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Psychometric properties of Tamil version of Body Weight Image and Self Esteem questionnaire (BWISE) in severe mental illness in a South Indian population

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ABSTRACT

Background: Body weight image self-esteem questionnaire (BWISE) has been recently developed to assess psychosocial adjustment related to antipsychotic induced weight gain in Schizophrenia and related disorders. Patients have reported disturbance in body image and poor self esteem due to weight gain leading to treatment non-adherence.

Aim: Assessment of psychometric properties of Tamil version of Body weight image self-esteem questionnaire (BWISE) in our population.

Methodology: In a cross sectional, validation study conducted at Schizophrenia Research Foundation (SCARF), 203 consenting outpatients with DSM IV diagnosis of Schizophrenia and related psychotic disorder fulfilling inclusion/exclusion criteria were administered BWISE.

Results: The mean age of the sample was 38.21 ± 10.32 years. BWISE ratings showed that patients (54%) reported weight gain with current medications and were aware of increase in weight. Only three percent reported to have severe psychosocial adjustment to the weight gain while remaining reported moderate (55%) and mild (42%) psychosocial adjustment. Validation of Tamil version of BWISE was found to be of moderate range (internal consistency 0.55–0.72). Principal Component analysis of BWISE identified 3 components with a 50.36% variance.

Conclusions: BWISE could be used as a useful screening instrument to assess the psychosocial consequences of weight gain in patients.

1. Introduction

Antipsychotics used in treating schizophrenia and cause adverse effect on physical appearance, have not been sufficiently discussed in the psychiatric literature. Weight gain is easy to measure and monitor in clinical practice, but tracking the antecedents and consequences of weight gain is more complex especially with the use of a psychotropic medication. It has been reported in multiple studies that patients with severe mental illness have distortions in weight perception but are not very keen to indulge in weight reduction behaviors inspite of high risk of obesity and its adverse consequences (Lee, 2008; Loh et al., 2008). Instruments to assess body image are seen more commonly in eating disorders, but instruments to assess body image in schizophrenia are lacking. Current instruments in the literature mainly focused on eating disorder specific symptoms and behaviors rather than the psychosocial impact due to weight gain in non-eating disorders. Recently a new short and easy to administer questionnaire Body Weight, Image and Self Esteem (BWISE) was developed by Awad and Voruganti (2004) for assessment of body weight, image and related self-esteem disturbance in schizophrenia. Therefore, this tool can be used to improve awareness and develop motivation strategies for weight reduction and non-compliance. This instrument can not only help in assessing patients perception and awareness to weight issues but can also help in promoting compliance as well as in planning motivation strategies targeting weight reducing behaviors. The original authors (Awad and Voruganti, 2004) administered BWISE in a heterogeneous outpatient psychiatric population of 141 subjects and internal consistency was found to be satisfactory with value of chronbach alpha 0.79. Split half measure reliability was 0.76 and test re test reliability was 0.81. Various other studies mostly in western population have reported the fair to good reliability with acceptable internal consistency of BWISE. Indian studies focused on psychosocial aspects of psychotropic induced weight gain are lacking. Therefore, this study was designed with a specific aim to translate Body Weight Image Self Esteem Questionnaire

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(BWISE) in the local language (Tamil) and to assess the psychometric properties of the translated questionnaire in our population.

2. Material & methods

2.1. Sample and design

This was a naturalistic cross sectional validation study conducted at the outpatient department (OPD) of Schizophrenia Research Foundation (SCARF) in Chennai, India. SCARF is a tertiary care rehabilitation center committed to care to both acute and chronic patients with Schizophrenia. Over a 6-month duration 480 patients were screened and total of two hundred and three consenting patients who fulfilled the inclusion and exclusion criteria were recruited for the study. The Institutional Ethics Committee approval was obtained prior to initiating the study. All patients who were willing to participate in the study gave a written informed consent in English or Tamil. Details of the study were explained to the patient and the accompanying family member.

2.2. Inclusion criteria

a All patients in age group 18–60 years.
b Diagnostic and Statistical Manual of Mental Disorders (DSM IV TR) diagnosis of Schizophrenia and related disorders including Schizoaffective, Delusional disorder, Schizophreniform Psychosis (American Psychiatric Association, 1994).
c Willing to participate in the study.

