

## Haemoglobin Concentration in Relation to Sex, Religion and Economic Condition Among the War Khasi

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**ABSTRACT** The present paper aims at finding out a possible relationship between haemoglobin content and socio-economic condition among the War Khasi in the East Khasi Hills district of Meghalaya. It is found that the Christian War Khasi have higher haemoglobin level than their non-Christian counterparts, despite the absence of statistical significance in the case of males. The difference among the income groups is found to be statistically significant in the case of males among the Christians, and in the case of females among the non-Christians. The mean values of haemoglobin content in both the Christians and non-Christians are found to be higher than those reported for some populations in the North Eastern region (Das and Deka, 1979). It holds good for both sexes. It is suggested that these differences within and between populations may be considered merely a means to an end of our understanding of the well-being or health status of the population(s) under consideration.

### INTRODUCTION

One of the nutritional problems affecting a large number of populations in many developing countries is the nutritional anaemia (WHO, 1968; Edmundson and Edmundson, 1992). 'Nutritional anaemia is defined as a condition in which the haemoglobin (Hb) content of the blood is lower than normal as a result of a deficiency of one or more essential nutrients, regardless of the cause of such deficiency' (WHO, 1968). Indeed, Hb content may also be considered as one of the important indicators of nutritional and health status of an individual, or a population (Srikantia et al., 1976; Guthrie and Guthrie, 1976; Edmundson and Edmundson, 1992). It is reported that individuals suffering from nutritional anaemia are more susceptible to infection (Chandra, 1976; Dallman, 1987). Moreover, data on Hb

concentration are also very useful in making out human variation under different ecological and cultural conditions (Crane et al., 1972; Garn et al., 1977; Owen and Owen-Yenochik, 1977; Gupta et al., 1984). It may, however, be mentioned that such studies are still very limited especially in the North Eastern part of India (Das and Deka, 1979).

In the present paper, an attempt has been made to give a brief account of the Hb level in relation to sex, religion and economic condition among the War Khasi of Meghalaya. The War Khasi are one of the sub-groups of the Khasi tribe, living in the southern slope of the Khasi hills in Meghalaya, following the matrilineal system of the society and speaking the Monkhmer language which belongs to the Austro-Asiatic group (Das, 1978; Das Gupta 1984; Khongsdier, 1994).

### MATERIALS AND METHODS

The present study was based on the data collected from 222 adult males and 212 adult females (aged between 20 and 55 years) belonging to the Christian and non-Christian sections of the War Khasi in the East Khasi Hills district of Meghalaya. Haemoglobin concentration was estimated by using Sahli's Haemometer. The estimation was carried out immediately after the collection of blood samples, following the standard techniques (WHO, 1980). Methods of data collection and classification of economic condition based on per capita monthly income of the households have already been reported (Khongsdier, 1996). Similarly, the systematic random sampling of villages, which were covered by the

present study, has already been described elsewhere (Khongsdier, 1994, 1995a, 1995b). No attempt was made to apply any statistical sampling of individuals on account of operational difficulties in the field. Efforts were, however, made to include in our sample all those persons who were willing to cooperate in carrying out the purpose of the present study. In this paper, we have presented our findings according to sex, religion and economic condition. It may be noted that, in the present study, the War Khasi are grouped into two broad religious groups, viz., the Christians (*i.e.* individuals who are by faith christian) and non-Christians (*i.e.* individuals who believe in *Ka Niam Khasi* or traditional religion). It is already pointed out that the Christians are more advanced and having better economic condition than the non-Christians (Khongsdier, 1994).

## RESULTS AND DISCUSSION

Table 1 shows the Hb content among the War Khasi according to sex and religious groups. It is found that the mean values of Hb level in the Christian males and females are  $13.99 \pm 2.25$  g/dl and  $13.65 \pm 2.56$  g/dl, respectively. Among the non-Christians, these values are found to be  $13.77 \pm 2.39$  g/dl and

$13.00 \pm 2.23$  g/dl, respectively. The WHO Scientific Group (1968) has recommended the Hb content of 13 g/dl for adult males and 12.00 g/dl for the non-pregnant adult females. So, it indicates that the Hb content among the War Khasi is above the recommended levels in both the religious groups, *i.e.* the Christians and non-Christians. Table 1 further shows that the Christian males and females have higher mean values of Hb level than their non-Christian counterparts. The difference between the two religious groups is found to be statistically significant in the case of females ( $z = 2.10$ ,  $P < 0.05$ ), but it is not so in the case of males ( $z = 0.71$ ,  $P > 0.05$ ).

The percentage distribution of persons according to different levels of Hb content is given in table 2. Among the Christians, about 84.76% of males and 78.79% of females have haemoglobin content of 12.00 g/dl and above, whereas among the non-Christians, these frequencies are found to be 82.05% and 69.03% for males and females, respectively. It is also found that the frequencies of anaemia ( $< 13.00$  g/dl for males and  $< 12.00$  g/dl for females) among the Christians are 26.67% and 21.21% in males and females, respectively. Among the non-Christians, these frequencies are found to be 30.77% and 30.97% in males and

Table 1 : Haemoglobin content (g/dl) according to sex and religion

Sex	Christians			Non-Christians			Difference $\pm$ S.E.
	N	Mean	SD	N	Mean	SD	
Male	105	13.99	2.25	117	13.77	2.39	$0.22 \pm 0.31$
Female	99	13.65	2.56	113	13.00	2.23	$0.65 \pm 0.31^*$

\*  $P < 0.05$ .

