

**PERSONAL HYGIENE AND SANITATION PRACTICES OF
PUPILS: A COMPARISON BETWEEN AN INTERVENTION
AND A CONTROL SITE IN KAJIADO DISTRICT, KENYA.**

By

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and Epidemiology of Kenyatta University.**

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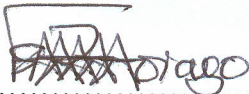
DECLARATION

This thesis is my original work and has not been presented before in any other university or any other award.

Signature..... Enakeng

Date June 28, 2005

This thesis has been submitted after examination with our approval as university supervisors.

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DEDICATION

To my loving parents Philip and Janet Mugambi, my sisters Gakii and Nkatha, brothers Kinoti and Kiriimi and lastly my late grand father Magambo.

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ACRONYMS AND ABBREVIATIONS USED IN THIS REPORT

AMREF	African Medical and Research Foundation
B.ED	Bachelor of Education Degree
CRC	Convention on the Rights of the Child
DFID	Department for International Development
Et al.,	Et Alia
GOK	Government of Kenya
HLM	Health Learning Materials
IRC	International Water and Sanitation Centre
IUHPE	International Union for Health Promotion and Education
Ksh	Kenya shillings
MOEST	Ministry of Education Science and Technology
MOH	Ministry of Health
PHASE	Personal Hygiene and Sanitation Education
ROK	Republic of Kenya
UN	United Nations
UNEP	United Nations Environmental Programmes
UNESCO	United Nations Education Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
URTI	Urinary Tract Infection
WHO	World Health Organization

DEFINITION OF TERMS

Personal hygiene involves all measures taken by the individual to preserve his or her own health. Good personal hygiene includes regular bathing, hand washing, cleaning of teeth, washing of the hair and washing clothes.

Sanitation broadly encompasses the disposal methods for all kinds of waste including human faeces, rubbish, and liquid waste such as kitchen and bathing wastewater. Sanitation can also be limited to refer to the safe management of human excreta. It also includes both the hardware, such as latrine and sewers and the soft ware; this includes the regulations in hygiene promotion.

Cleaning of “bottoms” is the cleaning of anus after defecating.

ABSTRACT

This research was based on Personal Hygiene and Sanitation Education (PHASE) project initiated by African Medical and Research Foundation (AMREF) in Central Division of Kajiado District in the year 2000. The Programme aims at changing the behaviour associated with poor hygiene and sanitation and the ultimate goal is to achieve a decrease in morbidity and mortality associated with diarrhoea diseases as well as improve the health status of communities in the intervention sites. The study, therefore sought to establish the impact of (PHASE) in promoting basic hygiene practices among the primary school going children in Kajiado District. A cross - sectional comparative study was carried out among 744 respondents selected proportionally from both intervention site (Central Division) and the control site (Ngong Division) of Kajiado District. The sample population comprised of standard three, five and seven pupils and class teachers of the three classes in each school. To the pupils in standard seven and five pre-tested questionnaires were administered, one to one interviews were conducted for class three pupils using same questions as those used in the classes five and seven questionnaires. Observation checklists and focus group discussions were also used to collect qualitative data. Descriptive data analysis was done by use of Statistical Package of Social Sciences (SPSS). Chi- square test (χ^2) was used to establish the differences between the two Divisions in terms of knowledge and practice of personal hygiene and sanitation. The same test (Chi- square test of independence) was also used to determine the association between knowledge and practice of the respondents in selected personal hygiene aspects. The results were presented in frequency tables, percentages, pie charts and bar graphs. More boys 55.2%, n=744 than girls 44.8%, n=744 participated in the study. In both Divisions most respondents were aged between 11 and 13 years 45.7%, n=744. Majority of the respondents in both Divisions were protestants with Ngong Division having 60.9%, n=366 and Central Division 42.5%, n=372). Data showed significant differences between the two Divisions in knowledge regarding correct definition of personal hygiene ($\chi^2 =13.884$, df=1; P=0.000***) and its usefulness ($\chi^2 =9.889$, df=1; P=0.002**). The results revealed significant differences in knowledge between the two Divisions in regard to some health aspects such as washing of the face ($\chi^2 =30.794$, df=1; P=0.000***), brushing of teeth ($\chi^2=39.558$,df=1; P=0.000***), washing of hands ($\chi^2=9.225$,df=1; P=0.002**), body ($\chi^2=13.702$,df=1; P=0.000***) and clothes ($\chi^2=6.062$,df=1; P=0.014**). In most cases respondents in Central Division were more knowledgeable compared to those from Ngong. There was no significant difference between the two Divisions in the correct practice regarding washing of ones face ($\chi^2=1.968$, df=1; P=0.161). However significant differences were found in frequency of brushing teeth ($\chi^2=7.067$,df=1; P=0.008**), bathing ($\chi^2=15.478$,df=1; P=0.000***) and proper disposal of human waste ($\chi^2=7.960$,df=1; P=0.005**) between the two Divisions. An association was found between knowledge and practice (both Divisions) in the selected health aspects, (washing of the face ($\chi^2=0.117$, df=1; P=0.000***), bathing ($\chi^2=70.548$, df=1; P=0.000***) and brushing of teeth ($\chi^2=14.465$, df=1; P=0.000***). It was therefore, concluded that acquisition of knowledge on personal hygiene may influence ones routine hygiene practice. Apart from adding empirical evidence to what the PHASE project had projected, the findings will be useful to the implementing NGO in evaluating the impact of the programme on school children's hygiene practices. The study will help health educators to understand that

knowledge does not always lead to practice, the hardware such latrines, pumps and pipes for water need to be provided for hygiene practices to be sustained. It is recommended that health teaching methods should be revisited and more emphasis given to the use of teaching aids such as pictures and charts. Teachers should ensure periodic evaluations of personal hygiene and sanitation practices of the pupils through daily school inspections and home visits. It is also recommended that PHASE be incorporated in the national school curriculum so that all other schools can benefit. It is also noted that children observe personal hygiene for fear of punishment, rather than prevention of health problems. Therefore, appropriate messages on the health importance of personal hygiene should be given to them. Overall, it is concluded that initiatives aimed at improving access to water and sanitation must be more holistic if meaningful gains are to be realized.

CHAPTER 1: INTRODUCTION

1.1 Background information

The home plays the most important role in influencing the health of a child (Hawes, 1997). However, owing to the fact that school-going children spend most of their time at school, every aspect of school life is important to the child's health and development. In achieving educational outcomes, the capacity of each pupil to learn effectively is influenced significantly by health status. Poor health inhibits learning and the achievement of positive educational outcomes is closely linked to good health (IUHPE, 1999). Thus, the school health programmes aim at changing the attitude and behaviour of pupils in their formative years, through health information and education (Boot and Cairncross, 1993).

Until recently, hygiene behaviour had not been given the importance it deserves in environmental health programmes. For example, water and sanitation programmes, even those with health goals have too frequently focused on provision of hardware (pumps, pipes, latrines) and the most common indicator used to measure the success of such programmes has been the number of people with access to this hardware (UNICEF and IRC, 1998). However, it is increasingly being recognized that assisting people to transform is as important as the provision of improved facilities. This would be a more inclusive way of reducing transmission of poor hygiene-related illness/diseases. The School Health Promoting Initiative (SHPI), by the World Health Organization, is an approach to facilitate the implementation of health activities and enhance healthy practices in school going children as well as the community (WHO, 1999).

The WHO expert committee on comprehensive School Health Education and Promotion in Geneva recommended that every school must more effectively serve as an entry point for health promotion and a location for health intervention (WHO, 1999).

1.1.1 Scope of Personal Hygiene and Sanitation

Personal hygiene on the other hand, is the condition or state of being clean and sanitary at a personal level; the acts taken to avoid personal contamination by parasites, pests and vectors which carry germs and other microorganisms that cause disease (GlaxoSmithkline, 1999). Good personal hygiene includes regular cleaning of the teeth, washing of the body, hands, hair and clothes (Nyamwaya and Akuma, 1994).

Sanitation is sometimes used in broad, inclusive way, encompassing the disposal methods for all kinds of waste, including human faeces, rubbish, and liquid waste such as kitchen and bathing wastewater. It can also refer to the safe management of human excreta (DFID, 1998). In a school situation, sanitation would include both the hardware and the soft ware. The hardware is the total package of sanitary conditions and facilities available in and around the school compound. The software is the activities aiming to promote conditions at school and practices of school staff and children that help to prevent water and sanitation-related diseases (UNICEF and IRC, 2001).

