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RESEARCH

PREVALENCE AND RISK FACTORS OF DEMENTIA AMONG COMMUNITY DWELLING ELDERLY PEOPLE IN IZMIR, TURKEY

ABSTRACT

Introduction: The prevalence of dementia is increasing worldwide. The aim of this study was to determine the prevalence and risk factors of dementia among community-dwelling elderly population.

Materials and Method: A cross-sectional study utilizing cluster sampling method was performed. Diagnosis of dementia was made clinically. The parameters effecting the presence of dementia were determined by Chi square test, φ coefficient and logistic regression model.

Results: The mean age of the total 490 elderly subjects was 71.8. 34.7% of the elderly were illiterate and 12% were living alone. Prevalence of dementia was found to be 12.9%. According to logistic regression analysis with φ coefficient, advanced age and cerebrovascular disease increased the prevalence of dementia in the elderly people.

Conclusion: Prevalence of dementia among community-dwelling elderly people is relatively high. We suggest that occurence of a high rate of dementia in the study population may be due to the cumulative effect of several unfavourable risk factors such as poor socioeconomic conditions and poor health status and low level of education.

Key Words: Dementia/Prevalence; Risk Factor; Aged.

ARAŞTIRMA

İZMİR'DE YAŞAYAN YAŞLILARDA DEMANS SIKLIĞI VE RİSK ETMENLERİ

ÖZ

Giriş: Demans sıklığı tüm dünyada artmaktadır. Araştırmanın amacı toplum içinde yaşayan yaşlılarda demans sıklığı ve risk faktörlerini saptamaktır.

Gereç ve Yöntem: Kesitsel bir araştırma yapılmış ve yöntem olarak kümelenme yöntemi kullanılmıştır. Demans tanısı klinik olarak konulmuştur. Demans varlığını etkileyen etmenler Ki kare testi, φ katsayısı ve lojistik regresyon modeliyle çözümlenmiştir.

Bulgular: Araştırmaya dahil edilen 490 yaşlının ortalama yaşı 71.8'dir. Yaşlıların %34.7'si oku-yazar değildir ve %12'si yalnız yaşamaktadır. Demans sıklığı %12.9 bulunmuştur. φ katsayısı kullanarak yapılan logistik regresyon çözümlemesine göre ilerlemiş yaş ve serebrovasküler hastalıklar demans sıklığını artırmaktadır.

Sonuç: Toplumda demans sıklığı yüksektir. Demans sıklığının yüksek olmasında olumsuz sosyoekonomik koşullar, kötü sağlık durumu ve düşük eğitim düzeyi gibi etmenlerin katkısı olduğunu düşünmekteyiz.

Anahtar Sözcükler: Demans; Görülme Sıklığı; Risk Etmeni; Yaşlı.

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INTRODUCTION

Dementia is a neuropsychiatric syndrome characterized by progressive deterioration of cognitive functions in older people. The prevalence of dementia is increasing worldwide in parallel with the ageing of the population and the number of people with dementia will almost double every 20 years. The estimates of the Delphi Consensus Study indicate that global dementia prevalence was 3.9%, and yearly incidence rate was 7.5 per 1000 population, with the regional prevalence being 1.6% in Africa, 5.4% in Western Europe and 6.4% in North America (1,2). Of the global dementia population of nearly 30 million persons, 54% live in developing countries. The rate of increase in the number of people with dementia is predicted to be three to four times higher in these regions than in the developed countries. The estimates of the prevalence of dementia in different communities vary according to variables such as geographic location, socioeconomic characteristics, genetic susceptibility, age, gender, education and diagnostic criteria (3-6). The prevalence of dementia among people aged 65 years and older by clinical diagnosis was determined to be 7.4% in Turkey (7). In other studies using a screening test, the prevalence of dementia (Mini Mental Examination Test) were found as 22.9% and 25.7% (8,9).

The modifiable risk factors of dementia are vascular, lifestyle and psychosocial factors. Low level of education, physical inactivity, insufficient mental stimulation and social network, cigarette smoking and alcohol consumption cause progressive cognitive deterioration in elderly population (10-12). Risk estimates from several epidemiological studies have not provided consistent results, although a consensus is emerging that adverse socioeconomic, cultural and health factors are likely to be important.

The aim of this study was to determine the prevalence among community-dwelling elderly population in Izmir, Turkey and to determine the associated risk factors.

MATERIALS AND METHOD

Setting and Study Design

This cross-sectional study was conducted among elderly individuals 65 years of age and older in the town of Narlıdere (an urban area) in the province of Izmir in Turkey. The target population of the study included 4012 elderly subjects, and cluster sampling method was used for sample size. Using the Epi-Info 2000 package, the minimum sample size based on dementia prevalence of 15%, 3% precision and confidence interval (CI) of 95% was calculated as 471 elderly subjects. The number of houses including this sample size was requested from Turkish Statistical Institute (TUIK). TUIK stated 2601 houses including 50 clusters of houses for sample size of district, and 517 elderly persons were determined in the 2401 houses visited. Participation rate was 94.8% (490 elderly).

