



Reliability and Validity of a Moroccan Arabic Dialect Version of the Epworth Sleepiness Scale

Mohammed Elbiaze*

Sleep Medicine University Center, Hassan 2 University Hospital, Faculty of Medicine, Mohammed Ben Abdellah University, Fes, Morocco

***Corresponding Author:** Mohammed Elbiaze, Professor, Director, Sleep Medicine University Center, Hassan 2 University Hospital, Faculty of Medicine, Mohammed Ben Abdellah University, Fes, Morocco.

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Abstract

The daytime sleepiness problem is a common symptom of many sleep disorders, including obstructive sleep apnea. The Epworth Sleepiness Scale (ESS) questionnaire was developed by Johns In 1991 as a simple, self-administered questionnaire for the assessment of daytime sleepiness. The aim of this work is to translate the Epworth Sleepiness Scale (ESS) from English to the Moroccan Arabic dialect and to study its psychometric properties to obtain a validated version according to the rules of transcultural adaptation.

The various stages of translation and cultural adaptation for the ESS were:

1. Translation of the original version of the source language to the Moroccan Arabic dialect.
2. Reviewing by a committee of professionals (health professionals, specialists, epidemiologists, sociologists...)
3. Pilot survey of 10 patients to evaluate the apparent validity.
4. Back translation of the final translated version ESSm.
5. Checking the psychometric properties of ESSm in 100 staff working at the Hassan II Hospital in Fez in 3 times (T1, T2, T3).

For the internal reliability, the ESSm the Cronbach's alpha is significant (more than 0.60) in the 3 passing times (0.645 in T1, 0.720 in T2 and 0.685 in T3). The stability coefficients of correlation are significant. The inter-observer stability (between T1 and T2), is estimated by Pearson's correlation coefficient at 0.923 ($p = 0.0001$). The temporal stability (test-retest between T1 and T3) of the ESSm is estimated by the same coefficient at 0.825 ($p = 0.0001$).

The use of validated transcultural adaptation techniques has enabled us to obtain the first validation in Moroccan Arabic dialect adapted to our Moroccan context and whose are so that it is considered a reliable tool both in consultations at different levels and in hospital.

Keywords: Excessive Daytime Sleepiness; Epworth Sleepiness Scale; Moroccan Arabic Dialect

Abbreviations

EDS: Excessive Daytime Sleepiness; ESS: Epworth Sleepiness Scale; AVS: Analog Visual Scale Body; BMI: Body Mass Index

Introduction

The daytime sleepiness problem is a common symptom of many sleep disorders, including obstructive sleep apnea. It affects 3 to

5% of the general population [1]. There are wide variations across different cultures; the prevalence of excessive daytime sleepiness (ESS > 10). The Epworth Sleepiness Scale (ESS) questionnaire was developed by Johns In 1991 as a simple, self-administered questionnaire for the assessment of daytime sleepiness [2-4].

The ESS is already translated into several languages including French, Spanish, Portuguese, Chinese, Japanese, Norwegian, and

even in Arabic and Omani dialect [5-12], but never in Moroccan Arabic dialect.

Aim of the Study

The aim of this work is to translate the Epworth Sleepiness Scale (ESS) from English to the Moroccan Arabic dialect and to study its psychometric properties to obtain a validated version according to the rules of transcultural adaptation. The final version adapted to our Moroccan context will be of great contribution in clinical practice and will direct both the practitioner and the patient towards a better management of sleep pathologies.

Materials and Methods

The Epworth sleepiness scale

Epworth sleepiness scale (Figure 1) is a self-survey to measure the general level of daytime sleepiness in a person’s daily life. Created by Dr. Johns Murray and modified by the same author in 1997, ESS is consistent with eight different situations, and the subject is asked to rate the probability of dozing in each situation on a scale of 0–3 with total scores ranging between 0 (normal sleep) and 24 (very sleepy). A score above or equal to 10 is in favor of drowsiness and a score above 16 indicates a high level of drowsiness. The questionnaire includes a first part reserved for instructions and a second part of the situations in which the level of drowsiness is measured.

The image shows the original English version of the Epworth Sleepiness Scale questionnaire. It includes a title, a name and date field, age and sex fields, and a set of instructions. A scale is provided: 0 = would never doze, 1 = slight chance of dozing, 2 = moderate chance of dozing, 3 = high chance of dozing. There is a note: "It is important that you answer each question as best you can." Below this is a table with 8 situations and a vertical scale for each. The situations are: Sitting and reading, Watching TV, Sitting, inactive in a public place (e.g. a theatre or a meeting), As a passenger in a car for an hour without a break, Lying down to rest in the afternoon when circumstances permit, Sitting and talking to someone, Sitting quietly after a lunch without alcohol, and In a car, while stopped for a few minutes in the traffic. At the bottom, it says "THANK YOU FOR YOUR COOPERATION" and "© M.W. Johns 1990-97".

Figure 1: Original version of Epworth sleepiness scale [1].