1.2 The Basis of Personal Hygiene and Sanitation Education Project (PHASE)

The concept of primary health care as elaborated in the Declaration of Alma Alta (UNICEF/WHO/UNESCO, 1992) emphasizes the central role of education concerning prevailing health problems and the methods of preventing and controlling them. This landmark declaration promoted a multi-sectorial approach to health care including the involvement of industries among others.

It is in respect to this approach that GlaxoSmithkline (GSK) being a health care company, through the international community partnership proposed that health education and mobilization should be given priority among other activities. Workshops were held in Africa, South-East Asia, Latin America and China. The Africa workshop in particular recommended that personal hygiene and sanitation should be a high priority area (GlaxoSmithkline, 1999). It was agreed that the best delivery mechanism would be the primary school system and that the main target group could be school children as they are the change agents for the future generations.

In Kenya, Africa Medical Research Foundation (AMREF) played the role of an implementing NGO in collaboration with the Ministries of Health and Education, Science and Technology. After carrying out a pilot study in four schools of Kombewa Division in Kisumu District, Personal Hygiene and Sanitation Education (PHASE) was then introduced in 247 schools in ten Districts from Western, Nyanza and Rift Valley provinces of Kenya.

It was initiated as a three-year project (2000-2003) focusing on the empowerment of both primary and secondary beneficiaries in order to initiate, implement and monitor personal hygiene and sanitation education interventions. In this case the school going children constituted the group of primary beneficiaries while teachers, parents and the community members were the secondary beneficiaries. Since faecal-oral transmission occurs mostly through faecal contamination of food, water and hands, the chain of disease transmission associated with inadequate hygiene and sanitation, can be broken by change of attitude and behaviour through hygiene education (Nordberg, 1999).

The PHASE project therefore, aims at changing the behaviour associated with poor hygiene and sanitation, with the ultimate goal of improving the health status of the communities in the intervention site by decreasing morbidity and mortality rates associated with diarrhoeal diseases. However, there has not been any published evaluation results on the impact of the project in regard to knowledge and hygiene practices compared to other schools.

1.2.1. Personal Hygiene and Sanitation Education Content

Personal hygiene and sanitation education is a specific form of the wider school health education. It deals only with hygiene-related health problems of an individual. PHASE primarily aims at changing behaviour toward good or safe practices in relation to personal, water, food, domestic and public hygiene.

This approach uses supportive materials with themes, topics and objectives drafted to agree with basic primary health education as listed in the Science and Home science curricula (Table 1). It is therefore not taught as a separate subject. The major emphasis on Health Learning Materials (HLM) is to achieve practical behaviour changes of the child's

daily personal hygiene and sanitation practices. The materials are prepared in levels that are aligned according to age groups and MOEST syllabi guidelines. Level one being for younger age (primary 1 to 3), level two for the middle age (primary 4 to 5) and level three for those at the upper end of the range (primary 6 to 8).

The PHASE approach contrasts with the normal Kenyan School Health Education Curriculum, which is covered in Science and Home Science subjects. Only a few aspects on personal hygiene and sanitation are included in the curriculum. Some of the topics covered include; cleanliness of the external parts of the body, cleanliness of the class room and the school compound, proper use of the toilets/latrine, water and sanitation among others (ROK, MOEST, 2001).

Unlike the Kenyan primary school curriculum that emphasizes on a very broad content of health education, the PHASE Programme has narrowed its scope of content on hygiene education and particularly aims at improving personal hygiene and sanitation practices of pupils. Putting into consideration that time limits the completion of school subject syllabi, such specific areas in health education would be easily covered by teachers. With the help of the Health Learning Materials, the pupils are also able to discuss among themselves without the presence of the teacher.

Table 1: Personal Hygiene and Sanitation Education Content (Kit/Guide)

<i>Level</i>	<i>Theme</i>	<i>Topic</i>	<i>Material</i>	<i>Activity</i>
Level I Class 1-3	Personal Hygiene Rubbish Disposal	<ul style="list-style-type: none"> • Body cleanliness • Personal hygiene practice • How illness is spread. 	Flip chart sets & flash card sets	Discussion
		<ul style="list-style-type: none"> • Benefits of better personal hygiene • Proper rubbish disposal 	Project guide 1 Project guide 2	Puppet making Rubbish pit making
Level II Class 4-5	Personal Hygiene	<ul style="list-style-type: none"> • External and internal parasites • Benefits of hygienic latrine care 	Flip chart sets & flash card sets	Discussion
		<ul style="list-style-type: none"> • Benefits of better personal hygiene 	Project guide 1 Project guide 2	Tippy-tap making Foot ware making
	Water Hygiene (Safe Water)	<ul style="list-style-type: none"> • Causes and effects of water contamination 	Flip chart sets & flash card sets	Discussion and Story telling
Level III Class 6-8	Waste Hygiene And Sanitation	<ul style="list-style-type: none"> • Hygienic human waste and rubbish disposal 	Flip chart sets & flash card sets	Discussion
	Food Hygiene	<ul style="list-style-type: none"> • Sources and effects of food contamination 	Flip chart sets & flash card sets	Role play Discussion
	Hygienic Human Waste Disposal	<ul style="list-style-type: none"> • Benefits of hygienic human waste disposal 	Project guide 1	Building a pit latrine
	Water Hygiene	<ul style="list-style-type: none"> • Benefits of better water hygiene 	Project guide 2	Making water filtering system

Source: (GlaxoSmithkline, 1999 (Phase Kit/Guide))

1.3 RATIONALE OF THE STUDY

1.3.1 Statement of the problem

Personal hygiene and sanitation education in primary school is encompassed in subjects such as Science in the lower primary, and Home Science in upper primary. Despite the teaching of health education in Science and Home science subjects, a baseline survey carried out in Kajiado District, reflected pupils' high level of poor personal hygiene practices. Sixty percent of the interviewed pupils reported to be taking a bath on daily basis, while the rest once a week. Only 16.7% wash their hands after visiting the latrine, about 89.3% of the pupils defecated in the bush, while the rest of them (10.7%) use pit latrines. The survey also revealed that the latrine coverage in the District was only 28%, and the prevalence of hygiene related diseases was 82 % (AMREF, 2001).

Bearing in mind that health education is not an independent subject, there is hardly adequate time for teachers to cover all the required topics in health education. A very demanding primary school curriculum also impedes the monitoring of the expected behaviour change in pupils, hence a conspicuous gap between knowledge and practice among the school children.

The increased numbers of pupils in schools as a result of new government policy on primary education is expected to worsen the situation if sanitation facilities are not improved to cope with the school population. The situation, therefore calls for constant supervision of pupils' hygiene practices and improvement of sanitation facilities.

Culture, attitude and beliefs are major contributing factors to the observed hygiene practices of the pupils, but the semi arid situation poses more challenges, especially in

attempt to improve the general hygiene among the children. The main set back is the severe shortage of surface water in the area (ROK, 2001).

1.4 Research questions

- a) Does level of knowledge on personal hygiene and sanitation in the intervention and control sites differ?
- b) Do personal hygiene and sanitation -related practices among pupils differ between the two sites?
- c) Is there a link between knowledge and the pupils' personal hygiene practices?

1.5 Null hypotheses

- a) There is no difference in knowledge and practices of pupils on personal hygiene and sanitation, between the intervention and control sites.
- b) There is no association between knowledge and practice of pupils in personal hygiene.

1.6 Objectives of the study

1.6.1. General objective

The main objective of the study was to establish the impact of personal hygiene and sanitation education in promoting basic hygiene practices among primary school going children.

1.6.2. Specific objectives

The specific objectives of the study were to:

- a) Establish the differences in knowledge on personal hygiene and sanitation between the intervention and control sites.
- b) Determine the differences between the two study sites in the pupils' personal hygiene and sanitation practices.
- c) Determine whether there is a link between knowledge and the pupils' personal hygiene and sanitation practices.

