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Perception about Preventive Measures of Malaria among Tribal Adults in Higher Endemic Community

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Abstract

Malaria is a public health problem in some parts of Bangladesh, particularly in 13 districts in the north-east and south-east areas. Among them Bandarban district is highly endemic. There is a need for updating preventive measures on malaria for suitable control strategies among tribal populations. Basis of this need the present study assessed the perception of preventive measures of malaria among Tribal adults in higher endemic community. A community based cross-sectional study was done among 316 Tribals adults were selected by convenient sampling technique in Sadar Upazila of Bandarban district. Data were collected through face to face interview by using pretested semi structured questionnaire. Average age of the respondents was 35.0 years with (SD) ±8.9 years. 63.61% female and 36.39% male respondents. One third respondent's levels of education were no schooling and 51.6% were housewives. About 98.1% of respondents correctly knew that malaria is transmitted by mosquito bite and fever was the recognized symptom for malaria (90.5%). Most of respondents 94.0% knew about malaria preventive measures. More than half 56.3% of respondents did not know about mosquito biting time. Only 20% respondents ever had malaria, among them 55.4% respondent's malaria was diagnosed more than 3 days and 93.8% started treatment within 1 day after diagnosis of malaria. After multivariate analysis, no. of family member is associated with all family member at home sleep under LLIN (p=0.003, OR=0.323, 95% CI for OR from 0.152 to 0.687) while controlling others variables. Knowledge of malaria and preventive measures was considerable but the utilization of preventive measures was suboptimal.

Keywords: *Perception of preventive measure, Malaria, Tribal adult, higher endemic community.*

Introduction

Background

Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes. In 2015, 91 countries and areas had ongoing malaria transmission [1]. Malaria is one of the most important public health problems in term of morbidity and mortality. There were 212 million cases of malaria in 2015 and 429 000 deaths globally [1].

In Bangladesh, the total number of people who are at risk of malaria in the 13 endemic districts is approximately 13.25 million. From the three CHT districts (Rangamati, Khagrachari and Bandarban) with a total population of about 1.6 million, about 80% of the cases of malaria in Bangladesh are found there. The indigenous population constitutes about 50% of the total population in CHT districts. The tribal hamlets are in clusters in the remote hills and foothills. Most of the houses are thatched built with indigenous material e.g. bamboo, wood etc. and these houses seldom have any protection against the vector mosquitoes [2]. Malaria is an important cause of morbidity and mortality in malaria endemic areas. Both males and females are affected by malaria; however. Due to their occupations, adult males are more affected by malaria and their behavior also put them at risk of being bitten by malaria vectors. Pregnant women and children <5yrs are biologically at higher risk and they tend to develop more severe

