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The factors contributing to diabetes-related distress among the Ukrainian population

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Diabetes mellitus (DM) is a chronic metabolic disorder delineated by reduced and/or absence of insulin secretion from the pancreas and/or insulin resistance leading to impaired glucose uptake, decreased glucose storage, and altered carbohydrate and lipid metabolism) [1]. The global diabetes prevalence in 20—79 year olds in 2021 was estimated to be 10.5 % (536.6 million people), rising to 12.2 % (783.2 million) in 2045 [2].

In Ukraine still struggling with the burden of the COVID-19 pandemic, the Russian invasion of Ukraine has further disrupted medical services, including diabetes care. 7,1 % of the Ukrainian adult population lives with DM and non-communicable diseases are the leading case of premature death [3].

Diabetes mellitus one of the most common non-communicable diseases requires ongoing medical treatment and multifactorial risk-reduction strategies along with strict regulation of glycemia [4]. The progression of the complications can be delayed by achieving the target glycemic goal through improving patient medication compliance and inhancing awareness about self-management behaviors [5].

Self-management, as important component in DM care, refers to the individual inherent capacity to manage symptoms, minimize physical and psychological disorders, and implement healthy lifestyle measures [6].

Diabetes mellitus exerts a profound impact on the psychosocial well-being and affects mental health which is manifested as depression, anxiety and stress, persistent fear of hypoglycemia, impaired eating habits, and development of diabetes-related distress (DRD) [7, 8].

DRD is the most common psychological comorbid condition. The manifestation of DRD can be elucidated by patients' emotional response to the diagnosis, the menace of complications, apprehension about support and access to care, and the multi self-management strategies as frequent monitoring of blood glucose, regular follow up with both a healthy dietary plan, and physical activity.

Several studies have shown that depression and DRD can interrupt self-management, impair glycemic control, increase the risk of complications and, mortality, and decrease the quality of life. Two questionnaires were developed to assess DRD, the Problem Areas in Diabetes (PAID) questionnaire and the Diabetes Distress Scale (DDS)-17 [9]. DDS-17 was recently developed and addressed the apparent drawbacks of the PAID since PAID focused and addressed only the emotional aspect of diabetes distress [9]. Both questionnaires have their advantages in appraising DRD, but the DDS-17 is more precise and has an improved questionnaire structure compared with PAID [9].

Objective — to assess the diabetes-related distress and its associated factors among adult participants with diabetes mellitus in Ukraine using the DDS-17.

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MATERIALS AND METHODS

An online cross-sectional survey was carried out between March and September 2023. Individuals had to be Ukrainian citizens who were type 1 or type 2 DM, 18 years of age or older, regardless of gender, and residing before Februry 2022 within the country.

Considering a prevalence of 7.1 % of DM in Ukraine, a minimum sample size of 115 participants was required to have a study power of 80 %, and a confidence interval (CI) of 95 %.

The study protocol was approved by the Research and Ethics Committee of the Ukrainian Scientific and Practical Centre of Endocrine Surgery, Transplantation of Endocrine Organs and Tissues Health Ministry of Ukraine. Participation was voluntary and informed consent was obtained from all participants before filling the questionnaire. Privacy and confidentiality of participants were respected.

The self-administered questionnaire was in Ukrainian, the native language in Ukraine, and required approximately 10—15 min to complete. The first section of the questionnaire covered the sociodemographic factors, including gender, age, weight, and height. Body mass index (BMI) was calculated using the weight and height, and categorized into three categories: normal (18.5—24.9 kg/m^2), overweight (2.0—29.9 kg/m^2), and obese (i 30.0 kg/m^2).

It included cigarette smoking status (yes or no), marital status (single, married, divorced, or widowed), employment status (yes or no), place of residence (permanent or internally displaced persons), medical history (DM, complications), and medication history (oral antidiabetics, insulin, or both).

Additionally, laboratory values were included and categorized as follows: fasting blood glucose (FBG) (< 5.5, 5.6—6.6, or i 6.7 mmol/L), hemoglobin A1C (HbA1c) (healthy < 5.7, pre-diabetic 5.7—6.4, or DM i 6.5 %), systolic blood pressure (SBP) (< 120, 120—129, 130—139, or i 140 mm Hg), and diastolic blood pressure (DBP) (< 80, 80—89, or i 90 mm Hg).

