

Factors associated with disordered eating behaviors among schizophrenia patients

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Key words: eating behaviors, schizophrenia, demographics.

Conflict of interest: the author declares that he has no competing interests, and confirms accuracy.

Ethics approval and consent to participate: this study was approved by the ethics committee of the Medical Faculty of the ZAUMS Zahedan (IR.ZAUMS.REC.1398.210), and all procedures were in accordance with the latest version of the Declaration of Helsinki.

Patient consent for publication: prior to participation, written informed consent was obtained from all participants and their parents/legal guardians after a comprehensive explanation of the study procedures.

Funding: none.

Availability of data and materials: the datasets generated and analyzed during the current study are not publicly available because no consent was obtained from the participants in this regard. However, the data are available from the corresponding author on a reasonable request.

Acknowledgments: the author hereby thanks the officials in charge of Zahedan University of Medical Sciences as well as the participants who aided in conducting the present study.

Received: 30 September 2023.

Accepted: 6 October 2023.

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Licensee PAGEPress, Italy
Mental Wellness 2023; 1:3
doi:10.4081/mw.2023.3

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Abstract

Recent hypotheses suggest that patients with schizophrenia consume more unhealthy foods, an issue that raises the need for a more meticulous examination of disordered eating behaviors (DEBs) in such patients due to increasing rates of metabolic mortality and morbidity. Therefore, this study aimed to investigate predictors associated with DEBs in schizophrenia. This cross-sectional study was conducted from May 2018 to November 2019. A total of 131 patients with schizophrenia were recruited through convenience sampling among outpatients referring to the Baharan Psychiatric Clinic (Zahedan, Iran). Patients were evaluated using demographic information forms and the eating attitudes test-26 items. In this study, 120 patients (52 males and 68 females) with schizophrenia provided correct answers to the questionnaires. According to regression analysis results, the variables of marital status, employment, classes of medication, and duration of disease could significantly predict DEBs among schizophrenia patients. The results of this study demonstrate the need for a more meticulous examination of DEBs at earlier stages of schizophrenia. Besides, psychosocial interventions and antipsychotic medication switching seem to be associated with a decreased risk of DEBs among schizophrenia patients.

Introduction

Schizophrenia is one of the most prevalent serious mental illnesses, affecting 1% of the general population.¹ Recent hypotheses suggest that patients with schizophrenia consume more unhealthy foods, an issue that raises the need for a more meticulous examination of disordered eating behaviors (DEBs) in such patients due to increasing rates of metabolic mortality and morbidity. DEBs in schizophrenia are often characterized by a lack of control, known as voracious gorging, or as a form of environmental automatism.² Although Kraepelin and Bleuler were the first in the 19th century to introduce disorganized and uncontrolled food intake as one of the characteristics of schizophrenia, the available literature in this field is scarce because of the inability to meet the full criteria for typical eating disorders.^{1,3,4} This issue has made clinicians consider DEBs as a secondary problem.⁵ Accordingly, a hypothesis has been addressed indicating that DEBs may be a physiological compensatory effort to reduce psychotic symptoms, as starvation is virtually acknowledged to be able to induce psychosis.² Although various studies have highlighted the comorbidity of schizophrenia with a variety of eating disorders, including anorexia nervosa, bulimia nervosa, binge eating disorder, night eating syndrome, and other eating disorders, the pathophysiology

of DEBs in schizophrenia has remained unknown.^{1,6} Various factors, such as mood disorders, sleep disturbances, socioeconomic difficulties, side effects of psychotropic medications, substance/medication use, high rates of smoking, and type 2 diabetes, have been considered to explain DEBs in schizophrenia patients.⁷ For example, in her paper, Bruch proposed that overeating is an adaptive defense against stress utilized for the maintenance of self-control. She developed this hypothesis based on Kallman's descriptions in a monozygotic twin study, stating that the heavier twin would not develop psychosis; however, these early descriptions cannot explain cognitive awareness or deliberate behavior.⁴

