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Editorial

Dr Abdul Abyad
Chief Editor

In this issue a paper from Iraq looked at the association between socioeconomic elements and ischemic stroke. A total of 510 patients (215 females and 295 males) with stroke were studied. The patients were divided according to their educational level. The study showed 58.3% of stroke patients belong to families with below 200 USD monthly income and 6.5% of the patient's families with more than 500 USD monthly incomes. The authors concluded that there is an inverse relationship between stroke occurrence and socioeconomic state and Strategies for primary prevention should target this group of people.

A paper from Jordan looked at the main clinical features of nasal and paranasal sinus diseases in elderly patients attending Ear, Nose and Throat clinic. A total of 2763 elderly were studied. The most prevalent sinonasal disease was allergic rhinitis, 271 (56.5%) which was followed by Rhino-sinusitis which was recorded in 147 (30.6%) patients. This study suggests that sinonasal diseases such as allergic rhinitis and rhino sinusitis are common geriatric otorhinolaryngological problems. General practitioners should be able to recognize these problems in geriatrics and possess adequate skills to deal with them.

A paper from India examined the pattern of perceived health status, immobility, and hospitalization among the elderly of India using the 60th round of National Sample Survey data collected during 2004. The authors used both Bivariate and multivariate analysis to understand the differentials and determinants of outcome variable among the elderly of India. The authors concluded that Indian elderly have a poor health status either in terms of self-assessed or mobility or hospitalization. So special attention to the elderly particularly focusing on females, living alone, poor, 70+ aged and the elderly of northern and eastern regions, is required.

A cross-sectional study followed by a nested case-control study from Egypt attempts to estimate the period prevalence rate of fall, circumstances of falls and their risk factors among the elderly persons living in a rural community setting. More than two-thirds of elderly reported one or more fall during the past year. The authors concluded that falls are frequent among rural elderly residents with preventable contributing factors. Risk fall scale could be useful for fall prediction among elderly.

A paper from Turkey looked at the relationship between hypertriglyceridemia and smoking. The study was performed on consecutive patients applying to Internal Medicine Polyclinic for check up procedure. The study included 116 cases with hypertriglyceridemia with a mean age of 43.5 years, and 49.1% (57) of them were female. Smoking showed a significantly higher prevalence in the hypertriglyceridemia group (42.2% versus 28.4%, $p<0.01$). The authors concluded that there are significant associations between hypertriglyceridemia, excess weight, DM, HT, and smoking, probably depending on personality types and life styles of individuals.

Original Contribution/Clinical Investigation

Socio-economic elements as a risk factor of ischemic stroke in Iraq

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ABSTRACT

Objective: to assess the association between socioeconomic elements and ischemic stroke in Iraq.

Patients and methods: 510 patients (215 females and 295 males) with stroke were admitted in 4 different hospitals in Baghdad between April, 2006 to December 2010. Patient's family's income was divided into 3 categories: Those with below 200, those with 201-500 and those with more than 500 USD/month incomes. The patients were divided according to their educational level into 4 groups; Illiterate, can write, Secondary school l and Higher education level. House condition was divided into 2 levels : three members of the family living in one room or, less members living in one room.

Results and discussion: The study showed 58.3% of stroke patients belong to families with below 200 USD monthly income and 6.5% of the patient's families with more than 500 USD monthly incomes. There is a higher rate [44.7%] of illiterate patients, in comparison to [9%] of the patients with higher education. There are 90.39% who live in crowded small houses. The results showed comparable results to other studies.

Conclusion: There is an inverse relationship between stroke occurrence and socioeconomic state and strategies for primary prevention should target this group of people.

Keywords: socioeconomic, ischemic stroke

Introduction

Stroke is a sudden focal neurological syndrome due to cerebrovascular disease(1). It is the commonest neurological disorder admitted in the general medical wards;(2) it accounts for 50% of the admissions in neurological wards (2,3). Stroke is the second leading cause of death worldwide (4). It is the commonest cause of morbidity worldwide (1,2,3,4).

High mortality and morbidity burden of stroke impacts a high economic and social burden on the families and society (5).

Because of all these impacts, added to low frequency of successful acute stroke treatment (2, 3, 5), it makes identification and prevention of stroke risk factors of utmost importance, to minimize the whole impact of stroke.

Stroke risk factors are classified into modifiable factors, which can be identified and treated; fortunately they are more frequent than non-modifiable risk factors. Efforts of researchers are directed toward identifying more risk factors in their societies and to analyze the difference between these societies(6). The most commonly used measurements for socioeconomic status are educational attainment, income, occupation, home and goods ownership.

The aim of this paper is to evaluate socio-economic status, housing conditions and education level as a risk factor in relation to stroke incidence in Iraq.

Patients and Methods

Five hundred and ten patients (215 females and 295 males) with stroke were admitted in the neurological wards at Al kindi teaching hospital, Al-yarmok teaching hospital and Medical City teaching hospital; between April 2006 to December 2010. Inclusion criteria were focal neurological deficit of sudden onset that lasted at least 24 hours with no known alternative to a vascular cause and brain CT not suggestive of hemorrhage or other pathologies. All the patients were asked about their detailed present illness, past medical history, drug history, gynecological history for females and social history; special concern was emphasized on monthly income of the patient's family. We divided families into:

1. Those with below 200 USD/month incomes.
2. Those with 201--500 USD/month incomes.
3. Those with more than 500 USD/month incomes.

The patients were divided according to their educational level into:

1. Illiterate group.
2. Can read and write group [primary school].
3. Secondary school level group [not entering university].
4. Higher education level group [university graduate].

Also we asked about house conditions whether they were:
1. Crowded with three members or more of the family living in one room.
2. Not crowded with two or less members living in one room.

Detailed medical and neurological clinical examinations were done by a neurologist. All the patients had Brain CT scanning.

Patients diagnosed with Antiphospholipid antibody disease and other connective tissue disease or Behcets disease were excluded from the study because of the direct relation of stroke in those patients to one cause rather than a risk factor.

The study protocol was approved by the scientific committee of Al- kindy, College of Medicine and the involved hospitals, who also agreed to participate and from which 500 patients were taken.

Descriptive statistics such as graphs, tables, percentages were used.

Results

Of the five hundred and ten patients (215 females and 295 males), the males were more affected more than females by 16% between 40 and 70 years age; the exception to this is the approximately no gender rates of difference below age of 40 years and above age of 70 years. See (Table 1 - opposite).

The maximum stroke estimate is between 71-80 years [34.9%] and the minimum estimate is below age of 40[3.33%] (see Table 1).

Hypertension was seen in 74.5% of the patients, smoking in 61.5%, other factors prevalence is shown in Table 2, opposite.

The study showed 58.3% [297/510] of stroke patients belong to families with below 200 USD monthly income, and 35.2% [180/510] between 201-500 USD, and 6.5% [33/510] of the patients' families with more than 500 USD monthly income see Figure 1 - page 6.

There is a higher incidence [44.7%] of illiterate patients, in comparison to [9%] of the patients with the higher education. See (Figure 2 - page 6).

There are 461 patients [90.39%] who live in crowded small houses and the rest [49] patients [9.6%] live in non-crowded houses.

Data was tabulated using Microsoft Excel 2010 program; percentages were used to assess the prevalence rate in the sample.

Discussion

The low frequency of treatment options in comparison to the grave high disease burden on the families and the public health system (8) requires most of the efforts to be directed toward recognition of modifiable risk factors, in order to reduce the disease occurrence to minimal incidence rates. Scientists and neurologists all over the world try to find new risk factors; most of the researchers have based their work on the Framingham study (9).

In Iraq there are low rates of monthly personal income and lower educational levels and illiteracy because of repeated wars and economic sanctions that were imposed on this country from 1990 until 2003.

Age /years	Male	Female	Total
----40	10 [59%]	7 [41%]	17 [3.33%]
41-50	18 [62%]	11 [38%]	29 [5.7%]
51-60	51 [61%]	32 [39%]	83 [16.27%]
61-70	102 [67%]	50 [33%]	152 [29.8%]
71-80	91 [51%]	87 [49%]	178 [34.9%]
80---	23 [46%]	28 [54%]	51 [10%]
Total	295 [58%]	215 [42%]	510

Table 1: age/ gender distribution

Age/year	-40	41-50	51-60	61-70	71-80	80-	Total	%
Hypertension	15	17	61	115	130	42	380	74.5%
SMOKING	9	23	55	98	113	16	314	61.5%
Heart diseases	5	11	45	85	97	40	283	55%
Diabetes mellitus	2	5	50	90	95	25	267	52%
TIA	3	16	35	69	81	25	229	45%
Hyper cholesterolemia	14	8	15	45	75	15	172	33.7%
Carotid Stenosis/Doppler	1	2	23	40	61	15	142	28%
Polycythemia	2	7	12	33	24	8	86	17%
Carotid bruit	0	1	19	22	25	8	75	15%
Obesity	2	15	12	25	17	3	74	14.5%
Migraine	8	12	6	0	0	0	26	5%
Alcoholism	3	5	5	2	2	1	18	3.5%
Pill	2	1	0	0	0	0	3	0.58%

Table 2: Risk Factors in the Present Study

The present study is the first trial to assess the socioeconomic state and educational level in patients with ischemic stroke and whether they can be considered as risk factors for stroke in Iraqi patients.

The present study showed an inverse relationship between stroke rates and monthly income as a higher stroke rate in low income people in comparison to those with low stroke rate in the higher income group. This could be due to non-healthy dietary habits, poor health awareness and non-compliance with treatment of other medical disease.

The present study shows a relation between stroke and crowded houses; this is related to poverty, stressful life and lack of exercise and higher infectious disease rate.

The present study showed an inverse relationship between stroke incidence and education level especially in the illiterate patients [44.7%]. This association is attributed to poor health awareness and poor health access in the low educated group.

The present study agrees with Cox et al whose conclusions show there was the strongest correlation with high rates of stroke in low socioeconomic groups and low socioeconomic groups also have lower survival and greater stroke severity than high socioeconomic groups. (10)

Studies of stroke incidence and socioeconomic status report an inverse association between socioeconomic status and stroke incidence (7, 11-14).

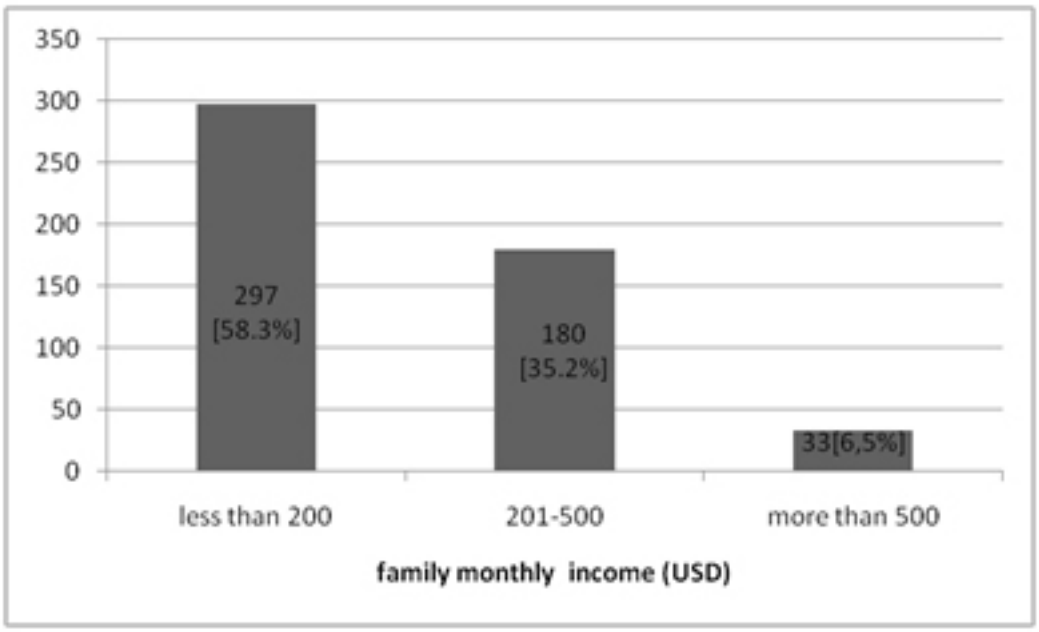

Figure 1: Relation of stroke incidence to the monthly income of the patients

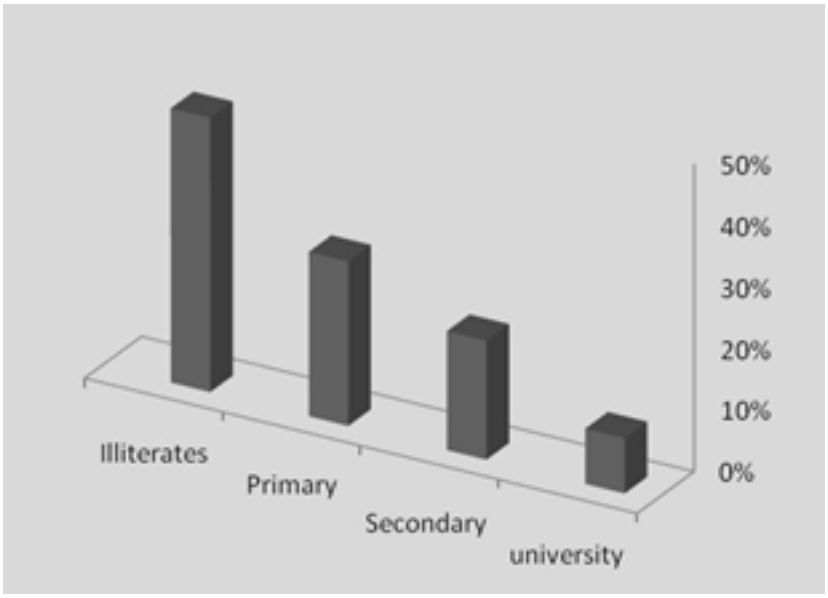

Figure 2: Relation of stroke incidence to Level of education of the patients

Reduced socioeconomic status (SES) is associated with an increased risk of stroke, although the mechanism is not clear. It may be that those with lower SES have a greater burden of classic vascular risk factors. (15)

