# Study on Hemoglobin Content, Blood Glucose Level and Lipid Profile of Elderly

**Nalwade Vijaya\*, Pawar Chandrabhaga\***

## Abstract

Thirty elderly (Men and Women) of different income group from the age group of 60 to 80 years was selected randomly from Parbhani city to find out the Hemoglobin Content, Blood Glucose Level and Lipid Profile of Elderly. Haemoglobin content by Cyanometheamoglobin method, total cholesterol by CHOD-PAP method, triglycerides by enzymatic colorimetric method, HDL-cholesterol and LDL-cholesterol by high performance CHOD-PAP method and blood fasting glucose level by GOD-POD method of elderly was estimated. The mean value of hemoglobin Content in the blood of the elderly men (11.04 ± 1.75g/dl) was more than that of elderly women (9.68 ± 1.17g/dl). It was also noticed that income of the elderly did not have a marked role in prevalence of anaemia. On the other hand, Fasting blood glucose value was found to be relatively high in elderly men as compared to elderly women. Serum cholesterol, LDL values and even triglyceride values were higher among elderly of high income group as compared to middle and low income group.

**Keywords:** Haemoglobin; Cyanometheamoglobin Method; Lipid Profile; Cholesterol.

## Introduction

In India, the elderly people suffer from dual medical problems,i.e., both communicable as well as non–communicable diseases. Ageing is associated with a progressive decline in the function of multiple organ systems thereby making individuals vulnerable to various disease and illness (Lipsitz, 2004). Ross (2000) explained that the aged may suffer coronary heart disease (CHD), strokes, type II diabetes, obesity hypertension, cancer, osteo-arthritis, low back pain, weakness and headache and disabled body among others.

Ageing implies predictable progressive universal deterioration in various physiological systems. Due to physiological and structural changes like to reduced metabolism including reduced BMR, lack of physical activity and lack of appetite mostly due to lack of interest in food; loss of teeth and difficulty in mastication; atrophy of taste buds; reduction of gastric volume associated with atrophy of gastrointestinal tract musculature. This is further compounded by impairment of special sensory functions like vision and hearing. A decline in immunity as well as age related physiological changes leads to an increased burden of communicable diseases in the elderly. Hence the present study is planned to find out the bloodhaemoglobin content , fasting blood glucose level and lipid profile of the selected elderly.

## Material and Methods

A total sample of 30 elderly 15 men and 15 women from the age group of 60 to 80 years was selected randomly from parbhani city for the study. Also they were divided in to three groups according to their family income such as low, middle and high income group 10 in each group. Blood sample of the selected elderly were collected andestimated for blood haemoglobin level, lipid profile andfasting blood glucose content was estimated. Haemoglobin content in the blood of all the selected elderly was estimated by Cyanometheamoglobin method Crossby*et al.* (1954). According to the haemoglobin content in the blood (g/dl) of theselected elderly were categorized in to four groups (Demaeyer, 1989)as a normal,mild

**Author's Affiliation:** \*Department of Foods and Nutrition, College of Home Science, Vasantrao Naik Marathwada Krishi Vidyapeeth Parbhani (M.S.).

**Corresponding Author: Vijaya Nalwade,** Professor & Head, Dept. of Foods & Nutrition College of Home Science, Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV), Parbhani -431402 (M.S.).

E-mail: vm_nalwade@rediffmail.com

anaemia, moderate anaemia, and Severe anaemia.

Total cholesterol in serum was determined by CHOD-PAP method (Schettler and Nussel, 1975). The level of triglycerides in serum was estimated by followingenzymatic colorimetric method GPO-PAP as described by Bucolo*et al.,*(1973). HDL-cholesterol and LDL-cholesterol in the serum samples wereestimated by high performance CHOD-PAP method as described by Lopes (1977) and blood fasting glucose level by GOD-POD method. Statistical analysis was carried out.

## Result and Discussion

Haemoglobin content of the selected elderly men and women ispresented in Table 1. Haemoglobin content in the blood of elderly men varied widely from 8-15.2 g/dl with mean value of 11.04±1.75 g/dl and that in the elderlywomen it ranged from 7 to 12 g/dl with mean of 9.68±1.17 g/dl. Thehaemoglobin content in the blood of elderly men was more than that in the blood of the elderly women but the difference in the haemoglobin content between the men and women was not significant statistically (p<0.05).

Distribution of the selected elderly of different groups intonormal, mild and moderate anaemia on the basis of blood haemoglobincontent according to their family income is given in Table 2. On the basis of family income a higher per cent of the elderlyof low income group was normal than that of middle and high incomegroups. In contrast the mild anaemia was more among high incomegroup and moderate anaemiawasrelatively more among middle income group. This indicates that more number of elderly from families of middle income group was suffering from moderate degrees of anaemia than thenumber of elderly from families of higher and lower income groups. However, it can be concluded from the results that income did not have a marked role on the nutritional status of elderly with special reference of anaemia.

