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Personal hygiene practice and associated factors among elementary school students in Fiche Town, Oromia, Ethiopia

Getaneh Haile Minda^{1*}, Habiteyes Hailu Tola¹, Abebe Feyissa Amhare², Asefa Kebie¹ and Tewodros Endale¹

Abstract

Background Students in school are more likely to be sick from communicable diseases like diarrheal illnesses, acute respiratory infections, and other illnesses linked to poor personal hygiene. Poor hygiene practices are common among school children and put their health at risk, which in turn has several consequences. These include significant school absences, transmission of infectious diseases to other students, and missed workdays for parents and guardians. However, there is limited evidence on the level of personal hygiene practice and its associated factors among school students. Thus, this study was aimed at determining personal hygiene practice level and its associated factors among elementary school grade (5–8) students in Fiche town, Oromia, Ethiopia, in 2022.

Methods A cross-sectional study design was conducted from April 29 to May 29, 2022, in Fiche town, Oromia regional state, among 534 elementary school students. A multi-stage probability sampling technique was used to select the individual students. A structured questionnaire was used to collect the data. The data was entered into epi-data version 4.6 and analyzed by SPSS version 26.0. Variables that scored a p-value less than 0.2 during bivariate analysis were included in multilevel logistic regression models to determine factors associated with personal hygiene practice. The odds ratio with a 95% confidence interval was estimated, and the level of significance was set at ≤ 0.05 .

Results The magnitude of good personal hygiene (scored above the mean) was 59.2% (95% confidence interval (CI)) (55.1–63.0). A considerable proportion of students scored more than 50% in latrine use (62.5%), regular hand-washing (55.4%), and oral hygiene (55.20%) practices. Being female, having good personal hygiene knowledge, doing hygiene inspections at school, and having latrine accessibility was significantly associated with good personal hygiene among elementary school students.

Conclusion Considerable proportion of elementary school students in Fiche town have score poor personal hygiene practice. Interventions aimed that target improving knowledge of personal hygiene and hygiene inspection at school are crucial to enhance the personal hygiene among elementary school students.

Keywords Personal hygiene, Latrine utilization, Hand washing, Oral hygiene, School health

*Correspondence:

Getaneh Haile Minda
getanehhaile3@gmail.com

¹Department of Public health, College of Health Science, Salale University, Fiche, Ethiopia

²School of Public Health, Xi'an Jiaotong University, Xi'an, China



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Introduction

The term “hygiene” refers to the practice of keeping oneself and one’s surroundings clean, mainly in order to avoid illness or disease spread [1–3]. Hygiene is the process of cleansing an environment of any pathogens that could cause illness [4]. The majority of health problems affecting school students can be prevented by encouraging personal hygiene (PH) practices among schoolchildren and family members. Poor school sanitation and personal hygiene are the main problems with school setup, and it is still a high-risky habit among elementary school students [2, 4]. The majority of diarrheal disease-related illnesses could be avoided if schools had a reliable, safe water supply and good sanitation practices [2, 4].

Globally, there are 2.4 billion people who live without adequate sanitation; 758 million do not have access to improved water sources; and 673 million still defecate in the open field [5]. Beyond the immediate implications for the child’s health, poor HP in children can have major economic and social effects, including significant school absences; the spread of infectious agents to others; and lost workdays for parents and guardians. Around 1.9 billion educational days are lost due to sickness each year globally on average due to sickness that could be prevented [2, 4]. Water-related illnesses account for approximately 443 million school days missed each year in the developing world, making them a major cause of school absences [6].

Over two million people die each year from diarrheal illnesses, with children being more at risk of dying from these infections [7]. Over 80% of diseases are linked to poor hygiene in underdeveloped countries [7]. Poor water, sanitation, hygiene (WASH) accounts for 60% of the burden of communicable diseases (CD) in Ethiopia, and over 250,000 children die yearly [6]. As a result, CDs are considered the major causes of illness, death, and disability in Ethiopia. Schools with poor hygiene and intense person-to-person contact are highly risky environment for children [6]. However, few schools in Ethiopia have a water supply and toilet facilities for sanitation and hygiene purposes [8].

Despite considerable evidence on PH problems among general population in Ethiopia, there is an evidence gap on PH among elementary school students. Moreover, there are limited evidence regarding personal hygiene practices among elementary school students the study area. In addition, students are at greater risk of acquiring diarrheal diseases, acute respiratory infections, and other personal hygiene-related diseases in schools. However, there is limited information on the factors affecting personal hygiene in elementary schools. Therefore, this study was aimed to determine the magnitude of personal hygiene and associated factors among elementary school students in Fiche town.

