

Validation of Berlin questionnaire for assessment of adult obstructive sleep apnea in Urdu language

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Abstract

Introduction: Obstructive sleep apnea syndrome (OSAS) is a serious condition specified by disturbance of normal sleep architecture by complete or partial obstruction of airflow which leads to decrease in normal blood oxygen saturation level known as hypoxemia. Obstructive sleep apnea is an overlooked problem in Pakistan. Berlin questionnaire (BQ) is a valid tool to screen patients who are at high risk for obstructive sleep apnea. This study aims to translate and validate the Berlin Questionnaire in Urdu language, so that it can be used in clinical settings for screening of patients for OSAS.

Material and methods: Established guidelines by Beaton et al were used for translation of the questionnaire. Pearson correlation and interclass correlation coefficient were applied to determine test-retest reproducibility. Cronbach alpha were used to determine the internal consistency of the translated questionnaire.

Results: The results showed significant test-retest reproducibility. Cronbach alpha was .706 indicating moderate to good internal consistency.

Conclusions: Berlin Questionnaire has been successfully translated and cross-culturally adapted to Urdu language and has been found to be valid and reliable statistically.

Keywords: Language; obstructive sleep apnea; translations

Introduction

Obstructive sleep apnea syndrome (OSAS) is a serious condition specified by disturbance of normal sleep architecture by complete or partial obstruction of air flow. Air flow obstruction results in the decrease of blood oxygen saturation known as hypoxemia. In an effort to resume the air

flow, multiple arousals per hour of sleep occur which affects the quality of sleep. This leads to day time somnolence and fatigue which have significant consequences on daily life routine including reduced productivity, impaired cognition, increased accident rates and numerous medical dental problems. If left unnoticed and untreated (OSA) can shorten expected life span along with other co-morbidities, such as increased rates of cardiovascular and pulmonary disease and obesity related diabetes mellitus.¹⁻⁴ Obstructive Sleep Apnea can be diagnostically confirmed by in-centre overnight sleep study polysomnography (PSG) performed by a sleep medicine specialist.⁵ Polysomnography can be performed after the patient is screened or is at high risk for developing OSA. For screening

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adult population at high risk for OSA, Berlin questionnaire (BQ) is mostly used. BQ is comprised of 10 questions divided into three categories based on snoring, day time sleepiness and hyper tension.⁶⁻¹⁰

Berlin questionnaire-based studies done in United States and Europe to know the prevalence of OSA showed 26 % result.¹¹⁻¹² In Asia scarce data is available regarding prevalence of obstructive sleep apnea. Indian studies done using the overnight PSG reports prevalence estimate of Sleep Disordered Breathing (SDB) (Apnea-Hypopnea Index (AHI) ≥ 5) from 13.74% to 19.5%.¹³ China reports lower prevalence of SDB (3.7%) and OSAS (2.1%).¹⁴

In Pakistan obstructive sleep apnea is an undiagnosed and undertreated condition, which does not show the true prevalence of (OSA) in Pakistan. In a study done by Taj F et al; using BQ the prevalence of individuals at high risk of OSA was found to be 10 %.¹⁵

BQ is in English language and it has been translated in many languages except Urdu. Since Urdu is the national language of Pakistan, therefore to overcome this lingual barrier and to make this questionnaire understandable to lay person, this study aims to translate and validate the Berlin Questionnaire in Urdu language to know the true prevalence of OSA in Pakistan.

Material and Methods

The Berlin questionnaire (BQ) was used in this study. BQ consists of 10 questions divided into three categories based on snoring, day time sleepiness and hyper tension. A question becomes positive when its starred option is marked. A category becomes positive when two or more questions score positive. If no or one category is positive, then the patient is at low risk of obstruction sleep apnea (OSA). If two or more categories are positive, then the patient is at high risk of OSA.

Permission for the translation of BQ was granted by the University of Innsbruck, which reserves the copyright. Ethical

approval for the translation of questionnaire was obtained from the Ethics Review Committee, Margalla Institute of Health Sciences Rawalpindi.

Participants of both genders who were 18 years or greater than that were included in the study. These individuals were able to understand Urdu language and were verbally guided about the research. Informed consent was signed by all patients. Participants with a systemic illness or syndrome, neuromuscular disease and chronic respiratory disease were not included in the study. There were 30 participants on whom pre-test of the questionnaire was done; this was followed by distribution of questionnaire among 110 subjects or participants. 20 randomly selected participants were asked to fulfil the questionnaire after two weeks.

