

# Can a Bengali version of Epworth Sleepiness Scale evaluate excessive daytime sleepiness: a validity study

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## Abstract

**Background:** Excessive daytime sleepiness (EDS) is an indicator of sleep disordered breathing (SDB) and the Epworth sleepiness scale (ESS) is a popular instrument to evaluate EDS subjectively. Although translated and validated in different languages including Hindi, but there has been no available and validated Bengali version of ESS so far.

**Methods:** The original English version of ESS has been translated in Bengali and thereafter cross translated in English with proper human resources. The accepted Bengali version was then given to 30 patients of obstructive sleep apnea (OSA) and 30 normal individuals (based on polysomnographic diagnosis) along with the original English version to respond. The mean score of responses for both the versions were thereafter compared.

**Results:** There was no significant difference on statistical analysis between the means obtained from using the two versions of ESS.

**Conclusion:** The Bengali version of ESS is thus found valid and reliable and can be successfully used.

**Keywords:** Epworth sleepiness scale (ESS), excessive daytime sleepiness (EDB), validation, obstructive sleep apnea (OSA), Sleep Disorder Breathing (SDB), Chronic Obstructive Airway Disease (COAD), Body Mass Index (BMI)

## Introduction

EDS is the most important symptom of OSA<sup>1</sup>. It can give rise to several problems as fatigue, tiredness, lack of energy, work place accidents and others<sup>2,3</sup>. Detection and measurement of EDS is thus important.

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Objective measurement of EDS with tests like MSLT (Multi Sleep Latency Test)<sup>4</sup> is difficult and mostly not feasible for the lack of a proper sleep lab. However, based on subjective assessment on documented response to 8 questions on a scale of 0 to 3, ESS has been a successful mode of assessment of the degree of EDS.

Though translated and used in several languages (Hindi, Spanish, German, Italy etc.)<sup>5,6,7,8</sup>, there is no Bengali version of ESS.

In this study we translated ESS in Bengali keeping the meaning of the original version intact and tried to

validate the translated questionnaire.

## Methods

Both 'Case' (OSA patients) and 'Control' (persons without OSA) were included in the study. The subjects, upon written informed consent underwent a full night PSG (polysomnography) with Embla machine (EMBLA, S 7000; Medcare Flaga, Iceland). Absence of significant COAD (Gold III & IV) and inability to freely read and write both or either of the languages (English and Bengali) were looked for before incorporating the volunteers for the study.

The English and the Bengali versions of ESS were given to the subjects before and after PSG respectively. The responses were later sorted to either case or control group for analysis.

## Statistical calculation

The responses were recorded in Microsoft Excel Worksheet, 2003. Means and standard deviations (SD) were calculated in excel sheet. Difference between two means was tested by the student's 't' test by Epical Software 2000.

Table 1: Demographic details of cases and controls

Parameters	Case mean±SD	Control mean±SD	p-value
Age (yrs.)	52.90±8.23	49.37±13.18	0.21
BMI (Kg/mt <sup>2</sup> )	30.79±4.91	28.59±5.16	0.09
Neck circumference (c.m.)	42.53 ± 4.26	38.78±3.43	0.0004#
Waist circumference (c.m.)	109.85±12.35	103.36±10.05	0.03#
Initial saturation (%)	95.93±2.45	97.20±1.52	0.02#

# Statistically significant

## Results

Out of 60 subjects 46 were male and mean age was 51.13 (±11.04) years. The mean sleep time was 386.00 (±124.08) minutes and mean BMI was 29.69 (±5.11) kg/mt<sup>2</sup>.

Out of 30 subjects in case group 25 were male and their mean age and BMI were 52.90 (± 8.23) years and 30.79 (± 4.91) kg/mt<sup>2</sup> respectively. Details are mentioned in Table 1.

