Anaemia and associated factors among the Bengali Muslims of Cachar district in Assam, India

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Abstract

Present study is an effort to observe the prevalence of anaemia with reference to age, education and income among the Bengali Muslims of Cachar District of Assam, India. The data have been collected by household census method and colour scale for haemoglobin among 362 Bengali Muslims (male-183, female-179) of 15 to 79 years of age from Ganganagar Part-I and Bhaurikandi Part-II village of Cachar District. The study reveals that half (50.0%) of the adult Bengali Muslim population is prone to different grades of anaemia. 20.7% of them are found to have mild anaemia; but a major proportion (27.1%) of them are suffering from moderate anaemia and 2.2% of them are found to be severely anaemic. Prevalence of anaemia is found to be significantly high (p-0.001) among the Bengali Muslim females (60.3%) compared to their male counterparts (39.9%). Anaemia is found to be more prevalent in older age groups in comparison to younger age groups of the community. Prevalence of anaemia decreases with the increase of educational status and per capita monthly income in the community. The interaction of different factors like age, education, income and overall socio-economic condition may have influenced the anaemic situation in the community.

Introduction

Haemoglobin (Hb), the red respiratory protein found in mammalian erythrocytes is one of the most informative molecules in primate blood (Chahal and Bansal, 2005). It is a protein-iron compound in the blood that carries oxygen to the cells and carries carbon dioxide away from the cells. Haemoglobin concentration is one of the most popularly used parameter for the evaluation of human health status (Singh and Mangang, 2012). Decrease of haemoglobin, with or without an absolute decrease of red blood cells, leads to symptoms of anaemia. It is the late expression of deficiency of nutrient(s) needed for haemoglobin synthesis. Most of the anaemia's are due to insufficient supply of nutrients like iron, folic acid and vitamin B12, proteins, amino acids, vitamins A, C and other vitamins of B-complex group are also involved in the maintenance of haemoglobin level (Lee and Herbert, 1998). It is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development (Al-Sayes et al., 2011; WHO, 2002).

Nutrition which is essential for human health is a multi-step process with intake of food, metabolism of food and its utilization (Bhardwaj and Kapoor, 2007). Adequate nutrition helps an individual to remain fit and healthy while insufficient nutrition reduces fitness and causes vulnerability to multiple diseases. Deficiencies of micronutrients continue to impose a substantial health and socio-economic burden in the world. The importance of dietary deficiencies cannot be overlooked as iron-deficiency anaemia resulting from inadequate intake and low absorption of dietary iron has been shown to be the most common cause of anaemia in India (Rao, 1978; Toteja and Singh, 2004). High prevalence of iron-deficiency anaemia has been reported from pregnant as well as women of child bearing age of India which continues to be a major cause responsible for prematurity and low birth weight of infants (Rao et al., 2010; Sarin, 1995; Seshadri et al., 1994). But the larger incidence of anaemia is more likely to have manifold causes and thus not exclusively be associated to iron deficiency.

Aims and objectives

Nutritional anaemia remains a major public health problem in nearly all developing countries, including India. However, most of the studies in India were done on pregnant and lactating women and young children (Agarwal et al., 2006; Chatterjee et al., 2011; Sidhu et al., 2005). Reliable data on the prevalence of anaemia in the adult population (adult male and non-pregnant female) is not available, especially among adult rural Muslim population of Cachar District, Assam.

The main objectives of the present study are:

1. To assess the anaemia status based on haemoglobin concentration level among the Bengali Muslim males and females.

2. To see the sex-wise distribution of anaemia with reference to some factors like age, education and per capita income.

Materials and methods

General demography and socio-economy

The present study was done in 2 randomly selected villages of Cachar district of Assam, which are primarily inhabited by Bengali Muslim population. The study was conducted among the Bengali Muslims of Ganganagar Part-I village of Palonghat block and Bhaurikandi Part-II village of Sonai Block of Cachar District, Assam during the month of July to December, 2010. General demographic as well as socio-economic data of 178 households was collected by household

census method from 178 Bengali Muslim households out of which 77 households were from Ganganagar Part-I village and 101 households were from Bhaurikandi Part-II village.