The study of Grimaud et al found a higher level of household income was associated with a higher risk of ischemic stroke among older people and they explain that by Selective survival. (16)

Conclusion

There is increased stroke frequency in the low income group, crowded houses and low educational background. Strategies for primary prevention should target less affluent people.

References

1. Marsden CD, Timothy JF. Cerebrovasculer diseases. In: Marsden CD. Editor. Clinical neurology. 2ed Ed. London: Arnold group; 1998. Chap 22:361-363.
2. Ropper AH, Brown RH. Cerebrovascular diseases. In: Adams and Victors editors. Principles of Neurology. 8th Ed. New York: McGraw hill; 2006. Chap 34: 680-681.
3. Aminoff MI, Greenberg D and Simon R. Stroke. In: Aminoff editor. Clinical neurology.6th Ed. New York: Lange-McGraw Hill. 2006. Chap 9:285-290.
4. Zivin J. Epidemiology of stroke. In: Goldman L and Ausiello D editors. CECIL textbook of medicine. 22nd Ed. New York: Saunders Philadelphia; 2004. p 2281.
5. Gorelick PB. Introduction to stroke prevention. Continuum series of the American academy of neurology. 2005; 11/4: 11-15.
6. SaccoRL. Risk factors and outcome of ischemic stroke. Neurology. 1995; Suppl [45]. 51:0-514.
7. Xu F , Tse LA , Yin X, Yu LTS , Griffiths S. Impact of socio-economic factors on stroke prevalence among urban and rural residents in Mainland China. BMC Public Health 2008, 8:170

8. Chong JY and Sacco RL. Risk factors for stroke; in stroke prevention Continuum series of American academy of neurology. 2005:11/4:15-20.
9. Gorelick PB. Stroke prevention, an opportunity for efficient utilization of health care resources during the coming decades. Stroke. 1994; 25:220-224.
10. Cox AM, McKevitt C, Rudd AG, Wolfe A. Socioeconomic status and stroke. Lancet Neurol 2006; 5: 181-88.
11. Engstrom G, Jerntorp I, Pessah-Rasmussen H. Geographic distribution of stroke incidence within an urban population. Stroke 2001; 32: 1098-1103.
12. 27 Gillum RF, Mussolino ME. Education, poverty and stroke incidence in whites and blacks: the NHANES I epidemiologic follow-up study. J Clin Epidemiol 2003; 56: 188-95.
13. 28 Hart CL, Hole DJ, Davey Smith G. The contribution of risk factors to stroke differentials, by socioeconomic position in adulthood: the Renfrew/Paisley study. Am J Public Health 2000; 90: 1788-91.
14. 29 Jakovljevic D, Sarti C, Sivenius J, et al. Socioeconomic status and ischaemic stroke: the FINMONICA stroke register. Stroke 2001;32: 1492-98.
15. Kerr DG, Slavin H, Clark D, Coupar F, Langhorne, Stott DJ. Do Vascular Risk Factors Explain the Association between Socioeconomic Status and Stroke Incidence: A Meta-Analysis. Cerebrovascular Dis 2011; 31:57-63.
16. Grimaud O, Dufouil C, Alpérovitch A, Pico F, Ritchie K, Helmer C etal . Incidence of ischaemic stroke according to income level among older people: the 3C study. Age and Ageing Volume40, Issue1 Pp. 116-121.

Original Contribution/Clinical Investigation

Pattern of Self-perceived Health, Immobility and Hospitalization among Elderly in India

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ABSTRACT

In this study, we examined the pattern of perceived health status, immobility, and hospitalization among the elderly of India using the 60th round of National Sample Survey data collected during 2004. Bivariate and multivariate analysis is used to understand the differentials and determinants of outcome variable among the elderly of India. Age group, economic dependency, education, sex, and living arrangements play an important role in the health status of the elderly. The most common diseases the elderly suffer from are eye ailments, cardiovascular diseases, and joint pain as reported. Logistic regression result shows that age, sex, dependency, and living arrangements as the most important factors affecting mobility and hospitalization of elderly. Indian elderly have a poor health status either in terms of self-assessed or mobility or hospitalization. So special attention to the elderly particularly focusing on females, living alone, poor, 70+ age and elderly of northern and eastern regions, is required.

Key words: Elderly, Self-perceived Health Status, Mobility, Hospitalization, India

Introduction

Rapid decline in fertility and mortality rates in the late twentieth century has resulted in a shift in stages of demographic transition as well as in the age structure of developing countries. As a result, a proportion of the 60+ population has increased in absolute as well as in relative terms due to increases in life expectancy and shrinking fertility (UN, 2005). As per the United Nations report on ageing, the number of global elderly persons is likely to increase from 606 million in 2000 to 1.9 billion by 2050 (UN, 2002). The increase is expected to be very high in the less developed regions where the number of older people will increase from 375 million in 2000 to 1.6 billion in 2050. India which is characterized by a rapid decline in fertility and mortality during recent years is going to be the home of elderly in the coming years (Rajan et al., 1999; Rajan et al., 2003). Moreover, the country has one of the fastest growing populations of elderly persons in the world (Rajan et al., 1999; Sengupta and Agree, 2003). At present, the country accounts for about 8.1 percent of the global elderly population (60+), which is projected to be 20 percent by 2050 (UN, 2007). The 2001 census has shown that the elderly population of India was 77 million. While the elderly constituted only 24 million in 1961, it increased to 43 million in 1981 and to 57 million in 1991. The proportion of elderly persons in the population of India rose from 5.6 per cent in 1961 to 7.5 per cent in 2001.

Under rapid economic development, socio-cultural, and demographic changes, the rapid growing elderly population in the country needs special attention in several aspects. First, it needs a health care system in the country which ensures good health status and assures a disability free life with longevity among the elderly. Secondly, to insure the financial security of the elderly, as the majority of the elder population in the country is economically dependent on the working population. Thirdly, beside the health and economic security, social support and well-being is another most important aspect which needs special attention. Because of rapid social changes increasing tendency of nuclear family norms, massive migration, social and familial insecurity, and absence of caretaker are emerging problems among the elderly of India. Finally, a combination of all these requirements poses' a major challenge from a policy and planning point of view.

In opposition, the existing literature suggests that the Indian elderly facing the problems of growing prevalence of morbidity, however the significant increase in longevity among the elderly is in continuation (Alam, 2000). But as the literature suggest the added years of life are often accompanied by chronic physical and psychological impairments (Nayar, 1999; Alam, 2000; Shrestha, 2006; Sobba and Reddy, 2006; Konjengbam et al., 2007). Living longer but with disabilities is nowhere near as enjoyable as living longer with good health (Cutler, 2001). Thus the proportion of elderly living longer with disabilities requires a greater amount of medical expenditure and curtails the savings of family income (Spillman, 2004).

As a majority of the elderly population suffers from diseases, thus the health status of the older population is the most important aspect of study of the elderly (Nandal et al., 1987; Rajan, 2006). A number of factors have been identified as determinants of health status and health care among the elderly in India. For example, income and educational attainment plays a key role for health seeking behavior among elderly (Gupta, 2001). Gender also appeared as a determinant of health seeking treatment among the elderly of India. For instance, the female older persons in Kerala had a greater likelihood of seeking treatment than males (Agrawal et al., 2009). Moreover, there are very high gender differentials in reporting of health status among elderly, as females are more likely to report morbidity and mobility. Moreover, the nutritional status of the elderly appeared as a determinant of health status, particularly among the poor section of the developing countries (Launer et al., 1994; Visser et al., 1994). For instance, body fat content and its distribution are helpful in assessing the risks for cardiovascular disease, hypertension, diabetes and dislipidaemia.

A recent study on Indian elderly suggests a growing prevalence of morbidity and poor health status along with significant increases in longevity among this population (Alam, 2000). Thus, while in the country where maternal and child healthcare indicators are still far from their goals, ageing has emerged as another long term burden over the country's health care system. Like many developing countries, the health system of India is inadequate to promote, support, and protect health and social well-being of the elderly due to lack of human and financial resources. The prevailing situation stands as a major concern among policy makers to extend socio-economic security and proper health care for their ageing population specifically the poor section of the society. Therefore, the necessity of analyzing the current morbidity pattern and demand for healthcare among elderly is of importance.

Besides this, very few studies have shown the pattern of health status and mobility of elderly in India (Mini, 2008; Agrawal et al., 2009; Dhak, 2009). But in our best knowledge none of the existing literature focused on determinants and patterns of living conditions and self-reporting health status, immobility and morbidity among elderly in the country. Considering the need, the present paper provides extensive knowledge on patterns and correlates of self-reported health status, mobility, hospitalization, and occurrence of diseases among the elderly in India.

Data and Methodology

The study is based on data collected by the National Sample Survey Organization (NSSO) in India. The 60th round of the survey was collected during January to June 2004, and provides information on morbidity, healthcare, and the living condition of the aged in India. The National Sample Survey is a nationally representative annual survey, conducted by the Ministry of Planning and Programme Implementation, Government of India, concentrating on one of the current socio-economic issues. The 60th round of the survey covered 34,831 samples of (males 51%, females 49%, urban 36 % and rural 64 %) elderly persons aged 60 and above.

Dependent Variables

Dependent variables used in the study are:

i) Self perceived health status: (excellent/very good, good/ fair, and poor) is defined based on questions of perception about current health status. It is a subjective assessment about own health status which is recognized by WHO as an instrument

for monitoring health (De Brun et al., 1996).

ii) Physical Immobility: is used as other health indicators where elderly were asked whether they are physical immobile /confined to bed/ confined to home. In this study, confined to bed or confined to home are considered as physically immobile.

iii) Self-reported and hospitalized ailments: Self-reported disease is assessed for any reported disease in the last 15 days prior to the survey period, while hospitalized ailment is assessed based on diagnosed diseases in the last 365 days prior to the survey. Further, all diseases, either self-reported or based on hospitalization) are classified into three groups, namely - a) communicable diseases, b) non-communicable diseases, and c) injuries. We have followed the similar categorization scheme of International Classification of Disease pattern of the World Health Organization (WHO, 1992).

Independent Variables

Several pertinent socio-economic and demographic variables are used to understand the possible determinants of self-reported health status, immobility, and morbidity among the elderly of India. The variables considered in the study are: age (1) (60-70 and 70+), sex (male/female), religion (Hindu, Muslim, Christian, and others) caste (scheduled castes and scheduled tribes - SCs/STs, other backward classes - Other Backward Caste (OBC) Others), place of residence (rural/urban), educational level (no education, below middle, middle complete, and high school and above) and economic dependency (not dependent/dependent), living arrangement of the elderly (living alone, living with spouse, spouse and other members, living without spouse but with others), and living condition (2) (low, medium, and high).

Footnotes

(1) Elderly were divided under two age category i. e. 60-70 years and 70+ years. Our intention is to understand that which group of elderly is more vulnerable in terms of health status, ad occurrence of diseases.

