



RESEARCH ARTICLE

NEUROLOGICAL DISEASES AMONG GERIATRIC POPULATION OF ARAR CITY, KINGDOM OF SAUDI ARABIA: A CROSS SECTIONAL STUDY

Nagah Mohamed Abo El-Fetoh¹, Mohammed Faried Mourad², Afaf Meshal AL-Mjlad³, Reem Salme Alenzi³, Sara A Alsaddique², Nawaf Abdullah Almohaisen², Faiz Faisal Alanazi² and Yasser Hamoud Alanazi³ and Abdalla Mohamed Bakr Ali⁴

1. Associate Prof. of Public Health and Community Medicine, Faculty of Medicine, Northern Border University, KSA.
2. Intern, Faculty of Medicine, Alfaisal University, Riyadh, KSA.
3. Final year student, Faculty of Medicine, Northern Border University, KSA.
4. Medical Student, Sohag University, Egypt.

Manuscript Info

Manuscript History

Received: 22 November 2016

Final Accepted: 23 December 2016

Published: January 2017

Key words:-

Neurological diseases; determinants; prevalence; elderly population; depression; Alzheimer's disease; obsessive compulsive disorder (OCD).

Abstract

Background: The aging population presents a challenge for the public healthcare system. There is a need to more health and social support to that vulnerable group. Neurological diseases represent an important public health problem. Local level data concerning neurological diseases among elderly are essential for providing the needed health services. **Study objective:** To study some of the demographic characteristics of the elderly population and to estimate the prevalence of neurological diseases, its types and possible determinants among the elderly population of Arar city, Kingdom of Saudi Arabia. **Methodology:** The present cross sectional community based study was conducted in Arar city, the capital of Northern Borders Governorate of KSA, on 138 elderly people. Systematic random sampling technique was followed. Data was collected through personal interviews with the sampled elderly and filling the questionnaire, which guided us to the data of socio-demographic characteristics and neurological diseases, its types and its determinants. **Results:** The overall prevalence rate of neurological diseases observed in this study was 20.9%; the prevalence of stroke was 4.3%, parkinsonism was 3.6%, facial palsy 4.3%, headache syndrome was 6.5% and 2.1% previous nervous system surgery. Stroke is associated with depression. Headache and parkinsonism were more common in females but stroke was more in males.

Conclusion and recommendations: In light of the results of the present study; neurological diseases were prevalent among elderly population in Arar city, Kingdom of Saudi Arabia. Commitment from decision makers is the first step to decrease the burden caused by neurological disorders and its sequel on that vulnerable group. Health education campaigns and initiatives are needed to increase societal and professional awareness of public health aspects of neurological disorders. Strengthening the preventive, curative and rehabilitation care within the existing health systems. Defining the priorities for research, is one of the important ways for dealing with neurological disorders among geriatric population.

Copy Right, IJAR, 2016., All rights reserved.

Introduction:

Arab countries, including Saudi Arabia (KSA) are passing through a phase of epidemiological transition with increasing burden of non-communicable diseases (NCD) consequent to transformation of scenario with improvement of health care services in preventive and promotive domains. Among the NCDs, neurological disorders form a significant proportion of global burden of disease [1].

A neurological disorder is any disorder of the nervous system. Structural, biochemical or electrical abnormalities in the brain, spinal cord or other nerves can result in a range of symptoms. Examples of symptoms include paralysis, muscle weakness, poor coordination, seizures, confusion, pain and altered levels of consciousness. There are many recognized neurological disorders, some relatively common, but many rare [2].

The specific causes of neurological problems vary, but can include genetic disorders, congenital abnormalities or disorders, infections, lifestyle or environmental health problems including malnutrition, and brain injury, spinal cord injury or nerve injury. The problem may start in another body system that interacts with the nervous system. For example, cerebrovascular disorders involve brain injury due to problems with the blood vessels (cardiovascular system) supplying the brain [3].

Neurological disorders are common and represent a major public health problem. For example, 50 million people have epilepsy. Neurological disorders and some of the other conditions with neurological impairments and sequelae constitute over 6% of the global burden of disease. This burden is especially high in many low and middle income countries. Public health challenges describes and discusses the increasing global public health importance of common neurological disorders such as dementia, epilepsy, headache disorders, multiple sclerosis, neuroinfections, neurological disorders associated with malnutrition, pain associated with neurological disorders, Parkinson's disease, stroke and traumatic brain injuries [2].

