

Household WASH Facilities (Water, Sanitation and Hygiene) and Hygiene Practices among Indian Children (11-17 years)

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Abstract

Purpose: Despite the importance of WASH, yet in developing countries such as India, there is a high prevalence of water and sanitation related diseases, especially among poor children, living under unhygienic conditions, who are already at higher risk for health and nutritional problems. Therefore, a study was undertaken to assess household WASH facilities and hygiene practices among children (N=1050, aged 11-17 years) from government schools of Punjab (India). Methods: A cross-sectional survey was conducted to obtain data on demographic profile, socio-economic status; household WASH facilities (water, sanitation, waste disposal, potable water use) and hygiene-related practices (hand washing and body hygiene) of school-children. Results: Among Punjabi school-children, hand washing with soap, before and after a meal (42% each) was seen practiced less compared to hand washing after using the toilet (78%). Less than half of school children used to bath (49%), brush teeth (48%) and change clothes (44%) daily. Slightly over half of school children were cleaning ears (50%) and cutting nails (52%) on a monthly basis. Regarding household WASH facilities, it was observed that, majority of the subjects had household piped water connections (63%) and improved (flush system) sanitation facility (64%). Most of them were not consuming potable water (73%), and reported throwing waste in garbage pits/on roads (71%). However, urban school children had better WASH practices and household facilities than rural school children. Children from government schools of Punjab did not meet the basic hygiene standards. The study findings underscore the need for implementation of WASH education in schools and awareness programs in rural communities, especially from low-income families.

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INTRODUCTION

New research on malnutrition, which leads to childhood stunting, suggested that an underlying cause of it may be an abundance of human waste polluting soil and water, rather

than a scarcity of food (WHO, 2012). Consumption of unsafe water, inadequately protected water sources, inappropriate waste disposal and unhygienic conditions around

homes has significant implication for spreading infectious and preventable diseases such as cholera, dysentery, hepatitis and especially diarrhea (Shibulal, 2013). Diarrheal diseases and poor dietary intakes are the principal causes of growth failure in early childhood, which proves that environmental factors like poverty, and not genetic or racial ancestry, account for most of the differences in growth between populations (Awoyemi *et al.*, 2012). Poor knowledge, practice and attitudes towards personal hygiene play major roles in the high incidence of communicable diseases and therefore has negative consequences for the child's long term overall development. It is further believed that personal hygiene in children depends also on active, passive and assisted cues they observed from people and adopt in an integrated manner (Ahmadu *et al.*, 2013).

Water, sanitation and hygiene (WASH) refers to a combination of technical (drinking water, hand washing, toilet and soap facilities) and human development components (activities that promote conditions and the practices of children that help to prevent WASH related diseases) that are necessary to produce a healthy environment and to develop or support appropriate health and hygiene behaviour (Sarkar, 2013). An individual's abilities and aptitude to perform the behaviour given appropriate conditions may be important internal factors (Quintero *et al.*, 2009). In developing countries, 2/3rd of the region does not have proper sanitation facilities and, wherever the facilities are present they are mostly inadequate (Pynnonen *et al.*, 2014). WASH related diseases account for 60 million disability-adjusted life years lost annually (World Bank, 2014b). About 28% of the children can be prevented from death each year only if WASH is addressed properly (Challenge, 2011). The incidence of various waterborne illnesses can be reduced with the improved supply of drinking water (Awoyemi *et al.*, 2012).

Since the beginning of 20th century,

school health services have tended to focus on nutritional support and clinical assessment. These inputs are necessary, but so is the need to assess the state of personal hygiene among children, which is directly or indirectly related to poor nutritional status of lower middle class children, especially in a developing country like India (Varu, 2008). WASH behaviour of school children, is not commonly studied during national level surveys of India, such as National Family Health Survey (NFHS) and District level household survey (DLHS), which are restricting data to children below 5 years of age; National Sample Survey Organization (NSSO), not specifying data for children; and National Nutrition Monitoring Bureau (NNMB) representing mostly rural population. The source of this knowledge gap can be the lack of standard method for assessing WASH behaviour of children. Consequently, from Punjab (India), studies based on WASH practices among school children, are almost non-existent. This study will assist the policy makers in developing comprehensive health and hygiene intervention programs; which will result in decreasing the burden of communicable disease in the country. Therefore, it becomes pertinent to assess household level WASH facilities and hygiene practices followed by children from government schools of Punjab.

