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# Predictive Factors of Diarrhea Preventive Practices by Caretakers

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## ABSTRACT

**Background:** Diarrhea is a leading cause of childhood mortality globally as well as in Nepal. Data all around the world has shown the highest prevalence of diarrheal disease amongst 6-12 months old children. This paper aims to assess the existing diarrhea preventive practices carried out by caretakers of children from 6-12 months of age and their predicting factors in Chitwan district of Nepal.

**Methods:** A cross-sectional survey was conducted among 384 caretakers of children aged 6-12 months from four different MCH clinics of Chitwan district, Nepal. Data were collected by using face-to-face interviews with structured questionnaires from April 15 to May 30, 2018. Univariate analysis, chi square, Pearson correlation and stepwise multiple regression analysis were the statistics used for data analysis.

**Results:** The findings showed that only around one-fourth (22.7%) of the caretakers followed good diarrhea preventive practices. Stepwise multiple regression showed that age, monthly family income, knowledge, attitude and accessibility to WASH (water, sanitation and hygiene), could predict the diarrhea preventive practices of caretakers by only 20.5%. Accessibility to WASH (beta= 0.246) had the highest predictive power and age (beta= 0.015) had the least predictive power of diarrhea preventive practices amongst them.

**Conclusions:** The findings of this study suggest that there is a definite need to promote diarrhea preventive practices. Local government and non-government organizations should establish activities to improve accessibility to WASH, caretaker's attitude and caretaker's knowledge in order to ultimately improve their preventive practices.

**Keywords:** Caretakers; children; chitwan; diarrhea preventive practices; 6-12 months old; Nepal.

## INTRODUCTION

Diarrhea claims the lives of millions of children under-five globally and still remains to be a leading cause of death worldwide.<sup>1,2</sup> Seventy-two percent of deaths from diarrhea happen in children younger-than two years as incidence peaks at age 6-11 months, then decreases with age.<sup>3</sup> Many studies have claimed that practices like hand-washing, sanitation, feeding practices, safe drinking water, proper disposal of faeces and waste management can help improve the situation and limit annual incidence of the disease.<sup>4-6</sup> Numerous studies have been conducted to show obvious decline in diarrheal incidences when interventions are provided to improve the knowledge, attitude and practices of the caretakers. However not enough research in this area have been carried out to identify what may predict these practices.<sup>7-13</sup> This study aims to identify the situation of diarrhea preventive

practices and their predictors amongst the caretakers of children aged 6-12 months in Chitwan district.

## METHODS

This research was a cross-sectional survey about the diarrhea preventive practices of caretakers of children 6-12 months of age. This district lies in Province number 3 of Nepal, which has the highest prevalence of diarrhea amongst all provinces (9%).<sup>14</sup> Chitwan district is also one of the very few districts of Nepal with the highest coverage and low dropout of vaccines as well as access to healthcare facilities.<sup>14</sup>

Data were collected between April 15<sup>th</sup> and May 30<sup>th</sup>, 2018. The sample population were the caretakers both male and female, aged 18 years and above of children aged 6 to 12 months living in Chitwan district. The

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first site of data collection was MCH clinic of District Hospital, Chitwan. The other three MCH were randomly selected out of three clusters from the east, north and south of the District Hospital. Each clinics selected from the cluster are representative of the areas. A total of four centers providing MCH clinics (1 District Hospital and rest of the three selected clusters) were the study site. The sample size was calculated on the basis of Cochran's Sample size formula.<sup>15</sup> Based on the population composition, Bharatpur being the most populated, in Chitwan district,<sup>16</sup> 50% of the calculated sample size was collected from the MCH clinic there. From the rest of the three of the selected health centers/ hospitals, sample size proportionate to population was collected by clustered random sampling. Then by simple random sampling, caretakers of children 6-12 months of age presenting to those clinics between April 15<sup>th</sup> and May 30<sup>th</sup> 2018, were interviewed after informed and written consent.

