Original Research

Psychometric Validation of the Bengali Version of the 10 Item Medication Adherence Rating Scale(MARS) among Bipolar Disorder Patients, Kolkata West Bengal

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Abstract

Background: Bipolar affective iDisorder is a group of disorders that cause extreme fluctuation of person's mood, energy and ability to function., where recurrence is very common. Bipolar patients have low or partial adherence rate to treatment. The MARS is a 10 item self report measure of medication compliance. Medication adherence is a vital predictor of illness course and outcome in bipolar patients.

Aim: 1. To validate the English to Bengali translation of MARS.

2. To establish the reliability of the MARS scale.

Material and Method: The original scale was translated to Bengali version by the following process:

1. Establishment of a bilingual group of experts.2. Examination of the conceptual structure of the instrument. 3. Translation 4. Examination of the translation by the experts. 5. Examination of the translation by a monolingual group. 6. Blind back translation7. Examination of the blind back translation by the experts.

The Psychometric properties of MARS-B were validated among the bipolar patients (N=100).

Data was collected from May 2023 to July 2023 through interviews using simple random sampling and analyzed using SPSS version16 and MS Excel 2010.

Results: This study report shows good reliability Cronbach's (α) 0.71 of MARS (Bengali) version. principal-components analysis extracted four factors, that together accounted for 65% of the variance. These factors were then subjected to a Varimax rotation revealing the factors of 'Medication adherence behavior', 'Health status and

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wellbeing causes medication adherence', 'Perception regarding benefits of medication adherence', and 'Negative side effects towards psychotropic medication' .

Conclusion: This study shows that MARS Bengali version is valid, reliable and applicable in clinical practice, research, public health care in west Bengal.

Key word: Medication adherence rating scale, bipolar disorder, adherence, compliance.

Background

Bipolar disorder is characterized by mood swings from profound depression to extreme euphoria(mania)with intervening periods of normalcy.[20] During a manic episode, the mood is elevated, expansive or irritable and during depressive episode there is extreme low mood with predominant helplessness, hopelessness and worthlessness. Bipolar patients have low adherence rate[1]. A survey from eight European countries estimated that 57% of Bipolar patients were partially adherent or non adherent to medication[2]. Non adherence is defined as taking less than 80 % of prescribed doses[3].

According to WHO medication Adherence is defined as 'the degree to which the persons behavior corresponds with the agreed recommendation from a health care provider. Estimated rates of non adherence to anti psychotic medication ranged between 25% and 55% in various review studies [5].Sub optimal medication non adherence leads to higher symptoms recurrence and associated with a higher hospitalization rate , increased emergency department consults and poorer outcomes[6].

Poor medication adherence is a pervasive problem which causes disability and sufferings as well as extensive financial cost among individual with bipolar disorders. Bengali is one of the 6th most widely spoken languages in the world with nearly 300 million speakers. In 2050 estimated Bengali Speaking population will be nearly 400 million.[8] At present there is no culturally adapted scale to measure medication adherence in Bengali. So it was aimed at developing a culturally adapted and validated Bengali version of MARS. It was developed from two existing scales, the 30 item Drug attitude inventory(DAI, Hogan et al 1983)[19] and 4 item Medication adherence questionnaire(MAQ; Morisky et al, 1986) with the aim of developing a more reliable and valid tool for assessing medication adherence behavior in mentally ill patients. This tool showed strong positive correlations compared to DAI, and MAQ.[18]

Ethical consideration: Ethical administrative clearance was taken from the ethical review committee of The MCH Kolkata. For conducting the study formal permission was taken from the questionnaire developing author Catherin Thomson.. Informed written consent was taken from the subject by informing the nature and purpose of the study, and the participants did not get financial benefits from this study. The present study posed a very low risk to the participants,

Instrument Development:

1. Establishment of a bilingual group of experts:- A bilingual local expert committee was formed at first. The committee comprised of one public health expert, one psychologist, two psychiatrists, two educated laypersons from the community.

2. Examination of the conceptual structure of the instruments by the experts: The experts examined the conceptual structure of the instrument .

3. Translation: MARS-10 was translated from English to Bengali. This preliminary translated Bengali version was then available to a local expert committee for discussion.

4. Examination of the Translation by the experts:. Repeated searches were made from an English-to-Bengali dictionary for appropriate wording to ensure that the MARS-10 scale was easily understandable by all classes of people in West Bengal.

5. Examination of the translation by a monolingual group: The expert group examined the translation group

6. Blind back translation: This intermediate Bengali version was back translated from the target language to its source by language expert who was unaware of the project and had no knowledge about the MARS-10 Scale. The back translated version was

then reviewed by two native English speaking health professionals to check for congruence with the original English version of the MARS-10 questionnaire..

7. Examination of the blind back translation by the experts. During evaluation the experts were requested to compare each translated item with original in terms of the various forms of equivalence as suggested by Flaherty et al [16]

1. Content equivalence. The content of each item of the instrument is relevant to the phenomena of each culture being studied.
2. Semantic equivalence-The meaning of each item is the same in each culture after translation into the language .
3. Technical equivalence. The method of assessment (e.g. pencil and paper, interview) is comparable in each culture with respect to the data that it yields.
4. Criterion equivalence. The interpretation of the measurement of the variable remains the same when compared with the norm of each culture studied.
5. 5. Conceptual equivalence. The instrument is measuring the same theoretical construct in each culture.

a) Apart from these issues the experts were requested to keep in mind issues pertaining to translated items being comprehensible, acceptable, and relevant and complete.