Socio-economic data includes relevant information on sex, age, education, marital status, occupation, income, house type, sanitation, electrification, source of drinking water, treatment of drinking water, energy sources for cooking, family size, family type, etc. Family income was gathered from different sources like an individual's income from both primary and secondary occupations, household assets like domesticated animals, ownership of cultivable land, crops and vegetable cultivations, etc. Family income was verified by different cross questions to the informant like expenditure on food, education, medical treatment (if any), etc.

Haemoglobin

Haemoglobin concentration level in blood (g/dl) was done by the WHO Haemoglobin Colour Scale (HCS) method on 362 Bengali Muslims which included 183 males and 179 females of 15 years to 79 years age. The sample was free from any selection bias. All the available willing individuals who fall within the age group of 15 years to 79 years were included in the study. Pregnant women were excluded from the study.

Anaemia status was assessed from haemoglobin levels (g/dl) by matching the colour of a blood drop on a test strip with one of the shades of red of colour scale which represent a range of haemoglobin values from 4 to 14 g/dl. The measured haemoglobin concentrations were used to classify individuals as severely, moderately, mildly anaemic and non-anaemic or normal individuals. Although Haemoglobin Colour Scale (HCS) method is considered as a subjective method but it is also a simple and inexpensive method which provide a reliable indication on the presence and severity of anaemia in field based assessment of anaemia (Tondon et al., 2009). Different grades of anaemia were assessed from haemoglobin levels by following WHO classification (WHO, 2001, 2011).

Statistical analysis

All statistical analysis was carried out by SPSS 16.0 version. Chi-square test was performed wherever required and a *P* value of <0.05 had been considered as significant.

A brief account on the land and the people

Geographically Cachar district is located in the southernmost part of Assam. Cachar is considered as one of the most economically backward districts of India which is largely due to geographical barrier with the rest of the country (Cachar District, 2013). There are different endogamous communities inhabiting in the district such as Bengali Hindu, Bengali Muslim, Meitei, Brishnupriya, Dimasa Kachari, Hmar, Khasi, etc. The people inhabiting in Barak valley (which includes Cachar, Karimganj and Hailakandi district) are primarily known as Sylheti Bengali (sylheti, a dialect) who mainly follow either Islam or Hinduism. According to the 2011 census Cachar district has a population of 17, 36, 319 and a population density of 459 inhabitants per square kilometre. Cachar has a sex ratio of 958 females for every 1000 males and a literacy rate of 80.36%. Religious break-up of the population are, Hindus 886,761, Muslims 522,051 and Christians 31,306 (District Census, 2011).

Linguistically the Bengali Muslims belong to the Indo-European ethnic group of Caucasoid racial stock (Basu et al., 2005). The Bengali Muslims of the area speak in Sylheti Bengali (Sylheti, a dialect and belong to Sunni sect of Islamic religion). Their family structure is patrilineal in nature. They follow community endogamy and marriage by negotiation is the

prevailing practice among them. Agriculture is their main stay of livelihood. Most of the male members are engaged in cultivation while females are engaged in household activities. Rice is their staple food. They are generally non-vegetarian.

Results

It is observed that majority (63.3%) of the studied Bengali Muslim population are from Bhaurikandi Part-II village and the rest belongs to Ganganagar Part-I village (Table 1a). The studied population is found to be the highest (26.2%) in 20-29 years age group where as 10.5% of them belong to elderly age group. Most of the Bengali Muslims are found to be currently married. Illiteracy is found to be very high among the Bengali Muslim females compared to the males. More than half of the Bengali Muslim males are found to be engaged in either cultivation or skill works or wage labour. Most of the Bengali Muslim females are found to be engaged in household activities. Division of total per capita monthly income into 3 equal portions reveals 28.5%, 39.5% and 32.0% of the Bengali Muslims in low, medium and high income group respectively.

