Water and sanitation practices at household level in Rupa Rural Municipality, Kaski, Nepal

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ABSTRACT

Introduction: Water, sanitation, and hygiene-related infrastructure, practices, and services are crucial preconditions for stopping the spread of illness. Thus the study aimed to assess the household-level sanitation and water practices in Rupa Rural Municipality, Kaski, Nepal. **Methods:** A cross-sectional study was conducted among household in Rupa Rural Municipality of Kaski district, Nepal. The study was conducted from October 6 to October 16, 2024. Observation checklist was used for observation of water and sanitation practices. Waste segregation, waste management, water purification, toilet availability, whether the toilet was clean, and the presence of soap and water in the toilet were all taken into consideration while evaluating the dependent variable. These objects were divided into two categories, 0 and 1. Following the addition of these criteria, sanitation practices were grouped according to mean values. Chi square tests was applied at 5% level of significance. **Results:** Out of 384 households, 75.80% reported having a separate kitchen in their home. Majority (81%) said they separated their garbage, and 55.8% had effective waste disposal practices. More than half (52.30%) of the water in the home was filtered. Among the total household, 80% had good sanitation practices while 20.0% had poor sanitation practices. The results show that there was a significant association of age and religion of household with the sanitation practices. **Conclusions:** The study highlights there was gap in hygiene behavior and sanitation practices at household level. More attention must be paid to infrastructure investments that enable effective waste management services and water purification.

Keywords: Household, rural, sanitation practice, water.

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INTRODUCTION

Important prerequisites for preventing the spread of disease are infrastructure, behaviors, and services related to water, sanitation, and hygiene.[1] However, access to water, sanitation, and hygiene infrastructure, services, and practices such as frequent water system failures, subpar latrines, and bad behavioral patterns are problems in many low- and middle-income nations.[2] Poor hygiene, insufficient sanitation, and contaminated water are responsible for 6% of all fatalities worldwide and 9% of the burden of diarrheal illnesses.[3] Nearly 7% of the world's burden of diarrheal illnesses, as determined by disability-adjusted life years (DALYs), and over 4% of all fatalities globally, the majority of which are children in poor nations, are caused by inadequate water, sanitation, and hygiene.[4] There are reported diarrheal mortality rates of fewer than 1/100,000 people in nations with universally available improved water sources, sufficient sanitation, and good personal hygiene habits; in these countries, diarrheal deaths account for less than 1% of total fatalities.[5]

Health Sector Strategy Implementation Plan (NHSS–IP), 2016 to 2021, and Sustainable Development Goal (SDG), 2016 to 2030. However, in impoverished nations like Nepal, WASH is frequently overlooked while planning for health. One of the risk factors for

infectious diseases is inadequate WASH.[6] Therefore, there have been numerous international initiatives to give everyone on the planet long-term access to clean drinking water and proper sanitation. The progress report shows that, despite the notable results of these efforts, there are still significant regional, socioeconomic, and cultural disparities in access to sources of safe drinking water and basic sanitation, and that these disparities have sometimes widened among vulnerable and marginalized groups.[7] According to research, a poor quality of life and financial loss might arise from inadequate access to services. Numerous water-borne illnesses can be brought on by a lack of safe and clean drinking water, and these illnesses can have a financial impact on the impoverished in two ways. First, those with water-borne illnesses will need to travel to hospitals for care, which will raise their medical costs. Second, poor people's livelihoods are negatively impacted when they lose their jobs due to illness. The sustainability of the ecosystem and human health are also seriously threatened by poor sanitation.[8]

A cost-effective strategy for the prevention and management of infectious illnesses is to provide sustainable facilities for appropriate WASH.[9,10] Previous research has demonstrated that a lack of knowledge, poverty, political instability and lack of commitment, a lack of coordination and poor management of the infrastructure and resources related to WASH, gender bias, geographic limitations, and sociocultural factors are the main causes of inadequate, improved WASH practices.[10-14] There is little evidence regarding water and sanitation in the study area. Thus, the study aimed to assess the water and sanitation practices at household level in Rupa Rural Municipality, Kaski, Nepal.

