VALIDATION OF PATIENT HEALTH QUESTIONNAIRE-9 FOR ASSESSING DEPRESSION OF ADULTS IN BANGLADESH

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Abstract

Depression is one of the most widely recognized and frequently underdiagnosed and undertreated mental health issues around the world. The Patient Health Questionnaire-9 (PHQ-9) has been suggested as the best accessible screening and case-discovering instrument to measure the severity of depression. The investigation aimed to set the reliability and validity of the PHQ-9 for the adults in Bangladesh. A total of 321 Bangladeshi adults (170 males and 151 females) were the study participants. A standard process of three phases was followed to adapt PHQ-9 in Bangladesh. The first phase was forward translation, second phase was Focus Group Discussion and panel of expert's rating and third phase was back translation into original language, piloting and final field data collection. The results showed good reliability of the translated version; the total scale Cronbach's alpha is 0.837, gender-wise 0.839 for males and 0.841 is for females; similarly, the Spearman-Brown Coefficient is 0.855, and the Guttman Split-half coefficient is 0.848, which indicate the high Split-half reliability as well. The content and construct validity suggest that the Bangla PHQ-9 is a valid tool to assess the depression of Bangladeshi adults. Therefore, the Bangla version of PHQ-9 gives an impression of being a reliable and valid instrument to assess and diagnose depression among Bangladeshi people.

Introduction

Depression is a universal psychological disorder in which an individual is found with low mood, lack of interest in daily activities, low self-esteem, inappropriate sleep and poor focus[1]. Over 264 million individuals of any age experience the ill effects of depression across the world[2]. In extreme cases, depression can prompt suicide, which is related to the loss of around 1 million lives every year[1]. Depression establishes many disabilities brought about by mental disorders and a significantly impacted public health[3]. An individual with depression regularly works inadequately in work settings, school or family climates, leading an individual to commit suicide. Due to depression, suicide is the second driving reason for the death of people of 15–29 years age[2].

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Major depressive disorder is a significant contributor of the worldwide weight to illness and was as positioned as the second driving reason for years lived with disability around the world[4-5].

Mental health issues are progressively turning into a danger to low and middle-income countries like Bangladesh. It has been assessed that about 20% of adult people of low and middle-income countries (LMIC) suffer from mental health related disorders every year[6]. Although both males and females are the sufferers of the dangerous effects of depression, females suffer 50% higher than males[7]. Even, Depression acts as the main source of illness trouble for females both in high-income as well as low- and middle-income nations[7].

The Bangladesh household mental health survey estimates that major depressive disorder is prevalent in 6.7% of the adult population of Bangladesh[8]. Depressive symptoms are often undetected and undertreated as they are often mixed up with somatic symptoms and anxiety[9]. There is an assortment of accessible instruments to assess depressive symptoms; however, the more significant part of them have been developed in high-income countries and have not been diversely adapted or approved for their utilization in low and middle-income countries (LMIC)[10]. Patient Health Questionnaire (PHQ) was the very first tool that was developed on the criteria from the Diagnostic and Statistical Manual of Mental Disorders[11], Fourth Edition (DSM-IV) for diagnosing a specific disorder. The Patient Health Questionnaire-9 (PHQ-9) is a self-administered apparatus which is based on the criteria of the depressive disorder according to DSM-IV. It can be utilized to screen the seriousness of depression by scoring the frequency of every indication on a scoring range of 0-3. The PHQ-9 is found as a reliable and valid instrument for diagnosing depressive symptoms in a various populations[12-14]. In a large sample of research conducted with the 6028 general people of Hong Kong, PHQ-9 was found as a reliable and valid screening instrument for diagnosing depression[15]. In another study conducted with the students of Nigeria, it was found that PHQ-9 is highly reliable and valid[16]. The PHQ-9 has been broadly validated in numerous nations, and thus it seemed quite acceptable as well as a useful tool for assessing depression[17-22]. Notwithstanding, PHQ-9 has not been adapted and validated yet for the people of Bangladesh. The present study, was therefore, aimed to adapt PHQ-9 for screening depression-related symptoms among Bangladeshi people.

Materials and Methods

A total of 321 participants (170 males and 151 females) were selected for this study using a convenient sampling technique. Of the participants, 53% were male, and 47% were female. Their mean age was 26.89 years, with a range of 16 to 68. Data were obtained between October 2020 and December 2020. All the participants were asked to

complete a questionnaire form that includes the participant's demographic information and translated Bangla version of PHQ-9.

