International Journal of Community Medicine and Public Health
Nouh F et al. Int J Community Med Public Health. 2017 Nov;4(11):3983-3990
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20174806

Original Research Article

Nutritional status of the elderly attending public polyclinics in Benghazi city, Libya

Faiza Nouh[1]*, Mariam Omar[1], Manal Younis[2], Moftah Younis[3]

[1]Department of Nutrition, Faculty of Public Health, Benghazi University, Benghazi, Libya
[2]Royal College of Obstetrics and Gynecology, Cumh Cork University Maternity Hospital, Cork, Ireland
[3]MRCP(I), FRCPC, MBChB. Associated professor, University of Saskatchewan, Canada

Received: 24 July 2017
Revised: 23 September 2017
Accepted: 25 September 2017

***Correspondence:**
Dr. Faiza Nouh,
E-mail: faiza.nouh@uob.edu.ly

ABSTRACT

Background: Ageing brings various physiological and non physiological changes which influence the nutritional status.
Methods: A cross-sectional study extended from 1st December 2007 to 15th April 2008 on elderly of both sexes attending public polyclinics in Benghazi city.
Results: 6.5% was the prevalence of malnutrition. 36.8% was the percentage of elderly at risk of malnutrition. Age, sex, occupation, income inadequacy to food, oral problems, dysphagia, constipation and dehydration, activity level, chronic disease, food intolerances and BMI all these factors were the various physiological and non-physiological factors associated with the nutritional status of the subjects.
Conclusions: Outpatients elderly in Benghazi should be routinely screened and assessed if needed, for malnutrition or its risk.

Keywords: Nutritional assessment, MNA, Malnutrition, Elderly, Out patients, Libya

INTRODUCTION

The United Nations (UN) and the World Health Organisation (WHO) have agreed to have the age of 60 years and more refer to elderly or older populations.[1-4] The elderly (≥60 years) currently form 6.2% of the total population of Libya. It is projected the percentage of elderly people of both genders will increase to 7.4% after two years in 2018 and 9.5% at the quarter of the present century.[4] Ageing is generally associated with degenerative changes leading to a decline of a number of physiological functions that can impact nutritional status like a reduction in lean body tissue, a resultant decrease in basal metabolic rate (BMR), altered gastrointestinal function, sensory function deficits, changes in the oral cavity, central nervous system changes, decline in the immune function, along with changes in renal functions and fluid regulation.[5-11] Mini Nutritional Assessment MNA is a very simple, quick, patient friendly, inexpensive, very sensitive, specific and reliable screening instrument for elderly. MNA has been validated in a series of studies to assess the geriatric population.[12-17] The older populations in the developing countries as a whole are growing more rapidly and Libya are no exception. The increase in the number of elderly in Libya, its related health implications and the need to not just assess but also to identify the basic and underlying cause of poor nutritional status in this age group justifies planning and designing the present study.[12-18] The objectives of this research to study the nutritional status of the elderly attending public polyclinics in Benghazi and to identify the physiological and non-physiological factors that are associated with malnutrition.

METHODS

A cross-sectional study extended from 1st December 2007 to 15th April 2008. Inclusion criteria are all elderly of both sexes who ≥60 years and attending polyclinics in Benghazi. 508 patients were finally enrolled for the study giving a response rate of 90%. Informed consent was obtained from the subjects who were also assured of the confidentiality of the information collected. The research was approved by the administration of the concerned polyclinics.

Questionnaire

The questionnaire included information about socioeconomic characteristics, physical activity level, food intolerances and nutritional supplement, chronic diseases and surgery, physiological or food related problems and (MNA) section. Height and weight measurements were used to calculate Body Mass Index (BMI).[17-21]

Statistical analysis

Data was exported to SPSS V.21. All data was coded prior to being entered in a computer but the scores for the MNA were entered as a quantitative value. A Chi square test was carried out to see if there was any statistically significant association between the nutritional status of the subjects and various physiological and non-physiological factors.

RESULTS

The subjects (n=508) 43.5% were males and 56.5% were females. The total means age ±SD was 66.2 years ±6.4. (67.7%) of subjects were married. 52.0% of the subjects were either illiterate or could only read or write. The retired/unemployed formed; 39.2% and 45.7% respectively. (70.7%) subsided on monthly family incomes of less than 250 Libyan Dinars (LD). (67.3%) of subjects their incomes was inadequate to purchase nutritious food. (94.3%) of them lived with family. Among those who lived alone, more than half prepared their meals themselves. (9.4%) of the subjects were immobile (Table 1-3).

