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Preliminary Results of Dementia Prevalence among Elderly People at Home by Cognitive Disorder Adapted Test of Niamey (Niger)

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Abstract

Introduction: Neurocognitive disorders are frequent with aging and are often seen at advancing stages in our context. It is really difficult to evaluate rapidly Nigerien elderly persons according to tools available on cognitive status while there is a great number of uneducated elderly people who suffer from cognitive deficiency. The purpose was to determine neurocognitive disorders prevalence in uneducated groups and Muslim elderly people by using the cognitive disorder examination (Codex) test adopted in the population living at home in Niamey (Niger). **Materials and Methods:** These are the results of a preliminary prospective study with simple three (3) random sampling concerning elderly people aged 60 and over living at home in whom the codex test adapted to Niamey was administered in uneducated Muslim elderly people for a total duration of four (4) minutes. This screen-adapted test should be completed by the mini-mental test of Senegal which is adapted globally to uneducated people in hospitals. The basic Codex test was developed in France for educated people, so we used this basic test in our educated people in the same study. **Results:** A total of 198 patients had been collected, of which 51.5% were female with an average age of 68 years with extremes of 60 to 84 years. 40 were educated. Among educated persons, 62.5% had a very low probability of dementia and 5% had a very high probability of dementia in the first step of the Codex. In the second step, 12.5% had a low probability of dementia and 20% had a high probability in the same group, while 51.3% had a very low probability of dementia and 21.3% had a very high probability of dementia in the first step of CODEX in uneducated elderly. In the second step in the same group, 12.6% had a low probability and 14.5% had a high proba-

bility of dementia. **Conclusion:** The adapted codex test of Niamey is simple and could be rapidly used to screen dementia among uneducated elderly Muslim prayers, and then could confirm it by complementary cognitive status test validated in the same population. However, it should be confirmed by using a large sample.

Keywords

Dementia, Elderly, Adapted Codex of Niamey, Prevalence, Niger

1. Introduction

Dementia or major neurocognitive disorders according to Manual Diagnosis and Statistic 5, is a common condition in geriatrics but very often diagnosed at a late stage. Few studies have been done in Africa to determine the prevalence of dementia with a frequency ranging from 2.29% to 10.4% [1] [2] [3] [4] [5]. The prevalence increases with age as reported by Coumé *et al.* in Dakar which was 10.8% [6]. The neurocognitive disorders evaluation depends strongly on socio-cultural context. So, many tools used to evaluate cognitive status are not really adapted to our socio-cultural context. So, it's necessary to adapt some cognitive evaluated tools to our context because the majority of our elderly population was not educated. In Niger, the population aged 60 and over was estimated at 4.4% at the last general population and housing register in 2012. This older population is majority uneducated and Muslim in 99%. Their practical characteristic is the realisation of the five obligatory ritual prayers per day. This ritual has a number of days, common times and the same actions called rakat for all Muslims prayers. The objective of our study was to report the prevalence of dementia in the elderly living at home by using a simple and quick tool adapted to our socio-cultural context in order to improve care.

2. Patient and Methods

This is a prospective, descriptive cross-sectional study carried out in the urban community of Niamey from February 2021 to December 2021. Inclusion criteria: subjects of both sexes, aged 60 and over, according to the consensus of the meeting of the Policy Framework and Plan of Action on Aging of the African Union, held in Nairobi from 3 on December 6, 2001 which defines an elderly person as being person aged 60 and over, living in the neighborhoods concerned by our study and present at the time of our visit.

Non-inclusion criteria: Person with documented cognitive disorders preexisting, language disorder, motor deficit or a visual disorder and those who refused to collaborate. For sampling and method, we used the multistage probabilistic method with a technique of simple random sampling at three (3) stages: First degree: the choice of municipalities: Two municipalities are drawn at random from the 5 municipalities of Niamey: Niamey municipality III and municipality V. Second

degree: the choice of neighborhoods. This was done by random draw in each municipality. Thus, the neighborhoods per municipality drawn were:

Commune III: Recasement, Yantalla; Commune V: Bangabana, Lamordé. Third degree: the choice of households to be surveyed. Once in the district we choose the center of the district and throw a pen in the air to choose the direction to take then we walk in this direction taking each household until we obtain the necessary number. The process of the survey was: Once the household has been identified, we proceed to the choice of statistical units. The selection of the person included in the study was made randomly in the households.

