

SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE
(SPHMMC) DEPARTMENT OF PUBLIC HEALTH



THESIS ON ASSESSMENT OF FACTORS INFLUENCING HYGIENE
BEHAVIOR OF PRIMARY SCHOOL CHILDREN IN GOVERNMENT
PRIMARY SCHOOL OF GULELE SUB CITY, ADDIS ABABA, ETHIOPIA
,2017

BY: MESFIN TIGSTU (BSC)

THESIS SUBMITTED TO DEPARTMENT OF PUBLIC HEALTH, IN
PARTIAL FULFILMENT FOR REQUIRMENTS FOR THE DGREE OF
MASTER' S OF PUBLIC HEALTH IN FIELD EPIDEMIOLOGY

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APPROVAL SHEET (by advisors and program coordinator)

Declaration form

Letter for declaration

I the under signed declared that this is my bona fide original work ,has never been presented in this or any other university ,and that all resources and materials used for the thesis have been fully acknowledged.

Student name: Mesfin Tigstu

Signature _____

Date _____

Place _____

Date of submission _____

This thesis has been submitted for examination with our approval as candidate' advisors

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Name of FETP Coordinator _____

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**DEPARTMENT OF PUBLIC HEALTH GRADUATE STUDIES FINAL THESIS
APPROVAL FORM**

As members of the Board of Examiners of the final thesis open defense, we certify that we have read and evaluated the thesis prepared by Mesfin Tigstu under the thesis entitled “Assessment of factors influencing hygiene behavior of primary school children in government primary school of Gulele sub city, Addis Ababa, Ethiopia, 2017” and recommencement for the degree of Master of Public Health in Field Epidemiology.

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Biography

My name is Mesfin Tigstu ,I was born on July 12 ,1986 G.C in Gurage zone Endegagn woreda Git Endegagn kebele ,Southern Ethiopia .

I attained my primary school education at Endegagn chora (1-6th) grade & Merabicho primary school(7-8th) grade from 1994 -2002 G.C & my high school education was attended in Gunchire secondary school (9-10th) grade and Wolkite comprehensive secondary school (11-12th) grade from 2003 -2006 G.C. Then I joined Haramaya University and graduated by BSC in environmental health profession in 2009.G.C.

After graduation I worked in Addis Ababa city administration in Gulele sub city woreda 08 health office as urban health extension program supervisor from 2009 _2013 G.C ,in Gulele sub city woreda 07 food, medicine, health care administration & control office as food & drinking establishments control officer from July 2014 to December 2014 ,in Gulele sub city health office as urban health extension program coordinator ,from December 2014 to November 2015 then I joined saint Paul's hospital millennium medical college for my post graduate studies masters of public health in field epidemiology .

Acknowledgment

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Table of Contents

Acknowledgment	ii
List of Tables	v
List of Figures	vi
Acronyms	vii
Abstract	viii
1. Introduction.....	1
1.1Background.....	1
1.2 Problem statement.....	2
1.3 Significance of the study.....	4
2. Literature Review.....	5
3. Objective	8
3.1. General objective	8
3.2. Specific objective.....	8
4. Methods and materials	9
4.1. Study area.....	9
4.2. Study design and period.....	9
4.3. Population	9
4.4. Sample size estimation &sampling techniques.....	10
4.5. Sampling procedure	12
4.6. Data collection tools and procedures	13
4.7. Operational definition	14
4.8. Study variables.....	14
4.9. Data quality assurance	15
4.10. Data analysis	15
4.11. Ethical consideration.....	15
5. Result	16
5.1 Socio demographic characteristics.....	16
5.2: Reinforcing factors of hygiene behavior	16
5.3: Predisposing factors.....	17
5.4: Hygiene behavior enabling factors	17
5.5: Bivariate analysis.....	17
5.6: Multivariable analysis.....	18
6. Discussion	20
7. Conclusion&recommendation	22
Reference	23

Annexes.....	27
Appendix I Consent form.....	27
Information about the study	28
Appendix II English version of questionnaire	29
Appendix III Consent form Amharic version	33
Appendix IV Amharic version of questionnaire	33
Appendix V Observation check list	39

List of Tables

Table 1: sample size estimation table for study objectives of hygiene behavior in Gulele sub city Addis Ababa, Ethiopia 2017	11
Table 2: Socio demographic characteristics of grade 6 th to 8 th students in Gulele sub city government primary schools, Addis Ababa Ethiopia, 2017	16
Table 3: Distribution of hygiene behavior reinforcing factor in Gulele sub city government primary school grade 6 th to 8 th students, Addis Ababa Ethiopia, 2017.....	16
Table 4:Multivariable analysis of hygiene behavior influencing factors in grade 6 th to 8 th government primary school, Gulele sub city, Addis Ababa Ethiopia, 2017.....	18

List of Figures

Figure 1: Map of Gulele sub city, Addis Ababa, Ethiopia, 2017.....	9
Figure 2: Schematic diagram of sample size distribution in grade 6 th to 8 th government primary school, Gulele sub city, Addis Ababa Ethiopia, 2017	13

Acronyms

AOR	Adjusted odds ratio
COR	Crude odds ratio
CSA	Central statistical agency
FMOH	Federal ministry of health
HWWS	Hand washing with soap
LMICS	Low and middle income countries
MOU	Memorandum of understanding
NGO	Nongovernmental organization
SHN	School health and nutrition
SPHMMC	Saint Paul hospital millennium medical college
STH	Soil transmitted helmentiasis
UNICEF	United nation international child fund
WASH	Water ,Sanitation and hygiene
WHO	World Health Organization

Abstract

Introduction: Improved sanitation better hygiene and safe water supply can be considered as three separate but complementary interventions for the prevention of transmission of faecal borne pathogens. Incidence rate of diarrhea increasing in Gulele sub city from 2013 to 2016 in 5 to 15 years old children, also acute respiratory infection and soil transmitted helminthiasis are top ten diseases. Aim of study was to assess hygiene behavior of primary school children in government primary school of Gulele sub city, Addis Ababa, Ethiopia.

Methods: A school based cross sectional study conducted in Gulele sub city from November to December 2017, 534 grade 6th to 8th students were included. Systematic random sampling procedure was employed to select study subjects and schools& pretested questionnaire and observation check list were used to collect data. Data were entered in epi info version 7 and analyzed by SPSS version 21 software and p value 0.05 for establishing significance was used for measure of association

Result: Response rate of study was 518 (97 %)&278(53.7%) had positive hygiene behavior. Being female adjusted odds ratio(AOR) 2.16(1.44, 3.24), mother or female guardian education at primary/secondary school AOR 3.59(1.93, 6.74), Mother / female guardian education college and above 1.78(1.05, 2.99),involvement of students on school health extension package AOR 1.8(1.16,3.09), students motivated by health professional to practice positive hygiene behavior AOR 2.03(1.27,3.24),being knowledgeable AOR 2.61(1.7,4.01)& having positive attitudes towards hygiene behavior AOR 3.08(2.0,4.77) showed significant association at 95%cl

Conclusion& recommendation: The study revealed around half of grade 6th to 8th students had positive hygiene behavior , toilet to students ratio was below recommendation of world health organization ,having knowledge& positive attitudes towards hygiene behavior ,being female students ,education of mother / female guardian ,students involvement in school health extension package ,motivation of health professional to students to practice positive hygiene behavior influence hygiene behavior .To minimize negative hygiene behavior health professional enhance their effort &Gulele sub city education office should focus on adult education to improve hygiene behavior of students

Key word: Factor influencing, hygiene, behavior, primary school children, Ethiopia

1. Introduction

1.1Background

Improved sanitation better hygiene and safe water supply can be considered as three separate but complementary intervention for the prevention of transmission of faecal borne pathogens (1).The specific behaviors' that have received most attention with regard to their role in Promoting the transmission of enteric pathogens are water handling behavior, food-handling behavior, and hand-washing(2).

The mere provision of water supply and sanitation facilities is not enough to bring down mortality and morbidity rates significantly; hygienic behavior has a greater impact on health(3) hygiene promotion can change hygiene behavior & hand washing promotion showed significant reduction in mean episodes of diarrhea (2,4)implementing school health and nutrition (SHN) behavior change activities in school improves hygiene and sanitation practices in school and communities significantly (5) health education is important intervention to change hygiene behavior of school children (6) .

Systematic review conducted by London school of hygiene and tropical medicine showed that, diarrhea risk reductions of 48, 17 and 36%, associated with hand washing with soap, improved water quality and excreta disposal respectively (7) house hold water treatment & safe water storage helps to reduce diarrheal diseases in developing countries (8,9) with access to safe water, improved sanitation and hygiene can reduce schistosomiasis and guinea worm by 80%(8) hand washing intervention is significant in reducing absenteeism in school children in educational setting(10) .

Prevalence of soil transmitted helmetiasis high in school going children(11) improvements in water supply and sanitation can substantially reduce the rates of morbidity and severity, of Ascariasis, diarrhea diseases ,dracunculiasis, hookworm infection, schistosomiasis ,and trachoma(12).

1.2 Problem statement

According to the World Health Organization, about two million people every year die due to Diarrheal diseases. Most of the deaths occur amongst children less than five years of age. Population in developing countries is the most affected(13). An estimated 94% of the diarrheal burden of disease is attributable to environment, and associated with risk factors such as unsafe drinking-water and poor sanitation and hygiene(14).

