CODEN: IAASCA   **ORIGINAL ARTICLE**

Assessment of Nutritional Status of Elderly Living in Rural Areas of Hathras District

Pushpa Devi[1], Kamal Kant[2], Sudhir Kumar Rawat[3]
Krishi Vigyan Kendra Hathras, U.P.
Email: sudhirkvk@gmail.com

ABSTRACT
Nutrition is one of the key factors associated with the health and overall wellbeing of every individual. Considering the elderly population which has increased on account of demographic transition, it has been observed that there has been a transition in terms of caregiving and living arrangement. Although there's uniformity in institutional setting, heterogeneity in terms of social, economic, physical and psychosocial factors affect the dietary intake among the elderly population. The assessment of the nutritional status is an important component of geriatric evaluation. In the present study the nutritional status of 150 elderly aged above 60 years of rural area of Hathras district was assessed with the help of Mini Nutritional Assessment (MNA) tool. Respondents were classified as 'well-nourished', 'at-risk' and' malnourished' on the basis of MNA scores. Data on dietary intake for three days was collected by the 24 hours dietary recall method and mean intake of nutrients per day was calculated and compared with RDA. A questionnaire was developed to observe the factors contributing to the nutritional status of elderly. It is evident that the proportion of 'at risk' and 'malnourished' elderly classified by MNA were 18.67 and 13.33 percent respectively. This could be attributed to decreased nutrient intake with advancing age. According to BMI, Maximum numbers of elderly males and females were normal (45.33% and 41.33%) whereas 28% and 29.34 % were obese as elderly male and female respectively. RDAs. . The average iron intake was lower than recommended value in both males and females. They consumed iron significantly lesser than their RDA i.e. -13.33% and -40.00% respectively. The average per cent intake of vitamin A was lower than the recommended values in both males and females. The average percentage consumption of dietary fibre intake is very low from the recommended values in both males and females. The females had significantly (p=0.05) higher per cent adequacy for dietary fiber compared to males. The intakes of all the nutrients were significantly less in malnourished group in comparison to well-nourished group. Half of the elderly subjects consumed more calories than the RDA. It is concluded that as the age advances there is corresponding decline in the nutritional status of elderly men and emphasis needs to be given on diet, health care and associated factors.
Keywords-nutrition, elderly, Mini Nutritional Assessment (MNA), BMI, RDA

CITATION OF THIS ARTICLE
Pushpa Devi, Kamal Kant, Sudhir Kumar Rawat. Assessment of Nutritional Status of Elderly Living in Rural Areas of Hathras District. Int. Arch. App. Sci. Technol; Vol 11 [4] December 2020: 49-54

INTRODUCTION
The health of the elderly is an important issue defining the health status of a population [1]. Old age is a significant phase in a person's life. It is biological processes which affect every one proper care can lead to healthy aging persons of 60 years and above are considered as elderly [2]. The population of elderly is on a raise, both in developed and developing countries and has resulted in the phenomenon of demographic revolution characterized by increase in number and proportion of older persons worldwide, this transition is predicted to continue well into the coming decades [3]. In India the percentage of elderly population (60+) accounts to about 8.0 percent, constituting 104 million with 53 million females and 51million males during 2011 census [4]. It is projected to increase to 133.32 million (2021), 178.59 million (2031), 236.01 million (2041) and 300.96 million (2051). India's older

population will increase dramatically over the next four decades [5] The share of India's population ages 60 and older is projected to climb from 8 percent in 2010 to 19 percent in 2050, according to the united nations population division (UN 2011) [6].The rate of aging differs with each individual. Aging begins with conception during growth, the building up (anabolic) processes exceed the degenerative (catabolic) changes, while after physiological maturity, the process increase, resulting in impaired functioning of the most of the organ [7]**.** According to census figures, the proportion of elderly persons (60[+]) in Uttar Pradesh is expected to have 19 million elderly in 2021 and the proportion of elderly persons (70[+]) is expected to increase 3.75 percent in 2021 for India [8].Malnutrition in the elderly is a multifactorial problem involving various factors. Many factors, particularly socioeconomic factors related to the living conditions, other factors related to dietary and personal habits of the elderly, influence their dietary intake and hence, nutritional status. Protein energy malnutrition is associated with an increased predisposition to illness, morbidity and mortality; this may change the quality of life [9]. Nutrition screening is defined as the process of identifying characteristics known to be associated with nutritional problems. The purpose of nutrition screening is to identify malnourished individuals or those at risk of becoming malnourished [10]. Non-invasive methods have come up which make nutritional assessment of the elderly quicker and easier. The Mini Nutritional Assessment (MNA) tool was developed by Guigoz and Vellas, and lauque *et al.* (1999) to evaluate the risk of malnutrition in the elderly. The elderly population is increasing day-by-day with the development of science and medicine. Therefore the assessment of the nutritional status is an important component of geriatric evaluation. Nutritional assessment also becomes crucial in this population because progressive under nutrition occurs often without being diagnosed. Its prevention requires the identification of the nutritional problems in the elderly (under nutrition, micronutrient deficiency and obesity) through nutrition surveys and implementation of nutritional intervention. Therefore the present study is being undertaken to assess the nutritional status of elderly using Mini Nutritional Assessment (MNA) tool and to find out the factors contributing to the nutritional status of the elderly.