malaria due to low level of immunity. (NSP, 2015-2020). Children aged less than five years and pregnant women are the people most vulnerable to dying of malaria or suffering serious consequences of the disease, especially in regions where transmission is intense. Children are most vulnerable because they have not acquired immunity to the disease, while maternal susceptibility to malaria infection during pregnancy may be related to the physiological immunosuppressant that occurs during gestation. Malaria infection during pregnancy can have adverse effects on both mother and foetus, including maternal anaemia, foetal loss, premature delivery, intrauterine growth retardation, and delivery of low birth-weight infants which is a risk factor for death. In children under five, the adverse effects include: convulsions, anaemia, coma and death. Preventing malaria is of prime importance in reducing the rates of morbidity and mortality in the country (Kimbi *et al*., 2014). The vulnerable segment of the population is worst affected due to above reasons [4]. Malaria is caused by plasmodium species. The bite from infected female anopheline mosquito is responsible for the most severe symptoms and death. Following its discovery over 4000 years ago, the world has been preoccupied with efforts aimed at preventing and eradicating malaria from various parts of the world. The World Health Organization (WHO) advocates a multipronged approach to its control; this involves vector control, preventive therapies, diagnostic testing, treatment with artemisinin-based combination therapies, and malarial surveillance. The practice of malaria preventive measures has been related to the level of knowledge and belief of people. However, incorrect beliefs or inappropriate behaviour can interfere with the effectiveness of these control measures. The current emphasis on malaria control is centered on community-based strategies. In order to prepare for a successful malaria control program, it is necessary to evaluate the level of awareness and practices of people living in an at-risk area. This will help to find ways to improve collaboration with the public health sector and also involve the full participation of the community in surveillance and control activities such as the use of ITNs/ long lasting insecticide treated bed nets. Capacity needs to be built in residents of such areas to empower them with adequate knowledge aimed at behaviour change and selection of appropriate control measures against malaria [3]. Vector control is the main way to prevent and reduce malaria transmission. If coverage of vector control interventions within a specific area is high enough, then a measure of protection will be conferred across the community. WHO recommends protection for all people at risk of malaria with effective malaria vector control? Two forms of vector control – insecticide-treated mosquito nets and indoor residual spraying – are effective in a wide range of circumstances [1]. Misconceptions about malaria transmission and its cause still exist. Knowledge about preventive measures does not necessarily get the desired result and that's why we don't see improvement in practices of the people. There is a need for targeted educational programs to increase the communities' efforts to develop desirable attitude and practices regarding malaria and their participation for malaria control. Families are the primary context where most health problems and illnesses occur and have a powerful influence on health. Most health belief and behavior are developed and maintained within the family. Community perceptions, beliefs, and attitudes about malaria causation, symptom identification, treatment of malaria, and prevention influence efforts to address malaria and are often overlooked in control efforts and it vary from community to community and among individual households. Considering these issues, it can be an important step towards developing strategies aimed at controlling the malaria. Understanding who already knows about malaria and malaria prevention, who has adopted malaria prevention and mosquito avoidance practices, and who is at risk of malaria infection is a necessary precursor to identifying and targeting vulnerable populations and ensuring successful implementation and sustainability of malaria control efforts [5]. Perception and belief about malaria in community people is a major factor that can influence malaria prevention and control. Malaria protective measures are related to knowledge and beliefs of people; when they think Malaria risk is low, it is more difficult to implement protective measures [6]. Capacity needs to be built in residents of such areas to empower them with adequate knowledge aimed at behaviour change and selection of appropriate

control measures against malaria [3]. Currently the burden of malaria is decreasing in the country with the government different prevention and control strategies. For the sustainability of the programs, capacity building must be done on the community perception and practice towards malaria prevention and control options. BRAC has launched a program by selecting their female Community Health Workers from their own community and involved them to reach the poor and people living in areas with limited access to treatment services as a supplement to the government's health care system. They provide home-based care of malaria diagnosis and treatment. They also provide malaria related information especially on malaria transmission, bed net usage, malaria symptoms and available treatment services at community level. Different sensitization meetings are conducted with opinion and religious leaders, local government and civil society representatives to increase awareness on malaria prevention and management [7]. The practice of malaria preventive measures has been related to the level of knowledge and belief of people. The understanding of the possible causes, modes of transmission and decision about adoption of preventive and control measures vary from community to community and among individual households. Therefore, this study was designed to assess the perception about preventive measures on malaria.

Methods

Study design and sample

The study was conducted to assess the perception about preventive measures of malaria among Tribal adults in higher endemic communities. This study was conducted per following methodology:

This cross-sectional study was conducted from 01st January, 2017 to 31st December, 2017. The study was conducted in ward no. 1, 2 and 3 in Sadar union, Sadar Upazila of Bandarban Hill District in the division of Chittagong. This place was rural area and varieties tribal people live here. For the current study the populations were Tribal adults both male and female. From the respondents the sample was taken by non-probability convenient sampling and sample size was 351. Face to face interview of the respondents was done for quantitative data.

The interview was conducted on participants by going from house to house. Attempt maintains privacy as far as possible. A semi structured questionnaire was developed initially in English for the collection of data from participants. The questionnaire was developed using the selected variables according to the specific objectives. The questionnaire contained questions that help to: 1) determine the socio-demographic characteristics of the respondents, 2) assess the perception on preventive measures of malaria by respondents. The questionnaire was translated into Bengali and interview schedule was pretested among few non-sampled respondents of matching characteristics and depending on the results of the pretest, it was revised and finalized.

Analysis

Collected data were analyzed after thorough checking, cleaning, editing and compiling by using the SPSS (Statistical package for social science, version 20 for windows) software and scientific calculator. Continuous variables were recorded into categorical variable by creating groups.