2.3. Exclusion criteria

a Uncooperative due to illness severity.
b Substance Dependence except Nicotine Dependence Syndrome.
c Patients with delusion dysmorphophobia.
d Patients with Mental Retardation, head injury sequelae & seizure disorder.

2.4. Tools used

2.4.1. Study Performa

This Performa was specifically designed for the purpose of this study and captures socio demographic data, illness, treatment and weight related variables.

2.4.2. Mini - international neuropsychiatric interview (MINI)

M.I.N.I. is an acceptable highly validated brief structured interview for assessment of major axis I psychiatric disorders in DSM-IV and ICD-10. (Sheehan et al., 1998)

2.4.3. Body weight, image & self-esteem evaluation questionnaire (BWISE) (Awad and Voruganti, 2004)

The B-WISE is a 12-item self-report questionnaire, and items are drafted as first person statements describing a subject's personal appraisal of the changes in body weight and issues related to psychosocial adjustment in the preceding 2 weeks. Answers are chosen from a three-point frequency based Likert scale (i.e., never, sometimes and all the time). The answers are assigned a rating of 1, 2 or 3, with potential total scores ranging between 12 and 36, higher scores indicative of better psychosocial adjustment. Total scores are divided into three categories: mild (29–36), moderate (21–28) and severe (12–20) psychosocial adjustment. Psychometric properties show high internal consistency (Chronbach's alpha 0.79) and fair split half reliability (Spearman–Brown coefficient of 0.76). Test–retest reliability coefficient is 0.81 ($p < 0.001$).

The permission to use, validate and translate BWISE questionnaire was obtained from the original authors. The original English version of the BWISE was translated into Tamil and harmonized by two independent researchers, and back translated by an independent translator.

2.5. Focus group discussion (FGD)

This was done for the content validity of the BWISE scale that is used on patients with Schizophrenia or Severe mental illness. Experts in this field who were well versed with local dialect were asked to participate in this discussion to validate the content of the questionnaire keeping in view the targeted population. Discussions Illustrating commonalities and varied opinions between members regarding the questions were deliberated, moderated and incorporated in the translated version. From the original BWISE Scale Question 4: I am not able to control my hunger and craving for food, BWISE Question 6: I am self-conscious in the company of others because of my weight, BWISE Question 7: I am reminded of my body shape and appearance during the day translated word for craving, self-conscious and reminded were considered to be literary and was changed into easy and colloquial terminology for better understanding by the target population. Cognitive interviewing was followed up with the translated questionnaire (Morgan and Krueger, 1998).

2.6. Anthropometric evaluation

Weight was measured using an electronic digital scale. Patients were placed standing at the center of the scale base without shoes and height was obtained with a wall anthropometer. They were asked to stand without shoes, ankles together, flat back, and arms stretched along the body. Both the assessment measures are present in the OPD and were used regularly to do anthropometric evaluation on patients. BMI was calculated according to formula BMI = wt. (in kg)/ ht^2 (in m^2). Patients were categorized as underweight, normal, overweight or obese based on criteria BMI ≤ 18.49, 18.5–24.9, 25–29.9, > 29.9 kg/ m^2 respectively per WHO guidelines (WHO expert Consultation, 2004). Subsequently, BWISE was administered. All assessment was done in a single sitting.

2.7. Data analysis

The data was analyzed by using the descriptive statistics such as mean, standard deviation for continuous variables and frequency and percentage for categorical variables. Group comparison between genders for continuous variable was done using independent *t*-test For BWISE internal consistency of the translated scale was evaluated with Chronbach's α coefficient. A factor analysis using varimax rotation was performed on the complete dataset to identify the underlying factorial structure of the instrument. The criteria used to determine the number of components were the Kaiser criterion, the screen plot and the interpretation of the components.

3. Results

3.1. Sample

Total of two hundred three patients were recruited. Out of which 92 (45.3%) were male and 111 (54.7%) were female. The mean age of the sample was 38.21 ± 10.32 years. No significant difference was found between the genders on the variables of age, education, religion, diagnosis, duration of illness. However, significant number of males reported to have never been married and more males were employed ($p < 0.0001$) at the time of recruitment. (Table 1)

3.2. Weight related variables

Mean body weight, height and BMI of total sample was found to be

Table 1
Socio demographic and Illness variables (N = 203).

