

A STUDY ON DIARRHEAL PREVALENCE AMONG THE BODOCHILDREN OF 6 MONTHS TO 5 YEARS OF AGE AND THEIR WASH PRACTICES AT HOUSEHOLD LEVEL IN RURAL KOKRAJHAR DISTRICTVonita Das¹, Dr. Shivendra Choudhary*², Sachin Sinha³, Alakananda Bagchi⁴ and Vishal Vuthoo⁵¹Head, Public Health Division, Narain Sewa Sansthan, Assam State Branch.²Associate Professor, Department of Dentistry, Patna Medical College & Hospital, Patna.³Associate Professor, Dept. of Oral Pathology, Daswani Dental College & Research Center, Kota.⁴Associate Professor, Dept. of Maternal and Child Health, School of Public Health, SRM University, Kattankulathur.⁵Vishal Vuthoo 2nd Year PG, Dept. of Oral Medicine & Radiology, DDDCRC, Kota (Rajasthan).***Corresponding Author: Dr. Shivendra Choudhary**

Associate Professor, Department of Dentistry, Patna Medical College & Hospital, Patna.

Article Received on 27/12/2018

Article Revised on 17/01/2019

Article Accepted on 07/02/2019

ABSTRACT

Background: Water related diseases are taking a terrible toll in human health status in past few years. The most significant of these diseases among children under 5 years are the diarrheal diseases. Safe water, improved sanitation and hygiene are the key components for the prevention of diarrheal incidences which are not only feasible and practicable, but also cost effective. The objective of the study is to determine the prevalence of diarrhea among the Bodo children between 6 months to 5 years of age in rural Kokrajhar District of Assam and to assess the practices regarding water, sanitation and hygiene among that population. **Materials and Methods:** A total of 220 rural households were included in the study. A descriptive cross sectional approach was adopted, including collection of information from the mothers through a pre-tested semi structured questionnaire. Based on the objective, data analysis is done by simple statistical tools using SPSS version 22.0. **Results:** Prevalence of diarrhoea in that region with sample size of 220 is calculated as 3.6 percent. 58.2 percent of the population is using tube-well as a source of drinking water. 24.5 percent are engaged in open defecation and 41.8 percent are using flush toilet. 92.7 percent of the population are following good hygiene practices. **Conclusion:** Significant association between diarrhoea among children under 5 years of age and source of drinking water, safe storage of water and hand-washing practices.

KEYWORDS: Prevalence, Diarrhoea, Wash, Bodo.**INTRODUCTION**

Assam represents highly flood-prone region characterized by severe hazards of floods. It is an old age phenomenon with such a climatic scenario every year and no doubt it has increased significantly during the last few years. Recently, more than 3 lakh people have been affected in flood hit in the state. Brahmaputra is flowing above the danger mark. More than 40 percent of its land surface is susceptible to flood damage and the total flood-prone area in the Brahmaputra valley is about 3.2 MHA. (Source: ASDMA: Assam State Disaster Management Authority) Almost 1,157 cases of water borne diseases per 1 lakh population per year are detected. Globally, water and sanitation hygiene practices are responsible for 90 percent of diarrhea-related mortality i.e., almost 2,195 children every day, which is much higher than combined mortality from malaria, measles and HIV/AIDS. Diarrheal diseases account for 1 in 9 children deaths worldwide (700,000 deaths in the year 2011), making Diarrhea the second

leading cause of death among children under the age of 5. Despite these sobering statistics, strides made over the last 20 years have shown that in addition to rotavirus vaccination and breastfeeding, safe water, improved hygiene and sanitation are the necessary and cost effective preventive measures (Source: Global disease burden, Centre of Disease Control and Prevention).

Cases and Deaths due to Acute Diarrheal Diseases reported during the years 2011 – 2013 in Assam were 105,876 and 147 respectively (Source: 'National Health Profile' published by Central Bureau of Health Investigation, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India). According to ASSAM DLHS 3, 57.6 percent of children between 0 – 5 years of age were diagnosed with diarrhea who seek for ORS therapy and treatment. And according to NFHS 4 Assam, the percentage of children with diarrhoea in last 2 weeks is 2.9(rural).

