Reliability and Validity of a Thai Version of the Berlin Questionnaire in Patients with Sleep Disordered Breathing

Surapon Suksakorn MD*,
Pimon Rattanaumpawan MD**, Wish Banhiran MD***,
Nitipatana Cherakul MD**, Wattanachai Chotinaiwattarakul MD*

** Division of Neurology, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*
*** Division of Respiratory, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*
**** Department of Ear Nose Throat, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*

Objective: *To assess the validity and test-retest reliability of a Thai version of the Berlin Questionnaire in patients with sleep disorder breathing.*
Martial and Method: *Patients who were suspected of sleep disordered breathing attending the outpatient department of Siriraj Hospital and who had undergone polysomnography were recruited and asked to complete a Thai version of the Berlin questionnaire. Each participant was asked to repeat the same questionnaire over the next 2-4 weeks for test-retest reliability.*
Results: *One hundred and thirty-two patients completed the present study. The age range of the patients was 26-72 years (mean, 48.15±8.80 years). 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-retest reliability of the Thai version of the Berlin questionnaire was investigated in 98 patients and demonstrated a high degree of reliability in intra class correlation (ICC = 0.97).*
Conclusion: *The present study reveals, for the first time, that the Thai version of the Berlin questionnaire has satisfactory validity and reliability when compared to the original English version.*

Keywords: *Obstructive sleep disordered breathing, Obstructive sleep apnea, Berlin questionnaire, Thai version of Berlin questionnaire*

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Obstructive sleep apnea/hypopnea syndrome (OSA/OSAHS) is the most common type of sleep apnea. It is a potentially disabling condition, second only to insomnia, and is related to many diseases. Patients suffering from obstructive sleep apnea are at an increased risk of cardiovascular disease[1], type 2 diabetes mellitus, hypertension[2], metabolic syndrome, stroke[3,4], cognitive impairment, and depression[5]. Excessive daytime sleepiness can have significant consequences, including morbidity and mortality from associated conditions, in addition to the personal and social consequences of cognitive impairment, such as driving and workplace accidents[6].

The symptoms of obstructive sleep apnea include excessive daytime sleepiness, repetitive pauses in breathing during sleep, disruptive and loud snoring, repeated episodes of upper airway obstruction during sleep, and nocturnal hypoxemia. Less common symptoms include morning headaches, insomnia, trouble concentrating, forgetfulness, mood changes such as irritability, anxiety, and depression, increased heart rate and/or blood pressure, decreased sex drive, unexplained weight gain, increased urination and/or nocturia, and frequent heartburn or gastroesophageal reflux disease[2]. A population-based study of workers in Wisconsin in 1993 found daytime sleepiness in 2% of women and 4% of men with OSA[7]. The prevalence of OSA or OSAHS in the Wisconsin sleep-cohort study performed in the USA and in studies from other countries was moderately similar. Although OSA is a common sleep disorder, 93% of men and 82%

Correspondence to:
Chotinaiwattarakul W, Division of Neurology, Department of Medicine, Faculty of Medicine Siriraj Hospital, 72nd-Year Building, 4th Floor, East Wing 2, Prannok Road, Bangkoknoi, Bangkok 10700, Thailand.
Phone: 0-2419-7101, Fax: 0-2412-3009,
E-mail: wattanachai.cho@mahidol.ac.th

of women with moderate to severe symptoms of OSA remain undiagnosed[8,9]. In Thailand, the prevalence of obstructive sleep apnea in the population was reported to be around 4.6-11.4%[10,11]. In populations greater than 60 years of age, the prevalence was 10%[12].

Overnight polysomnography (PSG) is considered the gold standard for diagnosis of obstructive sleep apnea; however, the cost, long test duration, and long waiting times for the testlimit its widespread accessibility. It also requires a specialist to order the test to reduce unnecessary testing, which is costlyespecially in Thailand where resources are limited.

