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Relationship Between Nutritional Factors, Sports Practicing and Falls among Elderly People in Baghdad City, Iraq, 2012

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Abstract: Ageing of the population is one of the most important demographic facts that came to the foreground in the 21st century. Apart from social and economic problems, the elderly population is very much associated with health problem. Nutrition is an important factor in falls prevention among elderly, as weakness results from a loss of muscle mass and strength, neuromuscular impairment, immobilisation and malnutrition. This study was conducted to assess the relationship between nutritional factors and sport with falls among elderly people in Baghdad city, Iraq. A matched 1:1 community based case-control study involving 716 elderly respondents, recruited randomly from six Non Governmental Organization (NGO) in different areas of Baghdad. Interview questionnaire to each respondent were done accordingly. Food frequency questionnaire were used to obtain the dietary information on weekly frequency of eating certain common food item in Iraq and anthropometric measurement (weight and height) were obtained to get the BMI. The minimum age for cases and controls were 60, the maximum age for cases was 87 years old and 85 years old for controls. Female were predominant than males and were 53.6 and 46.4% respectively. The association between BMI and falls was statistically significant ($p = 0.004$). Practicing sport or walk exercise was a protective factor for falls. All the micronutrients were significantly associated with falls except for vitamin C. It is concluded that nutrition of the elderly is one of the important risk factors contributing to falls. Elderly with low dietary intake of calcium and vitamin D, phosphorus, Protein and Iron are at risk for falls. Elderly not practicing sport are at higher risk of falls.

Key words: Falls, elderly, BMI, Baghdad, micronutrients

INTRODUCTION

Aside from social and economic problems, the elderly population is very much associated with health trouble. Chronic illnesses such as hypertension, diabetes, arthritis, hearing and eye problem is commonly associated with old age (Hayward *et al*., 2000). Psychological problems of depression, loneliness and dependency feelings are also common. Another common issue is falls among elderly which has a great impact as it may lead to many consequences such as bedridden, total dependence on others and also can cause death (Graafmans *et al*., 1996).

Inadequate diet, not eating enough healthy food to keep oneself strong and inadequate intake of protein or water, will lead to the loss of muscle mass or loss of bone density and that can increase the risk of falls and injuries (Scott *et al*., 2004).

According to United Nations (2007), the percentage of 60 and over age population in Iraq was 3.9% for men and 5.6% for women, while the sex ratio in 60 and over age group was 70 men to each 100 women. According to local Non Governmental Organizations and doctors, the general health of elderly people has been fast worsening in the past three years to the year 2007 (United Nations, 2007).

Dietary relationships to falls are less clear. However, adequate protein, essential vitamins and water are believed to be essential for optimum health. If deficiencies do exist, it is reasonable to expect that weakness, poor fall recovery and increased injury will ensue. Bone health is affected by intakes of vitamin D and calcium and deficiencies in these two nutrients have been associated with increased risk of fracture from a fall. A study in an urban area in Thailand found that the independent risk factor for falls was poor nutrition (Assantachai *et al*., 2003).

Elderly with low dietary intake of calcium and vitamin D, a low cutaneous production of vitamin D and decreasing renal function may be at risk for falls and fractures because of myopathy caused by vitamin D deficiency and secondary hyper-parathyroidism which is not compensated for by an enhanced renal production of 1, 25-dihydroxyvitamin D (Chapuy *et al*., 1983). There may be a direct effect of vitamin D status on muscle function

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(Pfeifer *et al*., 2001; Chapuy *et al*., 1992; Bischoff *et al*., 2003; Glerup *et al*., 2000) as vitamin D or its active metabolites seem to improve muscle function (Bischoff *et al*., 2000).

A Study by Morgan Robert (2003) evaluated the effect of an easily implemented, low-intensity exercise program on the incidence of falls and the time to first fall among a clinically defined population of elderly men and women. It was found that the risk for falls decreased significantly for exercise participants.http://biomedgerontology.oxfordjournals.org/content/59/10/M1062.short - aff-1.

In Iraq, there are no exhaustive studies or literature that have captured the epidemiology, etiology or impact of such falls, though there is evidence to suggest that it is an issue that warrants some attention. Such study regarding domestic fall among the elderly is important because elderly people in Iraq usually spend most of their time at home so it is considered important issue to guarantee their safety at home, to ensure they are safe being at home, moving from one room to another, bathing and cooking are need to be in a safe place and safe circumstances.

The objective of this study was to assess the relationship between nutritional factors (micr-nutrients intake, BMI), practicing sport and falls among elderly people in Baghdad city, Iraq.