A study in slum of Dibrugarh, Assam has been done by Borah *et al* in 2014 with sample size of 416. They found that the prevalence of diarrhea among the sample subjects was 26.2 percent and is more in people practicing drinking water from river by 90 percent, followed by kutchha well (60%) and then in illiterate mothers (Ind. J. Sci. Res. and Tech). Similar study has been also done in Delhi in the year 2015 by Sudipta Basa, Urban Health Division, MOHFW, New Delhi with the sample size of 695. He found that the prevalence of Diarrhea under five years females was 18.4%, highest compared to 12.2% in males. And he concluded that awareness regarding safe drinking water, excreta disposal and personal hygiene needs to be improved among slum dwellers. Improvement of poor literacy status of mothers is an urgent need to improve their health seeking behavior and thus the health of their children. In 2010, a systemic analysis was done by Sandy Cairn *et al* and his group on water, sanitation and hygiene for the prevention of Diarrhea (International Journal of Epidemiology). They found the effect of hand washing with soap is consistent across various study designs and pathogens, though it depends on access to water. They proposed diarrhea risk reductions of 48, 17 and 36 percent, associated respectively, with hand washing with soap, improved water quality and excreta disposal. A study by Diouf *et al* has been done in Burundi to determine the prevalence of and the factors associated with diarrhea in children less than 5 years of age (Global Health Action 2014, Vol – 7). The sample size of 903 children were enrolled and they found the diarrhea prevalence to be 32.6 percent.

The core intent of this study is to investigate the diarrheal prevalence (children between 6 months to 5 years) and WATSAN practices of rural Kokrajhar (among Bodo tribes) district population. Bodo tribes are the major ethnic group dwelling over BTAD (Bodoland Territorial Area District). They are the less explored ethnic group of Assam. The civil war between 1987 and 2002 left the territory health care and economy deeply shattered. After the Sawcha Bharat Abhiyan Programme, a significant change in lifestyle and awareness has been seen in that area, but yet the facts are unknown. And so far no study has been done in these areas.

MATERIALS AND METHODS

The study was conducted in rural area of Kokrajhar District, BTAD (Bodoland Territorial Area District), Assam. The BTAD consists of four contiguous districts - Kokrajhar, Baksa, Udalguri and Chirang – carved out of seven existing districts in Kokrajhar, Bongaigaon, Barpeta, Nalbari, Kamrup, Darrang and Sonitpur - an area of 27,100 km² i.e. almost 35% of Assam. Kokrajhar district is selected as the study area on the basis of the number of tribal rural blocks. It has an area of 3,169.20 km² with total population of 887,142, according to 2011 census. The total tribal household of the district is 181,081 and out of which rural household is 169,356. The district comprises of total 11 CD blocks, out of

which by using PPS (Probability proportional to sample size) 4 CD blocks are selected – Kokrajhar: 2 villages, Pachim Batabari (26 households) and Batabari (18 households); Dotma: 2 villages, Padmabeel (33 households) and Thuribari (22 households); Kochugaon: 2 villages, Singibeel (29 households) and Belguri (22 households); Gossaigaon: 2 villages, Aflagaon (28 households) and Dakhin Afla (44 households). With prevalence of 49.8 percent of diarrhea and margin of error 7 percent and confidence interval of 95 percent, the sample size is calculated as 196. Considering non response rate by 10 percent, the final sample size is 220. The study design is Cross sectional and descriptive. The study population comprised of mothers of 6 months to 5 years of children residing in the study area. The list of eligible mothers was obtained from the Anganwadi register Records, i.e. No. of households (of children under 6 months to 5 years of age) per village. A semi structured questionnaire was developed and pre-tested with 10 non-responding mothers. The questionnaire has been translated into 2 different languages: Assamese and Bodo. The questionnaire was adapted from WHO's and UNICEF's "Core questions on drinking-water and sanitation for household surveys". The questionnaire consists of 4 sections with information related to socio-demographic status, water storage, treatment and sources, waste management, hand washing practices and toilet facilities, frequency of diarrhea in 2 weeks of recall time. Approval for carrying out the survey was obtained from District Health office as well as Department of Public Health Engineering, Kokrajhar District. Verbal consent was obtained from each respondent before administration of the questionnaire. The study protocol was approved by the Institutional Review Board of School of Public Health, SRM University.

Along with the questionnaire, 192 drinking water sample is taken from 192 households out of 220 households to check the water quality. As there was no common source of water in those villages, households are having their own tube-well or open well facilitated by the government as the source of drinking water. A few households who were not having the water source, they share with their neighbors. The water samples are collected in sterile bacteriological veils and sent to district laboratory.

RESULTS

Table 1 shows that the majority of the mothers are of age group 26 to 30 years and more than half of the study population have the education up to 10th standard. It shows that the primary level education is well accepted by the population. Most of the study population preferred to stay as nuclear family with the percentage of 73.6, and 57.3 percent of the population has up to 50,000 rupees of family income. The age group of more than 2 years of children is 68.1 percent and the sex of the child is equally distributed.