The Berlin questionnaire and Epworth Sleepiness Scale are currently two of the most widely used questionnaires to evaluate patients with a history of suspected OSA. These assessment tools are now used in many countries around the world[5,13] in the general population as well as in specific populations such as surgical patients[14], pregnant women, truck drivers, and medical students.

The Berlin questionnaire assesses risk factors for sleep apnea such as snoring behavior, wake time sleepiness, and fatigue and the presence of obesity and hypertension. The Berlin Questionnaire contains 10 questions divided into three main categories. Category 1 comprises the first five questions and evaluates snoring-related parameters such as snoring frequency and loudness of snoring. Category 2 includes the next three questions and concerns fatigue and tiredness in frequently encountered situations. The last two questions in Category 3 relate to risk factors for obstructive sleep apnea such as weight change and hypertension. This questionnaire has been demonstrated to have good validity (Cronbach's alpha: 0.86 to 0.92) with a sensitivity of 86%, specificity of 77%, and a positive predictive value of 89% of sleep-disorder breathing in a primary care setting[15].

The Epworth Sleepiness Scale was developed to measure daytime sleepinessis often used clinically to screen for the manifestations of the behavioral morbidity associated to sleep-disordered breathing[16]. Epworth sleepiness scale yielded 66% of sensitivity, 48%[17]. It has now been translated into the Thai language and validated[18]. However, the Berlin questionnaire has still not been translated into the Thai language, and the overall reliability and utility of the scales have not been established in Thailand.

In Thailand, the usefulness of the Berlin questionnaire is still limited to a few physicians and researchers who use it only in special groups, such as in medical students, because there is still no Thai version designed to be user-friendly for the Thai population in community-based medicine. A standardized version is important, particularly when the questionnaire is translated into another language. Therefore, the objectives of the present study were to translate the Berlin questionnaire into the Thai language using a standard method and to test its reliability and validity. A validated Thai version of the Berlin questionnaire could be used as a screening tool to identify patients at risk for obstructive sleep apnea who need further evaluation with polysomnography in a primary care setting.

Material and Method

The Berlin Questionnaire has been widely used to screen for obstructive sleep apnea. First, we contacted Dr. Nikolaus C. Netzer, the license holder of the questionnaire, for permission to translate it into the Thai language.

The translation of the English version of the Berlin questionnaire into the Thai language version followed a standard method adopted from FACIT translation project procedures and guidelines (www.facit.org). The process began with the creation of two original, independent forward translations; the English version was translated into the Thai language by two translators, physicians specializing in sleep disorders, American board-certified, fluent in English and did not participate in the study. Next, the two original independently forwarded translations were used by another physician, also a sleep expert, blinded to the study to make a reconciled version.

The reconciled version was then translated back into English by another professional translator to make a "back translation" copy. Then, all the copies from the translation process (one back translation, one reconciled version, and two original, independently forwarded translations) were used by the physicians and professional translator to make three final versions of the revised independently forwarded translation.

One of these three revised independently forwarded translation copies was blindly selected and received approval from the research committee of medical specialists and a professional translator. The final Thai version was then tested in a small group of subjects and minimally adjusted before applying it to a larger study group.

The study protocol was reviewed for ethics and approved by the Departmental Research Committee and Institutional Review Board of the Faculty of Medicine, Siriraj Hospital. The study was supported

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Patients suspected of obstructive sleep apnea attending the Outpatient Department of Siriraj Hospital from April 2011 to August 2012 were invited to participate in the present study. Written, informed consent was obtained from each patient.

Subjects of either gender in the age group of 18-60 years who agreed to participate in the study were recruited. Those who could read and answer the questionnaire by themselves were included. Patients of extreme age, alcoholics, or those having a history of use of tranquillizers, opioid-derivative drugs, or other sedative drugs in the prior 4 weeks were excluded. Patients with underlying diseases or conditions that could have affected their ability to answer the questionnaire, such as pregnant women and patients with brain tumor, stroke, and delusional disorders, were also excluded from the present study.

