



Study on Serum Calcium, Phosphorus and Iron Level of Selected Elderly

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Authors' contributions

This work was carried out in collaboration between both authors. Author VZ designed, planned the study and wrote first and final draft of the paper. Author MR carried out statistical analysis of data and managed the analysis of data. All authors read and approved the draft.

Article Information

DOI: 10.9734/JSRR/2019/v25i630205

Editor(s):

(1) Dr. Karl Kingsley, University of Nevada, Las Vegas - School of Dental Medicine, USA.

Reviewers:

(1) Ahmed N. F. Neamat Allah, Zagazig University, Egypt.

(2) Tabe Franklin Nyenty, University of Yaounde 1, Cameroon.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/54005>

Received 17 November 2019

Accepted 23 January 2020

Published 31 January 2020

Original Research Article

ABSTRACT

For present study total 600 elderly were randomly selected from urban (200), rural (200), and tribal (200) areas from Nanded district of Maharashtra state of India. Information of socio economic status of elderly population was collected with the help of interview schedule and discussion. While biochemical estimations like serum calcium, phosphorus and haemoglobin content of blood was carried out for 10 percent rural (20) and urban (20) elderly with standard procedures. Result stated that, 75 percent elderly were belonging to age group of 60 to 70 years and 25 percent were above 70 years. Among selected elderly, 53.5 percent were female and 46.5 percent were male. Serum calcium of selected elderly subjects, ranged from 8.6 ± 0.00 to 9.45 ± 0.83 . The range of serum phosphorus was 2.78 ± 0.39 to 3.70 ± 0.90 . While haemoglobin content of blood of selected elderly ranged from 7.9 ± 0.00 to 9.73 ± 2.52 .

Keywords: *Elderly; calcium; phosphorus; haemoglobin; biochemical estimations.*

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1. INTRODUCTION

The elderly are one of the most vulnerable and high risk group in terms of health status in any society. Ageing is the natural phenomenon of every human being associated with several physical, biological and psychological changes. The term aging is often applied to people of age 60 and older. In the fullest biological sense it designates the sequences of mental and physical changes that begin at conception and end at death [1]. Bones and teeth contain most of the body's calcium and phosphorus. Either extreme or low calcium or phosphorus leads to health problems. Low serum calcium causes bone problems in elderly while low phosphorus causes changes in mental state (anxiety, irritability or confusion), pain in bones, irregular breathing, fatigue, loss of appetite, muscle weakness and weight loss or gain. It is important to remember that, it is difficult if not impossible to discuss calcium alone. As age increases, absorption of different nutrients decreases, specially calcium and phosphorus. Due to lack of dietary calcium and phosphorus absorption many problems start with ageing. To know the exact level of these nutrients in body is essential to diagnose the problems. To diagnose the level of these nutrients availability of suitable biomarkers is highly desirable. Ideally such biomarkers should reflect underlying mechanism of aging and thus make it possible to distinguish essential aging phenomenon from processes that are due to the various diseases that often occur with advancing age. Early detection of imbalance in serum calcium and phosphorus level can be a useful tool to assist healthcare professional, for therapeutic aspect and follow up. Serum calcium and serum phosphorus test can determine whether one have high or low calcium or phosphorus levels. Which helps to identify the actual cause of bone and health problems in elderly. While blood haemoglobin test help to identify the presence of anaemia among elderly.

1.1 Objectives

1. To study the socio economic status of selected elderly people living in urban, rural and tribal area of Nanded District.
2. To determine the calcium and phosphorus content of blood of selected (10%) Urban and Rural elderly population.

2. MATERIALS AND METHODS

Present investigation was conducted to study the biochemical profile of elderly population residing in urban, rural and tribal area of Nanded district of Marathwada region of Maharashtra state, India. Total 600 elderly from rural (200), urban (200) and tribal (200) areas were selected for the study with the help of random sampling technique. Information of socioeconomic background of selected elderly was collected by using structured questionnaire and personally interviewing the subjects. While to judge the extent of prevalence of anaemia among elderly, blood sample was taken from 10 percent rural and urban elderly by given finger prick. Haemoglobin content from the collected blood sample was determined by Cyanomethyloglobin method [2]. Serum calcium and serum phosphorus of 10 percent elderly from rural and urban elderly (20 elderly from each area) was also estimated in the laboratory by using Kramer Tiscal modified method and Fiske- Subbarow method [3] (Fiske CH, Subbarao YJ. 1925). Though many researchers had given outcome of their studies, but required information on elderly is not available like serum calcium, phosphorus and haemoglobin of blood of elderly in Nanded District. Considering the past studies the researcher felt to study the biochemical status of elderly of underdeveloped area of Nanded district of Marathwada zone. As the information on elderly of these area is scanty, the present investigation is taken up. As the tribal area of Nanded district is very remote area, no medical facility and biochemical laboratories are available in nearby areas where the study taken. Hence tribal area is exempted from biochemical estimation.