Patient Health Questionnaire (PHQ-9) is a nine-item self-administered scale created to diagnose the presence and seriousness of depressive symptoms during the prior two weeks. It was developed based on the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) diagnostic criteria for Major Depressive Disorder. This scale can function as a dual-purpose tool that can set up a tentative diagnosis of depressive disorder and assess the severity of depressive symptoms. It has an extra item to see the level of life functioning of a person[23]. The original scale has good reliability- a study on PHQ-9 involving two different patient populations formed Cronbach alphas of 0.86 and 0.89, and the criteria validity was established by conducting 580 structured interviews by a mental health professional [24]. Each item in the scale has four response options which belong to a scoring range of 0 to 3. Score 0 stands for 'not at all', 1 stands for 'several days', 2 stands for 'more than half the days' and 3 stands for 'nearly every day'. It is possible to get a summary score ranging from 0 (absence of depression) to 27 (most severe depression) by adding up the responses of all nine questions, which permits assessing the presence and severity of a depressive episode. Total scores of PHQ-9 can be categorized into five levels. A cut-off point of 0-4 means none or minimal depression, 5-9 means mild depression, 10-14 means moderate depression, 15-19 means moderately severe depression, and 20-27 means severe depression[24].

To validate Bangla PHQ-9, a standard procedure of three phases was followed. The first phase started with translating the original PHQ-9 from English to Bangla by two experts individually- a language expert and a subject matter expert. To get the first synthesized version of Bangla PHQ-9, the translated versions were revised and combined systematically by an expert team that guarantees the determination of appropriate words, phrases and expressions. The second phase involved arranging a Focused Group Discussion (FGD) with a panel of experts who helped to prepare the second synthesized version of Bangla PHQ-9. Then in the third phase, the translated Bangla version of PHQ-9 was back translated from Bangla to English by two other experts. The synthesized back translation was compared with the original scale to see any disparity in meaning between the original and back-translated versions. It was discovered that there was no dissimilarity in significance. Then the Bangla version of PHQ-9 was administered to the pilot sample (n=30), and the findings of reliability and validity were satisfactory. After getting acceptable findings from the pilot study, the Bangla version of PHQ-9 was administered to 321 participants through an online platform. Participants were given an informed consent form and written instructions along with the questionnaire. They were asked to read each item carefully and select one option most suitable for them by considering the prior two weeks. The participants were also instructed to respond to all items, and each took approximately 5-10 min to perform the whole task.

Results and Discussion

The results of this study involved checking reliability, validity and item analysis of the Bangla translated version of PHQ-9.

The items of Bangla PHQ-9 were analyzed for discarding ineffective items and determining corrected item-total correlation. The corrected item-total statistics of Bangla PHQ-9 suggest that all 9 items have significant item validity in the context of Bangladesh (Table 1).

Table 1. The item-total statistics and the reliability of the Bangla PHQ-9 (n=321).

Items	Corrected item-total correlation	Alpha if item deleted
Item 1	0.539	0.822
Item 2	0.697	0.804
Item 3	0.523	0.824
Item 4	0.551	0.820
Item 5	0.393	0.837
Item 6	0.635	0.810
Item 7	0.580	0.817
Item 8	0.534	0.822
Item 9	0.482	0.828

*Total scale alpha= 0.837,

To see whether the Bangla PHQ-9 is reliable for assessing depression of Bangladeshi adults, internal reliability such as Cronbach's alpha and Split-half reliability were analyzed. The total scale of Cronbach's alpha is 0.837, whereas Cronbach's alpha is 0.839 for males and 0.841 for females. The Spearman-Brown Coefficient is 0.855, and the Guttman Split-half coefficient is 0.848, which indicates that the Split-half reliability of the translated version is also at an acceptable level. Therefore, the overall internal reliability analysis indicates that the reliability of the Bangla PHQ-9 is high for both male and female adults in Bangladesh.

To assure the content validity of an assessment tool, the items must be selected and analyzed carefully during their construction. The items of the original PHQ-9 were selected based on the symptoms of major depressive disorder. The Bangla version of PHQ-9 was given to eight mental health practitioners of Bangladesh to check. All of them acknowledged that the translated items are entirely related to the symptoms of Major Depressive Disorder (MDD).