Additionally, recent evidence in patients and animal models has shown that antipsychotics can also create changes in food habits and hyperphagic effects, which are in turn associated with a lack of satiation and increased appetite.^{8,9} In line with this evidence, previous research on schizophrenia patients revealed that treatment with atypical antipsychotics was associated with more frequent DEBs than typical antipsychotics.^{10,11} For instance, Sallemi *et al.* examined 53 Tunisian patients with schizophrenia through the sick, control, one stone, fat, and food (SCOFF) questionnaire and found that 35.8% of these patients were predisposed to the risk of eating disorders, which was significantly linked to female gender and treatment with atypical neuroleptics.¹⁰ Earlier, Sentissi *et al.* studied 153 French patients with schizophrenia using the three-factor eating questionnaire (TFEQ) and reported that DEBs were not associated with gender, but they were influenced by treatment with atypical antipsychotics.¹¹ On the other hand, Kouidrat *et al.* studied 66 French patients with schizophrenia and observed no correlations between medication use, duration of disease, and TFEQ scores.¹² Moreover, they reported no significant differences between the male and female samples in terms of mean TFEQ scores. Since DEBs in schizophrenic patients may account for an important factor in the development of cardiometabolic disorders, it is essential to identify the related risk factors to develop effective interventions.^{1,12} Therefore, this study aimed to investigate predictors associated with DEBs in schizophrenia.

Materials and Methods

Study design

This cross-sectional study was conducted from May 2018 to November 2019. A sample size of 131 patients was calculated based on Green's method [$N \geq 50 + 8p = 50 + 8 \times 8 = 114$ (p , number of predictors)] considering a 15% attrition of participants.¹³ Participants were selected through convenience sampling among outpatients referring to the Baharan Psychiatric Clinic (Zahedan, Iran). The inclusion criteria were: i) a diagnosis of schizophrenia based on the diagnostic and statistical manual of mental disorders, 5th edition; and ii) an age range of 18-70 years. Exclusion criteria were as follows: i) acute psychotic episode;¹⁴ ii) diabetes mellitus disease;¹⁵ iii) substance use disorder; iv) intellectual disability; v) history of neurological disorders; vi) treatment with antidepressants or mood stabilizers during the last 3 months;¹⁶ vii) concurrent treatment with typical/atypical antipsychotics within the last 3 months; viii) depressive disorders or sleep-wake disorders;⁷ ix) hearing loss; and x) incomplete completion of questionnaires.

Ethical considerations

The present research was approved by the ethics committee at the research affairs of Zahedan University of Medical Sciences, with the ethics code IR.ZAUMS.REC.1398.210. To observe the Helsinki

Declaration completely, all participants were provided with and signed participation consent forms. They were then enrolled voluntarily in the study and could discontinue participation for any reason. The questionnaires were anonymous to protect the participants.

Instruments

Demographic information form

This was a researcher-made questionnaire containing information such as age, gender, marital status, residence, employment, level of education, duration of disease, and classes of medication.

Eating attitudes test-26 items

The eating attitudes test-26 items (EAT-26) is a questionnaire that comprises 3 subscales of dieting, bulimia and food preoccupation, and oral control. The questions are scored based on a 6-point Likert scale, with scores of 3, 2, and 1 for always, usually, and often responses, respectively, to questions 1-25, and 0 scores for other responses, namely never, rarely, and sometimes; question 26 is scored reversely. The scores of this questionnaire vary between 0 and 78, with a score ≤ 20 representing a risk of eating disorders. An acceptable validity and reliability (Cronbach's $\alpha = 0.75$) was reported for this questionnaire in Iran.¹⁷

Statistical analysis

Data were analyzed using descriptive statistics, including the mean and standard deviation. EAT-26 average scores were compared based on demographic characteristics by the analysis of variance. Correlations between study variables were assessed using Spearman's rank correlation coefficient. Besides, the predictor roles of the variables were examined with hierarchical multiple regression. Data were analyzed using the SPSS 25 software (IBM, Armonk, NY, USA) at a significance level of $p < 0.05$.

Results

Profiles of disordered eating behaviors

In this research, 120 patients (52 males and 68 females) with schizophrenia provided correct answers to the questionnaires. The demographic information of the participants (Table 1) indicates an 11.7% risk of eating disorders in schizophrenia patients. Comparisons of mean EAT-26 scores revealed significant differences in terms of age ($F(3, 116) = 3.573$, $p < 0.05$), marital status ($F(1, 118) = 27.509$, $p < 0.001$), residence ($F(2, 117) = 12.193$, $p < 0.001$), employment, ($F(1, 118) = 46.297$, $p < 0.001$), level of education ($F(4, 115) = 3.705$, $p < 0.01$), duration of disease ($F(3, 116) = 10.589$, $p < 0.001$), classes of medication ($F(1, 118) = 80.492$, $p < 0.001$), and risk of eating disorder ($F(1, 118) = 258.326$, $p < 0.001$) (Table 2).

