

Influence of Family Income on Food and Nutrient Intake among Elderly

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Abstract: Present study was conducted to study the influence of family income on food and nutrient intake among elderly. Thus 600 elderly population residing in urban (200), rural (200) and tribal area (200) of Nanded district of Marathwada region of Maharashtra state, were covered for the study. Anthropometric measurements i.e. height (cm.), weight (kg.), hip circumference (cm.), waist circumference (cm.) were recorded and body mass index was calculated using values of height and weight. Selected subjects were categorised under different grades of under nutrition on the basis of BMI. Two days dietary recall method and weighing was used to calculate food intake. The nutrient intake of the elderly was calculated by using food consumption table of ICMR (Gopalan et al., 2004). To find out the percent adequacy in consumption food intake was compared with balanced diet and nutrient intake was compared with the ICMR recommended dietary allowances (ICMR 2012). Result showed that, among three residential areas height and weight ranged from 150.13 ± 7.2 to 160.13 ± 13.97 and 44.77 ± 9.43 to 61.02 ± 9.08 i.e. among tribal low income group and urban high income group respectively. Among three income groups, majority percent of elderly were found to be normal, which ranged from 54.31 percent (low income) to 65.66 percent (high income). Most of the food stuffs was consumed more by high income group than other two income groups. Irrespective of income, highest adequacy was noted for sugar and jaggery and least adequacy was noted for roots and tubers. The values of intake of nutrients reported by low income group was lower than middle income and high income group. While, adequacy was found to be lowest in all three income groups for iron and calcium.

Keywords: Food, Nutrients, Elderly, Anthropometry, Percent adequacy

1. Introduction

The elderly are one of the most vulnerable and high risk group in terms of health status in any society. The elderly population in India has been at increasing rate in recent years and the trend is likely to continue in the coming decade. The share of population over the age of 60 is projected to increase from 8 percent in 2015 to 19 percent in 2050, by the end of the century, the elderly will contribute nearly 34 percent of the total population in the country (Vishwanath, G.R., et al., 2018). The record of anthropometric measurements like weight, height, body mass index, hip and waist circumference are important to know the present health status of elderly. Older people are vulnerable to malnutrition for many reasons including physiological and functional changes that occur with age, lack of financial support and inadequate access to food (Agarwalla, R. et al., 2015). The functional capacity and health of the elderly depend to a greater extent on their nutritional status and food security. It is also evident from the available literature that average diet and nutrient intake of elderly were found to be deficient as compared to recommended daily allowances suggested for elderly. Diet plays an important role in the aging process. Nutritional requirements of aged are also affected due to changes in absorption, utilization and excretion of nutrients which are influenced by biological changes in old age. Such as decreased basal metabolism, body composition, body weight, diminished enzyme production, slow reflexes etc. In addition, complications such as osteoporosis and other bone problems which are common in old age also demand additional attention towards diet and nutritional requirements of elderly population (Revanwar M, 2002). Considering the above facts present investigation is carried out to study the anthropometric indices and percent

adequacy of food and nutrient intake of selected elderly from various income level in Marathwada area particularly Nanded District.

2. Materials and method

Present investigation was conducted to find out the influence of family income on food and nutrient intake among elderly residing in Nanded district of Marathwada region of Maharashtra state, India. Random sampling technique was used for selection of samples and 200 each were selected from urban, rural and tribal areas. Out of total elderly 241 were having monthly income >10000/-, 197 having <5000/- and 162 elderly were having monthly income 5000 to 10000/-. Anthropometric measurements like weight, height, waist circumference and hip circumference was recorded by using standard methods and procedure (Jelliffe, 1966) and BMI was calculated by given formula (ICMR, 1986). On the basis of BMI they were categorised under different levels of undernutrition. Food intake was assessed by two day recall method and weighing method. By using food consumption table of ICMR (Gopalan et al., 2004) the nutrient intake of the elderly was calculated. To find out the percent adequacy food and nutrient intake of the elderly was compared with the balanced diet and recommended dietary allowances (ICMR 2012).