The instrument used in this study was structured questionnaire which consisted of 6 parts: general characteristics of the caretaker, knowledge of the caretakers, attitude towards diarrheal diseases and its prevention, accessibility to Water, Sanitation and Hygiene (WASH), social support and finally diarrhea preventive practice amongst caretakers. The first part was general characteristics which consisted of 8 items: Sex, Age, Occupation, Marital Status, Educational Level and caretaker's family income per month in terms of Nepalese Rupees. For the rest, each part had its own set of questions to which scoring was done.

Knowledge of the caretakers regarding diarrheal disease, including meaning of diarrhea in children aged 6 to 12 months, prevention and causes of diarrhea, feeding during diarrhea, measures of treatment, oral rehydration solution and its preparation. These were yes / no questions which were 32 in number. Under attitude, a total of 14 statements were given which could be positive or negative statements and the answers were agree, uncertain and disagree. Under accessibility to WASH, a total of 10 questions were given to which the answers are multiple choice, this is concerned with the water, sanitation and hygiene facilities accessibility to the caretakers of children. Source of drinking and domestic water, distance between drinking water source and latrine, type of latrine, handwashing were included in the questions. These questions are based on the JMP WHO/UNICEF WASH service ladders,<sup>4</sup> on the basis of which we can classify into accessible and inaccessible. Social support consisted questions regarding the four types of social support that is: emotional, tangible,

informational and appraisal support. For this part questions were asked on whether the respondents received support from their friends, family or health professionals always, sometimes or never and scoring was done for 15 questions. Finally, diarrhea preventive practices had 21 questions regarding practices like handwashing, food hygiene, sanitary disposal of child's stool, and safe drinking water, with the answers in frequency. The answers for practicing the activities were categorized as "every time", "sometimes" and "never" and scoring were done based on the responses.

This structured questionnaire was assessed for content validity by three experts from Mahidol University, two from the Department of Family Health including a pediatrician and one from Department of Public Health Nursing. After corrections and editing, a pilot study amongst 30 caretakers of children of the same age group was done in a different district whose characteristics were similar to the study population. The results were then analyzed for their Cronbach's alpha coefficient for each set for reliability.<sup>17</sup> The overall Cronbach's alpha coefficient was 0.746 and that for knowledge, attitude, social support and diarrhea preventive practices were found to be 0.720, 0.709, 0.824 and 0.734, respectively (all above 0.7 : reliable). The data were analyzed by descriptive statistics in terms of frequency, percentage, mean, standard deviation and applied to show the general characteristics of caretakers. Chi square test and Pearson product moment correlation coefficient were used to determine the factors that were related to the factors associated with diarrhea preventive practices of caretakers after which to determine the predictive factors that influence the diarrhea preventive practices of caretakers, stepwise multiple regression was used. A p-value of less than 0.05 was set as the cut off value to show statistical significance.

This research has been approved by the Ethical Review Committee for Human research (COA no.: MUPH 2018-71, approval date: 26 March 2018), Faculty of Public Health, Mahidol University. It was also approved by the Ethical Review Board of Nepal Health Research Council (NHRC) (registration no. 117/2018, 5 April, 2018). Necessary informed and signed permissions were also taken from the District Health Officer (DHO) of Chitwan district and all respective health center in-charges of the four MCH Clinics of Bharatpur and all participants after they were informed about the aims and objectives of the study and invited to participate.

## RESULTS

The total sample of 384 caretakers showed that most of

the caretakers (72.9%) lied between the age group of 21 to 30 years of age, with the median age of 25.94 (SD= 5.23 years). The number of females (92.7%) were more than that of males (7.3%). 90.4% of the caretakers that participated in the study were the mothers and most of the caretakers (77.9%) were found to be unemployed/ housewives. Regarding the level of education, the distribution was similar for secondary and higher secondary levels (26.6% and 23.2% respectively), whereas approximately similar number of caretakers (19.8%) had attained Bachelor's degree as well. Less than 1% each were either single or divorced while the rest (98.4%) were married. Majority (75.6%) of the caretakers' family income lied below or equal to 30,000 Nepalese rupees (around 280 USD).

