouwer et al. (2010) highlighted the need to widen clinical psychological studies. In this regard, psychodynamic theories (Bucci, 1997; Fonagy et al., 1998; Marty, 1991) can provide a specific contribution, suggesting a link between somatic disease and the impairment of symbolic processes that have their roots in emotional development. From this perspective, somatization involves potential dissociations among somatic and motoric patterns of activation and symbolic representations of objects, where somatic symptom may represent a substitute for thought (McDougall, 1989). According to object relations theory (Greenberg and Mitchell, 1983), the formation of symbolic thinking requires awareness about the differentiation between ego (the self) and object (external reality). When such a differentiation is lacking, anxiety may arise; thus, more or less mature defense mechanisms may emerge in order to protect the self. Moreover, according to Goldstein (2001), individuals who face chronic illnesses, such as diabetes, may experience feelings of loss, self-blame and guilt, symbolically referring to a damaged ego, which can activate emotional strategies in order to handle them. Chronic disease and consequent health loss may thus lead to a condition of ego-related damage that needs for mourning and acceptance to prevent depressive symptoms (Caputo, 2019; D'Alberton, Nardi, and Zucchini, 2012). Indeed, depression as a clinical condition may indicate a persistent sense of self-defectiveness, thus revealing the difficulties in mourning. In this regard, Marchini et al. (2018) proposed a connection between unconscious loss processing and overall diabetes adaptation, looking at chronic illness as "loss of good self".

Based on this premise, this manuscript aims at providing a study to address the above discussed issues from a clinical psychodynamic perspective, with a two-fold objective:

1. To test potential differences between persons with and without T2D on depression, defense mechanisms and ego-damaged related strategies;

2. To investigate the relationship between depression, defense mechanisms and ego-damaged related strategies, and treatment adherence in persons with T2D.

Concerning the first study aim, we hypothesize that persons with T2D have higher levels of depression than healthy controls, consistently with literature (e.g. Graham et al., 2020). As well, a greater reliance on defense mechanisms and ego-damaged related strategies is expected since current research findings highlight their role in depression-management and self-protection in patients with T2D (Hyphantis et al., 2005; Marchini et al., 2018; Martino et al., 2020). As regard to the second study aim, we expect that depression is negatively associated with treatment adherence as reported by recent literature (Shinkov et al., 2018). Besides as indicated by previous studies on the role of defense mechanisms (Hyphantis et al., 2005; La Grutta et al., 2013; Martino et al., 2020), we expect immature and "self-sacrificing" defenses (e.g. projection, turning against the other, reversal, and turning against the self) negatively correlate with treatment adherence, as they rely on conflict denial-avoidance or selfdevaluation. Instead, more mature defense mechanisms are demonstrated to be more effective in problem-solving and illness adaptation (Di Giuseppe et al., 2020). Specifically, principalization was found to be a meaningful factor favoring adherence behaviors in other clinical samples (La Grutta et al., 2013) and preventing from overwhelming distress in diabetes condition (Martino et al., 2020). Therefore, we could expect that principalization is positively associated with adherence, although this hypothesis should be more cautiously considered as provisional and tentative since no previous study has specifically tested it. Then, about ego-damaged related strategies we expect empathic identification to be positively associated with treatment adherence. Indeed, empathic identification may represent a successful strategy to handle self-defectiveness and promote self-care behaviors, compared to other strategies preventing from effective mourning of depressive feelings (Marchini et al., 2018).