The Variables of The Study, Description of The Variables and The Diagnostic Criteria of Dementia

Evidence of cognitive impairment was screened using the validated Turkish version of mini mental state examination (MMSE) by trained interviewers at the residences of the subjects. The clinical diagnosis of dementia was made according to the Diagnostic and Statistical Manual of Mental Disorders, 4rd Edition, Revised criteria (DSM IV-R) (13) by an experienced senior neurologist in the research team. Dementia subtypes (Alzheimer's disease and vascular dementia) were defined by NINCDS-ADRDA (13) and NINDS-AIREN (13), respectively. Final diagnosis was made after reviewing all available medical, laboratory, and neuroradiological data [computed tomograpy/magnetic resonance imaging (CT/MRI) scans].

Dependent variable of the study was the presence of dementia.

The independent variables were as follows: a) the socioeconomic variables were age, gender, status of education, social insurance, working before and during old age, personal and household income. b) the variables of health status were presence of chronic disease, history of head trauma, using of tobacco and alcohol, loss of capacity diagnosed by Barthel index (14) (≤40 scores: severe dependent, 41 to 60 scores: dependent, ≥61 scores: independent) and presence of depression (≥8 scores determined by Geriatric Depression Scale (15) was accepted as positive).

Data collection was completed between September 2006 and July 2008. All of the elderly people in the selected sample houses of 2601were reached. For home visits of older subjects, permission was taken from local authorities. After taking oral informed consent from elderly subjects or their relatives in the same house, neurologic examinations of the subjects were performed in their house by a neurologist in the research team. People with dementia were diagnosed at the department of Neurology in Dokuz Eylul University Hospital.

The study was approved by the ethics committee of the Faculty of Medicine of Dokuz Eylul University.

Statistical Analysis

The characteristics of the elderly people were evaluated by percent distribution. The parameters effecting the presence of dementia were determined by Chi square test in univariate analysis. A P value <0.05 in Chi square test was considered statistically significant. Coefficient of φ was calculated for all significant findings to check the error derived from the big size (n=490) of Chi square test ($\varphi = \sqrt{\chi 2/n}$) (16). φ value > 0.30 was accepted as significant. The variables of φ> 0.3 were analysed using logistic regression model.

RESULTS

The mean age of the total 490 elderly subjects included in the study was 71.8 (ranges from 65 to 114 years; sd= 6.5). Socio-demographic characteristics of the elderly are illustrated in Table 1. Of the elderly population, 59.2% were females, 70.8% fell in the relatively young age group (65-74 years), and 62.7% were married. The mean schooling year was 1.6 (Sx: 0.07), 34.7% were illiterate, and 50.4% did not complete their primary school education. While 12% of the elderly people were living alone, 45.3% were living with spouse, 14.7% with spouse and children and 25.1% with children. In our study population 9.8% of the subjects had no social insurance, 27.2% did not have any personal income and 5.7% were still working at the time of the study. Mean monthly personal income was 446,5 ± 385 Turkish Lira (TL) (range; 0-3.000 TL). Of the older persons, 25.5% were living in a squatter's house, 29.6% perceived self economic status as bad or very bad. Of the older subjects, 31.4% had no occupation, 18.2% were active smokers, 24.9% were former smokers, and the rate of alcohol consumption was 8%.

Nearly four out of five (83.9%) of the older subjects was experiencing at least one chronic disease. Most common diseases among the elderly were hypertension (53.7%), cardiovascular disease (24.1%), diabetes mellitus (18.2%) and musculoskeletal disease (15.7%). Of the total 482 subjects, 18.2% had depression. 37 (7.6%) had a history of head trauma, 5.8% were dependent in daily living activities.

According to DSM IV, the overall prevalence of dementia was 12.9%. The prevalence of dementia was significantly higher among women, subjects with more advanced age, single, widowed or divorced subjects and subjects with low level of education according to Chi square test (p<0.001, p<0.001, p<0.001, p=0.007, respectively). Marital status was significantly associated with dementia even after correction for age group. Prevalence of dementia was found to be

Table 1— Sociodemographic Characteristics of the Older People

Characteristics	n (490)	%
Gender		
Female	290	59.2
Male	200	40.8
Age Groups (y)		
65-69	226	46.1
70-74	121	24.7
75-79	80	16.3
80-84	41	8.4
≥85	22	4.5
Marital Status		
Married	307	62.7
Widoved	174	35.5
Divorced/Single	9	1.8
Education		
Illiterate	170	34.7
Literate	77	15.7
Primary school	128	26.1
Secondary school	29	5.9
High School	53	10.8
University	33	6.7
Social insurance (No)	48	9.8
Working at the present	28	5.7
Personal income (Yes)	357	72.9
Monthly personal income*	68	13.9

*minimal salary per month

significantly lower among married women (p<0,001), while the association between being a man and having dementia did not show any significance (p=0.735). The variables in Chi square test were evaluated with φ coefficient. It was found that only advanced age increased the prevalence of dementia (φ_{age}=0.33). Association between dementia and sociodemographic characteristics is shown in Table 2.