(2) A living condition variable was created using Principal Component Analysis (PCA) using variables like type of latrine, access to drinking water, water treatment, structure of the house, type of drainage and source of drainage which are important factors affecting health status.

Methods

Descriptive analysis is used to understand the pattern and differentials in selected outcome variables among elderly in the country. Cross-tabulation is used to understand the socio-economic differentials in self-perceived health status, immobility, and morbidity among the elderly in India. Multivariate technique, like ordinal logistic regression and binary logistic regression, is used to know the significant determinants of self-reported health status, immobility, and morbidity among the elderly in India. Ordinal regression is used for self-reported health status, as the variable is measured on ordinal scale (excellent, very good, fair, good, poor). But in the analysis we have clubbed the responses into three categories (excellent/very good, fair/good, poor) in order to make the interpretation convenient. Binary logistic regression is used in the case of physical immobility and whether hospitalized, as these variables are dichotomous in nature (0=otherwise, 1=yes). Analysis is performed using SPSS 16.0 software package.

Results

Socio-economic profile of sample population

Table 1 (opposite) presents percentage distribution of the elderly (age 60-70 and 70+) population according to their living arrangements, standard of living, and other key socio-economic characteristics in India during 2004. Among the elderly aged 60-70, equal proportions are male and female. Most of the elder population are from rural areas (76%); belong to Hindu religion (84%) and Other Backward Castes (40%) and the majority of them are uneducated (65%). Results show that three-fifths of the population aged 60-70 were dependent on other family members. A higher proportion of the elder population belonged to low standard of living. For instance, 38% of the elderly aged 60-70 lived in a household with a low standard of living. Regional distribution of elderly population shows a comparatively higher proportion of elder people among Central and South region compared to North and North-east region. A similar pattern is observed for the elder people aged 70+.

Prevalence of perceived health status, mobility, morbidity, and hospitalization among elderly in India

Table 2 (opposite) presents an overview about health perception, physical mobility, occurrence of diseases, and hospitalization among the elderly in India. In total, the majority of the elderly (71%) reported that their health condition is good/fair, while 24 percent perceived that they were living in poor health conditions. Only 5 percent of the elderly reported that they are enjoying excellent/good health status. Physical mobility among the elderly was almost universal. For instance, 92 percent of elderly reported that they do not face any problem in physical mobility. However, the proportion varies across the age groups of the elder population, as physical mobility is comparatively low among elderly aged 70 and above, than that of aged 60-70, 84 percent and 96 percent respectively. More than one two-thirds of the elderly reported that they do not have any kind of disease at the time of survey. Similarly, the majority of elderly (94%) reported that they were not hospitalized. Similar results are observed across the age groups of the elderly.

Background Variables	Age of the elderly		
	60-70	70+	Total (N)
Sex			
Male	49.4	51.2	17750
Female	50.6	48.8	17081
Type of Residence			
Rural	76.4	74.3	22265
Urban	23.6	25.7	12566
Religion			
Hindu	84.4	84.2	27959
Muslim	9.5	8.7	3660
Christian	2.4	3.4	1766
Other	3.7	3.6	1443
Caste			
STs & SCs	26.2	19.9	13343
OBC	39.8	39.9	12948
Others	34.0	40.2	8531
Educational Level			
No Education	65.4	66.7	21301
>Middle	19.0	20.7	7418
Middle Complete	6.1	5.2	2325
High school Above	9.4	7.5	3771
Dependency			
Not dependent on other	39.8	23.0	11800
Dependent on other	60.2	77.0	22429
Living arrangement			
Alone	5.5	4.7	1509
Spouse only	13.2	10.3	3875
Spouse and others	50.6	36.2	16127
Others	30.8	48.8	12593
Living condition			
Low	38.1	31.0	10610
Medium	35.2	36.7	11328
High	26.6	32.3	12850
Mobility			
Immobile	4.1	15.6	3224
Mobile	95.9	84.4	30821
Region			
North	12.1	14.3	5551
North-East	2.9	1.8	3324
East	21.0	18.7	4153
West	15.9	16.5	6433
Central	23.4	22.3	7099
South	24.8	26.6	8271
India	**64.8**	**35.2**	**34831**

Notes: SC=Scheduled Castes, ST=Scheduled Tribes, OBC=Other Backward Classes.

Table 1: Percentage distribution of aged population by various socio-economic, demographic and household living condition characteristics

Health and Morbidity	Age of the elderly		
	60-70	70+	Total (N)
Perception about health			
Excellent/very good	17.6	35.0	23.6
Good/fair	75.9	62.0	71.1
Poor	6.5	3.0	5.3
Mobility			
Immobile	4.1	15.6	8.1
Mobile	95.9	84.4	91.9
Have any disease			
No	72.4	62.5	69.0
Yes	27.6	37.5	31.0
Hospitalization			
Not hospitalized	94.7	92.3	93.9
Hospitalized	5.3	7.7	6.1

Table 2 Self reported health, Mobility, Morbidity and hospitalization by age groups among elderly in India, 2004

Background variables	Self perceived health status		
	Poor	Fair/good	Excellent/Very good
Age			
60-70	17.6	75.9	6.5
70+	35.0	62.0	3.0
Sex			
Male	21.5	71.7	6.8
Female	25.8	70.4	3.9
Type of Residence			
Rural	24.5	70.7	4.9
Urban	21.2	72.2	6.7
Religion			
Hindu	22.7	71.9	5.3
Muslim	32.4	63.6	3.9
Christian	28.0	67.0	5.0
Other	20.3	71.1	8.6
Caste			
ST & SC	24.6	70.4	5.0
OBC	23.7	71.7	4.6
Others	23.0	70.7	6.3
Educational Level			
No Education	25.7	70.2	4.1
>Middle	22.4	71.6	6.0
Middle Complete	18.8	73.0	8.1
High school Above	14.0	75.0	11.0
Dependency			
Not dependent on other	13.1	77.7	9.2
Dependent on other	29.1	67.6	3.3
Living arrangement			
Alone	23.0	71.7	5.3
Spouse only	22.7	72.5	4.7
Spouse and others	19.8	73.6	6.7
Others	28.8	67.4	3.8
Living condition			
Low	26.5	69.3	4.1
Medium	23.9	71.1	5
High	19.7	73.1	7.2
Region			
North	20.4	73.2	6.5
North-east	22.8	73.4	3.8
East	30.7	64.6	4.7
West	17.0	76.6	6.3
Central	25.5	69.1	5.4
South	22.6	72.7	4.6
Total	**23.6**	**71.0**	**5.3**

Notes: SC=Scheduled Castes, ST=Scheduled Tribes, OBC=Other Backward Classes.

Table 3: Perception of elderly about their own health status by different background characteristics

Differentials in perceived health status by key background characteristics among the elderly

An attempt has been made to understand the differentials in perceived health status among the elderly in India and the result is given in Table 3 above. The perceived health status is categorized into three categories - excellent/very good, fair/good, and poor. Result shows that poor health status is reportedly about twice higher among the elderly aged 70 and above (35%) compared to (18%) among the elder aged 60-70 years, while good/fair health status is higher among elderly aged 60-70 (76%) compared to elderly aged 70 and above (62%). Self perceived poor health status is higher among women than that of males. Similarly it varies across the religious groups - 32 percent among Muslims vs. 20 percent among other religions. Educational attainment of elderly is inversely associated with perceived poor health status while directly associated with excellent/very good health status. Similarly, poor health status is very low among self-dependent elderly (13%) compared to those who were dependent on other family members (29%). A similar result is observed with the living arrangement of the elderly. For instance, 29 percent of elderly living with others reported poor health status compared to those living with spouse and other family members (20%). Regional variation in self reported health status reflects that self reported poor health status is highest among the elderly of East region (31%) while it is lowest is among elderly of West region (17%).

Background Variables	Physically Immobile	Have Any Disease	Whether Hospitalised
Age			
60-70	4.1	27.6	5.3
70+	15.6	37.5	7.7
Sex			
Male	6.9	30.8	6.8
Female	9.3	31.2	5.5
Type of Residence			
Rural	7.9	28.9	5.4
Urban	8.6	37.6	8.6
Religion			
Hindu	7.8	29.9	5.8
Muslim	9.9	37.1	6.6
Christian	11.1	47.9	14.9
Other	8.8	30.3	6.6
Caste			
STs & SCs	7.7	25.6	4.4
OBC	7.7	28.9	6.3
Others	8.8	37.0	7.2
Educational Level			
No Education	8.8	28.0	4.8
>Middle	7.6	36.9	9.1
Middle Complete	5.3	35.9	8.5
High school Above	5.7	37.4	8.3
Dependency			
Not dependent on other	2.4	26.8	5.5
Dependent on other	11.0	33.7	6.6
Living arrangement			
Alone	5.2	31.0	4.7
Spouse only	4.8	33.7	6.7
Spouse and others	6.1	29.4	6.5
Others	12.0	33.3	6.0
Living condition			
Low	8.1	26.2	4.0
Medium	8.0	30.3	6.1
High	8.2	37.9	9.0
Region			
North	8.0	23.8	5.5
North-East	8.9	33.0	3.7
East	9.0	26.7	4.1
West	6.9	34.5	7.9
Central	7.7	26.6	3.5
South	8.4	39.7	9.7
Total	**8.1**	**31.0**	**6.1**

Table 4 Physical Mobility, Morbidity Level and Hospitalization by different background variables, 2004

Differentials in physical immobility, occurrence of diseases, and hospitalization among elderly by key background characteristics in India

Table 4 (above) shows the differentials in physical immobility, occurrence of disease, and hospitalization status among the elderly in India, with differentials in physical immobility largely varied across the age group of the elderly. For instance, 16 percent of elderly aged 70+ were immobile compared to 4 percent of elderly aged 60-70 years. Similarly, physical immobility was highest among Christians (11%) followed by Muslims (10%), and Other religious groups. Uneducated elderly have a comparatively higher proportion of physical immobility, however differentials are marginal across the educational groups. Interestingly we observed that elderly dependent on other family members are more immobile than those who are self-dependent. Similarly, elderly who lived with other family members are more immobile than those who were living with their spouse or alone. Regional differentials in immobility were minimal.

The second column of the Table shows occurrence of any diseases among elderly. In total, 31 percent of elderly had occurrence of any self-reported diseases. Percentage of disease occurrence is reportedly higher among elderly who belong to urban areas, Muslim religion, other castes, and among more educated group. Similarly, occurrence of any disease is higher among those who depend on other family members, and belong to a high standard of living. Regional variations in occurrence of diseases among the elderly are highest in the South (40%) whereas it is lowest in the North region (24%). The last column of the table shows that only 6 percent of the elder population was hospitalized in the country at the time of survey. Proportion of hospitalization is considerably higher among Christians (15%) than other religious groups. In general the proportion of hospitalization does not vary much across the background characteristics. However, we observed that wherever the occurrence of diseases is high the proportion of hospitalization is also high among the group.

Morbidities	Self Reported	Total (N)	Hospitalised	Total (N)
All Communicable diseases	18.2	2672	28.3	1517
Respiratory including				
ENT ailments	2.9	458	2.7	140
Eye ailments	9.3	1246	12.2	651
Tuberculosis	1.2	221	2.5	155
Febrile illnesses	3.3	461	5.5	274
All Non-Communicable diseases	68.4	9984	52.3	2981
Heart disease	5.3	937	9.7	544
Hypertension	10.2	1546	4.4	254
Gastritis/gastric or peptic ulcer	4.3	661	4.0	248
Bronchial asthma	7.6	1084	7.4	358
Disorders of joints and bones	15.3	1927	3.7	197
Neurological/Psychiatric disorder	2.8	459	4.5	262
Diabetes mellitus	5.5	874	4.3	229
Disabilities	10.0	1346	3.1	217
Accidents/injuries/poisoning	1.4	264	6.9	406
Other Diagnosed diseases	8.5	1190	11.2	643
Other Non-diagnosed diseases	3.5	446	1.0	66
Total (N)		**14535**		**5613**

Table 5 Major self reported and hospitalized morbidities among elderly in India, 2004

Prevalence of major morbidities among the elderly in India

Table 5 (above) shows proportion of self-reported diseases and of hospitalization among the elderly in India. Major diseases are classified into communicable diseases, non-communicable diseases, disabilities, and accidental/injuries/poisoning etc. Among major diseases of the elderly, reporting of non-communicable diseases is highest (68%), followed by communicable disease (18%), disabilities (10%), and accidental/injuries/poisoning etc. Among communicable diseases the proportion of eye ailment is reportedly higher (9%) followed by febrile illnesses and etc. Among non-communicable diseases, the majority of elderly suffered with disorders of joints and bones (15%) followed by hypertension (10%), bronchial asthma (8%), and diabetes (6%). The Table shows that the majority of the elderly were hospitalized in case of non-communicable diseases (52%) followed by communicable diseases (28%), accidental/injuries/poisoning (7%) etc.

