**Original Article**

# The Epworth Sleepiness Scale's Completeness Difficulties in an Urban Cameroonian Population

## *Difficultés à répondre à l'échelle de somnolence d'Epworth dans une population camerounaise urbaine*

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**RÉSUMÉ**

**Introduction.** In order to check some empirical observations, we aimed to assess difficulties in answering the Epworth Sleepiness Scale (ESS) and estimate its completeness rate in urban young, healthy and literate population in Cameroon. **Methodology.** This cross-sectional study was conducted on 2016, among randomly selected adults in Yaoundé, the capital of Cameroon. We collected sociodemographic and occupational data, as well as the ESS. The later assessed the sleepiness risk in 8 different daily situations : Sitting and reading, watching television, sitting inactive in a public place, passenger in a car for an hour without a break, lying down to rest in the afternoon, talking to someone, sitting quietly after an alcohol-free lunch and being in a car while stopped for a few minutes in the traffic. Unanswered items were noted, their number and distribution were described. **Results.** A total of 400 Yaoundé inhabitants (mean age 34.8 ±11.1 years, 57% men, 60.8% office workers) were enrolled. One participant (0.25%) could not answer the item 1, 3 (0.75%) could not answer the item 4 and 237 (59,2%) were limited with the item 8. Overall, 239 participants could not complete the ESS, giving a completeness rate [95% confident interval] of 40.3 [35.5; 45.1]. Among them, 236 were let down by a single item, 2 by 2 items and 1 by 3. **Interpretation.** This study confirmed difficulties in completing the ESS, even in a young and literate population. Further research is needed to confirm these difficulties with the ESS completeness, especially in rural populations and other regions. **Conclusion**. Epworth sleepiness scale is not easy to complete, even for a young, healthy and literate Cameroonian population.

**ABSTRACT**

**Introduction**. Afin de vérifier certaines observations empiriques, nous avons cherché à évaluer les difficultés à répondre à l'échelle de somnolence d'Epworth (ESS) et à estimer son taux d'exhaustivité dans la population urbaine jeune, saine et alphabétisée du Cameroun. **Méthodologie**. Cette étude transversale a été réalisée en 2016, auprès d'adultes sélectionnés au hasard à Yaoundé, la capitale du Cameroun. Nous avons collecté des données socio-démographiques et professionnelles, ainsi que l'ESS. Ce dernier a évalué le risque de somnolence dans 8 situations quotidiennes différentes: s'asseoir et lire, regarder la télévision, rester inactif dans un lieu public, passager dans une voiture pendant une heure sans interruption, allongé pour se reposer l'après-midi, parler à quelqu'un, assis tranquillement après un déjeuner sans alcool et être dans une voiture pendant quelques minutes dans la circulation. Les éléments restés sans réponse ont été notés, leur nombre et leur distribution ont été décrits. **Résultats**. Au total, 400 habitants de Yaoundé (âge moyen de 34,8 ± 11,1 ans, 57% d'hommes, 60,8% d'employés de bureau) étaient inscrits. Un participant (0,25%) n'a pas pu répondre au point 1, 3 (0,75%) n'ont pas pu répondre au point 4 et 237 (59,2%) ont été limités au point 8. Dans l'ensemble, 239 participants n'ont pas pu compléter l'ESS, donnant un taux d'exhaustivité [intervalle de confiance à 95%] de 40,3 [35,5; 45.1]. Parmi eux, 236 ont été déçus par un seul élément, 2 par 2 éléments et 1 par 3. **Interprétation**. Cette étude a confirmé les difficultés à terminer l'ESS, même dans une population jeune et alphabétisée. Des recherches supplémentaires sont nécessaires pour confirmer ces difficultés avec l'exhaustivité du ESS, en particulier dans les populations rurales et d'autres régions. **Conclusion**. L'échelle de somnolence d'Epworth n'est pas facile à compléter, même pour une population camerounaise jeune, en bonne santé et alphabétisée.

