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PREVALENCE AND ASSOCIATED RISK FACTORS OF ACUTE DIARRHEA AMONG INFANTS.

Paediatrics

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ABSTRACT

Diarrhea is a leading cause of Infant and under 5 mortality and morbidity worldwide. It is a preventable health problem with its Risk factors varying with context. These risk factors need to be understood for targeted planning and implementation of prevention strategies to reduce the global burden of the disease. A hospital based descriptive cross sectional survey was conducted among 134 mother infant pair to identify the prevalence and associated risk factors of acute diarrhea among infants in Parsa, Nepal using a pretested structured interview schedule via face to face interview technique. The obtained data were analyzed by descriptive and inferential statistics using SPSS 16 version. The two week prevalence of diarrheal morbidity among infants was 17.9%. Age of the infant (COR: 2.91, 95% CI: 1.11- 7.58), gender (COR: 4.56, 95% C.I: 1.58-13.08), bottle feeding (COR: 0.312, 95% CI: 0.12-0.78) ,no current breast feeding (COR: 3.52, 95% CI: 1.32-9.4), not completing immunization for age ((COR: 2.21, 95% CI: 0.81-6.25), no hand washing facilities (COR: 1.603, 95% CI:0.4-6.42), no separate kitchen (COR: 3.7, 95% CI: 1.26-10.89) were the significant risk factors of acute diarrhea among infants. Intervention on potential risk factors such as promotion of nutrition through proper breast feeding along with colostrum feeding, avoidance of bottle feeding, proper complementary feeding practice, immunization according to age, proper hand washing and promotion of hygiene and environment sanitation is recommended as simple and cost effective means of alleviating the problem.

KEYWORDS

prevalence, determinants, acute diarrhea, Infant

INTRODUCTION

Acute diarrhea is defined as the abrupt onset of 3 or more loose stools per day and lasts no longer than 14 days; chronic or persistent diarrhea is defined as an episode that lasts longer than 14 days. According to World Gastroenterology Organization "**Acute diarrhea** is **defined** as an abnormally frequent discharge of semisolid or fluid fecal matter from the bowel, lasting less than 14 days". According to the data of (UNICEF, 2018) % of under-five deaths due to diarrhea is 6% whereas % of post neonatal death due to diarrhea is 14%.

In developing countries, diarrhea is recognized as the most common cause of infant mortality and morbidity . (WHO ,2017)estimates that burden of diarrhea in developing country happens to be about 1.7×10^9 episodes of diarrhea among 4.4 million children. Diarrhea illnesses is considered one of the major cause of childhood mortality and morbidity killing 2.5 million people each year worldwide ,with 60-70% of them being children under five years of age.(Alelign T et al.,2016)

In Nepal, around 13000 Nepalese children under five years die each year from sanitation, hygiene and water related diseases. It is estimated that approximately 25% of child death are associated acute diarrhea. In a study conducted at Dhulikhel, Nepal by (Joshi A et al.,2015) it was revealed that incidence of acute diarrhea is highest is children below 2 years of age and the risk of diarrhea decreases with the increasing age. Childhood diarrhea is a global public health concern especially in developing countries compared to industrialized country. (Silas K et al.,2018) explains that occurrence of diarrhea is associated with a number of risk factors which includes poverty , socioeconomic characteristics, infant feeding and food preparation practices, pattern of breastfeeding, and immature community based defense mechanism to combat with this problem.

Multiple studies have identified various risk factors of diarrhea ie., younger age, male gender, early weaning, seasonal patterns, low maternal education, lack of piped water supply, poor water-storage practices, poor sanitation, younger maternal age, unsatisfactory garbage disposal, lack of hand washing with soap by caregiver, visible feces in the yard, indiscriminate disposal of child feces, inadequate boiling of water, and not treating water in the home.(Andrade IG et al.,2009).Therefore, this study was conducted to assess the prevalence of acute diarrhea and associated risk factors among infants at Birgunj, Parsa, Nepal .