Determinants of self-perceived health status, physical immobility and hospitalization among elderly in India

We have used ordinal logistic regression to assess the plausible determinants of self-perceived health status among elderly in India. As the outcome variable is ordinal in nature we used ordinal logistic regression. In the model several covariates such as age, sex, type of residence, religion, caste, educational level, dependency on other family members, living arrangement, living condition, and region are included (Table 6 - opposite page). Result shows that perceived excellent health status is significantly higher among elderly aged 60-70 and among those who are independent. For instance, the odds is 1.84 and 2.08 respectively. On the other hand perceived health status is significantly poor among male, uneducated elderly, and among those who are living alone and living in poor socio-economic status.

In order to understand the possible determinants of physical immobility and hospitalization among elderly in India binary logistic regression is used. A number of background variables such as - age of elderly, sex, place of residence, religion, caste, educational attainment, dependency on family members, living arrangements, standard of living, and regions of India is included in the analysis and result is presented in Table 7 (page 16) in forms of odds ratios with their 95% of confidence interval. Result shows that elderly of age 70 and more were significantly more immobile than elderly of lower age group. For instance, odds of immobility among elderly aged 70+ were 3.22. Sex of elderly is appeared as significant determinants of immobility as it was significantly less likely (0.86) among female compared to male. The odds of immobility is significantly higher among Muslims (1.17), elderly depend on other family member (3.48), lived with other family member (1.71), and comes from North-east and East region.

The second column of the table show the determinants of hospitalization among elder population in India. Likewise immobility, age is also appeared as significant determinant of hospitalization among Indian elderly. For instance odds of hospitalization are significantly higher (1.33) among elderly of age 70 and above compared to aged 60-70. Female were significantly less hospitalized (odds is 0.71) than male elderly. Elderly belong to OBC and other castes were significantly more likely to hospitalize that SCs/STs. Level of education is significantly and directly associated with hospitalization among elder in the country. Similarly, elderly belongs to medium and high standard of living is significantly more likely to hospitalize than that of low standard of living. For instance, the odds were 1.18 and 1.32 for medium and high standard of living respectively.

Background Variables	Self-assessed Health Status Exp (B)	95% C.I.
Age		
60-70	1.84***	1.74, 1.94
70+	1.00	
Sex		
Male	0.93**	0.88, 0.99
Female	1.00	
Type of Residence		
Rural	0.95	0.89, 1.01
Urban	1.00	
Religion		
Hindu	0.90	0.79, 1.03
Muslim	0.66***	0.56, 0.77
Christian	0.92	0.77, 1.11
Other	1.00	
Caste		
STs & SCs	0.99	0.92, 1.06
OBC	0.98	0.92, 1.05
Others	1.00	
Educational Level		
No Education	0.76***	0.68, 0.84
>Middle	0.80***	0.72, 0.89
Middle Complete	0.83***	0.73, 0.94
High school Above	1.00	
Dependency		
Not dependent on other	2.08***	1.95, 2.22
Dependent on other	1.00	
Living arrangement		
Alone	0.79***	0.70, 0.90
Spouse only	0.79***	0.72, 0.86
Spouse and others	1.09**	1.02, 1.16
Others	1.00	
Living condition		
Low	0.75***	0.69, 0.81
Medium	0.80***	0.74, 0.86
High	1.00	
Mobility		
Immobile	0.11***	0.10, 0.12
Mobile	1.00	
Region		
North	1.03	0.95, 1.12
North-East	1.29***	1.16, 1.44
East	0.68***	0.63, 0.74
West	1.27***	1.17, 1.39
Central	0.82***	0.76, 0.88
South	1.00	

*Note: *p<0.1 **p<0.05 and ***p<0.01. Category with value 1 is served as reference category. Dependent variables: self reported health status: 0 'poor' 1 'good' 2 'excellent'.*

Table 6: Ordinal logistic regression showing odds ratio of self assessed poor health status of elderly by background variables

Background Variables	Physically Immobile		Hospitalization	
	Exp(B)	95% CI	Exp(B)	95% CI
Age				
60-70®				
70+	3.22***	2.98, 3.49	1.33***	1.25, 1.42
Sex				
Male®				
Female	0.86***	0.79, 0.94	0.71***	0.66, 0.77
Type of Residence				
Rural®				
Urban	1.01	0.91, 1.11	0.95	0.87, 1.03
Religion				
Hindu®				
Muslim	1.17**	1.03, 1.32	1.03	0.93, 1.14
Christian	1.11	0.92, 1.34	0.96	0.83, 1.12
Other	1.02	0.84, 1.25	1.12	0.95, 1.31
Caste				
STs & SCs®				
OBC	0.98	0.88, 1.09	1.16***	1.06, 1.27
Others	1.10*	0.99, 1.23	1.26***	1.15, 1.38
Educational Level				
No Education®				
>Middle	0.92	0.83, 1.03	1.25***	1.16, 1.36
Middle Complete	0.92	0.77, 1.10	1.28***	1.12, 1.45
High school Above	1.10	0.93, 1.30	1.35***	1.20, 1.52
Dependency				
Not dependent on other®				
Dependent on other	3.48***	3.08, 3.93	1.42***	1.32, 1.53
Living arrangement				
Alone®				
Spouse only	1.20	0.92, 1.56	1.29**	1.06, 1.56
Spouse and others	1.18	0.93, 1.51	1.18*	0.99, 1.41
Others	1.71***	1.35, 2.17	1.11	0.93, 1.32
Living condition				
Low®				
Medium	0.95	0.86, 1.05	1.18***	1.08, 1.28
High	0.98	0.86, 1.11	1.32***	1.19, 1.46
Region				
North®				
North-east	1.33***	1.13, 1.56	1.01	0.88, 1.16
East	1.19**	1.04, 1.36	0.94	0.84, 1.05
West	0.90	0.78, 1.04	1.25***	1.12, 1.40
Central	1.03	0.90, 1.17	0.93	0.83, 1.03
South	0.99	0.87, 1.13	1.43	1.29, 1.59
Constant	0.02		0.07	
-2 Log likelihood	19095.51		27439.81	

*Note: *p<0.1 **p<0.05 and ***p<0.01. ® Reference Category. Dependent variables: Physical Mobility: 0=mobile, 1=immobile; Hospitalization: 0=not hospitalized, 1= hospitalized. Notes: SC=Scheduled Castes, ST=Scheduled Tribes, OBC=Other Backward Classes*

Table 7: Logistic regression show odds ratio of Physical Mobility and Hospitalization by different background variables

Discussion and Conclusion

Using the data of the 60th round of National Sample Survey Organization conducted in 2004, the present paper provides a picture of self perceived health status, immobility, and diseases occurrence among the elderly in India. The results show that majority of Indian elderly are living under poor socio-economic conditions. For instance, among the elderly population of India, the majority belong to rural area, are uneducated, and depend on other family members. Similarly, a substantive proportion of the elderly belong to lower standard of living. Findings demonstrate that health situation among the elderly is awful in India with about one-fourth of elderly persons reporting poor health status although it might be higher than reported due to bias in reporting (Joshi et al., 2003). Also with increased age the reporting of poor health status increases. Reporting of poor health status is higher among females than males despite the fact they enjoy higher life expectancies than their male counterpart (R.G.I., 2007). Those elderly staying in

rural areas and who are fully dependent on others for survival are more likely to report their health status as poor than urban and economically independent older age people. However, unlike self-reported perceived health status, proportion of physical immobility is very much less among the elder population in the country, though immobility is higher among the elder age 70+ than age 60-70.

Our result is showing a mismatch in occurrence of diseases when it is assessed based on self-report and hospitalization. It may be possibly because of reporting bias or varying reference period. The majority of the elderly in the country suffered from non-communicable diseases, either self-reported or based on hospitalization, as the majority of them were hospitalized for non-communicable diseases in the country. Among non-communicable diseases the majority suffered from disorders of joints and bones, hypertension, heart diseases, and bronchial asthma. Among communicable diseases eye ailments and febrile illness appeared as major ailments.

Multivariate analysis shows that age group of elderly appeared as a significant determinant of perceived health status, immobility, and occurrence of diseases among elderly in India. Health status of elderly age 70+ is significantly poor for all three outcome variables i.e. self-perceived health status, immobility, and occurrence of ailments (either self-reported or hospitalized). Beside the age group, educational attainment, dependency on family members, and standard of living appeared as significant determinants of perceived health status, immobility, and morbidity among the elderly in the country. Gender also appeared as a significant determinant of hospitalization among the elderly. For instance, the female elder population is less likely to be hospitalized than the male elder population. The finding is in line with the previous study of (Agarwal et al., 2009).

Thus it can be concluded that Indian elderly have a poor health status either self-perceived or in mobility or hospitalization. It calls for special attention to the elderly especially focusing on female, living alone, poor, 70+ aged, and elderly of northern and eastern regions.

References

Agrawal, G., Keshri, K., & Gaur, K. (2009). Aging, Disability and Health Care Services among Older Persons in India. Middle East Journal of Age and Ageing, 6(5), 21-28.

Alam, M. (2000). Ageing in Indian Society: A Country Profile. BOLD, Quarterly Journal of the International Institute on Ageing, 10(3), 5-22.

Bose., A., & Shankardass, M. K. (2004). Growing Old in India: Voices Reveal, Statistics Speak. Delhi: B. R. Publication Corporation.

Cutler, D. M. (2001). The Reduction in Disabilities among the Elderly. Proceedings of the National Academy of Sciences of the United States of America, 98(12), 6546-6547.

De Bruin A, Picavet HSG, Nossikov A (1996). Health Interview Surveys. Towards Harmonization of methods and instruments. WHO, Regional Publications European Series.

Dhak, B. (2009). Gender Difference in Health and Its Determinants in the Old Aged Population In India. J. Biosocial Science, 41, 625-643.

Gupta, I., Dasgupta, P., & Sawhney, M. (2001). Health of the Elderly in India: Some aspects of Vulnerability, Discussion paper. Delhi: Institute of Economic Growth.

Joshi, K., Kumar, R., & Avasthi, A. (2003). Morbidity profile and its relationship with disability and psychological distress among elderly people in Northern India. International Journal of Epidemiology, 32(6), 978-987.

Konjengbam, S., Bimol, N., Singh, J., Devi, E. V., & Singh., M. (2007). Disabilities in ADL Among the Elderly in an Urban Area of Manipur. Indian Journal of Physical Medicine and Rehabilitation, 18(2), 41-43.

Launer LJ, Harris T, Rumpel C, Madans J. Body mass index, weight change, and risk of mobility disability in middle-aged and older women. JAMA 1994; 271: 1093-8.

Mccallum, J., Shadbolt, B., & Wang, D. (1994). Self-rated health and survival: a 7-year follow-up study of Australian elderly. American journal of Public Health, 84(7), 1100-1105.

Mini, G. K. (2008). Socioeconomic and Demographic Diversity in the Health Status of Elderly People in Transitional Society, Kerala, India. J. Biosocial Science, 41, 457-467.

Nandal, D. S., Khatri, R. S. and Kadian, R. S. (1987). Aging problems in the structural context. In M. L. Sharma and T. M. Dak (Eds.). Aging in India. New Delhi: Ajanta Publications.

National Sample Survey Organization. (2006). Morbidity, Health Care and the Condition of Aged New Delhi: Ministry of Statistical and Programme Implementation, GoI.

Nayar, U. S. (1996). The Situation of Ageing: The Chip and the Old Block. In Added Years of Life in Asia: Current Situation and Future Challenges, United Nations (ed.). New York: United Nations.

Rajan, S. I. (2006). 'Population Ageing and Health in India', Centre for Enquiry into Health and Allied Themes, Satam Udyog Parel, Mumbai-400 012 Mumbai 2001-2051', Journal of Ageing and Social Policy, 15(2&3), 11-30.

Rajan, S. I., Mishra, U. S., & Sarma, P. S. (Eds.). (1999). India's Elderly : Burden or Challenge. New Delhi: Sage Publication.

Rajan, S. I., Mishra, US and Sarma, P. S. (2003). 'Demography of Indian Ageing, 2001-2051', Journal of Ageing and Social Policy, 15(2&3), 11-30.