MATERIAL AND METHODS
A household survey of men and women aged 60 years or over was conducted in the three villages i.e. Ahvaranpur, Ruheri and Nagla gallia in September 2017. Respondents were asked to reply to a questionnaire and anthropometric measurements.
Study design:
The present study was carried out using following tools and techniques.
Assessment of nutritional status using Mini Nutritional Assessment (MNA): A screening tool was used to assess the nutritional status of the elderly to categorize them as well-nourished, at risk and malnourished. This was done with the help of the Mini-Nutritional Assessment (MNA) tool .The MNA has been developed by Guigoz et al. (1998) and Lauque et al. (1999). The MNA is reliable and an easy to use nutritional assessment tool. It is both a screening and assessment tool for the identification of malnutrition. This tool is composed of 18 questions grouped in following four categories: (a) Anthropometric assessment: This included height, weight, BMI (Body mass index), arm and calf circumferences. (b) General assessment: This included six questions related to life-style, medication and mobility. (c) Dietary assessment: Six questions related to number of meals, food and fluid intake and autonomy of feeding were there in dietary assessment. (d) Subjective assessment: Two questions related to self- perception of health and nutrition was included in this section. On the basis of scores for each question elderly were classified as well nourished, at risk of malnutrition or malnourished. Elderly were categorized according to following classification as given by Guigoz *et al.* [10]..

MNA Score > 23.5	MNA Score 17-23.5	MNA < 17.0
Satisfactory nutritional status	Malnutrition risk with good prognosis given early intervention	Protein Energy malnutrition

Survey Schedule:
A survey schedule was designed to study the factors contributing the nutritional status of the elderly. This was also done with the help of questionnaire method. Questionnaire was used to collect the information on general profile, personal, psychological, social, dietary

habits and dietary intake. Information related to dietary intake was obtained with the help of 24 hours dietary recall method for three consecutive days. The selected factors (variables) were operationalized and scoring was done of each selected variables.

RESULTS AND DISCUSSION
Socio-economic profile of the elderly
A total of 150 respondents (75 males and 75 females), above the age of 60 years were included in the study. The median household size was 4 people (range 1–12) and the household head was usually male. The mean age of the respondents was 68 ± 8 years and 66 ± 5 years for males and females respectively. The table 1 revealed that most of the respondents belonged to 60-70 years age from both categories i.e. 53.33 and 66.66 percent in male and female respectively. The data presented in Table 1 showed that 39.33 percent and 60.66 percent of total respondents were living in nuclear and joint families respectively. It was observed that more number of females 62.66 percent was living in joint families as compared to 58.66 percent males. The individual who were living alone also included in small size families. The results (Table 1) showed that 39.33 percent of the total respondents were living in small families; 16 percent belong to large size family. The average family size to be 5.09±2.15 for the total respondents. It was evident from the table that a large proportion of female (34.66 per cent) were illiterate while only 13.33 percent of male were illiterate. Males had significantly higher educational level as compared to females (p=0.05). It was stated that 50.66 percent of males were having education up to high school or above while only 22.66 percent of females were having high school and above education. The 45.33 per cent of the total respondents were belonging to first income range, 24.67 per cent of respondents were belonging to second group while only 3.33 percent of respondents were belonging to fifth group i.e. >Rs. 20000 per month. Among the total respondents, maximum (48.66 %) were belonging IV class, 19.33 percent from V class, 12.66 percentages had III class and 10 included in II class as their per capita family income. Only 9.33 percent elderly had belonging the SES class I, because of they got monthly pension which contribute a main part of family income and also had nuclear family. 84.67 percent of the total respondents were found to be physically independent and 15.33 percent of the respondents were physically dependent on others. It was observed that son and daughter in law were the caretakers for physically dependent subject in both males and females. The entire respondents who were physically dependent found to be above the age of 70 years. Higher percentages of males were dependent compared to females.