3. Result

Table 1 revealed that among three residential areas height and weight ranged from 150.13 ± 7.2 to 160.13 ± 13.97 and 44.77 ± 9.43 to 61.02 ± 9.08 i.e. among tribal low income group and urban high income group respectively. However, BMI was found to be low among urban low income (17.47 ± 0.47) and highest in urban high income (23.37 ± 3.58)

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group. Further it was also found that like height and weight, waist and hip circumference was found to be lowest among low income tribal (68.18±8.70 and 75.55±9.30 cm) and more in urban high income group (86.12±7.65 and 92.12±9.03 cm). Whereas, waist hip ratio was almost same in all three areas of all three groups which ranged from 0.89±0.04 to 0.94±0.03. Individually Influence of area and income was studied, it was observed that, among urban subjects, height of the elderly belonging to low, middle and high income group was 156.25±6.55, 159.19±8.55 and 160.13±13.97 cm respectively. While respective values for weight of the selected elderly were 50.25±17.59, 54.75±9.13 and 61.02±9.08. However, BMI was 17.47±0.47, 21.60±3.00 and 23.37±3.58 kg. Except height and waist hip ratio, all other anthropometric measurements were found to have significantly different in urban area.

In rural situation, height (158.61±7.14), weight (54.81±10.07), waist circumference (84.23±9.93) and hip circumference (90.36±11.89) was noted more among high income group as compared to other two income groups. But the result was noted non significant. Among tribal elderly subjects, height (156.1±9.32) and weight (50.04±9.61), waist circumference (75.32±8.69) and hip circumference (83.72±8.85) were noted more among middle income group as compared to other group. However, except BMI and waist hip ratio other anthropometric measurements were found significantly different. On the whole, it can be concluded from the above findings that, anthropometric measurements were influenced by income level among the elderly belonging to three residential areas.

Prevalence of undernutrition among selected elderly on the basis of family income is presented in Table 2. Among three income groups, majority percent of elderly were found to be normal, which ranged from 54.31 percent (low income) to 65.66 percent (high income). More percent of elderly among low income group (41.62%) were found to be underweight followed by middle income group (23.45%) and high income group (9.95 %). On the contrary, maximum percent of elderly from high income group (24.48 %) were noticed overweight followed by middle income group (11.11 %) and low income group (4.06 %). From the above findings it is clearly indicated that, family income affected positively on prevalence of undernutrition.

Table 3 indicates the average intake of food by the selected elderly subjects from different income groups. Intake of cereals by selected elderly from Rs. >10,000/- income group was 262.31±71.13. while, it was 224.81±79.06 by elderly having income of Rs. 5000 to 10000/- and 172.04±55.89 by elderly having monthly income Rs. <5000/-. Difference was highly significant among three income groups. Intake of pulses by the elderly who have monthly income Rs. <5000/- and elderly having monthly income Rs. >10,000/- was exactly the same (29.09±14.38 and 29.10±14.03 gm.) While significantly low consumption of pulses (21.65±11.54 gm.) was observed by the elderly having monthly income Rs. 5000 to 10,000/-. Average intake of green leafy vegetables (27.68±32.58 gm.), roots and tubers (48.01±35.30 gm.), other vegetables (32.18±35.08 gm.), fats and oil (13.84±5.92 gm.) and milk products (103.12±52.04 gm.) were significantly more by the elderly of high income group (ie. Rs. >10,000/- per month) than that of other two income

groups. Whereas, intake of fruits was observed more by the elderly of middle income group (i. e. Rs 5000/- to 10,000/-) than others two groups. Intake of sugar was found at par level by the elderly of Rs. <5000/- income and elderly of Rs. >10,000/- income. Except Sugar, all other food groups consumptions was observed significantly low by the elderly having monthly income Rs. <5000/- as compared to other two income groups.

Table 4 explains the percent adequacy of food intake by the selected elderly subjects categorized into different income groups. Irrespective of income, highest adequacy was noted for sugar and jaggery and least adequacy was noted for roots and tubers. Except pulses and sugar and jaggery consumption the percent adequacy was increased as income level increased. The percent consumption of cereals (95.34%), fats and oil (69.2%), milk and milk product (61.77%), green leafy vegetables (54.07%), other vegetables (47.09%) and roots and tubers (18.33%) was higher in income group of Rs. >10,000/-. While, adequacy of sugar and jaggery (82.29%) and pulses (68.34%) was more in income group of Rs. <5000/-. Only adequacy of fruits (16.73%) was found more in income group of Rs. 5000/- to 10000/- but difference was negligible. More than 60 percent adequacy was noted for pulses consumption among low and high income group. Whereas, more than 75 to 82 percent adequacy was noted for sugar and jaggery. Except low income group, percent adequacy for cereals was 95.34 percent among high income group and 77.49 percent for middle income group.