Registrar General of India. (2007). Sample Registration System Statistical Report 2006 New Delhi.

Sengupta, M., & Agree, E. M. (2003). Gender, Health, Marriage and Mobility Difficulty among Older Adults in India. Asia Pacific Population Journal, 18(4), 53-65.

Shrestha, & Laura, B. (2000). Population Ageing In Developing Countries. Health Affairs, 19(3).

Sobba, I., & Reddy, M. S. N. (Eds.). (2006). Health Ageing: Concept, Problems and Prospects. New Delhi: Serials Publications.

Spillman, B. C. (2004). Changes in Elderly Disability Rates and the Implications for Health Care Utilization and Cost. The Milbank Quarterly, 82(1), 157-194.

United Nations Population Fund (UNFPA). 2007. State of World Population 2007, Unleashing the Potential of urban Growth. New York: UNFPA.

United Nations. (2002). World Population Ageing 1950-2050. New York: Departments of Economic and Social Affairs, Population Division.

United Nations. (2005). Living Arrangements of Older Persons around the World. New York: Department of Economic and Social Affairs Population Division.

Visser M, Van Den Heuvel E, Deurenerg P. (1994). Prediction equations for the estimation of body composition in the elderly using anthropometric data. British Journal of Nutrition. 71: 823-33.

Original Contribution/Clinical Investigation

Falls among elderly persons living in a rural community setting, Egypt

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ABSTRACT

Background: Falls are the most serious health problem among the elderly with adverse physical, medical, psychological and economic consequences.

Objectives: to estimate the period prevalence rate of fall, circumstances of falls and their risk factors among the elderly persons living in a rural community setting.

Methods: This is a cross-sectional study followed by a nested case-control study targeting all elderly in Menet Sandob village. The study questionnaire included the socio-demographic data, use of assistive devices, medical history, falls during the past year and their circumstances, as well as risk fall assessment scale.

Results: More than two-thirds of the elderly reported one or more falls during the past year. More than half of the fallers included in the case control study reported one fall during the past year. Most of the falls occurred in the morning, inside homes with slip contributing to about one-third of falls. More than 15% of fallers suffered from fractures as a result of the fall. The logistic regression revealed that the only independent predictor of fall among the elderly is the risk fall scale. Fallers are more likely to have mild to high risk fall scale than non-fallers (OR= 38.4)

Conclusion: Falls are frequent among rural elderly residents, with preventable contributing factors. Risk fall scale could be useful for fall prediction among the elderly.

Keywords: Falls, elderly, Risk fall scale

Introduction

Falls in the elderly are a public health and community problem with adverse physical, medical, psychological, social and economic consequences.(1) Falls are the most serious health concerns facing older persons. (2) The first major problems associated with aging are an increased susceptibility to injury and fracture, one out of three elder people living in the community are likely to fall one or more times in a year threatening the independence and 60% of nursing home residents fall each year. (3-5)

The high incidence of falls may be due to either intrinsic or extrinsic risk factors. Intrinsic factors related to the elderly themselves such as, age related changes, reduced visual capacity especially at night, improper use of mobility aids, such as canes walkers, or wheel chair without being prescribed, or properly fitted, disease related symptoms such as orthostatic hypotension, incontinence, reduced cerebral blood flow, weakness, fatigue, multiple use of medications and unsafe clothing such as poor fitting shoes and socks, are also causes of fall.(8) When identifying the risk of a fall, not only intrinsic (subject related) but also extrinsic (environmental-related) and behavioral (activity-related) factors need to be considered. (9)

Furthermore, falls can result in a range of adverse outcomes, from minor bruises to fractures, disability, dependence and death. Falls can be categorized broadly into non injurious and injurious falls. Approximately one quarter of falls result in physical injury and incur high costs in terms of quality of life, health and social services. (10)

In Egypt few studies have explored the problem of falls in the elderly; none of these studies were community-based and none were done in the Mansoura Region. The objectives of this study were to estimate the period prevalence rate of fall, circumstances of falls and their risk factors among the elderly persons living in a rural community setting.

Subjects and Methods

This is a cross-sectional study followed by a nested case-control study done in Menut Sandob village, 5 km away from Mansoura city, Egypt, during the period from July 1 to end of December, 2010.

A pilot study was carried out on 50 elderly from a nearby village (they were not included in the full-scale study) to evaluate the applicability, clarity and feasibility of the Arabic version of the study tool. Also the percentage of elderly with one or more risk factors of fall were assessed and used for sample size calculation.

Target population: all elderly persons living in Menut Sandob village during the study duration. The number of elderly aged 60 years or more was 933 (6.1% of the total population) according to the register of the Family Health Unit of the village. A list was obtained of their names and home addresses. We were able to locate and interview766 (82%) of them after their consent. The others had either died, changed their address, gave the wrong address, refused to participate or were not available at their homes during the study duration. All the 766 elderly were asked about a history of fall within the past year and the period prevalence of fall was calculated. Then a nested case control study was carried out.

EPI INFO program of the CDC was used to estimate the sample size for the nested case control study. From a pilot study we found that 66.0% of fallers had at least one risk factor such as, comorbidity of disease, medication use, the use of assistive devices, environmental hazards, with anticipated OR=2, level of significance=95%, study power = 80%, and case control ratio =1:1. It was estimated that at least 148 elderly should be included in each group.

A systematic random sample was selected from the fallers and the non-fallers, every second case from faller and every third elderly from the non-fallers.

The study protocol was approved by the College of Nursing, Mansoura University and the local Health Administration of Mansoura. Elderly were assured about the confidentiality of data collected and gave verbal consent to participate in the study.

The questionnaire included the socio-demographic data such as age, sex, level of education, occupation before retirement, income, current occupation, and marital status; types of assistive devices; as well as past medical history. Elderly with history of fall during the past year were asked about number of falls and the circumstances for the last event in details.

Falls Risk for Older People - Community Setting (FROP-Com) developed by National Ageing Research Institute (11) was used to assess the elderly person's likelihood of falling. It consists of 13 risk factors being rated, most on a graded 0-3 scale, which includes: history of falls, medications, medical conditions, sensory loss, feet and footwear, cognitive status, continence, nutritional status, environment, functional behavior, physical function (ADLs and IADLs), balance, and gait/physical activity. The total score of the scale is 63 and results were categorized into: low risk of falls (0 - 15); mild to moderate risk of falls (16 - 24) and high risk of falls (>24).

The Risk fall assessment scale was translated into Arabic by two researchers and back-translated into English by the other two researchers. The required corrections and modifications were carried out accordingly. The scale was tested for its reliability during the pilot study. This scale was repeated again for these elderly after two weeks. The scale was found to be reliable with Cronbach's alpha of 0.83 and test-retest reliability of 0.89.

Data was analyzed using SPSS version 16. Variables were presented as number and per cent as well as mean ± standard deviation, as appropriate. Spearman correlation coefficient was used to calculate test-retest reliability of the risk fall assessment scales and its internal consistency was measured by Cronbach's alpha.

Chi square or Fishers' Exact test was used for comparison between the groups of fallers and non-fallers, as appropriate. Significant predictors of falls in bivariate analysis were entered into a multivariate Wald forward logistic regression analysis to

find out the independent predictors of falls. P < 0.05 was considered statistically significant.

Results

The period prevalence rate of falls among studied elderly is 41.3% (316 fallers and 450 non-fallers) with 21.8% single fall and 19.5% multiple falls.

	N (%)
Number of falls	
Once	76(50.7)
Twice	48(32.0)
3 times or more	26(17.3)
Circumstances of the most recent fall	
Time of fall:	
At morning	102(68.0)
At evening	48(32.0)
Location of fall:	
Inside home	91(60.7)
Outside home	59(39.3)
Direction of fall:	
Right	32(21.3)
Left	28(18.7)
Forward	35(23.3)
Backward	18(12.0)
Down	31(20.7)
Can't remember	6(4.0)
Perceived cause of falls:	
Trip	23(15.3)
Slip	47(31.3)
Loss of balance	30(20.0)
Knee gave way	11(7.3)
Fainted	7(4.7)
Feeling dizzy, giddy	11(7.3)
Feel out of bed	21(14.0)
Injuries#:	
None	9(6.0)
Bruises and redness	56(37.3)
Hematoma	32(21.3)
Bleeding and wound	30(20.0)
Fracture	23(15.3)

 # More than one response

Table 1: Number of falls and circumstances of the most recent fall in the past year in the faller group

Table 1 shows that more than 50% of the 150 fallers included in the case-control study experienced one fall during the past year. The number of falls ranged from one to four times. More than two-thirds of the most recent falls occurred in the morning, and 60.7% occurred inside home. Forward, right and down are the most frequent directions of falls (23.3%, 21.3% and 20.7%l, respectively). Slip and loss of balance were the most perceived cause of fall (31.3%, 20.0% and 15.3%, respectively). Bruises and redness was the most frequent injury after fall. About 15% of fallers reported fracture as a sequel of falls.

The percentage of females among fallers is significantly higher than among non-fallers (65.3% vs. 52.0, P=0.02). Age, social status, occupation before retirement, living condition and education did not show any significant difference between fallers and non-fallers (Table 2).
The number of chronic diseases and their nature did not vary between the fallers and non-fallers. On the other hand the use of assistive devices was significantly higher among fallers than non-fallers (76.0% vs. 52.7%, respectively, P?0.001), however, the nature of device did not differ between the two groups. A significantly higher proportion of fallers had a higher fall risk score than non-fallers (38.0% vs. 1.3%, respectively; P<0.001) (Table 3). The logistic regression revealed that the only independent predictor of fall among elderly is the risk fall scale. Fallers are more likely to have moderate to high risk fall scale than non-fallers (OR= 38.4; CI=18.8-78.3) (Data not shown in tables).

Discussion

The phenomenon of falls among the elderly is not well studied in the developing world. However, being aware of the possible risk factors for fall specific to different populations and trying to eliminate these factors, is very important to prevent falls.(12) This is the first study from Egypt presenting the incidence and correlates of falls among the elderly in the community setting.

The cross-sectional study revealed that the period prevalence rate of falls among the studied elderly was 41.3%. This rate is much higher than rates reported from both developed and developing countries. Rates from previous studies were 29.0% in Australia (13); 33% in The Netherlands (14); 32.0% in France (15); 27.0% in Canada (16); 31.0% in Switzerland (17); 19.5% in Taiwan (18); 15.85% in Japan (19); 28.5% in Turkey (12); 34.8% and 27.1% in Brazil (20, 21); and 26.4% in China.(22)

The prevalence of recurrent fall was 19.5%. Again this is higher than the rates reported in previous studies. The prevalence of recurrent falls ranged from 7.0% to 16% in most of the studies. (14-16, 18, 21) An exceptionally higher rate of 31% was reported from Switzerland. (17)
This high rate of falls in our study could be attributed to unsuitable environments inside and outside the home, lack of protective measures and inadequate health care for morbidities contributing to the falls.

Among fallers included in the case control study, about 60.0% of the most recent falls occurred inside home. Most

	Non fallers (150) N (%)	Fallers (150) N (%)	Significance test
Age: (in years)			
60-	87(58.0)	78(52.0)	
70-	47(31.3)	52(34.7)	χ^2=1.2,P =0.6
80+	16(10.7)	20(13.3)	
Mean ± SD	68.8±6.5	69.6±6.8	t=1.02,P= 0.3
Sex:			
Male	72(48.0)	52(34.7)	χ^2= 5.5,
Female	78(52.0)	98(65.3)	P= 0.02
Social status:			
Married	62(41.3)	71(47.3)	χ^2= 1.1,
Widow and others	88(58.7)	79(52.7)	P= 0.3
Education:			
Illiterate	102(68.0)	93(62.0)	
Read & write	17(11.3)	26(17.3)	χ^2= 2.6,
Primary & preparatory school	19(12.7)	21(14.0)	P= 0.5
Secondary school & above	12(8.0)	10(6.7)	
Occupation before retirement:			
House wife	85(56.7)	88(58.7)	
Farmer	33(22.0)	21(14.0)	χ^2= 5.406,
Governmental employee	24(16.0)	25(16.7)	P=0.14
Manual and business work	8(5.3)	16(10.7)	
Living condition:			
Alone	30(20.0)	25(16.7)	χ^2= 0.6,
With others (family, sons, relatives)	120(80.0)	125(83.3)	P=0.5
Income: (Egyptian Pounds/ month)			
≤150	36(24.0)	26(17.3)	χ^2= 4.208,
150-300	54(36.0)	47(31.3)	P= 0.122
≥300	60(40.0)	77(51.3)	

Table 2: Socio-demographic factors associated with falls

of the elderly live inside the home either on the ground floor, or restricted their movement outside the home. Halil et al (12) commented that in developing countries elderly usually do not work and spent most of their time inside their homes.