Table 3. depicts the meanfasting blood glucose level (g/dl) of the selected men varied from 70 to 198 with mean values of 112.08±40.89 g/dl. On the other hand, in the elderly women they were found to be ranging from 70 to 134 with meanvalues of92.13±16.48 g/dl. Results indicated that difference in the fasting blood glucose level in the men and women was notsignificant statistically.

In nutshell, it can be said that mean value of fasting blood glucose was found to be relatively high in elderly men as compared to that in the elderly women. Even 80 per cent of elderly women were having normal level of fasting blood glucose level.

Mean values of lipid profile of the selected elderly of differentincome groups are given in Table4. The mean values of serum cholesterol was high (188.68±41.94) in elderly of high income group as compared to low(176.4±20.94) and middle (183.2±30.59) income groups. HDL values werefound to be approximately same in all three income groups. It was also foundthat the serum LDL values were high (127.3±35.89) in high income group than that of other two income groups. In case of VLDL the mean values of the selected elderly of lowincome group was high (26.57±15.88) than that of middle (22.52±6.97) and high income (23.47±2.66) groups. Triglyceride values of the selected elderly were also found to be higher among elderly in high income group.

On the whole, it can be concluded that the sex of elderly didnot show a significant association in lipid profile of elderly. Results alsoindicated that family income did not play a role in causing hypercholesterolemia or hypertriglyceridemia among the selected elderly.

The mean values of lipid profile in the serum of the selected elderly men and women are presented in Table 5. Serum cholesterol values (mg/dl) in the elderly men werebetween 124 and 251 with a mean of 182.2±34.86. On the other hand, serum cholesterol values of elderly women ranged from 131 to 252 with an average value of 183.32±29.19. Serum cholesterol level of elderly men and womendid not differ markedly. In case of HDL mean value of elderly men (41.28±3.69) andwomen (41.18±2.58) found to be almost same. All the selected elderly found to have HDL values within the normal HDL range. The mean value of LDL was relatively high in elderly women (120.39 ± 21.89) as compared to that in the elderly men (115.56±36.09). The VLDL content in the men was higher than that in the women. VLDL (mg/dl) of the elderly men ranged from 14 to 68.8 with amean value of 25.99±13.17 while in the women they ranged from 13 to14with an average value of 22.38±8.90. Statistically the difference in theVLDL content between men and women was notsignificant.

The per cent of elderly men having normal and hightriglyceride values were 60 and 40 whereas in the elderly women 53.3 percent having normal triglyceride value and 46.7 per cent were having hightriglyceride value. Mean values of serum triglyceride in the men and womenwere 171.08±83.53 and 168.28±56.74 respectively.

The categorization of elderly based on lipid profile values are given in Table 6. More than 75 per cent

elderly men and women had normallevel of cholesterol and the remaining 23 per cent had higher values of serumcholesterol than normal. On the other hand, HDL level all the selectedelderly men and women was found to be almost same. Majority (86.6%) of elderly men and (93.3%) women had normal level of LDL. Maximum (86) per cent of elderly men and women had normal level of VLDL and the remaining 14 per cent had VLDL above normal level. About 57 per cent of elderly men and women had normal

**Table 1:** Haemoglobin content of the selected elderly men and women of different income groups

| Sex | Number of elderly | Range (g/dl) | Mean value of haemoglobin (g/dl) content among the selected elderly Mean ± SD | 'Z' Value |
|---|---|---|---|---|
| Men | 15 | 8-15.2 | 11.04 ± 1.75 | |
| Women | 15 | 7-12 | 9.68 ± 1.17 | 0.53[NS] |

NS – Non significant

**Table 2:** Prevalence of varying degrees of anaemia among selected elderly

| Degrees of anaemia | Percent of haemoglobin (g/dl) content among the selected elderly of different income group LowMiddle High income incomeincome | | | 'Z' Value | | |
|---|---|---|---|---|---|---|
| | a N=10 | b N=10 | c N=10 | a vs b | bvs c | a vs c |
| Normal (>12 ) | 2(20) | 1 (10) | 1 (10) | 4.08** | 0 | 4.08** |
| Mild amaemia ( 10 - 12) | 4(40) | 1 (10) | 5(50) | 4.07** | 6.32** | 1.58** |
| Moderate anemia (7- 10) | 4(40) | 8(80) | 4(40) | 2.66** | 2.66** | 0 |

Figures in parenthesis indicate percentage
** - significant at 1 per cent level ,NS – Non significant

**Table 3:** Mean fasting blood glucose content of the selected elderly

| Sex | Number of elderly | Range (mg/dl) | Mean value of fasting blood glucose (mg/dl) content of selected elderly Mean ± SD | 'Z' Value |
|---|---|---|---|---|
| Men | 15 | 70-198 | 112.08 ± 40.89 | 0.75[NS] |
| Women | 15 | 70-134 | 92.13 ± 16.48 | |

