

ANEMIA AND VITAMIN B₁₂ DEFICIENCY IN ELDERLYZAOZIANLUNGLIU GONMEI^{1,2}, SUPRIYA DWIVEDI^{1,3}, GURUDAYAL SINGH TOTEJA^{1,5*}, KARUNA SINGH²,
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Received: 20 November 2017, Revised and Accepted: 18 December 2017

ABSTRACT

Objective: The present study was carried out to assess the prevalence of anemia, vitamin B₁₂ deficiency and hyperhomocysteinemia among elderly in slums of West Delhi.

Methods: A cross-sectional study was carried out among 234 elderly aged 60 and above in slums of West Delhi. 5 ml blood was collected from 116 elderly and was analyzed for hemoglobin, Vitamin B₁₂ and homocysteine. Anemia was defined as hemoglobin <130 g/L and <120 g/l for male and female, respectively, Vitamin B₁₂ deficiency as serum Vitamin B₁₂ <203 pg/ml and hyperhomocysteinemia as serum homocysteine >15 μmol/l.

Results: The overall prevalence of anemia, Vitamin B₁₂ deficiency, and hyperhomocysteinemia among elderly was 57.76%, 36.36%, and 57.57%, respectively. Among anemic elderly, 33.33% and 64.15% had Vitamin B₁₂ deficiency and hyperhomocysteinemia, respectively.

Conclusion: More than half of the elderly population was anemic, while one-third was having Vitamin B₁₂ deficiency.

Keywords: Elderly, Anemia, Vitamin B₁₂, Homocysteine.

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INTRODUCTION

The population of older adults aged 60 and above is growing rapidly worldwide. In India, respectively, 73.3 million and 30.6 million elderly resides in rural and urban areas [1]. It is estimated that almost 50% of elderly in India suffer from chronic diseases and 5% suffer from immobility [2]. Anemia is considered as an important marker in the investigation of health as it can be easily diagnosed and markedly affects the quality of life of an elderly [3]. It is common in elderly and is associated with adverse outcomes such as weakness, increased falls, depression, hospitalization, and mortality [4,5]. Around one-third of elderly with anemia have iron, folate, and/or Vitamin B₁₂ deficiency [6]. Vitamin B₁₂ deficiency may occur due to poor nutrition, stomach/intestinal problems and can result in anemia [7]. Homocysteine levels are increased due to a genetic deficiency of the enzymatic pathways involved in its catabolism, nutritional deficiencies, lifestyle, physiological conditions, drugs, and diseases, which induces a deficiency of folic acid, Vitamins B₁₂ and B₆ [8].

In India, the prevalence of anemia is 58.4%, 53%, and 22.7% among children (6–59 months), women (15–49 years), and men (15–49 years), respectively, as per National Family Health Survey 4 (2015–16) [9]. However, there is no nationwide survey for elderly to indicate the overall prevalence of anemia. Moreover, there are limited studies in India reporting the prevalence of anemia with Vitamin B₁₂ deficiency among elderly. Hence, the present study has been conducted to assess the prevalence of anemia with Vitamin B₁₂ deficiency among elderly in slums of West Delhi.

METHODS

A cross-sectional study was carried out among 234 elderly aged 60 and above in slums of West Delhi. Community survey of slums was carried

out to identify elderly with the help of local community leaders and paramedical working in the area. 5 ml blood was collected from 116 elderly and was analyzed for hemoglobin, Vitamin B₁₂, and homocysteine. Hemoglobin was analyzed using direct cyanmethemoglobin method, while serum Vitamin B₁₂ and homocysteine were analyzed using chemiluminescent immunometric assay (Immulate 1000 analyzer, Siemens). Institutional Ethical Clearance was obtained. A written informed consent was taken from all the study volunteers.

All biochemical analysis was done at National Accreditation Board for Testing and Calibration Laboratories (NABL) Accredited Laboratory, Centre for Promotion of Nutrition Research and Training with special focus on Northeast, Tribal and Inaccessible Population (Indian Council of Medical Research), New Delhi. Internal and external quality control of analysis was maintained by running controls along with the samples and by participation in external quality assurance programs.

Anemia was defined as hemoglobin <130 g/L and <120 g/l for male and female, respectively [10], Vitamin B₁₂ deficiency as serum Vitamin B₁₂ <203 pg/ml [11] and hyperhomocysteinemia as serum homocysteine >15 μmol/l [12].