Table 1 socio-economic profile of elderly population

PARTICULARS		Male		Female		Total	
		N=75	Percentage	N=75	Percentage	N=150	Percentage
Age	60-70	40	53.33	50	66.66	90	60.0
	70-80	28	37.33	22	29.33	50	33.33
	>80	07	9.33	03	4.0	10	6.66
Family type	Nuclear	31	41.33	28	33.33	59	39.33
	Joint	44	58.66	47	62.66	91	60.66
Family size	Small 1-4	34	45.33	25	33.33	59	39.33
	Medium 5-7	27	36.0	40	53.33	67	44.66
	Large > 7	14	18.66	10	13.33	24	16.0
Educations status	Post graduate	2	2.67	1	1.33	3	2
	Graduate	8	10.66	3	4.0	11	7.33
	Intermediate	14	18.66	5	6.66	19	12.66
	High school	14	18.66	8	10.66	22	14.67
	Middle school	12	16	14	18.66	26	17.33
	Primary school	15	20	18	24.0	33	22.0
Monthly Family Income	<5000	32	42.66	36	48	68	45.33
	50000-10000	18	24.0	19	25.33	37	24.66
	10000-15000	14	18.67	13	17.33	27	18.0

	15000-20000	6	8	5	6.67	11	7.33
	>20000	5	6.67	2	2.67	5	3.33
Socio-Economic Status (SES) class (Presad's scale)	I(Rs. >5571)	8	10.66	6	8.0	14	9.33
	II (Rs. 2786 - 5570)	9	12.0	6	8.0	15	10.0
	III(Rs. 1671-2785)	11	14.66	8	10.66	19	12.66
	IV (Rs.836 - 1670)	36	48.0	37	49.33	73	48.66
	V(Rs. <836)	11	14.66	18	24.0	29	19.33
Physical condition		63	84.0	64	85.33	127	84.67	63
		12	16.0	11	14.66	23	15.33	12

Nutritional status of the elderly:
The MNA tool was used to classify the elderly into well nourished, at risk for malnutrition and malnourished. The present distribution of the elderly in each of these groups is given in Table 2. It is evident that the proportion of 'at risk' and 'malnourished' elderly classified by MNA were 18.67 and 13.33 percent respectively. This could be attributed to decreased nutrient intake with advancing age.

Table 2 Percent distribution of MNA classified elderly according to age

Distribution of MNA	Age group (60-80 yrs)	No.	Well nourished		At risk		Mal-nourished	
			No.	%	No.	%	No.	%
Elderly male	60-70	40	34	22.67	4	2.67	2	1.33
	70-80	28	18	12.0	7	4.67	3	2.0
	>80	07	2	1.33	2	1.33	3	2.0
Elderly female	60-70	50	38	25.33	7	4.67	5	3.33
	70-80	22	10	6.67	7	4.67	5	3.33
	>80	03	0	0	1	0.67	2	1.33
Total		150	102	68.0	28	18.67	20	13.33

BMI (Body Mass Index) of elderly according to age:
According to table 3 BMI of Maximum numbers of elderly males and females were normal (45.33% and 41.33%) whereas 28% and 29.34 % were obese as elderly male and female respectively. Percentage of underweight of elderly men and women were 13.33% and 12.67% respectively.

Table 3 BMI (Body Mass Index) of elderly according to age

Classification	Indicators (kg/m²)	Males, n=75		Females, n=75		Total, n=150	
		N	Percentage	N	Percentage	N	Percentage
Severe thinness	<16.00	4	5.33	4	5.33	8	5.33
Moderate thinness	16.00 - 16.99	6	8.0	5	6.67	11	7.33
Mild thinness	17.00 - 18.49	10	13.33	12	16.0	22	14.67
Normal range	18.50 - 24.99	34	45.33	31	41.33	65	43.33
Pre-obese	25.00 - 29.99	12	16.0	13	17.33	25	16.67
Obese class I	30.00 - 34.99	6	8.0	6	8.0	12	8.0
Obese class II	35.00 - 39.99	3	4.0	4	5.33	7	4.67
Obese class III	≥ 40.00	0	0	0	0	0	0

Nutrients intake of the elderly with their RDA comparison:

Table 4 Nutrients intake of the elderly with their RDA comparison

Nutrients	Males, n=75			Females, n=75			Correlation Coefficient (r)
	Mean Nutrient Intake	RDA	Deficient or Increment %	Mean Nutrient intake	RDA	Deficient or Increment %	
Energy (Kcal)	1831.35	2200	-16.75	1775.46	1800	-1.36	0.0286
Protein (g)	60.77	65	-6.51	39.98	50	-10.02	-0.0256
CHO (g)	313	350	-10.57	302	300	+0.66	0.0451
Fat (g)	48.23	50	-3.54	41.58	40	+3.95	-0.0167
Iron (mg)	26	30	-13.33	18	30	-40	-0.0275
Calcium (mg)	669.01	1000	-33.1	678.05	900	-24.66	-0.1254
Vitamin A (µg)	688.01	1030	-33.2	763.78	930	-17.87	-0.0013
Dietary fiber (g)	12.94	30	-56.86	14.00	30	-53.33	0.2045*