The data were presented in different Tables, charts. The data were presented in different tables in order to the variables. The test statistics was used to analyze the data is descriptive statistics and inferential statistic according to the demand of the study with 95% confidence interval. Level of significance was set at 0.05. Qualitative data were analyzed on the basis of themes.

Result

This cross-sectional study was carried out among Tribal adult people to assess their perception about preventive measures of malaria. Face to face interview was conducted for quantitative data. This section presents findings of those data with descriptive analyses and then inferential analyses were done to find out the association. Data are presented through tables and figures under following sections:

Socio-demographic status of respondents

The table below shows distribution of the respondents according to their age is seen that maximum 38.9% of the respondents were between 20–29 years, while 35.4% respondents were between 30–39 years, 21.2% respondents

were between 40–49 years and rest of them in between 50 and above years age group. Average age of the respondents was 35.0 years with standard deviation (SD) ± 8.9 years. Minimum age of the respondents was 21 and maximum age was 60 years. About majority 63.61% of the respondents were female and 36.39% respondents were male. Among female respondents 32.3% had under five children. About highest number of respondents 105 (33.2%) were no schooling. Respondents educated upto primary level were 76 (24.1%), secondary level were 79 (25.0%) and 56 (17.7%) were educated upto higher secondary and above. Among the respondents 91.8% of the respondents were married, single respondents were only 8.2%. Majority of respondents were housewives 163 (51.6%), while 65 (20.6%) were farmers, 49 (15.5%) were service holders and 11 (3.5%) were driver.

The percentage of businessmen and student were equal 14 (4.4%). Majority 165 (52.2%) of the respondents stated monthly income of their family as less than 10000 taka, 99 (31.3%) of the respondent's family income was in between 11000 – 20000 taka and 52 (16.5%) of the respondents stated their family income were above 21000 taka. Mean family income of the respondents was 14231.01 taka with SD of ±8893.7 taka. Maximum family income was 50000 taka and minimum monthly income was 4000 taka.

Majority of the respondents 180 (57.0%) had their monthly family expenditure of less than 10000 taka, 180 (57.0%) of the respondent's family expenditure were in between 11000 – 20000 taka and 52 (16.5%) of the respondent's family expenditure were above 21000 taka. Mean family expenditure of the respondents were 12018.99-taka SD of ±6409.4 taka. Maximum family expenditure was 40000 taka and minimum monthly expenditure was 3500 taka.

Most of the respondents (96.2%) were living nuclear family and only 12 (3.8%) of the respondent lived in extended family. Among the respondent's maximum (47.5%) were housewives, 31.0% were head of the family and remaining held different positions 21.5%. Majority 52.8%) of respondents were living in kacha house, 42.4% in tin shed house and rest of respondents lived in pucca house.

Table 1. Socio-demographic characteristics of the respondents n=316

Characteristics	Frequency	Percent %
Age (Years)		
20 – 29	123	38.9
30 – 39	112	35.4
40 – 49	67	21.2
50 and above	14	4.4
Mean= 35, SD = ± 8.9		
Gender		
Male	114	36
Female	202	64
Respondent's education level		
No schooling	105	33.2
Primary level	76	24.1
Secondary level	79	25.0
Higher secondary and above	56	17.7
Marital Status		
Married	291	92
Unmarried	25	8
Occupation of the respondents		
Housewives	163	51.6
Farmers	65	20.6
Service holders	49	15.5
Businessmen	14	4.4
Students	14	4.4
Driver	11	3.5
Monthly income (Taka)		
<10000	165	52.2
11000 - 20000	99	31.3
>21000	52	16.5
Monthly expenditure (Taka)		
<10000	180	57.0
11000 - 20000	116	36.7
>21000	20	6.3
Type of family		
Nuclear	304	96
Extended	12	4
Position in the family		
Head of the family	98	31.0
Housewife	150	47.5
Daughter-in-law	42	13.3
Others	26	8.2
Type of house		
Kacha	167	52.8
Tin shed	134	42.4
Pucca	15	4.7

Diseases most frequent in the area n= 316

More than half (57.6%) of the respondents said that common cold is more frequent disease in their area, 88 (27.8%) said viral fever, 35 (11.1%) said typhoid fever and 11 (3.4%) said others diseases.