Methods

Sample and data collection

A comparative research design was employed. A convenience sample of 51 participants was used for this study. Twenty-six participants with T2D (14 males and 12 females) were recruited from a diabetes centre (in Rome), two hospitals (one in Rome and the other in Civitavecchia) and a primary care clinic (in Rome). The inclusion criteria for the clinical group were: being aged over 50 years old (1) and having a diagnosis of T2D (2) with a diabetes duration longer than two years (3). All the persons with T2D were on treatment with oral hypoglycaemic therapy. Twenty-five comparison participants (13 males and 12 females) were recruited using a snowball sampling procedure. The inclusion criteria for the comparison group were: being aged over 50 years old (1) and not having type 1 or 2 diabetes mellitus, metabolic syndrome, pre-diabetes diagnoses (2). A further inclusion criterion for both the samples was having good language proficiency to fully comprehend or perform the psychological administration. Persons with T2D were recruited during their medical checkups in accordance

with the doctors. After the checkup completion, the participants fulfilled the informed consent and the questionnaires in silent space to ensure their privacy. Concerning the comparison group, eligible participants were phone-called and then encountered to complete the informed consent and fill in questionnaires. The present study was approved by the research review committee of Department of Dynamic and Clinical Psychology ("Sapienza" University of Rome). All research procedures were in accordance with the Declaration of Helsinki and its later amendments and followed ethical standards.

Measures

The Defense Mechanism Inventory (DMI; Fioriti et al., 1992) was employed to assess defense mechanisms. This instrument consists of five defensive scales: Turning against the object (TAO), Projection (PRO), Principalization (PRN), Turning Against Self (TAS) and Reversal (REV). DMI has been described in detail (Juni, 1998). The instrument showed good psychometric properties (Fioriti et al., 1992). In the present study the reliability coefficients of the scales were as follows: TAO ($\alpha = 0,74$), REV ($\alpha = 0,61$), PRO ($\alpha = 0,61$), PRN ($\alpha = 0,68$), TAS ($\alpha = 0,61$).

The Beck Depression Inventory – II (BDI-II; Ghisi et al., 2006) was adopted to assess depression. This instrument is a 21-item scale, which evaluates depressive symptoms and depressive mood changes in the two last weeks. The Italian version of the scale consists of two subscales: a somatic-affective scale which refers to somatic and affective depressive symptomatology and a cognitive scale which refers to cognitive depressive symptomatology (Balsamo and Saggino, 2007). Convergent validity with other depression measures has been demonstrated (Ghisi et al., 2006). In the present study the reliability (Cronbach's α) of the measure was 0,84.

In order to evaluate ego-damaged related strategies of the participants the *Projective Envy Technique* (PET) was used (Nannini et al., 2019), which was previously employed in diabetic setting (Marchini et al., 2018). It is a sentence completion test consisting of 10 stories where the ego is symbolically confronted with one's loss/damage and, at the same time, with other's attainment/intactness across several life domains (e.g. having an unsatisfying couple relationship compared to another person). For each story, the respondent is asked to write down what the main character would answer to the other person. A current coding system allows classification of respondents' answers in four different areas: Empathic Identification (minimizing the frustrated ego and admiring other's attainment), Mania (denying the damaged ego and minimizing other's attainment), Frustration (emphasizing the damaged ego and expressing unpleasant feelings towards other's attainment) and Destructiveness (alleviating the damaged ego and expressing envious feelings towards other's attainment). All responses were independently coded by two researchers by detecting the presence of the four dimensions of the PET and attributing a single code to each text unit. The score for each PET dimension was calculated as a percentage out of the total coded text units. Inter-coder agreement was calculated using Cohen's K coefficient. Cohen's K value was 0,90 for Empathic Identification, 0,90 for Mania, 0,87 for Frustration and 0,89 for Destructiveness.

The Self-Care Inventory-Revised (SCI-R; Weinger et al., 2005) was adopted to assess patients' adherence to medical treatment. This instrument is a 15 items scale measuring perceived adherence to diabetes self-care recommendations among adults with diabetes and it has been translated into Italian for the purpose of this study through a forward-back translation procedure. Reliability, concurrent and convergent validity and responsiveness to treatment for persons with T1D and T2D have been provided (Weinger et al., 2005). In the present study the reliability (Cronbach's α) of this measure was 0,62.

