

HOMOCYSTEINE STATUS OF ELDERLY SLUM WOMEN IN DELHI

ZAOZIANLUNGLIU GONMEI¹, SUPRIYA DWIVEDI¹, ANUPA SIDDHU², GURUDAYAL SINGH TOTEJA^{1,3*}, NAVAL KISHORE VIKRAM⁴, PREETI KAMBOJ¹

¹Centre for Promotion of Nutrition Research and Training with special focus on North East, Tribal and Inaccessible Population (Indian Council of Medical Research), New Delhi, India. ²Department of Food and Nutrition, Lady Irwin College, University of Delhi, New Delhi, India. ³Desert Medicine Research Centre (Indian Council of Medical Research), Jodhpur, Rajasthan, India. ⁴Department of Medicine, All India Institute of Medical Sciences, New Delhi, India. Email: gstoteja@gmail.com

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ABSTRACT

Objective: The study was undertaken to assess homocysteine levels among economically deprived elderly women in Delhi.

Methods: The study was carried out among elderly women aged 60–70 years residing in Kirti Nagar slums of West Delhi. Blood samples were collected, and serum homocysteine was analyzed using chemiluminescent immunometric assay. Hyperhomocysteinemia was defined as serum homocysteine >15 µmol/l. Dietary information was also collected using 24 h dietary recall method and food frequency questionnaire.

Results: The prevalence of hyperhomocysteinemia was 16.9%. The mean serum homocysteine was 12.35±6.43 µmol/l. Serum homocysteine levels ranged from 3.84 to 35.20 µmol/l. It was observed that hyperhomocysteinemia was higher in vegetarians (31.2%) compared to non-vegetarians (6.7%).

Conclusion: The prevalence of hyperhomocysteinemia is higher among vegetarians than non-vegetarians. Further, research is necessary to see the effect of elevated homocysteine in multiple age-related diseases.

Keywords: Elderly women, Homocysteine, Hyperhomocysteinemia.

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INTRODUCTION

The prevalence of hyperhomocysteinemia is higher in elderly and is responsible for an increased risk of age-related diseases, namely vascular diseases, cognitive decline, dementia, depression, osteoporotic fracture, and functional decline [1-3]. Meta-analysis of 83 studies involving 35,758 individuals indicated elevated level of homocysteine and folate deficiency which is associated with increased risk of cancer [4]. Homocysteine level of ≥10.8 µmol/l is likely to be responsible for all-cause mortality and cardiovascular events [5]. Another meta-analysis of 72 studies revealed that lowering homocysteine concentrations can reduce risk of ischemic heart disease and stroke [6]. A study undertaken among adults aged 30–75 years with and without metabolic syndrome revealed that patients with metabolic syndrome had increased homocysteine level [7]. Studies carried out in India indicated a significant correlation between hyperhomocysteinemia and coronary artery disease [8,9].

The prevalence of hyperhomocysteinemia depends on the type of population, age group, dietary pattern, and genetic background [10,11]. Studies carried out in India reported the prevalence of hyperhomocysteinemia ranging from 13% to 84%. However, there are limited data available on homocysteine level of elderly in India. The present study was undertaken to assess homocysteine status of economically deprived elderly women in Delhi.

METHODS

The study was carried out in Kirti Nagar slums of West Delhi, India. Fifty nine elderly women aged 60–70 years were enrolled in the study. Institutional ethical clearance was obtained, and informed consent was taken from all the study participants. Blood samples were collected and analyzed for serum homocysteine. Dietary intake

of nutrients was also collected using 24 h recall method and food frequency questionnaire.

Five ml venous blood was collected in Becton Dickinson vacutainers and was then centrifuged for 10 min at 1500 rpm to separate serum. Separated serum samples were transported to the laboratory in cold chain and were stored at –80°C till analysis. Homocysteine was analyzed using chemiluminescent immunometric assay (Immolute 1000 analyzer, Siemens). Samples were analyzed at a National Accreditation Board for Testing and Calibration Laboratories (NABL) Accredited Laboratory, Centre for Promotion of Nutrition Research and Training with special focus on North-East, Tribal and Inaccessible Population (Indian Council of Medical Research), New Delhi. Hyperhomocysteinemia was defined as serum homocysteine >15 µmol/l [12].