## INTRODUCTION

Chronic non communicable diseases (NCD) have a growing prevalence in sub-Saharan Africa (SSA). This includes diabetes, high blood pressure, dyslipidemia, obesity and cardiovascular diseases [1]–[7]. Sleep related

disorders (SRD), including the obstructive sleep apnea syndrome (OSA), are part of these NCD. Data on OSA are still scarce in SSA. However, recent community studies revealed OSA's prevalence (5 – 10%) close to the one of the western world [8]–[11]. Furthermore, Benjafield published in 2019 a modelling-based meta-analysis, estimating OSA prevalence in almost all countries of the world. This prevalence ranged 7.8% - 77% for an apnea-hypopnea index (AHI) ≥ 5/h and 3 – 36.6% for moderate to severe OSA (AHI ≥ 15/h). African countries' prevalence estimates were not lower than others. Cameroon ones were 36.6% and 14.7% for global OSA and moderate to severe OSA respectively [12]. Excessive daytime sleepiness (EDS) is a major symptom in sleep related disorders and OSA especially. It is also associated with cardiovascular diseases, quality of life and other health problems [13]–[19]. The objective diagnosis of SRD and EDS requires sophisticated procedures such as ventilatory polygraphy, polysomnography, iterative sleep latency tests and maintenance of wakefulness test. Access to those procedures are still limited, especially in resource-limited settings as SSA, where screening tools are of great importance. The Epworth sleepiness scale (ESS) is one of the most used screening tool for EDS [20] [20]. However, some items of the ESS are not designed to be universally answered (see methodology section). Our daily practice revealed frequent difficulties to complete the form. Those difficulties have been assumed to be related to socio economic status or other factors such as rural area, access to electricity, literacy or access to public transport. We aimed to check these observations by estimating the completeness rate of the ESS in urban young, healthy and literate population in Cameroon.

## MATERIAL AND MÉTHODS

### Study design, settings and population

This cross-sectional study took place in Yaoundé, the political capital of Cameroon, between November 2015 and May 2016. Black subjects aged 16 or over and living in the city and its surroundings were asked to participate. We selected the population study using a two-stage clusters stratified sampling. The stratification variable was the type of activity, divided into office activity (administrative buildings) and outdoor activity (neighborhoods and / or markets). In the office activity group: 2 buildings in the city (Ministry of Higher Education and National Institute of Youth and Sport) were first chosen by convenience, then one or more services from each institution were randomly chosen, and all the members of the selected services were systematically invited to participate to the study, until the expected number of participants was obtained. In the outdoor activity group: 4 districts (Omnisport, Essos, Tropicana and Ekounou) were chosen by convenience among the most popular and endowed with significant external activity (markets, street vendors, manual workers). Then the streets of each district were crossed, and the questionnaire was proposed to all working adults encountered.

### Data collection and management

Data were collected during a face-to-face interview. Seventh year medical students specifically trained for the purpose conducted the interviews. The questionnaire included socio-demographic features (age, gender, place of residence, marital status), lifestyle and habits (occupation, toxics and drugs consumptions, activity profile using the Ricci and Gagnon auto test), personal and family medical history (particularly cardiovascular and metabolic conditions), symptoms enquiry, physical examination, and Epworth sleepiness scale (ESS).

The ESS evaluates the sleepiness risk in 8 different daily situations, relating to usual way of life in recent times, which are :

1. Sitting and reading,
2. Watching television,
3. Sitting inactive in a public place (e.g. a theatre or a meeting),
4. As a passenger in a car for an hour without a break,
5. Lying down to rest in the afternoon when circumstances permit
6. Sitting and talking to someone
7. Sitting quietly after a lunch without alcohol
8. In a car, while stopped for a few minutes in the traffic

Each item is marked from 0 (would never doze or fall asleep) to 3 (high chance of dozing or falling asleep), giving a total score range of 0 to 24. Excessive daytime sleepiness is defined by an ESS > 10 [20]. ESS was administered as an auto-questionnaire, in the presence of the investigator who could explain questions and items to participants, but not suggest answers.