METHODS

A cross-sectional study was conducted among household in Rupa Rural Municipality of Kaski district, Nepal. This study was part of the study "Comprehensive health status assessment of adult population and under five children of Rupa Rural Municipality of Kaski District of Nepal." A comprehensive health status assessment is a detailed assessment of an individual's physical, and environmental health status at household level. Out of nine wards, three wards were selected randomly. From three wards, households were selected based on proportionate to population size. The study was conducted from October 6 to October 16, 2024. The sample size for the study was performed by using the infinite population formula z^2pq/d^2 with 95% confidence interval. The prevalence of water and sanitation practice (p) was determined to be 50%. The absolute allowable error was set at 5%. The final sample size was 384. Face to face interview was conducted using a structured questionnaire. The observation checklist was used to observe water and sanitation practices. The questionnaire was prepared based on various studies. Pretesting was done among 10% of the sample size, and necessary modification was made. Independent variables include age, sex, ethnicity, religion, type of family, main occupation, and average monthly income in the family. Waste segregation, waste management, water purification, toilet availability, whether the toilet was clean, and the presence of soap and water in the toilet were observed and taken into consideration while evaluating the dependent variable. These objects were divided into two categories, 0 and 1. Following the addition of these criteria, sanitation practices were grouped according to mean values.

The Statistical Package for the Social Sciences (SPSS) version 21.0 was applied for data entry, cleaning, and analysis. All inferential analyses were conducted at a 5% level of significance. A chi-square test was applied to show the association of each independent variable with the outcome variable. Ethical approval was obtained from the Gandaki Medical College Institutional Review Committee (Ref. No. 03/081/082-F). Written informed consent was obtained from each participant. The objectives of the study were made clear to the participants, and confidentiality and the autonomy of the respondent was ensured.

RESULTS

Table 1 describes the socio-demographic status of the respondent at the household level. Out of 384 respondents, 232(60.4%) were females, and 155(40.4%) of respondents were above 50 years old. The majority 210(54.7%) of the respondents lived in joint family, followed by nuclear 150(39.1%) and extended family 24(6.3%). The majority of the respondents were from Janajati 164(42.7%). And most of the respondents 274(71.4%) followed the Hindu religion. The major occupation of the household was agriculture 210(54.7%). Most of the respondents 301(78.4%) had a monthly income of less than 50,000.

Table 2 results were based on the observation at household level. Out of total household, three fourths of the respondents 291(75.8%) had separate kitchens in their house. The majority 311(81%) of the households claimed that they segregate waste and 212(55.2%) had good practice of waste disposal. Good practice includes burial and municipality vehicle. More than half 201(52.3%) of the household purified water. Most of the household 360(93.7%) had a toilet at their house. Among the respondents, 61(15.9%) had no soap and water in the toilet while 308(80.2%) of

households had clean toilets.

Table 1: Socio-demographic characteristics of household (N=384)

Characteristics		Frequency	Percentage (%)
Sex of the respondents	Male	152	39.6%
	Female	232	60.4%
Age of the respondents (in years)	30	96	25%
	31-50	133	34.6%
	>50	155	40.4%
Type of family	Nuclear	150	39.1%
	Joint	210	54.7%
	Extended	24	6.3%
Ethnicity of the respondents	Brahmin	84	21.9%
	Chhetri	42	10.9%
	Janajati	164	42.7%
	Dalit	58	15.1%
	Other*	36	9.4%
Religion of the respondents	Hindu	274	71.4%
	Buddhist	44	11.5%
	Muslim	66	17.2%
Main occupation	Agriculture	210	54.7%
	Business	31	8.1%
	Daily wages	42	10.9%
	Service	21	5.5%
	Foreign employment	80	20.8%
Monthly income (in Rs.)	≤50 thousand	301	78.4%
	>50 thousand	83	21.6%

*Muslim, Terai Caste

Table 2: Sanitation practices at household level (N=384)

Characteristics		Frequency(n)	Percentage(%)
Separate kitchen	No	93	24.2%
	Yes	291	75.8%
Waste segregation	No	73	19%
	Yes	311	81%
Waste disposal practice	Poor	172	44.8%
	Good	212	55.2%
Water purification	No	183	47.7%
	Yes	201	52.3%
Availability of toilet	No	24	6.3%
	Yes	360	93.7%
Availability of soap and water in toilet	No	61	15.9%
	Yes	323	84.1%
Toilet sanitation	Poor	76	19.8%
	Clean	308	80.2%

Figure 1 describes the sanitation practice at household level. Among the total household, 80% had good sanitation practices while 20% had poor sanitation practices.