The second section consisted of the DDS-17 score. It was developed in 2005 [10] and was translated into the Ukrainian language. The questionnaire is composed of 17 questions grouped in four sub-components: five questions about emotional burden (EB), they included the following questions «Feeling that diabetes is taking up too much of my mental and physical energy every day», «Feeling angry, scared and/or depressed when I think about living with diabetes», «Feeling that I will end up with serious long-term complications, no matter what I do», «Feeling that diabetes controls my life», «Feeling overwhelmed by the demands of living with diabetes». Five questions about regimen-related distress (RD): Not feeling confident in my day-to-day ability to manage diabetes; Feeling that I am not testing my blood sugars frequently enough; Feeling that I am often failing with my diabetes routine; Feeling that I am not sticking closely enough to a good meal plan. Three questions about interpersonal-related distress (ID): Feeling that friends or family are not supportive enough of self-care efforts; Feeling that friends or family don't appreciate how difficult living with diabetes can be; Feeling that friends or family don't give me the emotional support that I would like, and four questions about physician-related distress (PD): Feeling that my doctor doesn't know enough about diabetes and diabetes care; Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes; Feeling that my doctor doesn't take my concerns seriously enough; Feeling that I don't have a doctor who I can see regularly enough about my diabetes. Each question is rated on a 6-point scale from 1 (no problem) to 6 (A very serious problems).

The score was calculated by adding up the participant's responses to the relevant questions and then dividing this sum by the total number of questions within that particular scale. For the calculation of the total DDS-17, responses of all questions were added and divided by 17.

The total score were interpreted according to the mean score. Score below than 2 indicates little or no distress. Score of two and above indicates moderate-high distress.

Descriptive statistics were used to describe patient characteristics, with frequencies and percentages for categorical variables and mean ± standard deviation for continuous variables. The chi-square or Fisher's exact tests were used for categorical variables, and student T-test or Mann Whitney tests were used for continuous variables. A p value < 0.05 was statistically significant. Fisher or Pearson Chi Square tests between two categorical variables were both used. The relationship between categorical and continuous variables, on the other hand, was examined using either the student T test or the ANOVA test.

RESULTS

Out of the 126 participants enrolled in this study, 93 were females (73.8 %) with a mean age of 48 years. 20.6 % of the participants were between 18 and 40 years. 99 participants (78.6 %) had overweight and

obesity. More of the participants were internally displaced personslived (69.1 %). A summary of sociodemographic characteristics is provided in Table 1.

Type 2 DM was in 39 (30.9 %) patients, duration of DM was less than 10 years in 74 (58.7 %). Details about medical history, and distress scores are listed in Table 2.

Individuals of 40 years and above had higher emotional distress compared to younger patients (72.9 % versus 46.3 %, p = 0.034). The association between sociodemographic characteristics and physician distress showed that participants of 40 years and above had more distress than younger participants (30.9 % versus 12.8 %, p = 0.037). Non-smokers had a significant distress (29.2 %, p = 0.015). The association between medical history with physician distress showed that participants who had diastolic blood pressure more than 90 mm Hg showed significantly moderate to high distress (53.2 %, p = 0.021).

The association between sociodemographic characteristics with regimen distress showed that ages above 40 years had more distress than ages between 18 and 40 years (57.2 % versus 27.7 %, p = 0.004). Obese and overweight participants had a significant moderate to high distress (64.2 %, and 48.1 %, respectively, p = 0.032).

Table 1

Social and demographic characteristics of patienrs with diabetes mellitus

Characteristic	Frequency
Gender	
Male	33 (26.2 %)
Female	93 (73.8 %)
Age, years (mean ± SD)	48 ± 16
Body mass index	
Normal weight	27 (21.4 %)
Overweight	52 (41.3 %)
Obese	47 (37.3 %)
Marital status	
Single	38 (30.2 %)
Married	65 (51.6 %)
Divorced/widowed	23 (18.2 %)
Employment status	
Unemployed	67 (53.2 %)
Employed	59 (46.8 %)
Residence area	
Permanent	39 (30.9 %)
Internally displaced persons	87 (69.1 %)
Smokers	88 (69.8 %)

The association between medical history with total distress showed that participants with HbA1c of more than 6.5 % followed by those who had HbA1c between 5.7 % and 6.4 % showed moderate to high total distress (45.3 % and 40.6 %, p = 0.025).

DISCUSSION

This study was the first of its kind to be conducted in Ukraine to study the association between patients' characteristics and DRD.