1.7 JUSTIFICATION

There is limited information on the level of knowledge and practices as well as the impact of hygiene related health programmes among school going children. In most cases pupils are taught and examined on health information, but little is done to ensure that knowledge is translated into practice. Most schools in the poor rural areas lack adequate water supply and sanitary facilities such as pit latrines and hand -washing facilities. However, schools could improvise facilities such as leaky –tins for hand washing after using a latrine. With the recent implementation of the free primary education, most schools have to cope with unprecedented population increase. Transmission of hygiene related diseases favours too crowded schools, where hygienic practices are not observed. Research shows that hygiene related practices such as safe disposal of faeces and hand washing after contact with faecal material can reduce the rates of intestinal worms considerably. Similarly, hand washing with soap and water can reduce diarrhoeal diseases by 35 % or more. In addition, safe disposal of faeces by use of pit latrine is

known to reduce diarrhoea by 36% or more (Almedom *et al.*, 1997). There is therefore, the need to measure the classroom instruction impact on the actual hygiene knowledge and practices of the pupils. Improvement of the school sanitary facilities is also equally important, since it assists children put into practice the knowledge and information provided in class. The study compared knowledge and hygiene practices among pupils from schools in which hygiene education has been reinforced by the Personal Hygiene and Sanitation Education project and those from schools that have not been reinforced. The results will help not only in formulation of similar interventions, but also in the design of policies that can be used to address issues on personal hygiene and sanitation.

While the impact of poor sanitation and hygiene is known to be disastrous for small

These parasites are known to cause or aggravate malnutrition and stunted growth in children. They also destroy body tissues and organs in which they live.

CHAPTER 2: LITERATURE REVIEW

2.1 Global status of hygiene and sanitation among children

Recent findings have shown that, more than 2.3 million people still live without access to sanitation facilities and are unable to practice such basic hygiene as washing their hands with soap and water (UNICEF/IRC, 1998). It is also reported that diseases related to poor sanitation and water availability still cause immense human suffering and the most affected are children.

While the impact of poor sanitation and hygiene is known to be disastrous for small children, it also has an important impact on the health of school-age children including adolescents. It has been established that lack of sanitation and hygiene is a public disaster, which deserves the highest priority. When children survive beyond their fifth birthday, they still face major problems of ill-health and malnutrition (UNICEF, 2000).

Water and sanitation related diseases affecting children include diarrhoea, trachoma, schistosomiasis and scabies. Frequent infections from any of these compromise children's attendance and performance at school. For instance, diarrhoea alone is estimated to kill over 3 million people every year, the overwhelming majority of whom are children (DIFD, 1998). In addition, about 40% of the world's school age children is infested with a variety of intestinal worms as a result of poor sanitation (WHO, 1996). These parasites are known to cause or aggravate malnutrition and stunted growth in children. They also destroy body tissues and organs in which they live.

Convention on the Rights of the Child (CRC), together with the African Charter on the Rights of the child considered the provision of adequate and safe water, as well as sanitation a basic right for the survival, protection and development of children (GOK/ UNICEF, 1998). To achieve this, schools have been used as entry points for hygiene and sanitation education.

2.1.1. Present situation of school sanitation in developing countries

Over 1.4 billion children between the ages of 5 and 14 world wide (approximately 87%) live in developing countries. Statistics have shown that children in this age group are 14 times more likely to die between their 5th and 14th birthdays due to hygiene related diseases, than their counterparts in the industrialized countries (UNICEF / IRC, 2001).

The sanitary conditions of schools particularly in rural areas of developing countries are often appalling, and hazardous to children. Water supply, sanitation and hand washing facilities are either non-existent, too few or inadequate due to poor maintenance of water systems and toilets or latrines (UNICEF, 2000).

Where these facilities are present, they are hardly adapted to the needs of children, in particular girls (UNICEF, 2000). Also the motivation of teachers to provide skills-based hygiene education is not always evident.

2.1.2. The Kenyan situation on hygiene and sanitation problems

The national health sub sector strategic plan (1999-2004) identified the major causes of morbidity in Kenya as diseases and conditions arising from environmental management and hygiene conditions (ROK, National Development Plan of Kenya, 2002-2008). These

environmental problems relate to lack of safe drinking water, unhygienic sanitation and waste disposal systems resulting in water borne diseases such as typhoid and cholera.

Children need to learn and implement hygiene practices such as washing of hands after visiting latrines and before handling food. Poor sanitation and hygiene practices cause a range of diseases, which include cholera, typhoid and intestinal worms.

Among all the hygiene related diseases affecting children, the most dangerous are diarrhoeal infections, which account for 17 % of childhood mortality (ROK, 2000). Although diarrhoea is more common in pre-school aged children, it is also reasonably prevalent in school aged children. The high rates of morbidity associated with multiple intestinal parasitic infections, are closely related to lack of water and to inadequate standards of hygiene in and around the majority of rural primary schools in Kenya. This and other infections such as skin and eye infections can be greatly reduced if good personal hygiene is practised especially in children (Nyamwaya and Akuma, 1994).

In Kenya few schools have an adequate number of latrines; the girls in particular are likely to keep out of school if there are no adequate sanitary facilities (UNICEF, 2000). Although Sanitation affects girls' enrollment more than that of the boys, a study in Wajir District revealed that some schools have latrines for boys and male staff but none for girls and female staff (ROK, 2000). In a study carried out in Nakuru, Kisumu, Nyambene and Tharaka- Nithi Districts by UNESCO, pupils and headteachers confirmed that in areas without latrines "pupils and teachers scatter in the nearby bushes". A field observation revealed that the bushes surrounding many of the schools were actually scattered with

human excrements. The same study found that in the few rural schools that had latrines, most of them were either full or filthy with collapsing walls and floors (Nkinyangi and Vynckt, 1995).

2. 1.3. The Kenyan guidelines on the physical facilities provision

Schools are often more than just places for learning and behaviour change. If school sanitation and hygiene facilities are inadequate, or are badly maintained and used, schools become risky places where diseases are transmitted (UNICEF and IRC, 2001). It is therefore important that they have proper facilities for a healthy learning environment.

The Kenya Public Health Act (Cap 242) provides clear guidelines on the provision of school physical facilities (Table 2). However, few schools comply with the specifications and especially those concerning the sanitation facilities such as the latrines (ROK, MOEST, 2000).

Table 2: Classroom size and sanitation facilities

Level	Classroom Size	Sanitation Facilities
Pre-primary	1sq meter per child	1:25 and 1 latrine/toilet for every 15
	25 children for 3-5 year olds	additional pupils
Primary	8m x 8m, 25' x 30' (40 pupils)	1:30 pupils –boys or 1:25 girls and urinals for boys and staff latrines / toilets
Secondary	8m x 8m, 25' x 30' (40 pupils)	1:30 pupils –boys or 1:25 girls and urinals for boys and staff latrines / toilets

Source: (ROK, 2000)

2.1.4. Kenyan free primary education and the consequences on hygiene

Since the introduction of free primary education at the beginning of the year 2003, the Kenyan primary schools admitted an estimated 1.5 million children who were out of school (Integrated Regional Information Net work, 2003). Many schools are coping with a 100% or more increase in numbers. Average class sizes have risen from 50 to 70 while facilities remain the same. The main consequence has been congestion in classes, and where ventilation is poor this creates a conducive environment for transmission of air borne diseases.

With the huge influx of primary school pupils the numbers exceeds the required rate of 50 pupils per latrine, and in most cases the children have to queue for a long time to get to the few available latrines (Integrated Regional Information Net work, 2003).

2.2 Hygiene and sanitation related diseases in school children

Helminthes infections are some of the leading causes of disease among young people and adults in the world today. Hundreds of millions of school-age children are infected by roundworm, whipworm, hookworm, bilharzia and other flukes (UNICEF, 2000). Of these, the intestinal worms are most common. Children miss school when they have the disease themselves, and also when they have to stand in for their sick parents, working in the field or at home.

Eye infections, especially trachoma is common among school children. Repeated infection during childhood is a key causative factor in the blindness which trachoma often causes later in life. Table 3 provides 1997 global morbidity and mortality estimates for hygiene related diseases.

Table 3: Global Morbidity and mortality for hygiene related diseases.

Disease type	Morbidity	Mortality	Population at risk
Diarrhoea	4,000 million	2.5 million	2,000 million
Amoebic dysentery	48,000	-	-
Cholera	145,000 (1996 data)	10,000 (1996 data)	
Hookworm	151 million infections	65,000	-
Whip-worm	43.5 million	10,000	N/A
Guinea worm	70,000	None	100 million
Trachoma	600 million (6 million blind)	None	500 million
Schistosomiasis	200,000	20,000	600 million mostly in Africa

(Source: World Health Report, 1998)

2.3 School hygiene and sanitation: The gender perspective

Lack of facilities and poor hygiene affect both girls and boys, although poor sanitary conditions at schools have a stronger negative impact on girls. If there are no latrines and hand-washing facilities at school, or if they are in a poor state of repair, then many children would rather not attend than use the alternatives. In particular girls who are old enough to menstruate need to have adequate facilities at school and normally separate from those of boys (Hubley, 1998).