Thus the final bangle version of MARS-B-10 was prepared.

Pilot testing: The Bengali version of the MARS-10 questionnaire thus prepared was pilot tested among 10 patients in psychiatric OPD to understand the comprehensibility of the scale.

Interviews and self-administration of the MARS: The MARS is a 10 item scale. According to the rule of validation the minimum sample size [17]required for the validation study come to be 10 × 10 = 100 These 100 patients were selected from the psychiatric OPD of NRSMCH, Kolkata. A sampling frame for all the Bipolar patients attending the psychiatric opd of NRSMCH was prepared of which 100 were selected by simple random sampling method.

Design and subjects: The current study was part of PhD thesis under West Bengal university of Health sciences, Kolkata, west Bengal. The descriptive, cross sectional study was conducted at psychiatry out patient department(OPD) of NRSMCH, Kolkata, and data was collected during the period of May 2023 to July 2023 from 100 patients by simple random sampling method with the final Bengali version of MARS-B. The interview was performed by the researcher herself through face to face interview technique. The dichotomous questionnaire encompasses10(ten) statement and the respondents were requested to indicates yes or no option of the each statement. After managing data properly it was analyzed in spss16.0 version and Microsoft excel software 2010 version.

Participants and Data collection process: The validation study of MARS-B was done on clinical samples in NRSMCH, Kolkata. The participants were recruited by simple random sampling.

Inclusion criteria: 1. Adult age group 18-65 yrs.2. Understand Bengali. 3. Diagnosed BPAD by psychiatrist suffering the disease at least one year

Exclusion criteria:1. Acute psychotic illness or suicidal intent require immediate intervention. 2. Neuro cognitive/Intellectual disability.

Consent was taken from the participants. Tool was consisted of socio demographic Performa and MARS-B questionnaire.

Research Instrument:

The MARS-Bengali is a self rated10 items reliable and validated scale to estimate compliance with medication in patients with bipolar disorders. It has good internal consistency with cronbach's alpha(α) =0.71. Inter item correlation identified four factors, where Item 1 & 2 Medication adherence behavior Item 3,4 &5 Health status and wellbeing causes medication adherence, item 7 & 8 Perception regarding benefits of medication adherence. Item 9 and 10 Negative side effects towards psychotropic medication. The participants were required to provide a 'dichotomous response of either 'yes' or 'no' for each item. For questions 1-6,9-10, a no answer response was coded as 1, For questions 7 & 8, a yes response was coded as 1. The sum of scores for all

items of ≥9 indicated good compliance. A score of ≥2 and ≤8 indicated partial compliance and a score of 1 indicated poor compliance.

Data Analysis: Demographic characteristics of the participants were analyzed using descriptive statistics. Exploratory factor analysis was employed for correlation matrix. Principal component analysis(PCA) and varimax rotation was used to examine the factor structure of the dichotomous questionnaire items. Internal consistency was determined by cronbach's α.

Results

Characteristics of the participants: Total participants in the study were 100. The socio demographic characteristics of the participants are summarized in table no 1., This study report shows good reliability Cronbach's (α) 0.71 of MARS (Bengali) version.

3.2 Validity & Reliability of MARS-B: Face validity, content validity and criterion validity was systematically assessed and maintained during the development of the research instrument and at the time of interview by the interview response. construct validity was assessed, done by exploratory factor analysis. The principal component analysis(PCA) with varimax rotation and internal consistency.

This study report shows good reliability Cronbach's (α) 0.71 of MARS (Bengali) version. principal-components analysis extracted four factors from the MARS that together accounted for 65% of the variance. These factors were then subjected to a Varimax rotation revealing the factors of Medication adherence behavior, Health status and wellbeing causes medication adherence, Perception regarding benefits of medication adherence, Negative side effects towards psychotropic medication.

Table 1: Demographic characteristics of respondents

Characteristics	Frequency	Percentage(%)
Age(years)		
18-28	14	14
29-39	42	42
40-50	30	30
51-65	14	14
Gender		
Male	40	40
Female	60	60
Religion		
Hindu	38	38
Muslim	62	62
Habitat		
Urban	17	17
Semi urban	9	9
Rural	74	74
Marital status		
Married	84	84
Single	13	13
Widow	2	2
Divorce	1	1
Education		
Upto primary	51	51
Upto secondary	36	36
HS	9	9
Graduate	4	4
Occupation		
Homemaker	58	58
Labour	20	20
Unemployed	5	5
Business	15	15
Service	2	2
Per capita income		
<1000	26	26
1000-2999	64	64
3000-4999	10	10
Duration of illness		
<1yr	10	10
1-3 yrs	40	40
3-6 yrs	30	30
6-9 yrs	12	12
9-12 yrs	8	8

Table 2: Item wise Mean and SD of MARS questionnaire.