Variable	Total N = 203(%)	Male N = 92(%)	Female N = 111(%)	Statistics
Age **(mean in years)**	38.21 ± 10.32	37.36 ± 9.55	38.90 ± 10.92	t = −1.058 df = 201 p = 0.291
Duration of Illness **(mean in years)**	12.61 ± 8.9	13.09 ± 9.03	12.21 ± 8.82	t = 0.697 df = 201 p = 0.487
Diagnosis				
Schizophrenia	157(77.3)	78(84.8)	79(71.2)	χ2 = 5.434
Schizoaffective	38(18.7)	12(13.0)	26(23.4)	p = 0.066
Other psychotic d/o	8(3.9)	2(2.2)	6(5.4)	df = 2
Marital Status:				
Single	105(51.7)	64(69.6)	41(36.9)	
Married	60(29.5)	19(20.7)	41(36.9)	χ2 = 23.349
Separated/Divorced	33 (16.3)	9 (9.8)	24 (21.6)	p= < 0.0001
Widow	5(2.5)	0	5(4.5)	df = 3
Education (mean in years)	12.78 ± 3.24	13.09 ± 3.13	12.53 ± 3.32	t = 1.238 df = 201 p = 0.217
Employment:				
Employed	60(29.6)	40(43.5)	20(18.0)	
Unemployed	94(46.3)	47(51.1)	47(42.3)	
Housewife	37(18.2)	0	37(33.3)	χ2 = 43.604
Student	9(4.4)	3(3.3)	6(5.4)	p= < 0.0001*
Retired	3(1.5)	2(2.2)	1(0.9)	df = 4
Religion :				
Hindu	172(84.7)	77(83.7)	95(85.6)	χ2 = 1.250
Christian	30(14.8)	14(15.2)	16(14.4)	p = 0.535
Muslim	1(0.5)	1(1.1)	0	df = 2
Polypharmacy	164(80.8)	73(79.3)	91(82.0)	χ2 = 0.225 p = 0.635
Monopharmacy	39(19.2)	19(20.7)	20(18.0)	df = 1
Medications taken as:				
Regular supervised	93(45.8)	42(45.7)	51(45.9)	χ2 = 0.022
Regular unsupervised	103(50.7)	47(51.1)	56(50.5)	p = 0.989
Irregular	7(3.4)	3(3.3)	4(3.6)	df = 2

*p < 0.05.

73.82 ± 15.97 kg, 1.62 ± 0.10 m and 28.04 ± 5.21 kg/m^2 respectively. All the three variables were found to be significantly different between the two genders, body weight (p < 0.0001) and height (p < 0.0001) both being higher in males while BMI (p = 0.004) was higher in females. Majority of the sample comprised of either overweight (38.4%) or obese categories (30.5%). Only 27 female were found to be in normal BMI category as compared to 35 males and difference in the BMI categories was found to be statistically significant (p = 0.02) between male and female.

3.3. BWISE and factor categorization

The mean BWISE scores of the sample were 27.59 ± 3.87. Out of 203 participants 110 (54.2%) answered positively to the screening question "Have you gained some weight on your present medications" while 93 (45.8%) answered in negative. The mean scores of Factor 1 representing body image and distress, Factor 2 indicating wellbeing and activity and Factor 3 catering to issues related to weight gain were 12.07 ± 2.69, 6.62 ± 1.61, and 6.61 ± 1.76 respectively. Statistically significant difference was neither found in the mean scores of BWISE, Factor 1, 2 or 3 nor in the screening question of BWISE between the two groups (Table 2).

4. BWISE reliability and factor analysis

4.1. Internal structure

The mean sampling adequacy (Bartlett test) was 411.539 (p < 0.001) and the Kaiser Meyer Olkin was 0.761. The extraction method used was principal component analysis. Three factors were identified that explain 50.36% of the variance (Table 4). Factor 1 had a value of 2.85 and explained 23.80% of the variance; Factor 2 had a value of 2.07 and explained 17.25% of the variance; Factor 3 had a value of 1.1 and explained 9.30% of the variance. (Table 3).

4.2. Internal consistency

Principal component analysis with Varimax rotation and Kaiser Normalization yielded a three-factor solution. Based on this, a model was arrived by selecting the variable most highly loaded with respect to the various factors (Table 3).