Diarrheal and pneumonia are leading killer of children they contribute 29 % of under five death worldwide,90% of death occur in sub Saharan Africa and Asia countries , India, Nigeria Democratic republic of Congo, Pakistan and Ethiopia contribute 50 % of diarrhea and pneumonia death in under five children worldwide(15) . Poor hygiene practices and inadequate sanitary conditions play major roles in the increased burden of communicable diseases within developing countries(16).In Ethiopia diarrhea is one of top ten causes of morbidity and mortality with contribution of 8% death of the country (17).

Water ,sanitation and hygiene intervention as well as their combination are effective in reducing diarrhea illness(3) hand washing with soap reduce diarrheal disease by 42-47%(18) respiratory infection by 24%(19) Water, sanitation and hygiene (WASH) access and practice reduce soil transmitted helminthes (STH) by 33%(20).

Providing new latrines without regular provision of soap and anal cleansing materials and without sufficient hygiene behavior change, increased use of school latrines may have resulted in increased fecal contamination on hands (21).

Study conducted in Indonesia grade 6th students hand washing with soap practice before eating and after defecation only 40.5% of students were practiced properly (22) study conducted in Angolela Ethiopia primary school children 99% of children wash their hands before eating but only 36% of them use soap during washing hands and only 14% of students practice hand washing after defecation(23) an other study conducted in Sebeta Ethiopia only 32% % of grade 6th to 8th student practicing hand washing with soap before eating and after defecation (24).

Among children for whom mainly positive hygiene behavior was recorded, the prevalence of diarrhea was 6.4 days per child-year, while it was 14.2 days per child year in children with mainly negative scores. The incidence was 2.4 episodes per child-year among children with mainly positive scores and 4.1 episodes per child-year among children with mainly negative scores (25) .

Ethiopia achieved millennium development goal target in accessing improved water sources target (26) the burden of diarrheal morbidity and mortality is remain high (17) .

In Ethiopia pneumonia and diarrheal disease are top ten causes of morbidity and mortality(17) . In Addis Ababa and Gulele sub city the diseases are also top ten causes of morbidity .The main determinant of these disease are hygiene behavior i.e. proper water handling, proper latrine utilization and proper hand washing in critical times (3,7,19,25).

Government of Ethiopia ministry of health ,ministry of education, ministry of water and energy and ministry of finance and economic development signed memorandum of understanding(MOU) to improve WASH in school (27) access of safe water and sanitation for all segment of population was one of the target of millennium development goal and sustainable development goal(26) strategy to improve hygiene behavior of school children like ,celebrating hand washing day in school since 2008 implementing in Ethiopia (28) scale up school water, sanitation& hygiene(WASH) program have been done by government of Ethiopia and partners (13) since 2010 started implementation of community, school and youth center urban health extension package in Addis Ababa focused on hygiene & sanitation .

Despite these effort, formative study conducted in Ethiopia showed that , hand washing behavior was low in 7-14 years old children only 46% wash hands with only water,34% not wash at all and only 18%wash hands with soap after defecation (29) .

Incidence rate of diarrhea decreasing in Gulele sub city in <15 years old children from 65% in 2013 to 57% in 2016 but in the same year period the incidence of diarrhea increasing from 13%to 18.4% in primary school age (5to 15 years old) children, also acute respiratory infection and soil transmitted helmetiasis are top ten cases in Gulele sub city. Therefore, the aim of this study is to assess hygiene behavior of primary school children in Gulele sub city government primary school.

1.3 Significance of the study

There is limited study conducted on hygiene behavior of primary school children in Addis Ababa and Gulele sub city, the effort done to improve hygiene behavior in primary school children is based on limited evidence. The study will help for school management and health clubs as source of information and guide the development of health and hygiene intervention strategy in school. It also provides evidence for policy maker and nongovernmental organization who are interested to support health and hygiene intervention in school by providing information about factor influencing hygiene behavior to prioritize their intervention .It will be significance to researcher interested conducting related study by providing base line information and generating hypothesis .

2. Literature Review

Magnitude of hygiene behavior

Study findings in Tigray Ethiopia grade 6th to 8th primary school children showed that 61.7 % of students had positive hygiene behavior (30).

Study conducted in an Angolela Approximately 52% of students were classified as having adequate knowledge of proper hygiene .Most students reported hand washing before meals (99.0%), but only 36.2% Reported using soap. Although 76.7% of students reported that washing hands after defecation was important, only 14.8% reported actually following this practice(23). Study conducted in Arbaminch, Ethiopia 22.23% of 1st cycle primary school children had proper hand washing practice, 72.57% had sufficient knowledge&78.28% children had positive Attitude towards hand washing practice(31).

Socio demographic factors

Study conducted in Chitungiza, hygiene behavior of primary school going children did not associated with their sex ,age and parents occupation (32) study conducted in Ethiopia on hygiene behavior of primary school children was not associated with sex ,age educational grade ,parents occupation and educational status (30)while in other study conducted in Kolkata India primary school children personal hygiene practice and mothers literacy status associated as mothers education status increase personal hygiene practice score increased (33) study conducted in west Turkey poor personal hygiene status was associated with low maternal education status and being male(34) hand washing practice were higher in females than male (35). Hand wash ‘habits’ were generally not inculcated at an early age (36).

Hand washing training was important in improving hand washing behavior (37) Many children learn some of their most important hygiene skills at school, and for many this is where they are introduced to hygiene practices that may not be promoted or possible in the home(38) hand washing promotion probably reduces diarrhea episodes in both child day-care centers in high-income countries and among communities living in LMICs by about 30% However, less is known about how to help people maintain hand washing habits in the longer term (4) .

There is evidence that low educational attainment and certain religious customs predispose to diarrhea, presumably because of behavioral factors. The specific hygiene-related Behavior that has been most studied is hand-washing(2).

Predisposing factors

Study conducted in Angolela Ethiopia Students with adequate Knowledge of proper hygiene were more likely to have clean clothes and to have a lower risk of parasitic Infection(23)study conducted in Mumbai India more than half (54%) of the study population reported a history of illnesses in the past one month, out of which 81.4% reported absenteeism due to illness,34% children were unaware about health related consequences of not washing hands. When asked about the important times when hands ought to be washed, only18% mentioned after toilet use (39). Children's knowledge and perceptions were inconsistent with hygienic behavior(32). students who have positive attitudes were more likely practice proper hand washing than who have negative attitude (24) positive hygiene behavior higher in primary school children those who had good knowledge in hygiene behavior (40)

Reinforcing factors

Teachers can be effective advocates for hygiene, through hygiene education and through acting as role models for schoolchildren(38) 56% students get awareness on personal hygiene issues from their teachers(41) teachers and parents pressure were strongly associated with hand washing practice (31) .The family institution seemed to play a more important role in life skills training and positive reinforcement compared to the school (50% vs. 27.3%) (32).

Enabling factors

Lack of soap and water, as well as inadequate sanitation facilities may be two of the main reasons why children do not wash their hands. By adopting correct Water storage (water container with tap), handling and hand washing practices found to improve health and reduction in 20% Illness absenteeism in school. Promoting these interventions And improvement in water-behavioral practices prevented in-house water contamination(42) availability and accessibility of water, and soap associated in hand washing practice of primary school children (31). studies document higher rates of infectious, gastrointestinal, neuro-cognitive and psychological illnesses where school children were exposed to inadequate water and sanitation facilities(43).

Key 'motivations 'for hand washing were disgust, nurture, comfort and affiliation. Fear of disease generally did not motivate hand washing, except transiently in the case of epidemics such as cholera (36) . 'Plans' involving hand washing included to improve family health and to teach children in Good manners. Environmental barriers were few as soap was available in almost

every household, as was water (36). Forgetfulness was cited as the primary reason for missing washing hands before eating food (88%) and after toilet use (84%)(39).

3. Objective

3.1. General objective

To assess factors that associated with hygiene behavior of primary school children in government primary school of Gulele sub city, Addis Ababa, Ethiopia, 2017

3.2. Specific objective

- To assess magnitude of hygiene behavior
- To identify factor that predispose for hygiene behavior
- To determine reinforcing factors for hygiene behavior
- To assess hygiene behavior enabling factors at school selected for the study in the sub city

4. Methods and materials

4.1. Study area

Gulele sub city has an area of about 3119.1 hectares and the altitude ranged from 2449 to 3016 meters above sea level which has range of 567 meter & the highest peak of the city exists in the sub city at Entoto mountain .The sub city divided in to ten woredas; It has a total population of 327312 among which 158,223 male and 169,089 Female (projected from CSA 2007) &the 6th densely populated sub city in Addis Ababa with population density of 104.94 population per hector. Regarding health facilities there are around 47 health facilities, among which 2 hospitals, 11health centers (10government&1 NGO) 32 private clinic and 2 NGO clinics. There are 18 second cycle government primary schools in the sub city.

