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Original article

Feeding behaviors among incident cases of schizophrenia in a psychiatric hospital: Association with dimensions of psychopathology and social support

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SUMMARY

Background: Despite early description by Eugen Bleuler of abnormal feeding behaviors among patients with schizophrenia, it has remained poorly studied and understood by clinicians. The present study sought to describe the various eating behaviors among incident cases of schizophrenia and its relationship with the dimensions of psychopathology and perceived social support.

Methods: This study elicited information on the feeding behavior of 206 incident cases of schizophrenia being followed up for various nutritional outcomes. Feeding behavior, dimensions of psychopathology and perceived social support were measured using literature based researchers' constructed nutritional questions, Positive and Negative Symptoms Scale (PANSS), and Multi-dimensional Scale of Perceived Social Support (MSPSS), respectively. Relationship between food refusal and dimensions of psychopathology as well as perceived social support were tested using independent t-test.

Results: Food refusal was seen in 56.5% of the patients, with 32.5% of it attributed to suspiciousness. Of the 13.2% with Inappropriate feeding behavior, 46.4% and 14.3% were related to abnormal food preparation and pica, respectively. Food refusal was significantly associated with positive symptoms dimension and general psychopathology ($p < 0.05$).

Conclusion: Our findings show that subtle feeding abnormalities occur among schizophrenia patients and this is related to positive symptoms dimension and poor perceived social support.

1. Introduction

Schizophrenia is a chronic psychiatric disorder as defined in the Diagnostic Statistical Manual (DSM) criteria [1], could manifest with delusions and hallucinations. Persecutory delusions as could be found in such patients could affect their nutritional status directly or indirectly, which could further worsen symptom severity via diverse ways [2].

Refusal to eat and other inappropriate feeding behaviors among patients with schizophrenia have been described by Eugen Bleuler as early as the nineteenth century [3]. These feeding behaviors may mimic eating disorders in this patient population and may complicate the diagnosis of same. It can occur at various stages of the illness, beginning during the prodromal phase and transforming into delusions throughout psychosis [4].

Studies have described various inappropriate feeding behaviors among patients with schizophrenia [2,4–7]. Notably, refusal to eat or drink, pica, carbohydrate preference and fat phobia have been described in this patient group [2,4–7]. These authors explained their findings using the phenomenology of schizophrenia, socio-demographic, clinical and environmental factors [2,4–8]. For instance, Amella and Quandt et al. [2,8], reported that food refusal and eating of non-nutritive material (pica) among patients with schizophrenia is related to the positive symptoms dimension (e.g., delusions). The unique symptomatology in schizophrenia such as persecutory and bizarre delusions may limit food intake in quantity and quality [2,9].

In this study, the socio-demographic (e.g., social support, gender, educational status, age, marital status and employment status) and clinical factors (e.g., dimensions of psychopathology, vagrancy status, duration of illness) were considered as

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covariates to food refusal among newly diagnosed cases of schizophrenia.

Refusal to eat and drink is a common and distressing precursor to malnutrition among schizophrenia patients [4]. These inappropriate feeding behaviors may lead to both macro and micro-nutrients deficiencies with significant impact on brain functioning, remodeling and repair against mental illness [6]. Understanding these behaviors is crucial to clinicians in seeking ways to resolve them.

Uncontrolled food intake has gotten more research attention than food restriction in patients with schizophrenia [10]. Starvation has psychotogenic implications especially during adolescence, when the susceptible brain undergoes injury, especially in the dopaminergic regulatory areas [9]. Although schizophrenia as well as eating disorders are both separate disease entities, both has shown significant inter-relations, where in either can be a cause or result of another [10]. Dopamine 2-receptor polymorphisms as well as catechol-O-methyl transferase Val158Met gene polymorphism has been linked to anorexia nervosa as well as schizophrenia [10]. In both conditions, regulatory dysfunction of dopaminergic genes has been found to occur due to epigenetic influences [10]. Studies have demonstrated that the presence food refusal in a psychotic illness is not a marker of severity, although, it has the propensity to worsen psychosis and lead to death [9,10].