Factor 1 which was related to body image and distress included BWISE questions 1(I am upset with my present weight), 5 (I dislike the way I look), 6 (I am self-conscious in the company of others because of my weight), 7 (I am reminded of my body shape and appearance during the day), 8 (I am avoiding friends and relatives because I am out of shape). Factor 2 was found to have questions related to self-esteem, wellbeing and activity and was derived from question 2 (I feel active and energetic), 3 (I am going out to enjoy myself more often), and 12 (Generally, I am feeling good about myself). Factor 3 was found to be

Table 2
BWISE ratings and factor categorization in the sample.

Variables	Total N = 203 (%)	Male N = 92 (%)	Female N = 111 (%)	Statistics
Screening Question of B WISE: ***Have you gained some weight on your present medications?***				$\chi 2 = 0.002$
Yes	110 (54.2)	50 (54.3)	60 (54.1)	p = 0.967
No	93 (45.8)	42 (45.7)	51 (45.9)	df = 1
BWISE(mean)	27.59 ± 3.87	27.42 ± 3.97	27.72 ± 3.80	t = −0.559 df = 201 p = 0.577
Body image distress (F1)	12.07 ± 2.69	11.85 ± 2.88	12.25 ± 2.52	t = −1.036 df = 201 p = 0.301
Wellbeing & activity(F2)	6.62 ± 1.61	6.69 ± 1.62	6.55 ± 1.61	t = 0.601 df = 201 p = 0.549
Weight control (F3)	6.61 ± 1.76	6.59 ± 1.74	6.62 ± 1.79	t = −0.095 df = 201 p = 0.924

Table 3
Principal Component Analysis - Total Variance Explained.

Component	Extraction Sums of Squared Loadings			Rotation Total
	Total	% of Variance	Cumulative %	
1	2.857	23.804	23.804	2.558
2	2.071	17.258	41.062	1.772
3	1.116	9.304	50.366	1.714

Table 4
Factors & Respective Domains- Reliability & Internal Consistency.

Factors	BWISE Questions	Domains	Internal Consistency
BWISE	Q1-12		0.558*
Factor 1(F1)	1,5,6,7,8	Body Image Distress	0.726*
Factor 2(F2)	2,3,12	Wellbeing & Activity	0.522*
Factor 3(F3)	9,10,11	Weight Control	0.586*

* Chronbach's Alpha.

comprised of questions related to weight control measures and were enquired from question 9 (I know why I put on weight, and I know how to lose it), 10 (I believe that excess weight is not good for my general health), 11 (I am taking steps to control my weight). Question no 4: I am not able to control my hunger and craving for food was not loaded in any of the factors. Internal Consistency was assessed through Chronbach's Alpha coefficient and was found to be 0.558 for the total scale and 0.726 for Factor 1, 0.522 for Factor 2, and 0.586 for Factor 3 (Table 4).

5. Discussion

The aim of the present study was to translate and validate the BWISE Questionnaire in Tamil language. This is the first large-scale study evaluating BWISE in Indian patients with Schizophrenia. WHO guidelines suggest lower BMI cut off values in Asian population. However, WHO recommend that currently available data do not necessarily indicate changes in BMI values for all Asians. Therefore, BMI values in our study were not based on the Asian values (WHO Expert Consultation, 2004).

In our study about 30 percent population was found to be in obese category. This finding is similar to 32% obesity reported by Loh et al. (2008) but lower than 42.5%–55% reported by Awad and Voruganti (2004), Tham et al. (2007), Lee (2008), De Hert et al. (2006) in patients with severe mental illness. This variability in the prevalence of obesity in patients with Schizophrenia can be attributed to the heterogeneous study population, small sample size, cultural differences and BMI standards considered in the study.

5.1. BWISE related variables

More than 50% of patients reported weight gain with their current medications, which is similar to the findings from Canada by Awad and Voruganti (2004) BWISE mean scores varied in the Chennai, Canadian and European samples (Tharoor et al., 2015; Awad and Voruganti, 2004; De Hert et al., 2006). Patient selection in the Canadian and European sample were heterogeneous comprising of patients with severe mental disorders. Chennai sample was homogenous so possibly had higher mean scores and a Greek study (Kavazidou et al., 2012) also showed higher scores because the study was conducted on non-clinical university going students. In another Belgian study (Probst et al., 2010) mean scores with schizophrenia were lower than the non-clinical subjects included in the study.