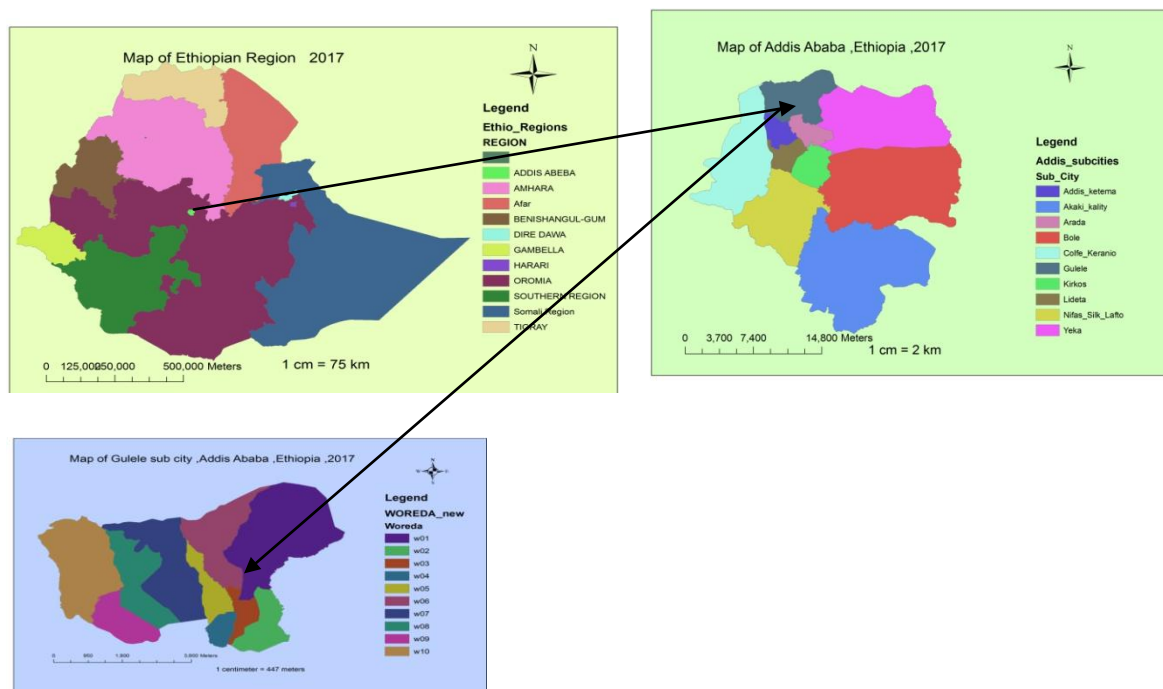


Figure 1: Map of Gulele sub city, Addis Ababa, Ethiopia, 2017

4.2. Study design and period

A cross sectional institution based study design was used in Gulele sub city, Addis Ababa Ethiopia, from November 2017 to December 2017

4.3. Population

Source population

All grade 6th to 8th school children who are learning in day time in Gulele sub city government primary schools.

Study population

Students who were learning from grade 6th to 8th available at school during data collection period

Inclusion and exclusion criteria

Inclusion criteria

- Grade 6th to 8th government primary school children in Gulele sub city

Exclusion criteria

- Students who have sight and hearing disability were excluded, reason for exclusion for hearing disability difficulty of sign language for taking consent & giving orientation how to fill the questionnaire & for sight disability we could not prepare data collection tools in Braille our data collection method was self-administered questionnaire

4.4. Sample size estimation & sampling techniques

Sample size estimation

Sample size were determined by assumption of study design, objective, confidence level, power, significance difference and prevalence of hygiene behavior on exposed to factor that influencing hygiene behavior

Table 1: sample size estimation table for study objectives of hygiene behavior in Gulele sub city Addis Ababa, Ethiopia 2017

Hygiene behavior determinant factor	Positive hygiene behavior		CI	Power	Ratio	Sample size		Total sample size	Reference
	P ₁	P ₂				Positive hygiene	Negative hygiene behavior		
Knowledge on water handling	69%	48.7%	95%	80%	1:1	102	102	204	(30)
Important referents	71.7 %	51%	95%	80%	1:1	83	83	164	(24)
Attitudes	71 %	47%	95%	80%	1:1	59	59	118	(30)
Prevalence of hygiene behavior	P=62 %	q=38%	95%	-	-	-	-	362	(30)

P₁=out come in exposed, p₂=outcome in none exposed

The maximum sample of 324 was taken by considering single population proportion formula based on magnitude of positive hygiene behavior =62% from previous study (30)

$$n = \left(z_{\frac{\alpha}{2}} \right)^2 \frac{pq}{d^2} = \frac{(1.96)^2 * 0.62 * 0.38}{(0.05)^2} = 362$$

Since source population was known which is 3,030 primary school students .They were less than 10,000 we use finite population correction formula to minimize sample size

$$n_0 = 362 \quad n_1 = \frac{n_0}{1 + \frac{n_0}{N}} = \frac{362}{1 + \frac{362}{3,030}} = \frac{362}{1.1195} = 324$$

$$N = 3,030 \quad \text{none response rate} = 324 * 10\% = 32 \quad n = n_1 + \text{none response rate} = 32 + 324 = 356$$

Since the sampling procedure was two stage sampling for selection of primary school from Gulele sub city primary school and selection of participant from selected school, design effect was considered and the calculated sample was multiplied by 1.5 by considering non response rate of 10 % total of=534 sample size were used.

For sample size for hygiene behavior influencing factor were determined by double population

proportion formula
$$n_1 = \frac{\left[z_{\frac{\alpha}{2}} \sqrt{\bar{p}\bar{q} \left(1 + \frac{1}{r}\right)} + z_{\beta} \sqrt{p_1 q_1 + \frac{p_2 q_2}{r}} \right]^2}{\Delta^2}$$
 Where $n_2 = r n_1$, $\bar{p} = \frac{(p_1 + r p_2)}{1+r}$

$\bar{q} = 1 - \bar{p}$ & r = ratio of outcome in exposed to non exposed

$$z_{\frac{\alpha}{2}} = 1.96 \quad z_{\beta} = 0.84 \quad \Delta^2 = (P_2 - P_1)^2$$

The larger sample size (534) was taken after estimating sample size for all my study objectives.

4.5. Sampling procedure

Multi stage probability sampling techniques were used to select representative sample. The first stage was selecting Primary school by systematic random sampling method by taking lists of school from Gulele sub city education office. The second stage was selection of study participants from selected primary school based on proportional distribution on consideration of number of class and students in order to select representative sample. Each study unit was selected by systematic random sampling method by taking list of identification number.

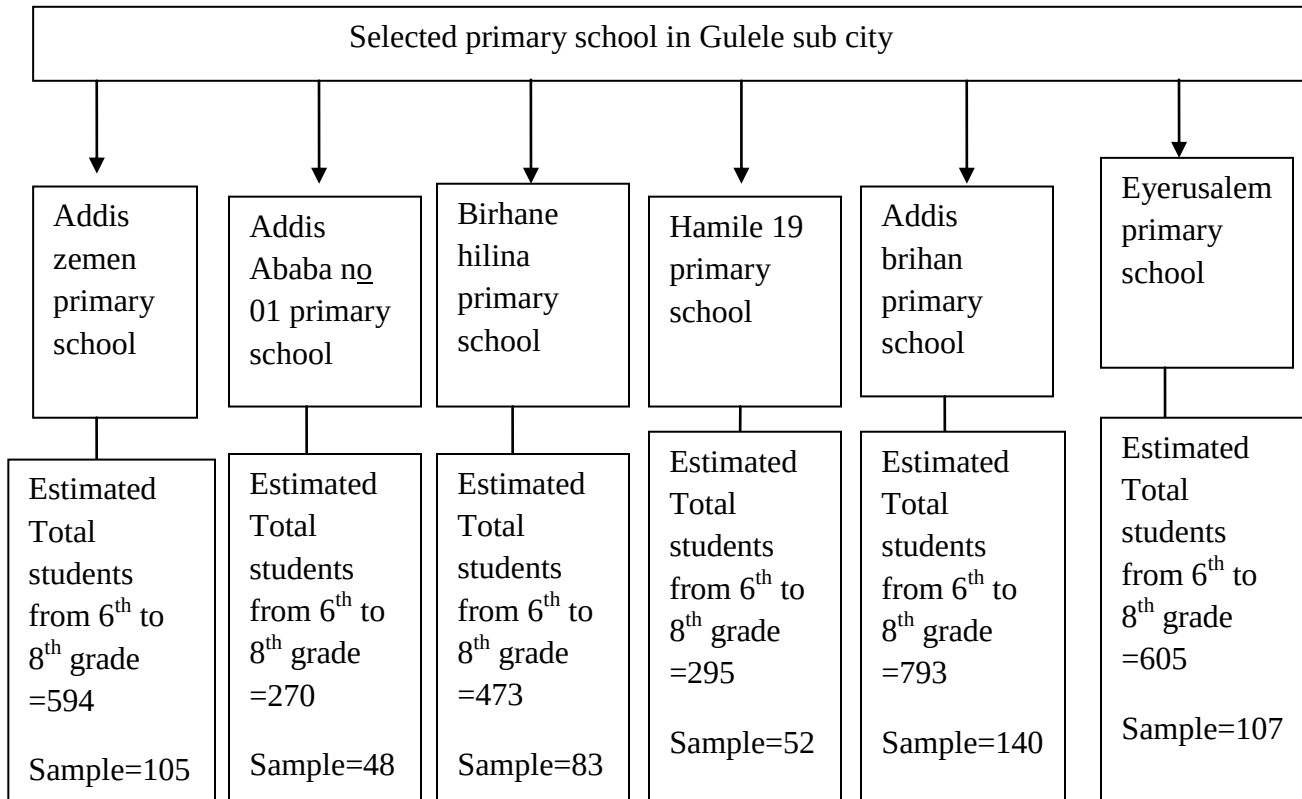


Figure 2: Schematic diagram of sample size distribution in grade 6th to 8th government primary school, Gulele sub city, Addis Ababa Ethiopia, 2017

The distribution of sample size to grade, 6th, 7th & 8th were based on proportion of students' number in each grade level