Determinants of disordered eating behaviors

Significant correlations were found between mean EAT-26 scores and gender ($r = 0.584$, $p < 0.05$), marital status ($r = 0.694$, $p < 0.001$), residence ($r = 1.068$, $p < 0.001$), employment ($r = 0.873$, $p < 0.001$), classes of medication ($r = 0.922$, $p < 0.001$), and duration of disease ($r = -0.442$, $p < 0.01$) (Table 3).

The study variables were subjected to regression analysis to examine their predictor roles. In the first step, analysis of the gender variable showed that it could not predict DEBs significantly in schizophrenia patients ($\beta = 0.072$, $\Delta R^2 = 0.005$, $p > 0.05$). In the second step, the gender variable was controlled, followed by the analysis of the

marital status variable, which could significantly predict DEBs in schizophrenia patients ($\beta=0.432$, $\Delta R^2=0.185$, $p<0.001$). In the third step, the residence variable was analyzed by controlling the gender and marital status variables, but it was unable to predict DEBs significantly among schizophrenia patients ($\beta=0.162$, $\Delta R^2=0.025$, $p>0.05$). Through the control of the gender, marital status, and residence variables in the fourth step, the employment variable was analyzed and could significantly predict DEBs among schizophrenia patients ($\beta=0.474$, $\Delta R^2=0.217$, $p<0.001$). The gender, marital status, residence, and employment variables were controlled at the fifth step, and analyzing the classes of medication suggested that it could also predict DEBs significantly among schizophrenia patients ($\beta=-0.242$, $\Delta R^2=0.050$, $p<0.01$). The regression analysis results at the sixth (final) step indicated that the variables of marital status ($\beta=0.215$, $p<0.01$), employment ($\beta=0.268$, $p<0.01$), classes of medication ($\beta=-0.186$, $p<0.01$), and duration of disease ($\beta=0.348$, $\Delta R^2=0.072$, $p<0.001$) were able to predict DEBs significantly among schizophrenia patients ($F(6, 113)=23.435$, $R^2=0.554$, $p<0.001$) (Table 4).

Discussion

In this research, a risk of 11.7% for eating disorders was detected among 120 Iranian adults with schizophrenia using the EAT-26 questionnaire, whereas Sallemi *et al.* reported a risk of 35.8% in 53 Tunisian patients with schizophrenia using the SCOFF questionnaire.¹⁰ This discrepancy can be attributed to, for example, the type of questionnaires, the number of participants, and sociodemographic characteristics. Furthermore, comparisons of mean EAT-26 scores

Table 1. Frequency of demographic characteristics, duration of disease, classes of medication, and risk of eating disorders.

		n (%)
Age	20-29	34 (28.3)
	30-39	36 (30)
	40-49	30 (25)
	50-60	20 (16.7)
Gender	Male	52 (43.3)
	Female	68 (56.7)
Marital status	Single	56 (46.7)
	Married	64 (53.3)
Residence	Private owner home	42 (35)
	Rental home	70 (58.3)
	Homeless	8 (6.7)
Employment	Employed	74 (61.7)
	Unemployed	46 (38.3)
Level of education	Illiterate	24 (20)
	Elementary grade	22 (18.3)
	Middle grade	22 (18.3)
	High school	34 (28.3)
	College	18 (15)
Duration of disease	6 months to 2 years	54 (45)
	2 to 5 years	16 (13.3)
	5 to 10 years	24 (20)
	Higher than 10 years	26 (21.7)
Classes of medicine	Typical antipsychotics	72 (60)
	Atypical antipsychotics	48 (40)
Risk of eating disorders	Exist	14 (11.7)
	Does not exist	106 (88.3)

Table 2. Comparison of mean eating attitudes test-26 items scores in terms of demographic characteristics, duration of disease, classes of medication, and risk of eating disorders.