Table 1: Socioeconomic characteristics and nutritional status.

Characteristics	Percentage of subjects						Total	
	Normal		Malnourishment risk		Malnourished			
	NO.	%	NO.	%	NO.	%	NO.	%
Age								
60-74	270	59.6	160	35.3	23	5.1	453	100
75-84	15	33.3	22	48.9	8	17.8	45	100
≥ 85	3	30.0	8	50.0	2	20.0	10	100
Total							508	100
Male	118	53.4	82	37.1	21	9.5	221	100
Female	169	59.0	105	36.6	12	4.2	287	100
Total							508	100
Occupation								
Employed	49	63.6	27	35.1	1	1.3	77	100
Unemployed	132	56.9	93	40.1	7	3.0	232	100
Retired	107	53.8	67	33.7	25	12.6	199	100
Total							508	100
Income adequacy								
Yes	100	60.2	63	38.0	3	1.8	166	100
No	188	55.0	124	36.3	30	8.8	342	100

80.3% of the subjects had teeth problem. 48.6% and 48.2% of the subjects had oral problem and constipation respectively. 21.1% and 25.8% of the subjects had dysphagia and dehydration. 98.4% of the subjects had at least one chronic disease. 17.8% stated that they were on a special diet. 67.5% had not undergone surgery of any kind. 92.1% did not have any food intolerance (Table 4-6).

77.1% were overweight and/or obese. (97.1%) of the subjects had a mid-upper arm MAC equal to or greater than 22 cm. 97.9% of the subjects their calf circumferences CC was 33 cm or more (Table 7).

(MNA) screening

(57.9%) of subjects did not report any loss of appetite. (49.4%) of the subjects did not have any weight loss. 10% of the subjects loss of 1-2 kg. (86%) of the subjects were mobile. (54.5%) of the subjects suffered a psychological stress or acute disease. (91.9%) of the subjects did not have psychological problem. 35.8% of

the subjects taking more than three daily drugs. 39.9% of the subjects had pressure sores or skin ulcers at the time of the study. As a result of screening the subjects using the MNA 243 (47.8%) had possible malnutrition. Those 243 subjects will proceed to the assessment step.

MNA assessment

Out of the assessment group of the MNA, 42% have no nutritional problem. 35.8 of the assessment group consume more than three different types of medications daily and 40% had pressure sore or skin ulcers (Table 9).

When the results from both screening and assessment steps of the MNA were combined it was found that out of the total 508 subjects, the mean prevalence of malnutrition was 6.5% (9.5% for males and 4.2% for females) while that of at risk of malnutrition was 36.8% (37.1% among males and 36.6% among females). Those found to be normal according to the MNA were 56.7%: 53.4% and 59.2% among males and females respectively (Table 10).

Table 2: Socio-economic characteristics of subjects.

Characteristics	Male		Female		Total	
	Number	%	Number	%	Number	%
Marital status						
Unmarried	9	4.1	6	2.1	15	3.0
Married	179	81.0	165	57.5	344	67.7
Widow/widower/ divorcee	33	14.9	116	40.4	149	29.3
Total	221	100	287	100	508	100
Educational level						
Illiterate	71	32.1	193	67.3	264	52.0
Basic education	118	53.4	82	28.6	200	39.4
Secondary and its level	22	10.0	9	3.1	31	6.1
University degree	10	4.5	3	1.0	13	2.6
Total	221	100	287	100	508	100
Family income (LD)						
<250	134	60.6	225	78.4	359	70.7
250<500	80	36.2	59	20.6	139	27.4
≥500	7	3.2	3	1.0	10	2.0
Total	221	100	287	100	508	100
Living arrangement						
Alone	15	6.8	14	4.9	29	5.7
With others	206	93.2	273	95.1	479	94.3
Total	221	100	287	100	508	100
Physical activity level						
Immobile	22	10	26	9.1	48	9.4
Sedentary	43	19.5	59	20.6	102	20.1
Moderate	99	44.8	135	47.0	234	46.1
Low active	57	25.8	67	23.3	124	24.4
Total	221	100	287	100	508	100

Table 3: Activity level and the nutritional status of the subjects.

Activity level	Percentage of subjects						Total	
	Normal		Risk of malnourishment		Malnourished			
	No.	%	No.	%	No	%	No	%
Immobile	8	16.7	23	47.9	17	35.4	48	100
Mobile	280	60.9	164	35.7	16	3.5	460	100
Sedentary	53	52.0	39	38.2	10	9.8	102	100
Moderate	148	63.2	82	35	4	1.7	234	100
Low active	79	63.7	43	34.7	2	1.6	124	100

Table 4: Physiological and food related problems.