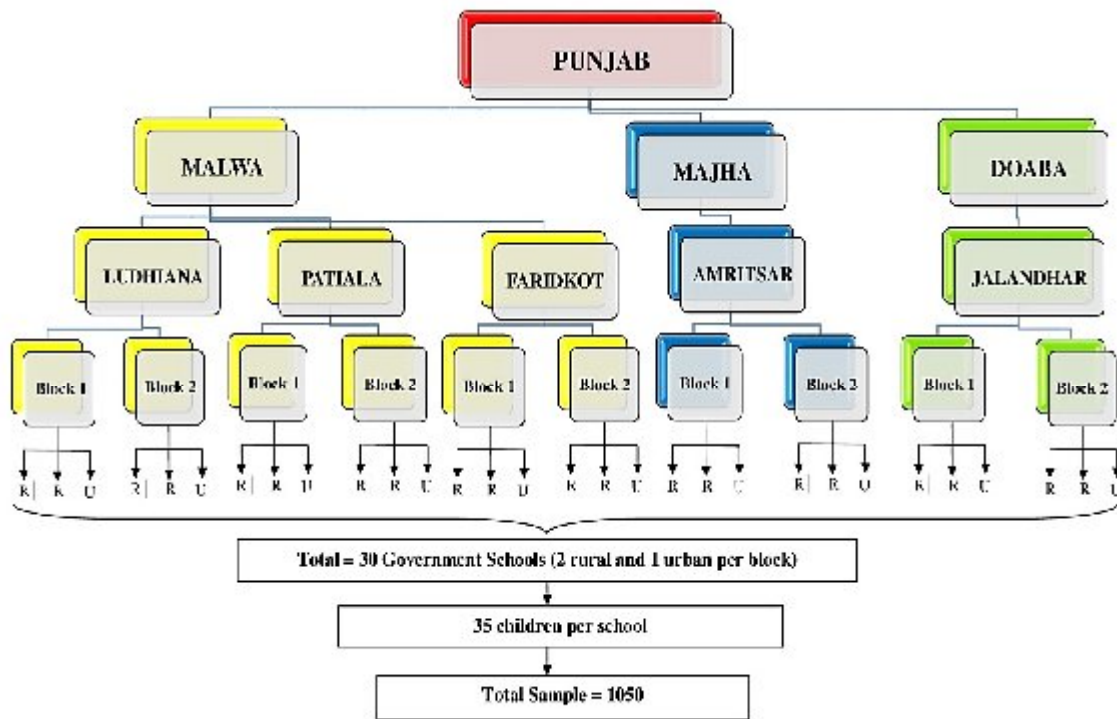
MATERIALS AND METHODS

Location and Selection of the subjects:

Thirty-cluster multistage sampling technique was used for the study. A total of 5 districts; including, 1 from Majha (Amritsar); 1 from Doaba (Jalandhar) regions and 3 districts from Malwa region (Ludhiana, Faridkot and Patiala) of Punjab were selected targeting school-going children. In the next stage of sampling, 2 blocks from each district were selected. The last stage included selecting 2 rural and 1 urban government schools from each block selected in order to have a total random sample size of 1050 children in the age group of 11-17 years,

representing the school-going children of Punjab state. Proportion of the subjects from rural schools (n=700) was more as compared to urban schools (n=350) because the

percentage of rural population to the total population of Punjab is higher (Census of India, 2011). The summarized sampling design is shown in Fig. 1.



R = Rural government school, U = Urban government school

Fig 1: Sampling design for the selection of school children from Punjab

Demographic and Socio-economic profile: Using a well-structured questionnaire, information related to gender (girls and boys); caste (General, Scheduled Caste/SC and Backward caste/BC); religion (Sikh, Hindu and Others-Muslim, Christian, Jain) of the subjects; and education (No education, Up to matric and Above matric); occupation (farming, business, service, labour, self-employed); and income (Up to Rs. 5000, 5000-10,000, 10,001-20,000 and Above 20,000) of the parents was recorded.

WASH facilities and hygiene-related practices: Information on hygiene-related practices such as hand washing with soap/HWWS (before meal, after meal and after using the toilet), and body hygiene practices (frequency of bathing, brushing, cleaning ears, cutting nails and changing clothes) was

collected. Data on household WASH facilities included, water supply (household piped water connections/HPWC, public stand post, tube well/borehole and hand pump); potable water use; sanitation facility (flush system, dry toilets, open defecation/OD); and waste disposal facility (garbage pits/on road, dustbin, municipal corporation/MC).