Neurology has an especially close relationship with psychology and psychiatry, as all three disciplines focus on the functions and disorders of a single organ, the brain. The main targets of the traditional British "neurological examination" may be elementary motor and sensory processes, but any adequate assessment of "brain function" must take account of cognition and behavior. Cognitive and behavioral involvement is the rule, not the exception, among patients with disorders of the central nervous system (CNS) [4].

Thus far, no nationwide, if any, research has been conducted recently on the incidence and prevalence of strokes in Saudi Arabia. However, over the past decade there was one study which reported that the crude incidence rate for first-ever incidence of stroke in Saudi Arabia was 29.8/100,000/year [5]. In addition, they reported that, the important risk factors were: systemic hypertension (38%), diabetes mellitus (37%), heart disease (27%), smoking (19%) and family history of stroke (14%) [5].

In 10 years of work on stroke in Saudi Arabia, the incidence and prevalence of strokes were low when compared to those reported from Western countries. However, the high prevalence of diabetes mellitus as a risk factor were quite distinctive. Undetected and untreated hypertension and a low frequency of cigarette smoking in the stroke-prone age group could be one explanation of these findings [6].

Parkinson's Disease (PD) is a common neurodegenerative disorder. Epidemiological studies of PD from 1985 to 2010, worldwide data showed a rising prevalence of PD with age (all per 100,000): 173 in 55 to 64 years; 428 in 60 to 69 years; 425 in 65 to 74 years; 1087 in 70 to 79 years; and 1903 in older than age 80. A significant difference was seen in prevalence by geographic location with 646 in individuals from Asia ($P < 0.05$). A significant difference in prevalence by sex was found ($P < 0.05$) [7].

Among the urban and rural population of Al Kharga District, New Valley, Egypt, the results revealed that the total prevalence rate of neurological disorders in Al Kharga District, New Valley was 2.4% with no significant difference among both sexes. The highest prevalence rate was recorded among elderly people (60+ years; 9.25%) [8].

In a study conducted in in Fayoum, Egypt, stroke was found in 2.8% of the studied elderly; 2.0% of males and 0.8% of females, headache was found in 58.4%; 31% of males and 27.4% of females [9].

In in Southern Saudi Arabia, Al-Modeer study, stroke was found in 34.9% of elderly, more in males than females (39.4% of males and 27.1% of females), parkinsonism was 4.3% (5.4% in males and 3.5% in females [10].

Between 1982 and 1992, in a study conducted by Al Rajeh et al., in a hospital that exclusively treated the Saudi Arabian National Guard community rated the crude annual incidence rate at 43.8 per 100,000 Males predominated

in all types of stroke. In both male and female groups the most likely stroke-prone age was 60 to 70 years. Hypertension (56%), diabetes mellitus (42%), and cardiopathy (33%) were common risk factors [11].

In Thugbah community in the Eastern Province of Saudi Arabia to determine its point prevalence of neurological diseases. only 1.5% were more than 60 years old. The overall crude prevalence ratio for all forms of neurological disease was 131/1,000 population. Headache syndromes were the most prevalent disorder (20.7). Stroke, Parkinson's disease, and Alzheimer's disease were uncommon with respective PRs of 1.8, 0.27 and 0.22. The major medical diseases that may be neurologically relevant were diabetes mellitus, hypertension, and connective tissue disorders [12].

As very few studies have focused on the elderly population, there is a lacuna in data of neurological disorders in elderly in Northern region of Saudi Arabia.

Objectives:

To study some of the demographic characteristics of the elderly population and to estimate the prevalence of neurological diseases, its types and determinants among the elderly population of Arar city, Kingdom of Saudi Arabia.

Participants and methods:

Study design and setting:

The present cross sectional community based study was conducted in Arar city, the capital of Northern Borders Governorate

Study period and target population:

This study was conducted during the period from 1 June to 30 September 2016, on elderly people of age 60 years and more.