Out of 220 Children, only 8 of them were experiencing diarrhoea in 2 weeks of recall time. Prevalence of

diarrhoea in that region with the sample size is calculated as 3.6 percent. Recent Assam NFHS 4 data on prevalence of diarrhoea (reported) in last two weeks prior to the survey in rural area is 2.9 percent, which almost coincides. The probable reason of such a low rate of diarrhoeal prevalence in that area might be because of the good WASH practices among the population. When we go through the statistics we found (*Bar Diagram 1*) that 57.2 percent of the population is having tube-well as source of domestic water, 40 percent are using open well and 2.3 percent of the population is sharing the water source with their neighbours. Similarly we found that the source of drinking water (*Bar Diagram 2*) is tube-well (58.2%) and open well (37.3%).

When we look through the WASH practices adapted by the population, it is quite surprising but true that 58.2 percent of the population use tube-well a source of drinking water as well as for domestic use followed by open well, tap water etc.

Mostly in tribal areas, the awareness of safe storage of drinking water is quite less but on the contrary, in this study, we found that 94.5 percent of the population is using bucket or jug for their storage of drinking water. Earthen pots are also used by the villagers (4.10%). They are using a unique kind of filter storage which has been provided by the government or some local NGOs in those areas.

As per the investigation, the Public Health Civil Engineering Department, Kokrajhar is trying to cover most of these areas with flush toilet facilities. During the field study it has been observed that 24.5 percent of the population is engaged in open defecation. Nevertheless, it cannot be denied that the other half of the population which is more than 50 percent of the study population is using flush toilet (41.8%), open pit (32.7%) and pit latrine (1%). It is remarkable that 69.1 percent of the population is not taking any effort for water treatment, yet it has been observed that use of alum or stand and settle process (12.3%), boiling (10.5%) and use of water filter, filter with clothes, use of chlorine or bleaching powder (2.7% respectively) are prevalent among the Bodo Tribes.

Tribal areas are always well known for their caring-sharing behaviour. Bodo Tribes are none different than others. It has been observed that 22.3 percent of the people (n=220) are sharing toilets and as well as drinking water sources in their daily life. 99 percent of the population are using backyard for solid wastes and excreta management, and has no proper drainage system.

If we look upon the hygiene practices, 92.7 percent of the study population practice hand washing very often, use of soap is seen among 90.1 percent people, 7.6 percent use ashes and 2.3 percent are using just water. The mother of the child have been enquired about the food hygiene behaviours, like washing hands before feeding the child, before having the food, washing vegetables before preparation etc. 99 percent of the household responded positively.

Out of 192 households, only in 2 households, the water sample is found bacteria positive from the village Padmabille (n=22). In the descriptive analysis, it was very clear that 90.9 percent of the households from village Padmabille are not treating their drinking water, 36.4 percent are practicing open defecation and 27.3 percent is using open pits. 72.7 percent households are having handwashing practices, 25 percent is using ashes and 2.3 percent are using just water.

Socio-economic factors are always significantly associated with the occurrence of diarrhoea. Most of the variables suggest behaviourally mediated modes of transmission. These findings also highlights the potential impact of educational, economical shift intervention on the occurrence of diarrhoea among the children. Totally there are 8 cases of diarrhoea found in the study (3.6% prevalence; n=220). None of the children whose mothers are having education up to graduation level have sights of diarrheal episodes. 58 percent of the households havetheir family income up to 50,000 rupees per annum. Again the children of households where family income is up to 80,000 rupees per annum, have no signs of diarrheal episode.

Table 1: Characteristics of the study population.

Characteristics	Category	Frequency	Percentage
Age Group of Mother	20-25 years	90	40.9
	26-30 years	84	38.2
	31-35 years	34	15.5
	36-45 years	12	5.5
Education Of the Mother	No education	40	18.2
	Up to 10 th standard	126	57.3
	Up to 12 th standard	44	20
	Up to Graduation	10	4.5
Family Income of the household (per annum)	Up to 40,000	43	19.6
	Up to 50,000	126	57.3
	Up to 60,000	38	17.3

	Up to 80,000	13	5.9
Type of Household	Joint	58	26.4
	Nuclear	162	73.6
Age Group of the Child (between 6 months to 60 months i.e 5 years)	6-12 months	36	16.4
	13-24 months	34	15.5
	25-36 months	50	22.7
	37-48 months	46	20.9
	49-60 months	54	24.5
Sex of the Child	Male	110	50
	Female	110	50

Table 2: Number of Household distributed in 8 Villages from 4 CD blocks.