Statistical Analysis of Data: The completed questionnaire was serially coded and tabulated. For descriptive analysis, the percentages were calculated using SPSS Windows version 16.0 (SPSS Inc., USA).

Ethical Approval: Institutional Ethical Committee's approval has been obtained prior to the start of the study. Consent of each participant was also ascertained from the parents through the school authorities.

RESULTS AND DISCUSSION

Demographic and socio-economic profile

Table 1: Demographic and socio-economic profile of school children from government schools of Punjab (N = 1050)

<i>Parameter</i>	<i>Category</i>	<i>Number (%)</i>
<i>Gender</i>	Girls	613 (58)
	Boys	437 (42)
<i>Religion</i>	Sikh	710 (68)
	Hindu	303 (29)
	Others (Muslim, Christian, Jain)	37 (3)
<i>Caste</i>	General	242 (23)
	SC	586 (56)
	BC	222 (21)
<i>Parent's education</i>		
<i>Mother</i>	No education	383 (37)
	Up to matric	591 (56)
	Above matric	76 (7)
<i>Father</i>	No education	264 (25)
	Up to matric	651 (62)
	Above matric	135 (13)
<i>Parent's occupation</i>		
<i>Mother</i>	Labour	170 (16)
	Housewife/non-working	798 (76)
	Self-employment/service/farming/any other	82 (8)
	Farming	136 (13)
<i>Father</i>	Business	48 (5)
	Service	119 (11)
	Labour	546 (52)
	Self-employed	168 (16)
	Any Other	12 (1)
<i>Family income (Rs.)</i>	Non-working/Late	21 (2)
	Up to 5000	363 (35)
	5000-10,000	423 (40)
	10,001-20,000	164 (16)
	Above 20,000	100 (9)

As depicted in Table 1, majority (68%) of the children were Sikhs, followed by Hindus (29%) and the rest were from other religions. Over half (56%) of the subjects belonged to scheduled castes (SC). Majority of the children's mothers (56%) and fathers (62%) were educated up to matric and very few (7% mothers vs. 13% fathers) were educated above matric, thus indicating that number of those without any worthwhile schooling was quite substantial. Furthermore, labour was the most pursued occupation of the fathers (52%); and

mothers were mostly housewives (76%). The unemployment was more frequent in mothers in comparison to fathers of the children which might be due to the lower literacy rate and fewer job opportunities for uneducated mothers. Most (75%) of the children studied were from low socio-economic status households, earning \leq Rs. 10000/month.

Hygiene

HWWS practices followed by school children from urban and rural government schools of Punjab are shown in Figure 2.

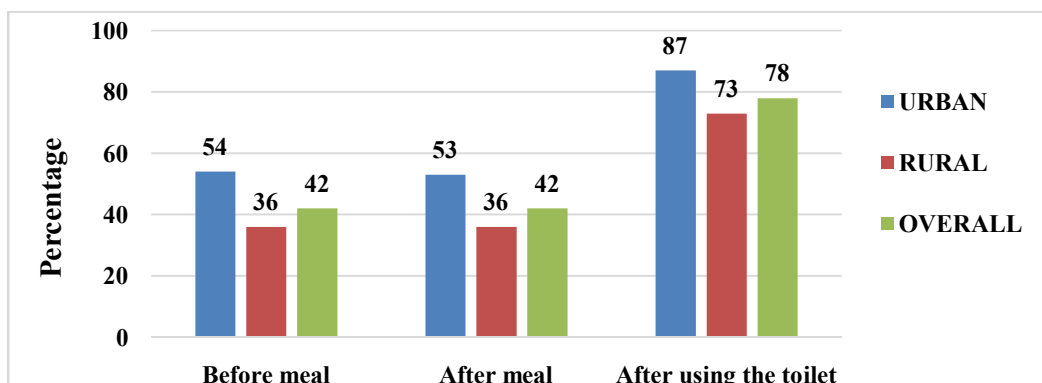


Fig. 2: HWWS practices followed by school children from urban and rural government schools of Punjab

Hand Washing with Soap (HWWS)

About 54% vs 36% of the urban and rural school subjects from Punjab, reported washing hands before meals; 53% vs. 36% used to wash hands after a meal; majority (87% vs. 73%) reported washing hands after using the toilets, respectively. Overall from Punjab, equal proportion (42% each) of the subjects reported washing hands before and after a meal; while most (78%) of them reported washing hands after using the toilet. In India, more than half of the households still do not use soap for washing hands before and after the meals (Total Sanitation Campaign, 2013). Worldwide, hand washing after using a sanitation facility or

contact with faecal matter is practiced by only 19% of people, with a mean of 14% in low-and middle-income countries, and 43% in high-income countries (Freeman *et al.*, 2014). HWWS is considered as one of the most cost-effective means of preventing faecal-oral transmitted diseases and other infections, especially in developing countries (Curtis *et al.*, 2011).