Table 1a. Demographic and socio-economic background of the Bengali Muslim population

Factors	Male		Female		Total	
	No.	%	No.	%	No.	%
Villages						
Bhaurikandi Part II	111	60.7	118	65.9	229	63.3
Ganganagar Part I	72	39.3	61	34.1	133	36.7
Age group (in years)						
<20 (15-19)	29	15.8	20	11.2	49	13.5
20-29	42	23.0	53	29.6	95	26.2
30-39	48	26.2	41	22.9	89	24.6
40-49	24	13.1	31	17.3	55	15.2
50-59	18	9.8	18	10.1	36	9.9
≥ 60	22	12.0	16	8.9	38	10.5
Marital status						
Unmarried	66	36.1	36	20.1	102	28.1
Married	113	61.7	118	65.9	231	63.8
Widow(er)/divorcee/separated	4	2.2	25	14.0	29	8.0
Educational status						
Illiterate	14	7.7	61	34.1	75	20.7
Literate (can read & write only) to Class IV	51	27.9	41	22.9	92	25.4
Class V to IX	78	42.6	54	30.2	132	36.5
Above Class IX	40	21.9	23	12.8	63	17.4
Occupational status						
Household Work/ Unemployed[1]	40	21.9	173	96.6	213	58.8
Cultivation/ Wage Labour[2]	96	52.5	2	1.1	98	27.1
Business/ Service (Govt. or Pvt.)	47	25.7	4	2.2	51	14.1
Per capita monthly income[3]						
Up-to Rs. 634 (low)	48	26.2	55	30.7	103	28.5
Rs. 635 to 1334 (medium)	74	40.4	69	38.5	143	39.5
More than Rs. 1334 (high)	61	33.3	55	30.7	116	32.0
Total	183	100.0	179	100.0	362	100.0

[1]dependent/unemployed/student/household work
[2]cultivation/wage labour/skill work (mason/carpenter/driver)
[3]in Indian rupees

The study reveals that majority of the Bengali Muslim people are living in Assam type house i.e. brick or bamboo wall with tin or C.I. sheet roof (Table 1b). Pit latrine facility is predominantly observed in their houses. More than half of the Bengali Muslims have reported to have electricity facility in their houses. Pond as well as water supplied from public health and

engineering department is the main source of drinking water among the Bengali Muslims. Most of them drink normal or raw water i.e. water (as come from the source) without any treatment. Firewood is found to be the primary source for cooking among them. It is observed that half of the Bengali Muslims are having medium size family while remaining half consists of both small and big size families. Majority of the people are found to be living in Nuclear families.

The study reveals that 22.4% and 17.5% of the Muslim males are having moderate and mild anaemia respectively (Table 2). On the other hand, 31.8% and 24.0% of the Muslim females are moderately and mildly anaemic respectively. 39.9% of the Muslim males are found to be anaemic compared to 60.3% among the females. Prevalence of anaemia is found to have statistical significant difference (p-0.001) between males and females.

Table 1b. Socio-economic background of the Bengali Muslim population

Factors	Male		Female		Total	
	No.	%	No.	%	No.	%
House type						
Hut	26	14.2	34	19.0	60	16.6
Assam type	157	85.8	145	81.0	302	83.4
Sanitation facility						
Pit latrine	180	98.4	175	97.8	355	98.1
Sanitary latrine	3	1.6	4	2.2	7	1.9
Electricity facility						
Not available	80	43.7	91	50.8	171	47.2
Available	103	56.3	88	49.2	191	52.8
Source of drinking water						
Pond	71	38.8	72	40.2	143	39.5
Dug well	11	6.0	8	4.5	19	5.2
PHE (Public Health Engineering)	85	46.4	83	46.4	168	46.4
Pond and PHE	16	8.7	16	8.9	32	8.8
Treatment of drinking water						
Normal (only raw water)	150	82.0	140	78.2	290	80.1
Boil/ filter/both boil &filter	33	18.0	39	21.8	72	19.9
Type of fuel for cooking						
Firewood	177	96.7	171	95.5	348	96.1
LPG (Liquid Petroleum Gas)	1	0.5	1	0.6	2	0.6
Both firewood & LPG/others	5	2.7	7	3.9	12	3.3
Family size (member/s)						
Small (1-4)	27	14.8	37	20.7	64	17.7
Medium (5-7)	88	48.1	94	52.5	182	50.3
Big (7+)	68	37.2	48	26.8	116	32.0
Family type						
Nuclear	94	51.4	106	59.2	200	55.2
Joint	89	48.6	73	40.8	162	44.8
Total	183	100.0	179	100.0	362	100.0