4.6. Data collection tools and procedures

Data were collected through structured self administered questionnaire and observational check list. Information on socio-demographic, predisposing and reinforcing factors that influence hygiene behavior were collected by self administered questionnaire .Data on enabling factor were collected through observational check list .The data collection tool were developed in English language and translated to Amharic and back translated to English from Amharic by another person in order to check consistency & make suitable to (clarify) questions to respondents. The tool was adapted after reviewing WHO and UNICEF water, sanitation and hygiene joint monitoring tools, UNICEF water, sanitation and hygiene in school in middle and low income country guideline & different literature with some modification based on my study objectives .The questionnaire was pre-tested Belay Zeleke primary school in the same sub city on 5% of sample size in order to check the questionnaire fitness to collect required data before the actual data collection date. Eight Bsc degree health professional data collector and two degree environmental health professional data collector supervisor were recruited and training had given for one day on sampling procedure, data quality confidentiality issue and each part of data collection tools by principal investigator. Six teachers were recruited as coordinator one teacher from each school. Cross supervision was done by principal investigator in addition to data collector supervisor

4.7. Operational definition

Hygiene behavior: practice of primary school children performed on water handling, sanitation & hand washing

Positive hygiene behavior: 12 practice question on water handling ,sanitation and hand washing were asked to study participants ,each question will score either 0 or 1 .A study participant who answer the question correctly (answer yes, always and usually) was score 1 for each question . Median score was used to categorize study participants hygiene behavior either positive or negative hygiene behavior. Primary school children answer practice questions on water handling, sanitation and hand washing more than or equal to median score was categorized as have positive hygiene behavior(37)

Knowledgeable: child answer knowledge related question on water handling, sanitation &hand washing more than median score correctly

Attitude: believes about hygiene behavior and degree to which hygiene behavior is positively or negatively valued. Attitude towards hygiene behavior were measured by using likert scale arranged question answer from strongly agree to strongly disagree, answer was dichotomized to strongly agree &agree in to one category score 1 and neutral ,disagree and strongly disagree score 0 was used .Summative score was used to categorize attitude of school children positive or negative .Child answer more than or equal to median score for attitude question strongly agree and agree will be categorized to have positive attitude(31).

4.8. Study variables

Dependent variable

- Hygiene behavior (positive or negative behavior)

Independent variable

- Socio demographic factor (age ,sex, grade level, mothers/guardian educational status ,fathers /guardian educational status)
- Predisposing factor (knowledge &attitude)
- Reinforcing factor (important referents(pressure from peers ,parents ,teachers), school hygiene promotion activities
- Enabling factors (hand washing station, toilet, availability and accessibility of soap and water)

4.9. Data quality assurance

To assure the quality of data, one day training was given for data collector and supervisor .In each selected school orientation was given to study participant on objective and relevance of the study .Teachers was not available in data collection hall/class in order to give more freedom for study participant to answer all questions without tension .pretest was done to check language suitability, consistency, relevance, time taken to fill the questionnaire and comprehensiveness of the question. Completeness of the questionnaire was checked by data collector supervisor at spot and rechecked by principal investigator.

4.10. Data analysis

The data was pre coded manually and entered in to epi-info version 7 then transported to SPSS version 21 statistical soft ware & statistical analysis was done .Univariate analysis was done to describe single variable by frequency, proportion, measure of central tendency and dispersion . Bivariate analysis was done to examine association between dependent and independent variable and variable that has p-value less than 0.2 were selected to multivariable analysis in order to identify determinant factors to hygiene behavior (outcome variable) &adjusted odds ratio with 95% confidence level was reported accordingly

4.11. Ethical consideration

Ethical clearance was obtained from Saint Paul hospital millennium medical college ethical review board. A written permission letter was obtained from Addis Ababa education bureau support letter was sent from Gulele sub city education office to all selected schools. The purpose of the study as well as its confidentiality of the information was explained to school director .written informed consent was obtained from parents or guardians of study participant by sending consent form that explain the objective, confidentiality and voluntarily participation to the study prior to one day from actual data collection . Study participants was informed on confidentiality of the information they gave, participation was voluntarily, the right of withdrawal from study and none response to the question was respected

5. Result

5.1 Socio demographic characteristics

A total of 534 students were invited to participate in study from six primary schools, 518 of them participated in the study and response rate was 97 %. From total participants 236(45.6%) were male. Mean age of participants was 13.67 years (SD=1.26), 278(53.7%)of study participant had positive hygiene behavior .

Table 2: Socio demographic characteristics of grade 6th to 8th students in Gulele sub city government primary schools, Addis Ababa Ethiopia, 2017

characteristics	category	number	(%)
grade	6 th	171	33
	7 th	172	33.2
	8 th	175	33.8
Age	<15 years	398	75
	≥ 15 years	130	25
Mother or female guardian educational status	Unable to read &write	111	21.4
	Primary or secondary school complete	295	56.9
	College and above educated	112	21.6
Father or male guardian educational status	Unable to read &write	44	8.5
	Primary or secondary school complete	306	59.1
	College and above educated	168	32.4

5.2: Reinforcing factors of hygiene behavior

All schools included in study had hygiene and sanitation club, 120 (23.2%) of the study participants were member of school hygiene and sanitation club, among study participants155 (29.9%) took training in hygiene and sanitation &112(23.6%) involved in school health extension package.

Table 3: Distribution of hygiene behavior reinforcing factor in Gulele sub city government primary school grade 6th to 8th students, Addis Ababa Ethiopia, 2017.

Reinforcing factors	Category	Number	%
Motivated by health professional to practice hygiene behavior	yes	146	28.2
	no	372	71.8
Motivated by parents /family to practice hygiene behavior	yes	454	87.6
	no	54	12.4
Motivated by teachers to practice hygiene behavior	yes	240	46.3
	no	278	53.7
Motivated by peer to practice hygiene behavior	yes	117	22.6
	no	401	77.4

5.3: Predisposing factors

Knowledge on hygiene behavior and attitudes towards hygiene behavior are predisposing factors for practice of hygiene behavior .Among the study participants 346(66.8%) were knowledgeable &172(33.2%) not knowledgeable in hygiene behavior. Attitude towards hygiene behavior were assessed in the study, 351(67.8%) & 167(32.2%) of study participants had positive and negative attitude respectively

5.4: Hygiene behavior enabling factors

Observations on hygiene behavior enabling factors were done on six primary schools. There were 54 toilets for 3,535 male & 46 toilet for 4,008 female students, with toilet to student's ratio of 1:66&1:87 for male and female students respectively

All schools had separated toilet for male and female students and teachers .Only two schools latrine were clean that means they had no bad odor, feces in the floor and smelly .There was no sign of open defecation around all toilet .There were sink for hand washing near toilet in all observed schools but in two of them there was no water for hand washing during observation .In all observed schools soap was not available for hand washing. There were a place for drinking water, municipal pipe water and water reservoir (tanker) were use for drinking purpose, there was no regular schedule for cleaning water reservoir .At time observation there was no water in two schools for drinking.

5.5: Bivariate analysis

Bivariate analysis was done to determine the relationship between dependent and independent variables at p-value of 0.2. Hygiene behavior influencing factors such as; being female students ,learning at grade 8th compared with grade 6th , mother/female guardian education ,father/male guardian education, took training on hygiene and sanitation ,involvement on school health extension package ,being a member of school hygiene and sanitation club, motivation of health professional to students to practice positive hygiene behavior ,motivation of parents/family to students to practice positive hygiene, motivation of teachers to students to practice positive hygiene, motivation of peers to students to practice positive hygiene, being knowledgeable of students on hygiene behavior &having positive attitude towards hygiene behavior showed relation with positive hygiene behavior

5.6: Multivariable analysis

Hygiene behavior associated factors were included in multivariable analysis which had p- value less than 0.2 at bivariate analysis

Being female at AOR 2.16(1.44, 3.24), mother or female guardian education at primary or secondary school complete AOR 3.59(1.93, 6.74), Mother or female guardian education college and above AOR 1.78(1.05, 2.99), involvement of students on school health extension package AOR 1.8(1.16,3.09), motivation of health professional on students to practice positive hygiene behavior AOR 2.03(1.27,3.24), being knowledgeable on hygiene behavior AOR 2.61(1.7,4.01)& having positive attitudes towards hygiene behavior AOR 3.08(2.0,4.77) showed statistically significant association with hygiene behavior

Table 4:Multivariable analysis of hygiene behavior influencing factors in grade 6th to 8th government primary school, Gulele sub city, Addis Ababa Ethiopia, 2017

