

Malnutrition is associated with depression in rural elderly population

Zamane Vafaei, Habibollah Mokhtari¹, Zahra Sadooghi², Rokhsareh Meamar^{3,4}, Ahmad Chitsaz^{3,5}, Mina Moeini¹

Department of Epidemiology, ¹Cardiovascular research institute, Isfahan university of Medical Sciences, ²Department of Public Health, ³Isfahan Neurosciences Research Center, Isfahan University of Medical Sciences, ⁴Department of Medical Science, Islamic Azad University, Najafabad Branch, ⁵Department of Neurology, Isfahan University of Medical Sciences Isfahan, Iran

Background: Aging induces physiological changes and affects all of organs. Nutritional status and mental health deteriorate with aging. As malnutrition and depression are main problem in elderly this study was performed to assess the association between malnutrition and depression among rural elderly. **Materials and Methods:** Three hundred and seventy rural elderly aged over 60 years were examined in a cross-sectional study by systematic sampling method and using mini nutritional assessment (MNA), which is a standard questionnaire for evaluating nutrition status. Depression was evaluated by a validated questionnaire in the elderly. Correlation between Socio-demographic characteristic, diseases, and nutrition status was obtained by *t*-test, Chi-square test and logistic regression in elderly population. **Results:** Mean \pm SD age was 70.6 ± 7.3 years. Frequency of malnutrition was similar in both genders. According to MNA, 3.8% of subjects suffered from malnutrition, 32.7% were at risk of malnutrition and 63.5% were well-nourished. Nutrition status correlated with body mass index ($P = 0.028$) and depression ($P = 0.001$). The risk of severe depression in patients with malnutrition was 15.5 times higher than non-depressed persons (odd ratio: 15.5; 95% CI: 2.9-82.5). **Conclusion:** Depression could act as a powerful risk for malnutrition in elderly population that it should be controlled by physicians.

Key words: Depression, elderly, malnutrition, mini nutritional assessment

INTRODUCTION

Malnutrition is known as a common disorder, which is probably under-recognized. It is defined as a state of nutrition in which a deficiency or excess of energy, protein and other nutrients affects shape, size, composition and function of body and may lead to clinical disease.^[1] In older ages, it may lead to general weakness, exacerbate previous diseases, alter their prognosis or increase their mortality.^[2]

Malnutrition may occur due to such different causes as dietary deficiencies, chewing or swallowing problems, gastrointestinal or endocrine disorders, loss of taste or smell, decreased appetite, consuming different kinds of drugs, immobility, social isolation, inflammatory diseases, chronic diseases, alcoholism, malignancies and cognitive disorder especially depression.^[3-11]

Just like malnutrition, depression common in geriatrics^[12] and as a pre-disposing factor for mortality and morbidity in this group.^[13]

Body and mental status have a powerful relationship so lowering of neurotransmitters cause the decrease of mental flexibility and this can lend to important symptom such as: Functional limitation, anorexia and

weight loss and malnutrition.^[8,14,15] Malnutrition and psychiatric problem are among prevalent in rural elderly people and depression often has seen in malnourished elderly.^[16-19] In this study, we therefore, decided to investigate the association of between malnutrition and depression in rural elderly.

MATERIALS AND METHODS

This was a cross-sectional study (2011-2012) conducted on 370 elderly living in 36 rural in Isfahan. The older adults were selected by a systematic sampling method. Subjects older than 60 years old entered the study. The data was collected using a questionnaire. The questionnaire consisted of three parts: The first part included socio-demographic characteristic (Age, Sex, level of education, lifestyle, Independent state, Job, type of home) and history of diseases (Hypertension, Diabetic, Osteoporosis, Hyperlipidemia, Arthritis, Cancer, Depression), which were obtained by self-report and Anthropometric dimensions including calf circumference, mid-arm circumference, weight and height were measured. Body mass index (BMI) was calculated by dividing weight (in Kg) by the square of height (in m); the second part included questions to assess depression, which has been validated in Iran,^[20] The questionnaire was a tool that can be used to screen the elderly patient at risk of depression and had 15 questions

Address for correspondence: Dr. Mina Moeini, Physician, Isfahan university of Medical Sciences, Isfahan, Iran. E-mail: dr_moeini@yahoo.com

Received: 08-01-2013; **Revised:** 20-01-2013; **Accepted:** 04-02-2013

that there were for each question, Answer yes and no, Subjects were classified normal (score 1-4), Mild depression (score 5-9), Severe depression (score 10-15) and the third part consisted of mini nutritional assessment (MNA), which is a standard questionnaire for evaluating nutrition status:^[20] Malnourished (score <17), at risk of malnutrition (score 17-23.5) and well-nourished (score >23.5).

