

# An Epidemiological Study of Correlates of Anaemia among Elderly Aged 65 years and above in UT, Chandigarh

Sharma MK, Swami HM, Gulati R, Bhatia V, Kumar D

## Abstract

**Background:** Anaemia is a significant health problem in all ages. The present study was carried out to find the prevalence of anaemia in elderly of UT, Chandigarh and to study its correlates.

**Material and Methods:** A cross-sectional descriptive community based study was conducted in urban and rural areas of UT, Chandigarh. Elderly >65 years of age were included in the study. Information on pre-designed and pre-tested proforma was collected by house to house visit. Haemoglobin estimation was done.

**Results:** A total of 362 elderly, (153 males and 209 females) were studied. An overall 140 (38.7%) elderly; 42 (27.5%) males and 98 (46.9%) females were inferred to be anaemic. Among males low haemoglobin levels were higher in illiterates than in educated ones (24.3% Vs 8.6%), in those consuming less calories than amongst those consuming high calories (17.8% Vs 11.5%) and in those doing no exercise compared with those doing regular exercise (40.7% Vs 6.9%). Among females similar figures were 81.5% Vs 68.4%, 77.3% Vs 82.1% and 85.1% Vs 66.1% respectively.

**Conclusion:** Anaemia in elderly is a major public health problem in UT, Chandigarh. Decreased physical activity, low dietary intake, illiteracy and increased morbidities contribute towards its high prevalence. Health education is required to be imparted to elderly regarding usefulness of good diet and regular exercise by various campaigns. There is a need to conduct more epidemiological studies to find out the causes of anaemia in elderly.

(Journal of The Indian Academy of Geriatrics, 2006; 2:61-65)

## Introduction

Anaemia is defined as reduction in the red cell mass. The WHO criteria for anaemia are haemoglobin less than 13gm/dl for men and 12gm/dl for women.<sup>1</sup> The same criteria can be applied for the elderly.<sup>2</sup> In the communities with better socioeconomic status the prevalence of anaemia in the elderly is same as that of the rest of the population; in communities with poor socio-economic status the incidence of anaemia

increases with age.<sup>3</sup> The most common cause of anaemia is iron deficiency and iron deficiency is probably the most common nutritional deficiency disorder in the world and is also significantly prevalent in virtually all developing nations.<sup>4,5</sup> In addition to poor intake and/or absorption, intestinal parasitosis, malaria, malignancies (particularly those involving gastrointestinal tract), chronic infections and lack of exercise are important factors for low haemoglobin in elderly. Consequences of iron deficiency are reduced physical working capacity and productivity. Since the diet in developing countries due to economic reasons is cereal-based with the consequent low absorption of iron, the most important way to combat anaemia is iron fortification of foods.<sup>6</sup> Most of the epidemiological studies on prevalence / incidence of anaemia has been conducted amongst children and pregnant females. The

\* Epidemiologist, \*\* Professor & Head, \*\*\* PG Student, \*\*\*\* Senior Lecturer, \*\*\*\*\* Statistician cum Sr. Lecturer, Department of Community Medicine, Government Medical College, Sector 32, Chandigarh.

### Address for Correspondence:

Dr M K Sharma, Epidemiologist, Department of Community Medicine, Government Medical College, Sector 32, Chandigarh.  
email: mks20042002@yahoo.co.in

study material on anaemia in elderly is scarce. Even the World Health Statistics on anaemia and ACC-SCN (1997) in its third report on the world nutrition situation does not mention prevalence of anaemia in elderly.<sup>4,7</sup> The ICMR report on micro-nutrient profile in Indian population reflects that amongst a total 273 studies regarding anaemia, 163 are on children, 80 on pregnant and lactating mothers and 30 on adolescents, but none on elderly. Thus keeping in view the paucity of data on this subject, present study was conducted to find out prevalence of anaemia and its correlates amongst elderly in UT, Chandigarh.

### Material And Methods

The study was conducted in the urban and rural areas of the UT, Chandigarh covering a total of 362 elderly from the total population of 1.06 million people. The urban areas of Chandigarh had been planned as sectors. There are total of 62 sectors and 27 villages in UT, Chandigarh. Nine sectors in the urban areas and seven villages in the rural areas were randomly selected. Households for study were selected by systemic random sampling technique. Every 20<sup>th</sup> house was visited. The data was collected by house to house survey on a pre-designed and pre-tested format. The team comprising of doctors, medical social workers and lab technicians were trained to enable uniform collection of data. The methodology adopted for selecting and visiting the households in rural areas was similar to that of methodology adopted for urban areas. The haemoglobin estimation was done using Sahli's method. Sahli's methods gives 1.07gm% low haemoglobin levels as compared to values obtained by using better procedure like Hemocue method.<sup>8</sup> We thus adjusted readings by adding 1.0gm% in each figure. The status of anaemia was determined by using WHO criteria. Males with haemoglobin less than 9 gm% and females with hemoglobin less than 8 gm% were categorised as severely anaemic. To find out correlation

of haemoglobin with various factors males and females were divided into two categories (i.e. low level & high level) based on haemoglobin status by taking cut off values of 11gm% for males and 10gm% for females respectively. The data was analyzed by Fox-pro programme.