In addition to the obvious health benefits and time saving (particularly affecting young school-age girls), provision of safe water and sanitary facilities can also have an influence on school enrolment and attendance. As found out in Bangladesh, a school sanitation program increased girls' enrolment by 11%, a level that is beyond the reach of conventional educational reform (Cairncross, S., 1998). Girls should therefore have access to safe, clean, separate and private sanitary facilities in their schools

2.4 Efforts towards the improvement of hygiene and sanitation in schools

Promotion of children and health through schools has been recognized at the international level as an important means of influencing health behaviour. Based on the recognition of hygienic conditions and adequate access to safe water and sanitation services as fundamental rights, various local, regional and international organizations have worked in partnership with each other in promoting health through schools.

Promoting the health of children through schools has long been an important task of WHO, beginning in 1950 when the expert committee in school health laid the first theoretical groundwork worldwide. In 1995, WHO's global School Health Initiative was

launched. It was designed to improve the health of pupils, school personnel, families and other members of the community through school. Its main goal is to increase the number of schools that can be “Health- promoting Schools” (WHO, 1999).

Among the goals that UNICEF has set for this millennium is to help all children to join and remain in school, by giving them the chance to learn in a “child-friendly” environment in order to master basic education and to develop the social and intellectual skills needed for “responsible life in a free society”(UNICEF, 1999).

The UNICEF, WHO, UNESCO, Education International and the World Bank launched a joint initiative FRESH Start (Focusing Resources for Effective School Health) in April 2000 at the Education for all Conference in Senegal, to “speak in one voice”, about school health. Its four main areas of focus include: Provision of safe water and sanitation, which is an essential step towards a healthy physical learning environment; Skills-based health education, which focuses on the development of knowledge, attitude, and life skills needed to deal with health and social issues; School-based health and nutrition services and health-related school policies, whose aim is to support the other three interventions above. To implement the above interventions in schools, the FRESH Start requires effective partnerships between teachers and health workers and between the education and health sectors, effective community partnerships and pupil awareness and participation, as children must be important participants in all aspects of school health programmes and not simply the beneficiaries (UNICEF/ WHO/ UNESCO, 1992).

In most countries, sanitation and hygiene education has been incorporated in the school health education curriculum. An example is the Kenyan health education curriculum that provides hygiene education through other subjects such as Science and Home Science.

The aim of sanitation education in schools is to create a clean, healthy and safe environment for children; to inculcate good hygiene habits at early age; and to encourage participation in the betterment of environmental sanitation in families, in schools and in the whole community. It has, therefore been widely recognized that schools could play an important role in bringing about behavioral changes and promoting better health.

2.5 School children as the target group

After the family, schools are the most important places of learning for children; they have a central place in the community, stimulate learning environment for children and initiate change. There is now increasing interest in the international community to go beyond “child survival” programmes and focus more attention on child growth and development especially targeting school children (Nkinyangi and Vynckt, 1995).

In terms of accessibility, schools remain the only institutions that are within easy reach of all communities. Moreover, compared to adults, children are more receptive to new ideas and can more easily change their behaviour and develop new long-term behaviours as a result of increased knowledge and facilitated practices (UNICEF, 1999). Hence, school-aged children are increasingly being recognized as an important target group in hygiene education. Through them, potential benefits can trickle down to all levels of society (UNICEF/ WHO/ UNESCO, 1992).

Research indicates that once health behaviours are established during childhood, they cannot be easily modified during adulthood. Therefore, proper health instructions should be provided to the school children since the health choices they make have the potential for lifelong consequences. Studies have also shown that children can act as potential agents of change within their homes and communities through their knowledge and use of sanitation and hygiene practice learned at school.

2.6 The School as a healthy learning environment

Compared to the more narrow and traditional view of school health as classroom instruction, the broader vision of the entire school as “Health Promoting” has begun to take hold in all countries around the world (WHO, 1999).

Children spend long hours in schools, therefore, the school environment will partly determine their health. In order to perform its roles in health care and education of the young and in community health, the school should exemplify a healthy environment and promote concern for environmental health. Access to sanitary facilities is a fundamental right that safeguards health and human dignity. Providing such facilities at schools not only helps to meet that right, but also provides the most favourable setting to encourage behaviour change in the school and in the community. Lack of sanitary facilities in schools keeps millions of girls out of school during their menstrual periods days (UNEP / UNICEF/ WHO, 2002). However, the mere provision of facilities does not necessarily make the environment conducive nor produce the desired impact. It is the use of technical facilities and the related appropriate hygiene behaviour of the pupils that provide health benefits.

Ensuring that children are healthy and able to learn is a major component of an effective education system. Child friendly schools should therefore, promote good health; provide hygiene and sanitary facilities; provide life skills-based health and hygiene education; provide health and nutrition services; guarantee the security and safety of children; promote child and youth participation and encourage active school-parent community partnerships.

Supportive school environment depends on the physical buildings, grounds, interior structure and psychosocial environment. The condition of the physical environment (cleanliness of the compound, availability of safe water, clean and sanitary facilities) and the policies regarding its use should be checked to ensure high standards of hygiene in the school (WHO, 1996).

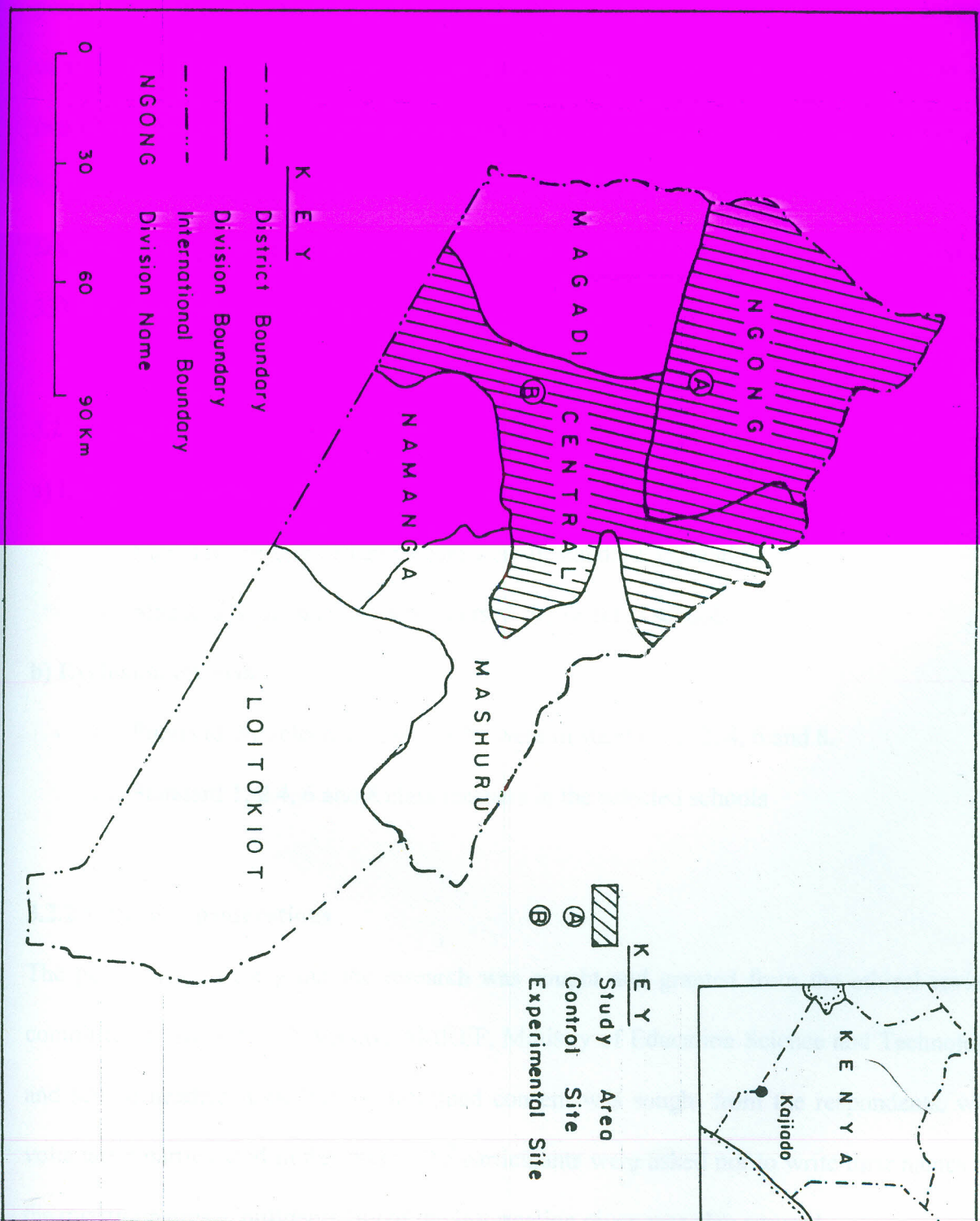
In conclusion, literature has shown that poor sanitary facilities and inadequate standards of hygiene in schools are a major contributing factor to hygiene related diseases among school going children. Hygiene education has been given to the pupils but little has been done to measure the actual knowledge and practices of the pupils.