The data were analyzed by SPSS^[16] using descriptive statistics, *t*-test, Chi-square test and logistic regression. *P* value of < 0.05 was taken to define statistical significance. The study was approved by the ethical research committee of Isfahan University of Medical Sciences and this study performed in rural because some previous researchers found that malnutrition and mental problems (depression) were more common in rural than urban areas in Iran.^[21]

RESULTS

Mean age of the subjects was 70.6 ± 7.3 years (60-92 years). Prevalence of depression was 50.3% (female 54.6%, male 42.3%) that 36.8% had mild depression and 13.5% had severe depression. Mild depression was higher in female than male 65.4% versus 34.6%, respectively and this correlation in severe depression was significant ($P < 0.005$). Furthermore, there is a significant relationship between depression and job so that unemployed elderly more suffer depression than others ($P < 0.002$) whereas age level education and life-style had no influence.

According to MNA, 3.8% of subjects suffered from malnutrition, 32.7% were at risk of malnutrition and 63.5% were well-nourished. Malnutrition was not associated with socio-demographic characteristics but it was significantly correlated with depression and BMI [Table 1]. The risk of malnutrition in patients with severe depression was 15.5 times higher than non-depressed persons (OR: 15.5; 95% CI 2.9-82.5) [Table 2].

DISCUSSION

In the current study, the prevalence of malnutrition and its relationship with influencing factors in elderly were assessed. The prevalence of malnutrition in our study was 3.8%, similar to the results obtained by Eshaghi *et al.*, but this measurement was 12.8% in the study of Afkhami *et al.* and 7% in the study of Rodriguez *et al.* which was higher than our study.^[22-24] This difference may be explained that these studies were done in institutionalized older adult and may be rate of malnutrition was higher in this group.

Malnutrition and depression have emerged as important problem among elderly.^[12] In our study, the older adult with depression are prone of malnutrition (16.4%). Some

of study identified an independent association between depression and malnutrition.^[11,22,25,26] Well-being is necessary for maintenance of best nutritional status.^[27] On the other hand, geriatrics with regular eating program have better psychiatric performance.^[28] Thompson *et al.* found a sign of depression in elderly is change in eating behavior^[29,30] and treatment of depression caused a decreased of weight loss in elderly.^[31] Probably depression influences the appetite, food in-take and reduced energy in-take and this can lead to weight loss and increase the risk of malnutrition. Prevalence of depression in our study was 50.3% (female 54.6%, male 42.3%) and female had more depression than male this gender difference may to some extent be explained by an under-reporting of depressive symptoms by male individuals. There were significant relationship between depression and job so that unemployed elderly had more suffer depression than employ people. Mokhber *et al.* found depression in geriatric with personal income was lower.^[21] In present study, all of the older adult were low schooling and most of them low socio-economic (unemployed) level, probably these induce to depression and malnutrition.

In the present study, malnutrition significantly was higher in elderly with normal BMI. Some other studies have described the relationship between BMI and malnutrition.^[23,32] It was reported that with advancing age, lean body mass decreases and the amount of body fat generally increases until age 70 after which it decreases again.^[33,34] Thus, it seems likely that the relationship between body fatness and BMI changes with advancing age.

In our study, the effect of age on malnutrition was not significant. This result was against other studies in which age affected the nutritional status in elderly.^[6,26,35,36] Generally in this study, it was demonstrated that the prevalence of malnutrition in females was not higher than males. Rodriguez *et al.* reported similar results; however, in some other studies women have been suffered from malnutrition.^[26,35,37] Difference between our result and other study maybe return to our small sample size.

We did not found significant correlation between the life-style and malnutrition in elderly. Elderly who live alone are at higher risk of malnutrition than others.^[24] This discrepancy could explain by social, cultural or economic factors in our population that most of the old subjects are living with our children.