Data Analysis

Data were managed and analyzed using the SPSS Statistics Version 25. The Shapiro–Wilk test for normality was conducted and outputs indicated that most of variables were not normally distributed; thus, nonparametric tests were used to address our research aims. Mann-Whitney U tests were conducted to compare the DMI, BDI-II and PET scores between persons with T2D and the comparison group as to investigate the first study objective. Cross-tabulation chi-square was used for categorical variables. Correlation analyses were performed to examine the relationship between depression (BDI-II), defense mechanisms (TAO, TAS, PRO, PRN, REV), ego-damaged related strategies (Empathic Identification, Mania, Frustration and Destructiveness) and adherence in order to answer the second study objective. Given the sample size and α error probability of 0,05, to ensure power of 0,80, the sensitivity analyses required an effect size of at least 0,37 for mean differences expressed through rank-biserial correlation and of at least 0,38 for correlations expressed through Spearman rho coefficient (Cohen, 1969).

Results

Demographic data

Given the comparative research method, the two groups were matched for age and gender. The mean and standard deviation of the age of the clinical group were 64,3 and 7,0 years and 62,5 and 8,7 for healthy comparison subjects, respectively. The results of the Mann Whitney U test showed no statistically significant age differences between the comparison ($Mdn = 60,00$) and clinical ($Mdn = 65,50$) groups, $U = 249,5$, $p = 0,157$, $r = -0,23$. Chi-square results indicated no significant differences between the two groups in terms of gender ($\chi^2 = 0,02$, $p = 0,89$).

Comparison between persons with and without type 2 diabetes mellitus on the examined variables

Table 1 shows the results of the comparison between the two groups. Persons without T2D ($Mdn = 3$) reported higher BDI-II somatic-affective scores than their counterparts ($Mdn = 1$), $U = 492,00$, $p < 0,01$, $r = 0,51$. Moreover, persons without T2D ($Mdn = 41$) reported significant lower reversal than the clinical group ($Mdn = 44$), $U = 177,50$, $p < 0,05$, $r = -0,36$. Then, persons without T2D ($Mdn = 0,07$) reported significant lower mania than persons with T2D ($Mdn = 0,21$), $U = 208,50$, $p < 0,05$, $r = -0,36$.

Tab. 1. Differences between persons with and without T2D

	Group with T2D	Comparison group	U	r	95% CI for Rank-Biserial Correlation		P value
					Lower	Upper	
Depression (Overall)	9,38 ± 7,48	9,88 ± 7,14	316,00	0,05	-0,27	0,36	0,756
Depression (Somatic-affective)	2,00 ± 3,37	3,84 ± 3,00	492,00	0,51	0,24	0,71	0,001
Depression (Cognitive)	6,81 ± 5,04	6,04 ± 4,58	288,50	-0,11	-0,41	0,20	0,496
Turning against the object	34,86 ± 8,49	37,84 ± 8,29	334,50	0,21	-0,11	0,50	0,208
Turning Against Self	31,95 ± 5,33	33,96 ± 6,60	321,00	0,17	-0,16	0,46	0,331
Projection	39,91 ± 5,73	40,40 ± 5,94	281,50	0,02	-0,30	0,34	0,898
Principialization	48,86 ± 7,55	46,76 ± 5,32	221,00	-0,20	-0,49	0,14	0,253
Reversal	44,40 ± 7,30	40,96 ± 5,45	177,50	-0,36	-0,61	-0,04	0,038
Destructiveness	0,10 ± 0,13	0,12 ± 0,15	353,50	0,09	-0,23	0,39	0,580
Mania	0,22 ± 0,22	0,08 ± 0,08	208,50	-0,36	-0,60	-0,05	0,026
Frustration	0,21 ± 0,19	0,30 ± 0,18	425,50	0,31	-0,01	0,56	0,059
Empathic identification	0,47 ± 0,29	0,50 ± 0,17	370,00	0,14	-0,18	0,43	0,401

Correlations between examined variables and treatment adherence in participants with type 2 diabetes