Sl no	ITEM	MEAN+-SD	corrected item total correlation
1	Do you ever forget to take your medication?	0.62±0.48	0.721
2	Are you careless at times about taking your medication?	0.42±.49	0.627
3	When you feel better, do you sometimes stop taking your medication?	0.51±0.50	0.778
4	Sometimes if you feel worse when you take the medication, do you stop taking it?	0.74±0.44	0.550
5	I take my medication only when I am sick	0.53±0.50	0.758
6	It is unnatural for my mind and body to be controlled by medication	0.65±0.47	0.083
7	My thoughts are clearer on medication	0.60±0.49	0.613
8	By staying on medication, I can prevent getting sick.	0.72±0.45	0.083
9	I feel weird, like a 'zombie' on medication	0.78±0.41	0.727
10	Medication makes me feel tired and sluggish	0.62±0.48	0.772

Participants responses score for MARS-B: The total score of MARS-B ranged between 0-10. The cut off value was calculated 8-10=good compliance, 3-7=partial compliance, 1-2=poor compliance. 61% showed partial adherence. 30% showed good adherence and 9% poor adherence.

Table 3: Response Score of participants:

Response score	N	%
8-10	30	30
3-7	61	61
1-2	9	9

Factor Analysis: Principal component Analysis was used to determine the Factor structure of the 10 item MARS. All 10 item showed were 4 factors with eigen values and % of variance. principal-components analysis extracted four factors from the MARS that together accounted for 65% of the variance. These factors were then subjected to a Varimax rotation revealing the factors of Medication adherence behavior, Health status and wellbeing causes medication adherence, Perception regarding benefits of medication adherence, Negative side effects towards psychotropic medication.

Table 4: Factor loadings for MARS-Bengali

Item	Name of the factor		Eigen value	% of variance
Q1 & Q2	Medication adherence behavior	Factor I	1.983	19.825
Q3, Q4, Q5	Health status and wellbeing causes medication adherence	Factor II	1.695	16.954
Q6, Q7, Q8	Perception regarding benefits of medication adherence.	Factor III	1.656	16.558
Q9, Q10	Negative side effects towards psychotropic medication.	Factor I V	1.402	14.016

Internal consistency: Internal consistency of MARS Bangla was found to be 0.71 (cronbach's α.) which suggests significant reliability. The corrected item total correlation was(table no 2) which was significant.

Table 5: Inter item correlation matrix of MARS-10 item questionnaire

Q1	1.00								
Q2	0.49								
Q3	0.34	0.39							
Q4	0.28	0.79	0.69						
Q5	0.25	0.62	0.61	0.77					
Q6	0.75	0.65	0.65	0.69	0.71				
Q7	0.62	0.71	0.71	0.72	0.73	0.75			
Q8	0.42	0.68	0.68	0.59	0.69	0.62	0.70		
Q9	0.73	0.71	0.76	0.63	0.70	0.72	0.77	0.71	
Q10	0.41	0.61	0.72	0.60	0.71	0.62	0.71	0.72	0.71

Discussion

Adherence to medication has been discussed from patients and caregivers. This study presented the development and psychometric evaluation of MARS-B in clinical setting . The original MARS had three factors. factor 1 (Medication behavior) factor 2 Attitude to taking medication, factor 3: Subjective negative side effect of medication.

This study report shows good reliability Cronbach's (α) 0.71 of MARS (Bengali) version. principal-components analysis extracted four factors from the MARS that together accounted for 65% of the variance. These factors were then subjected to a Varimax rotation revealing the factors of Medication adherence behavior, Health status and wellbeing causes medication adherence, Perception regarding benefits of medication adherence, Negative side effects towards psychotropic medication.

This study findings was found to be similar with another study conducted by O ASwunomi, PO Onifade on Pychometric evaluation of medication adherence rating scale among Nigerian patients with Schizophrenia. That study also showed internal consistency of MARS-10, cronbach alpha is 0.63.A principal component factor analysis with varimax rotation produced a 4 factor solution.

Reliability and validity of MARS in a cohort of patients with schizophrenia from Nizeriademonstrated good reliability (Cronbach's (α) 0.76)[13]. The scale was reducible to a three factor construct where factor 1 is 'Medication adherence behavior', factor 2 is'Attitude towards taking medication' & factor 3 is'negative side effect and attitude to psychotropic medication'. This study report supports our study result.

Limitations: With this minimum sample generalization of the study result may be difficult. Data were collected from the patients visiting a hospital of a city, but those from hospitals or institutions of other regions and heterogenous groups were not included. Larger studies involving more heterogenous patients may help to provide a more complete picture.

Conclusion

The results from this evaluation indicate good psychometric properties of the MARS-Bangla. This bangla validated scale will be helpful to assess medication adherence in clinical practice, research, public health and primary health care in Bengali speaking Bipolar disorder patients.

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Disclosure: Informed written consent was obtained from all participants in this study.

Ethics committee approval was taken from MCH, Kolkata Ref No MC/KOL/IEC/NON-SPON/657/03/2020 DATED12/03/2020

Conflict of interest: There is no conflicts of interest.

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