Bongue et al (15) reported that approximately two thirds of falls occurred indoors or around the habitation. Furthermore, Campbell et al (23) found that 65% of women and 44% of men who fall do so within their usual residence and in the most commonly used rooms.

However, the external environment with its fast-moving vehicles and soft, slippery and irregular ground surfaces can be challenges for older people. Studies have reported that 33-50% of falls occur outside the home. (19, 24)

More than two-thirds of falls occurred in the morning. Prudham & Evans (24) reported that most falls occur in peak activity periods, and only 20% occur at night. This is expected because most of the daily activities are performed at this time. The same was reported in other studies. (25, 26)

The present study found that the most likely causes for falls were slip and loss of balance followed by trip and fall out of bed. These results agree with Makhlouf. (26) Although, dizziness is the most common attributed cause of falls in some studies (27, 28), this study revealed that only 7.3% of respondentsattributed dizziness as the cause of falls. On the other hand, loss of balance disorder was observed to be the cause of falls among older persons, approximately 20% of fallers. This was also reported in other studies, where some authors mentioned that balance and gait abnormalities appeared to be significant risk factors for the occurrence of falls.(28, 29)

	Non faller (150) N (%)	Faller (150) N (%)	Significance test
Chronic diseases#			
Number of disease:			
None	11(7.3)	11(7.3)	
One disease	52(34.7)	48(32.0)	χ^2=1.3,
Two diseases	61(40.7)	70(46.7)	P= 0.7
Three and more diseases	26(17.3)	21(14.0)	
Type of disease:			
Cardiovascular diseases	70(46.7)	91(60.7)	χ^2= 5.9,P=0.2
Endocrine diseases	46(30.7)	44(29.3)	χ^2= 0.06,P= 0.8
Musculoskeletal problems	45(30.0)	39(26.0)	χ^2= 0.6,P= 0.44
Eye problems	43(28.7)	33(22.0)	χ^2= 1.8,P= 0.2
Gastrointestinal diseases	26(17.3)	30(20.0)	χ^2= 0.4,P= 0.06
Respiratory diseases	11(7.3)	6(4.0)	χ^2= 1.6,P=0.2
Neurological diseases	6(4.0)	1(0.7)	χ^2= 3.7,P=0.1
Use of assistive devices.			
Any devices			
Yes	79(52.7)	114(76.0)	χ^2= 17.8,P≤ 0.001
No	71(47.3)	36(24.0)	
Types of devices#:			
Cane	32(12.3)	60(40.0)	χ^2= 12.2, P≤
Eye glasses	50(33.3)	66(44.0)	0.001
Hearing aids	1(0.7)	5(3.3)	χ^2= 3.6, P= 0.06
			FET,P=0.2
Risk fall assessment scale			
Low risk (0-15)	117(78.0)	12(8.0)	
Mild to moderate risk (16-24)	31(20.7)	81(54.0)	χ^2= 159.1,
High risk(>24)	2(1.3)	57(38.0)	P≤ 0.001

#More than one response.; FET= Fisher's Exact Test

Table 3: Risk factors of falls according to medical history, use of assistive devices and risk of fall assessment scale

In this study bruises and redness were the most frequent injury after fall (37%) followed by haematoma (21.3%). About 15% of fallers reported fracture as a sequel of falls. In The Netherlands injury due to falls was reported by 45% of fallers; 2% hip fractures, 4% other fractures and 39% minor injuries.(14) A study in France reported that 77.9% of fallers reported a physical traumatization.(15) In Switzerland of all falls, 36% of falls resulted in fall-related injuries, 4% resulted in a severe injury, while 3.4% lead to fracture.(17)

A fall is not a diagnosis and often reflects a multiplicity of risk factors associated with normal physiological aging, deconditioning from inactivity, and superimposed acute and chronic diseases.(30) Maintaining balance is a complex task involving many systems which are affected by aging and susceptible to impairments induced by disease. There has been a great deal of research focusing on risk factors for falling, and over 400 potential risk factors have been reported.(31)

We found that females accounted for about two-thirds of fallers compared to about half of non-fallers. This is in agreement with previous studies.(12,15,16,18,21,24,28,32)

According to the total score of (FROP-Com), the present study found that the moderate and high fall risk, had a higher percentage in fallers than non-fallers. This is in agreement with other studies done in the USA and in Taiwan.(33,34)

Because of the high incidence and important consequences of falls, and the evidence that many falls are preventable, efforts should be made to develop a strategy to prevent falls in the community,. The effectiveness of any intervention needs to be assessed through clinical trial.

There is a need for a nationwide prospective cohort study to investigate different possible risks of falls and to test the predictive validity of the fall risk scale in the Egyptian community settings.

There are some limitations to the study. Firstly, there was a possibility of recall bias (the subjects could forget to report the falls) affecting the incidence of falls. Secondly, the case-control design of this study may not prove the temporal relationship between specific risks and the fall, especially with multiple falls. Since fall risk means the possibility of falling in the future, further studies using longitudinal data set is mandatory.

References

1. Graham J, Nunn A. Static and dynamic assessment and minimization of risk factors for falls in older people. The Alfred Care HealthCare Group of the Eastern Healthcare Network. 1996 August. (Available at: http://www.monash.edu.au/rehabtech/research/reports/falls.pdf , Accessed: December 15, 2010)
2. Muir S, Berg K. Use of the Berg balance scale for predicting multiple falls in community-dwelling elderly people: A prospective study. Phys Therapy 2008;88 (4):449-459
3. Lord S, Dayhew J, Howland A. 2002. Multifocal glasses impair edge-contrast sensitivity and depth perception and increase the risk of falls in older people. J Am Geriatr Soc 2002;50:1760-6.
4. Rao SH. Prevention of falls in older patients. Am Fam Physician. 2005 ;72(01):81-88.
5. Bueno-Cavanillas A, Padilla-Ruiz F, Jimenez-Moleon JJ, Peinado-Alonso CA, Galvez-Vargas R. Risk factors in falls among the elderly according to extrinsic and precipitating causes. Eur J Epidemiol 2000;16(9):849-59
6. Nelson M. Physical activity and public health in older adults: Recommendations from the American College of Sports Medicine and the American Heart Association. Am J Sports Med 2007; 39(8):1435-1445.
7. Ciaschini P, Straus S, Dolovich L, et al. Community-based intervention to optimize falls risk management: a randomized controlled trial. Age Ageing 2009;38(6):724-730
8. CDC. Preventing falls: How to develop community-based fall prevention programs for older adults. National Center for Injury Prevention and Control. Atlanta, GA: Centers for Disease Control and Prevention. 2008 (Available at: http://www.cdc.gov/HomeandRecreationalSafety/images/CDC_Guide-a.pdf , Accessed: December 15, 2010)
9. American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopedic Surgeons Panel on falls prevention. Guidelines for the prevention of falls in older persons. J Am Geriatr Society 2001;49(50:664-672
10. Salkeld G, Cameron ID, Cumming RG, et al. Quality of life related to fear of falling and hip fracture in older women: a time trade off study. BMJ 2000; 320(7231): 341-6.
11. National aging Research Institute. Falls risk for older people - Community setting (FROP-com). (Available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm. Accessed: December 15, 2010)
12. Halil M, Ulger Z, Cankurtaran M, et al. Falls and the elderly: Is there any difference in the developing world? A cross-sectional study from Turkey. Archives of Gerontology and Geriatrics 2006;43:351-359
13. Morris M , Osborne D, Hill K, et al. Predisposing factors for occasional and multiple falls in older Australians who live at home. Aust J Physiother 2004;50:153-159
14. Stalenhoef P, Diederiks J, Knottnerus J, Kester A, Crebolder H. A risk model for the prediction of recurrent falls in community-dwelling elderly: A prospective cohort study. J Clin Epidemiol 2002;55:1088-94
15. Bongue B, Dupre C, Beauchet O, Rossat A, Fantino B, Colvez A. A screening tool with five risk factors was developed for fall-risk prediction in community-dwelling elderly. J Clin Epidemiol 2011;64(10):1154-60
16. Fletcher P, Hirdes J. Risk factors for falling among community-based seniors using home care services. Journal Gerontology 2002; 57(8): 504-510.
17. Swanenburg J, de Bruin E, Uebelhart D, Mulder T. Falls prediction in elderly people: A 1-year prospective study. Gait Posture 2010;31:317-321
18. Hsu H, Han L. Risk Factors of Falling among the Elderly in Taiwan: A Longitudinal Study. Taiwan Geriatrics Gerontology. 2008;3(2):141-154.
19. Demura S,Sato S, Yamaji S, Kasuga K, Nagasawa Y. Examination of validity of fall risk assessment items for screening high fall risk elderly among the healthy community-dwelling Japanese population. Arch Gerontology Geriatrics 2011;53(1):e41-e45
20. Siqueira FV, Facchini LA, Piccini RX, et al. Prevalence of falls and associated factors in the elderly. Rev Saude Publica 2007;749-56
21. Coimbra A, Ricci N, Coimbra I, Costallat L. Falls in the elderly of the family health program. Gerontology and Geriatrics 2010;51: 317-322.
22. Chu LW, Chi I, Chiu AY. Incidence and predictors of falls in the Chinese elderly. Ann Acad Med Singapore 2005;34:60-72
23. Campbell AJ, Borrie MJ, Spears GF, et al. Circumstances and consequences of falls experienced by a community population 70 years and older during a prospective study. Age Ageing 1990;19(2): 136-141
24. Prudham D, Evans JG. Factors associated with falls in the elderly: a community study. Age Ageing 1981;10:1411-46
25. Smith B, Ulrich B. Early onset of stabilizing strategies for gait and obstacles: older adult with Down syndrome. Gait posture2008; 28:448-455.
26. Kim H, Brunt D. 2009. The effect of sensory perturbation on step direction or length while crossing on obstacle from quiet stance. Gait posture 2009;30(1):1-4.
27. El-noamany M. Geriatric fractures. Risk factors: A literature review and a survey in hospital population of fractured elderly. M.Sc. Thesis. Ain Shames University, Faculty of Medicine, 1996.
28. El-Gameel M. Study of falls among institutionalized elderly in Alexandria. M.SC. Thesis. Alexandria University , Faculty of Nursing , 2000
29. EL Miedany Y, EL Gaafary M, Toth M, Palmer D, Ahmed I. Fall risk assessment score (FRAS): Time to rethink. J Clin Gerontol Geriatr 2011;2(1): 21-26.
30. Close J, Lord S, Menz H, Sherrington C. What is the role of falls? Best Practice Res Clin Rheumat 2005;19(6):913-933
31. Oliver D, Hopper A, Seed D. Do hospital fall prevention programs work? A systematic review. J Am Geriatr Soc 2000;48:1679-1689
32. Tromp A, Pluijm S, Smit H, Deeg D, Bouter L, Lips P. Fall-risk screening test: A prospective study on predictors for falls in community-dwelling elderly. J Clinical Epidemiol 2001;54:837-844

(continued page 27)

Original Contribution/Clinical Investigation

What is the relationship between hypertriglyceridemia and smoking?

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ABSTRACT

Background: We tried to understand whether or not there is an association between hypertriglyceridemia and smoking, in the present study.

Methods: The study was performed on consecutive patients applying to the Internal Medicine Polyclinic for check up procedure. We took patients at and below the age of 70 years to avoid debility induced weight loss in elders. Cases with hypertriglyceridemia and number, age, and sex-matched cases without hypertriglyceridemia were detected. Prevalence of smoking, normal weight, excess weight including overweight and obesity, hyperbetalipoproteinemia, type 2 diabetes mellitus (DM), and hypertension (HT) were detected in each group and the results were compared.

Results: The study included 116 cases with hypertriglyceridemia with a mean age of 43.5 years, and 49.1% (57) of them were female. Smoking showed a significantly higher prevalence in the hypertriglyceridemia group (42.2% versus 28.4%, $p<0.01$). As the expected results parallel to the hypertriglyceridemia, prevalence of normal weight was lower and excess weight was higher in the hypertriglyceridemia group ($p<0.01$ for both). Similarly, prevalences of DM and HT were both higher in the hypertriglyceridemia group ($p<0.05$ and $p<0.001$, respectively).

Conclusion: There are significant associations between hypertriglyceridemia, excess weight, DM, HT, and smoking, probably depending on personality types and life styles of individuals.

