

PSYCHOPATHOLOGY AND PSYCHOTHERAPEUTICAL INTERVENTION IN TYPE 1 DIABETES: PARTICULARITIES, CHALLENGES AND LIMITS

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Abstract: Type 1 diabetes is a problem of great public health importance, creating a considerable burden to affected individuals and society. Even if, with the introduction of new instruments of testing and monitoring this type of diabetes, mortality rates have decreased considerably in the past decade, further decrease of mortality and increase of quality of life have become a significant challenge.

One important component that should be considered in improving care for type 1 diabetes patients is the psychological one. This implies, on a hand, early acknowledging of most common behavioral changes and symptoms satellite to this disease, and, on the other hand, the amelioration of psychotherapeutic interventions designed to address these problems.

For what concerns psychological symptoms, cognitive malfunctions in diabetes include especially slowing of information processing, mental flexibility, attention, memory and concentration, which, in turn, can significantly influence motivation for therapy, compliance and ability for self care. Restrictions pertaining to daily activities, risks of treatment itself and the perceived inability to control the disease can furthermore decrease the perceived quality of life of these patients. Depression can complicate the picture, by supplementary decreasing compliance and increasing the care expenses by a factor of 4,5 (Katon et al., 2005). The unrealistic self-assessment of disease gravity can lead to initialization and continuation of noxious behaviors (e.g. alcoholism, bulimia). Several theoretical models (HBM, TRA, TPB, Leventhal's, Prohaska & DiClemente's) can in part explain patient's attitudes and clues for intervention. However, there are still a number of difficulties and challenges for a proper and early diagnosis of all psychological modifications in type 1 diabetes, such as finding the best methods for an early diagnosis, the complexity of mechanisms that generate psychological symptoms, or the high individual variability in coping with this disease.

A performant management of type 1 diabetes involves a joint action of patient him/herself, of the physician and, in selected cases, of the psychologist. A better self care can include commuting from passive to active coping, getting informed, maintaining realistic hopes and thinking on a long term. In terms of physician interventions, expressing empathy and increasing confidence proved to be beneficial for ameliorating compliance. Also a substantial gain is brought by considering variables involved in modulating compliance (e.g. patient's representations of gains and losses, group norms, self-perceived social support, ability vs. desire of control, personal interpretations and strong values, or acceptance of the disease). Psychotherapeutic interventions include techniques, such as counseling (e.g. motivational interviewing), cognitive-behavioral therapy (addressing both problem representations and problem solving), relaxation, hypnosis and family therapy. Their efficacy is undeniable, despite their limits (originated, for example, in the lack of addressability to the psychologist or decreasing motivation of some patients).

Keywords: diabetes, psychopathology, psychotherapy

Type 1 diabetes is a problem of great public health importance, and creating a considerable burden to affected individuals and society, as the overall annual increase in incidence is steady and estimated at around 3% (1). Even if the introduction of new instruments of testing and monitoring this type of diabetes lead to a decrease of overall mortality in the past decade, quality of life in diabetes remained to our days a significant challenge. In this sense, action targeting additional factors, responsible for the onset and aggravation of diabetes factors, such as the psychological ones, is extremely valuable. This article is centered on an overview of psychological factors able to influence diabetes prognosis, on building an inventory of most frequent psychological interventions, but also on exposing their challenges and limits.

I. Factors that can be subject of psychological interventions are both complex and multiple.

- (a) *Cognitive malfunctions*: are numerous and resulting from complex mechanisms, such as:
1. hyperglycemic-induced end organ damage (via reactive oxygen species) => neuronal damage and altered neurotransmitter function (2);
 2. ischemia (diabetic microangiopathy) + hyperglycemia => diffuse brain degeneration (3, 4);
 3. decreased global rates of cerebral blood flow, correlated with the duration of the disease (5);
 4. ischemia (diabetic microangiopathy) + hyperglycemia => accumulation of glutamate => neuronal damage (6, 7);
 5. absence of C-peptide (8);
 6. hypoglycemic-induced neuronal damage (cortex, basal ganglia, hippocampus) (9-12);

Most frequent cognitive symptoms are:

- in type 1 diabetes:

- slowing of information processing* (13);
- decrease of learning efficiency* (14);
- low attention* (15);
- decrease of problem-solving skills* (16);
- loss of inhibition and focus (in teenagers) (17);
- impaired working memory (18);

*For all these parameters, long diabetes duration and young age of diabetes onset are the strongest predictors of low scores (19).