DRD is a common health issue that frequently accompanies DM [12]. Our study showed that a noted

Table 2

Medical history of DM patients and distress scores

Index	Frequency
Diabetes mellitus	
Type 1	39 (30.9 %)
Type 2	87 (69.1 %)
DM duration, years	
0—10	74 (58.7 %)
> 10	52 (41.3 %)
DM medications	
Insulin	39 (31.0 %)
Oral antihyperglycemic agents	73 (57.9 %)
Both	14 (11.1 %)
Fasting blood glucose, mmol/L	
< 5.5	7 (5.6 %)
5.6—7.0	25 (19.8 %)
≥ 7.1	94 (74.6 %)
HbA1c, %	
< 5.7	7 (5.6 %)
5.7—6.4	21 (16.6 %)
≥ 6.5	98 (77.8 %)
SBP, mm Hg	
< 120	14 (11.1 %)
120—129	21 (16.7 %)
130—139	48 (38.1 %)
≥ 140	43 (34.1 %)
DBP, mm Hg	
< 80	19 (15.1 %)
80—89	52 (41.3 %)
≥ 90	55 (43.6 %)
Total distress	
Little/no distress	62 (49.2 %)
Moderate/high distress	64 (50.8 %)

Note. HbA1c: Glycated hemoglobin; SBP: systolic blood pressure; DBP: diastolic blood pressure.

percentage of participants (50.8 %) had moderate to high DRD, with emotional distress being the most common type of distress.

These results were in accordance with a study conducted A. Ibrahim et al. [13] as it revealed that most of their study participants had DRD, and with emotional distress being its most common concern in their study.

Our findings are aligned with the results of a study conducted by M. Niroomand et al. [14]. This study aimed to validate the internal consistency of the Persian version of the DDS-17 and to investigate the prevalence of diabetes distress. However, our findings revealed that DRD was more common among Ukrainian adults with DM in comparison to other countries.

M. O. Aljuaid et al. indicated that 25.0 % of the participants had DRD in Saudi Arabia [15]. T. Alzughbi et al. showed that 22.3 % of participants in Saudi Arabia had DRD [16]. A study in Vietnam and in Thailand by V. B. Nguyen et al. [17], and K. Tunsuchart et al. [18] showed that 12.5 %, and 8.9 % of the participants had DRD, respectively.

The percentage in our study is higher, because there is war conditions in Ukraine when the study was conducted [19].

Our study showed that participants who are obese had more emotional distress which is in accordance with A. A. AlOtaibi et al. study [20]. Obesity might be associated with total distress since obese persons may have poor body estimation and require extra attention in diets, exercise, and weight-loss medications [21]. Another study by M. M. Huizinga et al. showed that BMI was significantly and negatively associated with physician perception of medication adherence. This might cause regimen related distress [21].

For the marital status, M. O. Alijuaid et al. [15] showed that divorced marital status had a significant regimen distress compared to single, married, and widowed participants in Saudi Arabia. These findings are in accordance with our study results. That is because divorced people tend to have higher levels of distress than single and married persons.

For the HbA1c levels, M. O. Alijuaid et al. [15], Alzughbi et al. [16], and V. B. Nguyen et al. [17], studies showed that participants who had higher HbA1c levels had more DRD, which is in accordance with our study. As a higher level of HbA1c reflects treatment failure and this could be attributed to more distress [23].

A combination of factors such as availability DM, transmitted disease due to COVID-19, and also the suffering caused by war can contribute to the aggravation of the development of diabetes distress. However, research publications distress in patients with DM, in particular, in the post-COVID period and in war conditions, is extremely low. Therefore, we believe that this question deserves careful attention and detailed study.

CONCLUSIONS

The prevalence of DRD is high in Ukraine, more common among internally displaced persons, and among participants high HbA1c, unmarried and on complex treatment regimens. Screening for DRD and providing better support can optimize clinical outcomes.

Conflicts of interest: none.

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ABSTRACT

Diabetes-related distress (DRD) is a psychological syndrome with worsened prognosis in patients with diabetes mellitus (DM). DM exerts a profound impact on the psychosocial well-being and affects mental health which is manifested as depression, anxiety and stress, persistent fear of hypoglycemia, impaired eating habits, and development of DRD as the most common psychological comorbid condition.

Objective — to assess the DRD and its associated factors among adult participants with DM in Ukraine using the Diabetes Distress Scale (DDS-17) score.