3. RESULTS AND DISCUSSION

Data on socio economic background of the selected elderly subjects residing in rural, urban and tribal area of Nanded district is presented in Table 1. It is evident from the table that, 75 percent elderly were belonging to age group of 60 to 70 years and 25 percent were above 70 years. Among selected elderly, 53.5 percent were female and 46.5 percent were male. Majority of the subjects were vegetarian (62.5%) while 37.5 percent were non vegetarian. However, the selected elderly (40.16%) were having monthly income of Rs. >10,000/- followed by 32.83 and 27 percent were having monthly income less than

Table 1. Socio economic background of the selected elderly subjects (n=600)

Socio economic factors	Frequency and Percentage
Area	
Rural	(200) 33.33
Urban	(200) 33.33
Tribal	(200) 33.33
Age	
60-70 yrs.	(450) 75
>70 yrs.	(150) 25
Sex	
Male	(279) 46.5
Female	(321) 53.5
Food habits	
Vegetarian	(375) 62.5
Non Vegetarian	(225) 37.5
Monthly Income (Rs.)	
< 5000/-	(197) 32.83
5000/- to 10,000/-	(162) 27.00
> 10,000/-	(241) 40.16
Occupation	
House wife	(142) 23.66
Farmers	(334) 55.66
Government Service	(66) 11.00
Private job/ business	(58) 9.66
Family Size	
1 to 4 members	(47) 7.83
<5 members	(553) 92.16
Family type	
Joint	(3) 0.5
Nuclear	(413) 68.83
Extended	(178) 29.66
Living alone	(53) 8.83
With family	(547) 91.16
Education	
Illiterate	(251) 41.83
Primary to High School	(290) 48.33
Degree holders	(59) 9.83

Rs. 5000/- and in between Rs. 5000/- to 10,000/-. Further 55.66 percent elderly were involved in farming as their prime occupation. Whereas, 23.66 percent elderly women were housewife, 31.33 percent elderly were retired as government servant. Whereas, 9.66 percent subjects were either doing private job or business. Almost all (92.16%) subjects lived with family having more than 5 members in the family. However, 91.16 percent elderly subjects were living with their family, only 8.83 percent were living alone. Majority of the elderly (68.83%) were having nuclear family and 29.66 percent elderly were belonging to joint family. Whereas, 48.33 percent were educated from primary to high school level and 41.83 percent were illiterate and 9.83 percent elderly were degree holders.

Data on serum calcium content of the selected elderly subjects from different socio economic status is presented in Table 2. The urban elderly exhibited significantly higher serum calcium content (9.45 ± 0.83) as compared to rural elderly (8.79 ± 0.40). More serum calcium content was exhibited by elderly of 60 to 70 years (9.07 ± 0.79) as compared to elderly above age 70 years (8.63 ± 0.83) with statistically non significant difference. The serum calcium content of elderly male (9.05 ± 0.77) and female (8.89 ± 0.86) was almost same. The values reported for serum calcium content of elderly of various occupations shows marginal difference. Which was in range of 8.66 to 9.45 for different occupation. The recorded values for elderly belonging to high income group i. e. > 10,000/- was 9.04 ± 0.84 . Which was comparatively more

than elderly belonging to low (Rs. <5000/-) and middle income (Rs. 5000/- 10,000/- Rs.) group. However, significant difference was noted for comparison of two income groups i.e. income Rs <5000/- and >10,000/-. Further it was noted that, vegetarian and non vegetarian elderly recorded serum calcium i.e. 8.88 ± 0.73 and 9.28 ± 1.02 with statistically non significant difference. Result mentioned by Revanwar, [4] and Bhosle, [5] are in line with the present reported result.

Table 3 presents the data on serum phosphorus content of selected elderly subjects. For this estimation, 10 percent each elderly were selected from urban (20) and rural (20) area only. It is evident from the table that, the serum phosphorus level of urban elderly (3.64 ± 0.69) was found to be more as compared to rural elderly (2.78 ± 0.39) elderly. Further significant difference was also observed among the elderly of 60 to 70 years (3.33 ± 0.70) than elderly of > 70 years (2.80 ± 0.56). The phosphorus content of male elderly was found to be more (3.45 ± 0.67) as compared to female elderly (2.99 ± 0.67). The statistically significant difference was noted. Contrary, when occupation of elderly considered, non significant difference was noted for phosphorus values.

The values reported in low and middle income shows difference but it is non significant. However, the values of phosphorus reported by low (< 5000/-), middle (5000/- to 10000/-) and high (> 10000/-) income also shows statistically significant difference. Non vegetarian elderly shows more values of phosphorus content than vegetarian elderly, but statistically non significant difference was noted.

