

Study on Knowledge and Practices of Water, Sanitation and Hygiene among Secondary School Students

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ABSTRACT

Background: Provision of adequate water supply, sanitation, hygiene and waste management in schools has a number of positive effects. The study focuses on children because disease related to water; sanitation and hygiene are the leading cause of mortality and morbidity among children. **Materials and Methods:** This cross-sectional study comprised of 220 students. Participants involved were Government school students of grades 9-10 in Sindhupalchowk and Bhaktapur. Data consisted of hygiene and hand washing practices, knowledge about sanitation and personal hygiene characteristics. **Results:** This study revealed that knowledge regarding water borne disease was high among Urban school students 86.5% but knowledge regarding transmission route seemed inadequate in both urban and rural students (35% and 16% respectively). The practice on hand washing was found high (94.4%). There was significant difference in the knowledge of students regarding WASH in urban and rural settings of the school (P value<0.001). Treated water facility and hand washing facilities with water was found lacking in rural schools. Schools from the urban area had proper hand washing facilities, but there was not any soap available in both the areas. **Conclusions:** The knowledge and practice of Water, Sanitation and Hygiene (WASH) among secondary school students is still poor. The knowledge of WASH in secondary school students when compared to the rural areas, urban areas had better on the basis of knowledge score.

Keywords: hygiene; knowledge; practice; water; sanitation.

INTRODUCTION

“Knowledge, Attitude and Practices (KAP) survey is a quantitative method that provides access to quantitative and qualitative information and reveals misconceptions or misunderstandings that may represent obstacles to the activities to be implemented and potential barriers to behavior change”.¹ Poor hygiene practices and inadequate sanitary conditions play major roles in the increased burden of communicable diseases within developing countries.² Provision of adequate water supply, sanitation; hygiene and waste management in schools have a number of positive effects. Children who have access to adequate water, sanitation and hygiene (WASH) conditions at school are more able to integrate hygiene education into their daily lives, and can be effective messengers and agents for change in their families and community.³ Good hygiene, sanitation and water-handling practices among students should be encouraged to transfer hygiene knowledge to their families and communities.⁴

Nepal has proposed sustainable development goals

(SDG) targets for the year 2030 which includes achieving universal and equitable access to safe and affordable drinking water, sanitation and Hygiene for all.⁵ National water supply coverage of Nepal is 83.59% and sanitation coverage is 70.28% of the total population.⁶ Improved public health and living standard of people of Nepal through safe, sufficient, accessible, acceptable, and affordable water, sanitation and hygiene services— any time, everyone and everywhere' is the major development goal of the Government of Nepal and hence has shown commitment towards achieving basic water and sanitation for all by 2017.⁷

The study focuses on WASH; inadequate and poor WASH is the leading cause of mortality and morbidity among children. The objective of this study is to assess the school going children's knowledge and their practice on water, sanitation and hygiene in rural and urban area.

MATERIALS AND METHODS

A comparative descriptive cross-sectional study was

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conducted in rural and urban schools of Sindhupalchowk and Bhaktapur in January-February 2018. The study protocol and all amendments were reviewed and approved by the Institutional Review Committee of Kathmandu Medical College. The calculated sample size was 216, taking prevalence of 52%⁸ with confidence interval of 95% and margin of error of 0.07. Convenient sampling method was applied. Students of grade 9 and 10 were involved from both urban and rural settings. Two schools were selected randomly from each of the two districts- Sindhupalchowk and Bhaktapur. The tools for data collection were: questionnaires, personal observation and a checklist. Orientation was given to all respondents regarding how to fill the questionnaire. Self-administered questionnaire was used for each respondent and was asked to fill the questionnaire individually without consulting their friend. Data were entered in SPSS version 20 and analyzed. Statistical test, mean and percentages were calculated.