Methods and material

Study design and setting

An institution-based cross-sectional study design was used to determine personal hygiene practice and its associated factors among elementary school students in Fiche Town, Oromia region, Ethiopia. There were 13 primary schools in the town. Of these, eight were grade 5–8 schools, while five were grade 1–4 schools. Based on the data obtained from the education bureau, of the 9292 primary school students, 4818 were in grades 5–8 and enrolled in school for 2021/22 academic years. This study was conducted in elementary schools in Fiche town from April 29 to May 29, 2022, among all students who were in the secondary cycle (grades 5–8).

Population

Inclusion and exclusion criteria

All grade 5–8 students who admitted for 2021/22 academic year were included in the study. However, mentally and physically incapable students were excluded from the study.

Sample size determination

The sample size was calculated using a single population proportion formula by assuming 30% true population prevalence of good personal hygiene practice among the students [6], 5% margin of error, 95% confidence interval, and 1.5 design effect. Accordingly, the determined sample size was 323 students. By accounting for the design effect within the clusters (schools and grade) the sample size was increased by 1.5 design effect and the total sample size became 485 students. The sample size further increased by 10% for non-response rate and the total sample size of this study was 534 secondary cycle students.

Sampling procedure

A multi-stage probability sampling method with three stages was used. The first stage was schooled; the second classes; and the third individual students. There were 13 elementary schools in Fiche town; of these, eight schools had a full cycle from grade 1–8. Five schools were selected from the total 13 schools by a simple random sampling method. Of the total 3769 students who were enrolled in grades 5–8 in the 2021/22 academic year, 534 students were selected by proportion of the total number of students in school, and each student was selected by a simple random sampling method using a list of students’ names in each section as a sample frame [Fig. 1].

Data collections tools and methods

A structured questionnaire was prepared based on a literature review [1, 6, 9–11]. It was prepared in English and translated into the local languages (Afan-Oromo

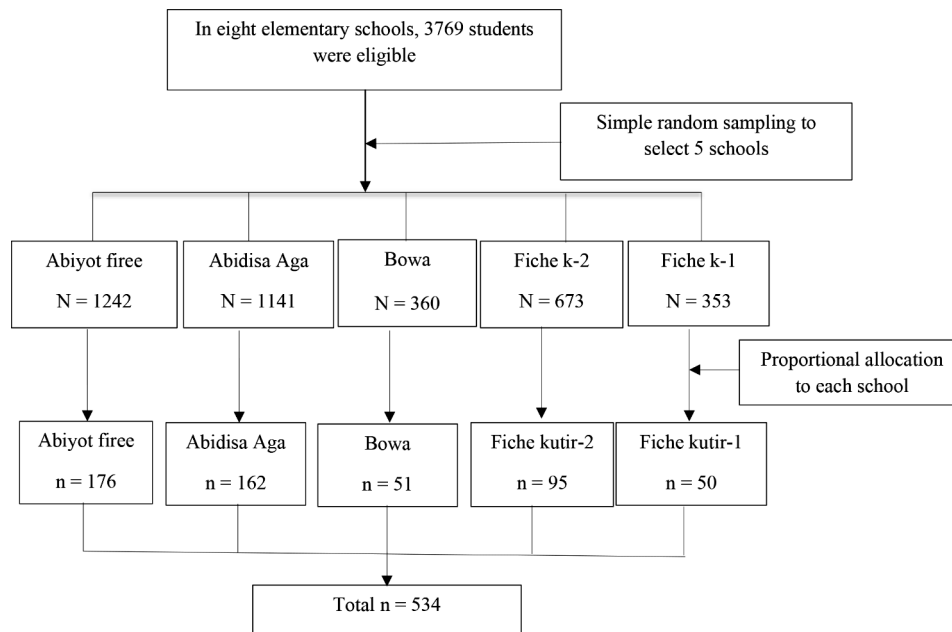


Fig. 1 Schematic representation of the sampling procedure of students Fiche town, Oromia, Ethiopia, 2022

and Amharic). The two-day training was provided for five data collectors and supervisors on the study objective, procedure, research ethics, and data collection tools. The students were selected by five teachers, who were school supervisors. After individual students were selected, study objectives and procedures were thoroughly explained for each selected student. Assent was obtained from each family of the student (by sending consent forms to their family) for those younger than 18 years, and written informed consent from students who were older than 18 years. Finally, the structured questions were administered by trained data collectors. The data collection process was supervised by the principal investigator and supervisors.