Table 2. The inter-item correlation matrix of Bangla PHQ-9.

|	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9
Item 1	1.000	0.518	0.304	0.374	0.170	0.454	0.416	0.309	0.314
Item 2	0.518	1.000	0.429	0.461	0.265	0.619	0.482	0.449	0.373
Item 3	0.304	0.429	1.000	0.369	0.271	0.370	0.359	0.351	0.354
Item 4	0.374	0.461	0.369	1.000	0.312	0.381	0.363	0.372	0.304
Item 5	0.170	0.265	0.271	0.312	1.000	0.257	0.291	0.368	0.218
Item 6	0.454	0.619	0.370	0.381	0.257	1.000	0.485	0.355	0.410
Item 7	0.416	0.482	0.359	0.363	0.291	0.485	1.000	0.348	0.312
Item 8	0.309	0.449	0.351	0.372	0.368	0.355	0.348	1.000	0.302
Item 9	0.314	0.373	0.354	0.304	0.218	0.410	0.312	0.302	1.000
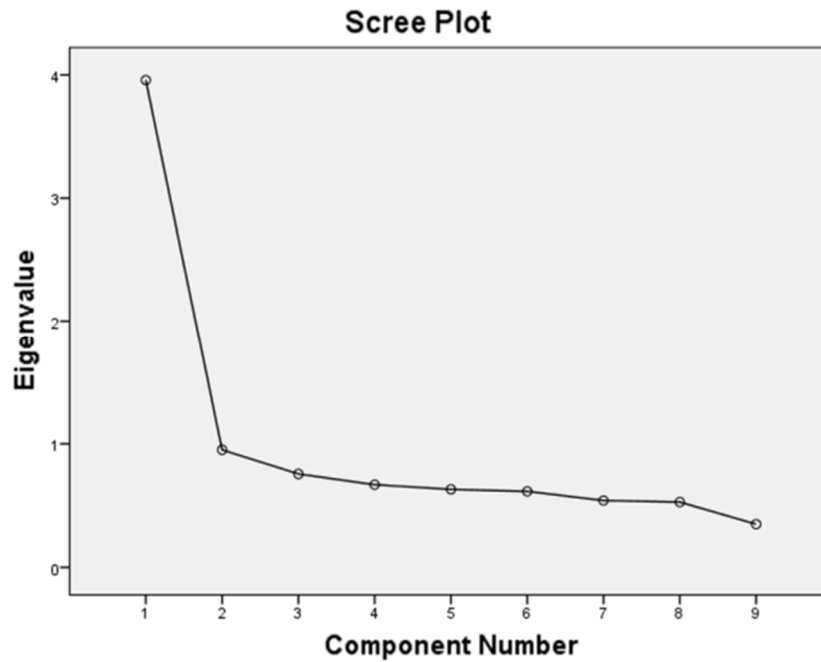
Fig. 1. Scree plot of the Eigenvalue of scale components.

The construct validity of Bangla PHQ-9 was determined through the item analysis and the inter-item correlations of the scale. The corrected item-total correlation statistics indicate that all 9 items of Bangla PHQ-9 have significant item validity in Bangladesh. Similarly, the KOM and Barlett's test of sphericity showed that all the items of Bangla PHQ-9 were positively correlated with each other, and the data structure was reasonable (KOM test coefficient: 0.897, Barlett's test result was $p < 0.001$, which indicate the

suitability of the data for principal component analysis (PCA). Only one component had >1 eigenvalue (3.96), which explained 43.976% of the total variance. Therefore, the above-mentioned statistical analysis specifies that all the items of Bangla PHQ-9 exhibit the same construct, whereas all the factor loading coefficients were ≥0.5 (0.5-0.8).

The present study aimed to adapt the Patient Health Questionnaire-9 in the Bangladesh context. The Bangla translated version of PHQ-9 was administrated to 321 adults in Bangladesh to set the reliability and validity. The results showed that the Bangla PHQ-9 is highly reliable and valid for assessing depression among Bangladeshi adults. However, like many other studies, our study is not beyond limitations. As we performed our data collection by using an online platform, we wanted to make the questionnaire or survey form as short as possible so that the participants do not feel tired or irritated to give their authentic responses. To fulfill the need to get accurate answers and make our study less complicated, we decided to avoid giving any other similar psychometric tool along with PHQ-9, by which the correlation of PHQ-9 with other tool, could be analyzed. However, as the findings of this study confirmed a satisfactory level of reliability and validity, we are hopeful that the Bangla PHQ-9 will be a valuable and popular depression assessment tool for mental health professionals and researchers.

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