In this study, 1.6% of elderly was functionally dependent and was not different from independent ones regarding the state of nutrition. Morely *et al.* and Paytte reported that functional disability in elderly is associated with inadequate food

Table 1: Summary results of correlation between socio-demographic, health problems and nutrition status in elderly population

Variable	N (%) total	Without malnutrition N (%)	With malnutrition N (%)	P Value
Age (mean±SD)		70.4±7.2	73.8±8.5	0.08
Sex				
Male	130 (35.1)	128 (98.5)	2 (1.5)	0.09
Female	240 (64.9)	228 (95)	12 (5)	
Level of education				
Illiterate	301 (81.4)	289 (96)	12 (2)	0.74
Ability of reading & Writing	55 (14.8)	53 (96.4)	2 (3.6)	
Primary school	14 (3.8)	14 (100)	0 (0)	
Lifestyle				
Alone	70 (18.9)	65 (92.9)	5 (7.1)	0.42
With wife	122 (33)	118 (96.7)	4 (3.3)	
With family	174 (47)	169 (97.1)	5 (2.9)	
With other	4 (1.1)	4 (100)	0 (0)	
Dependency state				
Completely independent	300 (81.1)	291 (97)	9 (3)	0.11
Needed the help of others	64 (17.3)	60 (93.8)	4 (6.2)	
Completely dependent	6 (1.6)	5 (83.3)	1 (16.7)	
Job				
Employ	66 (17.8)	65 (98.5)	1 (1.5)	0.56
Housekeeper	134 (36.2)	128 (95.5)	6 (4.5)	
Unemployed	170 (46)	163 (95.9)	7 (4.1)	
Type of Home				
Owner	367 (99.2)	353 (96.2)	14 (3.8)	0.73
Leased	3 (0.8)	3 (0.8)	0 (0)	
Diseases				
Hypertension	189 (51.1)	180 (95.2)	9 (4.8)	0.31
Diabetic	66 (17.8)	62 (93.9)	4 (6.1)	0.28
Osteoporosis	72 (19.5)	70 (97.2)	2 (2.8)	0.61
Hyperlipidemia	89 (24.1)	84 (94.4)	5 (5.6)	0.29
Arthritis	34 (9.2)	32 (94.1)	2 (5.9)	0.5
Cancer	1 (.3)	1 (100)	0 (0)	0.84
Depression				
Mild depression	136 (36.8)	130 (95.6)	6 (4.4)	0.001
Severe depression	50 (13.5)	44 (88)	6 (12)	
BMI (kg/m ²)				
<19	22 (5.9)	21 (95.5)	1 (4.5)	0.028
19≤<21	60 (16.2)	55 (91.7)	5 (8.3)	
21≤<23	70 (18.9)	65 (92.9)	5 (7.1)	
≥23	218 (58.9)	215 (98.6)	3 (1.4)	

BMI=Body mass index

Table 2: Correlation between malnutrition and depression, body mass index using logistic regression

Variable	Sig	OR	95% CI for OR	
			Lower	Upper
Without depression*	0.004			
Mild depression	0.09	4.1	0.80	20.93
Severe depression	0.001	15.49	2.9	82.59
BMI<9*	0.041			
19≤BMI<21	0.53	2.05	0.21	19.84
21≤BMI<23	0.65	1.67	0.17	16.01
BMI≥23	0.26	0.25	0.024	2.75

*Reference category, BMI=Body mass index; OR=Odd ratio; CI=Confidence interval

in-take and weight loss.^[38,39] Saka *et al.* compared nutritional state of their functionally depended and independent subjects and found a poor nutritional state with lower daily calorie in-take in dependent subjects.^[40] Malnutrition is more frequent in elderly who are functionally dependent.

A potential limitation of this data is that the population of elderly people in our study was limited to many rural community in the central city of the country and may not be generalized to all other elderly both living conditions and health-care organization different with our health-care organization.

CONCLUSION

According to our research, there is a lot of evidence that malnutrition and depression are common among elderly and may lead to deleterious effects on health and well-being. Hence, detecting alterations in primary care is important in order to improve quality of life and reduce complications. Since malnutrition is multi-factorial in origin and mostly several other problems are present concurrently, it is important to mention that nutritional interventions should be implemented only as a part of a complete strategy. Inter-disciplinary efforts directed toward increasing nutrient intake and removing pre-disposing causes of malnutrition should be encouraged.

