

# Hand Washing Practice Before Covid-19 Pandemic and Associated Factors Among Primary School Children at Hawassa City Sidama Ethiopia

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## Research Article

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# Abstract

## Objectives

the aim of this study was to assess hand washing practice before covid-19 pandemic and associated factors among primary school children, Hawassa City, Sidama, Ethiopia

## Method

An institution-based cross-sectional study was conducted at primary schools children in Hawassa city, Sidama Ethiopia from February to October 2019. A total of 739 students were selected using multistage sampling techniques. Information about socio demography and associated factors was collected by structured questionnaire.

## Result

In this study, about 399 (54%) of the students wash their hands at critical times. Availability of hand washing material, availability soap/ash, availability water and pear influence (AOR =1.75, 95% CI=1.22, 2.23), (AOR = 3.23, 95% CI =2.02, 5.15), (AOR = 1.76, 95% CI=1.07, 2.89),(AOR=0.32 95% CI=0.101,0.98) had higher odds of washing practice respectively.

## Conclusion

The magnitude of hand washing practice was low in this study before covid -19 pandemic. In this regard, Poor access to hand washing facilities need to strengthen as intervention efforts. Further, health education promotion for hand washing practice could be done in school by Hawassa city administration Education office and better facilities need to avail by the stakeholders.

# Introduction

Human hands are the chief vehicles for transmitting infections. Gastrointestinal or diarrhea and respiratory diseases are among the major causes of infectious disease in children with poor hand washing practice. Also it contributes for high rates of school absenteeism in developing countries including Ethiopia [1]. In many countries a high prevalence of water, Hygiene and sanitation related diseases causing morbidity and mortality for many people and children in particular [2]

Hand washing practice is considered when children wash their hands using proper technique at critical times (before eating, after toilet,) with detergents like soap, ash etc) [3]. Hand washing with soap is a simple and effective measure to prevent transmission of gastrointestinal and other respiratory infection in school-age children [2,4]

Unimproved hygiene, inadequate sanitation, and insufficient and unsafe drinking water account for 19% of child mortality worldwide [5,6].Sixty two percent of all deaths in Africa and 31% of all deaths in

Southeast Asia are caused by infection related to poor hand washing practice [7]. In developing countries 80% of disease burden are related to poor hygiene and sanitation practice. Ethiopia one of the least developing countries whose sanitation coverage is less than 40% and access to unsafe water supply is on average more than 50 % [8]. Among 7-14 years of age, 34% didn't wash their hands after using toilet and 78% wash their hands only with water before eating[9].A base line study conducted in some districts of SNNPR showed, water facility and sanitation facility were 47% and 42 % respectively [10].

Globally nearly one third of world population doesn't have access to sanitation facilities and some are unable to practice basic hygiene. Inadequate and unsafe water, poor sanitation, and unsafe hygiene practice are the main cause of diarrhea, which results in at least 1.7 million children's death annually worldwide. [11,]. There are known factors associated with poor hand washing practice accessibility to safe water is account 50%, no access to hand washing facility, toilet facility, poor knowledge, attitude and practice at school and home compound are the main factors which lead to children's to have poor hand washing practice [3].

Poor hand washing practice is the common cause of diarrhea and pneumonia in developing countries. Improved sanitation facilities contribute to 36% reduction in risk of diarrhea, while hand washing with soap reduces the risk of diarrhea by 48% [11]. Hand washing with soap before eating and after using the toilet could save more lives than any single vaccine or medical intervention [12].

WHO report in 2020 indicated 2 in 5 schools around the world lacked basic hand washing facilities prior to COVID-19 pandemic. [13]. Ethiopia Ministry of Education indicates only 20.8% of the primary schools have hand washing facilities. Of this, 88.9% of them have functional and 11.1% of the schools remained to have non-functional facilities. Nearly one third (29%) of the hand washing facilities were accompanied with soap or another substitute [14]. Therefore, this study provides important information about the practice of hand washing before covid-19 and the possible factors associated in Hawassa, Ethiopia.

## **Methods**

### **Study area, design and Period**

A cross sectional study design was conducted at public and private schools which are found in Hawassa city. Hawassa is the capital city of Sidama regional state, Southern Ethiopia. The study was conducted from- February 2019 to October 2019.