RESULTS

The study was conducted among 220 students (grades 9 to 10) from Government school of Sindhupalchowk and Bhaktapur districts. Among the study students, 42.7% of the respondents were from rural schools and 57.2% from urban schools. In terms of gender, 48.2 % of the respondents were male while 51.8% of the respondents were female. Comparing the knowledge among the Urban and the Rural students, 86.5% of students in urban area knew about the water borne disease in comparison to rural area (74.5%) and about route of transmission 34.9% of the urban students expressed that contaminated water is the main source of water borne disease whereas only 16% of rural students knew about it. 94% of the urban students have knowledge that Diarrhea is water borne disease but it was less in rural students (63.8%) and they got this knowledge from school.

Regarding quality of water, 66.6% urban students accepted that it effects health which is quite similar in context to rural setting(63.8%). 74.6% students in urban areas have knowledge that unsafe drinking water may cause diarrhea whereas only 29.8% students in rural areas knew about this. To the knowledge of rural school students, 36.2% of their family members and 27.7 % of their friends had suffered due to consumption of unsafe drinking water which was higher in comparison to urban area. It was seen that 92.6% of rural students had knowledge of prevention of water which was higher comparing to urban students' knowledge. Both

urban and rural students had good knowledge that boiling kills germs (96%). 97.9% of rural students reported that water container needs cleaning and covering which was found higher than urban students knowledge. The majority of participants (84%) reported the importance of hand washing after defecation in rural school which was found higher than the knowledge of the urban students, but there was no knowledge of critical hand washing in rural school students (Table 1).

Table 1. Knowledge of students on water, sanitation and hygiene (WASH).

Statement	Urban(n=126)		Rural(n= 94)	
	No.	%	No.	%
Knowledge of the students on				
Water borne disease	109	86.5	70	74.5
Route of transmission of water borne disease	44	34.9	15	16
• Through contaminated water	32	25.3	5	5.3
Diarrhea is water borne disease	94	74.6	60	63.8
Water borne disease got from school	111	88	54	57.4
Quality of water effects health	84	66.6	60	63.8
Effects of unsafe drinking water on human health is				
• Diarrhoea	94	74.6	28	29.8
Suffering due to unsafe drinking water among	39	30.9	34	36.2
• Family members	30	23.8	26	27.7
• Friends				
Prevention of water borne disease	114	90.4	87	92.6
Boiling kills germs	120	95.2	90	95.7
Water container needs cleaning and covering	118	93.6	92	97.9
Human faeces contain germs	89	70.6	87	92.6
Importance of handwashing				
• after defecation	47	37.3	79	84
• during all critical handwashing	45	35.7	0	0
• before meals	28	22.2	11	11.7
Reasons of handwashing				
• Health	87	69	87	92.6
• Hygiene	31	24.6	3	3.2

There was significant difference between the knowledge of students in urban and rural settings of the school (p value<0.001) (Table 2).

Table 2. Knowledge Score of the Students

Knowledge	Location		Total	p value
	Urban	Rural		
Poor	29	47	76	<0.001
Good	96	47	143	
Total	125	94	219	

Regarding the practices of the students on water, sanitation and hygiene (WASH), among urban school students 57.9 % stored their drinking water in narrow closed container which was quite similar in rural setting. 62.8% of the rural students used to clean water storing container every day,

34% cleaned it before fetching water which was seen higher than urban setting. The practice of chlorination of water was seen higher (38.3%) among rural students to make water safe. Among those who do not practice any of the water treatment methods in rural areas, 19.1% reported that water they used was already clean and safe and 5.3% added that treated water did not taste good which was less in comparison to urban students. 94.4 % of students in urban areas practiced hand washing with soap and water which was comparatively higher to rural. Only few students in rural areas (9.6%) practice hand washing with water only and (1.1%) with ash which was comparatively higher than in urban areas. 98.9% of the students in rural areas prefer hand washing before meals which was comparatively higher than in urban students. 52.3% urban students followed critical hand washing practices while 33% rural