Table 4 presents the data on haemoglobin content of blood among selected elderly subjects. For this estimation of blood haemoglobin, 10 percent each elderly were selected from urban (20) and rural (20) area only. It is evident from the table that, haemoglobin content of elderly from urban and rural was 9.09 ± 1.07 and 8.81 ± 1.05 . though the difference was noted among two areas it was found to be non significant. Further, the haemoglobin content of elderly of two age groups was noted, non significant difference was observed with more haemoglobin content among elderly of 60 to 70 years (9.04 ± 1.07) than elderly of > 70 years (8.43 ± 1.01). The haemoglobin content of elderly male (9.86 ± 0.62) was found to be more than elderly female (8.12 ± 0.58) with statistically significant difference. Contrary, when occupation of elderly

Table 2. Serum calcium of selected elderly subjects from different socio economic status (n=40)

Socio economic factors	Serum calcium (mean \pm SD)	't' values
Area		
a. Rural	8.49 ± 0.40	5.64**
b. Urban	9.45 ± 0.83	
Age		
a. 60 – 70 yrs	9.07 ± 0.79	NS
b. >70 yrs	8.63 ± 0.83	
Sex		
a. Men	9.05 ± 0.77	NS
b. Women	8.89 ± 0.86	
Food habits		
a. Vegetarian a	8.88 ± 0.73	NS
b. Non vegetarian b	9.28 ± 1.02	
Income		
a. <5000/-	8.6 ± 0.0	NS (a vs b)
b. 5000 – 10,000/-	8.77 ± 0.76	3.14** (a vs c)
c. <10,000/-	9.04 ± 0.84	NS (b vs c)
Occupation		
a. House wife	8.90 ± 0.90	NS (a vs b)
b. Farmer	8.66 ± 0.32	NS (a vs c)
c. Government job	9.01 ± 0.88	NS (a vs d)
d. Private job	9.45 ± 0.74	NS (b vs c)
		3.29** (b vs d)
		NS (c vs d)

Table 3. Serum phosphorus content of selected elderly subjects from different socio-economic status (n=40)

Socio economic factors	Serum phosphorus (mean+ SD)	't' values
Area		
a. Rural	2.78 ± 0.39	6.14**
b. Urban	3.64 ± 0.69	
Age		
a. 60 – 70 yrs	3.33 ± 0.70	2.65*
b. >70 yrs	2.80 ± 0.56	
Sex		
a. Male	3.45 ± 0.67	2.3*
b. Female	2.99 ± 0.67	
Food habits		
a. Vegetarian	3.14 ± 0.68	NS
b. Non vegetarian	3.45 ± 0.77	
Income		
a. <5000/-	2.9 ± 0.0	NS (a vs b)
b. 5000 – 10,000/-	2.83 ± 0.44	4.3** (a vs c)
c. <10,000/-	3.33 ± 0.74	2.94** (b vs c)
Occupation		
a. House wife	3.04 ± 0.72	NS (a vs b)
b. Farmer	3.13±0.05	NS (a vs c)
c. Government job	3.70 ± 0.90	NS (a vs d)
d. Private job	3.31 ± 0.46	NS (b vs c)
		NS (b vs d)
		NS (c vs d)

Table 4. Haemoglobin content of blood among selected elderly subjects from different socio economic status (n=40)

Socio economic factors	Hemoglobin (mean ± SD)	't' values
Area		
a. Rural	8.81±1.05	NS
b. Urban	9.09±1.07	
Age(yrs)		
a. 60 – 70	9.04±1.07	NS
b. >70	8.43±1.01	
Sex		
a. Male	9.86±0.62	10.23**
b. Female	8.12±0.58	
Food habits		
a. Vegetarian a	8.99±1.02	NS
b. Non vegetarian b	8.82±1.23	
Income (Rs.)		
a. <5000/-	7.9 ±00	NS (a vs b)
b. 5000 – 10,000/-	8.64±1.33	6.94** (a vs c)
c. <10,000/-	9.08±0.96	NS (b vs c)
Occupation		
a. House wife	8.17±0.64	NS (a vs b)
b. Farmer	9.04±2.82	NS (a vs c)
c. Government job	9.73±2.53	NS (a vs d)
d. Private job	9.11±2.07	NS (b vs c)
		NS (b vs d)
		NS (c vs d)

was considered, though the difference was noted for haemoglobin values among all occupations, but values were non significant. Further it is reported from the table that, income of the family shows impact on haemoglobin values. Comparatively, elderly from low income group shows significantly low haemoglobin content (7.90 ± 0.00) than elderly from high income group (9.08 ± 0.96). vegetarian elderly shows more haemoglobin values (8.99 ± 1.02) than non vegetarian elderly (8.82 ± 1.23) but difference was non significant.

4. CONCLUSION

It was concluded from above results that, Serum calcium of selected elderly subjects, ranged from 8.6 ± 0.00 to 9.45 ± 0.83 . the range of serum phosphorus was 2.78 ± 0.39 to 3.70 ± 0.90 . while haemoglobin content of blood of selected elderly ranged from 7.9 ± 0.00 to 9.73 ± 2.52 . it was noted from the data that, serum calcium, phosphorus content of selected elderly was significantly higher among urban elderly as compared to rural elderly. The values were also noted more among elderly aged 60 to 70 years, elderly male, elderly belonging to high income group and elderly retired as government servant. Further it was noted that, vegetarian and non vegetarian elderly recorded non significant difference for

serum calcium, phosphorus and blood haemoglobin content.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

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