Further investigations are necessary to show the need for a team work consisting of gerontologists, psychiatrists, anthropologists, clinicians, nutritionists, and other specialists involved in the care of elderly to generate guidelines in order to prevent and/or treat the elderly's malnutrition or decrease its risk.

ACKNOWLEDGMENT

We thank the staff and family of the elderly for their assistance in this study. This study was supported by the Vice-Chancellor for research, Isfahan University of Medical Sciences N.290038.

REFERENCES

- Freijer K, Nuijten MJ, Schols JM. The budget impact of oral nutritional supplements for disease related malnutrition in elderly in the community setting. *Front Pharmacol* 2012;3:78.
- Raynaud-Simon A, Revel-Delhom C, Hébuterne X, French Nutrition and Health Program, French Health High Authority. Clinical practice guidelines from the French health high authority: Nutritional support strategy in protein-energy malnutrition in the elderly. *Clin Nutr* 2011;30:312-9.
- Tucker KL, Buranapin S. Nutrition and aging in developing countries. *J Nutr* 2001;131:2417S-23.
- Chen CC, Chang CK, Chyun DA, McCorkle R. Dynamics of nutritional health in a community sample of American elders: A multidimensional approach using roy adaptation model. *ANS Adv Nurs Sci* 2005;28:376-89.
- Kong B Malnutrition in elderly. *Med Bull* 2005;10:13-4.
- Isaia G, Mondino S, Germinara C, Cappa G, Aimonino-Ricauda N, Bo M, *et al.* Malnutrition in an elderly demented population living at home. *Arch Gerontol Geriatr* 2011;53:249-51.
- Morley JE, Thomas DR. Anorexia and aging: Pathophysiology. *Nutrition* 1999;15:499-503.
- Morley JE, Kraenzle D. Causes of weight loss in a community nursing home. *J Am Geriatr Soc* 1994;42:583-5.
- Raynaud-Simon A. Virtual clinical nutrition university: Malnutrition in the elderly, epidemiology and consequences. *Eur J Clin Nutr Metab* 2009;4:86-9.
- Roubenoff R. Sarcopenia and its implications for the elderly. *Eur J Clin Nutr* 2000;54:S40-7.
- Visvanathan R. Under-nutrition in older people: A serious and growing global problem! *J Postgrad Med* 2003;49:352-60.
- Kok RM, Heeren TJ, Hooijer C, Dinkgreve MA, Rooijmans HG. The prevalence of depression in elderly medical inpatients. *J Affect Disord* 1995;33:77-82.
- Gebretsadik M, Jayaprabhu S, Grossberg GT. Mood disorders in the elderly. *Med Clin North Am* 2006;90:789-805.
- Jensen GL, Kita K, Fish J, Heydt D, Frey C. Nutrition risk screening characteristics of rural older persons: Relation to functional limitations and health care charges. *Am J Clin Nutr* 1997;66:819-28.
- Wada H. Problems and strategies in the treatment of mental disorders in elderly patients with physical illness. *Nihon Ronen Igakkai Zasshi* 2000;37:885-8.
- Urbina Torija JR, Flores Mayor JM, García Salazar MP, Torres Buisán L, Torrubias Fernández RM. Depressive symptoms in the elderly. Prevalence and associated factors. *Gac Sanit* 2007;21:37-42.
- Friedman B, Conwell Y, Delavan RL. Correlates of late-life major depression: A comparison of urban and rural primary care patients. *Am J Geriatr Psychiatry* 2007;15:28-41.
- Olayiwola IO, Ketiku AO. Socio-demographic and nutritional assessment of the elderly Yorubas in Nigeria. *Asia Pac J Clin Nutr* 2006;15:95-101.
- Zulkowski K, Coon PJ. Comparison of nutritional risk between urban and rural elderly. *Ostomy Wound Manage* 2004;50:46-8, 50,52, *passim*.
- Maghsoudnia SH. Appendix chapter. Primary Health Care for Old Adults in I.R. Iran. In: Akbarpour SH, editor. Tehran: University of Social Welfare and Rehabilitation Sciences; 2007. p. 195-8.
- Mokhber N, Majdi M, Ali-Abadi M, Shakeri M, Kimiagar M, Salek R, *et al.* Association between malnutrition and depression in elderly people in Razavi Khorasan: A Population Based-Study in Iran. *Iran J Public Health* 2011;40:67-74.
- Afkhami A, Keshavarz A, Rahimi A, Jazaieri A, Yegane HS. Nutritional status and dietary factors associated with non-varying in elderly Elderly nursing home in Tehran and Shemiranat. *Payesh Health Monit* 2008;7:211-7.
- Eshaghi R, Babak A, Manzori L, Marasi MR. Nutritional status of the elderly in Isfahan. *Salmand Iran J Aging* 2007;2:340-5.
- Rodríguez-Tadeo A, Wall-Medrano A, Gaytan-Vidaña ME, Campos A, Ornelas-Contreras M, Novelo-Huerta HL. Malnutrition risk factors among the elderly from the US-Mexico border: The "one thousand" study. *J Nutr Health Aging* 2012;16:426-31.
- Kvamme JM, Grønli O, Florholmen J, Jacobsen BK. Risk of malnutrition is associated with mental health symptoms in community living elderly men and women: The Tromsø study. *BMC Psychiatry* 2011;11:112.
- Halil M, Kalan I, Ulger Z, Yavuz B, Cankurtaran M, Giingor E, *et al.* Malnutrition risk and related factors in a group of Turkish elderly. *Clin Nutr* 2009;4:44.
- Takahashi R. Nutritional risk in community-dwelling elderly long-term care insurance recipients. *Nihon Ronen Igakkai Zasshi* 2006;43:375-82.
- Lombard CB. What is the role of food in preventing depression and improving mood, performance and cognitive function? *Med J Aust* 2000;173:S104-5.
- Thompson MP, Morris LK. Unexplained weight loss in the ambulatory elderly. *J Am Geriatr Soc* 1991;39:497-500.
- Park YH, Suh EE. The risk of malnutrition, depression, and the perceived health status of older adults. *Taehan Kanho Hakhoe Chi* 2007;37:941-8.
- Morley JE, Kraenzle D. Weight loss. *J Am Geriatr Soc* 1995;43:82-3.
- Vellas B, Guigoz Y, Garry PJ, Nourhashemi F, Bannahum D, Lauque S, *et al.* The Mini Nutritional Assessment (MNA) and its use in grading the nutritional state of elderly patients. *Nutrition* 1999;15:116-22.
- Noppa H, Andersson M, Bengtsson C, Bruce A, Isaksson B.