		EAT-26 (M±SD)	F (df1, df2)
Age	20-29	12.823±9.735	3.573 (3, 116)*
	30-39	7.611±5.689	
	40-49	13.266±13.724	
	50-60	7.400±4.671	
Gender	Male	9.692±6.745	0.610 (1, 118)
	Female	11.058±11.265	
Marital status	Single	14.857±11.648	27.509 (1, 118)***
	Married	6.625±4.674	
Residence	Private owner home	11.000±9.869	12.193 (2, 117)***
	Rental home	8.542±6.069	
	Homeless	24.500±20.240	
Employment	Employed	6.513±6.090	46.297 (1, 118)***
	Unemployed	16.826±10.679	
Level of education	Illiterate	16.666±15.610	3.705 (4, 115)**
	Elementary grade	7.818±4.854	
	Middle grade	10.090±7.555	
	High school	9.235±6.514	
	College	8.222±8.482	
Duration of disease	6 months to 2 years	14.925±12.047	10.589 (3, 116)***
	2 to 5 years	10.875±5.962	
	5 to 10 years	5.333±1.723	
	Higher than 10 years	5.692±3.497	
Classes of medicine	Typical antipsychotics	5.555±3.549	80.492 (1, 118)***
	Atypical antipsychotics	17.833±10.917	
Risk of eating disorders	Exist	32.000±8.770	258.326 (1, 118)***
	Does not exist	7.622±4.737	

EAT-26, eating attitudes test-26 items; M, mean; SD, standard deviation; df, degree of freedom; * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

demonstrated significant differences in terms of age, marital status, residence, employment, level of education, duration of disease, and classes of medication. Significant correlations were also observed between mean EAT-26 scores and gender, marital status, residence, employment, classes of medication, and duration of disease. Our findings are in line with those of Sentissi *et al.* and Kouidrat *et al.* who presented evidence of no significant differences between uncontrolled eating scores in terms of gender.^{11,12} Nonetheless, Sallemi *et al.* reported a significantly higher risk of eating disorders in the female gender.¹⁰ Additionally, significant differences between our EAT-26 scores in terms of classes of medication are in agreement with those of Kouidrat *et al.*,¹ Blouin *et al.*,⁸ Sallemi *et al.*,¹⁰ Sentissi *et al.*,¹¹ and Fawzi *et al.*¹⁸ However, the above results are inconsistent with those of Kouidrat *et al.*¹² who reported no correlations between TFEQ scores, duration of disease, and classes of medication. In addition, the regression analysis results in the current study indicated the roles of marital status, employment, classes of medication, and duration of disease in the prediction of DEBs among schizophrenia patients. Therefore, it can be concluded that the predictor roles of marital status and employment reflect the importance of psychosocial rehabilitation interventions to achieve recovery in schizophrenia. According to the Substance Abuse and Mental Health Services Administration's 2016 working definition, recovery is a process of change through which individuals improve their health and wellness, live a self-directed life, and strive to reach their full potential. Accordingly, the following 4 domains can support a recovering life: i) health, which means overcoming and managing the disease along with living in such a way to provide physical and emotional health; ii) home, which means a stable, constant, and safe place for living; iii) purpose, which means meaningful daily

activities including job, school, volunteerism, creative endeavors, and income and resources to participate in society; and iv) community, which means communications and social networks providing support, friendship, love, and hope.¹⁹ In this regard, psychosocial rehabilitation interventions, such as assertive community treatment, supported employment, illness self-management training, family-based services, and wellness recovery action planning, can mitigate stress and DEBs in schizophrenia patients through rapid access to health services, medication management, job creation, improvement in self-esteem, crisis intervention, and emotional support, and improve social interactions and community reintegration.

Additionally, increasing the duration of disease through adaptation to a new reality of the illness can alleviate stress and consequently reduce overeating as an adaptive defense.^{20,21} Concerning classes of medication, although the majority of the literature suggests that uncontrolled eating behaviors are mostly influenced by treatment with atypical antipsychotics, the effects of antipsychotic medication switching have not yet been accompanied by clear evidence for better outcomes as a strategy to reduce metabolic problems in schizophrenia patients.^{18,22}

Limitations

This study suffers from some limitations. Firstly, cross-sectional studies cannot essentially make an accurate estimation of the frequency of a disorder. In fact, the influence of psychotic symptoms on disordered eating behaviors, their alterations during the disease period,¹⁴ and the use of self-reporting questionnaires can hinder an accurate estimation of the frequency of such behaviors in the course of a cross-sectional study. Thus, this limitation can be markedly

Table 3. Correlation between the study variables.