Physiological food problem	Present	Percentage of subjects							
		Normal		Malnourishment Risk		Malnourished		Total	
		NO.	%	NO.	%	No	%	No	%
Oral cavity	Yes	118	47.8	100	40.5	29	11.7	247	100
	No	170	65.1	87	33.3	4	1.5	261	100
Dentition	Yes	223	54.7	152	37.3	33	8.1	408	100
	No	65	65.0	35	35.3	0	0	100	100
Dysphagia	Yes	45	42.1	50	46.7	12	11.2	107	100
	No	243	60.6	137	34.2	21	5.2	401	100
Constipation	Yes	127	51.8	97	39.6	21	8.6	245	100
	No	161	61.2	90	34.2	12	4.6	263	100
Dehydration	Yes	61	46.6	52	39.7	18	13.7	131	100
	No	227	60.2	135	35.8	15	4.0	377	100

Table 5: Medical characteristics of the subjects.

Chronic disease	Percentage of subjects						Total		Association
	Normal		Malnourishment risk		Malnourished				
	NO	%	NO	%	NO	%	NO	%	
Yes	277	55.4	188	37.6	35	7.0	500	100	Inverse association ($p<0.05$)
No	8	100	0	0	0	0	8	100	
Systems number									
1	110	64.3	56	32.7	5	2.9	171	100	
2	116	54.0	91	42.3	8	3.7	215	100	
≥3	54	47.4	40	35.1	20	17.5	114	100	

Characteristics	Male		Female		Total	
	No	%	No	%	No	%
Disease						
Yes	34	15.5	55	19.6	88	17.8
No	185	84.5	226	80.4	411	82.2
Total	219	100	281	100	500	100
Surgery						
Yes	77	34.8	88	30.7	165	32.5
No	144	65.2	199	69.3	343	67.5
Total	221	100	287	100	508	100
Diet						
Yes	9	11.7	8	9.1	17	10.3
No	68	88.3	80	90.9	148	89.7
Total	77	100	88	100	165	100

Table 6: Food intolerance and the nutritional status.

	Percentage of subjects						Total	
	Normal		Malnourishment Risk		Malnourished			
	No	%	No	%	No	%	No	%
Yes	13	32.5	17	42.5	10	25.0	40	100
No	275	58.8	170	36.3	23	4.9	468	100

Table 7: Anthropometric characteristic and the nutritional status.

BMI category	Percentage of subjects						Total		Association
	Normal		Risk of malnourishment		Malnourished				
	NO	%	NO	%	NO	%	NO	%	
Underweight	26.3	5	36.8	7	36.8	7	19	100	association (p<0.05)
Normal	34.0	33	42.3	41	23.7	23	97	100	
Overweight	63.8	250	35.8	140	0.8	3	392	100	
MAC/ CC Frequency	Male		Female		Total				
	No	**%**	**No**	**%**	**No**	**%**			
MAC									
21 < 22	3	2.7	4	3.1	7	2.9			
≥ 22	109	97.3	127	96.9	236	97.1			
Total (N)	112	100	131	100	243	100			
CC									
< 31	4	3.6	1	0.8	5	2.1			
≥ 31	108	96.4	130	99.2	238	97.9			
Total (N)	112	100	131	100	243	100			

Table 8: Screening of the subjects.

Characteristics	Male		Female		Total	
	Number	%	Number	%	Number	%
Appetite loss						
Severe loss	28	12.7	23	8.0	51	10.0
Moderate loss	68	30.8	95	33.1	163	32.1
No loss	125	56.6	169	58.9	294	57.9
Total	221	100	287	100	508	100
Weight loss						
>3 kg	15	6.8	15	5.2	30	5.9
Does not know	79	35.7	97	33.8	176	34.6
1-2 kg	21	9.5	30	10.5	51	10.0
No weight loss	106	48.0	145	50.5	251	49.4
Total	221	100	287	100	508	100
Mobility						
Bed or chair bound	10	4.5	5	1.7	15	3.0
Able to leave bed	28	12.7	28	9.8	56	11.0
Goes out	183	82.8	254	88.5	437	86.0
Total	221	100	287	100	508	100
Psychological						
Yes	120	54.3	157	54.7	277	54.5
No	101	45.7	130	45.3	231	45.5
Total	221	100	287	100	508	100
Neurological						
Severe depression	2	0.9	3	1.0	5	1.0
Mild dementia	21	9.5	19	6.6	40	7.9
No psychological problem	19	89.6	265	92.3	463	91.9
Total	221	100	287	100	508	100
Screening						
Normal	109	49.3	156	54.4	265	52.2
Possible malnutrition	112	50.7	131	45.6	243	47.8

Table 9: Assessment of nutritional status of the subjects.