A detailed physical examination was completed for all subjects. Blood pressure was measured with a mercury sphygmomanometer to the nearest 2 mmHg, in a recumbent position after at least 5 minutes of rest. Body weight was recorded in all patients with an electronic scale in an erect position without shoes and wearing only light indoor clothes. The authors used the same methods and measurement equipment for all patients to exclude inter-device variability. All participants were asked to completea demographic data form, the Siriraj sleep center checklist for sleep disorders, the Thai version of the Epworth Sleepiness Scale, and finally, the Thai version of the Berlin questionnaire during their first visit before they underwent standard polysomnography as scheduled. All participants were asked to complete the Thai Berlin questionnaire for a second time during a follow-up visit to the Siriraj Sleep clinic 2-4 weeks after polysomnography. After completion of the questionnaire, the polysomnography results were then communicated to the patient. The participants were contacted by telephone or mail to confirm a follow-up date. Participants were asked to complete the second Berlin questionnaire and return it in a prepaid envelope sent to their home address if they could not return for a follow-up visit within 4 weeks.

Statistical analysis

The sample size was calculated prior to enrollment. The authors assumed that the control group (negative test for polysomnography, Apnea Hypopnea Index (AHI) $\leq$5) would provide a 50% positive test for the Berlin questionnaire and the test group (positive test for polysomnography, AHI >5) would provide an 80% positive test.

For validity, the method of analysis used was a bivariate correlation test with a 0.05 two-sided significance level and 80% power. After calculation, it was determined that 132 patients would be necessary to detect a moderate correlation (r = 0.3), including 27 patients in the control group and 105 patients in the test group. In the Siriraj Sleep Clinic study, 20% of study participants were lost to follow-up or did not complete their questionnaires. Therefore, 160 participants (40 participants in the control group and 120 participants in the test group) were recruited.

For reliability, an intraclass correlation coefficient was used as an index of internal consistency for correlations between the first and the second Berlin questionnaire completions, with values of 0.7 or higher considered acceptable. At least 29 patients needed to complete the second Thai Berlin questionnaire, according to the analysis. This would provide a two-sided confidence level of 0.95 and a 0.05 two-sided significance level to detect an expected intraclass correlation of 0.8 for 5 rates.

All data were entered by researchers into a computer database and re-entered for verification. Statistical analyses were carried out using SPSS version 16.0 for Windows (SPSS Inc., Chicago, IL, USA).

Results

A total of 157 eligible patients met our criteria. Twenty-five patients (15.9%) were not included in the analysis. Of these, 17 patients (10.8%) were lost to follow-up and did not have a polysomnography test, two patients (1.3%) had high blood pressure before polysomnography and the tests were postponed, and six patients did not provide complete Thai Berlin questionnaires. As a result, 132 patients were included in the final analysis. The majority were men [90 patients (68.2%) versus 42 patients who were women (31.8%)]. The mean age was 48.15 years and the median age was 49 years (range, 26-72 years). The mean body mass index (BMI) was 29.2$\pm$6.8 kg/m^2. Forty-four (33.3%) and 88 (66.7%) patients had BMI values >30 and $\leq$30, respectively. Seventy-four (56.1%) patients provided a history of an existing condition; 60 patients (45.5%) had only a history of hypertension; 34 patients (25.8%) had other comorbid conditions, such as diabetes mellitus and dyslipidemia; and 22 patients (16.7%) had more than one preexisting condition. The demographic data are shown in Table 1.

There were 32 patients (24.2%) in the control group (AHI≤5) and 100 patients (75.8%) in the case group (AHI >5). The mean AHI was 30.3 with a standard deviation of 29.2. The mean Epworth Sleepiness Scale score was 9.9 with a standard deviation of 9.4. The number of positive results for the Epworth Sleepiness Scale, defined as scores >10, was 56 (42.4%). As a result, the sensitivity of the Thai Berlin questionnaire at a cutoff point of AHI ≤5 was 87.0% (95% CI, 78.8-92.9); the specificity was 75.0% (95% CI, 56.6-88.5); the positive predictive value was 91.6% (95% CI, 84.1-96.3); the negative predictive value was 64.9%; and the likelihood ratio of 3.5 (95% CI, 1.9-6.4). The Epworth Sleepiness Scale at a cutoff point showed a sensitivity of 87.5% (95% CI, 75.9-94.8) and specificity of 39.5% (95% CI, 28.5-51.4) with a positive predictive value of 51.6%, and a likelihood ratio of 1.5.