Average nutrient intake of the selected elderly subjects having different income status is shown in Table 5. It is observed from the table that, intake of different nutrients by elderly from high income group (>10,000/-Rs.) were 40.87±10.44 gm protein, 247.70±56.89 gm carbohydrate, 28.02±8.87 gm fat and 1423.96 ± 327.76 Kcal energy. Whereas, intake of iron, calcium, phosphorus, and vitamin C were 14.83±6.44 mg, 434.85±153.75 mg, 941.59±276.39 mg, and 38.14±28.32 mg. respectively. The values of intake of nutrients reported by middle income group was lower than high income group but subsequently more than low income group. When seen critically, statistically significant difference was noted among three income groups.

Table 6 depicted the influence of family income on percent adequacy of nutrient intake by selected elderly subjects. It is evident from the table that, as the income of the family increased, percent adequacy of all nutrients also increased. Percent adequacy for protein, carbohydrate, fat and energy among elderly of high income group were 73.55, 66.25, 136.77 and 74.80 percent respectively. While respective values among elderly of middle income group were 54.72, 53.41, 88.30 and 57.53 and 46.76, 43.84, 58.60 and 45.51 percent were for elderly among low income group. However, percent adequacy for iron, calcium, phosphorus and vitamin c was 50.47, 52.71, 115.01 and 91.67 percent respectively among high income group followed by middle income and low income group. Highest percent adequacy was found in case of fat (136.77%) from high income group and lowest adequacy was recorded for calcium intake (16.05%) from low income group. Overall, when noted,

adequacy was found to be lowest in all three income groups for iron and calcium.

4. Conclusion

It can be concluded from the above findings that, anthropometric measurements were influenced by income level among the elderly belonging to three residential areas. Among three income groups, majority percent of elderly were found to be normal. Except Sugar, all other food groups consumptions was observed significantly low by the elderly having monthly income Rs. <5000/- as compared to other two income groups. Except pulses and sugar and jaggery consumption the percent adequacy was increased as income level increased. The values of intake of nutrients reported by middle income group was lower than high income group but subsequently more than low income group. Percent adequacy was found to be lowest in all three income groups for iron and calcium.

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Table 1: Anthropometric measurements of selected elderly as per different income status and area (n=600)

Anthropometric measurements	Urban (Mean ±SD)						Rural (Mean ±SD)						Tribal (Mean ±SD)					
	Height (cm)	Weight (kg)	BMI (kg/m ²)	West circumference	Hip circumference	West hip ratio	Height (cm)	Weight (kg)	BMI (kg/m ²)	West circumference	Hip circumference	West hip ratio	Height (cm)	Weight (kg)	BMI(kg/m ²)	West circumference	Hip circumference	West hip ratio
Rs.<5000/- (n=4)	156.25±6.55	50.25±17.59	17.47±0.47	75.00±5.77	82.25±8.95	0.91±0.05	156.5±7.65	51.52±12.13	21.03±4.6	81.52±12.08	88.36±12.79	0.92±0.06	150.13±7.24	44.77±9.43	19.37±2.63	68.18±8.70	75.55±9.30	0.89±0.04
Rs.5000 to 10000/- (n=28)	159.19±8.55	54.75±9.13	21.60±3.00	80.82±7.01	85.67±8.77	0.94±0.03	156.18±15.87	51.42±9.00	20.69±3.26	81.16±8.26	86.80±9.67	0.93±0.04	156.1±9.32	50.04±9.61	19.92±2.52	75.32±8.69	83.72±8.85	0.89±0.05
Rs.>10000/- (n=168)	160.13±13.97	61.02±9.08	23.37±3.58	86.12±7.65	92.12±9.03	0.93±0.03	158.61±7.14	54.81±10.07	21.73±3.15	84.23±9.93	90.36±11.89	0.92±0.04	164.00±00	52.00±00	19.4±00	74.00±00	81.00±00	0.91±00
F value	0.21	7.7**	8.61**	9.63**	8.09**	1.38	0.815	2.790	2.073	2.442	2.335	0.512	8.37**	3.62*	0.48	7.49**	8.62**	0.34
CD	NS	10.64	3.99	8.65	10.32	NS	NS	NS	NS	NS	NS	NS	16.34	2.54	NS	18.9	20.08	NS

** - Significant at 5 %, NS - Non significant

Table 2: Prevalence of under nutrition among selected elderly as per family income, (n = 600)