Prevalence of dementia was found to be significantly higher among the elderly people who had low income, those who did not have a social insurance and those who did not have a separate room within the house (p=0.034, p=0.028, p=0.015, respectively).

In univariate analysis, prevalence of dementia was lower among the non-smoker older persons. However, no significant association between consumption of tobacco and dementia was found, when the stratified analysis regarding non-smoker and active smoker or former smoker groups with gender was performed (p=0.315, Mantel-Haenszel Chi square). The presence of dementia in the elderly people in

Table 2— Association Between Dementia and Sociodemographic Characteristics

Characteristics	n	Dementia (+)		Chi-square	p	Phi
		n	%			
Gender						
Male	200	14	7.0	10.347	**0.001**	0.15
Female	290	49	16.9			
Age (y)						
65-74	226	9	4.0	54.106	**<0.001**	
70-74	121	18	14.9			
75-79	80	12	15.0			**0.33**
80-84	41	14	34.1			
≥85	22	10	45.5			
Marital Status						
Married	307	19	6.2	32.623	**<0.001**	
Divorced/widoved/singl	183	44	24.0			0.26
Education						
Illiter./liter./primary sch.	375	58	15.5	9.832	**0.007**	0.14
Secondary s./high s.	82	3	3.7			
University	33	2	6.1			
Person living together						
Alone	59	7	11.9	0.059	0.808	0.01
Spouse/children	431	56	13.0			

terms of their health status was evaluated. Dementia was significantly high in older persons with cerebrovascular disease, neurodegenerative disease and depression ($p<0.001$, for all values). Diabetes, cardiovascular disease and hypertension did not increase the frequency of dementia ($p>0.05$, for all values) (Table 3). However, only cerebrovascular disease increased dementia occurence in φ coefficient analysis ($\varphi_{CVD}=0.30$) when compared to Chi square test.

In univariate analysis and also logistic regression model with φ coefficient, advanced age and cerebrovascular disease increased the dementia prevalence. Coefficent of multiple

Table 3— Presence of Dementia According to Health Status

	n	Dementia (Yes)		X^2	P	φ
		n	%			
Chronic Disease						
No	79	5	6.1	4.016	**0.045**	0.09
Yes	411	58	14.2			
Chronic Disease						
Cerebrovascular disease	28	15	53.6	42.937	**<0.001**	**0.30**
Neurodegenerative disease	20	12	60.0	41.360	**<0.001**	0.29
Psychiatric disease	14	4	28.6	1.897*	0.168	0.06
Depression						
No	393	28	7.1	41.853	**<0.001**	0.29
Yes	89	28	31.5			
History of Head Trauma (Yes)	37	8	21.6	1.963	0.161	0.06

Table 4— Studied Variables With φ Variables In Logistic Regression Model

Variables	Reference	p	Exp(B)	95% CI for EXP(B)	
Cerebrovascular disease	Absent	**0.000**	11.732	4.867	28,283
Age		**0.000**	1.139	1.092	1,188
Constant		0.000	0.000		

Nagelkerke R Square = 0.255.

determination of logistic regression model with φ coefficient is low. This model did not show a valuable causal association between dementia, older age and cerebrovascular disease (Nagelkerke R Square=0.255) (Table 4). In the same model with Chi square test, older age, low education level, presence of neurodegenerative disease and cerebrovascular disease increased the prevalence of dementia (Nagelkerke R Square=0.417). Despite the fact that the coefficent of multiple determination of this model was higher, it couldn't also explain the causal relationship adequately.

Discussion

In comparison to previous studies, the prevalence of dementia (12.9%) in our study was high.When it's compared with previous studies, the estimates of the Delphi Consensus Study indicate that the global dementia prevalence was 3.9%, among several developing countries prevalence being 1.6% in Africa, 2.4% in India and 3% in China (1). Most of the older people included in the study were in the relatively young age group (65-74 years). This is most probably because of shorter life expectancy at birth than several developed countries. However, the prevalence of dementia in this group was also quite high (7.8%). In a study performed by Bulut et al. (7) the prevalence of dementia among the elderly was 7.4% by clinical diagnosis, and 9.8% by the Standardized Mini Mental Examination Test (SMMET). In other studies carried out in Turkey, the prevalence of dementia was found to be 6.7% and 9.8% (17,18). In our previous study, the dementia prevalence in elderly individuals residing in a low socioeconomic area was 22.9% by using the screening test (8). Large variations in the studies on prevalence of dementia exist among regions concerning several factors such as age, sample size and educational status of the elderly, geography, study period and methodology.