Despite the early description of disturbances in eating among patients with schizophrenia, feeding behavior in this patient group in Africa has remained poorly studied and understood by health care providers. There is limited work to determine the relationship between food refusal in patients with schizophrenia and the phenomenology of the disease as well as perceived social support. The few reports in the literature were mostly case-reports [2,4]. This study to the best of the authors' knowledge is the first in Africa to investigate the phenomenon of food refusal among newly diagnosed cases of schizophrenia. In addition, the study explored its relationship with dimensions of psychopathology and perceived social support. This is also rare in the literature. In the light of the above issues, the following research questions became pertinent to schizophrenia research in the area of nutrition in Africa.

1. Are there changes in feeding behavior associated with schizophrenia?
2. If these feeding behaviors exist, in what pattern do there occur?
3. What is the relationship between food refusal among patients with schizophrenia and the phenomenology of the disease as well as perceived social support?

2. Materials and methods

2.1. Study design and population

This was a longitudinal naturalistic follow-up study, carried out among the incident cases of schizophrenia patients for various nutritional outcomes at the Federal Neuropsychiatric Hospital (FNH), Enugu, Nigeria. However, this paper reported the baseline assessment of newly diagnosed cases of schizophrenia at recruitment in cross-sectional manner. Patients with schizophrenia of suspected organic etiology or with medical or psychiatric co-morbidities were excluded. Patients were interviewed when they were in stable clinical condition, i.e., fully conscious, could follow the interview process, and not requiring emergency chemical and/or physical restraint.

2.2. Sample selection

The total population sampling was used to recruit all incident cases of schizophrenia that presented at the study site during the 13-month period of the study (i.e., 1st September, 2017 to 1st October, 2018). Patients aged 18–60 years and those coming for the first time for treatment in the study site were included in the study. This study is part of a larger follow-up study on nutritional outcome of patients with schizophrenia. In computing the required sample size for the study, we used the global median point prevalence of schizophrenia (4.6 per 1000) reported in a meta-analysis by Bhugra [11]. We computed the required sample size by using these figures ($p = 0.0046$, $q = 0.9954$) to substitute the Cochran formula [12] for proportion (Z^2pq/e^2) and arrived at 7. This number was too small and a decision was made to carry out a total population sampling.

Two hundred and twenty-one incident cases of schizophrenia were seen in the study site in the 13-month recruitment period. The 221 patients were approached consecutively and after complete description of the study, 4 declined to give consent due to unwillingness to participate. In addition, 11 other participants were excluded either because of suspected organic etiology or the presence of co-morbid other psychiatric diagnoses.

2.3. Diagnostic interview

Diagnosis of schizophrenia was made using the ICD-10 criteria for schizophrenia and confirmed using the Mini International Neuropsychiatric Interview (MINI). First, using the screening sections of the modules of the MINI, the researcher sought to screen out the presence of co-morbid major mental disorders while questions adapted from eating disorders diagnostic scale (DSM-5), was used to exclude eating disorders.

A detailed medical history with full physical examination (including neurological examination) was used to exclude the presence of co-morbid physical conditions.

The researcher then administered the socio-demographic questionnaire; this questionnaire contained items to assess socio-demographic characteristics and other nutritional variables (for example, food refusal, changes in appetite, eating of non-nutritious materials etc). The baseline assessments were completed by the researcher at the emergency and crisis intervention unit or within one week of admission for admitted participants. The researcher assessed baseline dimensions of psychopathology using Positive and Negative Symptoms Scale (PANSS) [13]. The PANSS was developed out of the need for a well-operationalized method of assessing the syndromes in schizophrenia, including their relationship to one another and to global psychopathology. Kay et al. [13], reported that the scale has good inter-rater reliability, criterion-related validity and construct validity. In addition, it has acceptable internal consistency (Cronbach's alpha) of 0.89 [13].

Also, the social support scale was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS) [14]. The MSPSS is a well validated 12-item concise instrument used for measuring the hierarchical structure of perceived social support from family, friends, and significant others [14]. Although it was initially developed for adolescents, it has been found to be suitable for adults. It has been shown that MSPSS has good internal reliability, test-retest reliability, and strong factorial validity [14]. In addition, good construct validity of the significant other, family, and friend subscales were also demonstrated [14]. The perceived social support is graded on a 7-point Likert-type of scale (from very strongly disagree to very strongly agree). This was applied when the patient was judged to have become clinically stable and able to complete the questionnaire. The social support scale was either given to the patient or read aloud for the patient to indicate the answer as it applied to him/her.