(ICMR, 2010)

Table 4 showed that the mean energy intake by males had been 1831.35 Kcal/day and 1775.48 Kcal/day by females respectively. The females consumed percent adequacy for energy almost equal to RDA (only -1.36 % deficient from their RDA), but male's energy intake was deficient than their RDA i.e. -16.75 due to poor oral health and loss of appetite. Most of the males were affected from diabetes and follow-up the low calories diet. The percent adequacy for protein was significantly higher in males compared to females. Males and females were having per cent adequacy very deficient to the recommended values i.e. -6.51 % and -14.96% respectively. Males and females both categories of respondents had consumed carbohydrate in not much deficient percent from their RDAs i.e. -10.57% and + 0.66% respectively. mean fat intake of males was 48.28 g/day and female was 49.98g /day. Males had consumed fat in deficient percent from their RDAs i.e. -3.54% and females consumed more fat i.e. +3.95% respectively. Males and females both categories of respondents had significantly calcium deficient from their RDAs i.e. -33.1 and -24.66 % respectively. The value of correlation coefficient is 0.1254 which is non-significant, but significantly deficient than their RDAs. . The average iron intake was lower than recommended value in both males and females. They consumed iron significantly lesser than their RDA i.e. -13.33% and -40.00% respectively. The average per cent intake of vitamin A was lower than the recommended values in both males and females. The average percentage consumption of dietary fibre intake is very low from the recommended values in both males and females. The females had significantly (p=0.05) higher per cent adequacy for dietary fiber compared to males.

CONCLUSION

As this survey and trial was carried out in rural area, more such empirical research needs to be done to assess nutrition status among the elderly. Geriatric Nutrition Assessment should be included and monitored from time to time and thus calls for further research in the field of geriatric nutrition. The conclusion of the study that as the age advances there is corresponding decline in the nutritional status. Mean nutrient intake of malnourished elderly is less than the RDA and that of the well-nourished elderly. Per capita income, education and self-view of nutritional status are strongly associated factors contributing to the nutritional status of elderly. Elderly subjects should be encouraged to include iron and micronutrients rich foods (fruits and green leafy vegetables) in their daily dietaries. Regular monitoring and intervention can improve the health outcomes of the elderly. Government, NGOs, community, families, medical and social science faculties need to give greater emphasis to provide health care, societal support and nutrition services to the elderly.

REFERENCES
1. World Health Organization.(2008). *The World Health Report 2008:Primary Health Care (Now More Than Ever).*
2. WHO. (1994). Assessment of fracture risk and its application to screening for postmenopausal osteoporosis: Report of WHO Study Group. *World Health Organ Tech Rep Ser;843.*
3. Central Statistics Office Ministry of Statistics and Programme Implementation Government of India. Elderly in India. 2016. Available at: http://mospi.nic.in/sites/ default/files/ publication_reports/ElderlyinIndia_2016.pdf Accessed on 7 March 2017.
4. Registrar General of India office, Government of India. Census of India. (2011). Available at: http://www.censusindia.gov.in/vital_statistics/srs_report/9chap%202%20-%202011.pdf Accessed on 2 March 2017.
5. Directorate General of Health Services Ministry of Health & Family Welfare Government of India. Operational guidelines National programme for the health care of the elderly. (2012). Available at: http://www.mohfw.nic.in /WriteReadData/l892s /2612656526Operational _Guidelines_NPHCE_final.pdf Accessed on 12 March 2017.
6. Today's Research on Aging. United Nations population division (2011); Available at: http://www.prb.org/pdf12/TodaysResearchAging25.pdf Accessed on 2 March 2017.
7. Kaur, Balbir . (2015). Circumferences and Skinfolds of Elderly Jat Sikh Females in Nuclear and Extended Families of Patiala District Punjab. Indian J.Sci.Res. 6(1): 99-109.
8. Irudaya S, Mishra US, Sarma PS. "India's elderly burden or challenge?" Sage Publications, New Delhi, 2005, 38.
9. Dougherty, D., Bankhead, R., Kushner, R., Mirtallao, J., Winkler, M. (1995). Nutrition care given new importance in JCAHO standards. Nutrition Clinical Practtice, 10 : 208-219
10. Guigoz Y, Vellas B. (1998). Assessing the nutritional status of the elderly. The mini nutritional Assessment as part of the geriatric evaluation. Nutrition Review, 1998, 54 : 59-65.
11. Guigoz Y, Vellas B. (1999). The mini nutritional Assessment (MNA) for grading the nutritional state of elderly: presentation of the MNA, history and validation. Nestle nutrition, Workshop Service Clinical Perform Programm, 1 : 310-332.