Table 2. Distribution of respondents according to most frequent diseases in the area (n=316)

Most frequent diseases	Frequency	Percentage
Common cold	182	57.6
Viral fever	88	27.8
Typhoid fever	35	11.1
Diarrhoea	9	2.8
Pneumonia	2	0.6
Total	316	100.0

Distribution of respondents according to their perception about preventive measures of malaria n= 316

Knowledge about transmission of malaria, malaria symptoms, and who is usually affected for malaria

Among 316 respondents 100.0% heard about malaria. The table below shows that majority of the respondents 98.1% knew that mosquito bite is the common cause to transmit disease and 8.2% knew close contact with malaria infected person and 8.2% respondents knew that unhygienic environment is the cause to transmit malaria. Among the respondents 90.5% knew that fever is the common symptom for malaria, while 46.8% knew shivering, 32.0% knew headache, 25.9% knew weakness, 24.4% knew vomiting and 7.3% knew that convulsion are common symptom of malaria and 4.1% respondents did not know about malaria symptoms.

Perception about malaria preventive measures

All of the respondents think that malaria is a preventable disease. Among them majority 297 (94.0%) of the respondents knew about malaria preventive measures and 19 (6.0%) did not know.

Perception about use of preventive measures

Maximum of the respondents 93.0% used Long Lasting Insecticide Treated Nets (LLIN) as preventive measures, 60.1% practiced clean surroundings, 38.9% practiced close windows and doors, 31.6% practiced draining of stagnant water, 10.1% practiced mosquito coil and 0.6% respondents practiced personal protective measures as preventive measures to prevent malaria. Only 6.3% respondents did not practice preventive measures of malaria.

Table 3. Distribution of respondents according to their knowledge about transmission of malaria, malaria symptoms, and who is usually affected for malaria (n=316)

Knowledge about transmission of malaria*	Frequency	Percentage
Mosquito bite	310	98.1
Unhygienic environment	18	5.7
Close contact with malaria infected person	26	8.2
Symptoms of malaria*		
Fever	286	90.5
Headache	101	32.0
Vomiting	77	24.4
Weakness	82	25.9
Convulsion	23	7.3
Shivering	148	46.8
Don't know	13	4.1
Usually affected for malaria*		
Under 5 children	210	66.5
Pregnant women	96	30.4
Adult men	92	29.1
All adults	163	51.6
Elderly	90	28.5
Don't know	35	11.1

*Multiple responses

Table- 4. Distribution of respondents according to their perception about malaria preventive measures (n=316)

Perception about malaria preventive measures	Frequency	Percentage
Yes	297	94.0
No	19	6.0
Total	316	100.0

Table 5. Distribution of respondents according to their perception about uses of preventive measures to prevent malaria (n= 316)

Preventive measures*	Frequency	Percentage
Using LLIN	296	93.0
Clean surroundings	192	60.1
Draining of stagnant water	101	31.6
Using insecticide spray	2	0.6
Using mosquito coil	32	10.1
Close windows and doors	123	38.9
Using personal protective measures	23	38.9
Don't use	20	6.3

*Multiple responses

Knowledge about the time of mosquito (malaria) bites

More than half 178 (56.3%) of the respondents did not know about the time of mosquito bite and 138 (43.7%) respondents knew about the time of mosquito bite**.**

Table 6. Distribution of respondents according to their knowledge about the time of mosquito (malaria) bites (n=316)

Knowledge about the time of mosquito (malaria) bites	Frequency	Percentage
No	178	56.3
Yes	138	43.7
Total	316	100.0

Knowledge about the methods of washing and drying of LLIN

More than half 66.8% of the respondents knew about the washing of LLIN and 33.2% respondents did not know. Majority of the respondents 85.8% knew about drying of LLIN and 14.2% respondents did not know.

