Evaluation of Epworth Sleepiness Scale as a screening method for Obstructive Sleep Apnea Syndrome (OSAS)

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ABSTRACT

Objective: To compare the results of the Epworth Sleepiness Scale (ESS) score and the Apnea-Hypopnea Index (AHI) measured by overnight polysomnography in patients diagnosed to have Obstructive Sleep Apnea Syndrome in King Hussein Medical Center (KHMC), to evaluate the Epworth Sleepiness Scale as a screening method for OSAS.

Method: Retrospective study of patients diagnosed to have obstructive sleep apnea syndrome between 2013 and 2015. Epworth Sleepiness Scale score and Apnea-Hypopnea Index of 118 patients were compared.

Results: Of the 118 patients diagnosed to have Obstructive Sleep Apnea Syndrome, 65 patients had a score of >10 on the Epworth Sleepiness Scale, which translates to 55% of the patients studied. 100% of patients with severe OSAS had an ESS score >10. However, in patients with moderate and mild OSAS, 46.5% and 36% scored >10 on the ESS respectively.

Conclusion: Epworth Sleepiness Scale is sensitive in patients with severe OSAS. However, the accuracy of the ESS becomes less in mild and moderate OSAS, making it a poor and non-accurate screening method for OSAS.

Key words: Epworth Sleepiness Scale (ESS), Obstructive Sleep Apnoea Syndrome (OSAS), screening

Introduction

Obstructive Sleep Apnea Syndrome (OSAS) is common, affecting approximately 4% of middle-aged men and 2% of middle -aged women. (1) However, these figures are an underestimation, and about 95% of patients with sleep disorders are not diagnosed.(2,3) It is very important to diagnose and manage OSAS efficiently, because OSAS is independently associated with increased morbidity and mortality due to cardiovascular and neurovascular diseases, metabolic disorders and impaired neurocognitive function.(4,5,6)

Overnight polysomnography (PSG) is the gold standard for diagnosing OSAS. However, the PSG is expensive, time consuming and not widely available outside big medical centers. Another problem is the long waiting time for PSG. All of these issues urge us to find a simple and reliable way to screen patients for the probability of OSAS before referring them to an overnight polysomnography.

Many tests have been evaluated and studied. The Multiple Sleep Latency Test (MSLT) is believed to provide a reliable measurement of sleepiness. (7,8) The Maintenance of Wakefulness Test (MWT) (9) and the Modified Assessment of Sleepiness Test (MAST) (10) were also shown to be reliable when it comes to evaluating patients with sleep disturbances. However, all these tests have the same disadvantage of being cumbersome, expensive and time consuming.

The Epworth Sleepiness Scale was developed in 1991, and was suggested as a screening method for patients with suspected OSAS. Despite the fact that it is subjective, ESS has the advantage of being fast, free and easy to be applied. (11)

Our aim in this study is to evaluate the Epworth Sleepiness Scale (ESS) as a screening method for OSAS.

Methods

The study was done by analyzing the files of 118 patients who underwent overnight polysomnography (PSG) in KHMC between 2013-2015. They were all diagnosed to have OSAS (defined as AHI?5). The pre-treatment ESS score of these patients was compared to their Apnea-Hypopnea Index (AHI) obtained during the PSG. An ESS score of >10/24 is considered to be suggestive of excessive daytime sleepiness (EDS) (12), and warrants further evaluation by PSG to rule out OSAS.

Results

In our study group which consisted of 118 patients with OSAS, 47 patients had mild OSAS (defined as AHI 5-15), 43 patients had moderate OSAS (AHI >15-30) and 28 patients had severe OSAS (AHI>30).

By comparing the results of the ESS score and AHI of these patients, it was found that 65 patients from our study group had an ESS score >10. This represents 55% of the patients included in the study.

All 28 patients with severe OSAS had an ESS score>10, which means that ESS score was suggestive of EDS in 100% of patients with severe OSAS in our study group.

From the 43 patients diagnosed with moderate OSAS, 20 patients had an ESS score>10, which means that 46.5% of patients with moderate OSAS in our study group had an ESS score suggestive of EDS.

From the 47 patients with mild OSAS, 17 patients had an ESS score>10. This means that 36% of patients with mild OSAS in our study group had an ESS score suggestive of EDS.

Table 1: The number and percentage of patients with ESS>10 in the mild, moderate and severe OSAS groups

OSAS (AHI)	MILD (5-15)	MODERATE (16-30)	SEVERE (>30)
Total number of patients	47	43	28
Number of patients with ESS>10	17	20	28
% of patients with ESS>10	36%	46.5%	100%
Total % of patients with ESS>10	55%		

Discussion

Epworth Sleepiness Scale (ESS) was developed in 1991 by Dr. John W. Murray. It consists of 8 questions that are supposed to evaluate the tendency of an individual to fall asleep in certain conditions. Each question is answered by a number on a scale from 0 to 3 (Chart 2 - opposite page.)