METHODS

Study area and population

This study was conducted at Immunization clinic affiliated to pediatric department of Tribhuwan University affiliated private Medical College with 752 bedded multispecialty Teaching Hospital, located at Birgunj Metropolitan, a commercial city which lies in Parsa district of Nepal. The study population were all the mothers of infants(2-12 months) attending immunization clinic who met the set inclusion criteria and were willing to participate in the study.

Type of study

A hospital based, descriptive cross sectional survey design was adopted to conduct the study.

Sample size determination and sampling technique

A representative sample size of 134 was obtained using nonprobability purposive sampling method and the Sample was size calculated at 95% confidence level and 5% confidence interval. **P**revalence of diarrhea among under 5 children in Nepal was reported 9.7 % in 2016, according to the World Bank collection of development indicators, compiled from officially recognized sources.

So, $n = Z^2PQ/d^2$

$= (1.96)^2 \times 9.7\% \times (19.7\%) / (0.05)^2$

$= 3.84 \times 0.097 \times 0.903 / 0.0025 = 134$

Instrumentation

A structured interview schedule was developed to assess the prevalence and associated risk factors of acute diarrhea among infants. The questionnaire consisted of following sections

Section A: Socio demographic variables of infant and mother

Section B: Breastfeeding and immunization factors

Section C: Hygiene, environment and water factors

Reliability of the tool was obtained for the items in section B and section C . The obtained reliability value was (r=0.79) and (r=0.81) respectively.

Data collection and analysis

Data was collected from 134 mothers of infants attending immunization clinic via face to face interview technique using a pretested structured interview schedule in the month of August to October 2018. All the participants were informed about the purpose of the study and assured that the participation was voluntary. Informed written consent was sought before the interview begun. The collected data was organized coded and entered in Ms- Excel and imported to SPSS 16 version for further statistical analysis.

Ethical consideration

Ethical clearance was obtained from the Institutional Review Committee of National Medical College and Teaching Hospital. Formal administrative Approval for conducting the study was obtained from the hospital director prior to data collection.

RESULTS

Socio demographic characteristics of respondents

A total number of 134 mother infant pair participated in the study. The mean age of infants was (6.37±3.11) months. whereas the mean age of mother was (24.15±4.17) years. Regarding gender 51.5% infant were female. Majority (53.7%) infant were 1st child. More than half (60.4%) of the respondents followed Hindu religion. Regarding education majority (60.4 %) mother had secondary education. More than 1/3rd (38.8%) mothers were home makers and majority (61.2%) belongs to nuclear family. (Table 1)

Immunization and breast feeding factors of respondents

Regarding breast feeding practice all the respondents' breast fed their infants**.** Amongst them majority (86.5%) fed colostrum and only (44.7%) had exclusively breast fed their infants. More than 2/3rd (74.7%) mothers never bottle fed their infants. Regarding current breast feeding (81.4%) infants were still breast fed. Meanwhile (82.1%) of infants had completed immunization for their age. (Table 2)

Environment, water and hygiene factors of respondents

Regarding type of latrine majority (61.2%) had water seal latrine at home. Of the total respondents (91%) had hand washing provision after latrine. Regarding source of drinking water (56.7%) had tube well. In addition, (44.7%) used boiling as a method of water purification. Concerning to the provision of waste water disposal (63.4%) had sewage system. Regarding hand washing (84.3%) mother reported that they washed their hands before preparing food and in addition (79.8%) used soap and water for hand washing. Meanwhile, (86.5%) had separate kitchen at home and (82.8%) used LP gas as fuel for cooking. Regarding initiation of complementary feeding (35.8%) infants were not started and (39.5%) infants had initiation at 4-5 months of age. Furthermore, (25.5%) respondents used to store the infants food in refrigerator whereas (26.1%) respondents offered fresh food every time to their infants.(Table 3)