### **Sample size determination**

The sample size was determined using single population proportion formula. The sample size was calculated based on the following assumptions: The expected proportion of hand washing with soap after toile by primary school students which will be 14.8 % based on the study conducted among primary school students in northern Ethiopia [3]. ( $p=14.8\%$ ), Confidence Interval of 95% and margin of error 3%.The finally total sample size was determined to be 739.

## **Sampling technique**

A multistage random sampling technique was used. All primary school (45 schools) in Hawassa city were stratified in to public and private in the first stage. Then 5 from public and 7 from private were selected by randomly sampling technique in the second stage. In third stage, the sample size is divided based on the proportion of the total number of students in each school. All sections are clustered (Grouped) in each school and clusters are selected using simple random sampling method in fourth place. Then In the last stage study subjects were selected using systematic sampling method. (see Additional figure 1).

## **Data collection process**

A pre-tested structured questionnaire, face to face interviewer administered, was used to collect data from study participants. Data was collected by well trained health professionals and daily evaluated by Supervisors.

## **Data analysis**

The data was coded, entry, cleaning and editing then analysis was done using EPI-Info version 2002 and SPSS version 20 statistical packages. Tables and figures were used to describe variables. The association between dependent and independent variables were determined by using odds ratio with a 95% confidence interval, P-value is less than 0.05 will be considered statistically significant. Potential confounders were controlled with logistic regression model (multi-variant analysis).

## **Ethical Consideration**

Ethical approval was obtained from the institutional review board of Hawassa University College of Medicine and health sciences. Permission to conduct the study was also obtained from Hawassa city Education Offices and the schools. All participants were informed about the purpose and importance of the study and they were provided written consent.

# **Results**

## **Socio-demographic characteristics**

A total of 739 respondents were interviewed with response rate of 100%. Among those five hundred forty one (73%) were from government school and one hundred ninety eight (27%) were from private school. Three hundred seventy eight (51.2%) were female and the remaining were males. Out of total respondents two hundred thirty two (31.4%), and five hundred seven (68.6%) were between age group of 6-11 and 12<sup>+</sup> years respectively.

Regarding parent education, one hundred fifty two (20.6%) mother were illiterate, two hundred ninety nine (40.5%) mother completed primary education, one hundred seventy six (23.8%) mother completed secondary education, sixty seven (9.1%) mother college graduate, forty five (6.1%) mother university

graduate. seventy nine (10.7%) fathers were illiterate, two hundred two (27.3%) fathers completed primary education, two hundred eleven (28.6%) fathers completed Secondary education, eighty seven (11.8%) fathers were college graduate and one hundred sixty (21.7%) fathers were university graduates. And details of socio-demographic characteristics including: religion, ethnicity, educational status of students are shown in (Table1).

### **Water supply situation at school and home**

Among 12 primary schools observed, all of them have (100%) water facilities in which pipe water is the main source. Six hundred forty seven (87.6%) of respondents reported that water is available at their home. The main source of water includes, six hundred twenty (95.8%) pipe water. Regarding, the frequency of water availability at home, three hundred forty (52.6%) respondents reported that water is always available, three hundred four (47.0%) indicated water is sometimes available and others responded water is not available at all.

### **School latrine, hand washing stand, water and soap/ash related factors at school near to toilet.**

Observed school latrine, hand washing stand, water and soap/ash related factors at school. Among 12 primary school observed, all the schools have (100%) toilet, eleven schools (91.7%) have hand washing stand near to toilet, out of eleven hand washing stand, five (41.7%) has water (functional) the others are locked and damaged, and none of the school has soap/ash near to toilet for hand washing (See **AdditionalTable** ).

Seven hundred thirty four (99.3%) toilet available at home, five hundred nine (68.9%) hand washing stand with water and three hundred seventy nine (74.4%) soap/ash available at home near to toilet for hand washing.

### **Hand washing practice, parent influence, teacher/school influence, pear influence, learning about HWP and related factors**

Those students who asked for hand washing yesterday, five hundred ninety nine (80.9%) reported washed their hands at critical times. And form this, three hundred forty two (57.1%) washed hands before meal using soap/ash and three hundred eight (51.4%) washed hands after toilet using soap/ash. those who washed their hands using water only, two hundred ninety seven (49.6%) before meal and three hundred thirteen (52.3%) after toilet (**Table 2** ).

School children's also asked whether they have information about hand washing practice, six hundred forty eight (87.7%) have the information. And the information they obtained from, five hundred (77.2%) from family, three hundred sixty three (56.0%) from teachers and school and forty five (6.9%) from friends (pears).