Table 7. Distribution of respondents according to knowledge about the methods of washing and drying of LLIN (n=316)

Knowledge about the washing of LLIN	Frequency	Percentage
Yes	211	66.8
No	105	33.2
Total	316	100.0
Knowledge about drying of LLIN		
Yes	271	85.8
No	45	14.2
Total	316	100.0

Malaria was diagnosed and days needed to start treatment after diagnosis of malaria

Among 65 respondents (67.7%) malaria was diagnosed by test of blood slide, (18.5%) by test of RDT and (13.8%) were diagnosed by identification of sign and symptoms. Maximum (93.8%) of the respondents started treatment within 1 day after diagnosis of malaria and (6.2%) respondents started treatment within 2 days.

Table 8. Distribution of respondents according to how was malaria diagnosed and days needed to start treatment after diagnosis of malaria (n=65)

Malaria was diagnosed by	Frequency	Percentage
By RDT	12	18.5
By test of blood slide	44	67.7
By identification of sign and symptoms	9	13.8
Days needed to start treatment after diagnosis of malaria		
Within 1 day	61	93.8
Within 2 days	4	6.2
Total	65	100.0

Association between all family members sleeps under LLIN and socio-demographic characteristics

Among the respondent's majority (92.0%) female respondents all family member sleep under LLIN compared to male respondents all family members. To see whether this difference is statistically significant or not, chi square test was done. The test revealed that it is statistically significant. Where χ^2 (1,316) = 8.627, p= <0.05. Among the respondents those mothers having under 5 children most of them (94.1%) were slept under LLIN than those who had not under 5 children.

To see whether this difference it is statistically significant or not chi-square test was done. The test revealed that it is statistically significant. Where χ^2 (1,316) = 5.372, P = <0.05. Among the respondents whose occupations were service holder majority (93.2%) of the respondents all family members sleep under LLIN than others occupations. To see whether this finding is statistically significant or not, chi-square test was done. The test revealed that it is statistically significant. Where χ^2 (3,316) =11.322, P = <0.05. Among the respondents who had family member upto 4 most of the respondents (90.7%) all family members sleep under LLIN than those respondent's family members 5 and above. To see whether this difference is statistically significant or not, chi-square test was done. The test revealed that it is statistically significant. Where χ^2 = (1, 8.245), p = <0.05.

Multivariate analysis to see the relationship between all family members at home slept under LLIN and socio-demographic characteristics

To analyze the prediction power of different variables (gender, mother having under five children, occupation, no. of family member) for all members at home sleep under LLIN, logistic regression test was done. The result found that the model was significant (p=0.000) and this model can predict the variation of all members at home sleep under LLIN from 7% to 14% and no. of family member is individually significant (p=0.003, OR=0.323, 95% CI for OR from 0.152 to 0.687) controlling the others variables in the model.

Association between use time of LLIN and socio-demographic characteristics

Majority (88.7%) of the male respondents were used LLIN after 9pm than female respondents. To see whether this difference is statistically significant or not, Fisher Exact test was done.

The test shows it is statistically significant. Where, p= <0.05. Among the respondents those age in between 20 - 29 years among them majority (85.4%) were used LLIN after 9pm than others age group. To see whether this difference is statistically significant or not, Fisher Exact test was done. The test revealed that it is statistically significant. Where, p=<0.05. Majority (91.9%) of the respondents were secondary and above level who used LLIN after 9pm than others educational level. To see whether this difference it is statistically significant or not Fisher Exact test was done. The test revealed that it is statistically significant. Where, P=<0.05. Among the respondents who were housewives majority of the respondents (73.8%) used LLIN after 9pm than others occupations. To see whether this difference is statistically significant or not, Fisher Exact test was done. The test revealed that it is statistically significant. Where, P = <0.05.

Association between day of starting treatment after diagnosis of malaria and socio-demographic characteristics

Among the respondents who started treatment within 1 day after diagnosis of malaria, most of the respondents 95.2% were in between 40 - 49 years of age. To see this difference whether it is statistically significant or not, Fisher Exact test was done.

The test revealed that it is statistically not significant. Where, p=>0.05. Among the respondents who started treatment within 1 day after diagnosis of malaria, most of the respondents 88.9% are housewives than other occupation. To see whether this finding is statistically significant or not, Fisher Exact test was done. The test revealed that it is statistically not significant. Where, p= >0.05. Among the respondents who started treatment within 1 day after diagnosis of malaria, all had monthly family income in between 11000 – 20000 taka.