BMI	<5000/-(%) (n = 197)	5000 – 10,000/-(%) (n = 162)	>10,000/-(%) (n = 241)
Underweight (<18.5)	82 (41.62)	38 (23.45)	24 (9.95)
Normal (18.5 – 25)	107 (54.31)	106 (65.43)	158 (65.56)
Overweight (>25)	08 (4.06)	18 (11.11)	59 (24.48)

Figures in parenthesis indicates percentages

Table 3: Average food intake by selected elderly subjects from different income groups (n = 600)

Food groups (gm)	<5000/- (n= 197) a	5000 to 10,000/- (n= 162) B	>10,000/- (n = 241) c	Z value		
				a Vs b	a Vs c	b Vs c
Cereals	172.04+55.89	224.81+79.06	262.31+71.13	7.16**	14.89**	4.86**
Pulses	29.09+14.38	21.65+11.54	29.10+14.03	5.47**	NS	5.86**
Green leafy Vegetables	5.88+14.96	19.32+28.04	27.68+32.58	5.50**	9.27**	2.75*
Roots and tubers	19.41+28.14	40.70+27.37	48.01+35.30	7.26**	9.47**	2.34*
Other vegetables	4.91+15.74	19.99+27.06	32.18+35.08	6.28**	10.86**	3.93**
Fruits	21.72+31.51	32.84+34.06	31.64+38.45	3.18**	2.97**	NS
Fats and oil	7.50+2.76	10.68+3.92	13.84+5.92	9.35**	15.46**	6.72**
Milk and milk products	14.72+27.62	54.52+39.92	103.12+52.04	10.75**	22.78**	10.61**
Sugar and jaggery	16.58+8.12	14.82+7.84	16.25+7.68	2.12*	NS	NS

** - Significant at 1%, *-Significant at 5 %, NS - Non significant

Table 4: Percent adequacy of food intake by the selected elderly subjects from different income groups, (n = 600)

Food groups (gm)	<5000/- (n= 197)	5000 to 10,000/- (n= 162)	>10,000/- (n= 241)
Cereals	61.42	77.49	95.34
Pulses	68.34	47.90	64.48
Green leafy Vegetables	10.19	30.04	54.07
Roots and tubers	2.37	8.96	18.33
Other vegetables	15.19	40.09	47.09
Fruits	9.26	16.73	15.97
Fats and oil	32.97	50.16	69.2
Milk and milk products	33.37	43.51	61.77
Sugar and jaggery	82.29	77.71	80.85

Table 5: Average nutrient intake of the selected elderly subjects from different income groups, (n = 600)

Nutrient	<5000/- (Mean ±SD) (n= 197)	5000 to 10,000/- (Mean ±SD) (n= 162)	>10,000/- (Mean ±SD) (n= 241)	Z value		
	A	B	C	a Vs b	a Vs c	b Vs c
Protein (gm)	25.18 ± 7.00	30.97 ± 9.86	40.87 ± 10.44	6.36**	18.9**	9.7**
Carbohydrate (gm)	159.22 ± 39.69	204.20 ± 60.20	247.70 ± 56.89	8.17**	19.15**	7.27**
Fat (gm)	11.68 ± 3.83	18.69 ± 6.25	28.02 ± 8.87	12.98**	26.35**	12.6**
Energy (Kcal)	844.32 ± 210.55	1117.79 ± 322.78	1423.96 ± 327.76	9.28**	22.38**	9.28**
Iron (mg)	8.25 ± 2.85	12.00 ± 6.17	14.83 ± 6.44	7.35**	14.62**	4.49**
Calcium (mg)	128.41 ± 66.12	271.65 ± 123.33	434.85 ± 153.75	13.29**	27.95**	11.78**
Phosphorus (mg)	520.59 ± 177.97	705.85 ± 259.12	941.59 ± 276.39	7.72**	19.26**	8.71**
Vitamin C (mg)	9.06 ± 8.81	20.70 ± 16.91	38.14 ± 28.32	8.03**	15.14**	7.75**

** - Significant at 1%

Table 6: Percent adequacy of nutrients intake by the selected elderly subjects from different income groups, (n = 600)

Nutrient	<5000/- (n=197)	5000 to 10,000/- (n=162)	>10,000/- (n=241)
Protein (gm)	46.76	54.72	73.55
Carbohydrate (gm)	43.84	53.41	66.25
Fat (gm)	58.60	88.30	136.77
Energy (Kcal)	45.51	57.53	74.80
Iron (mg)	28.48	40.36	50.47
Calcium (mg)	16.05	32.18	52.71
Phosphorus (mg)	65.30	85.98	115.01
Vitamin C (mg)	22.47	48.60	91.67