ESS’s cross-cultural translation and adaptation steps

1. The first step consisted of a translation of the original ESS English version to the Moroccan Arabic dialect. It was carried out independently by two bilingual people whose mother tongue is Arabic and who are fluent in English. The two translators later agreed on a first consensual Moroccan Arabic version.
2. The first consensual Arabic version was reviewed by a committee of professionals formed by epidemiologist researchers and pulmonologists who compared this consensual version to the original version to identify ambiguous or inappropriate items and generate alternative expressions, all based on WHO’s unified Arabic medical dictionary. As a result of these remarks, minor changes to this first version were made and the preliminary Arabic version was produced.
3. The draft was administered to a group of 10 people in the general population to evaluate the apparent validity. These people were asked to fill the ESSm questionnaire, to comment on items that would have caused them a problem of understanding in the translated version; and finally, were encouraged to give alternative expressions for these items.

The professional committee and translators had to consider the proposals to generate the final Arabic version. During this translation process, some items have been modified in order to adapt the original questionnaire to Moroccan culture:

- The term “recent time” replaced by “last months” in instructions.
 - The item 1 is adapted to the illiterate Moroccan population by adding the phrase “even if just photos”.
 - The item 2 is adapted to the Moroccan context by adding to public places “example: waiting room, train station, theatre”.
 - The phrase “without alcohol” had to be removed from item 7 knowing that Morocco is a Muslim country and where the consumption of alcohol is prohibited by religion.
4. The final Arabic version was translated into English by two other bilingual people who are fluent in English. This back-translation was compared with the original version and then approved by the same committee that revised the first consensual Arabic version. He discussed items that posed a particular problem before generating the final version ESSm (Figure 2 and 3).
 5. Validation study: The final version resulting from the various stages mentioned above was administered by investigators trained for this purpose to a given population.

Validation study

Study population

The validation was carried out in 100 staff working at the Hassan II Hospital in Fez. It included workers at least 18 years of age and all healthcare professions.



Figure 2: First part of ESSm version translating instructions of English version of ESS in Arabic (Moroccan dialect).

درجة احتمال يظنني النعاس (من 0 إلى 3)				هذه الحالات هي:
3	2	1	0	1- جالس اقرأ شي حاجة (ولمّا يكون فيها غير الصور)
3	2	1	0	2- اتفرج في التلفزة
3	2	1	0	3- جالس ما تعمل والو في مكان عمومي (مثال : قاعة الانتظار، محطة المطار، مسرح)
3	2	1	0	4- راكب في سيارة (بلا ما نسوق) مدة ساعة بلا توقف
3	2	1	0	5- مجبّد ارتاح وقت التيلولة إذا سمحت الظروف
3	2	1	0	6- جالس اتكلم مع شي واحد
3	2	1	0	7- جالس هادئاً من بعد الفداء
3	2	1	0	8- أنا في سيارة متوقفة مدة دقائق في زحام

شكرا على تعاونكم

Figure 3: Second part of ESSm version translating situations of sleepiness of English version of ESS in Arabic (Moroccan dialect).

Study scheme

The ESSm questionnaire was introduced by 2 investigators trained for this purpose. The first (T1) and second passing time (T2) were made on the same day in a random order. The 3rd passing time (T3) is done after an interval of one week to fifteen days by one of investigators. At the same time, another questionnaire was introduced by investigators and includes information of subjects on: sociodemographic characteristics, the existence of associated co-morbidity, Body Mass Index and an analog visual scale (AVS) for assessing drowsiness. This scale includes a question (To what degree do you imagine being drowsy in the day?) and a diagram of a rule graduated from 0 to 10.

Statistical analysis

The data entry and graphic presentation of the results was made on Microsoft Office Excel 2007. Statistical analysis of the data was carried out using SPSS statistics 17.0 software. Results are presented as an average +/- standard deviation or as a percentage. The Pearson and Spearman coefficients are used to analyze correlations between different passing times.

Study of the psychometric properties of ESSm

We analyzed the reliability of the ESSm, its stability and its validity. To measure the degree of internal reliability of an instrument, the recommended statistical tool is the Cronbach’s alpha [13]. Values between 0.70 and 0.95 are usually reasonable when the scale or subscale has more than 5 items. Temporal stability (or test-retest) is established between the responses given by the same subjects at T1 and T3. Inter-observer stability establishes the degree of correlation between the responses given by the same subjects when administering the questionnaire at the same time T1 - T2 by different investigators. A correlation greater than 0.60 is usually desirable to assess stability.

The apparent validity, which results from subjective judgment by the user, was partly appreciated by the group of 10 patients in whom ESSm is administered during the translation process of the original version. On the other hand, validity against criterion used the AVS as a “gold standard” to validate the final version of ESSm.

Results and Discussion

Population characteristics

The average age is 27 years +/- 7.76 with extremities ranging from 20 to 62 years. There is a female predominance (75%). Of the respondents, 98% are of urban origin, 95% have no associated co-morbidity and 67% have a higher level of education. Only 5% are smokers. The average BMI of our study population is 23.61 +/- 3.17.