2.4. Ethical considerations

Approval for this study was obtained from the Ethics and Research Committee of the Federal Neuropsychiatric Hospital, Enugu, with reference number FNHE/HTR/REA/VOL.11/356. This was approved on 15th of August, 2017 as part of a larger study on nutritional outcome of patients with schizophrenia. International ethical norms and standards were strictly adhered to. Verbal and written informed consent was obtained from all the participants. Participation was voluntary.

2.5. Data analysis

The statistical analysis was done using the International-Business Machine-Statistical Package for Social Sciences, version 20 (IBM-SPSS 20). Relationship between food refusal and dimensions of psychopathology as well as perceived social support were tested using independent t-test. Logistic regression was used to estimate the odds ratios (OR) and 95% confidence intervals (CI) for the differences in proportion of those with/without food refusal.

3. Results

Table 1shows the socio-demographic characteristics of the 206 schizophrenia participants. Schizophrenia patients aged 18–30 constituted about 43.7% of all the participants. The majority (58.7%) were females, single (63.6%), had high school education (56.0%) and were employed (57.8%).

Food refusal among patients with schizophrenia was seen in 56.8% of the patients. Majority (54.6%) of the patients cited decreased appetite as the reason for food refusal while another 32.5% refused feeds based on the symptom of suspiciousness. Inappropriate feeding behaviors were seen in 13.2% of the patients, with the most common inappropriate feeding behavior as abnormal food preparation (46.4%). Minority of them had pica (14.3%). Notable changes in feeding behavior occurred after the commencement of treatment. Majority of the patients had change in appetite (59.2%), of which, 49.0% had increased appetite with carbohydrate preference (See Tables 2–4).

Table 1
Socio-demographic characteristics of the study participants N = 206.

Socio-demographic Variables	Frequency (n)	Percentage (%)
Age Group (years)		
18–30	90	43.7
31–45	91	44.2
46–60	25	12.1
Gender		
Male	85	41.3
Female	121	58.7
Marital Status		
Single	131	63.6
Married	56	27.2
Separated/divorced/widowed	19	9.2
Educational Status		
No Formal	5	3.0
Primary	22	13.1
Secondary	94	56.0
Tertiary	47	28.0
Occupational Status		
Employed	119	57.8
Unemployed	87	42.2
Financial Independence Prior to Disease Onset		
Independent and can support others	14	6.8
Independent but cannot support others	58	28.2
Partially dependent	39	18.9
Fully dependent	95	46.1

Table 2
History of food refusal and reasons for food refusal among schizophrenia patients at presentation N = 206.

Variables	Frequency (n)	Percentage (%)
History of Food Refusal (n = 206)		
Present	117	56.8
Absent	89	43.2
Reasons for Food Refusal (n = 117)		
Suspiciousness	38	32.5
Religious practices	12	10.3
Change in Food Preference	3	2.6
Decrease in Appetite	64	54.6

Table 3
History of Inappropriate Feeding Behaviors and the various Inappropriate Feeding Behaviors among Schizophrenia Patients at Presentation N = 206.

Variables	n	Percentage (%)
History of Inappropriate Feeding Behavior (n = 206)		
Present	28	13.6
Absent	178	86.4
Total	206	100.0%
Types of Inappropriate Feeding Behavior (n = 28)		
Pica	4	14.3
Cooking Difficulty	13	46.4
Strange Feeding behavior	10	35.7
Others not specified (e.g., not cooking)	1	3.6
Changes in Food preference (n = 206)		
None	199	96.6
Carbohydrate preference	6	2.9
Mixed Classes of Food	1	0.5

NB: Cooking Difficulty (e.g., Inappropriate use of ingredients); Strange Feeding behavior (e.g., rubbing on the body, ruminating).

Table 4
Changes in feeding behavior after commencement of medications N = 206.

Variables	Frequency (n)	Percentage (%)
History of Change in Appetite (n = 206)		
Present	122	59.2
Absent	84	40.8
Types of Appetite Change (n = 122)		
Increased	101	82.8
Decreased	21	17.2
Increased in Appetite (n = 101)		
Increase in the quantity per meal	63	62.4
Increase in the frequency of feeding	8	7.9
Both	30	29.7

The association of food refusal among schizophrenia patients with the dimensions of psychopathology and perceived social support are shown in Table 5. The psychopathological scores for those with food refusal, vs. those without food refusal, were significantly different for positive symptoms (25.0 ± 5.0 versus 23.3 ± 5.4) and general psychopathology (52.2 ± 4.5 versus 49.6 ± 7.3) ($p > 0.05$). Schizophrenia patients with perceived adequacy of social support were significantly less likely to refuse food ($p < 0.001$). Newly diagnosed patients with schizophrenia with unsatisfactory perceived social support were 4.0 times more likely to report food refusal than those with satisfactory social support (Table 6).