Characteristics	Male		Female		Total	
	Number	%	Number	%	Number	%
View of nutritional status						
Being malnourished	14	12.5	9	6.9	23	9.5
Uncertain	60	53.6	58	44.3	118	48.6
Have no nutritional problem	38	33.9	64	48.9	102	42.0
Total	112	100	131	100	243	100
View of health status						
Not good	26	23.2	26	19.8	52	21.4
Does not know	48	42.9	49	37.4	97	39.9
As good	34	30.4	45	34.4	79	32.5
Better	4	3.6	11	8.4	15	6.2
Total	112	100	131	100	243	100
Lives independently						
Yes	112	100	131	100	243	100
No	0	0	0	0	0	0
Total	112	100	131	100	243	100
>3 prescription drugs						
Yes	43	38.4	44	33.6	87	35.8
No	69	61.6	87	66.4	156	64.2
Total	112	100	131	100	243	100
Pressure sores						
Yes	43	38.4	54	41.2	97	39.9
No	69	61.6	77	58.8	146	60.1
Total	112	100	131	100	243	100
Full daily meals						
1	2	1.8	2	1.5	4	1.6
2	42	37.5	44	33.6	86	35.4
3	68	60.7	85	64.9	153	63.0
Total	112	100	131	100	243	100
Protein intake						
≤ 1	39	34.8	44	33.6	83	34.2
2	56	50.0	55	42.0	111	45.7
3	17	15.2	32	24.4	49	20.2
Total	112	100	131	100	243	100
>2 servings of fruits or vegetables						
No	79	70.5	88	67.2	167	68.7
Yes	33	29.5	43	32.8	76	31.3
Total	112	100	131	100	243	100
Eat with assistance	0	0	1	0.8	1	0.4
Self fed with difficulty	35	31.3	23	17.6	58	23.9
Self fed only	77	68.8	107	81.7	184	75.7
Total	112	100	131	100	243	100

Table 10: Nutritional status of all the subjects.

Characteristics	Male		Female		Total	
	Number	%	Number	%	Number	%
Normal	118	53.4	170	59.2	288	56.7
Risk of malnourishment	82	37.1	105	36.6	187	36.8
Malnourished	21	9.5	12	4.2	33	6.5
Total	221	100	287	100	508	100

DISCUSSION

6.5% was the mean prevalence of malnutrition among elderly in Benghazi. In various global studies using the MNA, the outpatient elderly had a 4% mean prevalence of malnutrition.[22] Age group was inversely with nutritional status. Ageing is generally associated with a decline in various physiological functions and leading to malnutrition.[10,11,13,23] Increasing age has been linked with a higher incidence for disease which causes malnutrition. Female gender was associated with better nutritional status in this study. This could however be partly attributed to the higher mean age of males in this study.[24-29] Occupation was associated with the nutritional status of the elderly. Availability of money to purchase food is perhaps the most important factor affecting food intake in many retired elderly.[30-34] The self perceived adequacy of income to purchase nutritious food was associated with nutritional status of the elderly in this study. The increase in medical illnesses among the elderly, bring with it the need for prescription medications. Drugs represent a significant expense for elderly and its purchase, may limit the amount of money available for food.[1,6,14,15,22,31-33]

Activity level was associated with the nutritional status of the subjects. Restricted mobility because of arthritis, shakiness or lack of coordination as a result of neuro-degenerative changes can make food preparation, eating and/or cleaning up rather difficult tasks.[1]

Oral problems, dentition problem, dysphagia, constipation and dehydration were associated ($p<0.05$) with the nutritional status of the subjects. Reduced salivary flow and power of mastication limit the variety of foods eaten and lead to malnutrition.[34-38] Loss of teeth makes chewing difficult, and increased risk for poor nutritional status due to a decreased or modified food intake.[14,17,38] The cause of dysphagia while being caused by a variety of medical illnesses nevertheless be solely age related, it results in a reduced dietary intake which may lead to malnutrition.[3]