To see whether this finding is statistically significant or not, Fisher Exact test was done. The test revealed that it is statistically not significant. Where, p= >0.05.

Table 9. Association between all family member sleep under LLIN and socio-demographic characteristics (n = 316)

Variable	Category	All family member sleep under LLIN			
		Yes	No	χ^2, df	P value
Gender	Male	93 (80.9%)	22 (19.1%)	8.627, 1	0.003*
	Female	185 (92.0%)	16 (8.0%)		
Mother with under5 children	Yes	96 (94.1%)	6 (5.9%)	5.372, 1	0.020*
	No	182 (85.0%)	32 (15.0%)		
Occupation	Housewife	150 (91.5%)	14 (8.5%)	11.322, 3	0.010*
	Farmer	51 (78.5%)	14 (21.5%)		
	Service holder	55 (93.2%)	4 (6.8%)		
	Others	22 (78.6%)	6 (21.4%)		
No of family member	Upto 4	225 (90.7%)	23 (9.3%)	8.245, 1	0.004*
	5 and above	53 (77.9%)	15 (22.1%)		

*Statistically significant at the 0.05 level.

Table 10. Multivariate analysis to see the relationship between all family members at home sleep under LLIN and socio-demographic characteristics

Variable	B	df	P value	OR	95% CI	
					Lower	Upper
Gender	1.041	1	0.155	2.832	0.676	11.873
Mother with under 5 children	-0.765	1	0.170	0.465	0.156	1.387
Number of family member	-1.129	1	0.003*	0.323	0.152	0.687

Table 11. Association between the use time of LLIN and socio-demographic characteristics

Variable	Category	Use time of LLIN				
		After 7pm	After 8pm	After 9 pm	Fisher Exact, df	P value
Gender	Male	0 (0.0%)	13 (11.3%)	102 (88.7%)	8.109, 1	0.008*
	Female	2 (1.0%)	47 (23.4%)	152 (75.6%)		
Age group	20 - 29	1 (0.8%)	17 (13.8%)	105 (85.4%)	14.188,3	0.012*
	30 - 39	0 (0.0%)	19 (17.0%)	93 (83.0%)		
	40 - 49	1 (1.5%)	17 (25.4%)	49 (73.1%)		
	50 and above	0 (0.0%)	7 (50.0%)	7 (50.0%)		
Educational level	Illiterate	0 (0.0%)	37 (35.6%)	67 (64.4%)	31.237,2	0.000*
	Primary	1 (1.3%)	13 (16.9%)	63 (81.8%)		
	Secondary and above	1 (0.7%)	10 (7.4%)	124 (91.9%)		
Occupation	Housewife	1 (0.6%)	42 (25.6%)	121 (73.8%)	23.676,3	0.000*
	Farmer	0 (0.0%)	15 (23.1%)	50 (76.9%)		
	Service holder	1 (1.7%)	2 (3.4%)	56 (94.9%)		
	Others	0 (0.0%)	1 (3.6%)	27 (96.4%)		

*Statistically significant at the 0.05 level.

Table 12. Association between day of starting treatment after diagnosis of malaria and socio-demographic characteristics

Variable	Category	Day of starting treatment after diagnosis of malaria			
		Within 1 day	More than 1 day	Fisher Exact, df	P value
Age group	20 - 29	18 (100.0%)	0 (0.0%)	3.476, 3	0.294
	30 - 39	19 (90.5%)	2 (9.5%)		
	40 - 49	20 (95.2%)	1 (4.8%)		
	50 and above	4 (80.0%)	1 (20.0%)		
Occupation	Housewife	24 (88.9%)	3 (11.1%)	1.819, 3	0.605
	Farmer	22 (95.7%)	1 (4.3%)		
	Service holder	12 (100.0%)	0 (0.0%)		
	Others	3 (100.0%)	0 (0.0%0		
Income group	<10000	31 (88.6%)	4 (11.4%)	2.423, 2	0.279
	11000 - 20000	19(100.0%)	0 (0.0%)		
	>21000	11(100.0%)	0 (0.0%)		

Discussion

This cross-sectional study was conducted to assess the perception about preventive measures of malaria among tribal adults in higher endemic community. The study was carried out among 316 respondents who lived in Bandarban Sadar Upazilla which is a highly malaria endemic and it is a Tribal community-based area in Bangladesh. According to sample size we collected the data regarding from that area. At the same time, we tried our level best to take each and every data with caution and maintaining the respondent's privacy.

