



Research Article:

Cognitive Function Among Rural People in Nineveh: A Cross-Sectional Survey

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Abstract

Background: Early identification of cognitive weakening in previously undetected cases could help deal by starting programs for rehabilitation. **Aim:** The aim of this survey was to evaluate the prevalence and degree of cognitive impairment among adults of rural area in Nineveh, Iraq. **Method:** A Cross-sectional study with convenient sampling technique was conducted to enroll subjects from a rural area in Nineveh. Cognitive function was examined in all the patients by the Saint Louis University Mental Status (SLUMS) is a screening tool for the cognitive state. A total of 213 agreed to participate in the survey with a mean age of 52.1 ± 11.8 years and higher percentage of participants were with primary level of education 125 (58.7%). **Results:** The mean score for the cognitive function examination was 18.85 ± 4.55 with significant differences were found between cognitive function and educational level, employment, and monthly income. Cognitive score was negatively correlated with age of participants ($r = -0.128$, p value = 0.031). Although it was not significantly associated with level of education but around 43% of the study population suffered from mild cognitive impairment to dementia. **Conclusion:** The study concludes that there have been strong calls for program from the Ministry of Health to improve dementia care and support for societies with dementia and their occupations that will stay a life of that means and dignity. Efforts to make societies greater cognitively functioned, as well as, actively attractive patients will improve cost, the sustainable, treatment and care methods for diseases and quality of life.

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1. Introduction

Cognitive impairment (CI) which is the incapability to remember, reduces the ability to learn new things, inadequacy to concentrate or make decisions that affect daily life and increases the burden on society due to functional disability (1). Education and memory, administrative feature, interest, perception, and societal cognition are all examples of cognitive abilities. Mild cognitive impairment can exist without meeting the whole criteria for dementia, in which the deficiencies interfere with daily activities. Patients with chronic diseases are more

likely to have cognitive difficulties (2). Cognitive impairment leads to the inability to comply with instructions for the correct use of medications, proper diet, and exercise, which leads to irregular blood sugar, including the risk of hypoglycemia (3).

Early identification of cognitive weakening in previously undetected cases could help deal by starting programs for rehabilitation. Detecting anxiety and depression as early as possible will encourage early needed treatment and may aid in controlling diabetes and preventing future complications (4).

In the US, according to information from a massive Veteran's registry, dementia and cognitive impairment prevalence were 24.2% among those aged seventy-five years and older (5). Although the exact mechanism underlying the decline in cognitive function is unclear. Numerous studies also suggest that metabolic abnormality, insulin resistance and amyloidosis, concomitant hypertension, depression, and psychological and physical factor associated with aging may play a role in the development of CI (6-8).

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Globally, the cognitive impairment incidence is increasing in developing countries. Studies conducted in various parts of world showed that, by 2050 there be approximately 2 billion which is about 22% of individuals older than 60 years (9). Diagnosis of dementia can be prematurely expected within 7 years before. There is about 63-80% of mild cognitive impairment will get development of dementia (10).

This study was carried out with the aim of determining the pattern of cognitive function, and its related factors among rural population in Mosul city.

2. Study design and setting

Cross-sectional study with convenient sampling technique was conducted to enroll subjects from a rural area in Mosul city / Nineveh governorate / Iraq during a social event conducted by the university of Mosul. All the adult visitors were invited to participate; however, no sample size calculation was conducted because this was a fast survey with short time frame of only one week. Daily for 6 days duration, all adult visitors to the venue of the event were invited to participate. Face to face interview was used to obtain participant's consent, as well as demographic information and extract the need information using validate questionnaire.

All subjects who attended the venue of the university event were invited and those who agreed to participate were included. The study included participants of both genders. Patients on sleeping pills, patients with psychiatric disorders, and pregnant women were excluded.

A validated questionnaire (Arabic version) was used for data collection in this study. It consists of two parts to collect demographic information and assess cognitive function. The sociodemographic information: which includes information about age, sex, marital state, education level, monthly income, smoking, and alcohol intake, and information about past medical history, presence of another comorbid disease, duration, and treatment used for it.

Cognitive function was examined in all the patients by the Saint Louis University Mental Status (SLUMS) is a screening tool for the cognitive state. It consists of 11 items with a total score of 30 points. Seven domains are emerging from the 11 items, including attention, recall, orientation, fluency, calculation, visuospatial construction, and language (11). Arabic version of SLUMS was used in this survey (12). SLUMS can be considered a convenient tool for the study because the availability of the tool in many languages and non-time consuming.

2.1. Statistical analysis

The data were analyzed using SPSS version 23. For continuous variables, the mean, median, and standard deviation were calculated and for categorical variables, the percentages and frequencies were used. A p-value < 0.05 was considered as significant. Mann-Whitney test, Kruskal Wallis test and Chi-square test were used accordingly.