CHAPTER 3: MATERIALS AND METHODS

3.1 The study area

This study was carried out in Central and Ngong Divisions of Kajiado District (Figure 1, page 23). Kajiado District is one of the 18 Districts within the Rift Valley province. It is located at the southern part of the province. The District borders the republic of Tanzania to the southwest, Taita-Taveta District to the southeast, Machakos and Makueni Districts to the east, Nairobi province to the northeast, Kiambu District to the north and Narok District to the west. The District does not have adequate surface water for livestock and human consumption. A greater part of the District therefore, depends on sub-surface resources such as water pans, dams and shallow wells. The primary school enrolment rates are 10,748 (53.5%) males and 9,351 (47.6%) females, while the total dropout rates are 8.5% males and 6.3% females (ROK, 2001). Children in the District are particularly challenged with the incidences of diseases such as malaria, Upper Respiratory Tract Infections, diarrhoea, skin diseases, and eye infections among others. With only two District hospitals and nineteen health centers, the average distance to the nearest health facility is 10 kilometers. Central Division (the intervention site) is one of the seven Divisions, and has a population density of 14 persons per square kilometers. It covers an area of 2909.7 square kilometers with 10 locations and 27 sub locations. Ngong Division (control site) is the most densely populated with a population density of 40.5 persons per square kilometers. It is also the biggest division covering 3698.1 square kilometers of the District. It has 10 locations and 29 sub locations (ROK, 2001).

Figure 1: Location of the Study Area



3.2 The study population

The study population composed of primary school pupils, in classes 3, 5 and 7 who were purposively sampled. The rationale for using the three classes was mainly to ensure coverage of the lower, middle and upper classes. Class teachers of the sampled classes were also included in the study. The teachers were important in verifying the pupils' views on personal hygiene and sanitation practices. The study was carried out in four schools from each Division making a total of eight schools. A total number of 744 respondents (411 girls and 333 boys) were involved in the study.

3.2.1 Criteria

a) Inclusion criteria

- i) Pupils in the selected areas who were in standard 3, 5 and 7.
- ii) Standard 3, 5, and 7 class teachers in the selected schools.

b) Exclusion criteria

- i) Pupils in the selected schools who were in standard 1, 2, 4, 6 and 8.
- ii) Standard 1, 2, 4, 6 and 8 class teachers in the selected schools

3.2.2 Ethical considerations

The permission to carry out the research was sought and granted from the ethical review committee of Kenyatta University, AMREF, Ministry of Education Science and Technology and school headteachers. Further informed consent was sought from the respondents, who voluntarily participated in the study. The participants were asked not to write their names on the questionnaires. Confidentiality of the information given was also assured.

3.3 Study design

A cross-sectional comparative study was carried out in both Ngong and Central Divisions. This particular study design was chosen since it gathers data at a particular point in time with the intention of describing the nature of existing conditions. The purpose was to establish the impact of personal hygiene and sanitation education in promoting basic hygiene practices among primary school going children. Central Division formed the experimental group, while Ngong Division represented the control. Both qualitative and quantitative data were collected.

3.3.1. Sampling method

Convenience sampling technique was used to sample Central Division since it was the only one that had an intervention Programme by the Personal Hygiene and Sanitation Education project (PHASE). Ngong Division was purposively sampled as a control site since none out of the other Divisions without the PHASE project was nearer and accessible as far as resources were concerned. In Central Division, four out of the ten schools that had the PHASE project were randomly sampled using table of random numbers. A similar technique was used to sample four other schools in Ngong Division.

3.3.2. Sample size determination

The sample size for all the schools was arrived at, using the formula as previously used by Fisher *et al.*, (1998) and shown below:

$$n = Z^2 pqD/d^2$$

Where n= the sample size

$Z=$ the standard normal deviate (1.96), and corresponds to 95% confidence interval

$p=$ the proportion of the target population estimated to have a particular characteristic (for this case being behaviour change in pupils in relation to strengthened hygiene and sanitation education). The primary school going population of age 6-13 was 117,440 (ROK, Ministry of Planning and National Development, 2002), and the total number of the pupils benefiting from the PHASE project was 74,000. There fore:

$$p = 74,000 / 117,440 = 0.63$$

$$q = 1 - p$$

$$q = 1 - 0.63 = 0.37$$

$$d = \text{the degree of accuracy} = 0.05$$

D (the design effect) = 2 since the study has got two samples groups:

$$\text{Thus, } n = \frac{1.96^2 \times 0.63 \times 0.37 \times 2}{0.05}$$

$$= 716.4$$

Approximately a sample of 744 was taken to cater for attrition and any possible dropouts.

Ratio size sampling technique was used to determine the number of pupils in each Division.

The ratio of the schools in the two Divisions is 4:4, hence, $4/8 \times 750 = 375$ pupils from each

Division and therefore $375/4 = 93.75 \approx 94$ pupils from each randomly selected school. To get

the number of pupils in each of the three classes, $94/3$, gave about 31 pupils per class. To get

the proportion of boys to girls, probability proportion to sample size sampling technique was

used. The pupils were then randomly sampled.

3.4 Research Instruments

Both qualitative and quantitative data collecting instruments were employed. These included the questionnaires, interviews, focus group discussions and observation checklists. A pilot-study was carried out to pre-test the feasibility of the instruments. A total of 30 questionnaires and two focus group discussions were conducted during the pre-testing period.

3.4.1. Questionnaires

Pre-tested questionnaires were administered to standards 5,7 and the class teachers. However, where the standard five had problems in comprehending the questions, interviews were conducted (see Appendix 1a).

3.4.2. Interviews

Same questions as those in the questionnaires were used in form of interviews to generate information on knowledge and practice of personal hygiene from the standard 3 pupils. Being in the lower primary level the pupils could not read and understand the questions by themselves. English and Kiswahili were used to interview majority of the respondents. Masaai language was used in isolated cases with the help of an interpreter (see Appendix 1c).

3.4.3. Observation checklist

To establish pupils' hygiene practices, a structured checklist form was used to verify the pupils' hygiene practices. Some of the hygiene aspects of interest included: cleanliness of the school uniform, the pupils' hair, fingernails, presence of sandals and handkerchiefs. To find out whether the selected respondents observed sanitation practices such as hand washing

after using the latrine, those that asked for permission to visit the latrine were granted and counted. The researcher observed from a distance and recorded the number of the pupils that washed their hands. An observation checklist for the school compound, classrooms and the sanitation facilities was also used to document health-promoting activities in the school (see Appendix 1b and 1e).

3.4.4. Focus group discussions

A total of eight FGDs were held with standard 5 and 7 respondents in both the experimental and control areas. A single group was made up of between 6 and 8 participants. The purpose of the FGD was to collect qualitative information on pupils knowledge concerning consequences of poor hygiene practices and also how they rated the state of their school sanitation facilities (see Appendix 1f).