Table 2 : Percentage distribution of haemoglobin content

Hb content (g/dl)	Christians		Non-Christians	
	Male (N=105)	Female (N=99)	Male (N=117)	Female (N=113)
8 - 9	4 (3.81)	7 (7.08)	7 (5.98)	5 (4.42)
10 - 11	12 (11.43)	14 (14.14)	14 (11.97)	30 (26.55)
12-13	30 (28.57)	28 (28.28)	37 (31.62)	37 (32.74)
14 - 15	29 (27.62)	25 (25.25)	33 (28.21)	22 (19.47)
16 - 17	19 (18.10)	16 (16.16)	17 (14.53)	14 (12.39)
$\geq 18$	11 (10.48)	9 (9.09)	9 (7.69)	5 (4.42)

Figures within parentheses indicate percentage



females, respectively. So, it shows that among the Christians the frequency of anaemia is higher in males than in females, though the difference between sexes is not statistically significant ( $d = 0.91, P > 0.05$ ). On the other hand, the frequency of anaemia is slightly higher in females than in males among the non-Christians ( $d = 0.03, P > 0.05$ ). It may also be mentioned that the difference between the two religious groups with respect to the frequency of anaemia is not statistically significant for both males ( $d = 0.68, P > 0.05$ ) and females ( $d = 1.161, P > 0.05$ ), though the frequency is higher in the non-Christians than in the Christians for both sexes.

**Table 3: Haemoglobin content (g/dl) by income groups among adult males**

Income groups	Christians			Non-Christians		
	N	Mean	SD	N	Mean	SD
Low Income Group	33	13.47	2.44	45	13.27	2.20
Middle Income Group	46	13.92	2.11	42	13.93	2.55
High Income Group	26	14.78	2.01	30	14.30	2.28
F-statistics	5.01, $P < 0.01$			1.83, $P > 0.05$		

**Table 4: Haemoglobin content (g/dl) by income groups among adult females**

Income groups	Christians			Non-Christians		
	N	Mean	SD	N	Mean	SD
Low Income Group	31	13.26	2.71	40	12.27	1.82
Middle Income Group	40	13.33	2.49	43	13.13	2.22
High Income Group	28	14.54	2.25	30	13.78	2.44
F-statistics	2.40, $P > 0.05$			3.89, $P < 0.05$		

Table 3 shows the Hb content in adult males according to income groups. It is seen that the Hb content tends to increase with the increasing economic level for both the religious groups, though the differences among the three income groups are significant only among the Christians ( $F = 5.01, d.f. = 2, 102; P < 0.05$ ). The Hb level by income groups for the adult females is presented in table 4. It is seen that the mean value of Hb content is highest in the Low Income Group, which is followed by the Middle Income Group and then by the High Income Group. However, the anal-

ysis of variance shows that the differences among the three income groups are significant only among the non-Christians ( $F = 3.89, d.f. = 2, 110; P < 0.05$ ).

In the North Eastern region, Das and Deka (1979) have reported that the mean values of Hb level in the adult males of Rabha, Rajbanshi, Kachari and Mikir are 10.89 g/dl, 10.70 g/dl, 10.67 g/dl and 9.67 g/dl, respectively. So, in comparison with these populations, it shows that the mean values of Hb content are much higher in the Christian and non-Christian males of the War Khasi. Similarly, the mean values of Hb level among the Kachari (10.11 g/dl) and Mikir (9.10 g/dl) non-pregnant adult women (Das and Deka, 1979) are much lower in comparison with the present findings in the Christian and non-Christian females of the present population.

In the view of the present findings, one may suggest that the Hb content seems likely to be associated with some socio-economic factors like religion, economic condition and so on. Of course, our findings with respect to dietary intakes indicate that socio-economic condition plays a very important role in regulating the nutritional status of the War Khasi (Khongsdier, 1995c). So, the association of Hb content or nutritional status of population with socio-economic condition is perhaps no longer an uncommon phenomenon (Basu, 1987; Edmundson and Edmundson, 1992; Osmani, 1992). However, the question of how the low income groups adapt themselves to such an environment of lower Hb concentration, or lower intake of nutrients, is yet to be clearly understood. We have discussed elsewhere that the nutritional status of this population with respect to anthropometry is likely to provoke a controversy especially in relation to the use of international standard as a target of measuring the magnitude of undernutrition in the population (Khongsdier, 1995b). The present study is no doubt short of such data on disease prevalences, susceptibility to infection and the like with a view to understanding

the well-being or health status of the War Khasi population according to a different socio-economic condition. Indeed, it has been suggested that nutritional anaemia is attributable to high susceptibility to infection (Chandra, 1976; Dailman, 1987). So, we do hope that further studies will throw much more light on what the present study admits its limitation. Similarly, the differences between populations mentioned in this study may provoke many questions which cannot be answered on the basis of the present set of data. Are the differences in Hb content due to population differences in socio-economic conditions? Or are they due to population variation in both genetic and socio-economic characteristics? How do these populations adapt themselves to their respective environmental conditions? and so on. Anthropologists who are supposed to deal with the subject matter of human variation should have taken into consideration these questions, instead of just simply finding out and/or describing the population affinities or variations in respect of either cultural or biological traits.

Last but not least, it is observed that little attention has so far been given to the study of Hb content in the populations of the North Eastern region, though such a study is likely to reflect the nutritional and health status of population.

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