Prevalence of Anemia and its Determinants among Elderly People of Uttarakhand, India

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Abstract:

Introduction: Anemia is a sign of serious disease at all ages; but in elderly population it is especially true. According to epidemiologic data, its prevalence rises with increasing age sharply after the age of 60years. **Method:** To evaluate the prevalence of anemia and its determinants among older age group in Uttarakhand, NFHS-IV (2015-16) data was used. For socio demographic analysis, study included 7056 individuals (after excluding missing information) aged 60 years and above. **Results:** The median age was 66.38 years (range, 60–95 years). The mean levels of hemoglobin (Mean ± SD) were 14.23 ± 1.29 g/dL in men and13.75 ± 1.15 g/dL in women, and the overall prevalence of anemia was 36.42% (2502/6870): In men the prevalence was 36.86 % (2096/5687) and 34.32% (406/1183) in Women. The Prevalence in age group 60–69, 70–79 and ≥80 was 35.2%, 38.1% and 41.2% respectively. It was found that the prevalence of anemia differed significantly between those of age 60–69 and 70–79 years, those of age 60–69 and ≥80 years, and those of age 70–79 years and ≥80 years. **Conclusion:** The prevalence of anemia among elderly people of Uttarakhand was determined to be 35.9% and it increased with age. Male sex, older age, low Body Mass Index (BMI), low education and nuclear family were identified as independent risk factors of anemia among the elderly Indians.

Keywords: Anemia, Elderly People, NFHS-IV, Prevalence

Introduction:

According to census 2011 the percentage of elderly population (> 60 years) has gone up 5.7%,which was 5.3% as per census 2001. The increase in the elderly population will impose a greater burden on the already outstretched health services in our country.[1] Anemia is a major disease in the older population, and the prevalence of anemia rises with increasing age. Although it was previously believed that declines in hemoglobin levels might be a normal consequence of aging, evidence has accumulated that anemia does reflect poor health and increased vulnerability to adverse outcomes in older persons.[2] Even in persons 85 years and older, those meeting the World Health Organization (WHO) definition of anemia were found to have higher subsequent mortality rates than persons who were not anemic.[3] Studies indicated that the prevalence of anemia increases with advancing age and under age 75 years, anemia is more common in females, but over age 75 years it is more common in males.[4] Despite the high prevalence of anemia among elderly

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in India and the increasing size of the geriatric population, only few studies have examined the effects of anemia on elderly patients.[5]

The increased incidence of anemia with aging has led to speculation that lower hemoglobin levels may be normal consequence of aging. However, there are at least two reasons for considering anemia in the elderly as a sign of disease.[5] First, older people maintain a normal red cell count, hemoglobin and hematocrit. Second, in most elderly an underlying cause of anemia is found for hemoglobin levels of less than 12g/dl. Anemia should not be accepted as an inevitable consequence of aging. The objectives of this cross-sectional study were to assess the prevalence of anemia and its determinant factors for anemia among older Uttarakhand residents.

Method:

National Family Health Survey (NFHS-IV), coordinated by the International Institute for Population Sciences (IIPS) under the aegis of the Government of India, was conducted in 2015-16.[6,7] The NFHS-IV included several biomarker measurements including hemoglobin levels. Prevalence of anemia and its determinants among elderly people of Uttarakhand was analyzed by using data of NFHS-IV.[8] Height and weight data are used for assessing nutritional levels of the population. Record of Hemoglobin levels were used to identify the prevalence of Anemia. Data of all the persons aged 60 years and more were analyzed. After excluding missing information, the final sample of 7056 was included for socio demographic analysis. Analysis regarding anemia was done for 6870 individuals for whom hemoglobin estimation data were available.

Statistical Analysis : The study subjects were categorized into three groups according to age (of age 60–69, 70–79, and ≥80 years). Firstly, basic descriptive analysis for bio-socio demographic factor was done for male and female separately. With the help of chi square test association of different bio socio demographic factor was found out. Differences in the hemoglobin levels of the age groups were analyzed using ANOVA with Turkey's multiple comparisons test.