The constipation in the elderly may be due to inadequate fluid and fibre intakes as well as secondary to drug therapy.[11,38] Dehydration common among the elderly. Insufficient fluids lead to nausea, headache, constipation, urinary tract infection and confusion.[7,10]

Subjects with chronic diseases had a lower percentage of normal nutritional status. The numbers of chronic diseases among elderly increase with age and likely to involve a larger number of systems as than younger. Poor health and increasing number of medical illnesses have been associated with impaired nutritional status.[17,22,]

Both the presence and the type of food intolerance were associated with the nutritional status of the elderly. Older people report more discomfort with eating certain foods. Efforts to avoid eating these offending foods may lead to exclusion of nutritious foods from diet.[25]

BMI was associated with the nutritional status of the subjects. However even in the group with normal BMI, some subjects were found to be at risk malnutrition and actually malnourished. BMI alone does not detect many patients at risk of malnutrition among outpatient elderly.[27] Being under weight is a greater problem with graver medical consequences than being overweight among the elderly. Some under nutrition occurs as a result of unhealthy weight loss in elderly.[3,6,7,38]

General assessment domain

Elderly people who have limited social interaction may experience decreased food intake, lack of appetite and depression. Depression is an independent predictor of nutritional risk. Pressure ulcers are a potential problem in the immobilised; poor nutrition may increase its risk. Dementia becomes increasingly prevalent with increasing age. Limited data there is shows that profound changes in the desire to eat and feeding ability occur during dementia. The elderly are more likely to use a combination of drugs over a long period of time. The elderly drug users are more likely to suffer adverse side effect, including food-drug interactions. [14, 15,17,22]

Diet assessment domain

The loss of ability to smell and taste is age related and results in appetite suppression leading to malnutrition. Missing of meals is a sign of poor nutrition among older adults.[6,10] Diets of the elderly frequently lack dairy products, fruits and vegetables. Daily intakes of fruits, vegetables, whole grains and dairy products, lean meat, fish, poultry and legumes ensures the provision of nutrients that are found to be most at risk in the diets of elderly.[6,36] Functional disability and feeding problems put the elderly at an increased risk of poor nutrition.[36] There is a difference in the self perception of health among elderly. Elderly at nutritional risk are the ones who report poor or fair self reported health.[1,33,34]

CONCLUSION

The mean prevalence of malnutrition was 6.5% among Benghazi elderly outpatients belonging to various public polyclinics while that of those at risk of malnourishment was 36.8% highlighting the need for an earlier preventive approach through identification of country and region specific risk factors followed by appropriate intervention

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Suitor CJW. Promoting sound eating habits during childhood and adulthood. In: Nutrition, principles and application in health promotion. 2nd edition.