4. Discussion

The main highlights of the findings of this naturalistic follow-up study of a Nigerian schizophrenia cohort are: (1) food refusal was present at baseline assessment in 56.5% of patients with schizophrenia in a Nigerian Psychiatric Hospital; (2) the commonly given

Table 5
The relationship between dimensions of psychopathology, perceived social support and food refusal among patients with schizophrenia N = 206.

Variables	Food Refusal		t-stat	p-value	Effect Size
	Present	Absent			
Dimensions of Psychopathology					
Positive symptoms Dimension	25.0 ± 5.0	23.3 ± 5.4	−2.4	0.02	0.3
Negative Symptoms Dimension	27.9 ± 3.2	26.9 ± 4.9	−1.7	0.09	0.2
General Psychopathology	52.2 ± 4.5	49.6 ± 7.3	−3.2	0.002	0.4
Perceived Social Support	27.3 ± 4.3	30.8 ± 9.0	3.7	<0.001	0.5

Table 6
Logistic regression of the covariates of food refusal among incident cases of schizophrenia N = 206.

Covariates	Odd Ratio	95% Confidence Interval
Positive symptoms Dimension	1.1	1.0–1.2
Negative symptoms Dimension	1.0	0.9–1.1
General Psychopathology	1.1	1.0–1.3
Age		
≥45 years	1.2	0.5–2.7
Less than 45 years	–	–
Gender		
Female	3.0	1.7–5.3
Male	–	
Marital status		
Living with a partner	1.3	0.7–2.3
Not living with a partner	–	
Education status		
≥6 years of education	1.0	0.3–3.4
Less than 6	–	–
Social Support		
Unsatisfactory	4.0	0.4–39.4
Satisfactory	–	–
Duration of illness		
Less than 5 years	2.0	0.9–3.6
≥5 years	–	
Vagrancy status		
Yes	1.6	0.4–4.3
No	–	–

Dependent variable = food refusal (no/yes).

reasons for food refusal in our study population were decreased appetite and suspiciousness; (3) food refusal among this patient population were significantly associated with positive symptoms dimension ($p = 0.02$), general psychopathology dimension ($p = 0.002$), and unsatisfactory perceived social support; (4) that inappropriate feeding behavior occurred in 13.2% of our cohort. Majority (46.4%) of the patients studied had difficulty cooking (e.g., inappropriate use of cooking ingredients). Strange feeding behaviors (e.g., rubbing on the body, ruminating) and pica was found in 35.7% and 14.3%, respectively; and (4) history of change in appetite occurred in 59.2% of patients after commencement of antipsychotics. Most patients reported increase in appetite.

Food refusal has been reported in patients with schizophrenia in the existing literature [9,10,15–17]. This is consistent with our study finding, where majority (56.8%) of the study population presented with history of food refusal at baseline assessment. Fawzi and colleague, reported high prevalence of food refusal among antipsychotic naïve patients with schizophrenia in an Egyptian sample [18]. In patients with schizophrenia, food refusal has been associated frequently with overvalued ideas, positive symptoms dimension (e.g., persecutory delusions of being poisoned, command auditory hallucinations), and the fear that the food is fatty (fat phobia) [4,9,15]. Some symptom groups of the PANSS has shown more association with this experience [9,10,15–17]. Negative symptoms of schizophrenia have been known to restrict eating in patients who also have a co-existing bulimia [9]. Features such as suspiciousness, delusions, conceptual disorganization on the positive symptom scale as well as disturbance of volition (such as avolition), mannerisms and posturing found in catatonia on the general symptom scale has also been found to be associated with food refusal [9,15]. Our study found that food refusal was significantly associated with the positive symptoms dimension (e.g., suspiciousness) ($p < 0.02$) and general symptoms dimension ($p < 0.002$). Contrary to previous reports [9], we did not find any significant association between food refusal and negative symptoms dimension of psychopathology. This is probably because in our setting, patients commonly present in the hospital with acute symptoms and clinicians are more likely to associate such symptoms like food refusal to positive symptoms (e.g., persecutory delusions of food being poisoned or voices asking the patient not to eat) than negative symptoms. It is necessary, therefore, that before a diagnosis of eating disorder is made in patients with schizophrenia; this sub-set of patients who restrict food due to illness experience need to be excluded.