3.4.5 Assessment of respondent's level of knowledge

To assess the knowledge of the respondents a system familiar to the pupils where multiple-choice answers are given during exams was used. Therefore, for every question that measured knowledge, the answers given as multiple choices were ranked from the highest to the lowest in terms of the most appropriate response. Respondents that picked "a" were considered to be above average in terms of level of knowledge; those that picked "b" were average and those that picked "c" were regarded as below average. (Table 4)

Table 4: Scale used to Asses Knowledge in this Study

Numbers	Level of knowledge
a	Above average
b	Average
c	Below average

3.4.6 Relationship between Knowledge and practices of pupil's personal hygiene and sanitation

A cross tabulation was performed on a few selected aspects on knowledge and practice of personal hygiene. The aim was to find out whether having health knowledge on those particular aspects meant practicing the same.

3.5. Data Management

The raw data was coded from the questionnaires, processed and analyzed using the Statistical Package for the Social Sciences (SPSS). Chi - square test of significance was used to establish the difference in knowledge and practices of personal hygiene and sanitation between the two Divisions. The same test (Chi - square test of association) was used to determine the relationship between knowledge and practice of the respondents in selected personal hygiene aspects. Level of significance was given at 0.05. Data has been presented by use of frequency tables, pie charts and bar graphs while percentages were used to show proportions.

CHAPTER 4 RESULTS

This chapter presents results of 744 respondents who were involved in the study, views expressed through focus group discussions as well as information gathered through observation. The findings are presented in text form, summarized tables and bar charts in the following sub sections.

- a) Demographic data of the respondents.
- b) A comparison of levels of knowledge on personal hygiene of pupils between the two Divisions.
- c) A comparison of personal hygiene and sanitation practices of pupils between the two Divisions.
- d) Association between knowledge and practices of respondents in selected hygiene aspects.

4.1 Social demographic characteristics of the respondents

4.1.1 Distribution of study subjects by schools and classes

Four schools were drawn from each Division (Ngong and Central) and 31 pupils were taken from each class (3, 5 and 7) in every school. Table 5 gives a summary of respondents by class and school.

Table 5: Distribution of subjects by schools and classes

Class	KTS	Moipei	Alhuda	Nkoile	Kibiku	NTS	Enomatasia	Embul-bul	Total
Std3	31	31	31	31	31	31	31	31	248
Std 5	31	31	31	31	31	31	31	31	248
Std 7	31	31	31	31	31	31	31	31	248
Total	93	93	93	93	93	93	93	93	744

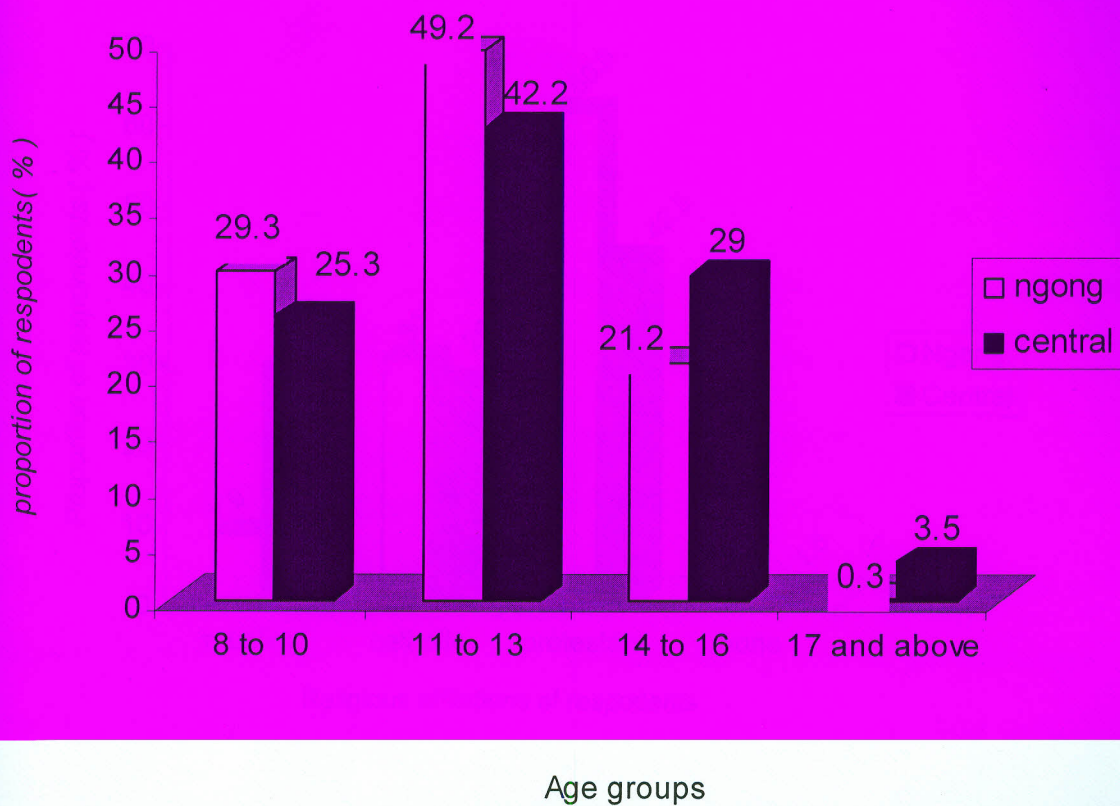
Key: KTS -Kajiado Township NTS -Ngong Township

4.1.2. Distribution of the respondents by sex and age

Out of the 744 respondents from both Divisions 55.2 % (411/744) were males and 44.8 % (333/744) were females. Figure 1 represents a summary of the data.

In Ngong Division, majority of the respondents, 49.2% (183/372) were aged between 11 and 13 years. About 29.3% (109/372) were aged between 8 and 10 years. The age group between 14 and 16 years had 21.2% (79/372) of the respondents, and only 0.3% (1/372) were 17 and above. In Central Division, 25.3% (94/372) were found to be aged between 8 and 10 years, while majority of the respondents, 42.2% (157/372) were aged between 11 and 13 years. About 29% (108/372) of the participants were found to be aged between 14 and 16, and only 3.5% (13/372) were 17 and above. Central Division had more pupils who were above the primary school age. Figure 2 provides graphic illustrations.

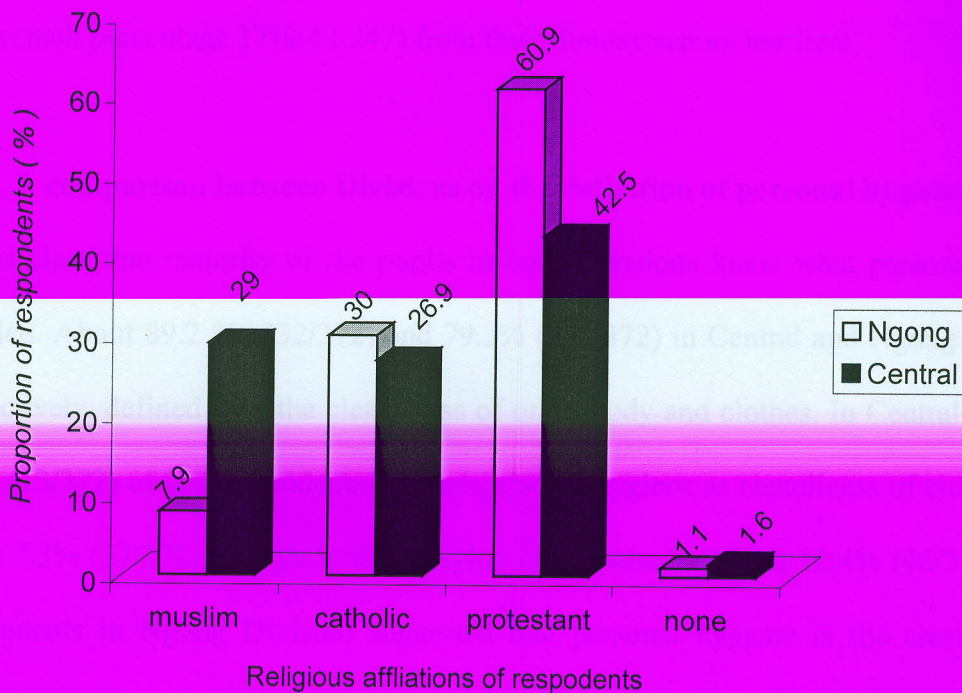
Figure 2: Distribution of respondents in this study by age groups



4.1.3. Distribution of respondents by religion

The proportion of respondents that belonged to the Muslim faith were 7.9% (29/366) and 29 % (108/372) in Ngong and Central Divisions respectively. About 30% (110/366) in Ngong and 26.9% (100/372) in Central Divisions were Catholics. The majority of the respondents in both Divisions were Protestants, with Ngong Division having 60.9% (223/366) and Central Division 42.5% (158/372). Around 1.1% (4/366) in Ngong and 1.6% (6/372) in Central Divisions did not subscribe to any of the mainstream faiths. The religious affiliations of respondents in this study are shown in figure 3.