This study revealed that amongst 384 caretakers who participated, 22.7% of the total participants of this study had good diarrhea preventive practices, 71.1% had moderate practices and only 6.2% needed improvement (Table 1).

**Table 1. Level of diarrhea preventive practices of caretakers (n=384).**

Caretaker's Diarrhea Preventive practices:	Number	Percentage
Good ( score ≥34)	87	22.7
Moderate (score=25-33)	273	71.1
Needs improvement (score<25)	24	6.2

Mean= 31.69; SD= 3.77, Min.=15, Max.= 40

To analyze the relationship between different factors and diarrhea preventive practices of caretakers, Chi square test and Pearson's Correlation Coefficient were used, the results of which revealed that age, caretakers monthly income, knowledge about diarrheal disease and its prevention, attitude towards diarrheal disease and its prevention and accessibility to WASH were significantly correlated with the diarrhea preventive practices of caretakers at a statistically significant level (p-value) of <0.05. However, there was no statistically significant association between sex (p-value=0.872), occupation (p-value=0.273), marital status (p-value=0.529), educational status (p-value= 0.769) and diarrhea preventive practices of caretakers. Also, no association between practices and caretaker's social support could be seen by Pearson's correlation (p-value 0.079)

Age, monthly income of the family, knowledge and attitude towards diarrheal disease and its prevention and accessibility to WASH were found to be the factors that had the power to predict the diarrhea preventive

practices of caretakers upto some limit. Using stepwise multiple regression analysis, it was found that these factors could predict upto 20.5% of the diarrhea preventive practices carried out by the caretakers of children 6-12 months of age. Accessibility to WASH best predicted the diarrhea preventive practices of caretakers (beta= 0.246) (Table 2).

**Table 2. Stepwise multiple regression between independent variables and diarrhea preventive practices of caretakers (n=384).**

Predictive Factors	B	Beta	t	p-value
Accessibility to WASH	0.443	0.246	5.149	<0.001
Attitude	0.246	0.236	4.996	<0.001
Knowledge	0.284	0.164	3.533	<0.001
Age	0.830	0.115	2.508	0.013

R<sup>2</sup>= 20.5 ; p-value significant at <0.05

## DISCUSSION

According to the results of this study, only around one-fifth of the respondents had good diarrhea preventive practices with the majority having only moderate level of practices. The practices were based on five criteria handwashing practices, child feeding practices, proper disposal of faeces, safe drinking water practices, and food preparation and storage practices. Although 95.6% of the caretakers had good practices regarding safe drinking water and more than half had good practices regarding food preparation and storage as well as handwashing and sanitation, majority of them needed improvement in feeding practices and proper disposal of faeces. This study is different from other studies done in Nepal or in other countries of Asia about behaviors or practices for diarrhea prevention done before which have showed at least / around half of the participants had good preventive practices / behaviors. A study done in Nepal's Lalitpur district study found out that nearly half (49.16%) of caregivers were doing good practice during diarrhea in under-five children,<sup>18</sup> another done in Samut Sakhon province of Thailand showed 54.4% had good level of practice related to childhood diarrhea and another one from Indonesia showed 68.3% of mothers had good behaviors in preventing diarrhea.<sup>11,19</sup> However, similar study done in Cambodia in 2014 showed that majority of the caretakers had poor diarrhea preventive behaviors.<sup>20</sup>

