



## Short communication

# High prevalence of malnutrition and anemia among elderly at old age homes in Kerala, India

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### Abstract

There are limited data available regarding the problem of anemia and malnutrition in the elderly care homes in India. The current study analyzed comprehensive health check-up data of 104 elderly inmates belonging to five old age homes in Kochi city. Hemoglobin was estimated using HemoCue® Hb 201 System. Anemia status was decided as per WHO guidelines; less than 12 g/dl for women and less than 13 g/dl for men. Among them, 28.3% (13/46) of males and 20.7% (12/58) had Body Mass Index less than 18.5. Mean hemoglobin was 11.28 (SD 1.88, 95% CI 10.95-11.60) ranging from 6.2g/dl to 16.40g/dl. Prevalence of anemia was 73.9% (34/46) among males and 77.6% (45/58) among females (p 0.417). Prevalence of malnutrition and anemia among elderly in old age home at Kochi were high and warrants urgent attention from the side of policy makers, primary health care providers, researchers and civil society.

**Key words:** Anemia, Elderly, Malnutrition, Old age homes

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Epidemiologic and demographic transition coupled with improvements in health has resulted in a steady increase in proportion of elderly [above 60 years] in India from 5.3 in 1951 to 8% in 2011<sup>1</sup>. Kerala, a state in southern India, which has good indicators of health and social development, seems to be aging fast with proportion of elderly forming 12.6% of the total population<sup>2</sup>. The age structure has resulted in a new set of problems in the society with direct and indirect effects. As per official figures, there are 565 old-age homes in Kerala accommodating 10,500 persons.

Globally, anemia is the most common nutritional problem and one of the leading causes of disability<sup>3</sup>. Most common cause of anemia is iron deficiency. Anemia is common in older people<sup>4</sup>. While there are numerous studies conducted on anemia

in other age groups, limited studies have been conducted to address anemia among the elderly in India. Majority of studies on anemia have been targeted toward children and pregnant women. Limited studies done among elderly in India have also shown the prevalence of anemia to be high in elderly<sup>5,6</sup>.

Malnutrition among elderly is imposing a huge challenge to the health sector as well as care providers. Amrita Urban Health Centre is involved in providing primary health care to the old age homes in Kochi Corporation as per the request from Corporation authorities. We conducted a comprehensive medical check-up including screening for malnutrition and anemia among the inmates of old age homes in Kochi corporation area during March 2018. Data pertaining to nutritional status and

anemia among elderly people at old age homes in Kochi are presented here.

### Materials and methods

Six old age homes were registered in Kochi Corporation under Social Justice department of Government of Kerala. The comprehensive screening program was done under stewardship of Kochi Municipal Corporation and with official support of District Social Justice Department. Medical team included lady medical officer, medical interns, social workers and field workers from Amrita School of Medicine. Examination included general examination, filling a history cum clinical sheet, screening for diabetes using GRBS, hypertension screening, screening for chronic respiratory diseases, hemoglobin estimation and screening for TB for all inmates.

Hemoglobin was estimated using HemoCue® Hb 201 System<sup>7</sup>. The HemoCue photometer has been widely used for estimation of hemoglobin in recent years because it is portable, requires only a small sample of capillary blood, is relatively simple to use, does not require electricity, and gives immediate, digitally displayed results. Hemoglobin determined by the HemoCue method is found to be comparable to the values determined by both the Cyanmethemoglobin and automated hematology analyser (Sysmex KX-21N) methods<sup>8-10</sup>.

The HemoCue instrument has inbuilt internal self-test that verifies the analyzer each time when it is turned on and every two hours after that. Quality Control has been made sure by testing the function of the HemoCue photometer on a daily basis by

measuring the control cuvette (Serial no: 0214-003 071) and a standard of known concentration.

The data was entered in Microsoft Excel and was analyzed using SPSS 16 for Microsoft windows. Anemia status was decided as per WHO guidelines; less than 12 g/dl for women and less than 13 g/dl for men. Severe anemia was hemoglobin less than 8g/dl and moderate anemia was hemoglobin between 8.1 and 10g/dl<sup>11</sup>. Descriptive statistics including frequencies and percentages were done. The study has got approval from Institutional Ethics Committee.

### Results

157 inmates were examined. 24 of them were bed-ridden and so itself did not undergo the complete examination process. Age of 29 inmates was less than 60. Data of 104 inmates including 46 males and 58 females whose ages were more than 60 years were compiled.

Mean age was 71.5 years. 15 of them reported that they belonged to other states. 60 % were females. Among them 27 (17.2%) had a diagnosed psychiatric illness and 05 (3.2%) had epilepsy. Chronic Respiratory Disease was present among 10.5% (11/104) and diabetes was present among 13.4% (14/104) inmates.

Mean hemoglobin was 11.28 (SD 1.88, 95% CI 10.95-11.60) ranging from 6.2 g/dl to 16.40 g/dl. Prevalence of anemia was 73.9% (34/46) among males and 77.6% (45/58) among females (p 0.417). Hemoglobin status by severity of anemia was shown in **Table 1**. Most of the males had mild anemia while females had moderate anemia.