- in type 2 diabetes:

- decreases in psychomotor speed (20, 21);
- deficits of frontal lobe/executive function (21, 22);
- poor verbal memory (23) and working memory (22, 24);
- low processing speed (23);
- decrease of complex motor functioning (21);
- deficits of immediate and delayed recall (25);
- impairment of verbal fluency (21, 26);
- impairment of visual retention (27);
- attention deficits (28).

Some studies claim that impaired glucose tolerance is a risk for cognitive dysfunction by itself; could emerge in lower MMSE scores, long-term memory deficits (29) and decreased verbal fluency (26).

It is important to notice that these findings are reported constantly in the literature, irrespective of the presence of depression (30), in other words depression, if met in diabetes, would just accelerate the manifestation and evolution of cognitive impairments that are manifest anyway. In addition, cognitive malfunctions can be independent from the presence of somatic (retinopathy, hypertension, polyneuropathy – (31-35), and neurological complications (e.g. vascular dementia) (36-38), however they can accelerate their evolution.

Some authors emphasize the importance of acute hypoglycemia episodes, as a distinct variable worsening the performance on tests of immediate verbal memory, immediate visual memory, working memory, delayed memory, visual-motor skills and visual-spatial skills (39, 40).

(b) *Perception of deterioration in quality of life*: it stems from various sources:

- *cognitive impairment itself*: can be a challenge for the self-management of the disease. It has been shown that patients with MMSE < 23 = worse on measures of self care and ability to perform activities of daily living; increased need for personal care and increased rates of hospitalization) (41);

- *restrictions in spontaneous decision-making and their social implications* (e.g. leaving home cannot be done without insulin and food; current bottle of insulin should be kept at room temperature, but extra supplies must be stored in a refrigerator; administration of insulin in public may cause anxiety and it may be avoided, resulting in hypo-/hyperglycemia, etc.);

- *food restrictions* (e.g. diet should be low in fat and high in complex carbohydrates, fibers, fruits and vegetables; consumption of alcohol is restricted; quantities should always be correlated to insulin dose and physical effort);

- *risks of insulin administration itself* (e.g. hypo- or hyperglycemia; difficulty in learning to distinguish various types of insulin and their effects, or in learning to adjust doses; lipodystrophy at the injection site);

- *sleep disorders* [e.g. insomnia, caused by rapid changes in glucose levels during sleep, responsible for awakenings (42); disruptions caused by discomfort or pain associated with peripheral neuropathy (43)];

- *inability to control the disease*: is modulated by factors such as low self-efficacy; external locus of control; low hardiness; low / absent coherence; pessimism / unrealistic optimism (44).

(c) *Psychiatric comorbidity*:

Includes especially *depression* (the prevalence of isolated depressive symptoms is about 30%, whereas the criteria for major depressive episodes are met in 10% of diabetic patients) (45). Depression affects especially higher at middle-age patients, possibly because perception of losses and restrictions is more acute. There is an inverse correlation between incidence of depression, socio-economic status, social support and male gender (46). Depression can increase by a factor of 4,5 times the care expenses, and also mortality (47) (via an increased number of complications, low metabolic control and bad self-management of the disease). It can derive from diabetes, but can be also a predictor for its evolution, via low compliance to treatment, diet, physical exercise and continuation of noxious behaviors (smoking, alcoholism). Main sources of depression are the long duration of treatment; low quality of life (via complications of the disease +/- everyday restrictions) (45) and, in some cases, stigma brought by the presence of the disease.