A single person is drawn at random from the household and each person has an equal chance to be eligible. The sample size was estimated at 384 and the variables studied were: in the preliminary results, the sample was 198 persons and the variables evaluated were: Sociodemographic aspects (age, gender, ethnicity, marital status, occupation, religious practice, educated or not, toxic habit and comorbidities evaluated by the cumulating illness rate scale 56 (CIRS56). The geriatric syndromes evaluated were: Nutrition status using weight and height to determine the body mass index (BMI) definite denutrition if the BMI is less than 18.5 kg/m^2.

Depression had been assessed by the Mini Global Depression Scale (GDS) score validating probable depression when a point is available. The loss of functional independence or autonomy was assessed by using the Katz-Lawton scales of Activity of Daily Living (ADL) with 6 items and the mini-Instrumental of Daily Living Activity (IAD) L with 4 items. The risk of falling was assessed by the five-second unipodal support test. Cognitive status was assessed in educated person by using the cognitive disorder examination test (Codex) which appreciates the low or high probability of developing dementia (**Figure A1**, see **Appendix**). For the collection tools, we used a survey sheet with the socio-demographic characteristics in which we found the scores used (see **Appendix**). Weight and height were expressed respectively in Kg and meter. When the measurement of weight and height was impossible, we used the formulas of *Lorentz* and *Chumlea.*

The majority of our study population was of practicing the Muslim religion and 158 (60%) had uneducated but all of them (100%) practice Muslim religion. We therefore proposed a test adapted to the Codex in order to determine dementia. The classical codex is practiced in two stages (**Figure 1**). The first step which assesses episodic memory and temporal orientation with two (2) items namely the reminder of 3 words and the clock test [7]. The subject was asked to repeat and remember three (3) words, then he drew a clock, put all the numbers in order, and positioned the large and small hands according to a given time (example 2:25 p.m.). After that, the person should remember the 3 words. If word reminder is normal and the clock test performed well, there is a low probability of dementia; when the two tests are abnormal there is a high probability of dementia and when one of two tests is abnormal it would be necessary to go to the second step of the Codex which evaluates the spatial orientation by asking

the question for example 5 questions (name of local area, the floor of building, the district, the municipality and the region where the person is coming from). A response of 4 out of 5 indicates a low probability of dementia but when normal responses are less than 4 there is a high probability of dementia. This test has a sensitivity of 85% and a specificity of 92% [8].

The codex-adapted test used among uneducated elderly Muslim religion practice population consists of replacing the item of the clock to the first step with the five (5) prayers of Islam.

Will ask the person: the name of the 5 five prayers in order, give the approximate times of their practices, the number of rakaat that each prayer contains and the theoretical or practical description of each rakaat.

A rakaat is roughly composed of one (1) standing position, one (1) genuflexion, standing position, and two (2) prostrations (see image in **Appendix**).

NB. There are 5 obligatory prayers in Islam with approximate times to practice them.

1) Early morning prayer (Fajr). Hours: between 5 and 6 am; Contains (2 rakaat).

2) 12:00 pm prayer (Zouhr). Hours: between 1:00 p.m. and 2:00 p.m.; contains (4 rakaat).

3) Prayer of Asr. Hours: between 3 and 4 p.m.; contains (4 rakaats).

4) Sunset prayer (Maghreb). Schedule sunset time; composition (3 rakaats).

5) Night Prayer (Ichaa). Timing: 1 hour or over after sunset prayer; composition (4 rakaats).