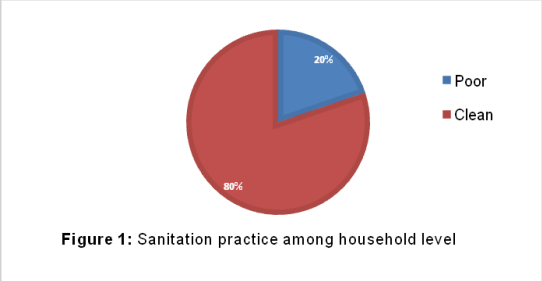

Figure 1: Sanitation practice among household level

The results show the association of independent characteristics and sanitation practices. Age above 50 years had poor sanitation (51%) practices compared to other age group. There was a significant association of age (p=0.039) and religion (p=0.028) with sanitation practices. However, sex of the respondents, type of family, ethnicity, and main occupation of household, and monthly income did not have statistically significant association with sanitation practices. (Table 3)

Table 3: Association of sanitation practices with independent variables (N=384)

Characteristics		Sanitation practice		Chi-square value	p-value
		Poor(%)	Good(%)		
Sex of the respondents	Male	75(49.6%)	77(50.7%)	3.197	0.092
	Female	93(40.1%)	139(59.9%)		
Age of the respondents (in years)	≤30	41(42.7%)	55(57.3%)	6.494	0.039**
	31 to 50	48(36.1%)	85(63.9%)		
	>50	79(51.0%)	76(49.0%)		
Type of family	Nuclear	66(44%)	84(56.0%)	0.061	0.970
	Joint	91(43.3%)	119(56.7%)		
	Extended	11(45.8%)	13(54.2%)		
Ethnicity of the respondents	Brahmin	44(52.4%)	40(47.6%)	7.483	0.112
	Chhetri	22(52.4%)	20(47.6%)		
	Janajati	63(38.4%)	101(61.6%)		
	Dalit	27(46.6%)	31(53.4%)		
	Other*	12(33.3%)	24(66.7%)		
Religion of the respondents	Hindu	117(42.7%)	157(57.3%)	7.133	0.028**
	Buddhist	27(61.4%)	17(38.6%)		
	Muslim	24(36.4%)	42(63.6%)		
Main occupation	Agriculture	93(44.3%)	117(55.7%)	1.362	0.851
	Business	14(45.2%)	17(54.8%)		
	Daily wages	15(35.7%)	27(64.3%)		
	Service	9(42.9%)	12(57.1%)		
	Foreign employment	37(46.3%)	43(53.8%)		
Monthly income (in Rs.)	≤ 50 thousand	133(44.2%)	168(55.8%)	0.108	0.803
	>50 thousand	35(42.2%)	48(57.8%)		

*Muslim, Terai caste, **denotes statistical significance (p<0.05)

DISCUSSION

In this cross-sectional study, we study assessed water and sanitation practices among households level. The

findings highlight both encouraging trends and ongoing challenges in achieving adequate WASH (Water, Sanitation, and Hygiene) practices at the household level. The results indicate high progress in improved basic infrastructures for sanitation and hygiene as most of the households (93.7%) had access to toilets while most of them (80.2%) had clean toilets. These findings are consistent with previous national surveys indicating improvements in sanitation coverage in rural Nepal.[15] Additionally, 84.1% of households had soap and water available in toilets, a positive indicator for hygiene behavior. However, the current study revealing the fact that 15.9% still lacked access to soap and water points potential gaps in hygiene promotion and behavioral change efforts though is improving compared to previous national survey report by UNICEF and NDHS 2022.[16.17]

Similarly, the availability of toilet (93.7%), hand washing facility in toilet (84.1%) as well as segregation of waste (81%) by the households has been reflected as most (80%) households having good sanitation practices. It was observed that 80.2% of households had kept their toilets clean. Though it seems convincing as most households have a better condition, the gap exists ranging from 15% to 20% in improving the basic amenities while it's critical that more than 6% households did not have toilets though the district had already gained Open Defecation Free status. It might have arise due to the impact of the natural disasters occurring at times that people have not reconstructed their toilets. Similar findings have been reported from a study conducted in rural setting of India where around 90 percent of the households had their own toilets and 5% had reported preferring open defecation in fields. Likewise, only 63% had water availability in the toilets and had a good rating of toilet quality.[18]