Risk factors of diarrhea among infants

A logistic regression analysis was carried out to identify the risk factors associated with acute diarrhea among infants. The prevalence of acute diarrhea among female infant was more than 4.5 times higher than male infants (COR: 4.56, 95% C.I: 1.58, 13.08). Moreover, the occurrence of acute diarrhea among infants >6 months of age is 2.9 times higher that infants < 6 months of age. (COR: 2.91, 95% CI: 1.11-7.58).Regarding breast feeding factors the colostrum fed infants had 5 times lesser risk of having diarrhea than the infants who were not colostrum fed (COR: 5.0, 95% CI: 1.71-14.56). Meanwhile infants who were currently not breast fed had 3.5 times higher risk of having diarrhea than infants who were currently breast feeding (COR: 3.52, 95% CI: 1.32-9.4). Bottle fed infants had very few but risk of having diarrhea than infant who were not ever bottle fed (COR: 0.312, 95% CI: 0.12-0.78).Result also revealed that infants whose immunization was incomplete for age had 2.2 times higher risk of having diarrhea (COR: 2.21, 95% CI: 0.81-6.25). Hand washing was a major predictor of diarrhea among infants. Infants of those mothers who had no provision of hand washing facility after latrine has 1.6 times higher risk of having diarrhea (COR: 1.603, 95% CI:0.4-6.42) than those with provision of hand washing. Similarly infants who had no separate kitchen at home was more than 3.7 times higher risk of getting diarrhea than those infants who had separate kitchen at their home(COR: 3.7, 95% CI: 1.26-10.89).(Table 4).

Table 1: Sociodemographic characteristics of respondents

Variables	Frequency (n=134)	Percentage (%)
Religion		
Hindu	81	60.4%
Muslim	31	23.1%
Christian	22	16.4%
Education		
Illiterate	3	2.2%
Read and write	4	3.0%
Primary	31	23.1%
Secondary	81	60.4%
Higher secondary	11	8.2%
Higher studies	4	3.0%
Occupation		
Homemaker	52	38.8%
Business	24	17.9%
Free work	33	24.6%
Employee	25	18.7%
Family type		
Nuclear	82	61.2%
Joint	30	22.4%
Extended	22	16.4%
Birth order of infant		
1st	72	53.7%
2nd	35	26.1%
3rd	20	14.9%
4th and above	7	5.2%
Gender		
Male	65	48.5%
Female	69	51.5%

Table 2: Breastfeeding and immunization factors

Variables	Response category	Frequency	Percentage
Ever breastfed	yes	134	100
Colostrum fed	yes	116	86.5%
	no	18	13.5%
Type of breastfeeding	exclusive	60	44.7%
	predominant	43	32%
	partial	31	23.3%
Prelacteal feeding	nothing	77	57.5%
	water	40	29.8%
	Honey	17	12.7%
Ever bottle fed	yes	34	25.3%
	no	100	74.7%
Current breastfeeding	yes	109	81.4%
	no	25	18.6%
Immunisation	Complete for age	110	82.1%
	Incomplete for age	24	17.9%

Table 3: Hygiene, water and sanitation factors

Variables	Response category	Frequency	Percentage
Latrine	yes	134	100%
Type of latrine	Water seal	82	61.2%
	Pit latrine	36	26.8%
	Open field	16	12%
Provision of handwashing	yes	122	91%
	no	12	9%
Source of drinking water	Public tap	41	30.6%
	Tube well	76	56.7%
	pipeline	14	10.4%
	Dug well	3	2.3%
Water purification	filter	56	41.7
	boiling	60	44.7%
	Nothing	18	13.6%
Disposal of waste water	Open field	27	20.2%
	Sewage system	85	63.4%
	Unprotected canal	22	16.4%
Hand washing of mother	Yes	113	84.3%
	Sometimes	21	15.7%
Hand washing with	Water only	26	19.4%
	Soap and water	107	79.8%
	Water and ash	1	0.8%
Separate kitchen	Yes	116	86.5%
	No	18	13.5%
Type of fuel	LP gas	111	82.8%
	Firewood	2	1.4%
	Bio gas	3	2.2%
	Miscellaneous	18	13.6%
Time of initiation of complementary feeding	Not yet	48	35.8%
	2-3 months	5	3.7%
	4-5 months	53	39.5%
	6 months and above	28	21%
Food storage for infant	Store in refrigerator	17	12.6%
	Storing in cooked utensil	34	25.5%
	Offer fresh food every time	35	26.1%
	Not applicable	48	35.8%