CD blocks	Name of villages	No. of Households (Frequency)	Percentage
Kokrajhar	PachimBatabari	26	11.8
	Batabari	18	8.2
Dotma	Padmabeel	33	15
	Thuribari	22	10
Kochugaon	Singibeel	29	9.1
	Belguri	20	20
Gossaigaon	Aflagaon	28	13.2
	DakhinAfla	44	12.7
	Total	220	

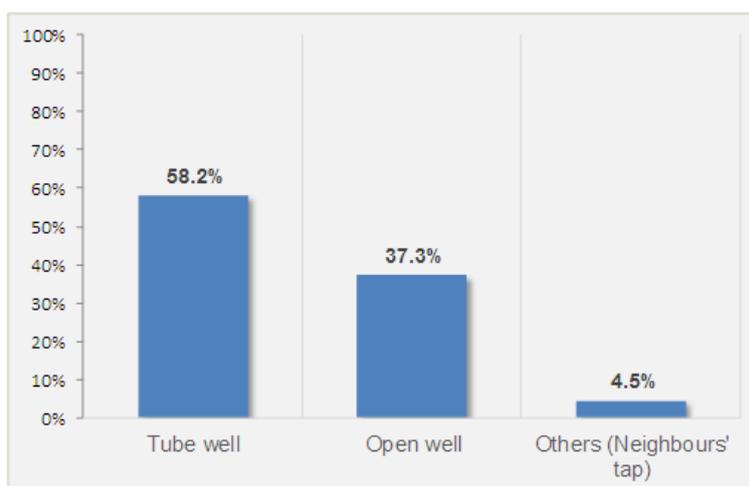


Figure 1: Source of Drinking Water.

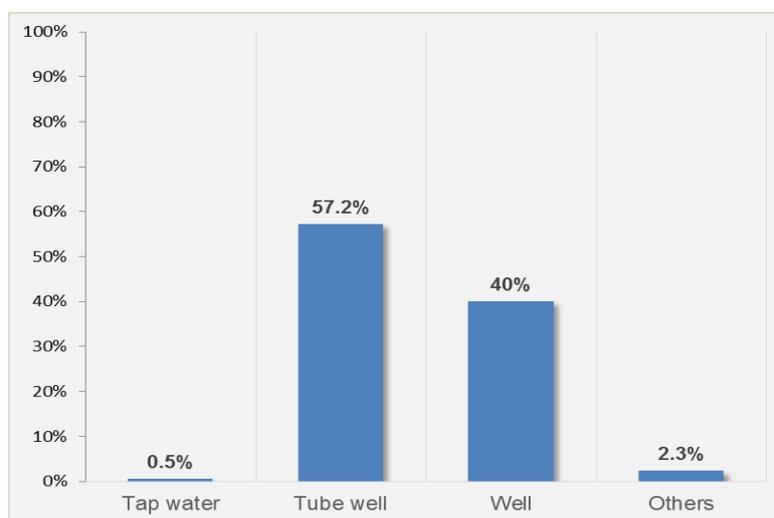


Figure 2: Source of Domestic use.

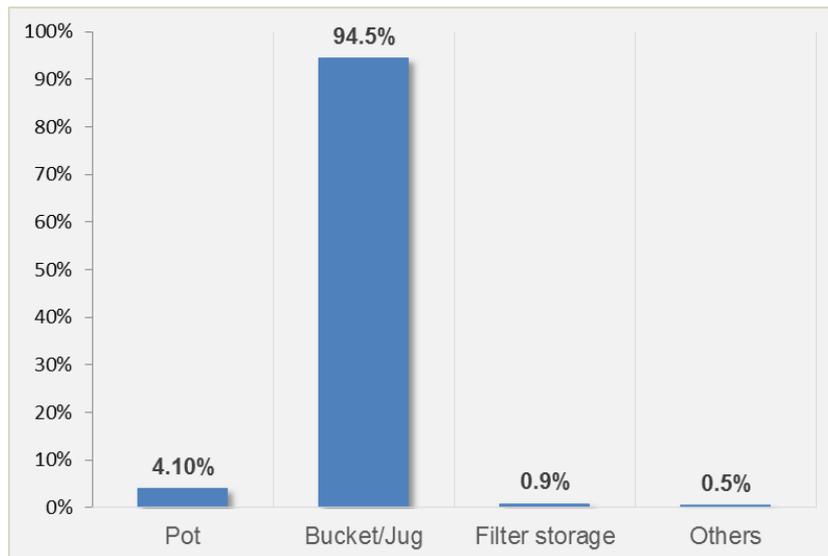


Figure 3: Drinking water storage.