Data analysis

The data was entered into Epi-Data, cleaned, and recoded. Data was exported to SPSS (Statistical Package for the Social Sciences) version 26 for analysis. Descriptive statistics such as frequency and percentage for categorical variables and mean with standard deviation for continuous variables were conducted. Data are presented in text, tables, and graphs. Multilevel logistic regression models were used to assess the factors associated with poor personal hygiene practices. A multilevel logistic regression analysis was applied to account for the corrections at the school, class, and individual levels. It also enables the partitioning of the total variation in the outcome within groups and between school, class, and individual variances by modelling cross-level interaction [12]. The first level was a school; the second level was classes; and the third level was individual student behaviour.

Variables with a p -value ≤ 0.2 during bi-variable analysis were included in the multivariable model by the step-wise model-building method. Multi-collinearity between independent variables was checked by a variance inflation factor (VIF). Model fitness was checked by the Hosmer and Lemeshow goodness-of-fit tests. Adjusted odds ratios with 95% confidence intervals were estimated to show the strength and significance of the association between each independent and dependent variable. $P \leq 0.05$ was used as a significant association.

Results

Socio-demographic characteristics of participants

From five elementary schools, 534 students were participated in this study with a response rate of 100%. Of 534 participants, 227 (42.5%) were male. The mean age \pm standard deviation of the participants was 14.3 ± 1.7 years with the age range of 9 to 22 years. From the total of 534 students, grade five 91 (17%), six 159 (29.8%), seven 139 (26%) and eight 145 (27.2%) [Table 1].

Knowledge of personal hygiene

The majority of the students got personal hygiene information from their families 332 (65.4%). Nearly half (52.2%) of the students had good knowledge of personal hygiene, while 365 (68.5%) had good hand washing, and 449 (84.1%) had good oral hygiene. The majority of the students (84.1%) knew that hand washing is necessary before eating food, and 352 (65.9%) after defecation and 322 (60.4%) after eating food. The majority (90.1%) of elementary students understood cleaning teeth with a

Table 1 Socio-demography of participants in Fiche town, Oromia, Ethiopia, 2022 (N=534)

Socio-Demographic Characteristics		Frequency	Percent (%)
Sex	Male	227	42.50
	Female	307	57.50
Age group	≤14	287	53.70
	>14	247	46.30
Family size	≤5	272	50.90
	>5	262	49.10
Educational level (grade)	5&6	250	46.80
	7&8	284	53.20
Family head	Father	398	74.50
	Mother	122	22.80
	Other	14	2.60
	Illiterate	266	49.80
Mother's educational level	Elementary & secondary school	145	27.20
	Certificate	38	7.10
Father's educational level	Diploma and above	85	15.90
	Unable to read and write	188	36.00
	Elementary & secondary school	179	34.30
Father's educational level	Certificate	61	11.70
	Diploma and above	94	18.00

*other (aunt, grandfather, brothers, sisters, uncle and relatives)

chewing stick/toothpaste and brush to prevent tooth decay and the unpleasant odor of breathing [Table 2].

Magnitude of personal hygiene practice

More than half of the students had good hygiene practices, while 318 (59.60%) had good hand washing practice [Fig. 2]. Almost all (98.7%) elementary school students were practicing regular bathing. Of the students who took a bath, the majority (76.1%) took it once a week. Most (83.1%) of the students have experience of hand washing with soap or ash. The majority of the students (88.4%) brushed their teeth; of those who brushed their teeth with a brush and soap, 331 (62.0%) and only 147 (27.5%) brushed twice per day (morning and night). Almost all (97.6%) students washed their faces. Among those who washed their faces, 247 (46.3%) washed with soap twice a day, and 520 (97.4%) trimmed their nails regularly [Table 3].

About two thirds (65.5%) of the students stated that there was a weekly personal hygiene inspection in school. All elementary schools had latrine facilities in their compound, but the available latrines were not adequate for the number of students (i.e., the toilet to setting pit ratio was 0.009 for females and 0.008 for male students). One-fourth of the students practiced open field defecation.

The majority (87.1%) of students have received health education on personal hygiene which given by teachers (81.7%), health professionals (32.3%), non-governmental organizations (6.9%), school clubs (23.4%), and media (23.9%). Most (70%) of the students participated in hygiene-related clubs such as sanitation and hygiene

(40.4%) and menstrual hygiene clubs (40.8%) [Table 4]. About two third (65.5%) of the students were stated as they had weekly personal hygiene inspection. Among the 401 students, 394 (73.8%) washed their hands after eating and 365 (68.4%) washed their hands after using the toilet. Nearly half of the students had hand washing practice after critical time [Fig. 3].

The children in this study area had diarrhea the last two weeks before data collection 43(8.1%) and headaches 86(16.1%) (Fig. 4).