Statement	Urban		Rural	
	No.	%	No.	%
Practices of the students on Drinking water storage container				
● Narrow mouth closed	73	57.9	53	56.4
Cleaning water storing container				
● Everyday	66	52.3	59	62.8
● Before fetching water	36	28.5	32	34
Method use to make water safe				
● Boil	91	72.2	15	16
● Strain through cloth	24	19	25	26.6
● chlorine	9	7.1	36	38.3
Consume boil water	95	75.3	17	18.1
Reason for not practicing any methods of treatment				
● water is already clean and safe	8	6.3	18	19.1
● treated water do not taste good	1	0.7	5	5.3
Materials use for handwashing				
● soap and water	119	94.4	84	89.4
● water only	6	4.7	9	9.6
● Ash	1	0.7	1	1.1
Handwashing before meals	122	96.8	93	98.9
Handwashing				
● In all critical handwashing	66	52.3	38	40.4
● After defecation	31	24.6	31	33

students prefer hand washing practice only after defecation (Table 3).

The situations of sanitation facilities among 4 schools (2 from urban and 2 from rural) under study were analyzed. In this study the observation checklist showed that both of the schools in urban region used ground water supply whereas the schools in rural regions used surface water supply and ground water supply. One of the schools in urban region had underground tank and while other had underground and roof top tank. In case of rural region one of the schools had reserve plastic tank

and other had underground tank. Only schools in urban region provided treated water to their students while rural schools did not have such facility. The study showed that only urban schools had hand washing facilities with water. The present study showed that all schools had coverage of improved toilets. Schools in urban region had adequate toilets while toilets in rural regions were not adequate to students. Regarding the distance of the toilet, both schools in urban region had easy access to the toilet

Checklist	Urban(2)	Rural (2)
	No.	No.
Availability of water supply source		
Available ground water	2	1
Available surface water	-	1
Availability of water storage		
Underground tank	1	1
Underground and top tank	1	-
Reserve plastic tank		1
Availability of treated water		
Available	2	-
Not available	-	2
Availability of handwashing facility		
Available	2	-
Not available	-	2
Availability of water at handwashing facility		
Available	2	-
Not available	-	2
Availability of soap at handwashing facility		
Available	-	-
Not available	2	2
Availability of sufficient toilets		
Available	2	-
Not available	-	2
Accessibility of toilets		
Accessible	2	1
Not accessible	-	1
Availability of improved toilets		
Available	2	2
Not available	-	-

while one of the schools in rural region had poor access (Table 4).

DISCUSSION

In this study 9-10 grade students were enrolled to know their knowledge and practices in water, sanitation and hygiene (WASH). The respondents were from the Government schools, so we did not intend to take lower grade students. This study was a comparative study among Urban and Rural school. The study in Vhembe¹⁰ was quite similar to this study in many contexts while in other studies only the primary school children were enrolled in urban settings.^{8,9,11,12,13} In this study regarding water borne disease, 86.5% of urban students had knowledge and similar result was found in study of Vhembe¹⁰ that knowledge among urban students was higher than rural. This study revealed only 25.3% of urban students had knowledge of

contaminated water as the main source of water borne disease and they got this information from school. The results were similar to Vhembe¹⁰ and Vivas et al.,⁸ in the context that 60% of the students did not know the disease transmission routes. In this study, 74.6 % of the urban students knew diarrhea as a water borne disease whereas in Vhembe,¹⁰ 76.80 ± 1.75% of the respondents knew about waterborne diseases, even though they could not differentiate between cholera and diarrhea. The study showed suffering due to water borne disease among family members and friends of rural students were 36.2% and 27.7% respectively which was bit higher in comparison to urban students but was in contrast with study in Vhembe¹⁰ where majority of the respondents did not know anyone who had been affected by a waterborne disease. 92.6% of rural students in this study knew about prevention of water borne disease which was higher in comparison to urban setting while comparing with study in Vhembe, majority of the respondents had no knowledge.