**Table 1: Anemia status of the elderly individuals at old age homes (N=104)**

Gender	Anemia status				Total
	Severe anemia	Moderate anemia	Mild anemia	No anemia	
Male	1 (2.2%)	4 (8.7%)	29 (63%)	12 (26.1%)	46
Female	2 (3.4%)	19 (32.8%)	24 (41.4%)	13 (22.4%)	58
Total	3 (2.9%)	23 (22.1%)	53 (51%)	25 (24%)	104

Chi square: 9.36, p=0.024

**Table 2: Distribution of Body Mass Index of elderly individuals at old age homes (N=104)**

Gender	Body Mass Index (kg/m <sup>2</sup> )			Total
	<18.49	18.5-24.99	>25	
Male	13 (28.2%)	26 (56.5%)	7 (15.2%)	46
Female	12 (20.6%)	37 (63.7%)	9 (15.5%)	58
Total	25	63	16	104

Chi square: 1.02, p=0.598

Among them, 28.3% (13/46) of males and 20.7% (12/58) had Body Mass Index less than 18.5. However, no association between gender and BMI could be obtained. Details were shown in **Table 2**. BMI and hemoglobin status did not show any statistically significant correlation ( $r$  0.16  $p$  0.091).

### Discussion

This demographic change has obvious implications for family and society. It may impact definitely on healthcare provision; as longer life does not necessarily equate to more years of good health. It is important to highlight common medical problems in elderly people, especially if their burden and negative impact are not generally recognized. The current data suggest that malnutrition and anemia are alarmingly high in old age homes in Kochi.

Malnutrition can lead to decline in immunity making an individual vulnerable to infections, delayed wound healing, and muscle weakness, which can lead to falls and fractures. Nutritional status of the elderly may further deteriorate as malnutrition itself can lead to further disinterest in eating. Malnutrition at older age group is multifactorial and determined by various social, physiological, and psychological changes that occur with aging, social isolation, financial instability and food insecurity. However, malnutrition in older individuals is still not recognized, leading to deprived nutrition, long periods of hospitalization, increased cost of health care and morbidity and diminished quality of life. Although we have many policies made for the elderly like National Policy for Older persons 1999, Maintenance and Welfare of Parents and Senior Citizens Act, 2007, National Programme for Health care of the Elderly, 2010 and National Policy for Senior Citizens, 2011, none of these legislations have not well addressed the nutritional needs of the elderly.

Anemia is a major risk factor that is associated with a variety of adverse outcomes in elderly, including hospitalization, disability, and mortality<sup>12-14</sup>. In general, hemoglobin levels are lower in elderly than in younger people. It is not clear whether this fall in hemoglobin in elderly is a feature of normal ageing, or whether it is always pathological, even in absence of underlying conditions. There has been debate about the use cut of values and whether the current cut off values should be used to define anemia in elderly, but there is no acceptable alternative definition of anemia in this age group.

Prevalence of undernutrition in elderly at old age homes in our study was more than those obtained from the community-based studies from urban areas of Coimbatore (19%), rural Vellore (14%) and

Assam (15%)<sup>15-17</sup>. A community based study from Kerala reported the prevalence of undernutrition among elderly as only 11%<sup>18</sup>. Our results are consistent with studies done at old age homes supporting the observation that malnutrition is more common at old age homes<sup>19</sup>. The differences might also be due to the methodology as most of the studies have assessed malnutrition not based on Body Mass Index. In the presence of edema or ascites, which is common among the elderly, BMI alone may not provide a good assessment of malnutrition<sup>20</sup>. Also due of vertebral compression, changes in the posture and weakening of muscle tone, measurement of height may be challenging in elderly<sup>21</sup>.

Data on malnutrition among elderly living in institutions like old age homes is crucial to provide importance to as the number of elderly in old age homes is increasing more frequently than before. The need for obtaining the data mainly is to determine the extent to which this issue has currently become a burden to our population as well as to determine the need of more effective nutritional care policies and health services to be undertaken for this population in terms of old age homes. This will improve the outcome by avoiding progressive degradation of the nutritional status of such individuals besides providing them with a continuum of care.

The current study compiled the data from a comprehensive health check up and did not look at the factors associated with anemia among them. Bed-ridden patients were excluded; however including them will only increase the prevalence of malnutrition and anemia. Sub group analysis could not be performed due to lower sample size. Whether generalisable to all old age homes in Kerala could not be stated. Despite these limitations the findings have got greater public health significance. Directions for future research includes answering i) to what extent anemia in the elderly is the result of pre-existing disorders, ii) to what extent it pre-determines potential subsequent morbidity, and iii) to what extent public health interventions could make a change

To summarize, prevalence of malnutrition and anemia was alarmingly higher among elderly at the old age homes in Kochi city. Malnutrition and anemia among elderly in old age home needs urgent attention from the side of policy makers, primary health care providers, researchers and civil society.