Table 2. Different grades of anaemia among the Bengali Muslims

Sex	Anaemia				Normal	No. of persons	Chi-square
	Severe*	Moderate	Mild	Total			
Male	-	41 (22.4)	32 (17.5)	73 (39.9)	110 (60.1)	183	x^2-15.129 d.f.-1 P-0.000
Female	8 (4.5)	57 (31.8)	43 (24.0)	108 (60.3)	71 (39.7)	179	
Total	8 (2.2)	98 (27.1)	75 (20.7)	181 (50.0)	181 (50.0)	362	
* in bracket the figure shows percentage							

Table 3a. Different grades of anaemia according to age groups

Sex	Age group (in years)	Anaemia			Normal	No. of persons
		Severe	Moderate	Mild		
Male	<20*	-	4 (13.8)	6 (20.7)	19 (65.5)	29 (100.0)
	20-39	-	21 (23.3)	12 (13.3)	57 (63.3)	90 (100.0)
	40-59	-	10 (23.8)	9 (21.4)	23 (54.8)	42 (100.0)
	60-79	-	6 (27.3)	5 (22.7)	11 (50.0)	22 (100.0)
Female	<20*	-	5 (25.0)	8 (40.0)	7 (35.0)	20 (100.0)
	20-39	2 (2.1)	30 (31.9)	22 (23.4)	40 (42.6)	94 (100.0)
	40-59	4 (8.2)	17 (34.7)	10 (20.4)	18 (36.7)	49 (100.0)
	60-79	2 (12.5)	5 (31.2)	3 (18.8)	6 (37.5)	16 (100.0)
*15-19 years; in bracket the figure shows percentage						

Age is categorized into four groups such as <20 (early young aged), 20-39 (young aged), 40-59 (middle aged) and 60-79 (old aged or elderly) years age group (Table 3a). Prevalence of anaemia among the Bengali Muslim males is found to be the highest in elderly (50.0%) age group in comparison to early young aged, young aged and middle aged group. Distribution of anaemia doesn't show any clear trend among the females in relation to their age group. But severity of anaemia is more among the older age group females.

Different grades of anaemia has been observed in relation to educational status of the Bengali Muslims by grouping the educational status into three categories such as illiterate to class IV pass (low), class V to IX pass (moderate) and above class IX (high). It is seen that the frequency of anaemia decreases with the increase of educational status in the community (Table 3b). Frequency of anaemia among the Bengali Muslims is found to be the highest in lowest educational category (male: 43.1%, female: 65.7%) compared to other educational categories.

Different grades of anaemia has been observed against per capita monthly income by grouping the per capita income into three equal portions such as up-to Rs. 634 (low), Rs. 635 to 1334 (medium) and More than Rs. 1334 (high) income group (Table 3c). It is revealed that the frequency of anaemia decreases with the increase of income group of the community. Percentage of moderate (29.2%) as well as mild (20.8%) anaemia among the Bengali Muslims is found to be the highest in low income group (male: 50.0%, female: 29.1%) compared to other income groups.

Demographic and socio-economic status has been determined depending on several criteria such as sex, age, education, marital status, occupation, income, house type, sanitation, electrification, source of drinking water, treatment of drinking water, energy sources for cooking, family size, family type, etc. to get an overall idea about the socio-economic condition of the community. However haemoglobin concentration level has been evaluated with reference to four key factors like sex, age, education and income. However these factors may also affect each other which have not given much weight in the present study.

It is observed from the National Family Health Survey-3 data of India that the frequency of severe, moderate and mild anaemia is much higher in Assam state in comparison to overall picture of the country (Table 4). Results of the present study (anaemia: 50.0%) are found to be in conformity with the state data of NFHS-3.

Table 3b. Different grades of anaemia according to educational status

Sex	Educational status	Anaemia			Normal	No. of persons
		Severe*	Moderate	Mild		
Male	Up-to class IV	-	17 (26.2)	11 (16.9)	37 (56.9)	65 (100.0)
	Class V to IX	-	17 (21.8)	14 (17.9)	47 (60.3)	78 (100.0)
	Beyond class IX	-	7 (17.5)	7 (17.5)	26 (65.0)	40 (100.0)
Female	Up-to class IV	7 (6.9)	35 (34.3)	25 (24.5)	35 (34.3)	102 (100.0)
	Class V to IX	1 (1.9)	17 (31.5)	13 (24.1)	23 (42.6)	54 (100.0)
	Beyond class IX	-	5 (21.7)	5 (21.7)	13 (56.5)	23 (100.0)
* in bracket the figure shows percentage						