This study found among the respondents the mean age was 35.0 years with standard deviation (SD) ± 8.9 years and age range was 21 – 60 years, majority of the respondents were in the age group of 20 – 29 years (Table 1). This study found that among the respondents those age in between 20- 29 years among them majority (85.4%) were used Long Lasting Insecticide Treated Net as a preventive measure of malaria which is statistically significant (p=<0.05). This result is consistent with the result of Kimbi et al. (2014). Majority respondents were female (63.61%). Among the female respondents (92.0%) all family member slept under Long Lasting Insecticide Treated Net than male respondents all family members and those who have an under 5 children most of them (94.1%) were slept under Long Lasting Insecticide Treated Net than those who have not under 5 children both (p= <0.05). This finding is consistent with the result of Mbonye et al. (2016) [8]. Male respondents were used Long Lasting Insecticide Treated Net after 9 pm than female respondents (p= <0.05). This is due to their occupation. Because males are more involved in outdoor activities and most of the respondents were housewives in this study.

One third of the respondent's level of education were no schooling and (17.7 %.) respondents' educational qualification were higher secondary and above level (Table 1). Majority (91.9%) of the respondents were secondary and above who used Long Lasting Insecticide Treated Net after 9pm than others educational level (P=<0.05). Majority (96.1%) were primary level who did not use personal protective measures than others educational level. A study data showed that it is a statistically significant association between educational level and use of bed nets (p<0.05). This association due to a number of factors such as a greater awareness about malaria as well as increasing access to preventive measures such as bet nets which have been provided at government health facilities [9]. Respondents were involved in different occupations, among them majority (51.6%) were housewives, (20.6%) were farmer and rest of them other occupation (Table 1). Among the respondents those occupation was service holder majority (93.2%) of the respondents all family member sleep under Long Lasting Insecticide Treated Net (P = <0.05). But it is statistically not significant in multivariate analysis. Another study showed that the largest proportion (30%) of respondents were daily wage workers, followed by housewives (22%) and business

person (19%). They found that occupation was significantly associated with prevention practices [10].

Mean family income of the respondents were 14231.01 taka with standard deviation (SD) of ±8893.7 taka and Mean family expenditure of the respondents were 12018.99 taka with standard deviation (SD) of ±6409.4 taka (Table 1). There is no association between monthly family income and seeking early treatment of malaria. It is due to BRAC has selected female Community Health Workers from their own community and involved them to reach the poor and people living in areas with limited access to treatment services supplementing the government's health care system. They provide home-based care of malaria diagnosis and treatment. Most of the respondents (96.2%) were lived in the nuclear family, where (78.5%) respondents had the family member upto 4 and (21.5%) respondents had family member 5 and above (Table 1). Among the respondents those who had family member upto 4 among them most of the respondents (90.7%) all family members sleep under Long Lasting Insecticide Treated Net than those respondent's family members 5 and above (p=<0.05). Among the respondent's majority (31.3%) lived in mud house. Most of the respondents 287(90.8%) had electricity supply in their home. More than half (57.6%) of the respondent's response that common cold is more incest disease in their area.