The item concerning the five prayers is normal when the person answers to: the name of the 5 prayers in order, the approximate times of the ritual, the number of rakaats per prayer and a description of a rakaats with a total score of 4 (See diagnostic diagram in **Appendix**).

Ethics and deontology: we had the authorization of a Faculty of Health Medical Science (University Abdou Moumouni) and authorization of the responsible of the Niamey region. The elderly person accepted to participate in the study with respect to confidentiality (See **Appendix**).

3. Results

A total of 198 elderly people were collected, the average age was 68 years and 158 (60%) had uneducated. The average age was 68 years with extremes of 60 - 84 years (**Table 1**).

The predominance of young elderly, major women housewives married and uneducated. 12% of elderly drink alcohol

3.1. Probability of Dementia in Educated Elderly (n = 40)

The elderly uneducated person had 5% very high probability of dementia but educated elderly person had very low probability of dementia in 62.5% at the first step with codex test. At the second step, the high probability of dementia was estimate at 20% (**Figure 2**).

Table 1. Sociodemographic aspect of elderly patients living at home.

Socio demographics aspects		N = number	Percentage (%)
Group of age:	65 - 74 years	130	65%
	75 - 84 years	55	27%
	≥85 years	16	8%
Sex:	Women	102	51.5%
	Men	96	48.4%
Education:	Uneducated	158	79.8%
	Educated	40	20.2%
Marital status:	Married	119	60%
	Single	79	40%
Confession religious:			
	Muslims	196	99%
	Christian	2	1%
Profession:	Housewife	78	39%
	farmer/breeder/retire/ official/trader/teacher	48/4/26/10/10/2	24.2/2/13/5/5/1
Toxic habit:	Tobacco: Yes/No	5/193	3/97%
	Alcohol: Yes/No	24/174	12/88%

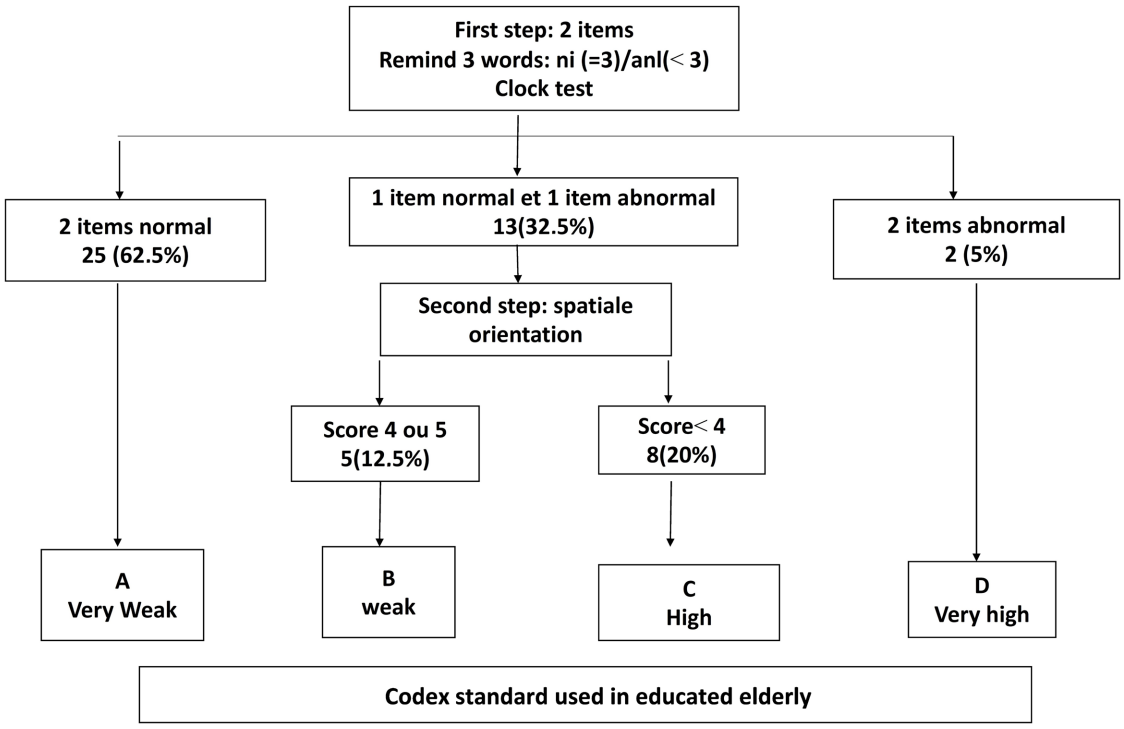

Figure 1. Codex standard used in educated elderly.