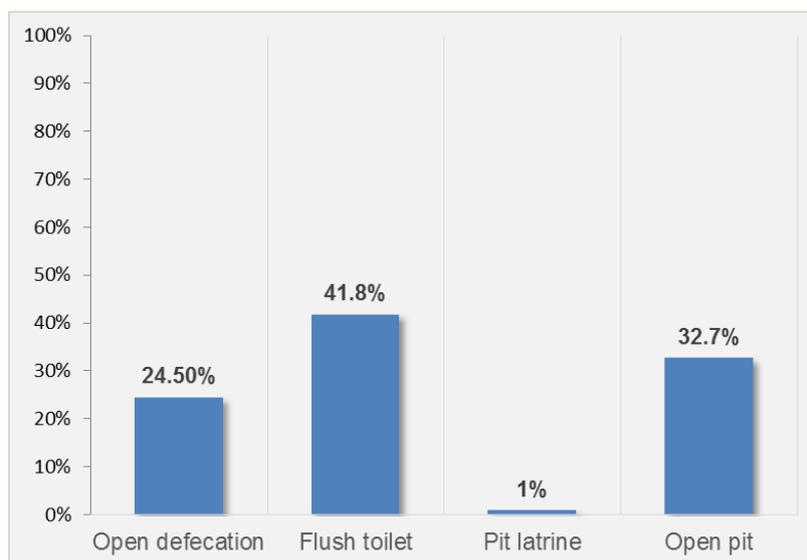


Figure 4: Toilet facility.

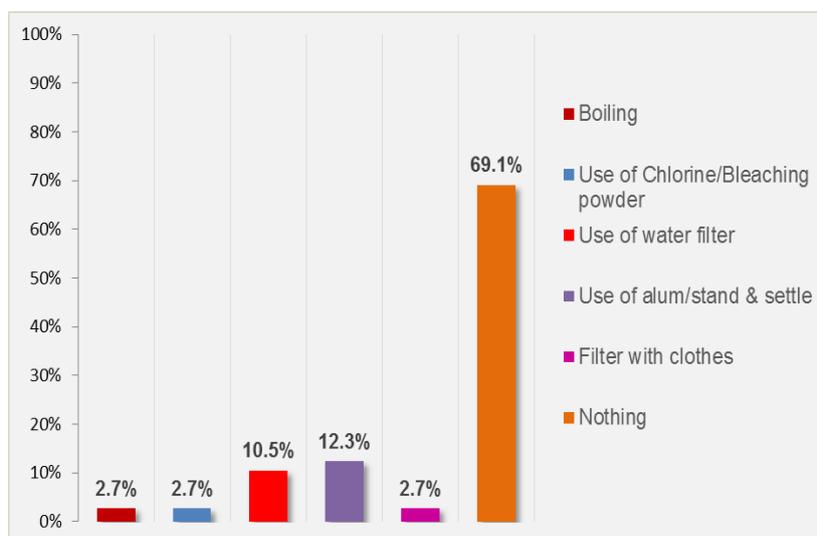


Figure 5: Water treatment.

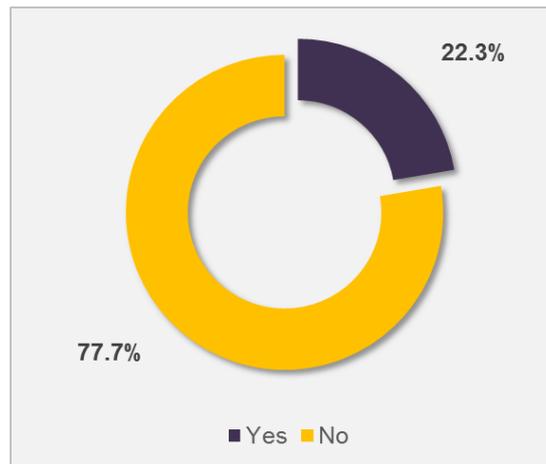


Figure 6: H/H Sharing.

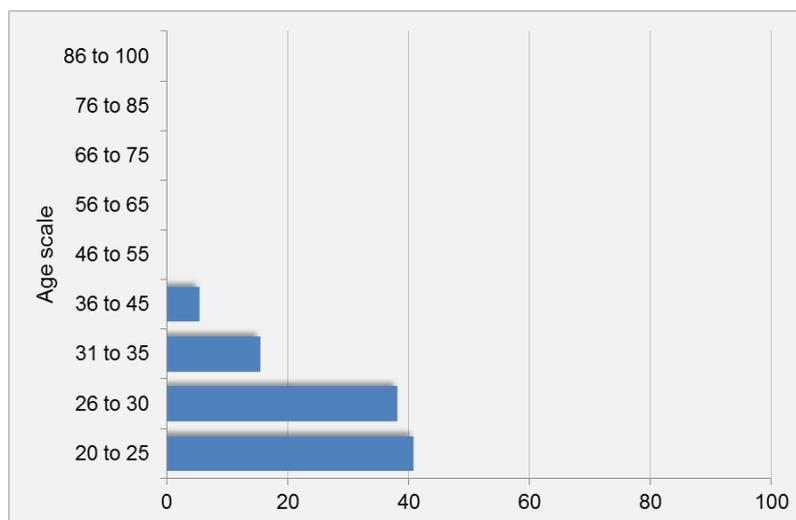


Figure 7: Age of Mother.