Participants in this study demonstrated considerable knowledge about malaria and preventive measures of malaria. All respondents (100%) heard about malaria and (98.1%) response of them correctly identified the mode of transmission as being from the bite of mosquito (Table 3). This knowledge is not surprising as Bandarban Sadar upazila falls within a region of malaria endemicity. This result is similar to the study result of Kimbi et al. (2014) [3]. Furthermore, most of the respondents knew that the common symptoms of malaria (Table 3). Fever was known as common malarial symptoms among respondents, which is similar to several studies carried out in different setting [3, 6]. Another study found that headache was the most recognized symptoms [9]. Malaria affects all age groups and if untreated it has adverse effects. About (66.5%) of the respondents knew that under 5 children were usually affected for malaria, all adults (51.6%) and (30.4%) of the respondents in this study knew that pregnant women were at risk of malaria (Table 3). There is a similarity in a study of Wright et al. (2014) [9]. Almost all (98.7%) of the respondents reported that malaria is a preventable disease and majority (94.0%) of the respondents knows about malaria preventive measures. The most common preventive practices among the study participants includes the use of Long-Lasting Insecticide Treated Net (93.0%), cleaning the surrounding (60.1%), close doors and windows (38.9%), draining of stagnant water (31.6%) and rest of others measures (Table 5). A study which sought to investigate the knowledge and use to preventive measures of malaria in rural parts of Northern Thailand showed that those with a greater knowledge about malaria were more likely to use a preventive measures with (90%) of them wearing protective clothing and (80%) of them using nontreated bed nets and (45%) of them using insecticide treated bed nets. Another study found that, the most common prevention practice used was removal of stagnant water in or near the house. This study showed that knowledge is not the only factors influencing prevention practice. Although more than four-fifth of respondents believed that bed net is effective in preventing malaria [10]. Among the respondents those who have Long Lasting Insecticide Treated Net among them (88.0%) respondents all family member slept under Long Lasting Insecticide Treated Net. The reasons for not using LLIN due to feeling very hot (7.0%), using non-insecticide treated net (3.2%) and feeling of breathlessness (1.95%). More than half (56.3%) of the respondents don't know about mosquito biting time. It is that more than one third of the respondents uses of LLIN after 10 pm, while it is advised that LLIN using time was after sunset. Only (67.7%) got advice about how to use of LLIN by the distributor. Among them (33.2%) and (14.2%) of the respondents don't know how to wash and dry of LLIN respectively. Among the respondents (13.9%) malaria was diagnosed by test of blood slide, (3.8%) by test of RDT and (2.8%) diagnosed by identification of sign and symptoms (Table 8).

Analysis of the data showed a statistically significant association between perception of preventive measures and socio-demographic variables. Which is showed that statistically

significant between gender, mother having under 5 children, occupation, no. of family member and all family member at home use of long-lasting insecticide treated nets (p=<0.05). Further multivariate analysis was done to see the relationship between all family members at home slept under LLIN and socio-demographic characteristics (Table 10). Where it is found that the model was significant (p=0.000) and this model can predict the variation of all members at home sleep under LLIN from 7% to 14% and no. of family member is individually significant (p=0.003, OR=0.323, 95% CI 0.152 to 0.687) controlling the others variables. Most of the respondents (91.9%) were secondary and above who use Long Lasting Insecticide Treated Net after 9 pm than others educational level. Hanafi et al. (2014) [11] also found a significant correlation between the educational level and participating in malaria control programs.

In the current study, it is showed that there is no association between days needed for starts treatment after diagnosis of malaria with age groups, occupation and income groups (p>0.05). Study shows that, among the respondents those who knows the preventive measures among them majority of the respondents (81.8%) used long lasting insecticide treated net after 9 pm. The association between using time of long-lasting insecticide treated net and know about the preventive measures is statistically significant (p<0.05). But there is no association between know about the preventive measures and days of started treatment, days needed for diagnosis and uses of personal protective measures (p>0.05). From the above discussion it was seen that majority of the respondents had expected knowledge regarding preventive measures rather than attitudes towards utilization on preventive measures

Conclusion

Malaria remains a public health problem in Bangladesh. Preventing malaria is of prime importance in reducing the rates of morbidity and mortality. This study assessed the perception about preventive measures of malaria among Tribal adults in higher endemic community. The study revealed most of the respondents know about malaria and its modes of transmission and some common symptoms. Among the respondents there are also a knowledge gaps about high risk people that need to be filled up. Study participants also have widespread misperceptions that need to be corrected. Most of the respondents have a considerable knowledge regarding malaria preventive measures and most of them used Long Lasting Insecticide Treated Net as a commonest preventive measure but their attitude towards utilization of preventive measures was not compatible with the required practiced provided guidelines. The study showed a statistically significant association between perception and utilization of preventive measures. The entire respondents responded that there is no applying of indoor residual spraying in their area. Majority of the respondents were malpractice regarding utilization on preventive measures.

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