When using the different diagnostic test thresholds, AHI >15 and AHI >30, the sensitivity was 91.7% and 96.2%, respectively, and the specificity was 51.7% and 43.8%, respectively. Other combined objective diagnostic test thresholds, for example, AHI >15 in subjects with Epworth Sleepiness Scale scores >10 or AHI >30 in subjects with BMI >30 were also analyzed for sensitivity, specificity, positive predictive value, and likelihood ratio. All of the criteria showed high percentages for sensitivity (Table 2).

Internal consistency

When each item in the Thai Berlin questionnaire was analyzed by separating the subjects into two groups, high-risk and low-risk subjects (depending on the results of the questionnaire analysis) as expected, high-risk subjects were more likely to respond to the choices as positive items. For example, in the second item (a question asking about snoring loudness), 91.4% of high-risk subjects responded to a positive choice compared to 8.6% responding to a negative choice, with a statistically significant ($p<0.001$) difference shown for all 10 questions (Table 3).

Cronbach's alpha coefficient was used to assess the correlation of scores for each item. Cronbach's alpha coefficient was 0.68 for the Thai version of the Berlin questionnaire in th present study, which indicated optimum internal consistency. The Cronbach's alpha coefficient was 0.48 if the item deleted was highest in item 2 (a question asking about snoring loudness). The Cronbach's alpha coefficients for deleting each item on the Thai Berlin questionnaire are shown in Table 4.

Test-retest reliability

The test-retest reliability or reproducibility analyses were performed on 98 subjects. The intraclass correlation coefficient was used to analyze the score for each question and for the total Thai Berlin questionnaire in the first and the second assessments. The intraclass correlation coefficient was 0.97 for overall 98 subjects. At the AHI cut-off point of 5, the intraclass correlation coefficient was 0.95 for the 77 patients in

Table 1. Demographic data of the 132 participants

Demographic data	Number (%) or Mean ± SD
Age (years)	48.15±8.8
Gender: male	90 (68.2)
Height (cm)	165±8.4
Weight (kg)	78.8±18.5
BMI (kg/m^2) >30	44 (33.3)
Existing conditions, n (%)	
No underlying disease	58 (43.9)
Hypertension	60 (45.5)
Others (diabetes mellitus, dyslipidemia, etc.)	34 (25.8)
ESS score	9.88±5.41
ESS >10	56 (42.4)
ESS ≤10	76 (57.6)
AHI (mean ± standard deviation)	28±29.7
AHI ≥5	100 (75.8)
AHI <5	32 (24.2)

ESS = Epworth sleepiness scale; AHI = apnea hypopnea index; BMI = body mass index

the case group (AHI ≤5) and 1.00 for the control group (21 patients). When we changed the diagnostic test threshold for the case group to AHI ≤15 and AHI <15 for the control group, the results were 1.00 and 0.95, respectively (Table 5).

Discussion

Although the Berlin questionnaire has proven its usefulness as a screening tool for obstructive sleep apnea, its application in Thai patients might be limited because of differences in language and culture leading to miscommunication and misunderstanding. In our study design, we prevented potential problems such as content in equivalence by following standard processes of forward and backward professional translation, examination of translation quality by content experts, and minor adjustments.