NS – Non significant

**Table 4:** Mean value of lipid profile of the selected elderly of different income groups

| Parameters | Mean values with SD of lipid profile the selected elderly of different income groups | | | 'Z' Value | | |
|---|---|---|---|---|---|---|
| | Low income N=10 Mean ± SD | Middle income N=10 Mean ± SD | High income N=10 Mean ± SD | a vs b | bvs c | a vs c |
| Total cholesterol (mg/dl) | 176.4 ± 20.94 | 183.2 ± 30.59 | 188.68± 41.94 | 0.14[NS] | 0.11 [NS] | 0.26 [NS] |
| HDL (mg/dl) | 41.85 ± 3.52 | 41.78 ± 2.50 | 40.06 ± 3.26 | 0.006 [NS] | 0.16 [NS] | 0.17 [NS] |
| LDL (mg/dl) | 107.77 ± 27.48 | 118.86 ± 23.12 | 127.3 ± 35.89 | 0.38 [NS] | 0.26 [NS] | 0.64 [NS] |
| VLDL (mg/dl) | 26.57 ± 15.88 | 22.52 ± 6.97 | 23.47 ± 2.66 | 0.65 [NS] | 0.16 [NS] | 0.48 [NS] |
| Triglycerides (mg/dl) | 177.83 ± 69.05 | 149.1 ± 73.84 | 182.1 ± 70.23 | 0.68 [NS] | 0.77 [NS] | 0.09 [NS] |

NS – Non significant

**Table 5:** Mean values of Lipid profile of the selected elderly

| Parameters | Mean values of lipid profile of the selected elderly | | 'Z' Value |
|---|---|---|---|
| | Men N=15 Mean ± SD | Women N=15 Mean ± SD | |
| Total cholesterol(mg/dl) | 182.2 ± 34.86 (124-251) | 183.32 ± 29.19 (131-252) | 0.02[NS] |

| | | |
|---|---|---|
| HDL (mg/dl) | 41.28 ± 3.69 (37-47.9) | 41.18 ± 2.58 (36.6-45) | 0.009 [NS] |
| LDL (mg/dl) | 115.56 ± 36.09 (74-186) | 120.39 ± 21.89 (80-135) | 0.15 [NS] |
| VLDL (mg/dl) | 25.99 ± 13.17 (14-68.8) | 22.38 ± 8.90 (13-44) | 0.58 [NS] |
| Triglycerides (mg/dl) | 171.08 ± 83.53 (80-344) | 168.28 ± 56.74 (109-338) | 0.06 [NS] |

Figures in parenthesis indicate range
NS – Non significant

**Table 6:** Categorization of elderly based on lipid profile values

| Parameters | Normal range (mg/dl) | Per cent of the selected elderly into different category according to lipid profile | | | |
|---|---|---|---|---|---|
| | | Normal range | | Above normal Range | |
| | | Men | Women | Men | Women |
| Total Cholesterol (mg/dl) | 130-200 | 11 | 12 | 4 | 3 |
| HDL (mg/dl) | 35-55 | 15 | 15 | 0 | 0 |
| LDL (mg/dl) | 60-165 | 13 | 14 | 2 | 1 |
| VLDL (mg/dl) | 12-35 | 13 | 13 | 2 | 2 |
| Triglycerides (mg/dl) | 50-150 | 9 | 8 | 6 | 7 |

triglyceride level and the remaining 43 per cent elderly men and women had triglyceride above normal level. From the above results, it is evident that a relatively high percent of the selected elderly found to have normal values of lipid profile.

## Conclusion

It can be said that mean values of the blood haemoglobin content andfasting blood glucose of elderly men were higher than that of women but it was not significant statistically. Majority of the elderly were found to be suffering from varying degrees of anaemia.On the other hand, the values of serum cholesterol LDL and triglyceride were found to be higher among elderly belonging to high income group while mean value of VLDL was high in low income group than other two income groups. However special attention should be paid in providing proper healthcare facilities to elderly to have overall wellbeing of elderly.

## References

1.   Bucolo G,Davi S.M. Triglyserides FI. Enzymatic colorimetric method GPO-PAP. Clin.Chem1973; 19: 476.

2.   Crosby, Munn, Fourth U.S. Armed Forces Med. J. 1954; 5: 693.

3.   Demaeyer E. M. Preventing and Controlling Iron Deficiency Anaemia Through Priamary health care 1989.

4.   Lipsitz L.A. Physiologic complexity, aging and the path to frailty.Sci Aging Knowledge Environ 2004 April; 21(16) ;16.

5.   LopesVirella M.F. Method of estimation of HDL-Cholesterol in serum. Clin.Chem. 1977; 23: 882.

6.   Panse V.G. and SukhatmeP. Statistical methods for Agricultural workers . ICAR Publications, New Delhi 1985; 58-60, 97-110.

7.   Ross T.N. Ageing well. Reading, Mass..Addison-Wesley publishing house 2000.

8.   Schettler G. and Nussel E. Cholesterol liquicolour CHOD-PAP method. Arb.Med Prav.Med.1975; 10: 25.