3.2. Probability of Dementia among Uneducated Muslim Practicians Elderly (n = 158)

The uneducated Muslim prayers elderly had a very high probability of dementia

in 21.3%, then this probability was high in 14.5%, low and very low in respectively in 12.6% and 51.3% of Codex adapted test of Niamey (Figure 3).

Algorythm of orientation with Niamey codex adapted test among uneducated elderly Muslim prayer. If the probability is high or very high, the test could be continue be the mini mental test of Senegal [5] (Figure 3).

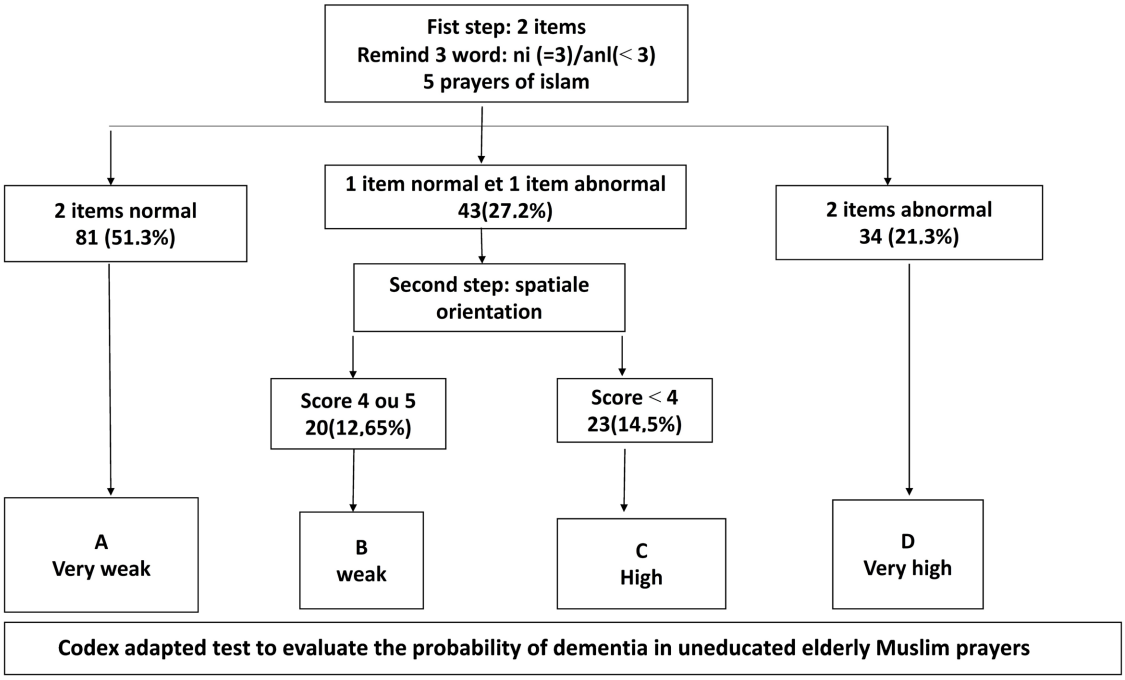

Figure 2. Codex adapted test to evaluate the probability of dementia in uneducated elderly Muslim prayers.