From the demographic data, it was shown that there were more men than women in all groups (68.2%). The mean age of the recruited patients (n = 132) was 48.15 years with minimum and maximum ages of 26 and 72 years, respectively. The results also showed the same prevalence of sleep apnea as seen in adults in the general population. More than one-third (33.4%) of subjects had a potential risk factor for obstructive sleep apnea, i.e. being overweight (body mass index >30) or

Table 2. Sensitivity and specificity of various diagnostic test thresholds compared with the Thai Berlin questionnaire

Diagnostic criteria	Thai Berlin questionnaire					
	High-risk patients n (%)	Low-risk patients n (%)	Sensitivity	Specificity	PPV (NPV)	Likelihood Ratio
AHI ≤5	8 (25.0)	24 (75.0)				
AHI >5	87 (87.0)	13 (13.0)	87.0	75.0	91.6 (64.9)	3.5
AHI >15	66 (91.7)	6 (8.3)	91.7	51.7	69.5 (83.8)	1.9
AHI >30	50 (96.2)	2 (3.8)	96.2	43.8	52.6 (94.6)	1.7
ESS >10	49 (87.5)	7 (12.5)	87.5	39.5	51.6 (81.1)	1.5
AHI >5 and ESS >10	40 (90.0)	4 (10.0)	90.1	37.5	42.1 (89.2)	1.5
AHI >15 and ESS >10	33 (97.0)	1 (3.0)	97.1	36.7	34.7 (97.3)	1.5
AHI >30 and ESS >10	27 (100)	0 (0)	100.0	35.2	28.4 (100)	1.5
AHI >5 and BMI >30	39 (95.1)	2 (4.9)	95.1	38.5	41.1 (95.0)	1.6
AHI >15 and BMI >30	32 (100)	0 (0)	100.0	37.0	33.7 (100)	1.6
AHI >30 and BMI >30	28 (100)	0 (0)	100.0	35.6	29.5 (100)	1.6

Table 3. Distribution of response of Thai Berlin questionnaire by risk group

Thai Berlin questionnaire equivalent item	Number of subjects'positive responses, n (%) (132 first-time questionnaires)		
	High-risk subjects	Low-risk subjects	p-value
1. Do you snore? (BQ1)	103 (88)	14 (12)	<0.001
2. Snoring loudness (BQ2)	53 (91.4)	5 (8.6)	<0.001
3. Snoring frequency (BQ3)	103 (88.8)	13 (11.2)	<0.001
4. Does your snoring bother other people? (BQ4)	91(88.3)	12 (11.7)	<0.001
5. How often have your breathing pauses been noticed? (BQ5)	47 (94)	3 (6)	<0.001
6. Are you tired after sleeping? (BQ6)	64 (90.1)	7 (9.9)	<0.001
7. Are you tired during waketime?(BQ7)	60 (90.9)	6 (9.1)	<0.001
8. Have you ever fallen asleep while driving? (BQ8)	40 (90.9)	4 (9.1)	<0.001
9. Has your weight changed? (BQ9)	80 (95.2)	4 (4.8)	<0.001
10. Do you have high blood pressure? (BQ10)	49 (83)	10 (17)	<0.001
Additional item of BQ8: If yes, how often does it occur?	30 (96.7)	1 (3.3)	<0.001

Table 4. Cronbach' alpha if item of Thai Berlin questionnaire is deleted

Thai Berlin questionnaire equivalent item	Cronbach' alpha if item deleted
1. Do you snore? (BQ1)	0.39
2. Snoring loudness (BQ2)	0.61
3. Snoring frequency (BQ3)	0.38
4. Does your snoring bother other people? (BQ4)	0.40
5. How often have your breathing pauses been noticed? (BQ5)	0.42
6. Are you tired after sleeping? (BQ6)	0.21
7. Are you tired during waketime? (BQ7)	0.23
8. Have you ever fallen asleep while driving? (BQ8)	0.41
9. Has your weight changed? (BQ9)	0.45
10. Do you have high blood pressure? (BQ10)	0.44
Additional item of BQ8: If yes, how often does it occur?	0.45

Table 5. Test-retest reliability of the Thai Berlin questionnaire

Diagnostic criteria	Number	Intraclass correlation*
Criteria 1		
Control, AHI <5	21	1.00
Case, AHI ≥5	77	0.95
Criteria 2		
Control, AHI <15	42	0.95
Case, AHI ≥15	56	1.00
Total	98	0.97

having hypertension (45.5%). All findings in the current study corresponded to the previous study and were similar to those found in other studies and in adult primary care practice[5,13-15].