The translation and cross-cultural adaptation was based on the guidelines of Beaton et al.¹⁶ According to these guidelines, the whole process consisted of five steps. (Figure I).

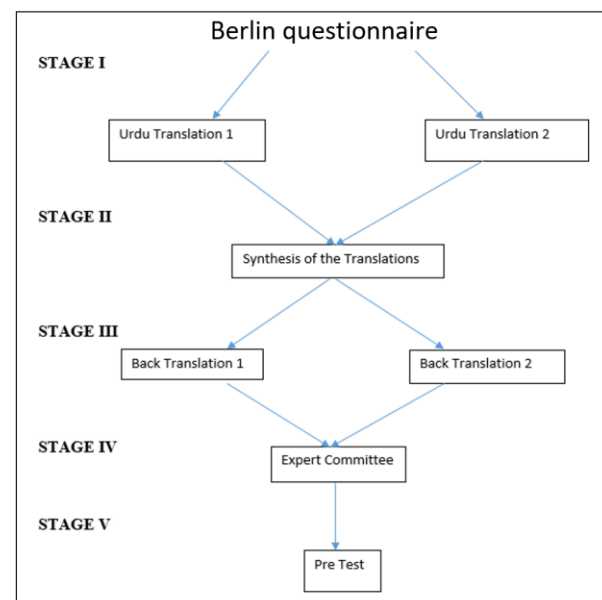


Figure 1: The process of translation and back translation followed in the study

STAGE 1

INITIAL TRANSLATION

The first step in the adaptation was the forward translation done by bilingual translators, who had Urdu as their narrative language and had adequate fluency in

English. They produced two independent translations of the questionnaire from English into Urdu.

Translator I: Was aware of the purpose of the study and the content of BQ.

Translator II: Was unaware of the concepts being quantified and have no medical or clinical background.

STAGE II:

SYNTHESIS OF THE TRANSLATIONS

The two researchers synthesized the results of the two forward translations. They worked on the original questionnaire as well as the first translator's (T1) and the second translator's (T2) versions to produce one common version (T-12). In this process, there was extensive discussion which was documented in the written report.

STAGE III

BACK TRANSLATION

Two independent translators then translated the agreed T-12 version back into the English language (BT1 and BT2). Both translators were fluent in English and Urdu languages. The two translators did not have medical background and were not aware of the concepts explored.

STAGE IV

EXPERT COMMITTEE

An expert committee, which included health professionals, language professionals, translators and researchers, reviewed the forward translations (T1 and T2), the common forward translation (T-12, the backward translations (BT 1 and BT 2) and the written report. The committee, after a thorough discussion, developed the pre-final Urdu version of the questionnaire.

STAGE V

TEST OF THE PREFINAL VERSION

The pre-final form of BQ was tested on a sample of 30 participants for pre-testing as recommended by recommerendBBBeaton¹⁰. All participants were interviewed about the questionnaire. They were enquired about the questions if they found any difficulty in understanding a single question and lay out of the questionnaire. Each participant was asked to answer the questionnaire and was welcomed to discuss any point they failed to understand. Subsequently the Urdu version of Berlin questionnaire was finalized. Given below.

قد (میٹر): وزن (کلوگرام):
 عمر: جنس: مرد / عورت
 براہ کرم ہر سوال کا صحیح جواب منتخب کریں
 سیکشن ۱
 (۱) کیا آپ خراٹے لیتے ہیں
 الف) جی ہاں
 ب) جی نہیں
 ج) معلوم نہیں
 اگر آپ خراٹے لیتے ہیں تو برائے مہربانی سوال نمبر ۲ سے سوال نمبر ۴ کا جواب دیں
 (۲) آپ کے خراٹے
 الف) سانس لینے کی آواز سے نسبتاً اونچے ہیں؟
 ب) بات کرنے کے برابر اونچے ہیں
 ج) بات کرنے سے زیادہ اونچے ہیں
 د) بہت باآواز (جو دوسرے کمروں تک سنائی دیں)
 (۳) آپ کتنی مرتبہ خراٹے لیتے ہیں؟
 الف) تقریباً ہر روز
 ب) ہفتہ میں ۳-۴ مرتبہ
 ج) ہفتہ میں ۱-۲ مرتبہ
 د) مہینہ میں ۱-۲ مرتبہ
 ہ) کبھی نہیں / تقریباً کبھی نہیں