Factors associated with personal hygiene practice

Being female students (COR=1.9, 95% CI (1.3– 2.7); $p<0.001$), having mother who attended primary and secondary school (COR=2.1, 95% CI (1.4 – 3.1); $p=0.001$) and Diploma or above (COR=1.9, 95%CI (1.1–3.2), $p=0.013$) were significantly associated with personal hygiene practice Family size less than or equal to five (COR=1.8, 95% CI (1.3–2.6), $p=0.001$), Being received health education on personal hygiene (COR=3.2, 95% CI: 1.9–5.4; $p<0.001$), being participated in health-related clubs (COR=2.1, 95% CI (1.4–3.0); $p<0.001$); and being trained in personal hygiene (COR=1.5, 95% CI(1.1 – 2.2); $p=0.017$) were significantly associated with personal hygiene practice in unadjusted analysis. Moreover, availability of school personal hygiene inspection (COR=2.1, 95% CI (1.5–3.0, $p<0.001$), having good knowledge on oral hygiene, (COR=2.0, 95% CI (1.3 – 3.2); $p<0.000$), hand washing (COR=2.2, 95% CI (1.5 – 3.1); $p<0.001$), and personal hygiene (COR=2.4, 95% CI (1.7 – 3.4);

Table 2 Knowledge of personal hygiene of participants in Fiche town, Oromia, Ethiopia, 2022(N=534)

		Response	Frequency	Per-cent (%)
Source of information about personal hygiene	Family	Yes	332	65.4
		No	176	34.6
	Teacher	Yes	281	55.3
		No	227	44.7
	Health worker	Yes	149	29.3
		No	359	70.7
	Media	Yes	132	26.0
		No	376	74.0
School club	Yes	108	21.3	
	No	400	78.7	
Hand washing after eating prevents communicable disease	No	97	18.2	
	Yes	437	81.8	
Proper hand washing is preventing 30-40% of communicable disease	No	173	32.4	
	Yes	361	67.6	
Human feces contain germs that could transmit from person to person	No	149	27.9	
	Yes	385	72.1	
Well-trimmed/cut hair is a personal hygiene	No	149	27.9	
	Yes	385	72.1	
Rinsing the mouth with clean water after a meal protects oral health	No	59	11.0	
	Yes	475	89.0	
Cleaning teeth with chewing stick/toothpaste and brush to prevent tooth decay and bad odor breath	No	53	9.9	
	Yes	481	90.1	
Brushing teeth everyday causes gum bleeding	Yes	336	62.9	
	No	198	37.1	
Poor personal hygiene results water-related diseases like diarrhea, scabies	No	88	16.5	
	Yes	446	83.5	
Knowledge of oral hygiene	Poor	85	15.9	
	Good	449	84.1	
Knowledge of hand washing	poor	168	31.5	
	Good	365	68.5	
Overall knowledge of personal hygiene	Poor	255	47.8	
	Good	279	52.2	

$p < 0.001$) were significantly associated with personal hygiene [Table 5].

In multivariate multilevel logistic regression model, being female student (AOR=1.8, 95% CI (1.1 –2.8); $p=0.013$), availability of school personal hygiene inspection (AOR=1.9, 95% CI (1.1 –3.2); $p=0.015$), and good knowledge towards overall personal hygiene (AOR=2.3, 95% CI (1.3 –4.1); $p=0.005$) were significantly associated with good personal hygiene practice [Table 5].

Discussion

This study was conducted to determine personal hygiene practices and their associated factors among elementary school (grades 5–8) students. It revealed that, more than half of the students had a good overall personal hygiene (PH), hand washing (HW), latrine use (LU), and oral hygiene (OH) practices. Personal hygiene knowledge, hygiene inspection in school, and being a female student were significantly associated with personal hygiene practice.

The magnitude of overall good PH was 59.2%, which was higher than the findings of a similar study reported from Mareko District [6]. This discrepancy could be due to the level of knowledge of children about personal hygiene and the fact that the residence of the previous study was only in town. However, in the current study, the students resided in both urban, semi-urban, and rural areas, which could have an effect on personal hygiene practices. In contrast, the results of the current study are similar to those of the previously reported studies [13]. In the present study, the overall personal hygiene knowledge of students was half, which was higher than the survey study reported by rural students from China [14]. This difference may be due to the setting of the study. In the current study, the students were residents of mixed setups, while the participants in the study reported from China were purely rural residents [14].