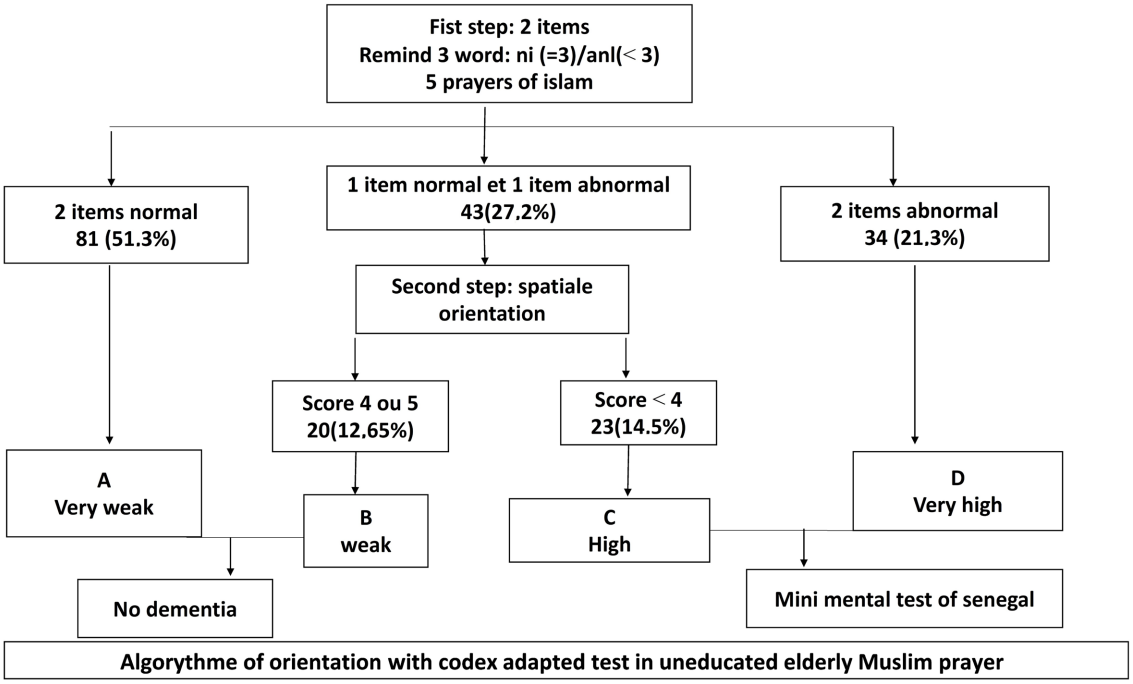

Figure 3. Algorythme of orientation with codex adapted test in uneducated elderly Muslim prayer.

4. Discussions and Comment

In our study, the average age was 68 years with extremes of 60 - 84 years. This average age varied from 72 to 73.7 years in the studies carried out by Andia and al in Niamey reported in extra-hospital environments [9] [10]. Berthé A *et al.* found the same mean age as our study in Burkina Faso [11] while Coumé *et al.* found a mean age of 67.2 years and Diagne *et al.* found 70 years both in Senegal [6] [12].

The female sex was predominant (51.5%) with a marital status married (60.1%) in our study. The feminization of age and marital status of married was also found in Andia *et al.* in Niger [8] [9]. Several studies in Dakar reported a predominance of marital status variables from 66 to 79%. Indeed, life expectancy is globally favored in females with age, also the socio-cultural context could explain the frequency of married status in West Africa. The cumulative comorbidity rating scale score between 0 - 5 was 84.3% with high blood pressure predominant. More than half of the people in our study were uneducated and this trend is general in West Africa and has been reported by several authors [8] [9] [13].

The frequent geriatrics syndrome found were: Loss of autonomy (78.2%); probable depression (65.6%), risk of falling (20.2%) and 13.1% of denutrition. In educated elderly 62.5% had a low probability of dementia and 5% had a high probability of dementia at the first step of the CODEX.

It appeared to realize a test adapted to the uneducated population of this study who had Muslin religious globally and practice prayers.