Body Hygiene Practices

Body hygiene practices followed by school children from urban and rural government schools of Punjab are shown in Table 2.

Table 2: Body hygiene practices followed by school children from urban and rural government schools of Punjab

Hygiene practices		Urban (n=350)	Rural (n=700)	Punjab (N = 1050)
Bathing	Daily	198 (56)	316 (45)	514 (49)
	Alternate days	145 (41)	332 (47)	477 (45)
	Weekly	7 (2)	52 (7)	59 (6)
Brushing teeth	Daily	195 (56)	304 (43)	499 (48)
	Alternate days	146 (42)	329 (47)	475 (45)
	Weekly	9 (3)	67 (10)	76 (7)
Changing Clothes	Daily	198 (57)	269 (38)	467 (44)
	Alternate days	152 (43)	431 (62)	583 (56)
	Weekly	122 (35)	120 (17)	242 (23)
Cleaning ears	Fortnightly	84 (24)	201 (29)	285 (27)
	Monthly	144 (41)	379 (54)	523 (50)
	Weekly	115 (33)	109(16)	224 (21)
Cutting nails	Fortnightly	82 (23)	199(28)	281 (27)
	Monthly	153 (44)	392(56)	545 (52)

Figures in parentheses represent percentages

Bathing, Changing Clothes and Brushing Teeth: from the urban and rural schools of Punjab, about 56% vs. 45%, 41%

vs. 47% and 2% vs. 7% of the subjects bathed, daily, at alternate days and weeks; whereas, about 57% vs. 38% of the urban and rural

school subjects reported changing clothes daily, followed by, at alternate days (43% vs. 62%), respectively. Fifty-six % vs. 43%, 42% vs. 47% and 3% vs. 10% of the subjects reported brushing daily, at alternate days and weekly, respectively. Overall from Punjab, about 49% and 48% of the subjects used to take bath and brush teeth daily, followed by, at alternate days (45% each) and weekly (6% and 7%), respectively; while, regarding changing clothes, it was found that, over half (56%) of the subjects used to change clothes at alternate days, followed by daily (44%).

Cleaning Ears and Cutting Nails

Most (41% and 44%) of the subjects from urban schools used to clean ears and cut nails monthly, followed by, weekly (35% and 33%) and fortnightly (24% and 23%); whereas, from the rural schools, over half (54% and 56%) of the subjects reported cleaning ears and cutting

nails monthly, followed by, fortnightly (29% and 28%) and weekly (17% and 16%), respectively. Overall from Punjab, most (50% and 52%) of the subjects reported cleaning ears and cutting nails monthly, followed by, fortnightly (27% each) and weekly (23% and 21%), respectively. Understanding the importance of personal hygiene allows child to make informed decisions about how to care for their health and appearance, and hygiene also plays an important role in social acceptance; which, based on positive or negative hygiene behaviour either improve or hinder a person's reputation in social situations.

Household WASH facilities

Table 3 provides information regarding household WASH facilities reported by school children from urban and rural government schools of Punjab.

Table 3: Household WASH facilities reported by school children from urban and rural government schools of Punjab

WASH facilities	Urban (n=350)	Rural (n=700)
Water Supply		
<i>HPWC</i>	234 (67)	424 (60)
<i>Public stand post</i>	11 (3)	33 (5)
<i>Tube well/borehole</i>	50 (14)	141 (20)
<i>Hand pump</i>	55 (16)	102 (15)
Potable Water Use	123 (35)	163 (23)
Waste Disposal		
<i>Garbage Pits/On Road</i>	184 (53)	559 (80)
<i>Dustbin</i>	110 (31)	130 (19)
<i>MC</i>	56 (16)	11 (2)
Sanitation Facility		
<i>Flush system</i>	268 (77)	408 (58)
<i>Dry toilets</i>	61 (17)	190 (27)
<i>OD</i>	21 (6)	102 (15)

Figures in parentheses represent percentages

Fig. 3 depicts household WASH facilities reported by school children from Punjab.