In the current study area, all elementary schools had toilets, compared with the national minister of education's report (2017) that 76% of schools in Ethiopia have latrines [15]. In the current study area, all elementary schools had toilets, compared with the national minister of education's report (2017) that 76% of schools in Ethiopia have latrines [15]. In the present study, good LU practice was found to be 62.5%. This finding was higher than the findings of a previous study reported from Mareko District, in which 46% of students practice LU [6]. Moreover, the present study result on latrine use practice was higher than the previous study reported from Chencha District (33.3%) [16] and Sigo (39%) [17]. The availability of separate toilets by sex (48.0%) and toilet privacy (30.8%) were the main motivators that encouraged students to use the toilet in the present study. This result is in agreement with to the study reported by Mareko 50% [6]. The result shows that the students stated that 33.1% of the school latrines were inaccessible to students irrespective of their physical disabilities, and 66.9% of the school children stated latrines were not accessible to younger students. This could be due to the design problem (21.8%), the distance from the rooms (12.6%), or the fact that 222 (62.2%) had no reason.

In the current study, hand-washing facilities near the toilet were 38.4% higher compared to the national minister of education's report of 4.4%. This might be due to

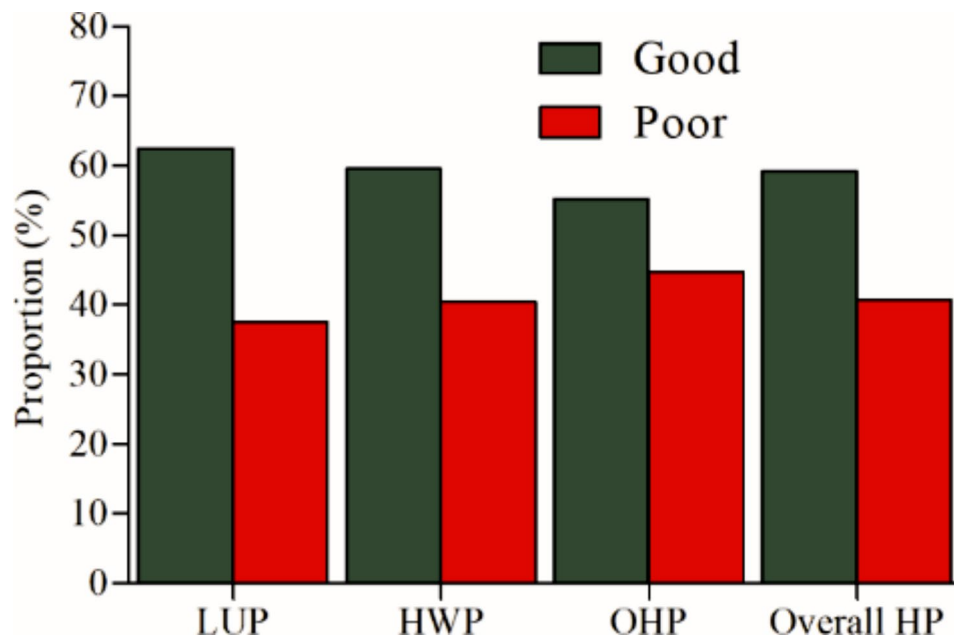


Fig. 2 Magnitude of hygiene practice of elementary school students in Fiche town, Oromia, Ethiopia, 2022

the fact that the study area is smaller than the national survey. Good hand washing practice among elementary school children in Fiche town was found to be 59.6%. This is very high compared with a study in Mareko (23%) [6], Yirgalem Town (39.1%) [7], Debark Town (52.2%) [18], Arba Minch Town (22.3%) [19], and Sebeta Town (32%) [20]. This could be due to the availability of sanitation facilities in the study areas. However, the present study result is similar to a study reported from India (60%) [21]. More than half (59.7%) of the students were always washing their hands with soap or ash at critical times. This result was lower than the results reported in studies conducted in Yirgalem town (88.2%) [7], Bangladesh (71.6%) [22], and the United Arab Emirate (71%) [23]. However, the present study result is higher than the studies reported from Mareko (26.8%) [6] and India (29.1%) [24]. This difference is most probably due to the difference in the knowledge level of the students about hand washing.

Two-thirds of the students had good knowledge of handwashing practices. This was similar to the study reported from Hosanna town (66.1%) [25]. However, the result of the current study on knowledge of washing hands with soap is much lower than study reported from Yirgalem (89%) [8], Bangladesh (89%) [22] and Saudi Arabia (90%) [3]. This difference most probably due to the high sample size used in the current study and the educational status of the family.