2.2. Demographic characteristics of the study population

A total of 213 subjects who visited the university event venue and agreed to participate in the survey were included in the final analysis after excluding those who could not fill out the questionnaire. All participants

consented to participate in the study, and we obtained an answer rate of 100% for all questions. The socio-demographic characteristics of participants are briefed in **Table 1**. The mean age was 52.1 ± 11.8 years and the range was between 18 – 82 years with a median age of 52 years. Males' percentage of 52.1% was around equal to that of females 47.9% and around all of the participants were married 210 (98.6%). Higher percentage of participants were with primary level of education 125 (58.7%) followed by those with secondary level of education 56 (26.3%). Only 48 (22.5%) of participants were officially employed and 112 (52.6%) having moderate monthly income of 500,000 – 1000,000 IQD. About one-fourth of the participants had chronic diseases like hypertension and diabetes 54 (25.4%).

Table 1. Demographic characteristics (N= 213)

Variables	Frequency	Percent%
Gender		
Male	111	52.1
Female	102	47.9
Marital status		
Single	3	1.4
Married	210	98.6
Educational level		
Primary	130	61.0
Secondary	56	26.3
University and higher	27	12.7
Employment		
Not employed	165	77.5
Employed	48	22.5
Monthly income		
less than 500000 IQD	94	44.1
500000-1000000 IQD	112	52.6
more than 1000000 IQD	7	3.3
Chronic disease (total)	54	25.4
Hypertension	49	23.0
Diabetes	13	6.1

2.3. Cognitive patterns among study population

The cognitive function was evaluated using the SLUMS scale which consists of 11 questions and a score range between 0-30. The mean score for the cognitive function examination was 18.85 ± 4.55 with a median value of 19. Differences in SLUMS scores among the socio-demographic groups of the subjects was examined and shown in **Table 2**. Significant differences were found between cognitive function and educational level, employment, and monthly income. Cognitive score was negatively correlated with age of participants ($r = -0.128$, p value = 0.031).

Further analysis was performed for description of the level cognitive function according to the scale recommendation of categorization as shown in **Table 3**. Although it was not significantly associated with level of education but around 43% of the study population suffered from mild cognitive impairment to dementia.

Table 2. The differences between demographic characteristics and cognitive function

Variables	Mean	SD	Median	P-value
Gender*				
Male	21.10	4.192	22.00	0.358
Female	20.28	3.419	20.00	
Marital status*				
Single	22.00	-----	22.00	0.756
Married	20.77	3.932	21.00	
Educational level**				
Primary	17.62	4.519	18.00	0.03
Secondary	20.20	3.979	20.00	
University and higher	22.00	3.530	22.00	
Employment*				
Not employed	18.52	4.619	19.00	0.047
Employed	20.00	4.162	20.00	
Monthly income**				
less than 500000 IQD	17.47	4.669	18.00	0.01
500000-1000000 IQD	19.75	4.158	20.00	
more than 1000000 IQD	23.14	2.854	23.00	
Chronic disease*				
Yes	19.35	4.869	20.00	0.354
No	18.69	4.444	19.00	

*Mann-Whitney U test, **Kruskal-Wallis test

Table 3. Cognitive levels among study population

Variables	Primary (n=130)	Secondary and higher (n=83)	Total (n=213)	P value
Normal	81 (62.3%)	40 (48.2%)	121 (56.8%)	0.096*
Mild	42 (32.3%)	39 (47.0%)	81 (38.0%)	
Dementia	7 (5.4%)	4 (4.8%)	11 (5.2%)	

*Chi-square test

3. Discussion

This study was conducted to explore the frequency of cognitive impairment among rural population and to explain the associated factors. The implementation of any intervention for the upgrading of the quality of life and their ability to understand their responsibility especially in taking medications properly need a baseline assessment of population cognitive function. The lack of documented surveys in Iraq for the prevalence of cognitive impairment provide a significance importance of this survey. Mild to severe cognitive impairment was found in this study. A study conducted in Portugal in 2010, also reported a higher prevalence of cognitive impairment among rural population especially among older age (4). A study found that there is 47% and 39% increased risk of dementia and Alzheimer's dementia among elderly patients respectively and this association was independent of the cardiovascular comorbidities (13). Rural population might have some shortage of education and governmental care due to the distance from large cities or shortage of resources.

The prevalence of cognitive impairment in the population study was found (43.2%). Other studies found a different prevalence of cognitive impairment which may be due to

different factors like the educational level of the study population and other Socio-demographic characteristics,

and different screening tools and cut-off points. In Saudi 80%, Pakistan 24.4% (14), China 28% (15), and some other studies 31.5% (16), 21.8% (17). No significant difference in cognitive scores between both genders was found which in accordance with others work (18). Demographic characteristics rather than gender are affecting the level of cognitive function despite gender aspect. Countries of the third nations might usually suffered from this problem and more care are needed from the social and governmental authorities to fixed the problem.