### Results

A total of 362 elderly (153 males and 209 females) were examined. Out of which 38.7% (27.5% in males and 46.9% in females) had anaemia (table 1).

Table 2 depicts that in elderly individuals 35.6% were illiterate (males 24.2%, females 44.0%). It is observed that in both sexes percentage of elderly with low haemoglobin level decreased as education status increased; in males from 24.3% for illiterates to 8.6% for those educated for >8 years and in females from 81.5% to 68.4% for similar groups. In the elderly population studied 14.4% males and 2.4% females were current smokers. Among males, more smokers were having high haemoglobin level than non-smokers (16% Vs 13.6%). Only 34.0% males and 13.4% females were consuming 1500 Kcal or more. Amongst male elderly consuming 1500 Kcal or more, the percentage of high haemoglobin level was better than their counterparts consuming less than 1500 Kcal (88.5% Vs 82.2%), for females reverse was true (17.9% Vs 22.7%). As much as 56.9% males and 28.2% females were doing regular exercise. In these 2 groups of both sexes percentage of elderly having low haemoglobin level was significantly less (6.9% in males & 66.1% in females) as compared to those with either no exercise performing group (40.7% in males & 85.1% in females) or the group doing only normal activities (17.9% in males & 80.7% in females).

From table 3 it can be deduced that on an average each male elderly had 2.1 morbidities and each female elderly 3.2 morbidities. None of the male elderly who had no morbidity had haemoglobin less than 11gm% while among elderly with different morbidities low haemoglobin level prevalence ranged from 23.6% to 30.8%. Effect produced by one GUT morbidity and by one GIT morbidity to produce low haemoglobin, was more as compared to the effect produced by other morbidities. Percentage of female elderly having low haemoglobin was more (82.2%) when they had GIT morbidities as compared to having other morbidities in whom it was 70.9%

**Table 1:** Sex-Wise Distribution of Anaemica

Sex	Anaemic Condition	Non-Anaemic
Males (n=153)	42 (27.5)	111 (72.5)
Females (n=209)	98 (46.9)	111 (53.1)
Total (n=360)	140 (38.7)	222 (61.3)

Figures in parenthesis indicate percentages

**Table 2:** Correlates of haemoglobin status

Correlate	Denominator	Hb Status		Odds Ratio	P-Value
		Low level	High level		
<b>A. Male (n=153)</b>					
Literacy					
Illiterate	37 (24.2)	9 (24.3)	28 (74.7)	1.0	
Upto Middle	24 (15.7)	6 (25.0)	18 (75.0)	1.96	$X^2=0.1, P>0.90$
Above Middle	92 (60.1)	9 (8.6)	83 (91.4)	2.96	$X^2=3.52, P<0.05$
Smoking					
No	131 (85.6)	21 (16.0)	110 (84.0)	1.0	
Yes	22 (14.4)	3 (13.6)	9 (86.4)	1.21	$X^2=0.08, P>0.20$
Calories					
<1500	101 (66.0)	18 (17.8)	83 (82.2)	1.0	
=or>1500	52 (34.0)	6 (11.5)	46 (88.5)	1.66	$X^2=0.60, P>0.20$
Exercise					
No exercise	27 (17.6)	11 (40.7)	16 (59.3)	1.0	
Normal activities	39 (25.5)	7 (17.9)	32 (82.0)	3.11	$X^2=3.11, P>0.05$
Regular exercise	87 (56.9)	6 (6.9)	81 (93.1)	9.28	$X^2=16.03, P<0.001$
<b>B. Female (n=209)</b>					
Literacy					
Illiterate	92 (44.0)	75 (81.5)	17 (18.5)	1.0	
Upto Middle	79 (37.8)	62 (78.5)	17 (21.5)	1.21	$X^2=0.09, P>0.10$
Above Middle	38 (18.2)	26 (68.4)	12 (31.6)	2.04	$X^2=1.96, P>0.10$
Smoking					
No	204 (97.6)	158 (77.4)	46 (22.6)	NA	NA
Yes	5 (2.4)		5 (100.0)	0 (0)	
Calories <1500					
=or>1500	28 (13.4)	23 (82.1)	5 (17.9)	0.74	$X^2=0.11, P>0.20$
Exercise					
No exercise	67 (32.0)	57 (85.1)	10 (14.9)	1.0	
Normal activities	83 (39.8)	67 (80.7)	16 (19.3)	1.36	$X^2=0.49, P>0.20$
Regular exercise	59 (28.2)	39 (66.1)	20 (33.9)	2.92	$X^2=5.22, P<0.05$