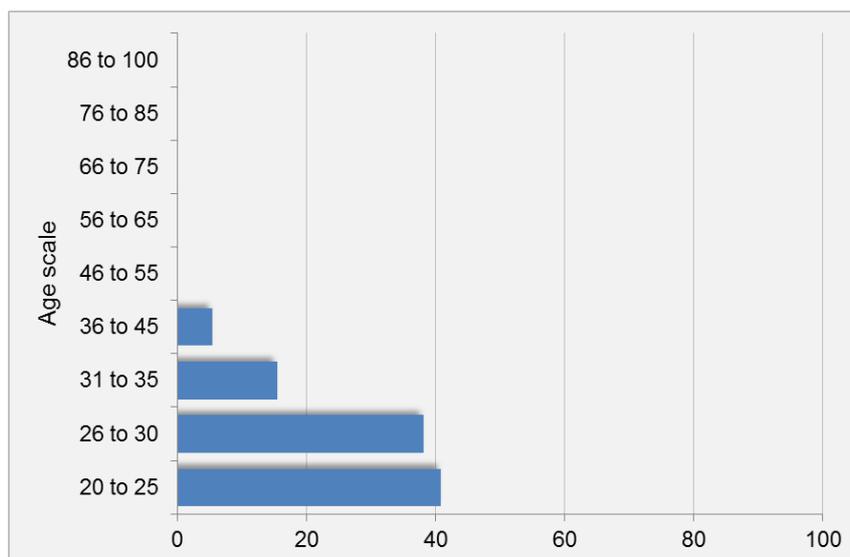


Figure 8: Education of the mother.

Table 3:

	Upto 10 th Standard	Upto 12 th Standard	Upto Graduation	No Education	Total
Frequency of diarrhoea (once)	5	1	0	2	8
Not at all	121	43	10	38	212
Total	126	44	10	40	220

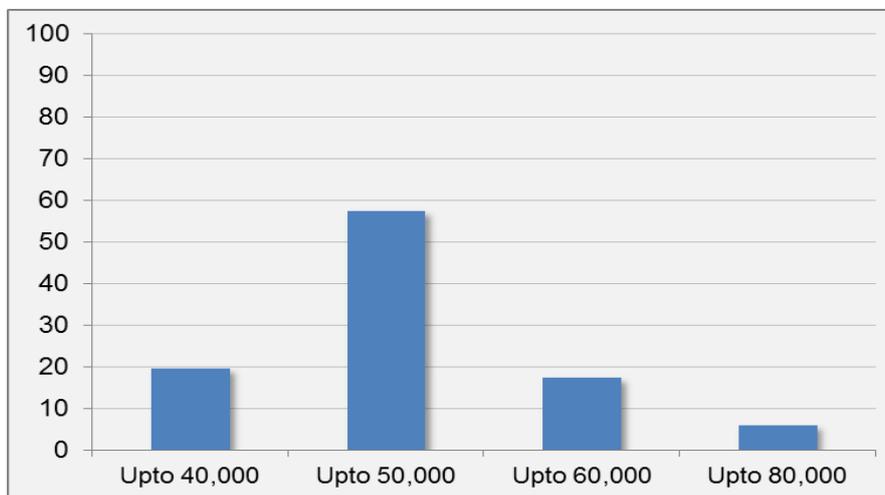


Figure 9: Family income (per annum).

Table 4:

	Upto 40,000	Upto 50,000	Upto 60,000	Upto 80,000	Total
Frequency of diarrhoea (once)	3	4	1	0	8
Not at all	40	122	37	13	212
Total	43	126	38	13	220

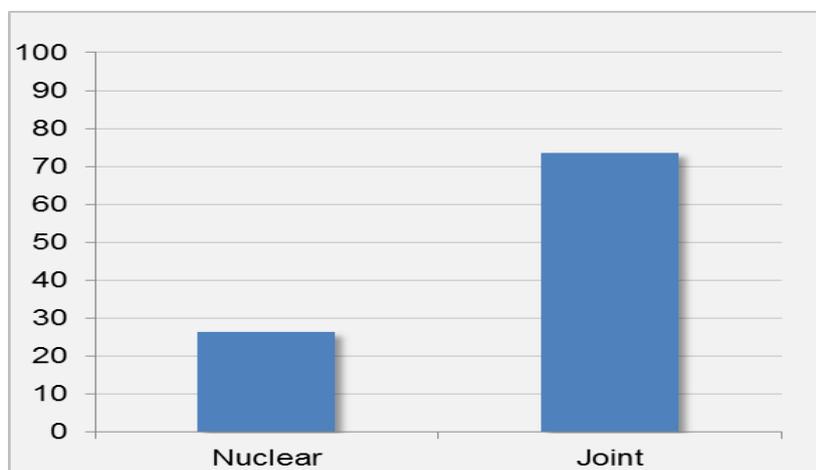


Figure 10: Type of Household.