Sampling:

The sample size was calculated using the sample size equation: $n = z^2 p(1-p)/e^2$, considering target population more than 1000, and study power 95%. Data was collected from 138 elderly participant aged 60 years and above. Systematic random sampling technique was followed. After identifying the first house randomly in the selected area, every 9th house was visited to include all the elderly subjects residing in those selected houses till the required sample is covered.

Data collection:

Data were collected by means of personal interview with the sampled elderly using a predesigned questionnaire covering the following items:

- (1) Socio-demographic characteristics including age, sex, educational and marital status.
- (2) Smoking status and certain types of diseases that may be prevalent among elderly suggested to affect neurological diseases such as diabetes mellitus and obesity.
- (3) The questionnaire included also questions regarding the already previously diagnosed neurological diseases, its types and its determinants, after ensuring the diagnosis by reviewing the accompanied health records and prescriptions and asking the caregivers about the case.

Ethical considerations:

Data collector gave a brief introduction to the participants by explaining the aims and benefits of the study. Informed written consent was obtained from all participants. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest.

Statistical analysis:

We utilized the statistical package for social sciences, version 16 (SPSS Inc., Chicago, Illinois, USA) to analyze the study data. The results were displayed as counts and percentages. The X² test was used as a test of significance, and differences were considered significant at P value less than 0.05.

Results:

Table (1) illustrates the sociodemographic characteristics and BMI status of the studied elderly population. The table showed that mean age (\pm SD) was 70 (\pm 9.25) years, male to female ratio was 47.8 to 52.2, married were 62.3 while 33.3 were widow, illiteracy constitutes 54.3%, primary school literates were 23.9% and total of 91.3% had less than secondary education, about half (45.7%) were obese, 26.8% underweight and only 24.6% had normal weight.

Table (2) illustrates the percentage distribution of neurological diseases among the studied elderly population. The overall prevalence rate of neurological diseases observed in this study was 20.9%; the prevalence of stroke was 4.3%, parkinsonism was 3.6%, facial palsy 4.3%, headache syndrome was 6.5% and 2.1% previous nervous system surgery.

Table (3) illustrates the relationship between neurological diseases and socio-demographic characteristics in the studied elderly population. Headache, parkinsonism are more common in females but stroke is more in males. Headache is common in 60-69 years age group but parkinsonism and stroke are more common in 70-79 years age group. There is specific distribution with marital status.

Table (4) illustrates the relationship between neurological diseases and DM, obesity, hypertension and smoking history in the studied elderly population. Headache, parkinsonism and stroke are more in non diabetics than diabetics, in non obese than obese, non smokers and in non hypertensive studied elderly population.

Table (5) illustrates the relationship between neurological diseases and psychiatric diseases in the studied elderly population. Alzheimer's disease is not associated with neurological diseases, depression is associated with Stroke. No psychiatric diseases was associated with headache or parkinsonism in the studied elderly population.

Table (1): sociodemographic characteristics and BMI status of the studied elderly population, Arar, 2016

Age group	No. (n=138)	%
• 60-	90	65.2
• 70-	36	26.1
• 80+	12	8.7
Mean age (\pm SD)	70 \pm 9.25	
Sex		
• Female	72	52.2
• Male	86	47.8
Marital status		
• Widow	46	33.3
• Single	3	2.2
• Married	86	62.3
• Divorced	3	2.2
Educational level		
• Illiterate	75	54.3
• Primary	33	23.9
• Preparatory	18	13.1
• Secondary or more	12	8.7
Working status		
• Shepherd	15	10.9
• House wife	21	15.2
• Military	3	2.2
• No work	53	38.4
• Retired	46	33.3
BMI (kg/m ²) status		
• Underweight	4	2.9
• Normal	34	24.6
• Overweight	37	26.8
• Obese	63	45.7
Mean BMI (\pm SD)	29.99 \pm 9.73	
Psychological diseases		

• Depression	12	8.7
• Alzheimer's disease	4	2.9
• Obsessive compulsive disorder (OCD)	4	2.9

Table (2): Percentage distribution of neurological diseases among the studied elderly population, Arar, 2016

Neurological diseases	No.	%
Yes	29	20.9
• Headache syndrome	9	6.5
• Parkinson's Disease	5	3.6
• Stroke	6	4.3
• Facial palsy	6	4.3
• Previous nervous system surgery	3	2.1
No	109	81.1
Total	138	100.0