Associated factors	Category	Hygiene behavior		COR at 95%CI	AOR at 95%CI
		Positive N (%)	Negative N (%)		
sex	M	103(37.1)	133(55.4)	1.00	1.00
	F	175(62.9)	107(44.6)	2.12(1.49,3.00)*	2.16(1.44,3.24)*
Grade	6 th	90(32.4)	81(33.8)	1.00	1.00
	7 th	82(29.5)	90(37.5)	0.82(0.537,1.25)	1.27(0.76,2.10)
	8 th	105(38.1)	69(28.7)	1.38(0.90,2.12)	0.75(0.44,1.23)
Mother or female guardian education	Unable to read or write	42(15.1)	69(28.8)	1.00	1.00
	Primary or secondary school complete	162(58.3)	133(55.4)	2.00(1.28,3.13)*	3.59(1.93,6.74)*
	College & above complete	74(26.6)	38(15.8)	3.2(1.85,5.53)*	1.78(1.05,2.99)*
Father or male guardian education	Unable to read or write	22(7.9)	22(9.2)	1.00	1.00
	Primary or secondary school complete	151(54.3)	155(64.6)	0.97(0.52,1.83)	0.68(0.27,1.67)
	College & above complete	105(37.8)	63(26.2)	1.67(0.854,3.25)	1.29(0.782,1.14)
Training on hygiene& sanitation	Yes	96(34.5)	59(24.6)	1.62(1.10,2.38)	0.9(0.53,1.53)
	No	182(65.5)	181(75.4)	1.00	1.00
Involvement on school health	Yes	80(28.8)	42(17.5)	1.9(1.25,2.9)*	1.8(1.16,3.09)
	No	198(71.2)	198(82.5)	1.00	1.00

extension package					
Being member of hygiene and sanitation club	Yes	80(28.8)	40(16.7)	2.02(1.32,3.09)*	1.52(0.89,2.56)
	No	198(71.2)	200(83.3)	1.00	1.00
Motivated by health professional	Yes	103(37)	43(17.9)	2.69(1.79,4.06)*	2.03(1.27,3.24)*
	No	175(63)	197(82.1)	1.00	1.00
Motivated by parents (family)	Yes	257(92.3)	197(82.1)	2.67(1.53,4.65)*	1.8(0.97,3.37)
	No	21(7.6)	43(17.9)	1.00	1.00
Motivated by teachers	Yes	144(51.8)	96(40)	1.61(1.14,2.29)*	0.94(0.59,1.51)
	No	134(48.2)	144(60)	1.00	1.00
Motivated by from peers	Yes	71(25.5)	46(19.2)	1.45(0.95,2.2)	1.10(0.64,1.90)
	No	207(74.5)	194(80.8)	1.00	1.00
Knowledge on hygiene	Knowledgeable	222(79.9)	124(51.7)	3.7(2.5,5.4)*	2.61(1.7,4.01)*
	Not knowledgeable	56(20.1)	116(48.3)	1.00	1.00
Attitude towards hygiene	Positive	228(82)	123(51.3)	4.3(2.9,6.45)*	3.08(2.0,4.77)*
	Negative	50(18)	117(48.7)	1.00	1.00

*variables that have p-value less than 0.05

6. Discussion

Provision of water supply and sanitation facilities is not enough to bring down mortality and morbidity rates significantly; hygienic behavior has a greater impact on health(3) implementing school health and nutrition (SHN) behavior change activities in school improves hygiene and sanitation practices in school and communities significantly (5) Study findings in Tigray Ethiopia grade 6th to 8th primary school children showed that 61.7 % of students had positive hygiene behavior (30) .Our study revealed that 278 (53.7) of grade 6th to 8th students had positive hygiene behavior ,the lower hygiene behavior in Addis Ababa is may be due to hygiene behavior improving intervention difference between Addis Ababa and Tigray.

Study conducted in chitungiza and Tigray, Ethiopia showed that hygiene behavior had no association with sex (30) (32),where as study conducted in turkey primary school children showed that being a male is associated with poor personal hygiene(34), another study showed that hand washing practice were higher in female students(35) ,our study showed that being a female is two times more likely practice positive hygiene behavior the reason may be more exposure of female on hygiene behavior activities at home.

Study conducted in Kolkata India primary school children mother education status increase personal hygiene practice score increased (33) study conducted in west Turkey poor personal hygiene status of primary school children were associated with low maternal education status (34) .Our study showed that mothers or female guardian education status was associated with positive hygiene behavior ,primary or secondary school complete mother or female guardian was 3.6 times more likely practice positive hygiene behavior compared to unable to read or write mothers or guardian ,college & above level educated mother or female guardian was 1.3 times more likely practice positive hygiene behavior compared to unable to read or write, this may be due to knowledge on hygiene behavior increment as educational level of mother or female guardian higher and they motivate their children to practice hygiene behavior

Hygiene promotion can change hygiene behavior (2) health education is important intervention to change hygiene behavior of school children (6) this study was in line with these study and participation of students in school health extension package1.8 times more likely practice positive hygiene behavior compared with not participated student in school heath extension package ,this could be due to understanding of hygiene related disease and prevent themselves from the disease

Positive hygiene behavior higher in primary school children those who had good knowledge in hygiene behavior (40), Students who have positive attitudes were more likely practice proper hand washing than who have negative attitude (24) our study was concurrent to these studies ,being knowledgeable was 2.6 times more likely practice positive hygiene behavior compared with not knowledgeable students and having positive attitude was 3 times more likely practice positive hygiene behavior than negative attitude .

According to WHO recommendation toilet to student ratio in low & middle income countries is one toilet for 25 female students, one toilet & one urinal for 50 male students (38) .our study findings showed that toilet to students ratio is below WHO recommendation which was one toilet for 66 male students & one toilet for 87 female students ,even though ratio of toilet to students ratio below WHO standards in both sex allocation of toilet to students were in contrary to WHO recommendation this may be due to unawareness of school managements on WHO recommendation on allocation of toilet for female & male students

Limitation of the study

- The study relied on self report information ,under or over reporting of hygiene behavior might have occurred since observation was not done on practice of hygiene behavior
- Observation was done on school hygiene enabling facilities ,observer bias might be occurred

7. Conclusion&recommendation

The study was done to identify factors that influence hygiene behavior of students .Findings of the study revealed around half of grade 6th to 8th students had positive hygiene behavior , toilet students ratio was below recommendation of WHO ,having knowledge on hygiene behavior and positive attitudes towards hygiene behavior ,being female students ,education of mother or female guardian ,students participation on school health extension package ,pressure of health professional on students to practice positive hygiene behavior significantly associated with hygiene behavior .

Recommendation

- School management work with health sector to improve awareness on allocation of toilet to students at school
- Health professional enhance their effort to influence hygiene behavior of students by participating students in school health extension package
- Gulele sub city education office should focus on adult education to improve hygiene behavior of their children

Reference

1. christine vanwijk and Tinekemurre. Motivating Better Hygiene Behaviour: Importance forPublic Health Mechanisms ofChange. 2003.
2. Feachem RG. Interventions for the control of diarrhoeal diseases among young children : promotion of personal and domestic hygiene. WHO. 1984;62(3):467–76.
3. Lorna Fewtrell etal. Water , sanitation , and hygiene interventions to reduce diarrhoea in less developed countries : a systematic review and meta-analysis. Lancet Infect Dis. 2005;5(January):42–52.
4. Ejemot-Nwadiaro RI, Ehiri JE, Arikpo D, MeremikwuMM CJ. Hand washing promotion for preventing diarrhoea (Review). cochrane Collab. 2015;(9).
5. Save the children. Changing hygiene behavior in schools and communities Successes and lessons learned from Nasirnagar , Bangladesh. Save the children. 2009;
6. Shrestha A, Angolkar M. Improving hand washing among school children : an educational intervention in South India. Al Ameen J Med Sci. 2015;8(1):81–5.
7. Cairncross S, Hunt AC, Boisson S, Bostoen K, Curtis V, Fung ICH. Water , sanitation and hygiene for the prevention of diarrhoea. Int J Epidemiol. 2010;39.
8. Oxfam. The Safe Water System : Safe Storage of Drinking Water. National center for emerging and zoonotic infectious diseases. 1996.
9. Macy J, Quick R. World Spotlight : The Safe Water System -- A Household-Based Water Quality Intervention Program for the Developing World. CDC. 2002;(Water Conditioning and Purification).
10. Willmott M et al. Effectiveness of hand hygiene interventions in reducing illness absence among children in educational settings : a systematic review and meta-analysis. BMJ. 2016;42–50.
11. Pradesh A, Ashok R, Suguneswari G, Satish K, Kesavaram V. Prevalence of Intestinal Parasitic Infection in School Going Children in. Shiraz E-Med J. 2013;14(4):1–4.
12. S.A. Esrey et al. Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. WHO. 1991;
13. UNICEF. Water , Sanitation and Hygiene Annual Report. 2013.
14. WHO. PREVENTING DISEASE THROUGH WASH Towards an estimate. 2006.
15. UNICEF. Pneumonia and diarrhoea,tackling the deadliest disease for the world poorest

- children. 2012.
16. Eran U. Review Article on Knowledge and Practices of People on Hygiene. *Int J Heal Sci Res.* 2017;7(April):425–8.
 17. Centers for Disease Control and Prevention Center for Global Health. fact sheet. 2014.
 18. Val Curtis and Sandy Cairncross. Effect of washing hands with soap on diarrhoea
Reviews Effect of washing hands with soap on diarrhoea risk in the community : a
systematic review. *Lancet Infect Dis.* 2015;275.81.
 19. Rabie T, Curtis V. Handwashing and risk of respiratory infections : a quantitative
systematic review. *Trop Med Int Heal.* 2006;11(3):258–67.
 20. Strunz EC, Addiss DG, Stocks ME, Ogden S, Freeman MC. Water, Sanitation, Hygiene,
and Soil-Transmitted Helminth Infection: A Systematic Review and Meta-Analysis. *plos
Med.* 2014;11(3).
 21. Greene LE, Freeman MC, Akoko D, Saboori S, Moe C, Rheingans R. Impact of a School-
Based Hygiene Promotion and Sanitation Intervention on Pupil Hand Contamination in
Western Kenya : A Cluster Randomized Trial. *Am J Trop Med Hyg.* 2012;87(3):385–93.
 22. Setyautami T SS and CJ. Proper hand washing practices among elementary school
students in Selat sub-district , Indonesia. *J Public Heal Dev.* 2012;10(2):3–20.
 23. A.P. VIVAS ET AL. Knowledge , Attitudes , and Practices (KAP) of Hygiene among
School Children in Angolela. *J PREV MED HYG.* 2017;(June 2010).
 24. Mathewos mekonnen. Assessment of hand washing practice and associated factor among
primary school children in Sebeta town Oromia regional state Ethiopia. Addis Ababa
University; 2014.
 25. Strina A, Cairncross S, Barretol ML, Larrea C, Pradol MS. Childhood Diarrhea and
Observed Hygiene Behavior in Salvador , Brazil. *Am J Epidemiol.* 2003;29(13):1032–8.
 26. WHO African Region. factsheets of health statistcs. 2016.
 27. Girma A, Ababa A. Federal Democratic Republic of Water , Sanitation & Hygiene (
WaSH) in. 2013;(February).
 28. The center for global hand washing day. An initiative of the Public Private Partnership for
Handwashing. 2009;
 29. FMOH. National Hygiene & Sanitation Strategic Action Plan for Rural , Per-Urban &
Informal Settlements in Ethiopia. 2011.