Figure 3: Distribution of respondents in this study by religion



4.2. Differences in knowledge on personal hygiene of pupils between Ngong and Central Divisions

Concerning the knowledge on hygiene education, the objective was to find out whether the level of knowledge on personal hygiene differed in the two Divisions. A scale was used to assess the levels of knowledge of the respondents in the two Divisions.

4.2.1. Sources of personal hygiene information

Majority of the respondents 95.8% (475/496) claimed to have heard about personal hygiene before, and only a small percent 4.2 (21/496) that had never heard about personal

hygiene. The respondents were allowed to tick more than one source. More than half 54.8% (408/744) of the respondents got the information from the school teachers, less than a half 39.7% (295/744) got it from their mothers, 10.5% (78/744) from their siblings and a small percentage 17%(42/247) from their Sunday school teachers.

4.2.2. A comparison between Divisions on the definition of personal hygiene

It was clear that majority of the pupils in both Divisions knew what personal hygiene entailed. About 89.2 %(332/372) and 79.3% (295/372) in Central and Ngong Divisions respectively, defined it as the cleanliness of one's body and clothes. In Central Division, 3.5% (13/372) of the respondents defined personal hygiene as cleanliness of clothes only, while 7.3% (27/372) thought it was obeying one's parents. About 12.4% (46/372) of the respondents in Ngong Division suggested that personal hygiene is the cleanliness of clothes only; however 8.3% (31/372) of them thought it is being obedient to parents. There was a significant difference in the level of knowledge in the two Divisions. More respondents in Central Division had the correct definition of personal hygiene compared to those in Ngong Division. Table 6 below shows the difference in level of knowledge.

Table 6: Respondents' definition of personal hygiene in this study

Definition of personal hygiene	Central (n=372)	Ngong (n=372)	Chi-square value
Cleanliness of body and clothes	89.2% (332)	79.2% (295)	($\chi^2 = 13.884$, df1; P=0.000***).
Clean clothes only	3.5% (13)	12.4% (46)	($\chi^2 = 20.047$, df1; P=0.000***).
Obeying parents	7.3% (27)	8.3% (31)	($\chi^2 = 0.299$, df1; P=0.584).

***Very significant difference

4.2.3 Usefulness of personal hygiene to the respondents

Table 7 illustrates the responses given by the pupils when asked ways in which personal hygiene was of importance to them. A large proportion of respondents in Central Division 83.9% (208/248) agreed that personal hygiene helps them prevent diseases, 9.3% (23/248) said it makes them smart, 6.8% (17/248) of thought by practicing personal hygiene they would avoid punishment. In Ngong Division slightly less than three quarters 72.2% (179/248) of the respondents knew that practicing personal hygiene would help them prevent diseases, 6.8% (17/248) would make them smart and 21% (52/248) said that it prevents them from being punished by the teacher. There was a significant

smell in class, while the rest 1.3% (5/372) feared they would receive punishment from the teacher. More respondents in Central Division than Ngong Division were more knowledgeable in regard to the consequences of poor personal hygiene.

Table 8: Perceived consequences of poor personal hygiene by respondents in this study

Consequences of poor hygiene	Central (n=372)	Ngong (n=372)	Chi-square value
Illness and bad smell in class	87.1% (324)	72.8% (271)	$\chi^2 = 23.573$, df=1; P=0.000***).
Smell in class	11.6% (43)	22.8% (85)	($\chi^2 = 16.645$, df=1; P=0.000***).
Avoid punishment	1.3% (5)	4.3% (16)	($\chi^2 = 5.929$, df=1; P=0.015**).

** Significant difference

*** very significant difference

4.2.5. Respondents' knowledge on the importance of washing the face

When questioned why it was important for one to wash his or her face, majority of the respondents in Central Division 82.3% (306/372) cited prevention of eye diseases. About 15.3 % (57/372) said washing of the face enabled them see properly, 2.4% (9/372)

reported that it helped them avoid punishment. In Ngong Division 64.3% (239/372) would wash their faces to prevent eye diseases, 29% (108/372) to enable them see properly and 6.7% (25/372) to avoid being punished. Table 9 shows a significant difference in the level of knowledge on the health importance of washing one's face.

Table 9: Views of respondents in this study on the importance of washing face

Importance of washing face	Central (n=372)	Ngong (n=372)	Chi-square value
Prevent eye diseases	82.3% (306)	64.2% (239)	$\chi^2 = 30.794$, df=1; P=0.000***).
See properly	15.3% (57)	29% (108)	$(\chi^2 = 20.256$, df=1; P=0.000***).
Avoid punishment	2.4% (9)	6.7% (25)	$(\chi^2 = 7.890$, df=1; P=0.005**).

** Significant difference

*** very significant difference

4.2.6 Importance of brushing teeth

In order to establish whether the respondents knew the importance of maintaining good dental hygiene, they were asked to tick the reason as to why it was important to brush one's teeth. Table 10 suggests that 89 % (331/372) of the respondents in Central Division

believed that brushing of the teeth would prevent tooth ache and bad mouth smell, 7.8% (29/372) brush their teeth to make them white, 3.2% (12/372) because the teacher says they should brush.

In response to same question pupils in Ngong Division gave varied answers. About 8.9% (33/372) brushed as a result of teacher's instructions while 18.8% (70/372) would brush to make their teeth white. However a big percentage 72.3% (262/372) would brush their teeth to prevent toothache and bad mouth smell. The results indicated significant difference in terms of knowledgeable pupils between the two Divisions, with more pupils in Central than Ngong being knowledgeable in dental hygiene.

Table 10: Reasons for brushing teeth as given by respondents in this study

Reasons for brushing teeth	Central (n=372)	Ngong (n=372)	Chi-square value
Prevent toothache and bad mouth smell	89% (331)	70.4% (262)	$\chi^2=39.558, df=1;$ $P=0.000***$
To make teeth white	7.8% (29)	18.8% (70)	$\chi^2=19.586, df=1;$ $P=0.000***$
Because the teacher says so	3.2% (12)	8.9% (33)	$\chi^2=10.431, df=1; P=0.001**$

** Significant difference

*** very significant difference

4.2.7. Occasions when the respondents thought it was necessary to wash hands

In response to the question as to when it was necessary to wash one's hands more than three quarters 79.6% (296/372) of the respondents in Central Division said it was necessary to have the hands cleaned before eating and after visiting the latrine or toilet, 17.5% (65/372) said they would wash their hands only before eating and only 3% (11/372) said that they didn't find it necessary to wash their hands. On the other hand, Ngong Division had less than three quarters respondents 69.9 % (260/372) who found it necessary to wash hands before eating and after visiting the latrine, 25.8% (96/372) would wash before eating only and about 4.3% (16/372) thought it was not necessary (Table 11). There was a significant difference between the two Divisions in terms of knowledgeable pupils. More respondents in Central than Ngong Division would wash their hands before eating and after visiting the latrine.

Table 11: Particular Instances when it was necessary to wash hands

When it was important to wash hands	Central (n=372)	Ngong (n=372)	Chi-square value
Before eating and after visiting the latrine	79.6% (296)	69.9% (260)	$\chi^2=9.225, df=1; P=0.002^{**}$
Before eating	17.5% (65)	25.8% (96)	$\chi^2=7.617, df=1; P=0.006^{**}$
It is not necessary	3% (11)	4.3% (16)	$\chi^2=0.961, df=1; P=0.327$

** Significant difference

4.2.8. Importance of bathing

Table 12 below shows that majority of the respondents knew the health importance of taking a bath. Eighty one percent (201/248) of the respondents in Ngong Division would take a bath to prevent bad body smell and skin diseases, 10.5% (26/248) to look smart and 8.5% (21/248) to avoid being punished by the teacher.

A larger proportion of the respondents in Central Division 92.3% (229/248) would bath to prevent bad body smell and diseases, 4.9% (12/248) does it to look smart, while 2.8% (7/248) of the respondents would wash their body to avoid punishment.