Our finding on the significant association between unsatisfactory perceived social support and the presence of food refusal is expected in our environment. Studies on the association between social support and various outcome parameters in schizophrenia patients have consistently reported that adequate social support are promotive of better outcome in different domains of the illness [19–22]. Literature on social support recognized the distinction between available social resource (structural) and the individuals' subjective perception or assessment of received support (functional) [21]. The former is reported to be protective against distress while the latter is a “buffer” against adverse outcome [21]. The availability of both among patients with schizophrenia could enhance good nutrition among this patient population. This study further reinforced the role of social support in ameliorating the severity of such symptoms like refusal to eat during a psychotic experience.

Inappropriate feeding behaviors such pica, rumination disorder, protomania, has been found to be present in some patients with schizophrenia [15], which was in agreement with the result from our study where a frequency of 13.2% was found. Quandt et al., reported that the injection of non-nutritive materials (pica) among patients with schizophrenia was common and that it may related to the delusion that the object contains a nutritive material that the patient lacks [2]. In addition, we also found other problems like cooking difficulty and strange feeding behaviors. Cooking difficulty, strange feeding behaviors and pica, were discovered to occur in decreasing frequency. These inappropriate feeding behaviors found among patients with schizophrenia have implication for diagnosis and treatment. For instance, these behaviors as symptoms of schizophrenia can result in cachexia, phenomenologically resembling comorbid anorexia nervosa posing a diagnostic challenge. Hence, there is need to further explore whether these symptoms are core to the pathology or its complications using appropriate study design in our environment.

Patients with schizophrenia do not commonly exhibit a change in food preference when compared with the normal population [17], this could explain the finding that 96.6% of the study

participants experienced no change in food preference. In addition, out of the population that exhibited a change (3.4%), 2.9% showed preference for food in the carbohydrate class; energy giving food with high caloric content, which such patients has been known to show peculiar preference [16,17], especially those on second generation antipsychotics [17]. However, it is worthy of note that one of the staple food of the Nigerian population are those in the carbohydrate class [23]. Nonetheless, this finding will need to be further explored especially with regard to metabolic disturbances which have been shown to be excess in patients with schizophrenia [24].

Anti-psychotics have been demonstrated to influence the appetite and satiety pathway through the dopaminergic pathway, although, the second generation anti-psychotics has been frequently cited [9,15,17]. A change in appetite after the commencement of antipsychotics was reported by 59.2% participants, where 82.8% reported an increase in appetite, which is in agreement with documented literature [10,16,17]. More so, 61.2% of these participants, reported an increase in quantity per meal [16,17], which is also in agreement with existing literature [16,17]. However, it is possible that the choice of anti-psychotics used may have influenced the degree at which the satiety stimulus was reset, which may affect the quantity consumed per meal [10].

4.1. Limitations

One of the limitations of this study was the use of institution based samples (care seekers); although it saved cost and time, and is the predominant methodology in the literature, a community sample would have been more representative.

The second limitation was the use of semi-structured questionnaire to assess feeding/eating behaviors; a structured questionnaire would have been more appropriate.

5. Conclusion

Our findings show that refusal to feed among schizophrenia patients is related to positive symptoms dimension and poor perceived social support. The implication of this to the nutritional status of the patient need to be further explored especially in Africa where malnutrition is a major cause of mortality.

5.1. Clinical implications

The findings of this study have some clinical utility. First, the need for clinicians to be aware of subset of feeding behavior among patients with schizophrenia that may not necessarily constitute eating disorders. Second, malnutrition is already a public health problem in Africa with many persons at the borderline. This study draws the attention of the clinician to possible feeding behaviors in patients with schizophrenia that may tilt them to malnutrition. Therefore, routine nutritional assessment in such patients should be considered a priority. Third, there is need to strengthen patients social capital to improve the quality of social support. This has become necessary in the African context where the traditional African extended family network is quickly being eroded by industrialization and westernization.

Statement of authorship

The first and second authors contributed to the study design, analysis and interpretation of data, and drafting the manuscript. Data collection was done by the first author, while statistical analysis was done by the second author, while, both authors were involved in data collection. All authors read and approved the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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