30. Assefa and Kumie. Assessment of factors influencing hygiene behaviour among school children in Mereb-Leke District , Northern Ethiopia : a cross-sectional study. BMC Public Health. 2014;1–8.
31. Besha et al. Assessment of Hand Washing Practice and it ' s Associated Factors among FirstCycle Primary School Children in Arba Minch Town, Ethiopia. Epidemiol Open Access. 2016;6(3).
32. Dube B, January J. Factors leading to poor water sanitation hygiene among primary school going children in Chitungwiza. J Public Health Africa. 2012;3:25–8.
33. Sarkar M. Personal hygiene among primary school children living in a slum of Kolkata , India. J PREV MED HYG. 2013;153–8.
34. Arikan et al. Personal Hygiene Status among Primary School Students in an Urban Area in the west of Turkey. Am J Res Commun. 2014;2(7):23–36.
35. Ergin A, Ergin N. Evaluation of students social hand washing knowledge ,practices and skills in university setting. Cent Eur J Public Heal. 2011;19(4):222–7.
36. V. A. Curtis et al. Planned , motivated and habitual hygiene behaviour : an eleven country review. open access. 2009;24(4):655–73.
37. Cevizci S, Uludag A, Topaloglu N, Babaoglu UT, Celik M, Bakar C. Developing students ' hand hygiene behaviors in a primary school from Turkey : A school-based health education study. Int J Med Sci Public Heal. 2015;4(2):155–61.
38. WHO. Water , Sanitation and Hygiene Standards for Schools in Low-cost Settings. John Adams, Jamie Bartram, Yves Chartier JS, editor. Geneva Switzerland: WHO; 2009.
39. Gawai PP et al. A cross sectional descriptive study of hand washing knowledge and practices among primary school children in Mumbai, Maharashtra, India. Int J Community Med Public Heal. 2016;3(10):2958–66.
40. Thekdi KP et al. Morbidity pattern and its association with personal hygiene practices among school going children (11 to 15 years of age group) in. Int J Community Med Public Heal. 2016;3(8):2125–8.
41. Lal BS, Kavitha G. Assessment of Personal Hygiene Knowledge and Practices : An Empirical Study of Schooling Children in Warangal. Int J Sci Res. 2016;5(8):1521–4.
42. Tambekar DH SS. Minimization of Illness Absenteeism in Primary School Students Using Low-Cost Hygiene Interventions. Online J Heal Allied Sci. 2012;11(2):2–5.

43. Jasper C, Le T, Bartram J. Water and Sanitation in Schools : A Systematic Review of the Health and Educational Outcomes. *Int J Environ Res Public Heal*. 2012;9:2772–87.

Annexes

Appendix I Consent form

Consent form for parents or guardian

Dear _____

Good morning /good afternoon

I am Mesfin Tigstu masters student in public health at Saint Paul hospital millennium medical college. I am interested to study hygiene behavior of primary school children in Gulele sub city government primary school. your children (name) _____ selected as study participant on hygiene behavior on water handling, sanitation and hand washing practices and factors that affects these hygiene behavior .To study these hygiene behavior I have prepared questionnaires, the questionnaire is approved by saint Paul hospital millennium medical college research review ethical board& there is no risk associated with being participant of this research .The aim of the study is for partial fulfillment of requirements for the degree of masters in public health in field epidemiology. I need your consent for the participation of your child in this study

I hope you will help me by giving permission your child to participate in this study .None of answers given by your child not be accessible to anyone & name of your child will not be mentioned. Result of this study will hopefully serve as an important in put for intervention to improve hygiene behavior in primary school children. The right of not participating & stop participation is respected.

Thank you in advance for your cooperation.

Are you willing your child participate in the study?

If you agree please sign here _____

Date of signature _____

Information about the study

Good morning /good afternoon

Dear participant

My name is _____(data collector) I am here to collect data for research carried out by Mesfin Tigstu saint Paul hospital millennium medical college masters degree student in public health .The title of the research is assessment of factors influencing hygiene behavior of government primary school children in Gulele sub city, Addis Ababa ,Ethiopia.

Data collection Procedure: your participation will be by answering self administered questionnaire, expected time for completion of questionnaire is 25-30 minutes

Risk: There is no risk associated with being participant of this research

Benefit: you may not be benefited directly however, people in the future may be benefited from the information generated from this study

Contact person: principal investigator Mesfin Tigstu tell no 0910071848, email mesfintigstu@gmail .com for any question regarding to the research

Right of participant: Decision to be this study participant is fully voluntarily, you will not be penalized or lose any benefit if you decide not participates or stops participation

Appendix II English version of questionnaire

Self administered questionnaire to assess hygiene behavior of primary school children

Part one: Socio demographic status			
No	Questions	Possible answer	Skip To
001	School identification code		
002	Student Identification Code		
003	Sex	1. Male 2. Female	
004	grade		
005	Age		
006	Mothers/guardian educational status	1. Unable to read and write 2. Primary/secondary complete 3. College and above	
007	Fathers/ guardian educational status	1. Unable to read and write 2. Primary/secondary complete 3. College and above	
008	What is your mother/guardian occupational status	1. Self employee 2. Private employee 3. Government Employees 4. Others _____	
009	What is your father /guardian occupational status	1. Self employee 2. Private employee 3. Government Employees 4. Others _____	
Part two : Reinforcing factor			
010	Do you took training in hygiene and sanitation	1. Yes 2. No	
011	Do you involve in school health extension package training program	1. Yes 2. No	
012	Is there hygiene and sanitation club in your school	1. Yes 2. No 3. Don't know	If your ans is 2 or 3 go to 014
013	If yes, Are you a member	1. Yes 2. No	
014	Who were motivate you to practice positive hygiene behavior	1.health professionals 2. parents/guardian 3.teachers 4.peers 5.other	
Part three : Knowledge on water handling , sanitation & hand washing behavior			

015	Do you know that unsafe water make people sick	1. Yes 2. No	
016	Do you know water used for house hold consumption should never be touched by dirty hands (water for house hold consumption means for drinking ,food preparation ,dish washing &hand washing)	1. Yes 2. No	
017	Do you know Boiling water kills germs	1. Yes 2. No	
018	Do you know Water container needs cleaning	1. Yes 2. No	
019	Do you know Water container needs covering	3. Yes 4. No	
020	Do you know human faces contain germs	1. Yes 2. No	
021	Do you know germs Can be transmitted from toilets by direct contact with contaminated hands or indirectly via insects	1. Yes 2. No 3. Uncertain	
022	Do you know proper toilet utilization prevents spread of diarrhea disease	1. Yes 2. No	
023	Do you know If you don't wash your hands after going to toilet, could you get germs?	1. Yes 2. No	
024	Do you know When it is important to wash your hands?	1. Yes 2. No	If your ans is 2 go to 026
025	If yes, when? (more than one answer possible)	1. Washing after defecation 2. Washing before eating meals 3. Washing after eating meals	
Part four: Attitudes towards on water handling , sanitation & hand washing behavior			
026	Quality of water used for drinking, food preparation ,hand washing &dish washing should be the same	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
027	Treatment of water used for drinking, food preparation ,hand washing &dish washing in any way is important for disease prevention	1. Strongly agree 2. Agree 3. Neutral 4. Disagree	