Coumé M *et al.* found a 10.8% of prevalence of neurocognitive disorder in the elderly Senegalese population with the mini mental test of Senegal tool developed in the context of west African reality [8].

We found a very high prevalence and high probability of dementia 21.3% and 14.5% respectively at the first step and the second step of Niamey adapted codex in the same study. In uneducated elderly it was 5% and 20% respectively at the first and second steps of the standard codex. To our knowledge, a single study carried out in Niger by Andia *et al.* in a hospital setting reported a prevalence of 8.7% using Folsein's mini mental status examination as a psychometric test in a population with a median age of 76 years [14]. Coumé *et al.* found a prevalence of neurocognitive disorders of 10.8% in a population of retires elderly with an average age of 67.2 years by using the Senegal mini mental test which was adapted to the Senegalese population [6].

Several authors in Europe and the USA found a prevalence varying from 9% to 10% using different cognitively evaluated tests [13] [15] [16]. The results of adapted codex tests in Muslim prayers uneducated elderly should be continued with the mini mental test of Senegalese for the adapted codex which was used in their population that is similar to Niamey population in west Africa characterized by Islam religion and prevalence of educated elderly people. In any case, other studies with a more representative sample would be done to validate the

codex adapted to our Nigerien country.

The limit of the research is about the sample, better sampling, the availability of patients and the aptitude to correctly perform the religious rituals. The adapted test should be discussed and improved in a large committee.

5. Conclusion

The adapted and validated codex of Niamey could be the tool used to screen major neurocognitive disorders or frequent symptoms allowed to suspect clinical dementia in uneducated elderly Muslim prayers living at home. However, this adapted test should be validated in the same educated population. In perspective, the codex adapted test could be recommended for uneducated Muslim prayers to screen neurocognitive disorders probably for the advanced stage, so the other Muslim ritual practices like making ablutions could all screen early neurocognitive disorders in this population in perspectives.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

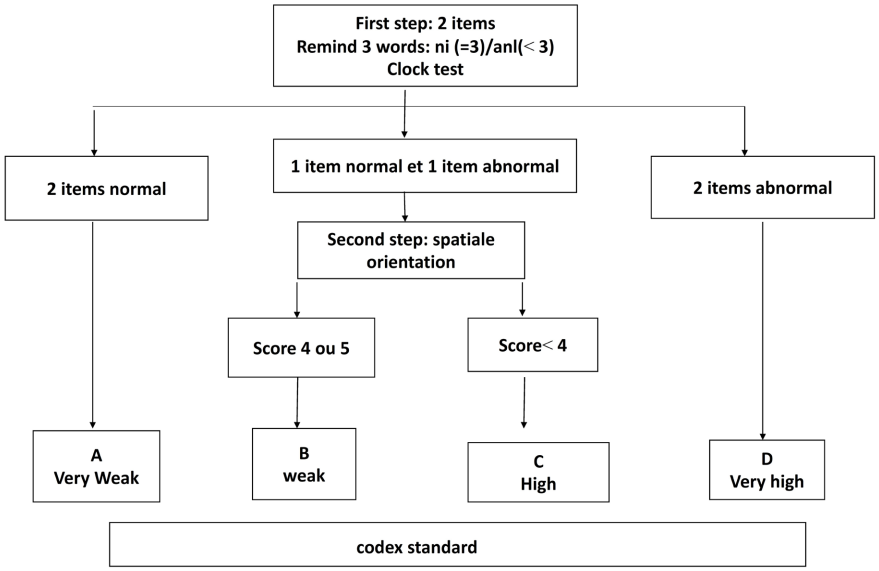

Figure A1. Algorithme dementia probability in elderly person by Codex test. The codex test used two steps. The first used temporal orientation with memory by three words and clock test. The step two use spatial orientation. When the patient answer correctly the 3 words remember and the clock test, there is a very weak probability of dementia (A) but if the two test of the first step is wrong, there is a very high probability of dementia (D). The second step concern patient who not response to one of items. The result after spatial orientation question done weak (B) or high (C) probability of dementia.