	Gender	Marital status	Residence	Employment	Classes of medicine	Age	Level of education	Duration of disease
EAT-26	0.584*	0.694***	1.068***	0.873***	0.922***	-0.146	-0.141	-0.442**

EAT-26, eating attitudes test-26 items; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 4. Summary of hierarchical regression analysis to assess the factors associated with disordered eating behaviors among schizophrenia patients.

		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
		B (β)	SEB	B (β)	SEB	B (β)	SEB	B (β)	SEB	B (β)	SEB	B (β)	SEB
Stage I	Gender	1.367 (0.072)	1.750	0.738 (0.039)	1.590	0.249 (0.013)	1.592	1.085 (0.057)	1.365	1.147 (0.60)	1.310	1.481 (0.078)	1.224
Stage II	Marital status			8.176 (0.432)***	1.579	8.402 (0.444)***	1.565	6.911 (0.365)***	1.356	5.495 (0.290)***	1.369	4.074 (0.215)**	1.319
Stage III	Residence					2.638 (0.162)	1.358	2.214 (0.136)	1.162	1.978 (0.121)	1.117	1.049 (0.064)	1.064
Stage IV	Employment							9.207 (0.474)***	1.388	8.360 (0.430)***	1.356	5.201 (0.268)**	1.465
Stage V	Classes of medicine									-1.874 (-0.242)**	0.566	-1.442 (-0.186)**	0.537
Stage VI	Duration of disease											6.719 (0.348)***	1.576
R ²		0.005		0.191		0.216		0.433		0.483		0.554	
Adjusted R ²		-0.003		0.177		0.196		0.413		0.460		0.531	
ΔR^2		0.005		0.185		0.025		0.217		0.050		0.072	
ΔF (df)		610 (1, 118)		26.799 (1, 117)***		3.771 (1, 116)		43.989 (1, 115)***		10.974 (1, 114)**		18.183 (1, 113)***	
F (df)		610 (1, 118)		13.771 (2, 117)***		10.655 (3, 116)***		21.950 (4, 115)***		21.278 (5, 114)***		23.435 (6, 113)***	

SEB, standard error of the computed value of B; R², coefficient of determination; df, degree of freedom; ** $p < 0.1$; *** $p < 0.001$.

resolved by designing longitudinal studies and interviewing individual participants. Secondly, a small sample size in our research may not accurately estimate DEBs among schizophrenia patients, which can be addressed by conducting a study on a relatively larger population. Thirdly, the results cannot be generalized to other regions when the sample size is limited to a single geographic region (taking individual, social, and cultural differences into account), which necessitates more extensive research in other regions of the world. The fourth limitation is that no standardized assessment is still available concerning the study of DEBs among schizophrenia patients, making it difficult to accurately evaluate the frequency of such behaviors. Finally, diabetic schizophrenia patients were excluded from this study. It is noteworthy that the risk of diabetes development in schizophrenia patients is 2-3 times higher than in the general population, and DEBs are observed in about 40% of patients with type 2 diabetes.^{15,23} Accordingly, the exclusion of such patients can lead to an underestimation of DEBs, which deserves consideration in future investigations.

Conclusions

In conclusion, it is essential to identify DEBs among schizophrenia patients as an important cause of cardiometabolic disorders. Since eating disorder symptoms diminish with the onset of a psychotic episode and recur with its alleviation, it becomes more important to evaluate the risk of eating disorders during the remission of psychosis. The present research demonstrated that the EAT-26 questionnaire can be used as a useful tool for screening DEBs among schizophrenia patients. Moreover, the use of psychosocial interventions and antipsychotic medication switching may reduce the risk of DEBs owing to the predictor roles of marital status, employment, and classes of medication. Additionally, the role of duration of disease in the prediction of DEBs can indicate the need for a more precise examination of such behaviors in earlier stages of schizophrenia. Yet, further studies (in particular longitudinal and empirical research) are required to prove the actual roles of the above factors in predicting DEBs among schizophrenia patients.

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