The authors demonstrated that the Thai version of the Berlin questionnaire had optimum internal consistency (Cronbach's alpha = 0.68). Internal consistency below the upper range was strongly influenced mostly by the second item (snoring loudness). However, the high percentage of high-risk subjects responding to high-risk choices for each item with statistical significance ensures that our Thai Berlin Questionnaire responses can detect patients who meet or exceed the AHI.

The present study demonstrated excellent sensitivity (87%) and a positive predictive value (0.91) as high as in the original study. Furthermore, when we changed the diagnostic test threshold in the study group from AHI >5 to >15 or even >30, the sensitivity of the Thai version of the Berlin questionnaire was still excellent (91.7% and 96.2%, respectively). In subsets of subjects using a different diagnostic criteria of AHI >15 in patients with ESS >10 or BMI >30, the sensitivity remained high (97.2% and 100%, respectively). In addition, the specificity of our questionnaire was quite good (75.0%).

The reliability of the Thai version of the Berlin questionnaire was evaluated by test-retest studies in 98 subjects, more than three times the estimated number of 29. The results were similar to the original English version of the Berlin questionnaire, as well as versions in other languages[5,19,20] (Table 6). The Thai Berlin questionnaire scores for each item were not significantly different between the pair of first and second tests, with an intraclass correlation coefficient of 0.97 revealing a very high degree of correlation. Even with the AHI >15 criterion, the intraclass correlation coefficient still demonstrated a high correlation (1.00). Therefore, the Thai Berlin questionnaire had a high degree of reliability.

There were some limitations in the present study. Firstly, we recruited many fewer subjects than the original study (132 versus 744 subjects). However, this sample size was statistically large enough to analyze meaningfully the outcome of our study. Secondly, the populations in the present study were from an outpatient unit at a tertiary hospital. Some participants were referred to our tertiary health care hospital or had been previously screened by a primary physician. This is a typical situation in Thailand because sleep specialists are only available in tertiary care facilities and the awareness of sleep-disorder breathing is very limited in the Thai population. It is uncommon to have patients in primary care settings. Thirdly, the Berlin questionnaire questions might not be appropriately applied to the majority of Thai people; for example, the

Table 6. Diagnostic test evaluations of different versions of the validated Berlin Questionnaire (AHI cut-point of 5)

Questionnaire	Sensitivity	Specificity	Source of populations
Thai Berlin Questionnaire	87.0%	75.0%	Tertiary care
Original Berlin Questionnaire[15]	86.0%	77.0%	Primary care
Indian Berlin Questionnaire[5]	86.0%	95.0%	Tertiary care
Greek Berlin Questionnaire[19]	76.0%	40.0%	Tertiary care
Filipino Berlin Questionnaire[20]	86.0%	Not mentioned	Primary care

second question regarding snoring loudness may be problematic for responders who might not actually know the loudness of their snoring, especially those subjects who were living or sleeping alone. In the validation, this question gave the lowest correlation among the 10 questions. Another example is a question asking if the subject has fallen asleep while driving; as shown in the eighth question, many responders were unclear whether they were drivers or passengers in the car. Furthermore, some Thai people use public transportation or ride bicycles. Regarding the fifth question asking how often breathing pauses have been noticed, many responders did not notice breathing pauses by themselves, especially those who lived alone.

Conclusion

Our Thai version of the Berlin questionnaire demonstrated good sensitivity, internal consistency, and excellent test-retest reliability. The authors concluded that the Thai version of the Berlin questionnaire would detect important symptoms contributing to obstructive sleep apnea and provide benefits for use in clinical settings as a screening tool for OSA.