Results:

Data of total 7056 elderly individuals were extracted after excluding missing information. Out of those 5848(82.99 %) males and 1208(17.14 %) were females. The present study divided the data gender wise to explore their bio-socio and demographic characteristics. Around 43 % of males were urban resident while 53% females were urban dwellers. More Males were living in nuclear family as compared to females. Females were more illiterate than males. (Table 1)

Table 2 presents the association of anemia with socio-demographic factors. Here, the results revealed that anemia is significantly associated with age, respondent caste, standard of living index, household structure, education and Body Mass Index at 5% level of significance.

The association of anemia with different variables, prevalence of anemia and hemoglobin level by age group were observed. Total 35.9% elderly individuals were anemic. Prevalence of anemia differed significantly between males (36.9%) and females (34.3%) (p=0.099). Significant difference in prevalence of anemia was found between different age groups as analyzed by ANOVA (p =0.021). (Table 3)The Prevalence of anemia by age group was analyzed by the multiple comparison method with Bonferroni's adjustment. Significant differences were found between the anemia prevalence in those of age 60–69years and those of age70–79 years (p=0.003), between age 60–69 years and ≥80 years (p=0.012), and between those of age 70–79 years and of age ≥80 years (p= 0.0474).

Logistic regression testing was performed to identify independent risk factors for anemia among the elderly. The parameters identified as independent risk factors of anemia were; a female sex, an old age, a lower BMI, nuclear family and

Table1: Characteristics of study subjects

Variables	Male n (%)	Female n (%)
Age		
60-69 years	3893(66.6)	776(64.2)
70-79 years	1505(25.7)	329(27.2)
80+years	450(7.7)	103(8.5)
Residence		
Urban	2515(43.0)	640(53.0)
Rural	3333(57.0)	568(47.0)
Religion		
Hindu	4329(74.0)	864(71.5)
Muslim	647(11.1)	124(10.3)
Others	872(14.9)	220(18.2)
Caste		
General	2363(40.4)	499(41.3)
OBC	1987(34.0)	385(31.9)
SC/ST	1498(25.6)	324(26.8)
Standard of living index		
Low	767(13.1)	191(15.8)
Medium	1708(29.2)	332(27.5)
High	3373(57.7)	685(56.7)
Household Structure		
Nuclear	1376(23.5)	205(17.0)
Non- Nuclear	4472(765)	1003(83.0)
Education		
Illiterate	2217(37.9)	882(73.0)
Primary	1292(22.1)	178(14.7)
Secondary	1850(31.6)	126(10.4)
Higher	489(8.4)	22(1.8)
Body Mass Index		
Underweight	1409(24.1)	272(22.5)
Normal	3575(61.1)	748(61.9)
Overweight	599(10.2)	126(10.4)
Obese	265(4.5)	62(5.1)
Marital Status		
Unmarried	16(0.3)	4(0.3)
Married	5088(87.0)	83(6.9)
Widows/Divorced Not living together	744(12.7)	1121(92.7)
Anemic		
Yes	2096(36.9)	406(34.3)
No	3591(63.1)	777(65.7)

education. As age increases chances of being anemic is 59% more. Female had 12 % more chances of being anemic as compared to men. An elder person dwelling in nuclear family was two time more prone for becoming anemic. (Table 4)

Discussion:

Anemia is a severe public health problem (prevalence of anemia ≥40%) in the rural areas of Uttarakhand State, India.[8,17] In the past, anemia in the elderly has been considered a part of the normal physiologic process.[8,9] At the present time, however, anemia in the elderly is considered a type of pathologic condition caused by under lying diseases.[4-6] Thus, anemia is no longer viewed as an accompaniment of aging and should not be attributed to natural senescence. In this study, we assessed the prevalence of anemia in Uttarakhand, India. Our results show that the prevalence of anemia among elderly was 35.9%. In present study significant difference in prevalence of anemia was found between different age groups. Other studies have also mentioned the same finding. [4,9,10]

Male sex, older age, low BMI, low education and nuclear family were identified as risk factors of anemia. It should be noted that the old age, low BMI factors are all associated with chronic illness and co-morbid conditions.[11] Higher education leads to higher capability to obtain information about the consequences of behavior regarding food intake or to healthier lifestyle. An old aged person living in nuclear family has less financial and social support,