Chart 1: Comparison between total number of patients diagnosed to have OSAS (mild, moderate and severe) and the number of those with ESS>10
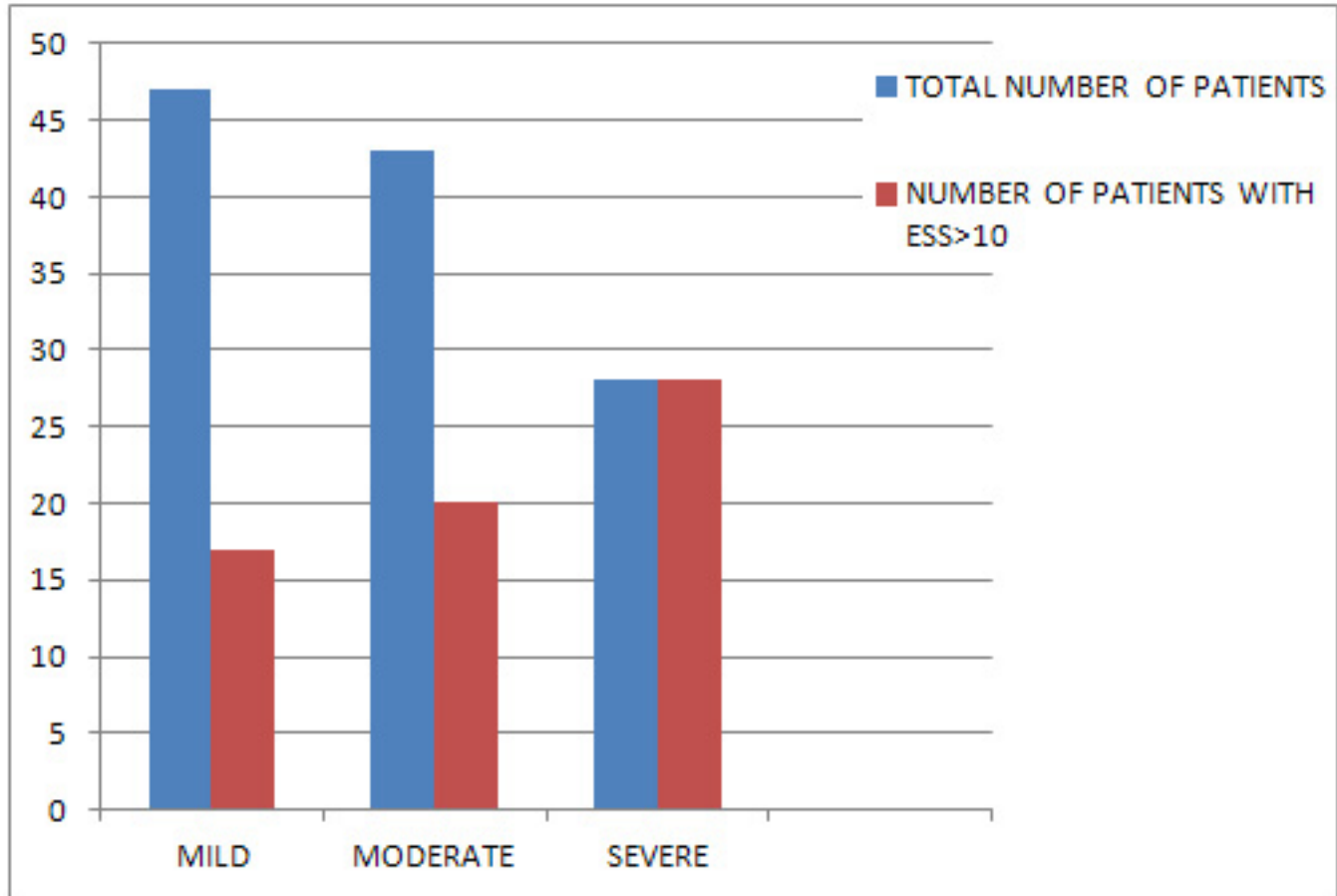

Chart 2: Epworth Sleepiness Scale form

0= No chance of dozing off	2 = Moderate chance of dozing off
1 = Slight chance of dozing off	3 = High chance of dozing off

Rate the chance that you will doze off in the following situations:

Sitting and reading

Watching television

Sitting inactive in a public place (e.g. in a theatre, during a meeting)

As a passenger in a car riding for an hour without break

Lying down to rest in the afternoon when circumstances permit

Sitting and talking to someone

Sitting quietly after lunch without alcohol

In a car while stopped for a few minutes in traffic

Add above total score

After answering all the questions in the ESS form, a score of >10 is considered to be suggestive of excessive daytime sleepiness (EDS), and OSAS is highly suspected in this group of patients, which warrants further evaluation by overnight polysomnography. However, and according to Dr. Murray, the evaluation by the ESS is influenced by the patient's reading and comprehension skills and honest answers. (11)

In our study, it was shown that the ESS is very sensitive in patients with severe OSAS. All 28 patients with AHI>30 had an ESS score>10, with 100% sensitivity of ESS in detecting EDS in this group.

However, the sensitivity of the ESS gets less when it comes to patients with mild and moderate OSAS.

From the 47 patients diagnosed to have mild OSAS in our study, 17 patients had an ESS score >10, which means that only 36% of these patients had an ESS score suggestive of EDS.

In the group of patients with moderate OSAS which consisted of 43 patients, 20 patients had an ESS score >10, which means that 46.5% of them had an ESS score suggestive of EDS.

Overall, 55% of the patients who were diagnosed to have OSAS in this study had an ESS>10, leaving nearly half of the patients (45%) with an ESS score NOT suggestive of EDS. This means that the ESS has a low sensitivity as a screening method for OSAS.

This result was also concluded by other studies, such as the meta-analysis done by Ramachandran and Josephs (13), which evaluated several clinical screening tests for OSAS. They concluded that the ESS was the least accurate of all the screening tests examined in the study.

Conclusion

The ESS is a very simple, cheap and fast way to assess patients for the possibility of EDS and OSAS. However, it has low accuracy in the mild and moderate OSAS groups.

Patients with mild and moderate OSAS are still at high risk for cardiovascular and neurovascular diseases and metabolic abnormalities, and failure to detect these patients through screening methods will delay their diagnosis, and thus will delay offering them good management of their OSAS, putting them at higher risk for complications of these diseases. This makes the Epworth Sleepiness Scale (ESS) not a preferable method for screening for OSAS, and it can't be used as a sole screening method for OSAS.

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