Significant correlation was found with age and a significant difference in cognitive score was found with educational level, employment, and monthly income. This finding with regard to age was comparable with others work (19,20). This finding could be considered logical as aging is a major factor for determining cognitive function. In this study gender could not be a factor for affecting cognitive function, however, it is not consistent with previous papers (21) which found a higher score of cognitive function among men and

others who found that cognitive impairment was more prevalent among female (22). In the area of data collection, which can be considered as low quality in term of civilian life style in which there is more than seven schools (primary and secondary) that enhance the chances for both genders to educate.

The level of education, employment and monthly income were the factors that found to affect level of cognitive function in this study. Those three factors seem to be intercorrelated as higher level of education are usually associated with higher monthly income and employment in which assurance of high quality of education will insure good employment chances and higher monthly income. The significant association with educational level was consistent with another study (1). Other studies found that educational level is more profound than the effect of age on cognitive function (23). Although another study found that age has a more pronounced effect on cognitive function (24).

4. Limitations

Limitations of this survey could relate to the design as it is a cross sectional study with convenient sampling methods restricted the generalization of the result. Lack of control group to compare with it. Also, like the study to measure the prevalence of sleep disorder, cognitive impairment, anxiety and depression in general population to compare with it.

5. Conclusion

The impact of cognitive function and dementia on human is very important to be considered among all population especially those out of modern cities. It is highly affecting the quality of life and in term of medicine, it affects the management of diseases. Level of education as well as employment with consequent monthly income are among the factors found to affect the cognitive function. There have been strong calls for program from the Ministry of Health to improve dementia care and support for societies with dementia and their occupations that will stay a life of that means and dignity. Efforts to make societies greater cognitively functioned, as well as, actively attractive patients will improve cost, the sustainable, treatment and care methods for diseases and quality of life.

6. Recommendations

According to the result of this study which demonstrated a high prevalence cognitive impairment; considering a strategy for screening, discussing these problems with subjects to improve compliance and reduce the risks associated with treatment. Future studies are recommended with larger sample size and randomized sampling method to ensure more representative information.

7. Acknowledgments

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8. Conflict Of Interest

There is no conflict of interest.

9. References

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الوظيفة المعرفية لدى سكان ريف نينوى: دراسة مقطعية

الخلاصة

المقدمة: يمكن أن يساعد التحديد المبكر للضعف المعرفي في الحالات التي لم يتم اكتشافها سابقاً في التعامل من خلال بدء برامج إعادة التأهيل. **الهدف:** الهدف من هذا المسح هو تقييم مدى انتشار ودرجة الضعف الإدراكي بين البالغين في المناطق الريفية في محافظة نينوى. **طريقة العمل:** تم إجراء دراسة مقطعية باستخدام أسلوب أخذ العينات المريح لتسجيل الأشخاص من منطقة ريفية في مدينة الموصل. تم فحص الوظيفة الإدراكية في جميع المرضى من قبل الحالة العقلية بجامعة سانت لوييس (SLUMS) وهي أداة فحص للحالة المعرفية. **النتائج:** وافق 213 شخصاً على المشاركة في الاستطلاع بمتوسط عمر 52.1 ± 11.8 عاماً وكانت النسبة المئوية الأعلى للمشاركين في المستوى التعليمي الابتدائي 125 (58.7%). كان متوسط درجات اختبار الوظيفة المعرفية 18.85 ± 4.55 مع وجود فروق ذات دلالة إحصائية بين الوظيفة المعرفية والمستوى التعليمي والتوظيف والدخل الشهري. ارتبطت النتيجة المعرفية سلباً بعمر المشاركين ($r = -0.128$)، قيمة $p = 0.031$). على الرغم من أنه لم يكن مرتبطاً بشكل كبير بمستوى التعليم، إلا أن حوالي 43% من مجتمع الدراسة عانوا من ضعف إدراكي خفيف إلى الخرف. **الاستنتاج:** وخلصت الدراسة إلى أنه كانت هناك دعوات قوية لبرنامج من وزارة الصحة لتحسين رعاية الخرف ودعم المجتمعات المصابة بالخرف ومنهم التي ستبقى حياة بهذه الوسيلة والكرامة. إن الجهود المبذولة لجعل المجتمعات تعمل معرفياً بشكل أكبر، بالإضافة إلى المرضى الجذابين بنشاط، ستعمل على تحسين التكلفة، والطرق المستدامة، والعلاج والرعاية للأمراض ونوعية الحياة.

الكلمات المفتاحية: الوظيفة المعرفية، سكان الريف، الأحياء الفقيرة.