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Socio-cultural adaptation and standardization of Dubois' five words testing in a population of normal subject in Mali, West Africa

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ABSTRACT

Introduction: Dubois' five words testing (5WT) is a verbal memory test that depends on many parameters. The aim of this study is to adapt Dubois' 5WT to the Malian socio-cultural conditions to (i) determine performances of normal subjects to the 5WT and (ii) provide reference scores of the 5WT.
Methods: A sample of 276 normal subjects aged ≥ 50 years (154 males and 122 females; 144 literates and 132 illiterates) were enrolled from February 2008 to January 2009. Subjects with a history of symptoms likely to modify cognitive functions and those who were found disabled under Lawton's four simplified item test were excluded.
Results: The learning score in illiterates was 1.51 in Dubois' 5WT and 4.90 in the modified 5WT. The mean value of the modified 5WT total score was 9.71. Majority (90.22%) of the subjects scored the maximum (10). The modified 5WT reduced with both the age (p < 0.006) and education level (p < 0.04).
Conclusion: Our results show that Dubois' 5WT is influenced by culture and the socio-educative level in French. Its adaptation to the socio-cultural context could prove useful and efficient in countries with a low literacy rate and a diverse cultural background.

1. Introduction

Dementia constitutes a real public health issue in Europe where and the number of incidences are high after age 65 [8,18]. This is a global concern with approximately 37 million affected individuals [23] because the number of aged people is increasing worldwide. In fact, the remarkable progresses realized in the field of health, economics, and technology contributed to the improvement of life expectancy. According to the World Health Organization [24], the majority of people on the planet live beyond 50 years. Worldwide, the population of individuals beyond 65 years of age increases by 750,000 individuals a month and is expected to reach 800 million by 2025. Two-thirds of these individuals will be from developing countries. In Mali, the population in 2009 was about 12,666,987 [21]. In 2025, the population will be about 24 million, and individuals aged 65 and beyond will be more than 1,000,000.

Alzheimer's disease (AD) is the most frequent etiology of dementia in people aged 65 and beyond, representing two-thirds of all dementia cases [4]. In France its prevalence is estimated at 860,000 with an incidence of 175,000 cases a year [20]. On the contrary studies on AD are rare in Africa. From the few investigations, it is reported that the incidence of AD in Yoruba population of Ibadan in Nigeria is estimated to be 1.4% [16] and in Mali the prevalence of probable AD in rural areas is estimated to be 1.85% [2].

The diagnosis of AD necessitates the availability of adapted and validated neuropsychological tools. In Mali, many neuropsychological tests have been used to assess cognitive decline in people affected by AD; these are the Mini Mental State [14], the Hodkinson's Abbreviated Mental Test [17], the Scales of cognitive complaints (McNair and Khan), Questionnaires of cognitive testing of aged subject (ECAQ), and simplified items of IADL [19]. Some items of these tests were not used because the majority of subjects were illiterates. Specific tools exist to assess amnesic problems of AD: Grober and Bushke test [5,15] and the Bruno Dubois' five words test (5WT). These tests have very good psychometric qualities with a good specificity and sensitivity.

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Bruno Dubois suggests using the 5WT to rapidly assess the verbal episodic memory during AD diagnosis. It is a very useful tool that is easily applicable during a non-specialized visit [12]. It was validated in France in a sample of patients visiting specialized centers of memory, research, and resources (CMRR) [10].

All these tools were conceived based on local culture and in the local language, making them difficult to use in populations with different background. Thus, for a better assessment of memory in a population, there is a need to develop or adapt existing tools to encompass local, social and cultural realities.

In Mali there is no adapted and standardized testing to assess the episodic memory in AD. Thus, the aims of this study were to adapt Dubois' 5WT test to the Malian socio-cultural and educative contexts and determine performances of normal subjects in the 5WT.

2. Material and methods

The study was approved by the Ethical Committee of the Faculty of Medicine and Dentistry of Bamako. The study included randomly selected subjects from urban families who were 50 years and older. All subjects with cognitive, visual or hearing impairment, and disabled for Lawton's four simplified items of disabilities of life [19], and all subjects on treatments susceptible to modify cognitive functions were excluded. We also did not include subjects with a history of neurological or psychiatric disorders or head injury. The subjects were classified in two groups:

Literates: subjects who attended conventional school up to bacca-laureate and can read and write in French.

Illiterates: subjects who did not attend conventional school and cannot read or write in French.