MATERIALS AND METHODS

A case control study matched by sex and age was conducted between January and March 2012 in Baghdad city, Iraq. 716 elderly respondents, recruited randomly from six Non Governmental Organization (NGO) in different areas of Baghdad; These NGOs provide social and medical services to the community in Iraq. Severely ill respondents, respondents using wheelchair, those who fall outside the home and elderly with severe psychosomatic disease were excluded from the study. Interview questionnaire to each respondent were done accordingly. Anthropometric measures include weight and height of the respondents by using calibrated weighing machine to calculate the respondent BMI. Ttypically, a person with a BMI lower than 18.5 is considered to be underweight. If your BMI falls between 25.0 and 29.9, most doctors would consider you to be overweight. A healthy BMI range is between 18.5 and 24.9.

FFQ (food frequency questionnaire) was conducted to check the nutritional facts of the respondents.

A pre test of the questionnaire was carried out. A total of 20 elderly were chosen as respondents to answer the questionnaire to ensure that the questions are easily understandable. The results of the pre- test were used to improve the phrasing of the questions in the questionnaire.

This study was approved by the Research and Ethics Committee of Universiti Kebangsaan Malaysia Medical Centre. Code Number FF-017-2012, Consent form from the respondents were taken.

SPSS version 16 and Nutritionist-pro software was used to analyze the nutrient content of food items.

RESULTS

The analysis was carried out using McNemar test for categorical variables and paired t-test for continuous variables because the data was matched between cases and controls by sex and age and the p value was not significant. The minimum age for cases and controls were 60, the maximum age for cases was 87 years old and 85 years old for controls, the mean age for cases was 67.01 while mean age for controls was 66.28 years old. Female were predominant than males and were 53.6% and 46.4% respectively. Other socio-demographic characteristics are shown in Table 1.

For the purpose of analysis, some of the variables' sub categories been merged into 2 sub categories, ex: the educational level been merged from 4 sub categories into 2 sub categories (low education and high education level); the marital status also been merged from 4 sub categories at the description level into 2 sub categories (married and not married); and BMI also been merged from 3 sub categories into 2 (normal weight, over weight and obese).

Table 2 shows the distribution of the respondents' BMI, the majorities of respondents were in the overweight category. The association between BMI and falls was statistically significant (ORmn 1.57, 95% CI = 1. 14-2.17), showing that those with overweight or obese BMI more prone to fall than elderly with normal BMI by about 2 times.

Table 1: The frequency distribution of the variables

Variables	Case (358) N (%)	Controls (358) N (%)
Educational level		
Never go to school	140 (39.1)	93 (26.0)
Primary school	112 (31.3)	96 (26.8)
Secondary school	21 (5.9)	58 (16.2)
Tertiary (University or higher)	85 (23.7)	111 (31.0)
Employment status (current)		
Unemployed	290 (81.0)	244 (68.2)
Employed	68 (19.0)	114 (31.8)
Marital status		
Single	9 (2.5)	28 (7.8)
Married	159 (44.4)	224 (62.6)
Divorced	3 (0.8)	18 (5.0)
Widow/widower	187 (52.2)	88 (24.6)
Monthly income		
Low income	192 (53.6)	164 (45.8)
High income	166 (46.4)	194 (54.2)
BMI		
Normal weight	99 (27.6)	137 (38.2)
Overweight and obese	259 (72.4)	221 (61.8)
Practice sport		
No	264 (73.7)	193 (53.9)
Yes	94 (26.3)	165 (46.1)

Table 2: Relationship between educational level, employment status, marital status, monthly income and BMI with fall

Variables	Case (358) Pairs N (%)	Control (358) Pairs N (%)	p-value	ORmn	95%CI
Educational level	**Low**	**High**			
Low	59 (16.5)	71 (19.8)	<0.001	2.06	1.51-2.85
High	130 (36.3)	98 (27.4)			
Employment status (current)	**Employed**	**Unemployed**			
Employed	11 (3.1)	103 (28.8)	<0.001	2.10	1.48-3.01
Unemployed	49 (13.7)	195 (54.5)			
Marital Status	**Married**	**Not married**			
Married	98 (27.4)	126 (35.2)	<0.001	2.06	1.51-2.85
Not Married	61 (17.0)	73 (20.4)			
Monthly Income	**Low**	**High**			
Low Income	87 (24.3)	77 (21.5)	0.045	1.36	1.00-1.85
High Income	105 (29.3)	89 (24.9)			
BMI					
Normal weight	33 (9.2)	104 (29.1)	0.004	1.57	1. 14-2.17
Overweight and obese	66 (18.4)	155 (43.3)			
Practicing sport	**Yes**	**No**			
Yes	48 (13.4)	117 (32.7)	<0.01	2.54	1.79-3.66
No	46 (12.8)	147 (41.1)			