ESSm score results

ESSm scores in 3 times are reported in table 1 with an average between 5.92 and 6.71.

Times of passing	Average	Standard deviation
1 st time T1	6,46	3,56
2 nd time T2	6,71	3,81
3 rd time T3	5,92	3,47

Table 1: Average and standard deviation of ESSm scores by passing time.

Psychometric properties

Reliability (Table 2)

For the internal reliability, the ESSm the Cronbach’s alpha is significant (more than 0.60) in the 3 passing times (0.645 in T1, 0.720 in T2 and 0.685 in T3). The stability coefficients of correlation are significant. The inter-observer stability (between T1 and T2), is estimated by Pearson’s correlation coefficient at 0.923 (p = 0.0001). The temporal stability (test-retest between T1 and T3) of the ESSm is estimated by the same coefficient at 0.825 (p = 0.0001).

Times of passing	Cronbach’s alpha	Inter-observer stability coefficient T1-T2	Temporal stability coefficient T1-T3
1 st time T1	0.645	0.923 p = 0.0001	0.825 p = 0.0001
2 nd time T2	0.720		
3 rd time T3	0.685		

Table 2: Analysis of reliability of ESSm version by passing time.

Validity

The initial version of ESSm was validated by the group of 10 patients in whom ESSm is administered during the translation process of the original version. In second step, the correlation of final version of ESSm with EVA was significant (Spearman correlation coefficient at 0.583, p = 0.0001). The average of AVS score is 2.47 +/- 1.94. Indeed, the higher a subject’s level of drowsiness according to ESSm, the higher his AVS score.

Study of the link between ESSm and the socio-demographic characteristics of the sample

The relationship between the ESSm score of the respondents and their different sociodemographic characteristics was studied with age, sex, urban origin, monthly income, marital status, education level, smoking, comorbidities, and body mass index. This study objectified a significant correlation only with the body mass index with a coefficient of correlation with BMI at 0.249 (p = 0.012).

Discussion

The ESS is already translated into several languages including French, Spanish, Portuguese, Chinese, Japanese, Norwegian, and even Arabic (Lebanese version) and Omani dialect [5-12].

Our study is a validation of a Moroccan version of the ESS. It allowed to obtain the first version of this questionnaire in Moroccan Arabic dialect. It also allowed us to have information on the characteristics of the respondents, and their level of drowsiness.

During the translation process, we followed the translation-back translation methodology, according to which the original questionnaire is translated into Moroccan Arabic dialect taking into account the peculiarities of Moroccan culture in order to maintain an inferential equivalence of the instrument.

The ESS is an easy questionnaire using simple words. During the translation, we did not encounter too many difficulties. The first translated version had few changes.

The translation as well as the back translation were validated both by the apparent validity survey on a sample of 10 people and by the professional committee, before developing the final Arabic Moroccan dialect version (ESSm) that was the subject of the final validation investigation.

The validation survey of the ESSm version lasted about 3 weeks, with an interval between the 1st time of passing and the 3rd time of passing of one to two weeks. During this period, 100 staff from the Hassan II Hospital in Fez were recruited.

The average score of the ESSm is 6.46 +/- 3.56 for our study population versus 9.0 +/- 4.7 for the population of the Japanese series [9]. That is, the population of our validation study is a seemingly healthy population with no sleep pathology.

The Cronbach alpha coefficient in the three time of passage between 0.645 and 0.720. The best being obtained during the 2nd passing. These coefficients are greater than 0.60. This makes it possible to conclude the internal consistency of the final version.

The inter-observer stability and temporal stability (Test-retest) of the ESSm are satisfactory. Indeed, coefficients of correlation of both are significantly higher than 0.60. The test-retest correlation is better in our study than the Takegami series (correlation coefficient at 0.75) [9].

To reinforce the validation of the final validation, we administered in parallel to the ESSm another scale measuring daytime drowsiness which is the AVS. The correlation between the ESSm score and the AVS was significant, i.e. any increase in the ESSm score was accompanied by an increase in the AVS score.

The correlations between ESSm and socio-demographic characteristics have been studied. The only significant correlation found was related to the body mass index. Indeed, obesity has been identified as a risk factor for excessive daytime drowsiness [14] and our

study supports this relationship. The higher the body mass index, the more daytime sleepiness. This result will support the validity of our ESSm version.

Conclusion

The ESS is an almost essential tool for an easy assessment of drowsiness and for the management of sleep pathology, especially sleep apnea syndrome. The use of validated transcultural adaptation techniques has enabled us to obtain this Moroccan Arabic version ESSm which is the first validation in Moroccan Arabic dialect adapted to our Moroccan context and whose internal homogeneity and reproducibility are satisfactory so that it is considered a reliable tool both in consultations at different levels and in hospital.

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Conflict of Interest

We declare no conflict of interest and financial assistance has not been received for this study.

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