Table 5:

	Nuclear	Joint	Total
Frequency of diarrhoea (once)	4	4	8
Not at all	54	158	212
Total	58	162	220

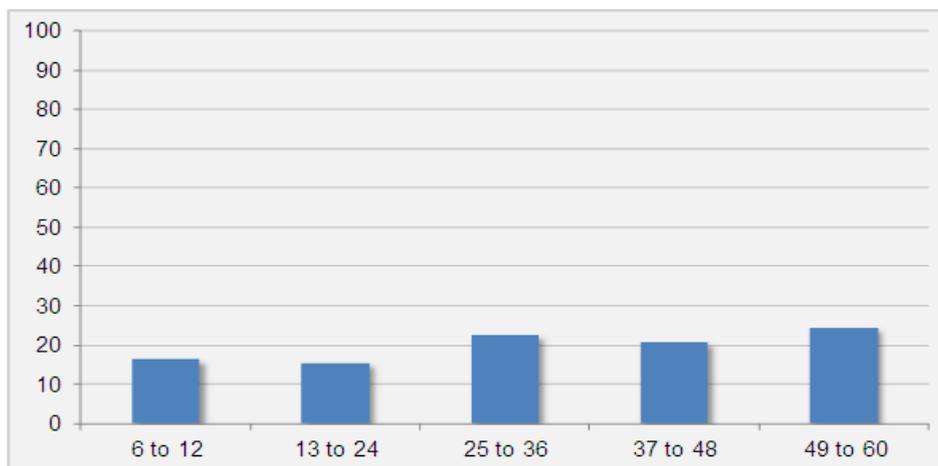


Figure 11: Age of the child (in months).

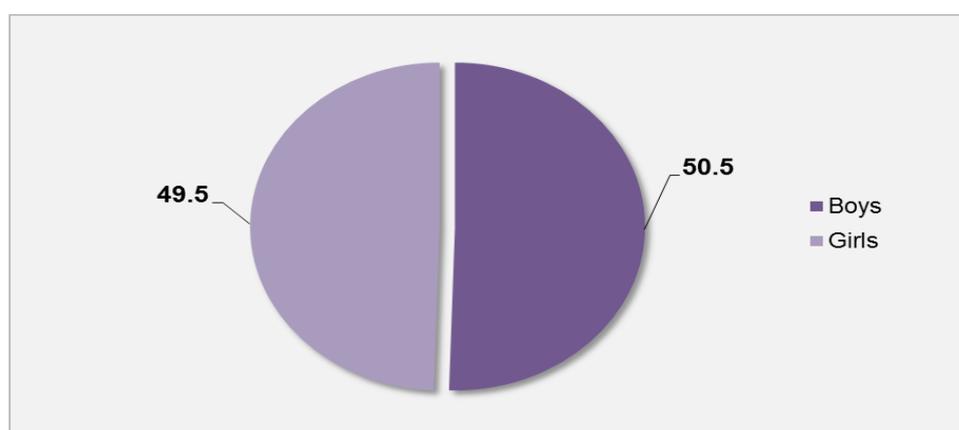


Figure 12: Sex of the Child.

DISCUSSION

The findings of this study documents the prevalence of diarrhoea among the Bodo children of 6 months to 5 years of age and their WASH practices at household level in rural Kokrajhar district. However, the interpretation of the findings might be limited by recall bias and under reporting.

The prevalence of diarrhoea of last two weeks was 3.6 percent in our study which is lower than what was reported as 26.2 percent by Borah et al in Prevalence of diarrhoea among and health seeking behaviour of their mothers in slums of Dibrugarh town of Assam 2014. Recent NFHS 4 (Assam) reported the prevalence of diarrhoea in last two weeks perceiving survey (rural) is 2.9 percent which indicates almost similar with our study finding. The difference in prevalence with that of the Borah et al might be due to the difference in nature of the population, geographic and seasonal variation and socio-economic condition of the selected community.

Our study demonstrated a higher frequency (8 cases) of diarrheal episodes among the children of mothers with education up to 12th standard. However, the prevalence of diarrhoea among the children of illiterate mothers is 5 percent (Out of 8 cases of diarrhoea, 2 mothers are

illiterates) compared to the study of Borah et al prevalence of diarrhoea among the children of illiterate mothers is 68.6 percent (out of 109 cases of diarrheal, 75 percent of mothers are illiterate).

While talking about source of drinking water, Bodo tribes are using tube-well and open well (Ring well), 58.2 percent and 37.3 percent respectively. Whereas, the use of Tube well, Katcha well and river is 80 percent, 12 percent and 7.2percent respectively in the study of Borah et al. Comparing the report of prevalence of diarrheal (2015) in urban slum of Delhi by SudiptaBasa, Consultant, Urban Health Division, MOHFW, New Delhi is 49.8 percent.