Table 2 shows the correlations between the examined variables and treatment adherence. A statistically significant negative correlation between depression and adherence was found with a close to large effect ($r_s = -0,49, p < 0,05$), which mostly depends on the association with the cognitive component ($r_s = -0,46, p < 0,05$). A statistically positive correlation between principalization and adherence was found with a close to large effect ($r_s = 0,48, p < 0,05$). Interestingly, a medium-sized negative correlation effect between turning against the object and adherence was also found ($r_s = -0,36, p = 0,10$), despite not being statistically significant. Moreover, with regard to ego-damaged related strategies, a medium positive correlation effect between empathic identification and adherence was found ($r_s = 0,36, p = 0,07$).

Tab. 2. Correlations (Spearman rho) between examined variables and treatment adherence

Measure	Spearman rho	P value
Depression (Overall)	-0,49	0,013
Depression (Somatic-affective)	-0,24	0,066
Depression (Cognitive)	-0,46	0,006
Turning against the object	-0,36	0,100
Turning Against Self	0,07	0,739
Projection	-0,31	0,160
Principialization	0,48	0,022
Reversal	0,18	0,405
Destructiveness	-0,27	0,184
Mania	-0,28	0,164
Frustration	-0,26	0,200
Empathic identification	0,36	0,067

Discussion

The study results show that persons with T2D reported lower depression (somatic-affective) and higher reversal and mania compared to healthy controls. Besides, in persons with T2D, adherence was associated with lower depression (specifically with the cognitive component) and higher principalization to a statistically significant extent.

The lower scores in somatic-affective BDI-II subscale in persons with T2D represent the most robust finding with a large effect size of 0,51, ensuring enough power for detecting differences between the clinical and the comparison group. This finding is surprising because it is in contrast to most of the literature reporting higher depression in persons with T2D (Graham et al., 2020). However, it should be put into perspective considering the other differences found between the two groups. The low expression of the somatic-affective component of depression (e.g., insomnia, changes in appetite, crying, irritability and loss of interest) could be understood in the light of difficulties in expressing affects and their related somatic aspects in chronic diseases (Bucci, 1997; Pancheri, 1980; Solano, 2013). This seems also confirmed by the higher scores of the clinical group in both reversal and mania. Indeed, reversal refers to a defensive minimization of the severity of perceived threats through responding neutrally or positively toward a frustrating object, thus lessening feelings of loss (Martino et al., 2020). This is consistent with higher levels of mania indicating the prevalence of avoidant and dismissing unconscious strategies that allow the denial of depressive feelings related to a damaged ego (Marchini et al., 2018). Therefore, such findings could be more widely interpreted in terms of the relationship between the subject and his/her own chronic disease as an internal symbolic object (Marchini et al., 2018; Shahar, and Abu-Shakra, 2008). Despite resorting to repressive defenses may make diabetes less threatening, we should acknowledge that the patient may begin to deny outright that s/he actually has diabetes and consequently his/

her dependence on and concern for treatment. Moreover, higher levels of mania in persons with T2D may suggest a difficulty in reaching depressive position, which is related to an impairment in symbolic thought and differentiation between the ego and the external reality, according to object relation theory (Greenberg and Mitchell, 1983). This is in line with recent literature highlighting the relationship between T2D and alexithymia, and its negative consequences on self-care and quality of life (Martino et al., 2020)

With regard to the relationship of depression, defense mechanisms and ego-damaged related strategies with adherence, the diverse role of depression and principalization in lowering or improving compliance with treatment seems in line with previous studies (Martino et al., 2020; Whithorth et al., 2016; Yi et al., 2010). With regard to depression, people with diabetes who have higher depressive symptoms such as pessimism and self-criticism are more likely to feel overwhelmed and unmotivated in struggling to comply with the medical requirements. Concerning the positive role of principalization in following medical recommendations, it could be hypothesized that intellectualizing defense mechanisms, aiming at avoiding negative feelings, could be adaptive in handling disease-related negative emotions, thus making easier and less conflictual following medical treatment. Moreover, principalization is known to be associated with lower depression and better quality of life in patients with T2D (Martino et al., 2020).