Water Supply

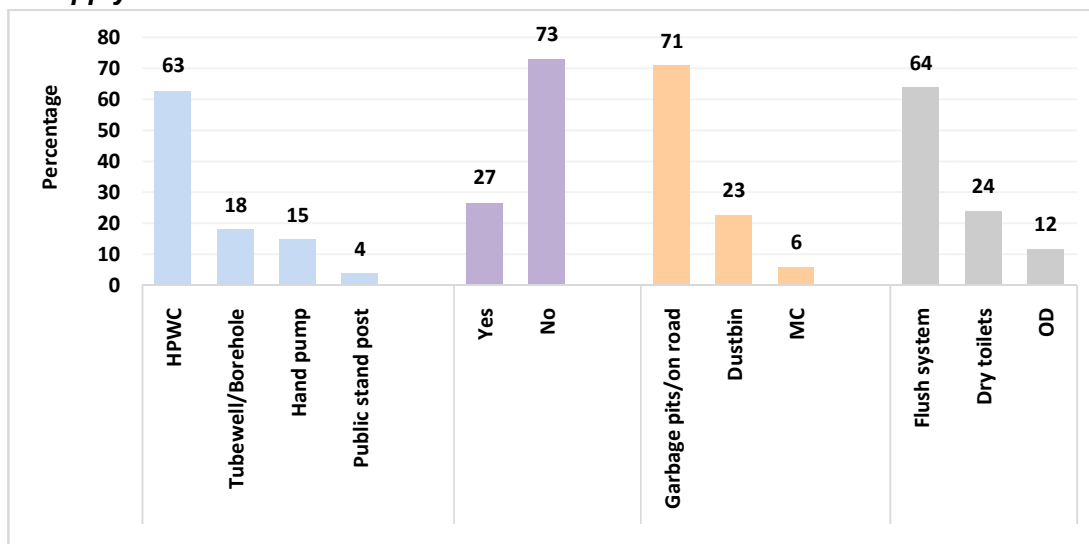


Fig. 3: Household WASH facilities reported by school children from government schools of Punjab

The water supplied through household taps and public stand posts have been generally referred to as water supply from piped water sources. Data regarding source of water used by the subjects showed that, from the urban and rural schools of Punjab, majority (67% vs. 60%) of the subjects had HPWC; whereas, 14% vs. 20% were using tube well/borehole, 16% vs. 15% were using hand pump, respectively; while, few had to use public stand post. Overall, majority of the subjects from Punjab had HPWC (63%), followed by tube well/borehole (18%) and hand pump (15%). Similarly, DLHS-4 (2012-13) noted that about 60% of the households are using piped water for drinking and 37% of households are using tube well or borehole water. According to Census of India (2011), 34% of rural households in Punjab use hand pump, followed by, tube well/borehole; whereas 35% use tap water. In contrast, NFHS-4 (2015-16) reported 99% households in Punjab using improved drinking-water source. Even though more households in Punjab have piped water connections than in any other part of India (World Bank, 2014a); the quality of water in Punjab remains substandard when compared to

other Indian states (World Bank, 2015).

Therefore, the state is exploring the feasibility of tapping its abundant rivers and canals for household water supply.

Further, according to study results, very few (4%) subjects from Punjab reported using public stand post. The burden of fetching water from distant sources outside the home takes time away from productive, educational or leisure activities (UNICEF, 2006). Consistent with study results, Census of India (2011) showed that in urban parts of Punjab, Goa, Uttarakhand, Gujarat and Jammu & Kashmir, less than 5% households had source of drinking water away from the households; while, in other states it ranged from 10-40%, with maximum in rural parts of Jharkhand, Madhya Pradesh, Rajasthan, West Bengal and Chhattisgarh; and lower range in urban parts of six poor performing states such as Odisha, Jharkhand, West Bengal, Madhya Pradesh, Chhattisgarh and Andhra Pradesh.