Patients reporting recent weight gain had lower BWISE scores. Among patients with higher BMI very few reported moderate to severe concern regarding their body shape. This was reflected in multiple studies on patients with schizophrenia who underestimated their weight to a greater degree. In contrast Probst et al study reported that male respondents demonstrated significantly better adjustment in regard to body weight, image and self-esteem than female subjects. Wong (2010) reported that patients with schizophrenia report that patients would perceive themselves as overweight than their actual weight. Tham et al. (2007) reported that females had more negative body image distortion and Strassnig et al. (2005) reported that females were able to perceive their overweight status more accurately as compared to males. In contrast, female patients in our study did not perceive their overweight status accurately. The female patient in our study did not perceive their overweight status. Chronicity of illness and B-WISE tool designed to capture recent weight gain are the possible reasons for this finding.

5.2. BWISE internal consistency and validity

The results indicate that the internal consistency of the BWISE is moderate. A chronbach alpha of 0.70 or higher indicates sufficient internal consistency. This is similar to studies by Probst et al. (2010), Raepsaet et al. (2010), Kavazidou et al. (2012). However other studies in patients with Schizophrenia, Awad and Voruganti (2004), De Hert et al. (2006), Angha et al. (2011), Al Halabi et al. (2012) showed sufficient internal consistency (Table 5). This may be due to variability of

Table 5
Studies with Psychometric properties of BWISE.

Study	Sample Size	Population type	Translated version	Chronbach's alpha	Internal Consistency
Awad & Voruganti, 2004, Canada	141 outpatients	Heterogeneous psychiatric population	English	0.79	Good
De Hert et al., 2006, Belgium	300 patients	schizophrenia/ schizoaffective disorder	Dutch	0.63	Acceptable
Arbour-Nicitopoulos et al., 2010, Canada	92 outpatients	Schizophrenia	English	0.56	Poor
Probst et al., 2010, Belgium	800 non- clinical and 112 with psychiatric disorders	Non clinical & Clinical population	Dutch	0.44-0.68	Poor to moderate
Raepsaet et al., 2010, Belgium	112 subjects	Non psychotic psychiatric patients.	Dutch	0.65	Moderate
Angha et al., 2011, Iran	110 women	Non clinical	Persian	92%	Good
Al Halabi et al., 2012, Spain	211outpatients	Schizophrenia and bipolar disorder	Spanish	0.55-0.73	Fair
Alesi and Pepi, 2016, Italy	1,033 subjects	Non-clinical	Italian	0.43 to 0.45	Not satisfactory
Present study, India	203 outpatients	Schizophrenia and related disorders	Tamil	0.55	Fair

subjects in different studies and the scale has three relatively orthogonal factors, which may lead to poor alpha. A possible explanation for the moderate consistency is that patients were on medications for a sufficient period of time so perception of body image may not reflect the true picture because the instrument is more sensitive to capture weight gain in the last two weeks. Factor analysis presented a three-factor solution with over 50% variance, which is consistent with the study done by De Hert et al. (2006) and Al Halabi et al. (2012). The first factor cover items related to distress and awareness of body image. Item 1, 5, 6, 7, 8 were maximally loaded under factor 1 which represents distress and awareness of body image. This factor had good internal consistency showing that patients with severe mental illness are aware of and can present with distress over body image. The second factor was related to well-being and activity which included item 2, 3 & 12. While the third was related to knowledge about overweight issues and actions to control them with items 9, 10 & 11. Item 4 (I am not able to control my hunger and craving for food) scored low in all three categories in our study, which is similar to that of De Hert et al. (2006) study. However, in Al Halabi et al. (2012) study this item was found to have good value and was included in factor 1. Variable consistency among the three factors can be due to possibility that though patients are aware and even distressed about self body image but are not so proactive about control and wellbeing especially in a developing country like India.

Limitations: BWISE is a sensitive instrument and captures recent weight gain in the last two weeks. Therefore assessments over a timeline may have given a better understanding of the instrument. It needs to be tested in a larger follow up longitudinal studies of drug naïve or first episode schizophrenia patients for validity and reliability.

6. Conclusion

Psychosocial adjustment due to pharmacotherapy needs to be examined in routine clinical settings. Patients with higher BMI were significantly associated with poor psychosocial adjustment. The Tamil version of the BWISE is an easy to use instrument. The BWISE tool can be a major focus in intervention programs targeting obesity and treatment adherence by addressing the psychosocial variables related to weight induced by antipsychotics.

Declarations of interest

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Conflict of interest

None.

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