Students also asked for majors to be taken for prevention of diarrhea, six hundred eight (82.3%) files prevention from food contamination, five hundred ninety nine (81.1%) environmental sanitation and five

hundred seventy nine (78.3%) Wash hands at critical times.

Concerning learning about personal hygiene and sanitation as one subject in the class, six hundred eighty one (92.2%) helps to remember and wash hands, six hundred forty two (86.9%) helps to know the use of hand washing practice, five hundred eighty one (78.6%) helps to teach our family. They also assessed for proper hand washing steps by using yes/no questions: those who said yes six hundred thirteen (82.9%) and out of this who showed the step is sixty two (9.9%) correctly.

### **Factors that determine hand washing practice**

Logistic regression analysis was used to identify the variables which influence good hand washing practice and to control the effect of confounding variable on hand washing practice. To determine the factors associated with hand washing practice bivariate and multivariate analysis,  $PV < 0.05$  and 95%CI were used. Availability of hand washing material, availability of soap/ash, availability of water and pear influence found to have association with good hand washing practice (**Table 3**).

Availability of hand washing material was associated with good hand washing practice. Students who accessed hand washing material were 1.75 times (AOR=95%CI= 1.75 (1.21, 2.22) more likely to wash their hands than who do not have the material. Regarding availability of soap/ash those who have access to soap/ash 3.227 times (AOR=95% CI= 3.227(2.022, 5.152) more likely to wash their hands than who have not the access. Regarding availability of water those who have availability of water 1.756 times (AOR =95% CI= 1.756(1.066, 2.894) more likely to wash their hands from those students who don't have water access. Regarding pear influence on hand washing practice, those who are influenced by their claque 68.5 times (AOR=95% CI= 0.315(0.101, 0.984) less likely to wash their hands using soap/ash at critical times. None of the socio-demographic characteristics were significantly associated with hand washing practices. However, girls were more likely to wash hands properly than boys (COR = 1.24).

## **Discussion**

In this study we assessed the magnitude of hand washing practice and factors affecting hand washing practice. Of the students interviewed, 80.9% reported wash their hands at critical times. Of these 51.1% students were washing their hands using soap/ash after defecation and 57.1% were washing their hands using soap/ash before meal. This finding is consistent with the finding from Northern Vietnam which reported that 60% students of wash hands before meal [15, 16]. Self reported frequency of hand washing with soap/ash at after toilet and before meal is higher than study conducted in rural northern Ethiopia. According to this study, hand washing using soap before meal was 36.2% and after defecation 14.8% [3]. This difference may be due to access to sanitation facility is higher in urban setting than rural Ethiopia [17, 18].

The self-reported frequency of hand washing before meals among school children in this study has similarity with the frequencies reported studies from northern Ethiopia. According to this study, hand washing before meal 99.7% [3]. Studies in other countries for example, in Erbil city on primary schools

children regarding personal hygiene shows similar finding which is 98.8% hand washing hands before meals [19].

This study also found that the observed hand washing stand near to toilet at school is more than ninety percent but the functionality (water availability) is very low, and the report at home reveals that the functionality of hand washing stand is around sixty nine percent. This shows functional hand washing stand is more available at home than school. Observational check list also reveals that none of the school has soap/ash near to toilet for hand washing but student report showed that availability of soap/ash near to toilet at home is more than seventy four percent. And hand washing with soap/ash after toilet at school and hand washing with soap/ash at home were also different 52.5% (N=120) and 72.3 (272) respectively.

Then, this encourages children's to practice hand washing more at home than school. This difference may be because of urban health extension workers working using their effort at home but not at school and schools may not give attention to this hygiene practice and inadequate supervision of the concerned body on school hygiene practice.

Study conducted in Ghana showed about 60% of the schools had hand washing points. But, Only 30% of the schools have clean running water. To promote hand washing, hand washing-facilities must be easily accessible and available at all times with the right materials and place necessary to make the process a successful [20,16].

This study also showed that why students did not wash their hands after toilet in the availability of water and soap/ash, the most frequent reason were failure to remember. The reason they given were almost similar with the study conducted at Colombia and Indonesia which is (78.2%), (81.8%) respectively [21, 22]. This study indicated higher percentage than Colombia's study, this may be because of high social value in our country, during break time and students may prefer to play with their claque. Placing visual aids and other signs at school near to the hand washing facilities at visible site may encourage students to remember and wash their hands; schools should be more concerned about this and display appropriate reminders [20, 22].