Table 4: Factors associated with acute diarrhea among infants

Variable	No diarrhea	Diarrhea	COR(95% CI)
Gender			
male	60	5	1
female	50	19	4.56(1.58-13.08)
Age of infant			
< 6 months	60	7	1
>6 months	50	17	2.91(1.11-7.58)
Colostrumfed			
yes	100	16	1
No	10	8	5(1.71-14.56)
Ever bottlefed			
Yes	23	11	0.312(0.12-0.78)
No	87	13	1
Current breastfeeding			
Yes	94	15	1
No	16	9	3.52(1.32-9.4)
Immunization			
Complete for age	93	17	1
Incomplete for age	17	7	2.25(0.81-6.25)
Handwashing			
Yes	101	21	1
No	9	2	1.603(0.4-6.42)
Handwashing before food preparation			
Yes	94	19	1.54(0.5-4.73)
Sometimes	16	5	1
Separate kitchen			
Yes	99	17	1
No	11	7	3.7(1.26-10.89)

DISCUSSION

Diarrhea among infants is a leading cause of morbidity and mortality in developing country including Nepal. Prevalence and risk factors of diarrhea are important for planning interventions for proper management and prevention strategies. In this study, the two week prevalence of acute diarrhea was 17.9% which is lower than the study done in west Bengal (Gupta A et al, 2015) that reported 22.73% and study done by (Mengistie B et al, 2013) which was 22.5% .The variation in the prevalence could be due to the environmental variation and socioeconomic determinants of the respondents. (Magbagbeola DD et al., 2017)

Present study revealed that female infants were more likely to have diarrhea compared to male infants. This might be because of the child rearing practices prevailed in our society. This finding is supported by the available gender-specific mortality data which are consistent with levels of disadvantage in young girls worldwide(UNICEF, 2015).The finding of present study revealed that infants who were not currently breast fed and not immunized for age were more likely to have diarrhea compared to those infants who were immunized for age and properly breast fed. This finding is support by the fact sheet by (WHO, 2017) which explains that immunization and breastfeeding help reduce diarrheal mortality either by directly preventing infections that cause diarrhea or by preventing infections that can lead to diarrhea as complication of an illness such as measles.

The finding of present study explains that the prevalence of diarrhea is associated with hand washing practice among the mothers. Infants of Mothers who followed hand washing practice were less likely to have diarrheal prevalence compared to infant of those mothers who did not follow proper hand washing practice. The finding is supported by the study by (Curtis V et al., 2003) which suggests that hand washing reduces the risk of diarrheal morbidity by 47%.

The other factor that determines the diarrheal prevalence among infant is present study was the provision of hand washing facility at latrine. The finding is congruent with a study done by (Kiddus Y et al.,2017) which suggested that use of hand washing facility outside latrine can help in preventing fecal contamination that might lead to contamination of infants food thus contributing diarrheal morbidity among infants.

CONCLUSION

Prevalence of diarrhea among infants was found to be high as compared to the national data. These findings underscore the need for community based health interventions to alleviate the burden of diarrhea among vulnerable population. Intervention on potential risk factors such as improving housing and hygiene condition, provision of safe drinking water, education on exclusive breast feeding, immunization and complementary feeding is recommended as simple and cost effective means of alleviating the problem.

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