Materials and methods. In the period from March to September 2023, a cross-sectional analysis was conducted with the participation of 126 patients with DM aged 18 to 72 years (on average, 48.2 ± 6.9 years). There were 93 (73.8 %) women and 33 (26.2 %) men among the study participants. Demographic (gender, age, body weight and height) and social (marital status, employment, place of residence) indicators were determined. Body mass index was calculated using the weight and height, and categorized into three categories: normal, overweight, and obese). It included cigarette smoking status, marital status, employment status, place of residence (permanent or internally displaced persons), medical history (DM, complications), and medication history (oral antidiabetics, insulin, or both).

Results. Patients with DM over 40 years of age had significantly higher rates of emotional stress compared to younger patients (72.9 % vs. 46.3 %, p = 0.034). Internally displaced persons with DM had statistically significantly higher distress (90.8 % vs. 61.3 %, p = 0.023). Severe distress was also recorded in obese patients (68.1 % compared to overweight individuals — 48.1 %; p = 0.039). Similar results were found in unmarried (divorced or widowed) and married participants (78.3 % and 49.2 %; p = 0.037). A direct correlation between the state of DM compensation and distress has been established. Patients with a level of glycated hemoglobin > 6.5 % and 5.7 — 6.4 % had moderate or severe distress (45.3 and 40.6 %; p = 0.048).

Conclusions. The prevalence of DRD is high in Ukraine, more common among internally displaced persons, and among participants high HbA1c, unmarried and on complex treatment regimens. Screening for DRD and providing better support can optimize clinical outcomes.

Keywords: diabetes mellitus, diabetes distress, glycated hemoglobin, internally displaced persons, associated factors, Ukrainian population.

РЕЗЮМЕ

Чинники ризику розвитку дистресу, пов'язаного з цукровим діабетом, у населення України

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Пов'язаний із цукровим діабетом (ЦД) дистрес — це психологічний синдром, який спричиняє погіршення перебігу і прогнозу пацієнтів із ЦД. Цукровий діабет значною мірою впливає на психосоціальне благополуччя та психічне здоров'я, що виявляється у вигляді депресії, тривоги та стресу, постійного страху перед гіпоглікемічними станами, порушеннями харчових звичок та розвитку дистресу як найпоширенішого психологічного коморбідного розладу.

Мета роботи — оцінити пов'язаний із ЦД дистрес та чинники його розвитку в дорослих хворих на ЦД в Україні за допомогою шкали діабетичного дистресу (DDS-17).

Матеріали та методи. У період з березня до вересня 2023 року проведено перехресний аналіз за участю 126 пацієнтів із ЦД віком від 18 до 72 років (в середньому (48,2 ± 6,9) року). Серед учасників дослідження було 93 (73,8 %) жінки і 33 (26,2 %) чоловіки. Визначали демографічні (стать, вік, маса тіла та зріст) і соціальні (сімейний стан, зайнятість, місце проживання) показники. Розраховували індекс маси тіла (ІМТ) з розподілом на три категорії: нормальна, надмірна маса тіла та ожиріння. Анкета містить запитання про паління, сімейний стан, зайнятість, місце проживання (постійна адреса або внутрішньо переміщені особи), історію хвороби (ЦД, ускладнення) та схему лікування ЦД (пероральні протидіабетичні засоби, інсулін або їхнє поєднання).

Результати. У хворих на ЦД віком понад 40 років зареєстровано достовірно вищі показники емоційного стресу порівняно з молодшими пацієнтами (72,9 % проти 46,3 %, p = 0,034). Внутрішньо переміщені особи з ЦД мали статистично значущо більший дистрес (90,8 % проти 61,3 %, p = 0,023). У пацієнтів з ожирінням також зафіксували сильний дистрес (68,1 % у порівнянні з особами з надмірною масою тіла — 48,1 %; p = 0,039). Схожі результати виявлено в неодружених (розлучених або овдовілих) і одружених учасників (78,3 % і 49,2 %; p = 0,037). Установлено прямий кореляційний зв'язок між станом компенсації ЦД і дистресом. Хворі з рівнем глікованого гемоглобіну > 6,5 % і 5,7 — 6,4 % мали помірний або сильний дистрес (45,3 і 40,6 %; p = 0,048).

Висновки. Частота пов'язаного з ЦД дистресу в Україні є високою. Він поширеніший серед внутрішньо переміщених осіб, а також серед хворих з вищим рівнем HbA1c, неодружених осіб і пацієнтів, які отримують комплексну схему лікування. Скринінг на діабетичний дистрес і надання кращої психологічної підтримки хворим можуть оптимізувати клінічні результати.

Ключові слова: цукровий діабет, цукровий дистрес, глікований гемоглобін, внутрішньо переміщені особи, супутні чинники, населення України.

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