Key words: Hypertriglyceridemia, smoking, life style, metabolic syndrome

Introduction

There are some associations between certain metabolic parameters including excess weight, hypertension (HT), type 2 diabetes mellitus (DM), dyslipidemia, coronary heart disease (CHD), stroke, and eventually an increased all-cause mortality, defined as metabolic syndrome (1,2). Metabolic syndrome has become increasingly common in developed countries, for example, it is estimated that 50 million Americans have it (3). The syndrome is characterized by a group of metabolic risk factors, including excess weight, dyslipidemia, elevated blood pressure (BP), insulin resistance, and a prothrombotic and proinflammatory state (4), instead of being a certain disease since it can be reversed completely with appropriate nonpharmaceutical approaches including life style changes, diet, and exercise (5). So it actually contains the risk factors for development of irreversible chronic diseases including HT, DM, CHD, and stroke. On the other hand, smoking-related diseases kill one in every ten adults globally, and if the current trend continues, smoking will kill one in every six by 2030 (6).

Interestingly, some studies revealed that the increase in body weight by age has been found to be lower among smokers (7), and there is an increase in body weight after smoking cessation (8). However, little is known about the real relationship between smoking and dyslipidemia, excess weight, and their eventual complications on physical health, yet. We tried to understand whether or not there is an association between hypertriglyceridemia and smoking in the present study.

Materials and Methods

The study was performed on consecutive patients applying to the Internal Medicine Polyclinic of the Dumlupinar University for check up procedure between August 2005 and March 2007. We took patients at and below the age of 70 years to avoid debility induced weight loss in elders. Their medical histories including smoking habit and current medications were learnt, and a routine check up procedure including fasting plasma glucose (FPG), triglyceride (TG), and low density lipoprotein cholesterol (LDL-C) was performed. Current daily smokers were those who smoked at least for a period in the last 6 months and cases with a history of five pack-years smoked, were accepted as smokers. Cigar or pipe smokers were excluded. Insulin using diabetics and patients with devastating illnesses, including malignancies, acute or chronic renal failure, chronic liver diseases, hyper- or hypothyroidism, and heart failure were excluded to avoid their possible effects on weight. Body mass index (BMI) of each case was calculated by the measurements of the same physician instead of verbal expressions. Weight in kilograms is divided by height in meters squared, and obesity is defined as a BMI of equal to or greater than 30 kg/m2, overweight as between 25.0 and 29.9 kg/m2, normal weight as between 18.5 and 24.9 kg/m2, and underweight as less than 18.5 kg/m2 (9). Patients with hypertriglyceridemia and/or hyperbetalipoproteinemia were detected according to the National Cholesterol Education Program Expert Panel's recommendations (9), and hypertriglyceridemia is diagnosed if the serum level of TG is equal to or greater than 200 mg/dL and hyperbetalipoproteinemia is diagnosed if the serum level of LDL-C is equal to or greater than 160 mg/dL (9). A 10-day twice daily measurement of blood pressure at home (HBP) was obtained in all cases after a 10-minute education session about proper BP measurement techniques (10). The education included recommendation of upper arm while discouraging wrist and finger devices, using a standard adult cuff with bladder sizes of 12 x 26 cm for arm circumferences up to 33 cm in length and a large adult cuff with bladder sizes of 12 x 40 cm for arm circumferences up to 50 cm in length, and taking a rest at least for a period of 5 minutes in the seated position before measurement. HT is defined as a BP of equal to or greater than 135/85 mmHg on average HBP (11). Cases with an overnight FPG level of 126 mg/dL or above on two occasions or already taking antidiabetic medications were defined as diabetics. An oral glucose tolerance test with 75-gram glucose was performed in cases with a FPG level between 100 and 125 mg/dL, and diagnosis of cases with a 2-hour plasma glucose level of 200 mg/dL or above is DM. Eventually, cases with hypertriglyceridemia and number, age, and sex-matched cases without hypertriglyceridemia were detected. Prevalence of smoking, normal weight, excess weight including overweight and obesity, hyperbetalipoproteinemia, DM, and HT were detected in each group and the results were compared. Independent-Samples T Test and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 116 cases with hypertriglyceridemia with a mean age of 43.5 years, and 49.1% (57) of them were female. Although there was an absence of any difference according to the total number, mean age, and gender distribution between the groups, smoking showed a significantly higher prevalence in the hypertriglyceridemia group (42.2% versus 28.4%, $p<0.01$). On the other hand, as the expected results parallel to the hypertriglyceridemia, prevalence of normal weight was lower and excess weight was higher in the hypertriglyceridemia group ($p<0.01$ for both). Similarly, prevalence of DM and HT were both higher in the hypertriglyceridemia group ($p<0.05$ and $p<0.001$, respectively). Although the prevalence of hyperbetalipoproteinemia was slightly higher among the hypertriglyceridemia cases, the difference between the groups was nonsignificant, probably due to the small number of study cases (18.9% versus 16.3%, $p>0.05$) (Table 1 - next page).

Discussion

Metabolic syndrome is a collection of metabolic risk factors for many eventual diseases. Although there is no universally accepted definition for the syndrome, it basically includes five metabolic problems, including obesity (high body weight, BMI, or waist circumference), high glucose and insulin levels, low HDL-C, high TG, and high BP (12). Actually the syndrome is a collection of risk factors instead of the final diseases and it is a reversible condition with appropriate nonpharmaceutical approaches. Whereas HT, DM, and symptomatic atherosclerosis are irreversible and in the final states almost always require drug therapy to delay complications. Similarly, we detected significantly higher prevalences of DM and HT in the hypertriglyceridemia group in the present study ($p<0.05$ and $p<0.001$, respectively). But as an interesting result of the study, although prevalence of hyperbetalipoproteinemia was slightly higher among the hypertriglyceridemia cases, the difference between the groups was nonsignificant (18.9% versus 16.3%, $p>0.05$).

Variable	Cases with hypertriglyceridemia	Cases without hypertriglyceridemia	*p*-value
Number	116	116	
Mean age (year)	43.5 ± 12.4 (21-69)	44.4 ± 14.0 (19-70)	>0.05
Female ratio	49.1% (57)	49.1% (57)	>0.05
Smoking	***42.2% (49)***	***28.4% (33)***	***<0.01***
Normal weight	***16.3% (19)***	***29.3% (34)***	***<0.01***
Excess weight	***83.6% (97)***	***70.6% (82)***	***<0.01***
Hyperbetalipoproteinemia	18.9% (22)	16.3% (19)	>0.05
Diabetes mellitus	***16.3% (19)***	***10.3% (12)***	***<0.05***
Hypertension	***23.2% (27)***	***11.2% (13)***	***<0.001***

Table 1: Comparison of cases with and without hypertriglyceridemia

It is already known that excess weight leads to structural and functional abnormalities in many systems, and risk of death from all causes, including cardiovascular diseases and cancers, increases parallel to the severity of excess weight in all age groups (13). Effect of weight on BP was also shown in a previous study (14) by us that prevalence of sustained normotension was significantly higher in underweight (80.3%) than normal weight (64.0%) and overweight groups (31.5%) ($p<0.05$ for both), and 55.1% of cases with HT had obesity against 26.6% of cases with normotension ($p<0.001$) in another study (15). So a dominant underlying component of the metabolic syndrome appears to be already existing excess weight (5) or just a trend towards excess weight, which is probably the main cause of eventual irreversible disorders. Even prevention of the accelerating trend of body weight with diet or exercise, even in the absence of a prominent weight loss, will probably result with resolution of many parameters of the metabolic syndrome (16,17). But according to our opinion, limitation of excess weight as an excessive fat tissue in and around abdomen under the heading of abdominal obesity is meaningless, instead it should be defined as excess weight including overweight and obesity via BMI, since adipocytes function as an endocrine organ that produces a variety of cytokines and hormones anywhere in the body (5). The resulting hyperactivity of sympathetic nervous system and renin-angiotensin-aldosterone system is probably associated with insulin resistance, endothelial dysfunction, and elevated BP. Similarly, the Adult Treatment Panel III reported (9) that although some people classified as overweight had a large muscular mass, most of them also have excess fat tissue, and overweight and obesity do not only predispose to CHD, stroke, and numerous other conditions, they also have a high burden of other CHD risk factors including type 2 DM, HT, and dyslipidemia. Similarly, we detected significantly higher prevalences of excess weight including overweight and obesity, parallel to the significantly higher prevalences of DM and HT, in the hypertriglyceridemia group in the study ($p<0.01$).

Although already known are the many harmful effects of smoking, some studies reported that smoking in humans and nicotine administration in animals are associated with a decreased body weight (18). Evidence revealed an increased energy expenditure while smoking, both at rest and during light physical activity (19), and nicotine supplied by patch after smoking cessation decreased caloric intake in a dose-related manner (20). According to an animal study, nicotine may lengthen inter-meal time and simultaneously decreases amount of meal eaten (21). Additionally, body weight seems to be the highest in the former, and the lowest in current, and medium in never smokers (22). In another study (23), there was a relationship between overweight and smoking in men but not in women. Smoking may be associated with postcessation weight gain, but evidence suggests that risk of weight gain is the highest during the first year after quitting and declines

over the years (24). This may be interpreted as a response to smoking cessation, whereas the long-term increase in BMI has been attributed to more stable characteristics such as gender (25). Similarly, smoking females have not got weight gain after cessation compared to never smoking women (26). Actually, the apparent body weight increase after smoking cessation in males seems to be due to decreased weight during smoking plus a transient weight increase after quitting. Prevalence of smoking was significantly higher in the hypertriglyceridemia group (42.2% versus 28.4%, $p<0.01$) parallel to the higher prevalences of excess weight, DM, and HT in the present study. The association between smoking and hypertriglyceridemia, excess weight, DM, and HT may be explained by personality types and life styles of the individuals.

As a conclusion, there are significant associations between hypertriglyceridemia, excess weight, DM, HT, and smoking, probably depending on personality types and life styles of individuals.

References

1. Eckel RH, Grundy SM, Zimmet PZ. The metabolic syndrome. Lancet 2005; 365: 1415-1428.
2. Grundy SM, Brewer HB Jr, Cleeman JI, Smith SC Jr, Lenfant C. Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association conference on scientific issues related to definition. Circulation 2004; 109: 433-438.
3. Clark LT, El-Atat F. Metabolic Syndrome in African Americans: implications for preventing coronary heart disease. Clin Cardiol 2007; 30: 161-164.
4. Tonkin AM. The metabolic syndrome(s)? Curr Atheroscler Rep 2004; 6: 165-166.
5. Franklin SS, Barboza MG, Pio JR, Wong ND. Blood pressure categories, hypertensive subtypes, and the metabolic syndrome. J Hypertens 2006; 24: 2009-2016.
6. World Health Organization. Smoking statistics, fact sheet 2002, WHO, Regional Office for the Western Pacific 2005.
7. Rasmussen F, Tynelius P, Kark M. Importance of smoking habits for longitudinal and age-matched changes in body mass index: a cohort study of Swedish men and women. Prev Med 2003; 37: 1-9.
8. Caan B, Coates A, Schaefer C, Finkler L, Sternfeld B, Corbett K. Women gain weight 1 year after smoking cessation while dietary intake temporarily increases. J Am Diet Assoc 1996; 96: 1150-1155.
9. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. Circulation 2002; 106: 3143-3421.
10. O'Brien E, Asmar R, Beilin L, Imai Y, Mallion JM, Mancia G, et al. European Society of Hypertension recommendations for conventional, ambulatory and home blood pressure measurement. J Hypertens 2003; 21: 821-848.
11. Helvaci MR, Seyhanli M. What a high prevalence of white coat hypertension in society! Intern Med 2006; 45: 671-674.
12. Hunt KJ, Resendez RG, Williams K, Haffner SM, Stern MP. National Cholesterol Education Program versus World Health Organization metabolic syndrome in relation to all-cause and cardiovascular mortality in the San Antonio Heart Study. Circulation 2004; 110: 1251-1257.
13. Calle EE, Thun MJ, Petrelli JM, Rodriguez C, Heath CW Jr. Body-mass index and mortality in a prospective cohort of U.S. adults. N Engl J Med 1999; 341: 1097-1105.
14. Helvaci MR, Ozcura F, Kaya H, Yalcin A. Funduscopic examination has limited benefit for management of hypertension. Int Heart J 2007; 48: 187-194.
15. Helvaci MR, Kaya H, Yalcin A, Kuvandik G. Prevalence of white coat hypertension in underweight and overweight subjects. Int Heart J 2007; 48: 605-613.
16. Azadbakht L, Mirmiran P, Esmaillzadeh A, Azizi T, Azizi F. Beneficial effects of a Dietary Approaches to Stop Hypertension eating plan on features of the metabolic syndrome. Diabetes Care 2005; 28: 2823-2831.
17. Volek JS, Feinman RD. Carbohydrate restriction improves the features of Metabolic Syndrome. Metabolic Syndrome may be defined by the response to carbohydrate restriction. Nutr Metab (Lond) 2005; 2: 31.
18. Grunberg NE, Greenwood MR, Collins F, Epstein LH, Hatsukami D, Niaura R, et al. National working conference on smoking and body weight. Task Force 1: Mechanisms relevant to the relations between cigarette smoking and body weight. Health Psychol 1992; 11: 4-9.
19. Walker JF, Collins LC, Rowell PP, Goldsmith LJ, Moffatt RJ, Stamford BA. The effect of smoking on energy expenditure and plasma catecholamine and nicotine levels during light physical activity. Nicotine Tob Res 1999; 1: 365-370.
20. Hughes JR, Hatsukami DK. Effects of three doses of transdermal nicotine on post-cessation eating, hunger and weight. J Subst Abuse 1997; 9: 151-159.
21. Miyata G, Meguid MM, Varma M, Fetissov SO, Kim HJ. Nicotine alters the usual reciprocity between meal size and meal number in female rat. Physiol Behav 2001; 74: 169-176.
22. Laaksonen M, Rahkonen O, Prattala R. Smoking status and relative weight by educational level in Finland, 1978-1995. Prev Med 1998; 27: 431-437.
23. John U, Meyer C, Rumpf HJ, Hapke U. Relationships of psychiatric disorders with overweight and obesity in an adult general population. Obes Res 2005; 13: 101-109.
24. Froom P, Melamed S, Benbassat J. Smoking cessation and weight gain. J Fam Pract 1998; 46: 460-464.
25. Perkins KA. Effects of tobacco smoking on caloric intake. Br J Addict 1992; 87: 193-205.
26. John U, Hanke M, Rumpf HJ, Thyrian JR. Smoking status, cigarettes per day, and their relationship to overweight and obesity among former and current smokers in a national adult general population sample. Int J Obes (Lond) 2005; 29: 1289-1294.