Clinical impact

The Thai version of the Berlin questionnaire could be an instrument to help clinicians easily screen Thai patients with suspected obstructive sleep-disordered breathing as a self-administered questionnaire. Although the Berlin questionnaire is very useful, it should not be used as a single tool to diagnose or predict obstructive sleep disorder breathing severity. The authors recommend its use in combination with a more comprehensive clinical evaluation.

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Potential conflicts of interest

None.

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Appendix. Thai version of Berlin questionnaire

แบบทดสอบเบอร์ลินฉบับภาษาไทย

โปรดวงกลมข้อความที่คิดว่าใช่สำหรับตัวท่าน

1) คุณนอนกรนหรือไม่

ก. ใช่

ข. ไม่ใช่

ค. ไม่ทราบ

2) ความดังของการกรน

ก. ดังเท่ากับการหายใจ

ข. ดังเท่ากับการพูด

ค. ดังกว่าการพูด

ง. ดังมาก

3) ความถี่ของการกรน

ก. เกือบทุกวัน

ข. 3-4 ครั้งต่อสัปดาห์

ค. 1-2 ครั้งต่อสัปดาห์

ง. 1-2 ครั้งต่อเดือน

จ. ไม่เคยหรือเกือบจะไม่เคย

4) การกรนของคุณรบกวนคนอื่นหรือไม่

ก. ใช่

ข. ไม่ใช่

ค. ไม่ทราบ

5) อาการหยุดหายใจขณะนอนหลับของคุณได้ถูกสังเกตว่าเป็นบ่อยแค่ไหน

ก. เกือบทุกวัน

ข. 3-4 ครั้งต่อสัปดาห์

ค. 1-2 ครั้งต่อสัปดาห์

ง. 1-2 ครั้งต่อเดือน

จ. ไม่เคยหรือเกือบจะไม่เคย

6) คุณยังรู้สึกอ่อนเพลียหลังจากได้นอนหลับไปแล้วหรือไม่

ก. เกือบทุกวัน

ข. 3-4 ครั้งต่อสัปดาห์

ค. 1-2 ครั้งต่อสัปดาห์

ง. 1-2 ครั้งต่อเดือน

จ. ไม่เคยหรือเกือบจะไม่เคย

7) คุณรู้สึกอ่อนเพลียในช่วงที่ตื่นอยู่หรือไม่

ก. เกือบทุกวัน

ข. 3-4 ครั้งต่อสัปดาห์

ค. 1-2 ครั้งต่อสัปดาห์

ง. 1-2 ครั้งต่อเดือน

จ. ไม่เคยหรือเกือบจะไม่เคย

8) คุณเคยงีบหลับขณะขับรถหรือไม่

ก. ใช่

ข. ไม่ใช่

9) คุณมีน้ำหนักเปลี่ยนแปลงหรือไม่

ก. เพิ่มขึ้น

ข. ลดลง

ค. ไม่เปลี่ยนแปลง

10) คุณมีความดันโลหิตสูงหรือไม่

ก. ใช่

ข. ไม่ใช่

ค. ไม่ทราบ

การให้คะแนนแบบทดสอบเบอร์ลิน

หมวดที่ 1 ข้อ 1-5

ข้อ 1 ถ้าตอบ ก. ให้ 1 แต้ม

ข้อ 2 ถ้าตอบ ค. หรือ ง. ให้ 1 แต้ม

ข้อ 3 ถ้าตอบ ก. หรือ ข. ให้ 1 แต้ม