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**Conflict of interest:** None

## References

- Registrar General of India. Primary Census Abstracts (2011). Ministry of Home Affairs. Government of India. Available from: <http://censusindia.gov.in/pca/default.aspx> (Last accessed on May 28, 2018)
- Government of Kerala. Economic Review 2014. State Planning Board, Thiruvananthapuram, Kerala, India. March 2015. Available from: <http://spb.kerala.gov.in/images/er/er14/index.html#p=1> (Last accessed on May 28, 2018)
- World Health Organization. Anemia prevention and control [Internet]. Geneva: WHO; 2011. Available at [www.who.int/medical\\_devices/initiatives/anaemia\\_control/en](http://www.who.int/medical_devices/initiatives/anaemia_control/en) (Last accessed May 20, 2018)
- Gaskell H, Derry S, Andrew Moore R, McQuay HJ. Prevalence of anemia in older persons: systematic review. *BMC Geriatr.* 2008 Jan 14; 8(1). PMID: 18194534 DOI: 10.1186/1471-2318-8-1.
- Purty AJ, Bazroy J, Kar M, Vasudevan K, Veliath A, Panda P. Morbidity pattern among the elderly population in the rural area of Tamil Nadu, India. *Turk J Med Sci.* 2006; 36:45-50.
- Sharma MK, Swami HM, Gulati R, Bhatia V, Kumar D. An epidemiological study of correlates of anemia among elderly aged 65 years and above in UT, Chandigarh. *J Indian Acad Geriatr.* 2006; 2:61-5.
- HemoCue. Hb 201 System. [Internet]. USA: HemoCue America. Available from: <http://www.hemocue.us/en-us/products/hemoglobin/hb-301-system> (Last accessed December 31, 2014)
- Lardi AM, Hirst C, Mortimer AJ, McCollum CN. Evaluation of the HemoCue for measuring intra-operative haemoglobin concentrations: a comparison with the Coulter Max-M. *Anaesthesia* 1998 Apr; 53(4):349-52. PMID: 9613300
- von Schenck H, Falkensson M, Lundberg B. Evaluation of "HemoCue," a new device for determining hemoglobin. *Clin Chem.* 1986 Mar; 32(3):526-9. PMID: 3948400
- Nkrumah B, Nguah SB, Sarpong N, Dekker D, Idriss A, May J, Adu-Sarkodie Y. Hemoglobin estimation by the HemoCue® portable hemoglobin photometer in a resource poor setting. *BMC Clin Pathol.* 2011 Apr; 11:5. PMID: 21510885 DOI: 10.1186/1472-6890-11-5
- World Health Organization. Iron deficiency anaemia: Assessment, prevention, and control. A guide for program managers [Internet]. Geneva: WHO, 2001. Available from: <http://www.who.int/nutrition/publications/en/ida.pdf> (Last accessed May 20, 2018)
- Culleton BF, Manns BJ, Zhang J, Tonelli M, Klarenbach S, Hemmelgarn BR. Impact of anemia on hospitalization and mortality in older adults. *Blood.* 2006 May; 107(10):3841-6. PMID: 16403909 DOI: 10.1182/blood-2005-10-4308
- Denny SD, Kuchibhatla MN, Cohen HJ. Impact of anemia on mortality, cognition, and function in community-dwelling elderly. *Am J Med.* 2006 Apr; 119(4):327-34.
- Izaks GJ, Westendorp RG, Knook DL. The definition of anemia in older persons. *JAMA.* 1999 May; 281(18):1714-7. PMID: 10328071
- Agarwalla R, Saikia AM, Baruah R. Assessment of the nutritional status of the elderly and its correlates. *J Family Community Med.* 2015 Jan-Apr; 22(1):39-43. PMID: 25657610 DOI: 10.4103/2230-8229.149588
- Vedantam A, Subramanian V, Rao NV, John KR. Malnutrition in free-living elderly in rural south India: Prevalence and risk factors. *Public Health Nutr.* 2010 Sep; 13(9):1328-32. PMID: 19807935 DOI: 10.1017/S1368980009991674
- Mathew AC, Das D, Sampath S, Vijayakumar M, Ramakrishnan N, Ravishankar SL. Prevalence and correlates of malnutrition among elderly in an urban area in Coimbatore. *Indian J Public Health* 2016 Apr-Jun; 60(2):112-7. PMID: 27350704 DOI: 10.4103/0019-557X.184542
- Abraham J, Navaneetha N, Johns F, Aiyappan R, Mili M, Shibu P, Mathew E. Nutritional status of older adults in a community in Pathanamthitta district of Kerala. *Int J Res Med Sci.* 2018; 6 (1):210-4. DOI: 10.18203/2320-6012.ijrms20175721
- Santosh A, Srinivas N, Varadaraja Rao BA. Geriatric nutrition: Elderly at risk of malnutrition in old age homes. *Natl J Community Med.* 2017 Aug; 8(8):447-50.
- Campillo B, Paillaud E, Uzan I, Merlier I, Abdellaoui M, Perennec J, Louarn F, Bories PN; Comité de Liaison Alimentation-Nutrition. Value of body mass index in the detection of severe malnutrition: influence of the pathology and changes in anthropometric parameters. *Clin Nutr.* 2004 Aug; 23(4):551-9.
- World Health Organization. Physical status: The use of and interpretation of anthropometry. Report of a WHO Expert Committee. Geneva: WHO; 1995.