Figures in parenthesis indicate percentages

## Discussion

Present study demonstrated 38.7% prevalence of anaemia in elderly population. No case of severe anaemia was seen in community. This finding of absence of severe anaemia in elderly may be due to the better availability of health care services in UT, Chandigarh because of which most of these elderly

individuals are timely admitted in hospital and get iron therapy at the earliest. The reasonably high prevalence of mild anaemia on the other hand (in addition to use of Sahli's method) might be due to several reasons:-

- i. Many of elderly might be having one or more chronic infections including malaria, tuberculosis, and others.

**Table 3:** Effect of morbidity on haemoglobin

Morbidity	Males (n=153)			Females (n=209)		
	Hb<11gm%	Hb>11gm%	Total	Hb<10gm%	Hb>10gm%	Total
None	0 (0)	14 (100.0)	14 (4.3)	86 (96.6)	3 (3.4)	89 (12.6)
GUT	4 (30.8)	9 (69.2)	13 (4)	17 (85.0)	3 (15.0)	20 (2.9)
GIT	9 (24.3)	28 (75.7)	37 11.5	60 (82.2)	13 (17.8)	73 (10.7)
Others	61 (23.6)	197 (76.4)	258 (80.2)	353 (70.9)	145 (29.1)	498 (73.2)
<b>Total</b>	<b>74 (23.0)</b>	<b>248 (77.0)</b>	<b>322 (100)</b>	<b>516 (75.9)</b>	<b>164 (24.1)</b>	<b>680 (100)</b>

GIT = Gastro intestinal tract, GUT = Genito urinary tract  
 Figures in parenthesis indicate percentages

- ii. Haemorrhagic lesion of the gastrointestinal tract may be responsible. In an important study this was the case in 63% of screened elderly anaemic subjects.<sup>9</sup>
- iii. It can be due to lack of exercise in elderly.<sup>10</sup>
- iv. Decreased androgen secretion in men due to age related changes.<sup>11</sup>
- v. Older women may have depleted iron stores from their pre-menopausal years, and recent work suggest that this age group may be iron depleted.<sup>12</sup>

As against 38.7% prevalence of anaemia in elderly in our study, another study including elderly of same city showed the prevalence of anaemia as 65%<sup>13</sup> This higher prevalence of anaemia observed by the latter study may be due to the fact that this study included more elderly from villages where nutritional status is poor and worm infestations due to prevalent practice of open field defaecation.

High prevalence of anaemia among elderly has been observed by many studies detecting 84% anaemics: states of Assam, Bihar, Orissa, West Bengal, Tripura detecting 76.6% males and 81.3% females as anaemics and an independent evaluation from Orissa detecting 90% anaemics.<sup>14, 15</sup>

Majority (88.0%) of elderly were consuming less than even barely minimum (1500) kilocalories as per our study. This micro-nutrient deficiency is fairly common even in developed countries as in the NDNS

study about half of the institutionalized men and a third of the women were found to have haemoglobin levels below 13g/dl and 12g/dl respectively.<sup>16</sup>

In our study group 24.2% of males and 44% of females were illiterate. In another study on elderly in Chandigarh the similar figures were 28.6% and 59.8% respectively.<sup>13</sup> A survey from Wardha, Maharashtra showed 37.7% males and 90% females as illiterates.<sup>17</sup> Evidence of high haemoglobin level amongst professional (highly educated ones) is expected because such persons are more likely to get themselves screened and consume haemetanics and iron rich foods. This trend of less morbidity with education has also been observed by others.<sup>18</sup> Male smokers were seen to have higher percentage (86.4%) of haemoglobin level than non-smokers (84.0%). This may be due to the increase of carboxy haemoglobin from inhaling carbon monoxide by smokers.<sup>19</sup>

The percentage of elderly males and females with low haemoglobin level was 40.7% and 85.1% respectively when they were not doing any exercise. The same percentage decreased to 6.9% and 66.1% respectively for those elderly who were doing regular exercise. The lack of exercise in elderly people raises the plasma volume and thus lowers haemoglobin levels.<sup>10</sup>