۴) کیا آپ کے خراٹوں سے کبھی لوگ پریشان ہوتے ہیں؟

الف) جی ہاں

ب) جی نہیں

د) مجھے معلوم نہیں

۵) کیا کسی نے کبھی آپ کی نیند میں سانس ٹوٹنے کی نشاندہی کی ہے؟

الف) تقریباً ہر روز

ب) ہفتے میں ۳-۴ مرتبہ

ج) ہفتے میں ۱-۲ مرتبہ

د) مہینہ میں ۱-۲ مرتبہ

ہ) کبھی نہیں / تقریباً کبھی نہیں

سیکشن ۲

۶) کتنی بار ایسا ہوتا ہے کہ صبح سو کر اٹھنے کے بعد آپ کو تھکن سی محسوس ہوتی ہے

الف) تقریباً ہر روز

ب) ہفتے میں ۳-۴ مرتبہ

ج) ہفتے میں ۱-۲ مرتبہ

د) مہینہ میں ۱-۲ مرتبہ

ہ) کبھی نہیں / تقریباً کبھی نہیں

۷) جب آپ جاگ رہے ہوتے ہیں تو کیا آپ سستی، تھکاوٹ یا کابلی محسوس کرتے ہیں

الف) تقریباً ہر روز

ب) ہفتے میں ۳-۴ مرتبہ

ج) ہفتے میں ۱-۲ مرتبہ

د) مہینہ میں ۱-۲ مرتبہ

ہ) کبھی نہیں / تقریباً کبھی نہیں

۸) کیا کبھی ایسا ہوا ہے کہ گاڑی چلاتے وقت آپ کی آنکھ لگ گئی ہو یا آپ سو گئے ہوں

الف) جی ہاں

ب) جی نہیں

اگر آپ کا جواب نہیں ہے تو سوال نمبر ۹ چھوڑ دیں اور سوال نمبر ۱۰ کا جواب دیں

۹) تو یہ کتنی بار ہوتا ہے؟

الف) تقریباً ہر روز

ب) ہفتے میں ۳-۴ مرتبہ

ج) ہفتے میں ۱-۲ مرتبہ

د) مہینہ میں ۱-۲ مرتبہ

ہ) کبھی نہیں / تقریباً کبھی نہیں

سیکشن ۳

۱۰) کیا آپ کا بلڈ پریشر زیادہ رہتا ہے؟

الف) جی ہاں

ب) جی نہیں

د) مجھے معلوم نہیں

STATISTICAL ANALYSIS AND VALIDATION

The responses of participants were analysed for test-retest reliability, internal consistency using the Statistical Package for the Social Sciences (SPSS) version 26 (SPSS, Inc., Chicago, IL, USA).

Results

The translators did not find any major difficulty in the process of translation. The opening statement was written in active voice since it easier to understand. There was a discussion about question 3, 5, 6, 7 and 9

options that whether they should be written in ascending order or descending order. Ultimately it was decided that they should be written as it is mentioned in the original Berlin questionnaire. i.e. in the descending order. There was a debate on question 8 "not up to par" was difficult to be translated in its true sense as it is mentioned in the question, Urdu word "کاپلی" was decided for this question. Question 10 was also discussed as word blood pressure if exactly translated in Urdu is called as "ہلند فشار خون" which is not commonly used by population. Blood pressure was written in Urdu and used as it is, as lay man now a day is familiar with this word.

Participants did not find any ambiguity in filling the Urdu version of BQ during pre-test session.

Table I: Demographic data

Number of participants	110	100%
Male	65	59.1%
Female	45	40.9%
Age(years)	38.95	± 14.77
Height(cm)	1.67	± .09
Weight(Kg)	71.87	± 15.23

Reliability

Internal Consistency

Internal consistency or homogeneity was ruled out with the help of Cronbach alpha test, i.e. .706.