		5. Strongly disagree	
028	proper latrine usage is better than getting medication for diarrheal disease prevention	1. Strongly agree 2. agree 3. neutral 4. disagree 5. strongly disagree	
029	open defecation cause acute watery diarrhea ,other diarrheal and intestinal parasite infection	1. strongly agree 2. agree 3. neutral 4. disagree 5. strongly disagree	
30	After visiting toilet for urination hand washing is a must	1. strongly agree 2. agree 3. neutral 4. disagree 5. strongly disagree	
031	Washing hands with water only frequently is not as good as washing hands with soap?	1. Strongly agree 2. Agree 3. Neutral 4. Disagree 5. Strongly disagree	
Part five : practice and skill on water handling , sanitation & hand washing behavior			
032	What usually you do to make house hold consumption water safer if you suspect contaminated	1. Boil 2. Add chlorine products 3. Use a water filter 4. None	
033	Do you participate on cleaning water container before collection of water	1. Always 2. Sometimes 3. Never	
034	Do you cover water container	4. Always 5. Sometimes 6. Never	
035	Do you touched house hold consumption water as your hands have dirty	1. Yes 2. No	
036	Where do you usually excrete your feces	1. Home latrine 2. School latrine 3. Communal latrine 4. Open field	
037	Do you use a latrine always	1. yes 2. no	
038	Where did you defecate yesterday?	1. Home latrine 2. School latrine 3. Open field(river, bush, backyard)	
039	When do you wash your hands with	1. Before eating	

	soap (more than one answer possible)	2. After eating 3. After defecation 4. Other specify	
040	How frequent did you wash your hands with soap after defecation?	1. always 2. some times 3. never	
041	If not wash always ,Why not washing hands after defecation (multiple response is possible)	1. Not important 2. Forgetfulness 3. Laziness 4. Lack of time 5. Lack of clean water 6. Lack of soap 7. Don't know	
042	Have you wash your hands yesterday	1. Yes 2. No 3. Uncertain	
043	How do you wash your hands (rearrange the following) 1 st step----- 2 nd step----- 3 rd step----- 4 th step----- 5 th step----- 6 th step -----	1. Clean under your fingernails 2. Rinse your hands well with running water 3. Wet your hands with water and lather with soap 4. Rub your hands and scrub all surfaces up to your wrists 5. Dry them in the air 6. Continue for at least 30 seconds	
044	What Materials use for hand washing	1. Soap 2. ash 3. Water only 4. Others, ____	
45	If your answer for question 044 is water only What makes you not to use soap	1. Soap is not important 2. Unavailability of soap 3. Don't know	
046	Have you sick in diarrheal intestinal in last one month	1. Yes 2. No	

Appendix III Consent form Amharic version

የጥናት ተሳታፊ ወላጅ/አሳዳጊ ፈቃደኝነት ቅጽ

ስም/ወ/ሮ/ወ/ሪት-----

ጤና ይስጥልኝ!

እኔ መስፍን ትዕግስቱ አባላለሁ በቅዱስ ጳውሎስ ሆስፒታል ሚሲዮም ህክምና ኮሌጅ የሁለተኛ ዲጊሪ የህብረተሰብ ጤና ተማሪ ነኝ። በጉሰሴ ክፍል ከተማ በሚገኙ የመንግስት አንደኛ ደረጃ ት/ቤቶች በሚማሩ ተማሪዎች ላይ የንጽህና ልምድ ማስትም በውሃ አድያዝና አጠቃቀም፣ የመጽዳጃ ቤት አድያዝና አጠቃቀም እና የእጅ ንጽህና አጠባበቅ በተመለከተ ጥናት አድራጊነት አገኛለሁ ። የእሱ ልጅ ተማሪ-----
- በዚህ ጥናት እንዲሳተፍ ተመርጧል ። ልጄን የጥናቱ ተሳታፊ ለማድረግ የእርህ ፍቃድ አስፈላጊ ነው ። ጥናቱ የሚካሄደው በእኔ በተዘጋጀና በቅዱስ ጳውሎስ ሆስፒታል ሚሲዮም ህክምና ኮሌጅ የጥናት ስነምግባር አጣሪ ኮሚቴ በተረጋገጠ መጠይቅ ነው። ልጄ በጥናቱ በመሳተፉ ምንም ዓይነት ችግር አያጋጥመውም ። የጥናቱ አላማ በህብረተ ሰብ ጤና ኢፒደሞሎጂ ስህተት ዲጊሪ ማሟያ መመሪያዎ ጽሁፍ ነው ።

ከጥናቱ የሚገኘው ውጤት በት/ቤት የተማሪዎች የንጽህና ልምድ ለማሻሻል ለሚሰሩ አካላት ያገለግላል። ልጄን በጥናቱ እንዲሳተፍ እንደሚፈቅዱለት ተስፋ አድራጊነት ለሰሚደረገልኝ ትብብር አስቀድሜ አመሰግናለሁ።

ልጄ በጥናቱ እንዲሳተፍ ፈቃደኛ ከሆኑ በፊርማዎ ያረጋግጡልኝ

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Appendix IV Amharic version of questionnaire

የመጠይቁ የአማራጭ ትርጓሜ

ክፍል 1. የማህበራዊ ሁኔታ ዳከሳ			
ጥ.ቁ	ጥያቄ	መልስ	ጠቁሚ
001	የትምህርት ቤቱ መለያ ቁጥር		
002	የተማሪው መለያ ቁጥር		
003	ፆታ	1.ወንድ 2. ሴት	
004	ክፍል	-----	
005	እድሜ	-----	
006	የእናትህ/ሽ ሴት አሳዳጊህ/ሽ የትምህርት ደረጃ	1.ማንበብና መጻፍ የማትችል 2.1ኛ/2ኛ ደረጃ ያጠናቀቀች 3.ኮሌጅና ከዛበላይ	
007	የአባትህ/ሽ ወንድ አሳዳጊህ/ሽ የትምህርት ደረጃ	1.ማንበብና መጻፍ የማትችል 2.1ኛ/2ኛ ደረጃ ያጠናቀቀ 3.ኮሌጅና ከዛበላይ	
008	የእናትህ/ሽ ሴት አሳዳጊህ/ሽ ስራ ምን ድነው	1.የግል ስራ 2.የግል ድርጅት ተቀጣሪ 3.የመንግስት ስራ 4.ሌላ ከሆነ ይገለጽ _____	
009	የአባትህ /ሽ ወንድ አሳዳጊህ/ሽ ስራ ምን ድነው	1.የግል ስራ 2.የግል ድርጅት ተቀጣሪ 3.የመንግስት ስራ 4. ሌላ ከሆነ ይገለጽ _____	
ክፍል 2. የጤና አጠባበቅ ባህሪ ለማጠናከር የሚረዱ ተግባራት			
010	በጤና አጠባበቅ(ሀይጂንና ሳኒቴሽን) ላይ ስልጠና ወስደህ/ሽ ታውቃለህ/ሽ	1.አዎ 2. አይ	
011	በትምህርት ቤት የጤና ኤክስቴንሽን ፓኬጅ ስልጠና ትሳተፋለህ /ሽ	1.አዎ 2. አይ	
012	በትምህርት ቤታችሁ የጤና አጠባበቅ ክበብ አለ	1.አዎ 2. አይ 3. አላውቅም	መልስህ/ሽ 2/3ቁጥር ከሆነ ወደጥ.ቁ 014 ሂዱ
013	መልስህ/ሽ አዎ ከሆነ የክበቡ አባል ነህ/ሽ	1. አዎ 2. አይ	
014	ጤናማ የሆነ የጤና አጠባበቅ ባህሪ እንድትተገብር/ሪ ግፊት የሚያደርግህ/ሽ ማን ነው (ከአንድ በላይ መልስ መመለስ ይቻላል)	1.የጤና ባለሙያዎች 2.ወላጆች/አሳዳጊዎች 3.መምህራኖች 4.ጓደኞች 5. ሌላ ካለ ይጠቀስ.....	

ክፍል 3. የውሃ አያያዝ ፣የመጻዳጃ ቤት አጠቃቀምና የእጅ አስተጣጠብ የእውቀት ጥያቄዎች			
015	ንፅህናው ያልጠበቀ ውሃ ሰዎች ለበሽታ እንደሚዳረግ ታውቃለህ /ሽ	1.አዎ 2. አይ	
016	ለቤት ውስጥ አገልግሎት የሚውል ውሃ በፍጹም ንጹህ ባልሆነ እጅ መነካት እንደሌለበት ታውቃለህ /ሽ ለቤት ውስጥ አገልግሎት የምትጠቀምበት/ሚበት ውሃ ማለት ለመጠጥ፣ምግብ ለማዘጋጀት፣የመመገቢያና ማዘገጃ ዕቃ ለማጠብ እና እጅ ለመታጠብ የምንጠቀመው ውሃ ማለት ነው)	1.አዎ 2.አይ	
017	ውሃ ማፍለት ጀርመች(በሽታ አምጪ ተህዋሲያን) እንደሚገድል ታውቃለህ /ሽ	1.አዎ 2. አይ	
018	የውሃ ማስቀመጫ ዕቃ በየጊዜው መጻዳት እንዳለበት ታውቃለህ /ሽ	1.አዎ 2.አይ	
019	የውሃ መስቀመጫ ዕቃ ክዳን ሊኖረው እንደሚገባ ታውቃለህ /ሽ	1.አዎ 2.አይ	
020	የሰው አይነምድር በሽታ አምጪ ተህዋሲያን እንዳለበት ታውቃለህ/ሽ	1.አዎ 2.አይ	
021	በሽታ አምጪ ተህዋሲያ ከመጻዳጃ ቤት ወደ ሰው በቀጥታ በእጅ ንክኪ ወይም በተዘዋዋሪ በነፍሳት አማካኝነት እንደሚመጡ ታውቃለህ/ሽ	1.አዎ 2.አይ	
022	መጻዳጃ ቤት በአግባቡ መጠቀም የተቅማጥ በሽታ እንደሚከላከል ታውቃለህ/ቂያለሽ	1.አዎ 2.አይ 3.አላውቅም	
023	ከመጻዳጃ መልስ እጅህን /ሽን ካልታጠብክ/ሽ በሽታ አምጪ ተህዋሲያን እጅ ላይ እንደሚኖሩ ታውቃለህ/ሽ	1. አዎ 2. አይ	
024	እጅህን/ሽ በምን ምን ሰዓት መታጠብ ጠቃሚ እንደሆነ ታውቃለህ/ሽ	1. አዎ 2. አይ.	መልስህ /ሽ 2ከሆነ ወደ ጥ.ቁ 026 ሂድ/ጂ
025	ጥ.ቁ 024 መልስ አዎ ከሆነ በምን ጊዜ ነው እጅህን መታጠብ ያለብህ/ሽ? (ከአንድ በላይ መልስ ይቻላል)	1.ከመጻዳጃ ቤት መልስ 2.ከመመገብ በፊት 3.ከምግብ በኋላ 4.ሌላ ካለ ይጠቀስ	
ክፍል 4. የውሃ አያያዝ ፣የመጻዳጃ ቤት አጠቃቀምና የእጅ አስተጣጠብ አመለካከት ጥያቄዎች			