Table (3): the relationship between neurological diseases and socio-demographic characteristics in the studied elderly population

Variables	Neurological diseases				Total (138)	Chi-Square	P value
	Others* (n=118)	Headache (n=9)	Parkinsonism (n=5)	Stroke (n=6)			
	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)		
Sex							
• Female	62 (52.5)	6 (66.7)	3 (60.0)	1(16.7)	72(52.2)	3.91	0.27
• Male	56(47.5)	3(33.3)	2(40.0)	5(83.3)	66(47.8)		
Age group							
• 60 – 69	79(66.9)	8(88.9)	1(20.0)	2(33.3)	90(65.2)	9.68	0.138
• 70 – 79	29(24.6)	1(11.1)	3(60.0)	3(50.0)	36(26.1)		
• 80 +	10(8.5)	0	1(20.0)	1(16.7)	12(8.7)		
Marital status							
• Widow	40(33.9)	4(44.4)	1(20.0)	1(16.7)	46(33.3)	19.55	Non applicable
• Single	2(1.7)	1(11.1)	0	0	3(2.2)		
• Married	75(63.6)	4(44.4)	3(60.0)	4(66.7)	86(62.3)		
• Divorced	1(.8)	0	1(20.0)	1(16.7)	3(2.2)		

* others include other neurological diseases and the participants without neurological diseases

Table (4): The relationship between neurological diseases and DM, obesity, hypertension and smoking history in the studied elderly population

Variables	Neurological diseases				Total (138)	Chi-Square	P value
	Others* (n=118)	Headache (n=9)	Parkinsonism (n=5)	Stroke (n=6)			
	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)		
DM							
• Yes	46(39.0)	2(22.2)	1(20.0)	2(33.3)	51(37.0)	1.697	0.637
• No	72(61.0)	7(77.8)	4(80.0)	4(66.7)	87(63.0)		
Obesity							
• Non obese	61(51.7)	5(55.6)	5(100.0)	4(66.7)	75(54.3)	4.907	0.179
• Obese	57(48.3)	4(44.4)	0	2(33.3)	63(45.7)		
Hypertension							
• Yes	56(47.5)	3(33.3)	1(20.0)	3(50.0)	63(45.7)	2.077	0.557
• No	62(52.5)	6(66.7)	4(80.0)	3(50.0)	75(54.3)		
Smoking history							

• No smoking	82(69.5)	6(66.7)	5(100.0)	2(33.3)	95(68.8)	9.523	0.146
• Smokers	7(5.9)	2(22.2)	0	1(16.7)	10(7.2)		
• Ex-smokers	29(24.6)	1(11.1)	0	3(50.0)	33(23.9)		

* others include other neurological diseases and the participants without neurological diseases

Table (5): the relationship between neurological diseases and psychiatric diseases in the studied elderly population

Psychiatric diseases	Neurological diseases				Total (138)	P value
	Others* (n=118)	Headache (n=9)	Parkinsonism (n=5)	Stroke (n=6)		
Alzheimer's disease	4(3.4)	0	0	0	4(2.9)	Not applicable
Depression	8(6.8)	1(11.1)	0	3(50.0)	12(8.7)	
Obsessive compulsive disorder (OCD)	3(2.5)	0	0	1(16.7)	4(2.9)	
No psychiatric diseases	103(87.2)	8(88.8)	5(100.0)	2(33.3)	118(85.5)	

* others include other neurological diseases and the participants without neurological diseases

Discussion:

Ageing is inevitable and it is a concern of every one. Elderly life is full of problems- physical, social and economic. Older people are helpless and a disability is more likely to occur in the old age [13].

Neurological diseases considered a major concern because of its increasing frequency and serious consequences and related disability and dependency. The present study is a descriptive cross sectional survey, conducted to estimate the prevalence of neurological diseases, its types and determinants among the elderly population of Arar city, Kingdom of Saudi Arabia. In the Northern Province of Saudi Arabia, well-known cultural barriers to discussing sensitive issues, especially with strangers, exist. the information provided by the elderly would form a basis for more in-depth and large scale studies concerning neurological diseases in this vulnerable group in our region.