Waste segregation has a crucial role in sanitation practices. The waste segregation and water treatment for use in Rupa Rural Municipality seems better than the concurrent rural studies. The waste segregation practiced by most (81%) and a majority households having good waste disposal practice (55.2%) and water purification (52.3%) compared to that of Indian study reporting the waste segregation practiced by 30.8 % of the households, only 42.8% treating their drinking water and 40.6% having improper waste disposal nearby household surrounding.[18] Compromised hygiene practice frequently reported by other studies as well.[19] Such practices has been linked to higher morbidities due to water borne diseases.[20] While the challenging public health situation due to high burden of water borne infections like cholera, typhoid, dysentery and diarrheal diseases as well as neglected tropical diseases like intestinal worms, trachoma in African nations attributed to the poor WASH practices requiring cross cultural, economic and sustainable plans for improving WASH practices.[21]

Despite 81% of households claiming to segregate waste, only 55.2% demonstrated good waste disposal practices. This gap may be due to limitations in waste management facilities from the rural municipality or a lack of community awareness on proper waste disposal practices. Similarly, more than half (52.3%) of the households reported using purification of their drinking water, a few less than half (47.7%) did not had water purification practices. The unsafe water use has been raising concerns about the risk of waterborne illnesses and diarrheal diseases as causes of morbidity in low-income settings.[4] While a review by UNICEF identified strong impact of WASH on ten of the key areas diarrhoea, nutrition, complementary food hygiene, female psychosocial stress, violence, maternal and newborn health, menstrual hygiene management, school attendance, oral vaccine performance, and neglected tropical diseases. It further stresses the significance of interventions for improving optimal WASH practices.[22]

The current study found that two of the socio-demographic factors viz. age and religion had a significant association with sanitation practices. Participants with higher age (>50 years) were less likely to have good sanitation practices compared to participants from younger age. Similar significant association of younger age group participants having good sanitation practices was found in a national survey in Nepal. This could be attributed to generational differences in awareness or adaptability to newer health practices.[3] Regarding religion, a higher proportion of Muslims (63.6%) and Hindus (57.3%) had good sanitation practices compared to Buddhists (38.6%). It aligns with the studies highlighting culture and religious norms as influencing factors of sanitation and health behaviors.[23,24] It influence how communities perceive cleanliness, disease prevention, and healthcare practices.

In contrary, variables such as sex, family type, ethnicity, occupation, and income were not found to be significantly associated with sanitation practices. It indicates while socio-economic factors are generally important for WASH practices the local governance structures and health promotion programs would be more important in this rural setting. A cross-sectional multilevel analysis of WASH practices among mothers of under 5 children from Nepal's Demographic and Health Survey shows the higher wealth index and higher educational status having higher probability of better WASH practices for both fathers and mothers.[25] Similar analysis of the Multi Indicator Cluster Survey from Nigeria aligns with reporting education of the

household head and the wealth index having association with access to sanitation facilities while access to hygiene facilities was associated with the sex of the household head.[26] The concurrent studies have highlighted the importance of other contextual factors such as community education, health promotion programs and the local governance structures or political will in shaping the WASH practices at household levels.[27]

The results from the study aligning with global research highlight that inadequate WASH access is often influenced by a complex interaction of knowledge gaps, cultural practices, political will, and resource management. This further creates the demand for interventions for addressing gaps in people's behavior and essential infrastructure for proper sanitation and hygiene practices. Despite the global and national commitments—such as SDG 6 (ensure availability and sustainable management of water and sanitation for all) and NHSS-IP 2016–2021 outlines WASH priorities —local implementation remains a challenge, especially in rural and marginalized areas.[28] The limitations of the study was it was cross-sectional study and only bivariate analysis was done, hence, casual relation cannot be established.

CONCLUSIONS

The study revealed that despite improvements in sanitation infrastructure in Rupa Rural Municipality, there are still significant gaps in hygiene behaviors and water safety practices. Further focus on investment in infrastructures for water purification support and efficient waste management services is also required. This not only improves household sanitation behavior but also reduces the burden of infectious diseases and facilitates meeting the development goals.

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AUTHORS' CONTRIBUTIONS

IB did Concept and design of research, literature search, data collection, analysis, interpretation, manuscript preparation and editing. SK did literature search, review of manuscript. SB did design of research, literature search, data collection, analysis, interpretation, manuscript preparation and editing, finalization of manuscript. All the authors have read and approved the final draft.

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