026	ለመጠጥ ፣ለምግብ ማብራሪያ ፣ለእጅ መታጠቢያ፣ መመገቢያና የማብራሪያ ዕቃዎች ለማጠቢያ የሚውል ውሃ ጥራት ተመሳሳይ መሆን አለበት	1.በጣም እስማማለሁ 2.እስማማሁ 3.ምንም ሀሳብ የለኝም 4.አልስማም 5.በፍጹም አልስማም	
027	ለመጠጥ ፣ለምግብ ማብራሪያ ፣ለእጅ መታጠቢያ፣ መመገቢያና የማብራሪያ ዕቃዎች ለማጠብ የሚውል ውሃ በማንኛውም መንገድ ማከም አስፈላጊ ነው	1.በጣም እስማማለሁ 2.እስማማሁ 3.ምንም ሀሳብ የለኝም 4.አልስማም 5.በፍጹም አልስማም	
028	በተቅማጥ በሽታ ታሞ ከመታከም መጻዳጃ ቤት በአግባቡ መጠቀም የተሻለ ነው	1.በጣም እስማማለሁ 2.እስማማሁ 3.ምንም ሀሳብ የለኝም 4.አልስማም 5.በፍጹም አልስማም	
029	ከመጻዳጃ ቤት ውጪ መጻዳጃት ለአተት፣ለሌላ ተቅማጥ በሽታዎችና ለአንጀት ጥገኛ ትላትሎት ይዳርጋል	1.በጣም እስማማለሁ 2.እስማማሁ 3.ምንም ሀሳብ የለኝም 4.አልስማም 5.በፍጹም አልስማም	
30	ለውሃ ሽንት መጻዳጃ ቤት ከተጠቀምን በኋላ እጅ መታጠብ አስፈላጊ ነው	1.በጣም እስማማለሁ 2.እስማማሁ 3.ምንም ሀሳብ የለኝም 4.አልስማም 5.በፍጹም አልስማም	
031	እጅን በውሃ ብቻ ብዙ ጊዜ መታጠብ በሰሙና እንደመታጠብ ያህል በሽታን አይከላከልም	1.በጣም እስማማለሁ 2.እስማማሁ 3.ምንም ሀሳብ የለኝም 4.አልስማም 5.በፍጹም አልስማም	
ክፍል 5. የውሃ አያያዝ ፣የመጻዳጃ ቤት አጠቃቀምና የእጅ አስተጣጥብ የተግባር ጥያቄዎች			
032	ለቤት ውስጥ አገልግሎት የሚውል ውሃ ተበክሏል ብለህ /ሽ ካሰብክ/ሽ ምን ታደርጋለህ/ሽ	1.አፈላግለሁ 2.የክሎሪን ውጤቶች እጨምርበታለሁ 3.የውሃ ማጣሪያ እጠቀማለሁ 4.ምንም አላደርግም	
033	የቤታችሁ ውሃ ማጠራቀሚያ ውሃ	1.ሁልጊዜ አደርገዋለሁ	

	ከሞሞላቱ በፊት እንዲጸዳ ጥረት ታደርጋለህ/ሽ	2.አንዳንዴ አደርገዋለሁ 3.በፍጹም አድርጌ አላውቅም	
034	የቤታችሁ ውሃ ማጠራቀሚያ ክዳን ትከድናለህ/ሽ	1.ሁልጊዜ አደርገዋለሁ 2.አንዳንዴ አደርገዋለሁ 3.በፍጹም አድርጌ አላውቅም	
035	ለቤት ውስጥ አገልግሎት የሚውል ውሃ ንጹህ ባልሆነ እጅ ነክተህ /ሽ ታውቃለህ/ሽ	1.አዎ 2.አይ	
036	ሁል ጊዜ መጸዳጃ ቤት ትጠቀማለህ	1.አዎ 2.አይ	
037	አብዛኛውን ጊዜ የት ነው የምትጸዳው/ጂው	1.እቤታችን ያለው መጸዳጃ ቤት 2.የት/ቤት መጸዳጃ ቤት 3.ወንዝ/ጫካ	
038	ትናንት የት ነው የተጸዳደሽው/ሽው?	1.እቤታችን ያለው መጸዳጃ ቤት 2.የት/ቤት መጸዳጃ ቤት 3.ወንዝ/ጫካ	
039	በምን ጊዜ ነው እጅህን /ሽን በሳሙናና ውሃ የምትታጠበው/ዊው	1.ከመመገቤ በፊት 2.ከተመገብኩ በኋላ 3.ከመጸዳጃ ቤት መልስ	
040	እጅህን /ሽን ከመጸዳጃ ቤት መልስ መታጠብ ምን ያህል ታዘወትራለህ/ሽ	1.ሁልጊዜ እታጠባለሁ 2.አልፎ አልፎ እታጠባለሁ	
041	እጅህን/ሽን ከመጸዳጃ ቤት መልስ ሁል ጊዜ የማትታጠበው/ቢው ከሆነ ለምንድነው (ከአንድ በላይ መልስ ይቻላል)	1.አስፈላጊ ስላልሆነ 2.ስለምረሳ 3.ስንፍና 4.ጊዜ ማጣት 5.ንጹህ ውሃ ስለሌለ 6.ሳሙና ስለሌለ 7.አላውቅም	
042	ትናንትናከመጸዳጃ ቤት መልስና ከመመገብህ በፊት እጅህን ታጥባለህ/ሽ	1.አዎ 2.አይ 3.እርግጠኛ አይደለሁም	
043	እጅህን/ሽን እንዴት እንደምትታጠብ/ቢ በቅደም ተከተል ከተሰጡት አማራጮችበመምረጥ ቀጥሎ ባለው ባዶ በታ አስቀምጥ/ጪ 1ኛ----- 2ኛ----- 3ኛ----- 4ኛ----- 5ኛ-----	1.የእጅ ጥፍሮችን ማጽዳጽ 2.እጅን በንጹህ ውሃ ማለቅለቅ 3.እጅን በውሃ ማርጠብና ሳሙና መምታት 4.የእጅ አንጓ ድረስ ያለው እጅ ክፍል መፈተግ 5.በአየር ላይ ማድረቅ 6.እጅን መፈተጉ ቢያንስ ለ 30 ሰከንድ መቀጠል	

	6ኛ-----		
044	አብዛኛው ጊዜ እጅህን/ሽን በምንድነው የምትታጠበው /ቢው	1.ሳሙና 2.አመድ 3.ውሃ ብቻ 4.ሌላ ካለ ይጠቀስ-----	
045	እጅህን/ሽን ሁል ጊዜ በሳሙና የማትታጠብ/ቢ ከሆነ ለምንድነው	1.ሳሙና አስፈላጊ ስላልሆነ 2.ሳሙና አለመኖር 3.አላውቀውም	
ሌላ ጥያቄዎች			
046	በዚህ አንድ ወር ውስጥ በተቅማጥ ህመም ታመህ /ሽ ነበር	1.አዎ 2. አይ	

Appendix V Observation check list

Observation check list to assess hygiene enabling facility at selected school

School Name-----

School Location/woreda -----

Observation Date-----

Total Student Population at time of observation -----

Female -----

Male -----

Total number of teachers -----

Female -----Male -----

1. Does the school have toilets or latrines?

A, Yes----- B, No----- If No, skip to Question 7

2. Do males and females have their own (separate) toilets?

A, Yes -----B, No-----

3. How many functional toilet compartments are there in the school? -----

For females only-----

For males only-----

For either males or females (anybody can use) -----

For female teachers-----

For male teachers-----

For either male or female teachers-----

4. Go into the toilets. Are they clean? Clean means no human feces is observed on floor of the toilet .

A, Yes, -----B, No, -----

1. Go into the toilets. Are they smelly?

A, Yes, -----B, No, -----

6. Any other comments or observations about the school toilets-----

7. Are there signs of open defecation (human feces on the ground) in or near the school grounds?

A, Yes----- B, No-----

8. Is there a place to wash your hands at school?

A, Yes----- B, No-----

9. Is it near the toilets?

A, Yes----- B, No-----

10. What kind of place (sink with running water, jug, tippy-tap, etc)?

11. Use the hand washing place to wash your hands. Is there enough water?

A, Yes-----B, No -----

12. Is there soap?

A, Yes----- B, No-----

13. Location of hand washing facilities

A, Next to latrines

B, within walking distance

C, inside latrine

14. Is there a place to drink water at the school?

A, Yes----- B, No-----

15. What kind of place (hand pump, tap, jug, bucket, barrel, etc.)?

16. Is there water available for drinking?

A, Yes-----

B, No -----

17. If the drinking water comes from a bucket, barrel or jug, does it have a cover?

A, Yes -----B, No-----