The present study showed that, the age of elderly ranges from 60-92 years with a mean age (\pm SD) was 70 (\pm 9.25) years, male to female ratio was 47.8 to 52.2. in southwest Saudi Arabia by Al-Modeer et al, the age of elderly ranges from 60-104 years with a mean of 77.2 ± 8.9 . Most of the studied elderly (55.9%) were females [10]. In Al Rajeh et al., in a hospital that exclusively treated the Saudi Arabian National Guard hospital, the mean age of the patients was 63 (\pm 17) years [11]. In a study conducted on elderly in Dubai, United Arab Emirates, the gender ratio of the elderly patients in the study was 2.1 female: 1.0 male. the age of elderly ranges from 60-113 years with mean (SD) age was 78.77 (9.50) years [16].

In the present study, married were 62.3% while 33.3 were widow, illiteracy constitutes 48.6%, primary school literates were 19.6% and total of 76.2% had less than secondary education. In Ibrahim et al in Jeddah, widowed elderly represented about one- fifth (21.8 %) of the sample which is less than our figure. The majority of elderly (78.4 %) had less than secondary education which is consistent with our figure [14]. Khadervalli et al [15] in their study reported only 27% as illiterate and 31% as primary school literates, which is better than our figures.

The overall prevalence rate of neurological diseases observed in this study was 20.9% with no significant difference among both sexes. This results are comparable to other studies. For example, in Thugbah community in the Eastern Province of Saudi Arabia, Al Rajeh et al., reported overall prevalence rate of neurological diseases 13.1% which is more than our figure [12]. In Al Kharga District, New Valley, Egypt, the results revealed that the total prevalence rate of neurological disorders among elderly people (60+ years) was 9.25% with no significant difference among both sexes [8].

In our study the prevalence of stroke (4.3%) were more in males than females .

In Fayoum, Egypt study, the prevalence of stroke (2.8%) were more in males than females, this less than our finding [9]. In Al-Modeer study, Stroke was found in 34.9% of elderly, more in males than females (39.4% of males and 27.1% of females), which is far higher than our figure [10]. A stroke registry revealed 0.04% (0.03% males, 0.017% females) of first-ever strokes affecting Saudi nationals [5] which is far less than our figure. Al Rajeh et al., reported overall prevalence rate of stroke 1.8% which is also less than our figure [12]. In a study conducted in Dubai,

cerebrovascular accident affected 38.8% of the studied elderly, more prevalent in males than females which is consistent with our result but the figure is far higher than our figure [16].

In the present study the prevalence of parkinsonism was 3.6% were more in males than females. In in Southern Saudi Arabia, Al-Modeer study, parkinsonism was 4.3% (5.4% in males and 3.5% in females [10] which is consistent with our figure . Epidemiological studies of PD from 1985 to 2010, worldwide data showed a rising prevalence of PD with age 0.0173% in 55 to 64 years; 0.043% in 60 to 69 years; 0.04% in 65 to 74 years; 0.01% in 70 to 79 years; and 0.019% in older than age 80. Al Rajeh et al., reported overall prevalence of parkinsonism 0.27% which is also less than our figure [12]. In Asian population it was 0.065%. A significant difference in prevalence by sex [7] which is consistent with our finding but the figures are far less than ours. In Dubai study, parkinsonism was found in 17%, more in males than females (23.9% Vs.13.7%) [16]. These results are comparable with our results but the figures are higher than ours.

In our study the prevalence of headache syndrome was 6.5% was more in females than males. In Thugbah community in the Eastern Province of Saudi Arabia, Al Rajeh et al. [12], reported that, headache syndromes were the most prevalent disorder (20.7%). In Egyptian, Fayoum study, headache was found in 58.4%; 31% of males and 27.4% of females [9]. These results are not comparable with our results.

Conclusion and recommendations:

In light of the results of the present study; neurological diseases were prevalent among elderly population in Arar city, Kingdom of Saudi Arabia. Commitment from decision makers is the first step to decrease the burden caused by neurological disorders and its sequel on that vulnerable group. Health education campaigns and initiatives are needed to increase societal and professional awareness of public health aspects of neurological disorders. Strategies to address the associated stigma and discrimination needs to be part of the public health activities for neurological disorders. Strengthening the preventive, curative and rehabilitation care within the existing health systems. Defining the priorities for research, is one of the important ways for dealing with neurological disorders among geriatric population. The above recommendations need to be implemented and appropriately adapted to local conditions of our region.

