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Dr. Dimple Arora
Department of Physiology,
C. M. Medical College,
Kachandur, Durg, Chhattisgarh,
India

Soudeep Kr. Sau
Special Officer, Vidyasagar
University, Midnapore, Paschim
Medinipur, West Bengal, India

Nilotpal Mandal
Department of Nutrition,
Mahishadal Girl's College,
Mahishadal, Purba Medinipur,
West Bengal, India

Ananda Raj Goswami
Department of Physiology,
New Horizon Dental College and
Research Institute, Sakri,
Bilaspur, Chhattisgarh, India

A comparative study of some physiological and nutritional status of elderly persons living in the old age home with those living in the home

Dr. Dimple Arora, Soudeep Kr. Sau, Nilotpal Mandal, and Ananda Raj Goswami

Abstract
The elderly peoples were particularly vulnerable group of our society. Ageing is often accompanied by the occurrence of illness, which may increase the risk of nutritional deficiency. A comparative study was therefore performed to evaluate the nutritional status as well as the physiological status of elderly living at old age homes and in community, in the Paschim Medinipur, West Bengal. A total of 200 elderly male subjects having aged over 60 years were selected at random for the study. The subjects were constituted by 100 inmates of old age homes and 100 people who were residing at their houses. Dietary intake pattern, anthropometric measurements and physiological examinations were the parameters used to evaluate the nutritional status of the selected subjects. The results showed that the elderly living in old age homes had lower weight, BMI, MUAC, chest circumference, waist circumference and hip circumference compared to those living at home. The present study also indicated that the systolic and diastolic blood pressure were high in elderly subjects living in old age home those living in old age homes compared to that the elderly at home. The elderly people living in old age homes were more hypertensive than that the elderly people living at home. The calorie intakes as well as the dietary intakes were of elderly subjects living in old age homes were significantly decreased compared to that the elderly at home. The uric acid level was unaltered in elderly subjects living in old age home compared to elderly subjects at home. From this study, it can be concluded that the health and nutritional status of elderly residing at their home was much better than elderly whose residing in old age home.

Keywords: Old age, nutritional status, MUAC, BMI

1. Introduction

The proportion of older persons in the population of a country has increased. From 5.6% in 1961 the proportion has increased to 8.6% in 2011 [1] and 13.69% in 2016 [2]. For males it was marginally lower at 8.2%, while for females it was 9.0% [2]. Due to economic well-being, better health care system, good medicines, etc. there is substantial reduction in mortality in the society. These factors together have resulted in increasing number of elderly persons in the population. This phenomenon, called population ageing, is a dynamic demographic trend all over the world.

Anthropometric values are closely related to nutrition, genetic makeup, environmental characteristics, social and cultural conditions, lifestyle, functional status and health. Anthropometric evaluation is an essential feature of geriatric nutritional evaluation for determining malnutrition, being overweight, obesity, muscular mass loss, fat mass gain and adipose tissue redistribution. Anthropometric indicators are used to evaluate the prognosis of chronic and acute diseases, and to guide medical intervention in the elderly [3-5].

There are many reports which indicate that the nutritionally inadequate diets can contribute to or exacerbate chronic and acute diseases [6-8]. Agnihotri [9] and Saha [10] reported that hasten the development of degenerative diseases associated with aging, and delay recovery from illness. The malnutrition among the elderly is most often due to loneliness and the old age is a time of losses believed by the many. Now the growth of many old age homes which are all flooded due to today's busy work structure and the nuclear family cluster. The negligence was the common problems in senior citizens across the world and due to this negligence they are

Correspondence
Dr. Dimple Arora
Department of Physiology,
C. M. Medical College,
Kachandur, Durg, Chhattisgarh,
India

seen to suffer from the health problems. The present study was undertaken to evaluate the physiological and nutritional status of the old age people with the comparison between residential and old age home.

2. Meterials and Methods
2.2 Selection of site and Subject
The present study was conducted different areas of Paschim Medinipur, West Bengal, India. The study was taken up 200 elderly subjects having aged over 60 years. The subjects were selected at random for the study and classified into elderly living in old age home and elderly people living in their home. Out of the total 200 elderly peoples, 100 inmates living in old age homes and 100 peoples who were residing at their houses. The study protocol was approved by the Human Ethical Committee of the institution, and the experiment was performed in accordance with the ethical standards of the committee and with the Helsinki Declaration. The subjects were invited to participate and, after agreeing, provided their informed consent.

2.2.1 *Inclusion criteria*
Subjects over 60 years of age were included in this study as this is the geriatric age group as defined by the World Health Organisation (WHO).