This study showed that the range of age of caretakers was quite wide with a minimum of 18 years and maximum of 52 years. This could be due to the reason that this study

not only includes mothers as the caretakers, but also others like grandmothers, fathers, aunts, etc. who take care of the child. We also have to keep the inclusion criteria of age of 18 years or above, we may have excluded many mothers younger than that age. This could be the reason why the mean age is on the higher side. As stated by the NDHS, “17% of Nepalese women age 15-19 have begun childbearing; 13% have had a live birth, and 4% are pregnant with their first child; this percentage increases with age, from 2% among women age 15 to 36% among women age 19”.<sup>15</sup> Most of the caretakers in this study were females which could be because most of the primary caretakers tend to be the mothers of the child, and the other females included were the grandmothers and aunts and is befitting in the context of Nepal. This finding is similar to that of the study done in Lalitpur in 2010.<sup>18</sup>

This study also showed that the factor with the highest influence on diarrhea preventive practices was accessibility to WASH followed by attitude, knowledge and age of caretakers, respectively. Accessibility to WASH has been acknowledged as an important risk factor for diarrhea in terms of lack of sanitation, inaccessibility to clean water supply, poor water-storage practices, and insufficient personal hygiene, lack of vigilant hand washing, poor sanitation and not treating water in the home.<sup>21-23</sup> When questions regarding WASH were asked, it was found that although majority of the caretakers had access to tap-water as the source of drinking and domestic use water with the point source at home, but treatment of water before drinking was done properly by only a small proportion. Around one third answered that they did not treat the water at all before drinking. Similarly, there were disparities amongst the way of disposal of the waste from home amongst the participants. However, accessibility to latrine and place for handwashing inside the premises were present for most of them. Studies done all over the world have shown that 90% of diarrheal disease occurrence are as a result of inaccessibility to WASH, especially in low income settings.<sup>24-26</sup>

This study also showed that the influence of characteristics of caretakers on diarrhea preventive practices of caretakers is very low, which brings up the fact that other factors may also be responsible which may include affordability, policies and social norms.<sup>27</sup> In a study from Western Ethiopia, community water source, water storage container, and knowledge of mothers remained a strong predictor of diarrhoeal morbidity.<sup>28</sup> In Nigeria, another study reflected that “promotion of hygiene and nutrition education for mothers particularly

on proper infant feeding practices and complete immunization of infants is needed to address the diarrhea determinants”.<sup>29</sup>

In a study from the Philippines about “Determinants of Mother’s Preventive Practices against Children’s Acute Gastroenteritis” which used the same statistics, showed that among the several variables that were considered, attitude and knowledge entered into the regression model with unstandardized Beta coefficients of .193 and .030, respectively.<sup>30</sup> This implies that Knowledge and attitude are the common variables with similar beta coefficients that can predict diarrhea preventive practices of caretakers.

Most of the studies in the past regarding diarrhea prevention has compared the knowledge, attitude and practices to the incidence/prevalence of diarrhea in the children. However, this study compares not only the knowledge and attitude of caretakers regarding diarrheal diseases and their prevention, but also important factors like accessibility to water, sanitation and hygiene and social support to the caretakers with their effect on diarrhea preventive practices. Another gap that this study fills is this study is amongst the very few studies which has been targeted specifically to the caretakers of children 6-12 months of age. Usually studies of such kind cover a wider range of age group (under 5 years). But while doing this we tend to oversee the fact that there is a wide gap between the possible modes of transmission amongst the various subgroups of this group.

The samples were collected from the caretakers who attended the MCH clinics which may not be representative of the population. Language barriers due to multilingual ethnicities present in this area (Tharus, Maithili, etc.) were another issue.

## CONCLUSIONS

This study reflects that majority of caretakers in Chitwan district have moderate level of diarrhea preventive practices. The findings of this study suggest that there is a definite need to promote diarrhea preventive practices, responsible organizations should establish activities to improve accessibility to WASH (water, sanitation and hygiene), caretaker’s attitude and caretaker’s knowledge, which are found to be the best predictors, in this study. Further longitudinal and/ or qualitative research is needed to see if the diarrhea preventive practices are really carried on in the community and whether the subjective and objective responses match or not.

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