RESULTS

The overall prevalence of anemia and Vitamin B₁₂ deficiency among elderly was 57.76% and 36.36%, respectively. Prevalence of anemia was higher among female (61.82%) compared to male (54.10%) (Table 1). The prevalence of mild, moderate, and severe anemia was 31.90%, 24.14%, and 1.72%, respectively. Prevalence of mild anemia was higher in male (36.07%) while the prevalence of moderate anemia was higher in female (32.737%).

The prevalence of Vitamin B₁₂ deficiency (Table 2) was higher in male (41.67) than female (31.71%). Similarly, the prevalence of hyperhomocysteinemia was higher in male (73.91) than female (53.49%). Both Vitamin B₁₂ deficiency and hyperhomocysteinemia were higher among vegetarians. Among anemic elderly, 33.33% and 64.15% had Vitamin B₁₂ deficiency and hyperhomocysteinemia, respectively (Table 3).

DISCUSSION

Our study revealed the prevalence of anemia as 57.76% among elderly, with 31.90%, 24.14%, and 1.72% having mild, moderate, and severe anemia, respectively. Our findings are similar to a study carried out among adolescent girls in the same study locale where the prevalence of anemia was reported as 58.7%, with 31.6%, 25.7%, and 1.4% of subjects being mild, moderate, and severely anemic [13]. Studies carried out among elderly in different parts of the country have reported the prevalence of anemia ranging from 27.8% to 96% [14-18].

A study carried out in Bengaluru reported a lower prevalence of Vitamin B₁₂ deficiency (16%) and hyperhomocysteinemia (13%) as 35% of the study population was consuming multivitamin supplements [12]. Studies carried out among adults in Maharashtra (58%) and Assam (55%) reported similar findings on the prevalence of hyperhomocysteinemia [19,20]. While a study carried out among adults residing in an urban slum and adjacent non slum area in the Southern area of New Delhi revealed a higher prevalence of hyperhomocysteinemia (84%) [21].

Data of 1770 elderly individuals aged 60 years and older elderly males obtained from the 2001-2002 National Health and Nutrition Examination Health Survey revealed that elderly male is at higher risk of folate and Vitamin B₁₂ deficiencies [22]. Our study also indicated a higher prevalence of Vitamin B₁₂ deficiency among male (41.67%) than female (31.71%).

Table 1: Prevalence of anemia in elderly

Type	n (%)		
	All (n=116)	Male (n=61)	Female (n=55)
Anemia	67 (57.76)	33 (54.10)	34 (61.82)
Mild	37 (31.90)	22 (36.07)	15 (27.27)
Moderate	28 (24.14)	10 (16.39)	18 (32.73)
Severe	2 (1.72)	1 (1.64)	1 (1.82)

Table 2: Prevalence of Vitamin B₁₂ deficiency and hyperhomocysteinemia in elderly

	n	Serum	n	Vitamin
		B ₁₂ <203 pg/ml		hcy>15 μmol/l
	n (%)		n (%)	
All	77	28 (36.36)	99	57 (57.57)
Male	36	15 (41.67)	46	34 (73.91)
Female	41	13 (31.71)	43	23 (53.49)
Vegetarian	22	11 (50.00)	23	15 (65.22)
Non vegetarian	29	10 (34.48)	31	18 (58.06)

Table 3: Prevalence of anemia with vitamin B₁₂ deficiency and hyperhomocysteinemia

	n	Serum	Vitamin	Serum
		B ₁₂ <203 pg/ml		hcy>15 μmol/l
	n (%)		n (%)	
Male	24	10 (41.67)	25	18 (72.00)
Female	27	7 (25.93)	28	16 (57.14)
All	51	17 (33.33)	53	34 (64.15)

Around one-third of anemia is nutritional anemia mainly due to calorie and protein restriction, iron, Vitamin B₁₂, and folic deficiency [23]. Our study also revealed Vitamin B₁₂ deficiency among 33.33% of elderly with anemia. Both Vitamin B₁₂ deficiency and hyperhomocysteinemia were higher among vegetarians. Non-consumption of animal foods may result in the low intake of Vitamin B₁₂, thereby resulting in lowered Vitamin B₁₂ levels and elevated homocysteine concentrations in vegetarians [24].

CONCLUSION

More than half of the elderly population was anemic, while one-third was having Vitamin B₁₂ deficiency.

ACKNOWLEDGMENT

The authors acknowledge the support of Indian Council of Medical Research and University Grants Commission.

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