In one of the question whether boiling kills germs, 95% students in both settings accepted it, which was in contrast to the findings in Vivas et al.,⁸ where it was 61.4%. In this study, 98% of rural students had knowledge that water container needs cleaning and covering. This result was quite higher comparing to urban schools in our own context. The reason can be stated as students in rural setting (mostly girls) had to go to fetch water and practically involve in household activities, so they had better knowledge regarding this. This finding was quite similar to study in Vivas et al (94.3%).⁸ In this study 92.6 % of the students had knowledge that human faeces contains germs which was similar to the study Vivas et al.,⁸ but was less in Shilunga et al¹¹(62.9%); Knowledge on importance of hand washing after defecation, during critical hand washing and before meals in this study was similar to the study of Dajaan¹⁵ and was different in comparison to Vivas et al.⁸

The knowledge score in this study was used to compare among location (rural and urban setting) of the school and knowledge of the students. Similar scoring was done in another study Sarkar M⁹ and Shilunga et al.,¹¹ but it was used to show the association of knowledge with gender and ethnicity and learner's age and school grade respectively.

Regarding the practices of the students on WASH, in our context, around equal number of students in

rural and urban settings (56%) used narrow container for water storage which was cleaned everyday. This was different in context of western Kenya¹³ where 86% used Clay pots for household water storage with lid covers and had not mentioned about the cleaning practices of those storage containers. In this study different methods were used for water treatment. Boiling was the commonest method used among students in urban(72.2%) while chemical method chlorine among rural (38.3%)and 26% straining through cloth which was similar to the study of Kenya¹³ where as 42% boiling, around 20% straining, 35% chemical (water guard was used). The study of Vivas et al.,⁸ showed only boiling as method of water treatment. In this study the respondents who did not use any of the treatment methods were asked the reason for not using, 19.1% students in rural schools replied that water was clean and safe to drink; only 5.3% said that treated water did not taste good. This was the cultural and social aspect of the rural students which was different from the study of Kenya where the study focused on water guard only, where 57% expressed it as expensive and 17% said that water is safe to drink.

Regarding the practice of hand washing in this study, 94.4% used soap and water which was similar to the study of Dajaan¹⁴and comparatively the practices were less in the study of Vivas et al.,⁸ Kenya¹³ and Behera.¹² Besides soap water, hand washing practices by water only, was common in study of Vhembe¹⁰ and Vivas⁸ and less common in study of Behera¹² and Dajaan.¹⁴ Hand washing practice before meal was higher in this study which was similar to most of the studies been referenced for this study except Vhembe¹⁰ (65%) and Sarkar⁹ (75.9%). Critical hand washing was preferred as the best washing practices but it was not high in this study as well as in other studies.

The source of water in the schools in this study was ground and surface water which was different in other studies: Municipal supply and borehole water in Vhembe.¹⁰ Water source had not been mentioned in study of Kenya.¹³ Private vendors in Giardina¹⁵ and 17% piped water by the local water authority in Gisore.¹⁶ Rain water harvesting in Elobeid.¹⁷ In the study 50% of school had underground tank and rest 25% had underground and top tank and reserve tank which was similar to study of Vhembe¹⁰, Elobeid¹⁷ and Gisore.¹⁶ Only 50% of the school used treated water in this study whereas in only 2 studies Kenya¹³ and Giardina¹⁵ water treatment was done by chemical method. In the study of Gisore¹⁶ and Elobeid,¹⁷ no treated water was supplied. Only 50%

coverage of hand washing facility was shown in this study which was similar to study in Gisore¹⁶ in contrary to the study in Vhembe which had 100% coverage. There was no hand washing facilities in all schools surveyed in Eleboid and Giardina. Only 50% of the schools had water in hand washing facility which was similar to study in Gisore whereas no water available in study of Giardina. In the study of Kenya, all the schools had water supply in hand washing facility. In this study no soap was provided at the hand washing facility. This result was consistent with studies conducted in Vhembe and Elobeid. The findings were different in Kenya and in Giardina with availability of soap. All the schools in this study were improved type with 50% sufficient rate (inadequacy of latrines) which was similar with the study in Elobeid and Gisore whereas the study in Vhembe

and Kenya showed adequacy of latrines in school.

CONCLUSIONS

The knowledge and practice of Water, Sanitation and Hygiene (WASH) in secondary school students is still poor. The knowledge of WASH in secondary school students is better in urban areas as compared to the rural areas on the basis of knowledge score. The practices of Water, Sanitation and Hygiene (WASH) at those schools are critically poor.

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Conflict of Interest: None

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