Potable Water Use

From the urban and rural schools of Punjab, about 35% vs. 23% of the subjects were consuming potable water, respectively. Overall, from Punjab, only 27% of the subjects

reported consuming potable water; whereas, majority (73%) had never treated their drinking-water. Similarly, Samra *et al.* (2011) showed that about 63% of respondents were not consuming potable water. According to NSS-69th round (2013), about 31% vs. 12% of urban and rural households in Punjab consume potable water; which was found to be lower than the national averages of 32% vs. 54%, respectively. Although, Punjab has made great strides in making drinking water available to its population; however, the ground realities in terms of social development are quite different as accessibility of safe drinking water is still an issue and, in some areas, the water is heavily contaminated with toxic metals, thus posing a greater health risk to population of Punjab (World Bank, 2013).

Waste Disposal

About 53% vs. 80% and 31% vs. 19% of the subjects from urban and rural schools of Punjab, used to throw waste in garbage pits/on road and in dustbins, respectively; whereas only 16% vs. 2% of the subjects reported that disposal of waste was arranged by MC. Overall from Punjab, majority (71%) of the subjects used to throw waste in garbage pits/on road, 23% used dustbins and only 6% reported that it was arranged by MC. Awareness among people regarding right method of waste disposal is very important as they tend to get rid of the garbage easily without caring about its safe disposal. It is the responsibility of each and every individual in the society to take care and adopt that disposal of waste is being conducted in sustainable and environment friendly manner. Moreover, community, panchayat and municipality, should not consider disposal of waste as a problem, but an opportunity to make improvement in an environment where we live.

Sanitation Facility

Majority (77% vs. 58%) of the urban and rural school subjects had flush system at home; 17% vs. 27% used dry toilets; whereas only 6% vs. 15% of the subjects reported open

defecation/OD, respectively. Overall from Punjab, majority (64%) of the subjects had flush system, followed by dry toilets (24%) and 12% of the subjects reported practice of OD. According to NFHS-3 (2005-06), overall 81.5% of the households in Punjab (85% urban vs. 79% rural households) are using improved sanitation facility. As indicated in study results, the percentage of subjects who practiced OD was higher from rural schools as compared to urban schools. Consistently, UNICEF (2016) documented that access to and usage of toilets to achieve OD free (ODF) status is a major challenge in rural areas.

Several factors can influence sanitation status such as, education, type of housing, hygiene practices, and water availability (WHO/UNICEF, 2011). Similar to study results, NSS-69th round (2013) also showed that few urban (6%) and some rural households (22%) in Punjab did not have any toilet facility. Consistently, Census of India (2011) reported that, in Punjab, about 19.5% households practiced OD. According to DLHS-4 (2012-13) in Punjab, about 87% of households had improved sanitation facility.

In the study, percentage of the subjects reporting OD, from Punjab, was less compared to those reported in these national level surveys for Punjab; and also was far lower than the national average; which indicated that there may be an improvement in sanitary conditions of the households in Punjab. However, at national level, the pathetic state of sanitation index has put the country behind Pakistan, China, Bangladesh, and Nigeria (Purohit, 2015 and Manjari, 2016). Although at slower pace, the country still managed to made significant progress in terms of coverage and outcomes (Total Sanitation Campaign, 2013).

Hygiene promotion should not be looked at in isolation; but along with the sense of environmental hygiene; which seemed to be lacking among children from government schools of Punjab. Government schools, especially based in rural settings, usually have substandard WASH facilities that could restrict

children from adopting positive hygiene behaviour and obstruct health promotion efforts. Comprehensive school and community-based hygiene education and awareness programs, water treatment and proper waste disposal programs, as well as strategies from UNICEF's WASH program, should be fully implemented in rural communities (UNICEF, 2009), at state or district level to address the current situation in Punjab.

CONCLUSIONS AND RECOMMENDATIONS

Most of the children from government schools of Punjab did not meet the basic hygiene standards, as less than 50% did not bath, brush teeth and change clothes daily. Slightly over 50% were cleaning ears and cutting nails monthly. HWWS before and after a meal was seen practiced less compared to hand washing after using the toilet. This could be attributed to low socio-economic status, illiteracy among parents, knowledge gap among children, and lack of motivation among teachers for providing hygiene education. Although, at household level, most of them had improved WASH facilities; consumption of non-potable water and waste disposal on roads, was the major problem. Urban school children were seen following good WASH practices more frequently as compared to rural school children. Hence, it can be concluded that educating children about personal hygiene is of utmost importance.

Authors' Contributions

Sukhdeep Kaur, Kiran Bains and Harpreet Kaur contributed to conception, design, analysis and interpretation; drafted, critically revised the manuscript and gave final approval. Sukhdeep Kaur agrees to be accountable for all aspects of work ensuring integrity and accuracy.

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