The proportion of oral hygiene knowledge among the students was 84.1%. However, among elementary school students in Fiche town, good oral hygiene practice was 55.2%. This result was higher than the previous studies reported from different settings. For instance, the studies

reported from Ghana (79.9%) [13] and India (70.4%) [26], in Southeast Serbia (54.5%) [27] reported a lower proportion of oral hygiene knowledge. This difference might be due to sample size and oral hygiene-related culture in different study areas.

Almost half (53.2%) of the students were brushing their teeth once a day. The students who brushed their teeth for less than 60 s were 47.9%, which is Debre Tabor [28]. At Fiche Town Elementary School, 27.5% of students brush their teeth twice a day. This result was much smaller than a study conducted in Saudi Arabia in which 71.7% of elementary school students brushed their teeth [3]. This difference could be due to differences in study area culture, economic status, and sample size.

Female students were 1.8 times more likely to have good hygiene practices compared with male students. This result was supported by the fact that male students are 0.42 less likely to have good personal hygiene practices in Côte d'Ivoire [29] and in Bangladesh [30]. The majority (98%) of men and women agree that washing hands after toileting is important [31]. Moreover, 91% of women and 84% of men are more likely to report the importance of handwashing after toilet use [31].

The students who had good knowledge of personal hygiene were 2.3 times more likely to have good personal hygiene practice compared with those who had poor knowledge, and knowledge significantly determined personal hygiene practice. The present study result is supported by a study reported by Mareko [32] in which personal hygiene practice is 5.1 times higher among those with high knowledge. Moreover, the current study findings are similar to those reported in Debark Town [18].

Table 3 Magnitude on personal hygiene practices of elementary school students in Fiche town, Oromia, Ethiopia, 2022(N=534)

Personal hygiene practice Response		Frequency	Percent (%)
Take a bath	No	7	1.3
	Yes	527	98.7
Frequency of take a bath	1-2 Times a day	65	12.3
	Every week	401	76.1
	Every two Weeks	34	6.5
	Every month	15	2.8
	**Other specify	12	2.3
Hands washing	No	15	2.8
	Yes	519	97.2
Use soap/ash during hand washing	No	90	16.9
	Yes	444	83.1
Brushing of teeth	No	62	11.6
	Yes	472	88.4
Everyday brush of teeth	No	177	33.1
	Yes	357	66.9
Number of brush teeth in a day	Once	275	58.3
	Twice	143	30.3
	Three or more	37	7.8
	Every other day	17	3.6
Duration teeth brushing	<60 s	248	52.5
	Between 60–120 s	125	26.5
	>120 s	81	17.2
	Didn't know	18	3.8
Materials used to brush teeth	Sticks	146	27.3
	Flossing	12	2.2
	Teeth brush with teeth soap	331	62
	Teeth brush, soap, and flossing	45	8.4
Dentist check-up	No	407	76.2
	Yes	127	23.8
Dental follow-up without illness	Don't See	387	72.5
	Occasionally	104	19.5
	Regularly	43	8.1
Wash face material	Water only	72	13.5
	Water and soap	462	86.5

*other (every three days, every weeks); **other specify (every two days and every three days)

Table 4 Source of information about personal hygiene of participants in Fiche town, Oromia, Ethiopia, 2022

Questions	Response	Frequency	Percent (%)
Family	Yes	332	65.4
	No	176	34.6
Teacher	Yes	281	55.3
	No	227	44.7
Health worker	Yes	149	29.3
	No	359	70.7
Media	Yes	132	26.0
	No	376	74.0
School club	Yes	108	21.3
	No	400	78.7

Diarrheal diseases alone were responsible for 43 (8.1%) of the school absences in the present study. The current study result is smaller (28.8%) than the results of the study reported by Mareko [6]. This is most probably due to the water treatment with chlorine 381 (71.9%) and the study area and time. In this study, almost one-third of the elementary school students were suffering from one or more morbidities related to poor personal hygiene practices in the past two weeks.

Limitation

The nature of the study design and the self-reported data collection tools recall bias (remember the last two weeks of illness and the last dental follow-up). The cross-sectional study design means that because exposure and outcome are simultaneously measured, there is generally no evidence of a temporal relationship between exposure