(References cpntinued from page 23 Falls among elderly persons living in a rural community setting, Egypt)

33. Hensbroek P, van Dijk N, van Breda F, et al. The CARE-FALL Triage instrument identifying risk factors for recurrent falls in elderly patients. Am J Emerg Medicine 2009; 27: 23-36.
34. Chen Y, Hwang S, Chen L, Chen D, Lan C. Risk factors for falls among elderly men in a veterans home. J Chin Med Assoc 2008;71(4): 180-85.

Original Contribution/Clinical Investigation

Sinonasal Diseases in Elderly Patients

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ABSTRACT

Objective: To report the main clinical features of nasal and paranasal sinus diseases in elderly patients attending Ear, Nose and Throat clinic.

Patients and Methods: All patients aged 60 years or older who presented to the ENT clinic at King Hussein Medical Center (Amman, Jordan) with sinonasal diseases, between February 2008 and January 2011 were enrolled in the study.

The following data was recorded for each patient: age, sex, duration of complaint and clinical diagnosis.

Results: During the study period, 26,571 patients received initial attention at the Ear, Nose and Throat (ENT) Clinic of King Hussein Medical Center, out of whom 10.4% (n = 2763) were 60 years old and above. However only 2,270 records were found adequate for study purposes. Out of 2270 patients only 480 patients presented with nasal and paranasal sinus disease.

Ages ranged from 60 to 85 years, with mean age of 65.8; the majority of patients fell within the age group of 60-70 years (66.7%) while the least (4.1%) fell in the 81-85 years age group.

The most prevalent sinonasal disease was allergic rhinitis, in 271 (56.5%), which was followed by Rhino-sinusitis which was recorded in 147 (30.6%) patients.

The duration of symptoms of sinonasal diseases ranged from one day to 8 months.

Conclusion: This study suggests that sinonasal diseases, such as allergic rhinitis and rhino sinusitis are common geriatric otorhinolaryngological problems. General practitioners should be able to recognize these problems in geriatrics and possess adequate skills to deal with them.

Keywords: Elderly, Sinonasal diseases, allergic rhinitis

Introduction

Currently 580 million people in the world are 60 years or older, with 355 million in developing countries (1). Also, in several developing countries, the population aged 60 years or over is increasing at a faster rate than is the population as a whole. Between 1980 and 2020 the population of the developing world is expected to increase by 95%, whereas the elderly population will probably rise by almost 240% (2).

With the aging baby boomer generation, many physicians are seeing more and more elderly patients with ENT issues that are affecting their quality of life. In addition, the elderly are becoming more knowledgeable regarding their health and actively seeking treatment options for various medical conditions, many of which occur in the ear, nose, throat, and related structures of the head and neck. These factors, combined with the unique physiologic and cognitive changes experienced by this group, make it imperative that practicing clinicians receive a comprehensive review of treatment options for ENT issues in the elderly, including outcome information, in order to make informed treatment decisions for this growing patient population.

Previous survey data ranks sinusitis the sixth most common chronic condition of elderly persons, occurring more frequently than cataracts, diabetes, and general visual impairment (3).

There are several factors that predispose the elderly to paranasal sinus disease. Nasal and paranasal mucosal changes include mucosal atrophy, decreased mucus production, excess mucus crusting, and decreased mucociliary clearance. The supporting fibro-fatty tissues of the nose atrophy, with potential loss of support of nasal structures (narrowed nasal valve) and associated nasal obstruction. Evidence suggests that antibody-mediated immune function against common upper-respiratory infectious agents is impaired in the geriatric population. There is also an increased incidence of epistaxis and olfactory impairment in the elderly (4-6).

The aim of this study was to report the main clinical features of nasal and paranasal sinus diseases in elderly patients.

Patients and Methods

This hospital-based retrospective study was carried out between February 2008 and January 2011 in the Ear, Nose and Throat (ENT) Surgery Department, King Hussein Medical Center (Amman, Jordan).

All patients aged 60 years or older, presenting with sinonasal diseases to the ENT clinic and seen by ENT doctor, were enrolled in the study.

The following data was recorded for each patient: age, sex, duration of complaint and clinical diagnosis.

Results

During the study period, 26571 patients received initial attention at the Ear, Nose and Throat (ENT) clinic of King Hussein Medical Center, out of whom 10.4% (n = 2763) were 60 years old and above. However only 2,270 records were found adequate for study purposes. The others were discarded due to inadequate demographic details and incomplete clinical history.

Out of 2270 patients only 480 patients presented with nasal and paranasal sinus disease.

The gender profile of the studied group is shown in Table 1.

Ages ranged from 60 to 85 years, with mean age of 65.8; the majority of patients fell within the age group of 60-70 years (66.7%) while the least (4.1%) fell in the 81-85 year age group as shown in Table 2 (next page).

The most prevalent sinonasal disease was allergic rhinitis, in 271 (56.5%), which was followed by Rhino-sinusitis which was recorded in 147 (30.6%) patients, while the other presentations are as shown in Table 3 (next page).

The duration of symptoms of sinonasal diseases ranged from one day to 8 months.

Discussion

In Jordan, just like in other countries, there is an increase in the number of elderly individuals. With the increase of such a population segment, there is an impact in both society and medicine. Geriatric patients are those who use medical care the most. Literature data affirms that a population with 12% of elderly individuals uses 33% of medical time (7). In this study, the number of consultations for geriatric patients was 10.4% of the total outpatients in the study period.

The factors that can lead to increased sinonasal inflammation in the elderly include a decrease in immune function,

Gender of patients	Total No.	Percentage
Male	274	57%
Female	206	43%
Total	480	100%

Table 1: Distribution of patients with respect to sex (No. 480)

Age of presentation	Total No.	Percentage
60-65 years	162	33.8%
66-70 years	158	32.9%
71-75 years	90	18.8%
76-80 years	50	10.4%
81-85 years	20	4.1%
Total	480	100%

Table 2: Distribution of patients with respect to age (No. 480)

Clinical Diagnosis	Total No.	Percentage
Allergic rhinitis	271	56.5%
Rhino-sinusitis	147	30.6%
Epistaxis	25	5.2%
Vasomotor Rhinitis	19	4%
Nasal Polyposis	14	2.9%
Inverted papilloma	3	0.6%
Nasopharyngeal Carcinoma	1	0.2%
Total	480	100%

Table 3: Clinical diagnosis of Sinonasal diseases (No. 480)

mucociliary dysfunction, allergies, dehydration and thickened nasal secretions (8).

These factors must have been responsible for the rhino sinusitis and allergic rhinitis that constituted the main sinonasal diseases seen among our studied patients.

Few studies have specifically examined the incidence or prevalence of sinusitis in the elderly population. Knutson et al noted that sinusitis is common in elderly persons and may have more subtle presenting signs and that when sinusitis is properly treated; the management of asthma can be improved (9).

Studies have generally demonstrated that there is no definite relationship between age and the type of nasal epithelium. Neither age nor smoking has been related to a reduction in ciliated cells. In addition, the effect of age on mucociliary transport is modest. However, loss of nasal structural support can increase symptoms of nasal obstruction.

The most common nasal complaints in the elderly include nasal drainage, postnasal drip, sneezing, coughing, olfactory

loss and gustatory rhinitis. Nasal discharge and postnasal drip among the elderly may be explained by loss of autonomic control. Gustatory rhinitis may be caused by over activation of the autonomic control of the mucoserous and Bowman's glands. In general, nasal resistance increases with age although many patients do not complain about these symptoms because they believe it to be a consequence of aging.

Treatment of these problems should entail humidification and avoidance of topical or systemic decongestants because they may aggravate dryness or mucosal atrophy. In patients with vasomotor or gustatory rhinitis, anticholinergics such as ipratropium bromide spray may be effective. Some medications commonly used by the elderly such as diuretics and antihypertensives may dessicate the nose and treatment with topical or systemic decongestants and should be avoided because they may aggravate dryness and mucosal atrophy. Treatment should include cessation of offending medications if possible, humidification, nasal irrigations, appropriate antibiotic therapy and sinus surgery when indicated.

The result of sinus surgery for chronic sinusitis has been examined. In a study of 1112 patients who underwent endoscopic sinus surgery, patients older than 65 made up 15% of the patient population. This group had a higher incidence of minor complications but final outcomes that were similar to those for the other age groups (4).

However, more studies about sinonasal diseases in the geriatric age group are required and more attention and care of this group is needed at all levels.

Conclusion

This study suggests that sinonasal diseases such as allergic rhinitis and rhino sinusitis are common geriatric otorhinolaryngological problems. General practitioners should be able to recognize these problems in geriatrics and possess adequate skills to deal with them.

References

1. World Health Organization (WHO). Ageing: Exploding the Myths. Washington, DC: WHO; 1999. WHO/HSc/AHE/99; 1:3-4.
2. World Health Organization (WHO). Report of a WHO Expert Committee on Health of the Elderly: Demography and Public Health Aspects of Population Ageing. Washington, DC: WHO; 1989. Technical Report Series 779:14-17.
3. Calkins E, Vladutiu, AO. Duthie: Practice of Geriatrics. 3rd ed. Philadelphia: W. B. Saunders Company; 1998. p. 65, 421-2.
4. Jiang RS, Hsu CY. Endoscopic sinus surgery for the treatment of chronic sinusitis in geriatric patients. Ear Nose Throat J 2001; 80(4):230-2.
5. Leopold DA, Bartoshuck L, Doty RL, et al. Aging of the upper airway and the senses of taste and smell. Otolaryngol Head Neck Surg 1989;100(4):287-9.
6. Kurtti P, Isoaho R, Von Hertzen L, et al. Influence of age, gender and smoking on Streptococcus pneumoniae, Haemophilus influenza and Moraxella (Branhamella) catarrhalis antibody titers in an elderly population. Scand J Infect Dis 1997; 29:285-489.
7. Clarke LK. Geriatric otorhinolaryngology: embracing the challenge. ORL Head Neck Nurs. 2002, Spring; 20(2):6.
8. Kimmelman CP. Medical aspects of nasal dysfunction in the elderly. In: Kashima HK (ed.) Clinical Geriatric Otorhinolaryngology. St. Louis, Mosby-Year Book. 1992: 67-70.
9. Knutson JW, Slavin RG. Sinusitis in the aged: optimal management strategies. Drugs Aging 1995; 7:310-316.

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