The most important source information about hand washing practice and hygiene were parents (77.2%) followed by school environment 56.0%. This finding also almost consistent with the study conducted in Indonesia, the main sources of information about hygiene and hand washing were parents (88.5%), followed by school (66.7%) [5, 15, 22 and 23].Based on this study, therefore, teachers should be more involved in promoting proper hand washing at schools, since they are close to and interact with students' learning activities there.

This study also showed that those students who have access to hand washing material (hand washing stand, plastic container) more likely to practice hand washing than those who don't have. This study also revealed that school children are who accessed soap/ash and water are more likely to wash their hands at critical times than those who don't have soap/ash and water access. And this shows that Soap/ash

and water has significant association with hand washing practice. Studies conducted in other countries on primary school on determining factors that associated with hand washing practice also consistent with this study for instance, study conducted in Indonesia which is availability of clean water (Adj OR = 4.24, 95% CI = 1.92-9.35) and soap (Adj OR = 5.55, 95% CI = 2.36-13.08) at hand washing stands were found to be significant predictors of proper hand washing [21]. Study conducted in Indonesia reveals that, when clean water was available at hand washing stands, the respondents were four times more likely to wash their hands properly. Similarly, when soap was available at hand washing stands, the respondents were about six times more likely to wash their hands properly [16].

Studies conducted in different countries also showed that availability of hand washing materials (Soap/ash, plastic container, Basin, sink, standing pipe water, water and towel) are the most important factors that affects the practice of hand washing [20,21,22].

Regarding peer influence on hand washing practice, those school children's who were influenced by peer less likely to practice hand washing than those who had not influenced by their peers. In other studies for instance, study conducted in Vietnam and London reveals that peer influence have great impact in improving hand washing practice [24, 15]. But in this study, those students influenced by peers less likely to practice hand washing than those do not influenced, this may be because of those influential students may not have adequate knowledge on hand washing practice or they may be negatively practicing hand washing.

## **Conclusion**

The present study found that the prevalence of good hand washing practice was low among the primary school children. The study also revealed Poor access to hand washing facilities such as clean water, soap/ash and hand washing stand near to toilet. Furthermore, teachers are poorly involved on proper hand washing practice to teach and supervise school children. Thus, Poor access to hand washing facilities need to strengthen as intervention efforts. Further, health education promotion for hand washing practice could be done in school by Hawassa city administration Education office and better facilities need to avail by the stakeholders.

## **Declarations**

### **Ethics approval and consent to participate**

Ethical approval was obtained from the institutional review board of Hawassa University College of Medicine and health sciences. Permission to conduct the study was also obtained from Hawassa city Education Offices and the schools. All participants were informed about the purpose and importance of the study and they were provided written consent.

### **Consent for publication**



Not applicable

## Availability of data and material

The datasets used and /or analyzed during the current study are available from the corresponding author on reasonable request.

## Competing interests

The authors declare that they have no competing interests.

## Funding

Not applicable

## Authors' contributions

ST, GM and SH conceived and designed the study. ST was involved in the data collection. SH and GM supervised the data collection. ST, GM and SH were involved in the data analysis. GM and SH drafted the paper. GM critically reviewed the paper. All authors read and approved the final version of the paper for submission.

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## Tables

**Table-1: Socio-demographic characteristics of primary school children at Hawassa city administration, Sidama, Ethiopia, from February to October 2019**

<b>Characteristics</b>	<b>Frequency</b>	<b>Percent</b>
Gender		
Male	378	51.2
Female	361	48.8
Age ( years)		
6-11	232	31.4
12+	507	68.6
Religion		
Orthodox	258	34.9
Protestant	289	39.1
Catholic	62	8.4
Muslim	129	17.5
Educational status of students		
1 <sup>st</sup> Cycle (1-4)	228	30.9
2 <sup>nd</sup> Cycle (5-8)	511	69.1
Ethnicity of students		
Sidama	187	25.3
Wolayta	191	25.8
Guragie	80	10.8
Amhara	141	19.1
Oromo	77	10.4
Others	63	8.5
Educational status of Mother		
Illiterate	152	20.6
Primary school complete	299	40.5
Secondary school complete	176	23.8
College graduate	67	9.1
University graduate	45	6.1
Educational status of Father		