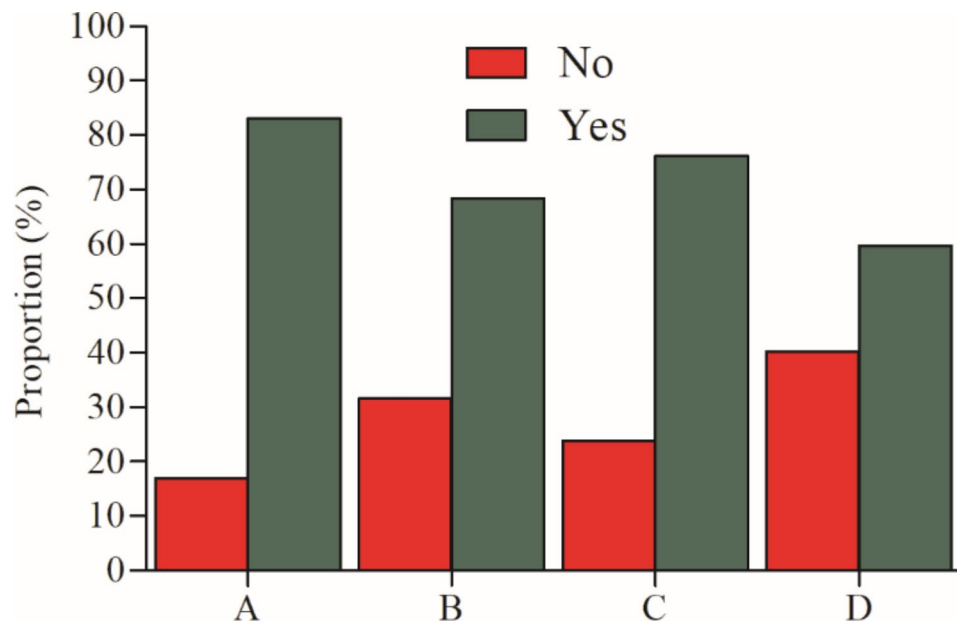


Fig. 3 Shows the percentage distribution of (Use soap/ash during hand washing before eating (A), Always wash hands with soap/ash after eating (B), Always wash hand with soap/ash after visiting toilet (C) and hand washing after critical time (D) in Fiche town, Oromia, Ethiopia, 2022

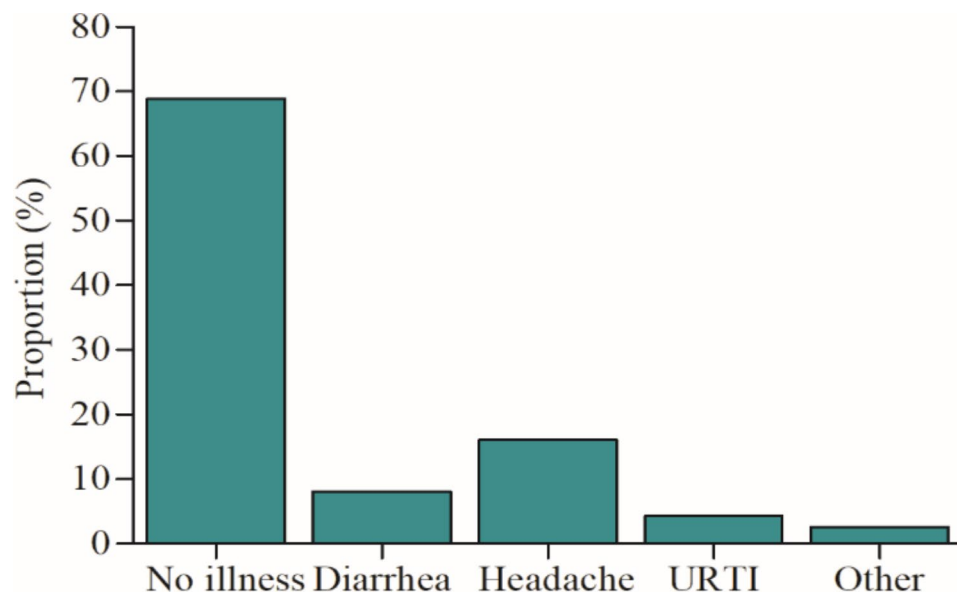


Fig. 4 Shows that students having illness before the last two weeks of data collection among elementary school students in Fiche town, Oromia, Ethiopia, 2022

and outcome, which could not enable us to investigate the cause-and-effect relationship.

Conclusion

The overall personal hygiene practice among elementary school children in the study area was minimal. Interventions that would be implemented by schools, teachers, health extension workers, and WASH project officers are required to raise knowledge on personal hygiene practice among elementary students and increase the availability

of regular personal hygiene inspections. The availability of personal hygiene facilities at home and in school is crucial to promoting personal hygiene practice. Further research that triangulates quantitative and qualitative data is recommended for a holistic understanding of the problem.