Table 3c. Different grades of anaemia according to per capita monthly income

Sex	Per capita monthly income	Anaemia			Normal	No. of persons
		Severe*	Moderate	Mild		
Male	Up-to Rs. 634	-	14 (29.2)	10 (20.8)	24 (50.0)	48 (100.0)
	Rs. 635 to 1334	-	17 (23.0)	10 (13.5)	47 (63.5)	74 (100.0)
	More than Rs. 1334	-	10 (16.4)	12 (19.7)	39 (63.9)	61 (100.0)
Female	Up-to Rs. 634	4 (7.3)	18 (32.7)	17 (30.9)	16 (29.1)	55 (100.0)
	Rs. 635 to 1334	4 (5.8)	25 (36.2)	12 (17.4)	28 (40.6)	69 (100.0)
	More than Rs. 1334	-	14 (25.5)	14 (25.5)	27 (49.1)	55 (100.0)
* in bracket the figure shows percentage						

Table 4. Comparison of prevalence of anaemia among the Bengali Muslims of Cachar district with state and country data

Anaemia status based on haemoglobin concentration level (in percentage)						
Sex	Area	Severe	Moderate	Mild	Total	Reference
Male	Bengali Muslims (district)[1]	-	22.4	17.5	39.9	Present study
	Assam (state)	2.9	17.9	18.9	39.7	(IIPS, 2007)
	India (country)	1.3	9.9	13.0	24.2	
Female	Bengali Muslims (district)[1]	4.5	31.8	24.0	60.3	Present study
	Assam (state)	3.4	21.2	44.8	69.4	(IIPS, 2007)
	India (country)	1.8	15.0	38.6	55.4	
Total	Bengali Muslims (district)[1]	2.2	27.1	20.7	50.0	Present study
	Assam (state)	3.2	19.6	31.8	54.6	(IIPS, 2007)
	India (country)	1.6	12.4	25.8	39.8	
[1] Bengali Muslims in two villages of Cachar district of Assam, India						

Discussion

The importance of anaemia as a foremost health problem throughout the globe is extensively recognized. The actual results for the prevalence of anaemia differ from one study to other but there is no doubt that anaemia is a major health problem in India especially among the rural populations. The study reveals that half (50.0%) of the adult Muslim population is prone to different grades of anaemia. 20.7% of them are found to have mild anaemia; but a major proportion (27.1%) of them are suffering from moderate anaemia and 2.2% of them are found to be severely anaemic.

According to WHO (2001) if the prevalence of anaemia at community level is more than 40.0% it is considered as severe public health problem, if in between 20.0 to 39.9% it is a moderate public health problem, if between 5.0 to 19.9% it is a mild public health problem and if less than 5.0 % it is not a public health problem. So the results indicate that there are serious health problem in the population as half of them are suffering from anaemia.

Different factors may have played a role for possible underlying causes of anaemia in the population. The main causes of anaemia in developing countries include: inadequate intake and poor absorption of iron, malaria, hookworm infestation and other infections, genetic disorders (e.g., sickle cell and thalassemia), blood loss during labour and delivery, heavy menstrual blood flow and closely spaced pregnancies (Kaur and Kochar, 2009; Ahmad et al., 2010).

Anaemia status and sex

In the present study, prevalence of anaemia is found to be significantly higher among the Bengali Muslim females in comparison to males (male: 60.3%, female: 39.9%, p: 0.000). The sex differences in anaemia may be due to the fact adult females experience regular blood loss due to menstruation as well as repeated delivery (Pal et al., 2014). A community based study among the non-pregnant women in rural areas of Paschim Medinipur, West Bengal documented extreme levels of anaemia (Maiti et al., 2011).

Most of the Indian societies are patrilineal in nature due to which the socio-economic position of a female is more susceptible than a male. This situation may be relevant in the present study. The high rates of anaemia among Indian women, indicates that there are social as well as biological susceptibility both within society and the household (Bentley and Griffiths, 2003). Pal et al. (2014) disclosed high frequency of anaemia among the adult males and non-pregnant females of 18-60 years age group in rural areas of West Bengal, India and mentioned that the higher prevalence of anaemia may be due to dietary deficiency, poor dietary patterns, type of diet and unequal food sharing in the families.