Illiterate	79	10.7
Primary school complete	202	27.3
Secondary school complete	211	28.6
College graduate	87	11.8
University graduate	160	21.7

NB. \*\* = Hadiya, Tigre, Gedeo, Gamo, Derashe, Konso

**Table-2: Hand washing, parent influence, teacher/school influence, peer influence and related factors of primary school children at Hawassa city Administration, Sidama, Ethiopia, from February to October 2019**

Characteristics	Frequency	Percent
Do you wash your hands at critical times (After toilet and before meal) yesterday		
Yes	599	80.9
No	141	19.1
Hand washing before meal yesterday		
Yes	701	94.9
No	38	5.1
Hand washing after meal yesterday		
Yes	703	95.1
No	36	4.9
Hand washing after toilet yesterday		
Yes	702	95.0
No	37	5.0
Before meal water and soap/ash used yesterday		
Yes	342	57.1
No	257	42.9
After toilet water and soap/ash used yesterday		
Yes	308	51.4
No	291	48.6
Before meal water only used yesterday		
Yes	297	49.6
No	302	50.4
After toilet Water only used yesterday		
Yes	313	52.3
No	286	47.7
For diarrhea prevention, Preventing fillies from food contamination		
Yes	608	82.3
No	131	17.7
For diarrhea prevention, Environmental sanitation		

Yes	599	81.1
No	140	18.9
For diarrhea prevention, Wash hands at critical times with soap		
Yes	579	78.3
No	160	21.7
For diarrhea prevention, Don't wash hands before meal		
Yes	8	1.1
No	731	98.9
Learning about hand washing practice		
Yes	648	87.7
No	91	12.3

Continued

**Table-2: Hand washing prac., parent influence, teacher/school influence, pear influence and related factors of primary school children at Hawassa city Administration, Sidama, Ethiopia, from February to October 2019**

Characteristics	Frequency	Percent
Hand washing learned From family		
Yes	500	77.2
No	148	22.8
Hand washing learned from school and teachers		
Yes	363	56.0
No	285	44.0
Hand washing learned from Friends		
Yes	45	6.9
No	603	93.1
If we learn Hand washing as one subject, help us to remember and wash our hands		
Yes	681	92.2
No	58	7.8
learning Hand washing & Sanitation as one subject, Help to know the use of hand washing practice		
Yes	642	86.9
No	97	13.1
If we learn Hand washing as one subject, Help us to teach our family		
Yes	581	78.6
No	158	21.4
If we learn Hand washing as one subject, if other subjects are add it will confuse us		
Yes	9	1.2
No	730	98.8
The use of hand washing with soap		
Yes	728	98.5
No	11	1.5
HW with soap for hygienic purpose		
Yes	343	46.4
No	396	53.6



HW with soap for disease prevention		
Yes	590	79.8
No	149	20.2
Did you washed your hands after toilet today		
Yes I washed with soap/ash	316	47.4
Yes I washed with water only	213	32.0
I am not washed my hands	137	20.6
Do you know the proper hand washing steps		
Yes	613	82.9
No	126	17.1
Show me proper hand washing steps		
Yes	62	9.9
No	562	90.1

**Table-3: Association between hand washing with soap/ash at critical times and the associated factors of primary school children at Hawassa city Administration, Sidama, Ethiopia, from February to October 2019**

Characteristics	Hand washing practice with soap/ash at critical times N=599		Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
	Yes	No		
<b>Gender</b>				
Male	161	136	1.248(0.906,1.721)	1.234(0.894,1.704)
Female	147	155	1.00	1.00
<b>Hand washing material</b>				
Available	225	184	1.576(1.115,2.229)	1.752(1.215,2.229)**
Not available	83	107	1.00	1.00
<b>Soap/ash</b>				
Available	186	110	3.165(2.009,4.987)	3.227(2.022,5.152)**
Not available	39	73	1.00	1.00
<b>Water at home</b>				
Not available	277	244	1.721(1.060,2.796)	1.756(1.066,2.894)*
Available	31	47	1.00	1.00
<b>Pear influence</b>				
Yes	21	11	1.825(0.861,3.867)	0.315(0.101,0.984)*
No	250	239	1.00	1.00

N.B P-value < 0.05\*, P-value < 0.001\*\*

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [4AddtionalTable.docx](#)
- [5Addtionalfigure.docx](#)