Table 5 Multilevel logistic model analysis Factors Associated with Personal Hygiene Practice among elementary school students in Fiche town, Oromia, Ethiopia, 2022(N=534)

Characteristics		Personal hygiene practice		COR (95% CI)	AOR (95% CI)
		Poor	Good		
Sex	Male	113(49.8%)	114(50.2%)	1	1
	Female	105(34.2%)	202(65.8%)	1.91 (1.3–2.7)**	1.8 (1.1–2.8)*
Mother educational status	Unable to read and write	132(49.6%)	134(50.4%)	1	1
	Elementary &Secondary	47(32.4%)	98(67.6%)	2.1 (1.4–3.1)**	1.6 (0.87–3.0)
	Certificate	10(26.3%)	28(73.7%)	2.8 (1.3–5.9)**	0.95 (0.33–2.7)
	Diploma and above	29(34.1%)	56(65.9%)	1.9 (1.1–3.2)*	0.88 (0.34–2.3)
Father educational status	Unable to read and write	97(51.6%)	91(48.4%)	1	1
	Elementary and Secondary	74(41.3%)	105(58.7%)	1.5 (1.0–2.3)*	1.2 (0.63–2.1)
	Certificate	21(34.4%)	40(65.6%)	2.0(1.1–3.7)**	1.3 (0.5, 3.1)
	Diploma and Above	23(24.5%)	71(75.5%)	3.3(1.9–5.7)**	2.2 (0.79–6.1)
Families size	≤5	92(33.8%)	180(66.2%)	1.8 (1.3–2.6)*	1.25 (0.80, 1.97)
	>5	126(48.1%)	136(51.9%)	1	
Received education on personal hygiene	No	45(65.2%)	24(34.8%)	1	
	Yes	173(37.2%)	292(62.8%)	3.2 (1.9–5.4)**	1.89 (0.95, 3.78)
Health-related clubs in your school	No	85(53.1%)	75(46.9%)	1	
	Yes	133(35.6%)	241(64.4%)	2.1(1.4–3.0)**	1.24 (0.71, 2.15)
Training on personal hygiene	No	114(46.3%)	132(53.7%)	1	
	Yes	104(36.1%)	184(63.9%)	1.5 (1.1–2.2)*	0.91 (0.57–1.5)
Inspection of personal hygiene	No	97(52.7%)	87(47.3%)	1	
	Yes	121(34.6%)	229(65.4%)	2.1 (1.5–3.0)**	1.9 (1.1–3.2)*
knowledge of oral hygiene	Poor	47(55.3%)	38(44.7%)	1	
	Good	171(38.1%)	278(61.9%)	2.0(1.3–3.2)*	1.2 (0.62, 2.2)
knowledge of hand washing	Poor	90(53.6%)	78(46.4%)	1	
	Good	127(34.8%)	238(65.2%)	2.2 (1.5–3.1)**	1.4 (0.80–2.5)
Knowledge personal hygiene	Poor	131(51.4%)	124(48.6%)	1	
	Good	86(30.9%)	192(69.1%)	2.4 (1.7–3.4)**	2.3 (1.3–4.1)*

Key: - COR (Crude Odd Ratio), AOR (Adjusted Odd Ratio), *CI* (Confidence Interval * P – value < 0.05 And ** p – value < 0.001

Abbreviations

AOR	Adjusted Odd Ratio
CD	Communicable Disease
CI	Confidence Interval
COR	Crude Odd Ratio
DHS	Demographic Health Survey
HWP	Hand washing practice
LUP	Latrine utilization practice
OHP	Oral hygiene Practice
PH	Personal Hygiene
SPSS	Statistical package for Social Science
WASH	Water and Sanitation Hygiene
WHO	World Health Organization

Author contributions

GHM- Conceptualization, data curation, formal analysis, investigation, funding acquisition, methodology; AFA, AK, TE- data curation, writing a review and editing the manuscript; HHT- Conceptualization, formal analysis, investigation, funding acquisition, methodology, project administration, resources, software, supervision, validation, visualization, writing a review and editing the manuscript.

Funding

Not applicable.

Data availability

All manuscript data was there with authors (collected data SPSS result and full research data).

Declarations

Ethics approval and consent to participate

This study was ethically approved by the Institutional Review Committee (IRC) of Salale University on March 20, 2022 (Ref. No. 878/2022). Written informed consent was obtained from each student older than 18 years, and assent was obtained from families of students younger than 18 years. All information collected was recorded anonymously and confidentially.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12879-024-09665-7>.

Supplementary Material 1

Acknowledgements

The authors would like to acknowledge Salale University for funding this study. We would also like to acknowledge the contribution of the Fiche town education office and all selected school administrations for their cooperation and support during data collection. We also appreciate the toleration and cooperation of all data collectors and participants.

Received: 27 March 2024 / Accepted: 25 July 2024

Published online: 05 August 2024

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