The means of ESS (in English version) and ESS (in Bengali version) of case group were 13.73 (± 5.45) and 13.57 (± 5.29) respectively and difference is not statistically significant (t=0.12, p-value=0.91). The means of ESS (in English version) and ESS (in Bengali version) of control group were 9.27 (± 4.14) and 9.40 (± 4.47) respectively and the difference is also statistically

Table 2: Comparison of ESS English and ESS Bengali in both cases and controls

ESS questions	Case			Control		
	ESS in English (Mean ± SD)	ESS in Bengali (Mean ± SD)	p-value	ESS in English (Mean ± SD)	ESS in Bengali (Mean ± SD)	p-value
Sitting and reading	1.50 ± 1.20	1.53 ± 1.14	0.92	1.20 ± 1.03	1.17 ± 1.05	0.91
Watching television	1.70 ± 1.12	1.83 ± 1.21	0.66	1.20 ± 0.92	1.30 ± 1.09	0.70
Sitting inactive in a public place	1.77 ± 1.04	1.77 ± 1.04	1.00	1.00 ± 0.87	0.97 ± 0.93	0.89
As a passenger in a car/bus for an hour without a break	2.20 ± 1.06	2.10 ± 1.06	0.71	1.67 ± 1.09	1.60 ± 1.13	0.80
Lying down to rest in the afternoon when circumstances permit	2.63 ± 0.61	2.67 ± 0.76	0.82	1.97 ± 1.03	1.93 ± 1.01	0.88
Sitting and talking to someone	0.73 ± 0.87	0.67 ± 0.88	0.79	0.20 ± 0.41	0.20 ± 0.48	1.00
Sitting quietly after a lunch without alcohol	2.20 ± 1.00	2.20 ± 0.96	1.00	1.40 ± 0.93	1.47 ± 0.86	0.76
In a car, while stopped for a few minutes traffic	1.00 ± 1.08	0.80 ± 1.00	0.46	0.63 ± 0.89	0.80 ± 0.96	0.48
ESS total score	13.73 ± 5.45	13.57 ± 5.29	0.91	9.27 ± 4.14	9.40 ± 4.47	0.91

insignificant ( $t=0.12$ ,  $p\text{-value}=0.91$ ). Both versions of ESS in either case are compared in table 2.

## Discussion

SDB is a common problem and a manifestation of several disease states as narcolepsy, idiopathic hypersomnolence, OSA etc. Out of them, OSA remains the most important and frequent but most neglected public health problem and has been the cause of significant mortality and morbidity<sup>9</sup>. Awareness of the likely presence of OSA is thus a very important issue to be disseminated to the society and assessment of the presence of symptoms is important for the general practitioners. Incidentally, SDB is the most important and the commonest symptom of OSA<sup>1</sup>. It has been found that the degree of the presence of OSA has been co-related to the degree of EDS<sup>10</sup>. Thus measurement of EDS has become an important issue to the physicians in general. Several objective and subjective methods are forwarded for the measurement SDB. However, ESS being a subjective one is the most simple to practice.

Although subjective, ESS has been the most popular one because of its simplicity<sup>11</sup>. It is based on reply to 8 questions on a scale of 0 to 3 as '0 = no chance of dozing', '1 = slight chance of dozing', '2 = moderate chance of dozing' and '3 = high chance of dozing'. Although the sensitivity and the specificity of screening OSA is low with ESS, it is found to be useful for assessment of narcolepsy, idiopathic hypersomnolence, and other conditions associated with EDS<sup>12,13,14</sup>. Hence, a widespread use of ESS is strongly warranted and this demands the use of this simple instrument in different languages other than English. Incidentally, Hindi version of ESS is already validated<sup>6</sup>; yet it is not enough since, the mother tongue of the majority of the countrymen is not Hindi although many people can understand the language to a good extent, very few can read or write.

In our observation, as expected, there has been an obvious difference in the BMI, waist and neck circumferences between the case and the control group but there were no difference in response to individual questions (both the Bengali and the English version) in both the groups. Most of our patients happen to be non alcoholic and do not possess a car or travel by car frequently. Hence, although they had no problem of understanding the question, the response was forthcoming on equating car with bus or other public

transport. Therefore, for the question no 7 in particular, the option of bus etc. should be kept in addition to car. The translated and validated version of the ESS is thus likely to help our physicians and the patients to assess the EDS and take proper measures to preserve health of the public.

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