In our study on an average each male and female elderly had 2.1 and 3.2 morbidities respectively. The similar figures from Israel based elderly study were 2.6 and 3.0.<sup>20</sup> All morbidities were seen to reduce

haemoglobin and the ones related to genitourinary tract (GUT) and gastrointestinal tract (GIT) led to maximum reduction. As little as 4% GUT morbidities among males produced more effect in reducing haemoglobin than 80.2% of 'other morbidities' could do resulting 30.8% and 23.6% elderly with low haemoglobin levels respectively. Similarly just 10.7% GIT morbidities in females produced low haemoglobin status in 82.2% elderly while even 73.2% other morbidities could reduce haemoglobin only in 70.9% elderly. This suggests that GUT morbidities increase iron excretion and GIT morbidities decrease iron absorption and other morbidities do not effect iron metabolism to a great extent.

## Conclusions

Anaemia, in its mild and moderate form is a major public health problem in elderly of UT, Chandigarh. The effect of low caloric diet, low educational level and increased morbidity, though are positively associated with this problem, any one of them as a single factor is not sufficient enough to produce this condition. Only an integrated and combined effort dealing with above said factors can reduce anaemia in elderly. Further studies concerning the high prevalent anaemic condition in elderly are required.

## References

- World Health Organisation. Nutritional anaemias. Report of a WHO scientific group. Tech Rep Ser No. 405 Geneva. WHO; 1968.
- Gerbrand JI, Rudi GJ, Dick LK. The Definition of Anaemia in Older Person. *JAMA* 1999; 281:1714-1717.
- Agarwal A, Advani S H. Anemia In: Sharma OP, (ed). Geriatrics Care in India: Geriatrics & Gerontology. ANB Pvt Ltd; 1999:421-427.
- De Maeyer E, Adiels – Tegman M. The prevalence of anaemia in the world. *World Health Stat Q* 1989; 38:302-316.
- World Health Organisation. Iron deficiency anaemia: assessment, prevention and control. A guide for programme managers. Geneva.WHO, 2001:15.
- Viteri FE. Iron supplementation for control of iron deficiency in population at risk. *Nutrition reviews* 1997; 55:195-209.
- Detels R, Mc Even J, Beag R. Tanaka H.(ed) Oxford Textbook of Public Health 4<sup>th</sup> ed. Oxford University Press, New York 2002:153.
- Kapil U, Tondon M, Pathak P, et al. Comparision of haemoglobin values obtained by haemocue and Sahli's Methods. *Ind J Pub Hlth* 2002; 44:28-30.
- Rocky DC, Cello JP. Evaluation of the gastrointestinal tract in patients with iron deficiency anaemia. *N Engl J Med* 1993, 329:1691-1695.
- Tallis RC, Fillit HM. Brocklehurst's Textbook of Geriatric Medicine and Gerontology, 6<sup>th</sup> ed. Churchill Livingstone London, 2003:1229.
- Lipschitz DA et al. Effect of age on haemopoiesis in man. *Blood* 1984; 63:502-509.
- Fleming DJ, Jacques PF, Tucker KL et al. Iron status of the free living elderly Framingham Heart Study Cohort: an iron replete population with a high prevalence of elevated iron stores. *Am J Clin Nutr* 2001; 73:638-646.
- Joshi K, Kumar R, Avasthi A. Morbidity profile and its relationship with disability and psychological stress among elderly people in Northern India. *Inter J Epidemiol* 2003;32:978-987.
- Chakravarty I, Ghosh K. Micronutrient Malnutrition – Present status and future remedies. *J Ind Med Assoc* 2000; 98:539-542.
- Chauhan S. Annual Report 2002-2003, Indian Council of Medical Research, New Delhi, 2004:95-97.
- UK Office of Population Census and Surveys. The National Diet and Nutritional Survey (NDNS): People aged 65 years and over, HMSO, London, 1998.
- Kishore S, Garg BS. Socio-medical problems of aged population in rural areas of Wardha district. *Ind J Pub Hlth* 1997; 41:43-48.
- Yadava KNS, Yadava SS and Roberts RE. Aging and Health Hazards in Rural Northern India. *Health and Population, Perspectives & Issues* 1996; 19:1-18.
- Friede A, WO P, Carroll, Nicola RM, et al. CDC Prevention guidelines: A guide for action. 1<sup>st</sup> ed. Williams & Wilkins. Baltimore, Maryland, USA 1997:995.
- Fuchs J, Blumstein T, Novickov I et al. Morbidity, Co-morbidity and their association with disability among community dwelling oldest – old in Israel. *J Gerontol* 1998; 53:447-455.