The ESS completeness rate was defined as the proportion of respondents who answered to the 8 items without difficulties. Continuous variables were expressed as mean ± standard deviation, and categorial ones as counts and percentages. Epidata version 3.1 was used to digitize data, and Stata version 12.0 was used for data analysis.

### Ethical statements

The study was approved by the Institutional Ethics Committee for Research on Human Health, at the University of Douala. A written consent was given by each participant before its enrollment.

## RÉSULTATS

### Baseline characteristics of study participants

A total of 400 subjects were enrolled in our study, including 228 men (sex ratio = 1.3). They had a mean age of 34.8 ± 11.2 years. Two-fifths (41.3%) of them were aged 25 to 34 years and the extreme ages were 16 and 86. The place of residence was exclusively urban (69.5%) or peri-urban (30.5%). The occupation was considered as physically inactive (office worker or no occupation) for 62.8% of the sample. Alcohol consumption and known HBP were present in nearly half and a third of them respectively, while almost 40% were obese or overweight. A little proportion of respondents confessed illegal drugs consumption (See Table 1).

**Table 1: Baseline characteristics of subjects enrolled in the study on the Epworth sleepiness scale completeness rate**

| Characteristic | Modality | Values |
|---|---|---|
| Age, years | Mean +/- standard deviation | 34,8 ± 11,1 |
| | Extremes | 16 - 86 |
| Sex, number | men/women | 228/172 |
| Place of residence | Urban | 278 (69.5%) |
| | Peri-urban | 122 (30.5%) |
| Occupation type | Manual worker | 130 (32.5%) |
| | Itinerant worker | 19 (4.7%) |
| | Office worker | 243 (60.8%) |
| | No activity | 8 (2.0%) |
| Activity score (Nina and Gagnon) | Inactive | 18 (4.5%) |
| | Active | 375 (93.7%) |
| | Very active | 7 (1.8%) |
| History of high blood pressure | | 138 (34.5%) |
| Alcohol consumption | | 196 (49.0%) |
| Tobacco consumption | | 21 (5.2%) |
| Coffee consumption | | 142 (35.5%) |
| Illegal drug consumption | | 7 (1.7%) |
| Psychotropic medication | | 21 (5.2%) |
| Weight category (N=310) | Thin | 12 (3.9%) |
| | Normal weight | 178 (57.4%) |
| | Overweight | 80 (25.8%) |
| | Obese | 40 (12.9%) |

### ESS completeness and difficulties

Two hundred and thirty nine out of the 400 participants (59.7%) could not. Thus, the ESS completeness rate [95% confident interval] was 40.3 [35.5 ; 45.1].

Item 8 (In a car, while stopped for a few minutes in the traffic) was the most involved in failure to complete ESS, with 237 (59.2%) persons concerned. The 2 other uncompleted items were 4 (As a passenger in a car for an hour without a break) and 1 (Sitting and reading), with 3 and 1 participants unable to respond respectively (See figure 1).
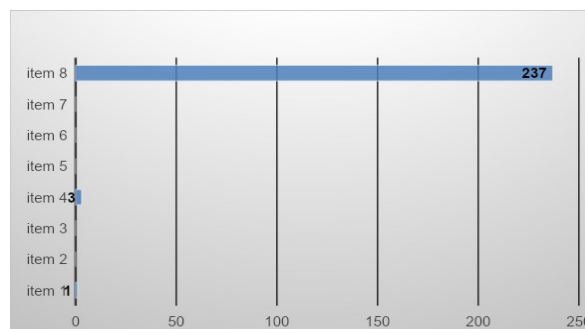


Figure 1 : Number of participants unable to answer properly for each item, in the study on the Epworth sleepiness scale completeness rate