Table 2: Association of Anemia with different bio-socio and demographic factors

Variables	Not Anemic n(%)	Anemic n(%)	Total	χ2(df, p value)
Age (years)				
60-69	2939(64.8)	1596(35.2)	4535	10.39 (2,0.006)*
70-79	1112(61.9)	684(38.1)	1796	
≥80	317(58.8)	222(41.2)	539	
Gender				
Male	3591(63.1)	2096(36.9)	5687	2.72 (1,0.053)
Female	777(65.7)	406(34.3)	1183	
Residence				
Urban	1940(62.6)	1157(37.4)	3097	2.15 (1,0.143)
Rural	2428(64.6)	1345(35.6)	3773	
Religion				
Hindu	3323(64.2)	1851(35.8)	5174	5.24(2,0.075)
Muslim	484(63.2)	282(36.8)	766	
Others	561(60.3)	369(39.7)	930	
Caste				
General	1022(39.5)	1564(60.8)	2586	30.83(2,0.000)*
OBC	939(36.8)	1614(63.2)	2533	
SC/ST	541(31.3)	1190(68.7)	1731	
Standard of living Index				
Low	585(75.2)	193(24.8)	778	92.43(2,0.000)*
Medium	1422(67.6)	683(32.4)	2105	
High	2361(59.2)	1626(40.8)	3987	
Household Structure				
Nuclear	1171(78.0)	330(22.0)	1501	172.80(1,0.000)*
Non- Nuclear	3197(59.5)	2172(40.5)	5369	
Education				
Illiterate	1968(65.6)	1032(34.4)	3000	13.60(3,0.000)*
Primary	934(64.1)	524(35.9)	1458	
Secondary	1158(60.8)	748(39.2)	1906	
Higher	308(60.9)	198(39.1)	506	

Body Mass Index				
Underweight	1116(67.1)	546(32.9)	1662	33.87(3,0.000)*
Normal	2655(64.0)	1499(36.0)	4164	
Overweight	403(56.1)	316(43.9)	719	
Obese	184(56.6)	141(43.4)	325	
Marital Status				
Unmarried	9(45.0)	11(55.0)	20	3.03(2,0.219)
Married	3210(63.7)	1826(36.3)	5036	
Widows/ Divorced Not living together	1149(63.3)	665(36.7)	1814	

* Significant at 5% level of significance

Table 3: Mean Hemoglobin and Prevalence of Anemia among different age groups

Variables	Age Groups (Years)			
	60-69 years (n= 4535)	70-79 years (n=1796)	>80 years (n=539)	p value*
Hemoglobin(g/dl)	13.6±1.6	12.7±1.3	11.8±1.8	0.004
Prevalence of Anemia	1596(35.2)	684(38.1)	222(41.2)	0.021

* p values are by analysis of variance (ANOVA) as per ANOVA Turkey's multiple comparisons are performed

Table 4: Odds Ratio for Anemia by Logistic Regression Analysis

Variables	Estimate	Std err	OR (95% CI)	p value
Age	0.15	0.21	1.59(1.1-1.97)	0.002
Education	-0.58	0.03	0.56(0.45-0.68)	0.014
Female	0.18	0.07	0.88 (0.07-1.27)	0.321
Nuclear Family	1.21	0.45	2.41(2.10-2.75)	0.024
BMI	-0.25	0.27	0.87(0.45-0.96)	0.047

*Abbreviations: std. err=standard error; OR=odds ratio; CI=confidence interval; BMI= body mass index

lack of personal care, healthier food style and healthier living environment. The cross-over effect whereby men are more likely than women to have anemia at older ages reflects the application of sex-specific criteria for defining anemia.[12,13] The health improvement of the nation is based on its management information system. National Family Health (NFHS) surveys conducted periodically are a reminder for India to wake up and respond to the urgent issues that have been lingering through decades. Though strategies are being revised periodically, there is need for financial support, awareness generation and most importantly political commitment.[14,15] A study conducted by Gupta et al

has highlighted the need for primary care physicians to undertake regular testing and provision of treatment for anemia among the elderly population.[16] No nutritional anemia in older adults has been documented to result from an interaction between an increased inflammatory milieu and age-related co morbidities. [17]

Conclusion:

The prevalence of anemia among elderly people in Uttarakhand was determined to be 35.9% and it increased with age. Male sex, old age, low BMI, low education and nuclear family were identified as independent risk factors of anemia among the elderly Indians. Anemia among elderly is an important public health problem in India. The actions at the national level need to be directed towards meeting these challenges in a rational, coordinated and unbiased manner with total commitment towards achieving the desired goals.

Declaration:

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Conflict of Interest: Nil

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