Table 3: Relationship between micro nutrients and falls

	Paired differences					
			95% CI of the difference			
Micro nutrients (unit)	Mean	SD	Lower	Upper	t	p-value
Protein (mg)	22.79	11.97	21.55	24.03	36.02	<0.001
Calcium (mg)	229.62	185.77	210.31	248.93	23.38	<0.001
Vitamin D (µg)	24.40	48.24	19.39	29.42	9.57	<0.001
Iron (mg)	1.39	1.21	1.26	1.52	21.72	<0.001
Potassium (mg)	453.67	108.34	442.41	464.94	79.23	<0.001
Phosphorus (mg)	315.68	81.34	307.22	324.13	73.42	<0.001
Magnesium (mg)	34.65	8.079	33.81	35.49	81.15	<0.001
Zinc (mg)	2.66	1.57	2.49	2.82	31.98	<0.001
Fluoride (mg)	45.29	88.48	36.09	54.48	9.68	<0.001
Vitamin C (mg)	-5.18	65.54	-11.99	1.63	-1.49	0.13

SD: Standard deviation

Table 2 Sport or walking exercise was significantly associated with fall in this study ($p<0.01$) and those who did not practice sport were more prone to fall by about 2.5 times as compared to those who practiced sport or walking exercise.

There was a difference in the mean intake of the micronutrients between cases and controls, for all the micro nutrients, the intake for controls was more as compared to cases except for vitamin C the mean intake of vitamin C for cases was 7.28 and 2.10 for controls. All the listed micronutrients were significantly associated with falls except for vitamin C which shows no statistical association with falls among elderly as shown in Table 3.

DISCUSSION

Fall is still found to be one of the public health problems among elderly; falls are a common and often devastating problem among older people, causing a tremendous amount of morbidity, mortality and use of health care services. The most important finding in our study is BMI and malnutrition were associated with an increased risk of being a faller and with impaired.

Some of the limitations in this study includes the study is not an interventional type, logistic problems because of the security situation in Baghdad and the recall bias of the respondents. While the strength of this study is mainly it is a case control and a community based study, with large sample size and the first study of it is kind in Iraq.

In this study, it shows that there is a significant difference between low education and high education among cases and controls and those with low education level were more at odds of risk by about 1.8 times as compared to those with high education as shown in other studies (Maciel and Guerra, 2005; Perracini and Ramos, 2002).

There was a significant relationship between monthly income and falls as supported by other studies (Juliana *et al*., 2010). The possible reason for that could be those with higher monthly income can get better nutrition, better life style and more medical checkups. There were

a significant association between working status (working or not working) and fall and of odds risk 2.1 times as supported by Victoria *et al.* (2004); Perracini and Ramos (2002).

Inadequate diet/exercise-Not eating enough healthy food to keep oneself strong, an inadequate intake of protein or water, or not doing enough physical activity to ward off the loss of muscle mass or loss of bone density can increase the risk of falls and injuries (Juliana *et al.*, 2010).

Since many falls can be attributed to muscle weakness, loss of balance, fatigue with exertion and declines in physical functioning among the elderly, it is logical that exercise programs might delay or reverse physical decline and so prevent falls (Victoria *et al.*, 2004).

Research studies have supported both general physical activity, such as walking, cycling, mild aerobic movements or other endurance activities and specific exercise regimes that are geared towards balance, strength and flexibility (RAND Report, 2003).

The result shows that the nutritional status was important factor determining the likelihood of fall among the elderly in an urban area. As supported by Assantachai P (Assantachai *et al.*, 2003; Coutinho *et al.*, 2008; Neyens *et al.*, 2012). More than 2 billion people in the world today suffer from micronutrient deficiencies caused largely by a dietary deficiency of vitamins and minerals. The public health importance of these deficiencies lies upon their magnitude and their health consequences (WHO, 2006).

Some of the benefit of taking vitamins may result in slowing bone loss; however it is also possible that the supplement impacts other physical aspects such as muscle strength and the ability to balance (Sandra, 2009). In a study done in Japan, it was found that vitamin D administration decreases falls (Harada, 2012).

A certain lifestyle associated with eating fish seems to influence the tendency of falling among elderly women. It was also found that women not eating sour dairy products were associated with a higher risk of falling which was even more significant in the final analyses (OR 3.0; P<0.005) (Nabil Kronfol, 2012).

Conclusion: Nutrition of the elderly is one of the important risk factors contributing to falls. Elderly with low dietary intake of calcium and vitamin D, phosphorus, Protein and Iron are at risk for falls.

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