ข้อ 4 ถ้าตอบ ก. ให้ 1 แต้ม

ข้อ 5 ถ้าตอบ ก. หรือ ข. ให้ 1 แต้ม

หมวดที่ 2 ข้อ 6-8

ข้อ 6 ถ้าตอบ ก. หรือ ข. ให้ 1 แต้ม

ข้อ 7 ถ้าตอบ ก. หรือ ข. ให้ 1 แต้ม

ข้อ 8 ถ้าตอบ ก. ให้ 1 แต้ม

หมวดที่ 3 ข้อ 10

ข้อ 10 ถ้าตอบ ก. ให้ 1 แต้ม

หมวดที่ 1 ได้ผลเป็นบวกจากคำถาม ข้อที่ 1-5 ถ้าคำตอบเป็นผลบวกตั้งแต่สองข้อขึ้นไป

หมวดที่ 2 ได้ผลเป็นบวกจากคำถาม ข้อที่ 6-8 ถ้าคำตอบเป็นผลบวกตั้งแต่สองข้อขึ้นไป

หมวดที่ 3 ได้ผลเป็นบวกจากคำถาม ข้อที่ 10 ถ้าคำตอบเป็นผลบวกและ/หรือมีดัชนีมวลกายมากกว่า 30 กิโลกรัม/เมตร^2

ผลสรุปสุดท้ายถ้ามีหมวดที่ได้ผลเป็นบวกตั้งแต่สองหมวดขึ้นไปบ่งชี้ว่ามีความเสี่ยงสูงในการเกิดโรคทางเดินหายใจอุดกั้นขณะหลับ

หมายเหตุส่วนข้อ 9 นั้น ไม่ได้ให้คะแนนจากงานวิจัยนี้อาจแทนได้ด้วยคำถามที่ประเมินถึงความรุนแรงของภาวะในข้อ 8 ดังนี้

ถ้าใช่ อาการง่วงหลับเกิดบ่อยแค่ไหน

ก. เกือบทุกวัน

ข. 3-4 ครั้งต่อสัปดาห์

ค. 1-2 ครั้งต่อสัปดาห์

ง. 1-2 ครั้งต่อเดือน

จ. ไม่เคยหรือเกือบจะไม่เคย

โดยถ้าตอบ ก-ง น่าจะมีนัยสำคัญจริง

ความเที่ยงตรงและความเชื่อมั่นของแบบสอบถามเบอร์ลินฉบับภาษาไทยในผู้ป่วยที่มีการหายใจผิดปกติระหว่างหลับ

สุรพล สุขสาคร, พิมล รัตนาอัมพวัลย์, วิชญ์ บรรณหิรัญ, นิธิพัฒน์ เจียรกุล, วัฒนชัย โชตินัยวัตรกุล

วัตถุประสงค์: *เพื่อประเมินความเชื่อมั่นและความเที่ยงตรงของแบบประเมินเบอร์ลินฉบับภาษาไทยในผู้ป่วยที่มีปัญหาทางเดินหายใจขณะหลับ*

วัสดุและวิธีการ: *ผู้ป่วยที่สงสัยว่ามีปัญหาทางเดินหายใจขณะหลับจากแผนกผู้ป่วยนอกของโรงพยาบาลศิริราช ที่ได้รับการส่งตรวจการนอนหลับในห้องปฏิบัติการได้รับการแนะนำให้ตอบแบบประเมินเบอร์ลินฉบับภาษาไทย 2 ครั้ง ห่างกัน 2-4 สัปดาห์*

ผลการศึกษา: *ผู้ป่วยที่สงสัยว่ามีปัญหาทางเดินหายใจขณะหลับ 132 ราย ได้เข้าร่วมการวิจัย โดยมีช่วงอายุระหว่าง 26-72 ปี พบว่าแบบประเมินเบอร์ลินฉบับภาษาไทยมีความเชื่อมั่นเชิงความสอดคล้องภายในโดยมีค่า Cronbach's alpha correlation coefficient อยู่ที่ 0.68 ส่วนค่าความเชื่อมั่นที่ได้ทดสอบในผู้ป่วย 98 ราย อยู่ในเกณฑ์สูงโดยมีค่า intraclass correlation อยู่ที่ 0.97*

สรุป: *แบบประเมินเบอร์ลินฉบับภาษาไทยมีความความเชื่อมั่นและความเที่ยงตรงสูงใกล้เคียงกับต้นฉบับ*