Regarding the number of items, 236 participants (98.7%) out of the 239 who were unable to complete the ESS had a difficulty for a single item, while 2 were concerned by 2 items and the las one by 3 items (see figure 2).
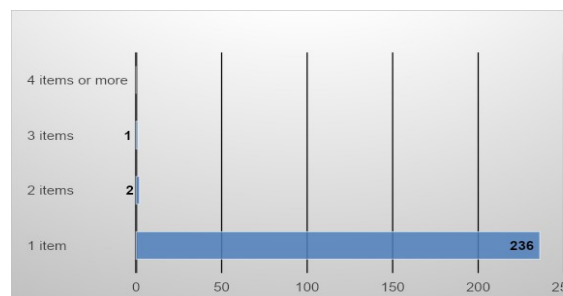


Figure 2 : Number of participants unable to respond properly, with respect to the number of items concerned, in the study on the Epworth sleepiness scale completeness rate,

### DISCUSSION

In this cross-sectional study of the ESS answering difficulties, more than half of participants could not complete the questionnaire. Most of them were limited by a single item, which appeared to be the 8th one (In a car, while stopped for a few minutes in the traffic).

In our knowledge, there are no published data on the ESS completeness rate in sub-Saharan Africa, and this issue is poorly documented even in other regions, especially on young and healthy populations. A study conducted among 104 nondemented older subjects revealed that 60% of them could not answer at least one question on the ESS [21]. Another one found a proportion of 64% in a geriatric Caucasian population with a mean age of 82 ± 8 years [22]. One could assume that the elderly is not the suitable population for a rigorous assessment of the ESS, since cognitive or sensorial defects (known or not) may alter their abilities to respond. However, this highlight the fact that our data were alarming, as our participants were young, healthy and active, and we found comparable results.

In a Brazilian study designed to compare sleepiness scores in 231 adults with different levels of blood pressure, 60 of them (26%) were excluded due to difficulties in the obtained data, including the ESS. This study was the sole we found that addressed difficulties with ESS in adult (no elderly) population. But not reporting or publishing targeted data on this issue does not mean that they don't exist. On the ESS form, respondents are asked to imagine themselves in unknown situations as follows: "Even if you haven't done some of these things recently, try to work out how they would have affected you" [20]. But this may be quite a difficult exercise, increasing risk of wrong answers. It has been shown that ESS scores were significantly different when the questionnaires were filled by the patients themselves rather than their relatives [23] or their caregivers [24].

In this resource-limited setting, having the item 8 overrepresented was not surprising, since few people own a car and/or have ever driven one. Very few people were limited by more than 1 item. In our opinion, the number and proportions of items concerned would be quite greater if the study included rural areas. Items such

as reading, watching television or being a passenger in a car for an hour, are expected to be more impacted in rural areas. This assumption is supported by the following facts : 1) 23% of adults Cameroonian are illiterate and most of illiterate live in rural areas [25], 2) 39% of the population don't have access to electricity in Cameroon, and the situation is worse in rural areas [26], 3) The population/car ratio in Cameroon is as low as 15 cars/1 000 inhabitants [27], and 4) public transportation means in rural areas usually do not allow any sleepiness (cars overloading, bad roads, use of bikes as taxi and bike overloading, etc.).

One strength of our methodology was the absence of intervention from our investigator in the responses' formulation. This permitted the real expression of potential difficulties. Enrolling only in urban and peri-urban population was a limitation, since this was not representative of the whole country which have more than 60% of rural population [28]. However, this was a voluntary strategy intended to reveal ESS limitations in the less unfavored people.

This study confirmed difficulties in completing the ESS, even in a young and literate population. Further research is needed to confirm these difficulties with the ESS completeness, especially in rural populations and in the elderly, as it has been shown elsewhere. Physicians and other caregivers should accompany patients while filling the questionnaire, in order to minimize the potential disruption of the results. However, clinicians would welcome a new EDS screening tool, which would have less limitations related to socio-economic aspects or personal possessions.

## CONCLUSION

Epworth sleepiness scale is not easy to complete, even for a young, healthy and literate Cameroonian population.

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