- Longitudinal studies of anthropometric data and body composition. The population study of women in Göteborg, Sweden. *Am J Clin Nutr* 1980;33:155-62.
34. Frisancho AR. New norms of upper limb fat and muscle areas for assessment of nutritional status. *Am J Clin Nutr* 1981;34:2540-5.
35. Tsai AC, Liou J-C, Chang M-C. Food patterns that correlate to health and nutrition status in elderly Taiwanese. *Nutr Res* 2006;26:71-6.
36. Valls T, Mach N. Risk of malnutrition in people older than 75 years. *Med Clin (Barc)* 2012;139:157-60.
37. Aliabadi M, Kimiagar M, Mobarhen MG, Feyzabadi AA. Prevalence of malnutrition and related factors in elderly Khorasan Razavi. *Iran J Nutr Sci Food Technol* 2007;2:45-56.
38. Morley JE. Anorexia of aging: Physiologic and pathologic. *Am J Clin Nutr* 1997;66:760-73.
39. Payette H, Gray-Donald K, Cyr R, Boutier V. Predictors of dietary intake in a functionally dependent elderly population in the community. *Am J Public Health* 1995;85:677-83.
40. Saka B, Kaya O, Ozturk GB, Erten N, Karan MA. Malnutrition in the elderly and its relationship with other geriatric syndromes. *Clin Nutr* 2010;29:745-8.

How to cite this article: Vafaei Z, Mokhtari H, Sadooghi Z, Meamar R, Chitsaz A, Moeini M. Malnutrition is associated with depression in rural elderly population. *J Res Med Sci* 2013;18:S15-S9.

Source of Support: Nil, **Conflict of Interest:** None declared.