2.2.2 *Exclusion criteria*
Subjects with cancer, end-stage renal disease or terminal illness.
A detailed history was taken and clinical examination was done for each subject.
Persons with chronic illness (diabetes, hypertension, COPD) were categorized into the co-morbidity group. Every subject under this study was individually assessed for nutritional status with anthropometry.

2.3 Anthropometric measurements
Standard techniques and appropriate landmarks were followed to measure the anthropometric dimensions.
Height was taken with the help of an anthropometer (Hindustan Minerals) [11].
The weight of the subject was taken by a portable weighing machine (Libra) [11].
The body mass index (BMI) was calculated from the collected height and weight data by a standardized method [12].
BMI=Weight (kg) / Height^2 (m)
Mid upper arm circumference (MUAC), chest circumference, waist circumference and hip circumference was taken with the

help of a measuring tape [11].

2.4 Physiological measurement
Standard techniques and appropriate landmarks were followed to measure the blood pressure and pulse rate.
The pulse rate of the subjects was taken in resting condition. The resting pulse rate was taken by 30 beats time recording method with the help of a stop watch.
The blood pressure have been measured with the help of the sphygmomanometer and stethoscope by auscultatory method. The blood pressure only taken in resting condition to determining whether the subjects belong in hypotensive, normotensive and hypertensive.

2.5 Nutritional status
Nutritional status of the women subjects was evaluated by 24-hrs recall method [13]. In this method four meals i. e. breakfast, lunch, snacks and dinner were evaluated by discussion with the subjects. In this regard recipes, ingredients and amount of dishes consumed by the family members were also evaluated to find out the actual amount of food consumed by the women subject of the age range selected. From that quantity of the food the amounts of energy, carbohydrate, protein, and fat were calculated by using the Indian Council of Medical Research (ICMR) food composition table [14].

2.6 Uric acid level
The Uric acid levels were measured following standard procedure.

2.7 Statistical analysis
Data are expressed as mean ±SD. Two tail t-test was employed to compare the data of elderly people living in old age home and elderly subjects residing at their home using the statistical package for social science software (SPSS software: 20.0.0, USA). $p \leq 0.05$ was considered as a significant difference.

3. Results
3.1 Height, weight, body mass index (BMI), mid upper arm circumference (MUAC), chest circumference, waist circumference and hip circumference
It was observed from the results that the weight, BMI, MUAC, chest circumference, waist circumference and hip circumference were significantly lower ($p<0.001$ and $p<0.05$) in elderly people living in old age home compared to elderly subjects residing their home. However no significant difference was observed in case of height (Table 1).

Table 1: Comparison of height, weight, BMI, MUAC, chest circumference, waist circumference and hip circumference of elder subjects residing their home (n=100) and elder subjects living in old age home (n=100).

Parameters	Elder subjects residing their home	Elder subjects living in old age home
Height (cm)	152.20±5.37	153.67±7.41
Weight (kg)	60.87±8.25	49.83±8.25**
BMI (kg/m^2)	26.17±3.45	21.27±3.13**
MUAC (cm)	27.52±2.39	25.80±2.64#
Chest ircumference (cm)	92.52±12.09	86.26±5.72#
Waist circumference (cm)	94.67±12.29	88.76±6.28#
Hip circumference (cm)	94.31±9.72	88.72±7.22#

Values are Mean ±SD Significant at **$p<0.001$, #$p<0.05$

3.2 Blood pressure and pulse rate
It was observed from the results that the blood pressure and the pulse rate was significantly higher ($p<0.001$) in elderly people living in old age home compared to elderly subjects

residing their home (Table 2). And also the elderly people whose living in old age home are more hypertensive than the elderly subjects residing their home (Table 3).

Table 2: Comparison of blood pressure and pulse rate of elder subjects residing their home (n=100) and elder subjects living in old age home (n=100).

Parameters	Elder subjects residing their home	Elder subjects living in old age home
Systolic blood pressure (mm of Hg)	124.04±16.45	141.75±13.92**
Diastolic blood pressure (mm of Hg)	79.04±9.02	86.75±8.48**
Pulse rate (Beats/min.)	71.92±9.68	77.28±5.47

Values are Mean ±SD Significant at **$p<0.001$

Table 3: Status of blood pressure of (frequency and percentage) of elder subjects residing their home (n=100) and elder subjects living in old age home (n=100).