All these findings in our study could be linked with other factors as well including, good food and personal hygiene of the mother, proper hand washing practices, better storage of drinking water, etc. The Cultural beliefs of these tribal areas are also different from the other part of the country. Bodo tribes are accustomed with the use of herbal teas and herbal medication, whose effects and ingredients are still unknown.

CONCLUSION

It is clearly proved that there is a significant association between under five diarrhoea and point of use of water treatment and safe storage. There are also locally available treatment methods some of which are effective and others not. Bodo tribes are setting a good example of the WASH practices. We can use this opportunity to promote water treatment and storage practices which are effective and still can benefit from the gain of preventing diarrhoea among our children under the age of five years. Most of the rural areas are deprived of proper sanitation and safe drinking water, in spite of these outlines, there are few areas which are yet to be explored are performing profoundly, and Bodo tribes are one of them. Mobilization of the population along the similar minded people is the need of this hour. Government is involved in positive attempts for providing toilet as well as the source of drinking water (Tube-well, Ring-well, etc.). The above activities along with IEC for safe drinking water, excreta disposal and personal hygiene needs to be done regularly and continuously so that morbidity and mortality due to diarrhoeal disease are effectively prevented in slums.

ACKNOWLEDGEMENTS

The satisfaction and euphoria that accompanied the successful completion of this study would be incomplete without mentioning the people whose constant guidance and encouragement made it possible.

First and the foremost, I would like to convey my earnest and most sincere gratitude to my co-authors Dr. Sachin Sinha and Dr. Alakananda Bagchi. Both of them have been the constant support behind this work with their valuable suggestions and feedback.

I would also like to thank Dr. Bhagwandas for being there to help with the technical details and generating the motivation to go forward with the work.

Department of Public Health Engineering, Kokrajhar District – all the senior Site Development Officers and Site Assistants, Angandwadi workers and my respondents. My study would not have been successful without their cooperation and help.

Declarations

Funding: Narain Sewa Sansthan.

No conflict of interests

Ethical approval: Not applicable.

REFERENCES

1. Hiyeswar Borah, Gourangie Gogoi and Hiranya Saikia. Prevalence of Diarrhoea Among Under-Five Children and Health Seeking Behaviour of Their Mothers in Slums of Dibrugarh Town, Assam. *Ind. J. Sci. Res. and Tech.*, 2014; 2(1): 16-19/Borah et al.

2. Sudipta Basa: *Asian Journal of Biomedical and Pharmaceutical Sciences*, 2015; 5(45): 08-11.
3. District Census Handbook Kokrajhar, Assam. Census India, 2011.
4. Saul S. Morris, 1 Simon N. Cousens, 1 Betty R. Kirkwood, 1 Paul Arthur, 1² and David A. Ross. Is Prevalence of Diarrhea a Better Predictor of Subsequent Mortality and Weight Gain Than Diarrhea Incidence?. *American Journal of Epidemiology*, 1996; 144: 6.
5. Malhotra et al. – Bacteriological evaluation of public water supplies *Journal of Infection in Developing Countries*, 2015; 9(8): 844-848.
6. Christa L Fischer Walker, Sunita Taneja, Amnesty LeFevre, Robert E Black, and Sarmila Mazumde. Appropriate Management of Acute Diarrhea in Children Among Public and Private Providers in Gujarat, India: A Cross-Sectional Survey. *Global Health Sci Practice*, 2015 Jun; 3(2): 230–241.
7. National Family Household Survey-4, 2015-16. Ministry of Health and Family Welfare. Government of India.
8. Sandy Cairncross, Caroline Hunt, Sophie Boisson, Kristof Bostoen, Val Curtis, Isaac CH Fung and Wolf-Peter Schmidt¹, Water, sanitation and hygiene for the prevention of diarrhoea, *International Journal of Epidemiology*, 2010; 39: i193–i205.
9. Wolf-Peter Schmidt, Benjamin F Arnold, Sophie Boisson, Bernd Genser, Stephen P Luby, Mauricio L Barreto, Thomas Clasen and Sandy Cairncross, Epidemiological methods in diarrhoea studies—an update, *International Journal of Epidemiology*, 2011; 40: 1678–1692.
10. Water, Sanitation and Hygiene Household Survey Gaza. UNICEF.
11. Core questions on drinking-water and sanitation for household surveys. World Health Organization, UNICEF.
12. Anjana Kuberan, Awnish Kumar Singh, Jyoti Bala Kasav, Satish Prasad, Krishna Mohan Surapaneni, Vandana Upadhyay, and Ashish Joshi. Water and sanitation hygiene knowledge, attitude, and practices among household members living in rural setting of India. *Journal National Science, Biology and Medicine*, 2015 Aug; 6(Suppl 1): S69–S74.