We observed in this study that there was a significant increase in dementia cases with age. A multicentre study reported that the prevalence of dementia increases from 1.2%-4.7% among persons aged 65-74 years to 11.5%- 39% among persons aged 85 years and older (2). The overall prevalence of dementia in Brasil was 5.1%, while it was 21.4% among the elderly aged 85 years and older (6).

The prevalence of dementia in the present study was higher among women than men according to Chi suare test, but not by φ coefficient analysis. Most studies on prevalence of dementia reported that female sex was a risk factor in dementia among older people (1,2, 5). Several hypotheses such as psychosocial, hormonal and environmental factors have been proposed to explain the female gender association with dementia. Prevalence of dementia in this study was found significantly lower among married persons than the widowed, divorced or single ones. This association persisted in stratified analysis even after correction for age. In analysis of gender-stratified data, the prevalence of dementia was significantly lower among married women, while the association between marital status and dementia did not show any significancy among men. Therefore, gender is not a confounding factor in dementia analysis.

Previous studies reported that low educational status and low income were associated with increased risk of dementia (5,6). Prevalence of dementia in our study was found to be significantly higher among the low educated and unemployed elderly people, among those who had a lower income and those who did not have a social insurance. Similar findings have also been reported by some recently reported studies (8,19).

Concerning cigarette smoking as a risk factor for dementia, conflicting results have been reported. A study by Vincze et al. (20) reported that smoking was protective against dementia, while a study in England and Wales reported that smoking was neither protective nor predictive factor in dementia (21). We did not observe an association between smoking and dementia. However, many previous studies reported that current smoking was an important risk factor for the prevalence of dementia (10,19-21). We also did not

observe any effect of alcohol consumption on the prevalence of dementia. A study from Hungary reported that occasional or former history of alcohol consumption was a protective factor for demented persons (20). A study from Australia also determined that moderate alchohol intake lowered the risk of dementia (22). On the contrary, several authorities reported that excessive alchohol intake was associated with increased risk of dementia (20,23). The role information bias, lifestyle confounding, and differential exposure assessment in the inverse association, however, remains to be determined.

An interesting finding in our study is that most of the older people (94.3%) perceived their levels of daily living activities as independent, although most (83%) had at least one chronic disease. Physical activity has regularly been found to be protective against the onset of dementia (22,24). However, several studies reported that the presence of chronic diseases such as cardiovascular and neurodegenerative diseases, diabetes, obesity and hypertension substantially increase the risk of dementia regardless of age, gender and education. In our multivariate analysis, only cerebrovascular and neurodegenerative diseases were found to be risk factors. Depression among the elderly was presented as an independent risk factor in some studies, consistent with our study (8,25).

There are some limitations in the present study. First, our findings represent only the prevalence of dementia and dementia associated risk factors in the elderly people and does not exclude the possibility that sometimes different relative risks exist separately for the dementia subtypes. Second, investigation of risk factors for dementia is based on memory. Some effecting factors in dementia might have been forgotten because of memory bias and could not be determined, especially in older persons with advanced age. Third, according to logistic regression models with Chi square test and φ coefficient the causal relationship between dementia and the mentioned variables (sociodemographic and medical) couldn't be explained clearly. Biological process in the formation of dementia needs to be well evaluated, and several sociodemographic and biologic factors should also be included in the studies.

We found a relatively high prevalence of dementia compared with the previous studies. After adjusment for significant risk factors, female gender, advanced age, low income, poor health status and depression have been found to be significantly associated with a higher prevalence rate. We suggest that the high rated incidence of dementia in the study population may be due to the cumulative effect of several unfavourable risk factors such as poor socioeconomic conditions, poor health status and low education. Further research is required to clarify the risk factors of dementia in the community dwelling elderly people and to establish the effectiveness of specific interventions. The older population is increasing rapidly in Turkey. According to General census held in 2009, the proportion of older persons is 7% (the number of old people: 5.083.414). However, national health and social policies for the elderly subjects are not available as is the case in many other developing countries. Older people receive health care services only when they have access to a health facility. For community-dwelling elderly people, preventive health care services, nursing home care services and long-term care services are not adequate. Nearly 75% of the total population is living in urban areas, and the structure of traditional large family is disappearing gradually. At present, dementia among the elderly people is a major public health problem in Turkey similar to many developing countries.

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