Condition	Elder subjects residing their home		Elder subjects living in old age home	
	Frequency	Percentage	Percentage	Percentage
Hypotensive (≤90/≤60 mm Hg)	4	4 %	4	4 %
Normotensive (<120/<80 mm HG)	92	92 %	76	76 %
Hypertensive (≥140/≥90 mm Hg)	4	4 %	20	20 %

3.3 Nutritional status
Nutritional status was compared between elderly subjects residing their home and elderly people living in old age home and it was observed from the results that the nutritional intake was significantly decreased ($p<0.01$ and $p<0.001$) in elderly subjects living in old age home than that of the elderly people residing at their home (Table 4).

Table 4: Comparison of nutritional status between elder subjects residing their home (n=100) and elder subjects living in old age home (n=100).

Parameters	Elder subjects residing their home	Elder subjects living in old age home
Energy (kcal)	2119.95±184.09	1794.30±182.50*
CHO (gm)	403.71±45.12	328.59±35.43**
Protein (gm)	54.25±5.12	49.40±7.28*
Fat (gm)	34.12±8.12	32.29±7.03*

Values are Mean ±SD Significant at *$p<0.01$, **$p<0.001$

3.4 Uric acid levels
It was observed from the results that the uric acid level was unaltered when it compared between in both the elderly subjects residing their home and elderly people living in old age home (Table 5).

Table 5: Uric acid levels of elder subjects residing their home (n=100) and elder subjects living in old age home (n=100).

Parameters	Elder subjects residing their home	Elder subjects living in old age home
Uric acid levels (mg/dl)	9.88±0.828	9.52±0.692

Values are Mean ±SD

4. Discussion
The elderly peoples were particularly vulnerable group of our society. The stability and strength decreases among the old aged persons. Ageing is often accompanied by the occurrence of illness, which may increase the risk of nutritional deficiency [9, 10]. There was a need to compress the period of morbidity experienced by the elderly to minimise the occurrence of the nutritional deficiency and improved well-being. Alteration of the nutritional status is associated with the pathogenesis of the number of common diseases of the elderly. In general, body mass increases during adulthood and decreases progressively with old age at a rate of approximately one kilogram per decade. Anthropometric methods for assessing the nutritional status in adults are simple, inexpensive and potentially reliable. However, problems arise when evaluating elderly populations as there is limited information to interpret anthropometric data in this age group. Reference values for the evaluation of the nutritional status in older adults have been based on statistical definitions of threshold values, rather than on population studies on elderly morbidity, mortality and quality of life. It is necessary to consider all of these factors to determine desirable threshold values for anthropometric measures in the elderly population. The findings of the present study shows the average BMI value of elderly subjects living in old age home was significantly lower compared to the elderly subjects residing their home. Pai [15] also reported that the similar observation, who reported that the elderly at home had higher BMI compared to those living in old age homes. Hwalla et al. [16] have also reported that the elderly living at home had significantly higher mean BMI than those living in institutions. The MUAC, waist and hip circumferences were significantly decreased in elderly subjects living in old age home compared to the elderly subjects residing their home. The present study also indicated that the systolic and diastolic blood pressure were increased in elderly subjects living in old age home compared to the elderly subjects residing their home. But the pulse rate was unaltered in both group of subjects. The elderly people living in old age home were more hypertensive that the elder subjects residing their home. Desai and Kamble [17] also reported the similar observation that the maximum number of old age home elderly people were hypertensive.

A significant difference was seen in all nutrient and calorie intake of elderly people living in old age home. The average values of nutrient intake and calorie intakes of elderly subjects of old age home were seen much lower compared to residential elderly subjects. The nutrient intake of the elderly subjects from both study places was compared with RDA for Indians given by the ICMR and was found much below than requirement. The intake of macro and micro nutrients was found to be much below than suggested recommended standards in both places of the study. The dietary intake was markedly deficient in protein. It was also deficient in energy and this was reflected may be in their clinical examination results. The fat intake of the elderly subjects residing their home was very high compared to RDA and this was reflected in their high BMI values. Nutritionally inadequate diets can contribute to or exacerbate chronic and acute diseases, hasten the development of degenerative diseases associated with aging, and delay recovery from illness [6]. There was no significant differences was seen in uric acid level in elderly subjects living in old age home compared to elderly people residing at their home. But the level of uric acid was higher from the normal uric acid level in both groups of subjects.

5. Conclusion

From this study, it can be concluded that there was a significant difference in dietary intake, anthropometric and clinical assessment between old age home elderly and elderly residing in their home and the health and nutritional status were affected in elderly people living in old age home. The nutritional status of the elderly people residing in home was much better than the elderly people residing in old age home. Prospective studies are required to determine the associations between health and nutritional status in the elderly people residing at old age home because of the elderly people residing at old age home were posed at greater risk of severe health problems.

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