Conclusions

In sum, regarding the first study aim, our hypotheses were partially confirmed since participants with T2D showed lower levels of somatic-affective depression but relied on some defense mechanisms (reversal) and ego-damaged related strategies (mania) to a greater extent compared to healthy controls. These findings thus seem to highlight a more complex relation between depression and diabetes. Indeed, the sole depression assessment may not represent an exhaustive indicator of emotional suffering, when not considering the role of such unconscious strategies that may conceal the expression of depressive feelings (Marchini et al., 2018). This may suggest the defective processing of loss referring to one's unhealthy condition (Carmassi et al., 2014; Marchini et al., 2018), leading to a maniac reversal of the relationship with the illness in the effort to gain control over it (Caputo, 2013). Therefore, the reduced capacity of patients with T2D to acknowledge and express into language potential depressive feelings could lead to underestimate their need for psychological support in diabetic practice. Regarding the second study aim, our hypotheses were mostly confirmed. Indeed, depression was negatively associated with treatment adherence; whereas principalization positively correlated with it. The combination of pessimism, guilt feelings and self-criticalness (characterizing the cognitive component of depression) and the reduced reliance on rational explanations (principalization) can suggest feeling powerless and overwhelmed by diabetes, thus negatively affecting

adherence. Lessening patients' self-criticalness and guilt feelings about having diabetes and helping them finding rational solutions could allow better self-care and disease management. Then, robust evidence did not emerge with regard to the remaining defense mechanisms, and empathic identification showed a promising but not statistically significant association with adherence (mostly due to the limited power of the study).

Overall, the results from this study highlight the relevance of deepening emotional suffering in such a clinical sample because some defensive patterns are enacted to counteract the feelings of loss. This is particularly relevant if considering that depression – as the result of a defective mourning process related to illness – seems to represent an obstacle to adherence. Indeed, the potential novelty of this study is its focusing on the role of unconscious dimensions in diabetes related adherence that is a mostly unexplored research field.

Limitations

Some limitations should be acknowledged in order to put the results into perspective. At first, the low sample size does not always consent to detect potential differences and get robust findings, which thus need to be considered as preliminary and should be replicated on larger samples in future research studies. Moreover, the present study does not allow reliable generalizations to the population of persons with T2D; as well, the sample was entirely composed of Italian participants thus not ensuring transcultural validity. Besides this, the correlational nature of the present study does not allow the disentanglement of the relationships among the examined measures, because of other potential unobserved variables or confounders affecting the comparison between the participants with and without T2D. In particular, the lack of control for relevant variables such as the level of personality functioning and the overall mental health of the subjects of the two samples could have biased the present findings. As well, the cross-sectional design makes it impossible to infer the causal effects of such variables on treatment adherence in the clinical group. Other limitations refer to the use of self-reported measures which may lead to a potential social desirability bias, as well as to the limited number and types of adherence indicators.

Future Directions

Future research studies should include psychodynamic measures to assess the psychological functioning of persons with T2D and its potential impact on adherence. To this purpose, it should be useful to enrich the theoretical reflection on depression as the feeling to have lost the ego's intactness, which could lead the individual to make efforts to restore the damaged self through acceptance of the disease and self-care behaviors. In this regard, new tools assessing the process of mourning along the progression of the disease could be useful to monitor the acceptance of diabetes and its effective integration in daily

life. Concerning the adaptive role of some defense mechanisms (especially intellectualizing ones), longitudinal studies would be required to better inspect their relationship with solution focused behaviors and long-term effects on adherence to medical treatment. Then, it could be thus interesting to carry out future studies including clinician-reported measures of treatment adherence, as well as other medical outcomes such as blood glucose records.

Author contributions

The authors contributed equally to this manuscript.

Compliance with Ethical Standards

Conflict of interest

The authors declare that they have no competing interest.

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Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Each participant dealt with the process of informed consent.

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