2.1. Sampling

The technique of sampling was based on the random method. Subjects were enrolled during home visits (door to door) in the geographical area of the 4th district. The starting point was the road along the river; we entered in each adjacent street to enroll all the seventh homes located on the right side of the street. Thus, during sampling, we visited homes with no eligible subject and others with more than one eligible subject. However, the majority of subjects who were not present during our first round were interviewed in their homes after an appointment was made.

2.2. Interviews

Data were collected by four interviewers, each having two years of post-baccalaureate education and completed training on how to administer the tests. In addition, interviewers were supervised by a final year medical student. Interviewers met with subjects and questioned them using both tests (Dubois' 5WT and the modified 5WT). Before proceeding with questioning, informed consent was obtained from the participant and sometimes his/her guarantor, and the investigators explained items with the highest level of respect. Data were then collected from each individual.

2.3. Population

We enrolled 276 normal subjects of age 50 and beyond (154 males and 122 females; 144 literates and 132 illiterates) between February 2008 and January 2009. Information gathered during interviews and their clinical interpretations were confidential and used only for the purpose of this study.

2.4. Material

Two tests were used: Dubois' 5WT and the modified 5WT. Each test comprises of a list of five words. Each word belongs to a different semantic category and is not prototypical of its category.

The list of Dubois' 5WT consists of: museum, lemonade, grasshopper, strainer and truck, which referred to the following semantic categories: building, drink, insect, kitchenware and transportation.

The list of modified 5WT was elaborated by experts at the National Directorate of Functional Literacy and Applied Linguistics. The choice of words was based on words suggested by volunteers. Therefore, of all suggested words, the most frequent and rare were dropped. Hence, a list containing five words in Bambara (the national and most spoken language in Mali and spoken in seven West African countries) were considered: Tominji, Mangalani, Nintin, Bulonba and Wotoro with following semantic categories: Minfen, Bagan, Gadominen, So, and Bolifen. The morphemes of these words are:

Tominji: tamarind juice Tomin: tamarind ji: drink.
Mangalani: doe Mangala: deer Ni: diminutive.
Bulonba: big entrance hall Bulon: entrance hall (vestibule) Ba: enhancement.
Nintin: strainer.
Wotoro: cart.

The linguistic characteristics of words (number of letters, phonemes and syllables) are comparables. Thus, the average number of letters of Dubois' 5WT is 7.4 and 8 for Croisile [7] and the modified 5WT. The average number of phonemes is 5.6 in Dubois' 5WT and Croisile et al., and 5.8 in the modified 5WT. The average number of syllables of Dubois' words is 2.8, and 3 for Croisile et al. and the modified 5WT.

2.5. The procedure of the 5WT

The procedure of the 5WT [12] is done by submitting a list of five words written on a sheet belonging to each semantic category. Interviewers ask: "Please read this list of five words loudly and try to memorize them because I will ask you to repeat them shortly". After reading, interviewers ask: "By looking at the sheet, can you re-read the word corresponding to each semantic category?"

Interviewers turn the sheet over and ask: "Can you tell me the five words?" For the words not remembered interviewers ask: "What was the name of (by giving the corresponding hint, for example: drink if the patient did not remember the word lemonade)? If the score of immediate recall is 5, interviewers can plan the test of delayed recall 3 min later. If the score is less than 5, the interviewer goes through the list and point to the words not remembered by reminding the word with its hint. Interviewers then ask them again to recall each word in response to its hint. The interviewers ensured that the patient has recorded all the words before assessing their ability to memorize. For 2 to 5 min the patient is distracted with an interfering test. We have chosen the story of the Lion of Barbizet [1]. The interviewer then asks: "Can you give me back the five words?" For not recalled words, the corresponding hint is provided. Correct responses are direct and cued responses. This cued learning is very important since patients with AD suffer from a major deficit of the delayed recall and are poorly helped with the hints of recuperation [11,13,22].

The procedure of 5WT allows obtaining four basic scores and one total score. The four basic scores are as follows: the free immediate recall (RImL, on 5), the cued immediate recall (RImInd), the free delayed recall (RDL, on 5), and the cued delayed recall (RDInd). The sum of these four basic scores (total maximum of 10) will give the total score (TS).

We calculated other scores including the total of immediate recalls (TRIm or training score), the total of delayed recalls (TRD) or memory score (RDL + RDInd), and the balanced total score (BTS) [6]. It increases the weight of free responses: $2\times$. Free Immediate Recall + Cued