(d) *Risky behaviors* include:

- *unrealistic self-assessment* (between 40% and 80% of people with diabetes underreport their blood sugar levels on at least half of their recordings) (48);

- *continuation or persistence of some noxious routines* (e.g. alcoholism, bulimia); especially alcohol has become in the last decades an important cause of death in patients with type 1 diabetes (49);

- *low compliance*: attempts have been made to explain low compliance within the theoretical frame provided by several theoretical models, such as:

- *Health Belief Model (HBM)* (is focused on patient's opinion on gains vs. losses offered by the treatment): it has been found that 2/3 to 3/4 of diabetes patients were of the opinion that their prescribed regimen was unsuitable for them (50);
- *Theory of Reasoned Action* (tries to capture the threshold between "reasonable" and "unreasonable" treatment): according to this model, the influence of group (family) norm and group (family) support is more important in type 1 diabetes (50);
- *Theory of Planned Behavior* (aims to evaluate how much, in patient's view, is changeable in the course of the disease); it can be influenced by symptom or regimen changes, but also by preexistent representations of control (51);
- *Stages of Change Model* (looks on where is the patient in the process of accepting the disease and changing his / her routines); In 1982, DiClemente & Prohaska (52) described several stages in this process (Precontemplation / Contemplation / Preparation / Change / Maintenance) that can be applied also to diabetes and correlated to compliance;
- *Leventhal's Self-Regulation Model* (is focused on the role of personal interpretation and of strong values) (53); they can be also critical in diabetes, in some patients.

All psychological variables stated above [(a) – (d)], even well known, are, in many cases challenging and / or associated with limitations, for several reasons:

1. *(Early) diagnosis of cognitive deficits can be problematic*, as the existence of specific and reliable instruments is still not ensured in all diabetes wards. Among the most valuable tests, DemTect (54) and the Montréal Cognitive Assessment (55) can be combined with modern imaging methods: fMRI, PET, SPECT, or arterial spin labeling MRI (56);
2. *Complexity of mechanisms can be puzzling*, for example, quite frequently veritable vicious circles exist, e.g. low adherence / noxious behavior – deterioration of health – depression – low adherence / noxious behavior, or low self-perceived control – low adherence – even lower self-perceived control, etc. This can be confusing for an inexperienced clinician, however it can offer the advantage of working simultaneously at several levels, in order to improve the management of a diabetes case;
3. *Individual variability is not only somatic, as generally considered, but also psychological*, and this can substantially modify the picture (e.g. hardiness, self-efficacy, strong values, balance gains vs. losses are not easy to detect in a normal Dr-Pt consultation, but can influence the outcome);
4. *Models trying to explain patient's attitudes* should be seen in dynamic (in other words, seen longitudinally in the history of a certain case. For example, in HBM model, gains vs. losses balance can change sharply, sometimes because of a momentary event (e.g. belief of vulnerability prior to onset of diabetes can make treatment a reasonable option BUT belief of vulnerability after complications have occurred despite treatment may orient the patient towards alternative medicine);
5. *Insufficiency of tailored instruments to assess patients and validate models* can be a further challenge.

II. In spite of these challenges, **a better management of diabetes is possible, via tasks that can be equally filled by the patient, doctor and psychologist.**

(a) Tasks doable by the patient

The patient, irrespective of his/her educational background, should:

- be active (address the problems) and not use passive coping mechanisms (denial, projection, repression);
- get informed;
- maintain hope and optimism (not unrealistic, though);
- collaborate with the Dr and / or psychologist;
- think on a long term.

(b) Tasks for the doctor

A priority for the doctor should be expression of empathy, active listening and working on patient's trust. This was proven not only to be directly proportional to global compliance (57), but to have a positive effect on specific behaviors (such as taking medication as prescribed, planning diet, testing blood glucose, avoiding certain types of food, exercising, or monitoring progresses) (58). Trust is able to enhance patient's feeling to be an active participant in managing his / her disease and the force to overcome difficulties.

The doctor should pay attention to all variables involved in modulating compliance (such as patient's representations of gains and losses, group norm, perceived social support, ability vs. desire of control, personal interpretations and strong values, progress into accepting the disease) and address them (alone or in collaboration with the psychologist).

(c) Psychological intervention comprises a number of techniques, from simple counseling to group psychotherapy.