Acknowledgement:

The authors thank Dr. Zeinab Mohammad Ibrahim, Mohanna Jabban Alenezi, Khaled Alnashmi Alanazi, Abdullah Musari Alanazi, and Fayez Sulobi Alenezi (Intern, Faculty of Medicine NBU), Abdullah Ahmed Alsaileek, Ahmad Rami Aldeiri (Intern, Faculty of Medicine, Alfaisal University, Riyadh, KSA), Abdullah Hussain Alhadhari, Anwar Mohammed Alanazi, Ahmed Saad Alanazi (Students, Faculty of Medicine NBU) for their help in different steps of the research.

References:

1. P. Andlin-Sobocki, B. Jonsson, H.U. Wittchen, J. Olesen. Cost of disorders of the brain in Europe Eur J Neurol, 12 (Suppl. 1) (2005), pp. 1–27
2. WHO Neurological Disorders: Public Health Challenges
3. Merck Manual: Brain, Spinal Cord and Nerve Disorders
4. Butler, C (1 March 2005). "Neurological syndromes which can be mistaken for psychiatric conditions". Journal of Neurology, Neurosurgery & Psychiatry. 76 (suppl_1): i31–i38. doi:10.1136/jnnp.2004.060459.
5. Al-Rajeh S. Larbi E.B. Bademosi O. Awada A. Yousef A. Al-Freih H. Miniawi H.g Stroke Register: Experience from the Eastern Province of Saudi Arabia. Cerebrovasc Dis 1998;8:86–89
6. Al Rajeh S.a · Awada A. Stroke in Saudi Arabia. Cerebrovasc Dis 2002;13:3–8
7. Pringsheim, T., Jette, N., Frolkis, A. and Steeves, T. D.L. (2014), The prevalence of Parkinson's disease: A systematic review and meta-analysis. Mov Disord., 29: 1583–1590. doi:10.1002/mds.25945.
8. El Tallawy H.N.A. Farghaly W.M.A. Metwaly N.A. Rageh T.A. Shehata G.A. Elfetoh N.A. et al. Door-to-Door Survey of Major Neurological Disorders in Al Kharga District, New Valley, Egypt: Methodological Aspects. Neuroepidemiology 2010;35:185–190
9. Hassan SK. A Study of Morbidity Pattern among Geriatric Population in Fayoum Governorate, Egypt. Journal of American Science 2015;11(4).
10. Al-Modeer M, Hassanien S, Jabloun C. Profile of morbidity among elderly at home health care service in Southern Saudi Arabia (2013). J Family Community Med, 20(1):53-57.

11. Al Rajeh S, Awada A, Niazi G, Larbi E. Stroke in a Saudi Arabian National Guard community. Analysis of 500 consecutive cases from a population-based hospital. *Stroke*. 1993;24(11):1635–9.
12. Al Rajeh S, Bademosi O, Ismail H, Awada A, Dawodu A, al-Freihi H, Assuhaimi S, Borollosi M, al-Shammasi S. A community survey of neurological disorders in Saudi Arabia: the Thugbah study. *Neuroepidemiology*. 1993;12(3):164-78.
13. Balamurugan J, Ramathirtham G. Health problems of aged people, *IJRSS*, 2012 ; 2(3) : 139-150.
14. Ibrahim NK, Ghabrah TM, Qadi M. Morbidity profile of elderly attended/admitted in Jeddah health facilities, Saudi Arabia. *Bull High Inst Public Health*. 2005;35:173–90.
15. Khadervalli Nagoor et al Comparative study of health status among slum and non slum elderly population in Kadappa region South India *Journal of Evolution of Medical and Dental Sciences* 2014 Vol3 issue 5 Feb 03 pg 1298-1307.
16. Anood AlShaali Amal Al Jaziri. Health profile of elderly patients registered in the Elderly Home Based Primary Care, Dubai, United Arab Emirates. *Middle East Journal of Age and Ageing* Volume 12 Issue 1, February 2015.