Anaemia status and age

Human life is so multi-dimensional that one or two aspects cannot explain it holistically and it is affected by several biological, psychological and socio-cultural factors associated with human being. Anaemia is a common hematologic condition among older adults and it increases with the increase of age after the fifth decade of life (Patel et al., 2007).

The study reveals that the prevalence of anaemia increases with the increase of age groups among the Bengali Muslim males. No definite trend of increase of anaemia is seen from younger to older age group of Muslim females. Anaemic females among the Bengali Muslims are found to be the highest in 15 to 19 years age group but most of them are mildly anaemic. Sidhu et al. (2005) revealed similar kind of results among the adolescent girls of Scheduled Caste community of Amritsar.

Anaemia status and education

Prevalence of anaemia has been observed in relation to educational status which reveals that the frequency of anaemia decreases with the increase of educational status among the people irrespective of their sex. Literacy plays a significant role in the occurrence of anaemia which is reported to be higher among the illiterate women residing in a rural environment (Biswas and Baruah, 2014). Education helps an individual to aware himself to the pros and cons of health related issues. An improvement in educational status helps the people, especially women to become receptive to the advice given by health care providers. Knowledge on nutrition related

issues helps to improve dietary intakes in family for receiving needed macro or micro nutrients as protein, iron and vitamins etc. for haemoglobin synthesis is important (Kapur et al., 2002). Moreover it plays a key role to uplift socio-economic situation of an individual especially of a woman through engagement in better income generating activities.

In the present study, prevalence of anaemia is found to be the highest among the Bengali Muslims of low educational category compared to moderate and high educational category. The severity of anaemia is observed to be inversely related to educational status in the present studied population. Shah et al. (1982) studied the rural population of Kashmir and observed that prevalence of anaemia decreases with the increase in educational status.

Anaemia status and income

Prevalence of anaemia has been observed in relation to per capita monthly income among the Bengali Muslims. Anaemia among the adults especially women probably accounts for a significant loss of productivity and which ultimately family welfare (Leslie, 1997). Work capacity may determine work output and hence income; but income may also affect dietary intakes and ultimately work capacity (Ghosh and Bharati, 2003). Several studies have shown a relationship between haemoglobin concentration and work output (Basta et al., 1979; Husaini et al., 1983; Wolgemuth et al., 1982).

In the present study, it is revealed that the frequency of anaemia decreases with the increase of income group. There is a declining trend in severity of anaemia with an increase in per capita monthly income among the Bengali Muslims. Ahmad et al. (2010) also documented a decline in the prevalence of anaemia with the increase in socio-economic status.

Anaemia status in district, state and country

In the present study, prevalence of anaemia is found to be 50.0%, which is more or less similar to the NFHS-3 data of the state but it has huge difference with country data (IIPS, 2007). NFHS-3 data also revealed that eastern zone of India along with Assam and Tripura from north-eastern zone as well as Andhra Pradesh from southern zone are severely affected by anaemia. It is notable to mention that North-East zone consists of eight different states but apart from Assam and Tripura (where majority of the population are non-tribals of Caucasoid racial stock) numerically dominant inhabitants of other six states such as Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Sikkim are tribal population of Mongoloid racial stock (Barbhuiya and Das, 2014). Sex-wise comparison of anaemia status on the basis of the same data indicated that females are suffering more from anaemia compared to their male counterparts. Comparison of anaemic condition of the adult Bengali Muslims of the present study indicates that it is worse than country scenario but slightly better than state picture. Comparison of the present study with state and country data of NFHS-3 indicates that there is population as well as spatial or regional variation in the proportion of different grades or severity of anaemia. New programme and strategies are needed to effectively address the population determinants of anaemia of the area.

Conclusion

It is revealed from the study that half (50.0%) of the Bengali Muslim population is prone to different grades of anaemia. 20.7% of them are found to have mild anaemia; but 27.1% of them are suffering from moderate anaemia and 2.2% of them are found to be severely anaemic. Bengali Muslim females are more prone to anaemia compared to the males. Anaemia is found to be more prevalent in older (≥40 years) age groups in comparison to other younger age groups

of the community. Prevalence of anaemia decreases with the increase of educational status in the community. Similarly the frequency of anaemia decreases with the increase of income among them. The overall socio-economic conditions among the Bengali Muslim population are found to be in bad shape which may have influenced the anaemic situation among them.

Acknowledgements

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