This demonstrates a good reliability. Individual Cronbach alpha scores of Urdu BQ domains are shown in

Table II: Cronbach alpha test

Cronbach's alpha	N of items
.706	10

Item total statistics

Question number	Cronbach's alpha
Q1	.648
Q2	.667
Q3	.619
Q4	.635
Q5	.671
Q6	.717
Q7	.728
Q8	.722
Q9	.715
Q10	.638

Test-retest reproducibility

Intra class co-relation was applied to check test-retest reproducibility. This test was applied on those 20 questions which were filled by the same participant at 2 weeks' interval. On average the value was .748 which shows moderate reliability.¹⁷

Validity

Pearson co-relation was applied to check validity of the questionnaire. Results of this test are given in table III.

Table III: Pearson co-relation

Question #	Value (r)	Pearson co-relation
Q1	0.8	Strong co-relation
Q2	0.7	Weak co-relation
Q3	0.7	Weak co-relation
Q4	0.8	Strong co-relation
Q5	1.0	Strong co-relation
Q6	0.7	Weak co-relation
Q7	0.7	Weak co-relation
Q8	0.8	Strong co-relation
Q10	1.0	Strong co-relation

Question no 9 was not mentioned in the result because its answer was dependent on the positive response of question number 8. If question 8 answer was negative, then patients had to skip question 9 and jumped to question 10.

Discussion

Obstructive sleep apnea syndrome was an overlooked area previously. There was a population-based survey in 1993 in Wisconsin which indicated that 2 % of women and 4 % of men had symptoms of sleepiness along with sleep apnea had at least moderate degree of illness. Diagnosis of obstructive sleep apnea by the physician is low. In the Wisconsin study only 7 % of women and 12 % of men who had moderate to severe illness reported receiving diagnosis of sleep apnea from a medical check-up.¹⁸

After development of Berlin questionnaire in 1996 at a conference on sleep in Berlin Germany, physicians got a diagnostic tool to screen patients who are high risk for OSAS. BQ is a validated and cheap diagnostic aid to categorize patients who are high risk and refer them for polysomnography which is an

expensive procedure performed only in sleep centres. Patients screened for OSA can only be treated medically after confirmation from polysomnography.

Berlin questionnaire originally is in English language. In the past it has been translated into various other¹⁹⁻²⁵. All 10 items of the Thai version of the Berlin questionnaire were moderately correlated in internal consistency (Cronbach's alpha correlation coefficient = 0.68). The test re test reliability of the Thai version of BQ showed high degree of reliability (intra class co-relation coefficient = 0.97). The Filipino version of BQ used Cramers coefficient test for construct validity. In this study it has been translated, validated and cross-culturally adapted into Urdu language. Urdu language is the eleventh most widely spoken language in the world. When a questionnaire is translated it should be understandable in the same context in the target area as it is developed in the source area. For that purpose, this was translated according to the established guidelines of Beaton et al.¹⁰ Statistically internal consistency was measured by Cronbach alpha test which was .706 which showed moderate to good homogeneity. Pearson co-relation and intraclass co-relation were applied to check test re test reproducibility which came out to be significant. There was semantic equivalence in the Urdu version of BQ due to the specialist opinion of members of the expert committee and participants did not find any difficulty in filling the questionnaire.

To taper down this discussion there is minimum awareness about OSA in Pakistan. This Urdu-BQ can arouse awareness among common people about the seriousness of this condition and how it can affect quality of life. Urdu-BQ is a cost effective and proficient tool that can be used by general dentist, orthodontists, general physician to diagnose people who are at high risk and low risk. People at low risk can be guided about life style modification while people at high risk are referred for polysomnography which is an expensive, long and inaccessible procedure. Limitations of this study were that psychometric properties were not evaluated

for populations belonging to different age groups, socioeconomic status and literacy rate. Original English BQ was applied on the sample of thousand plus individuals. Future studies should verify the psychometric properties of this instrument in different populations. STOP bang and Epworth sleepiness score are two other questionnaires which can used to recognise patients at high risk for OSAS. These questionnaires translation should be considered in future The Urdu-Berlin questionnaire translated according to verified guidelines of Beaton et al; and statistically validated can be used in academic and clinical settings for research and baseline investigation of patients who are at high risk for Obstructive sleep apnea.

Conclusions

Berlin questionnaire originally developed by Nikolaus C. Netzer¹² in English language has been successfully translated to Urdu language. Urdu version of BQ demonstrated good internal consistency, validity and moderate test retest reproducibility. This questionnaire can be used to detect the patients who are at high risk for obstructive sleep apnea.

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