1. Counseling

Relies on increasing the motivation of the patient for remaining an active participant in therapy and aim change, in the sense of a better management of his/her medical condition. Several principles used by psychologists in counseling diabetes patients are:

- expressing empathy (via elements such as active (verbal and nonverbal) listening, showing understanding and respect for patient's suffering);
- exposing differences between present Self and ideal Self (and contribution of the disease to this discrepancy);
- addressing implicit resistance to change (by inviting the patient to take into account an alternative perspective, and emphasize its positive consequences);
- increasing self-efficacy and confidence, by acknowledging successes and encourage the desire for future changes;
- use counseling in combination with other techniques which generate more trust and self-confidence, such as relaxation and / or hypnosis (59).

2. Cognitive-behavioral therapy (CBT)

Represents a step further beyond counseling, as it is more problem-centered. It proved to be very efficient for a better management of chronic conditions, including diabetes, as it is flexible, focused and time-limited (60);

It comprises several phases (61):

1. Specify the problem (e.g. “snacking after dinner”): avoids the tendency for patients to “catastrophize” it (to see it as ubiquitous and overwhelming);
 2. Goal setting: should be specific (e.g. “not snacking after dinner”), measurable (how much, how often), action oriented (e.g. to address behavior, rather than physiology) and realistic (not too difficult, so that patients become discouraged, yet difficult enough to give a sense of accomplishment);
 3. Identify barriers to goal attainment, e.g. unrealistic thoughts (e.g. extremistic), counterproductive emotions (e.g. lack of self esteem), problems with networks (e.g. low social support), problems with resources (e.g. lack of time or money);
 4. Elaborate strategies to overcome barriers (patient-centered approach: clinicians should ask patients questions, so that they can formulate themselves ideas and alternatives);
 5. Contracting for change (“behavioral contract”);
 6. Track outcomes (monitor difficulties, reward successes / analyze failures, work on the initial strategy and restructure it, if necessary);
- Continuous support can be used in any of the phases (1)-(6), with additional positive effects.

3. Group psychotherapy

- Family approach

Is a rather directive and intensive approach (averagely lasts 2-3 months). Emphasis is on:

- changing behaviors related to diabetes management;
- helping families support patient’s responsible, age - appropriate diabetes management behaviors.

These objectives are accomplished by modifying individual family members’ roles and responsibilities regarding diabetes management. The tasks assigned to the family provide concrete, objective behaviors that everyone can agree either have or have not been carried out. This tends to keep the discussion confined to concrete issues, instead of more distracting and less helpful general complaints.

The psychologist tracks family’s ability to stick with the plan, its successes and failures in developing new ways of functioning.

- Non-family group psychotherapy in diabetes

Among these groups, some are designed to offer a better and more stable psychological status in long-term confrontation with diabetes, for example to decrease the incidence of depression and anxiety in group participants. Interventions comprise generally a few (e.g. 6) months weekly group meetings, lead by a psychotherapist and focusing on topics such expression of grief and anxiety about the loss of health, impact on social and family life, anxiety about hypo- and hyperglycemia and late complications, and unconscious personality patterns (denial, frustration, aggression) (62, 63). Such groups proved to be efficient also in improving diabetes’ knowledge and psychosocial functioning, especially in older individuals (64).

In another variant of non-family group psychotherapy, the primary aim is to improve coping with daily demands of diabetes. This is often useful for children and adolescents, as their social life is often impaired by the presence of the disease. By learning new social skills and problem-solving abilities, these patients are thereby able to significantly improve their quality of life (65, 66).

Irrespective of the kind of psychotherapy used, a number of challenges and limits should be considered, in order to find a more proper place of psychotherapeutic intervention in the array of means used to handle diabetic patients. They are:

- the lack of addressability to the psychologist, even when symptoms (e.g. depression are manifest);
- the limits of the therapies themselves (some may not work as expected, especially those based on suggestion); sometimes they are done improperly (e.g. too early / late), with implications on a long term);
- decreasing motivation (especially via unrealistic expectations).

However, despite these amendments, professional management of diabetes in our days should consider the intervention of the psychologist a key element that should be used without reserve, in order to improve prognosis and quality of life of diabetic patients.

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