Philadelphia: J.B Lippincott. Company; 2007: 152-158.
2. WHO. Definition of an older or elderly person Available at: http://www.who.int/healthinfo/survey/ageingdefnolder/en/index.html. Accessed on 3 August 2017.
3. Barker HM. Nutrition and older people. In: Nutrition and Dietetics for Health Care.9th edition. New York: Churchill Livingston; 2009: 129-38.
4. WHO. Keeping fit for life: Meeting the nutritional needs of older persons. Geneva: World Health Organisation; 2002.
5. Rabin DL. Characteristics of elderly population. In: Clinical aspects of aging. 3rd edition. Reichel E, ed. Baltimore: Williams and Wilkins; 2011: 487-494.
6. Horwath C. Nutrition and ageing. In: Essentials of human nutrition. 2nd edition. Mann J, ed. New York: Oxford University Press; 2002: 551-565.
7. Kennedy ET. Evidence for nutritional benefits in prolonging wellness. Am J Clin Nutr. 2006;83:410-4.
8. U. S. Bureau of Census, International Data base, Washington, 2006 Available at: http://www.census.gov/cgi-bin/ipc/idbsprd. Accessed on 3 August 2017.
9. Brownie S. Why are elderly individuals at risk of nutritional deficiency? Int J Nurs Pract. 2006.
10. Rosenberg IH. Nutrition and ageing. In: Human nutrition and dietetics. 10th edition. Garrow JS, James WPT, Ralph A, eds. London: Churchill Livingtone; 2005: 465-470.
11. Dudek SG. Adult health issues and nutrition consideration for older adults. In: Nutrition handbook for nursing practice. 3rd edition. Philadelphia: Lippincott. 2008: 345-74.
12. Calkin E. Nutrition in the elderly. In: Practice of geriatrics. 2nd edition. Philadelphia: WB Saunders Company; 1992: 19-32.
13. Ozeraitiene V, Butenaite V. The evaluation of bone mineral density based on nutritional status, age and anthropometric parameters in elderly women. Medcina. 2006;42(10):836-42.
14. White JV, Ham RJ. Older adults. In: Medical Nutrition and Disease. 3rd edition. Hark L, Morrison G, eds. Massachusetts: Blackwell Publishing; 2003: 175-189.
15. Viswanathan R. Undernutrition in older people: A serious and growing global problem. J Postgrad Med. 2003;49:352-60.
16. Lovat LB. Age related changes in the gut physiology and nutritional status. Gut. 2016;38:306-9.
17. Snowman MK. Nutrition for older persons. In: Nutrition in health and disease. 17th edition. Pennsylvania: JB Lippencott Company; 2012: 345-360.
18. Reichel E. Essential principles in care of the elderly. In: Clinical aspects of aging. 3rd edition.
19. Boyce JM, Shome GR. Effect of ageing on smell and taste. Post grad Med J. 2006;82:239-41.
20. Bennett J, Creamer H. Oral health maintenance. In: Nursing management of the elderly. 2nd edition. Carnevali DL, Patrick M, eds. Philadelphia: JB Lippincott Company; 2016: 164-179.
21. Gariballa SE. Nutrition and older people: special consideration for ageing. Clin Med. 2004;4:411-3.
22. Viswanathan R, Newbury JW. Malnutrition in older people: screening and management strategies. Aust Fam Physician. 2004;33(1):799-805.
23. Charlton KE, Rose D. Nutrition among older adults in Africa: The situation at the beginning of the millennium. J Nutr. 2001;131:2424-8.
24. Bales WB. What does it mean to be "at nutritional risk"? Seeking clarity on behalf of the elderly. Am J Clin Nutr. 2001;74:155-6.
25. United Nations. Report of the Second World Assembly on Ageing. New York: United Nations; 2002.
26. Gray LC. Health assessment of the elderly patients. Aust Fam Physician. 2004;33(10):795-7.
27. Guigoz Y. The Mini Nutritional Assessment (MNA). Review of literature- What does it tell us? J Nutr Health Aging. 2006;10(6):466-85.
28. Calkin E, Ford D, Katz PR. Preventive assessment. In: Practice of geriatrics. 2nd edition. Philadelphia: WB Saunders Company; 2012: 119-135.
29. Lennan WJ. Screening elderly patients. A taste well suited to healthy visitors. Br Med J. 2010;300:694-5.
30. Keller HH, McKenzie JD, Goy RE. Construct validity and test retest reliability of the seniors in the community risk evaluation for eating and nutrition questions. J Gerontol. 2001;56:552-8.
31. Beck AM, Overson I, Schroll M. Validation of Residents Assessment Instrument triggers in the detection of undernutrition. Age Ageing. 2000;38:1184-90.
32. Zohoori N. Nutrition and healthy functioning in the developing world. J Nutr. 2001;131:2429s-32s.
33. World Health Organisation. Country profile. Libyan Arab Jamahiriya. Health status indicator. [online] 2001 [cited 2008 March 21] Available from URL: http://www.emro.who.int/emrinfo/index.asp?Ctry=li
34. Worthington-Roberts B, Karkeck JM. Nutrition. In: Nursing management of the elderly. 2nd edition. Carnevali DL, Patrick M, eds. Philadelphia: JB Lippincott Company; 2016: 189-218.
35. Davies L. Risk factors for malnutrition. In: Nutrition in the elderly. Horwitz A, MACFadyen DM, Munro H, Scrimshaw NS, Steen B, Williams TF, eds. Oxford: Oxford University Press; 2009: 153-166.
36. Mold JW. Nutritional assessment and dietary recommendation. In: Ambulatory geriatrics.2nd edition. Yoshikava TT, Cobbs EL, eds. St Louis:Mosby; 2008: 154-164.
37. Barasi ME, Mottram RF. Nutrition in special age groups. In: Human nutrition. 4th edition. London: Edward Arnold; 2007: 141-164.
38. Smolin LA, Grosvenor MB. Energy balance and weight management. In: Nutrition science and application. 4th edtion. London: Wiley; 2003: 176-215.

Cite this article as: Nouh F, Omar M, Younis M. Nutritional status of the elderly attending public polyclinics in Benghazi city, Libya. Int J Community Med Public Health 2017;4:3983-90.