RESULTS

A total of 59 elderly women were enrolled in the study. Of 59 elderly enrolled, 10 (16.9%) had hyperhomocysteinemia. The mean serum homocysteine was 12.35±6.43 µmol/l. Serum homocysteine levels ranged from 3.84 to 35.20 µmol/l. Dietary information was collected from 46 elderly. Among them, 65% were non-vegetarian (n=30) and remaining were vegetarian (n=16). Five of 16 vegetarians (31.2%) and two of 30 non-vegetarians (6.7%) had hyperhomocysteinemia (Table 1).

DISCUSSION

Our study indicated the prevalence of hyperhomocysteinemia among elderly women as 16.9%. A study carried out in Bengaluru, Karnataka, India, among 175 elderly revealed the prevalence of hyperhomocysteinemia as 13%. Another study carried out among 137 women from Mumbai, Maharashtra, India, aged 36–71 years

Table 1: Homocysteine levels of elderly women according to food habits

Food habits	n	Serum homocysteine >15 µmol/l n (%)	Serum homocysteine ≤15 µmol/l n (%)
Vegetarian	16	5 (31.2)	11 (68.8)
Non-vegetarian	30	2 (6.7)	28 (93.3)

n=46

indicated slightly higher prevalence of hyperhomocysteinemia that is 24.2% [13].

Higher prevalence (50–80%) of hyperhomocysteinemia has also been reported among adults in India. A study carried out among middle-aged men in Pune, Maharashtra, India, reported the prevalence of hyperhomocysteinemia as 58% [14]. Similarly, a study carried out among 448 middle-aged men living in an urban slum in the southern area of New Delhi, India, reported hyperhomocysteinemia among 84% of the study population [15]. Hyperhomocysteinemia was also reported among 55% of study volunteers in a study carried out among 970 volunteers aged 35–86 years in Dispur, Assam, India [16]. Elevated homocysteine levels are also reported in China, Taiwan, Iran, and Pakistan. A meta-analysis covering 60,754 subjects derived from 36 studies carried out in China estimated overall prevalence of hyperhomocysteinemia as 27.5% [17]. A study carried out in Taiwan covering 1094 males and 1135 females aged 65–90 years reported the prevalence of hyperhomocysteinemia, respectively, as 23.4% and 11.2% among elderly males and females [18]. The homocysteine survey carried out among 1214 people aged 25–64 years in Tehran reported hyperhomocysteinemia among 73.1% and 41.07% in men and women, respectively [19].

Elevated homocysteine level can be either due to deficiency of folate or Vitamin B₁₂ [20]. A recent study carried out in China among 330 study volunteers also reported folate and Vitamin B₁₂ deficiency as well as MTHFR C677T polymorphism were significantly associated with elevated serum homocysteine levels [21]. Higher prevalence of hyperhomocysteinemia has been reported among vegetarians mainly due to Vitamin B₁₂ deficiency [22]. A systematic review and meta-analysis of studies involving 3230 volunteers revealed that homocysteine levels are elevated at low serum Vitamin B₁₂ levels [23]. Our study also indicated higher prevalence of hyperhomocysteinemia among vegetarians (31.2%) than non-vegetarians (6.7%). A cross-sectional study carried out among 200 volunteers in Lucknow also revealed that the prevalence of hyperhomocysteinemia was lower in non-vegetarians than vegetarians [24]. A study carried out in Pakistan among 200 healthy volunteers also reported that vegetarians (30%) as compared to non-vegetarians (6%) are more prone to develop hyperhomocysteinemia [25]. Studies carried out in Taiwan, Italy, and Turkey, also reported higher homocysteine level among vegetarians compared to non-vegetarians [26-28].

CONCLUSION

The prevalence of hyperhomocysteinemia is higher among vegetarians than non-vegetarians. Further, research is necessary to see the effect of elevated homocysteine in multiple age-related diseases.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

AUTHOR'S CONTRIBUTIONS

Equal contribution, Zaozianlungliu Gonmei: Data collection and paper writing, Supriya Dwivedi: Data analysis and paper writing, Dr. Anupa Siddhu: Conceptualization of study and interpretation of data, Dr. Gurudayal Singh Toteja: Conceptualization of study, interpretation of data, and paper writing, Dr. Naval Kishore Vikram: Interpretation of data, Preeti Kamboj: Paper writing.

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