Table 12: Importance of taking a bath as given by respondents in this study

Importance of taking a bath	Central (n=248)	Ngong (n=248)	Chi-square value
Prevent bad body smell and skin diseases	92.3% (229)	81% (201)	$\chi^2=13.702, df=1;$ $P=0.000^{***}$
To look smart	4.8% (12)	10.5% (26)	$\chi^2=4.936, df=1; P=0.026^{**}$
To avoid punishment	2.4% (7)	8.5% (21)	$\chi^2=7.419, df=1; P=0.006^{**}$

** Significant difference

*** very significant difference

4.2.9 Respondents' knowledge on the importance of washing clothes

When asked why it was important to clean their clothes, the respondents gave varied reasons. About 75.4% (187/248) in Ngong Division said it would prevent the invasion of

lice and fleas, 18.5% (46/248) wash their clothes to look smart and 6% (15/248) to avoid punishment.

More than four fifths 84.3% (209/248) of the respondents in Central Division washed their clothes to avoid getting lice and fleas, 9.7% (24/248) to look smart, 5.6% (14/248) to avoid punishment and only 0.4% (1/248) did not give any response. Table 13 below shows the responses given and the difference in level of knowledge.

Table 13: Importance of washing one's clothes as given by respondents in this study

Importance of washing clothes	Central (n=248)	Ngong (n=248)	Chi-square value
Prevent lice and fleas	84.3% (209)	75.4% (187)	$\chi^2=6.062, df1; P=0.014^{**}$
To look smart	9.7% (24)	18.5% (46)	$\chi^2=8.050, df1; P=0.005^{**}$
To avoid punishment	5.6% (14)	6% (15)	$\chi^2=0.037, df1; P=0.848$

** Significant difference

4.3 The differences between Ngong and Central Divisions on personal hygiene and sanitation practices of pupils

To find out personal hygiene practices of the pupils, the respondents were asked to indicate how often one washed his/her face, took a bath and brushed his/her teeth, while sanitation practices included disposal of human waste and cleaning of “bottoms”. The correct personal hygiene and sanitation practices the researcher looked for were; daily washing of the face and body, brushing of teeth after meals, use of latrine/ toilet for faeces and urine disposal and cleaning of “bottoms” after relieving one self.

4.3.1 Personal hygiene practices amongst the respondents

Table 14 on the next page, shows the respondent’s frequency of washing face. In both Divisions majority of the respondents cleaned their faces on daily basis, with 86.7 % (215/248) in Ngong and 90.7 % (224/247) in Central Division. About 6 % (15/248) of the respondents in Ngong Division washed their face when the teacher told them to do so, while 7.3% (18/248) when they remembered. In Central Division 5.7% (14/247) washed their faces only when they remembered and 3.6 % (9/247) washed their faces when the teacher tells them. Although more pupils in Central Division observed the correct practice (washing the face daily) compared to Ngong, the difference was found to be insignificant ($\chi^2=1.968, df=1; P=0.161$).

Table 14: Instances when the respondents in this study washed their face

Washing of the face	Central (n=247)	Ngong(n=248)	Chi-square value
On daily basis	90.7% (224)	86.7%(215)	$\chi^2=1.968,df=1; P=0.161$
When the teacher says so	5.7% (9)	6% (15)	$\chi^2=0.032,df1; P=0.857$
When they remember	5.7% (14)	7.3% (18)	$\chi^2=0.517, df1; P=0.47$

Regarding brushing of teeth, Ngong Division had 54.6% (203/372) while Central Division had 82.7% (307/371) of the respondents that brushed their teeth. In Central Division about 61.7% (129/209) of them brushed at least once a day, 35.9% (75/209) after every meal and 2.4% (5/209) when they remembered. In Ngong Division, more than 71.2 % (108/153) of those who brushed did so at least once a day, 22.9 % (35/153) after every meal, while 5.9% (9/153) when they remembered to do so. Table 15 below illustrates the differences in dental hygiene practices. More pupils in Central than Ngong Division brushed their teeth after every meal and the difference was significant.

Table 15: Instances when the respondents in this study brushed their teeth

Brushing of teeth	Central (n=209)	Ngong(n=153)	Chi-square value
After every meal	35.9% (75)	22.9% (35)	$\chi^2=7.067,df=1; P=0.008^{**}$
Once a day	61.7 % (129)	71.2 % (108)	$\chi^2=3.071,df=1; P=0.080$
When they remember	2.4 % (5)	5.9 % (9)	$\chi^2=2.894, df=1; P=0.089$

** Significant difference

The respondents gave various reasons for not brushing their teeth. In Ngong Division 35.8% (34/95) of them lacked toothbrushes and toothpaste, 4.2 % (4/95) did not find it important, while 60 % (57/95) forget to brush their teeth. In Central Division, 39.5% (15/38) did not have teeth brushing materials such as tooth brush and tooth paste, 5.3 % (2/38) did not find it important, while 55.5% (21/38) usually forget to brush their teeth. Majority of the respondents reported to be using toothbrush and toothpaste to brush their teeth, with 92% (46/50) and 85.7% (84/98) in Ngong and Central Divisions respectively. About 8% (4/50) of the respondents from Ngong and 13.3% (13/98) from Central Divisions used chewing stick, while 1 % (1/98) respondents from Ngong reported to be using water only.

Regarding the cleanliness of the body, the respondents were asked how often one took a bath. About 54.3 % (202/372) of the respondents in Ngong Division bathed on a daily basis, 34.1 % (127/372) on weekly basis while 11.6% (43/372) bathed when the teacher reminded them to do the so. Fifty- two percent (193/371) of the respondents in Central Division took a bath on weekly basis, 39.9 % (148/371) every day and 8.1% (30/371) when the teacher reminded them to bathe. Table 16 illustrates the frequency of taking a bath. The results indicated a significant difference between the two Divisions in regard to the correct practice. Ngong Division had more respondents who reported to be bathing at least once a day.

Table 16: Instances when respondents in this study reported to be taking a bath

Taking a bath	Central (n=371)	Ngong (n=372)	Chi-square value
Daily basis	39.9 % (148)	54.3% (202)	$\chi^2=15.478, df=1; P=0.000^{***}$
Weekly (once a week)	52% (193)	34.1% (127)	$\chi^2=24.223, df=1; P=0.000^{***}$
When the teacher says so	8.1% (30)	11.6% (43)	$\chi^2=2.529, df=1; P=0.112$

*** Very significant difference

4.3.2. Sanitation practices amongst the respondents

In the two Divisions majority of the respondents; 92.7% (345/372) in Ngong and 91.2% (339/371) in Central Divisions reported to have had pit latrines at their homes.

For the proportion that lacked latrines at their homes, table 17 on the next page gives a summary of where the respondents helped themselves. Almost 40.8% (11/27) in Ngong Division used the neighbour's latrines to help themselves, 29.6% (8/27) used the bush while 29.6% (8/27) helped themselves in the farm. Majority of the respondents in Central Division 62.5% (20/32) however, used the bush, 28.1% (9/32) relieved themselves in the farm and only 9.4% (3/32) used their neighbours' latrines. The results indicated a significance difference regarding proper human waste disposal in situations where pupils lacked latrines at their homes.

Table 17: Sites where the respondents in this study relived themselves

Where pupils relived themselves	Central (n=32)	Ngong (n=27)	Chi-square value
Neighbour's latrine	9.4 % (3)	40.7% (11)	$\chi^2=7.960, df1; P=0.005^{**}$
Bush	62.5% (20)	29.6% (8)	$\chi^2=6.345, df1; P=0.012^{**}$
Farm	28.1% (9)	29.6% (8)	$\chi^2=0.016, df1; P=0.899$

** Significant difference

Figure 4 on the next page, displays “bottom” cleaning practices and materials used. Only 27.6% (102/370) in Ngong and 37.2% (138/372) in Central Divisions used tissue papers to clean themselves after visiting the latrine. In Ngong more than 59.7% (221/370) used waste paper, 2.2% (8/370) cleaned themselves using water, 2.7% (10/370) used leaves and 7.8% (29/370) never cleaned themselves after the long call.

However in Central Division, only 21.3% (79/371) reported to be using waste papers, 17.5% (65/371) used water, 11.9% (44/371) leaves and 12.1% (45/371) of them never used any thing. The most important thing is that at least more than three quarters of the respondents in each Division cleaned themselves after the long call. The difference in this practice was significant ($\chi^2=3.891$ df= 1; P=0.049).

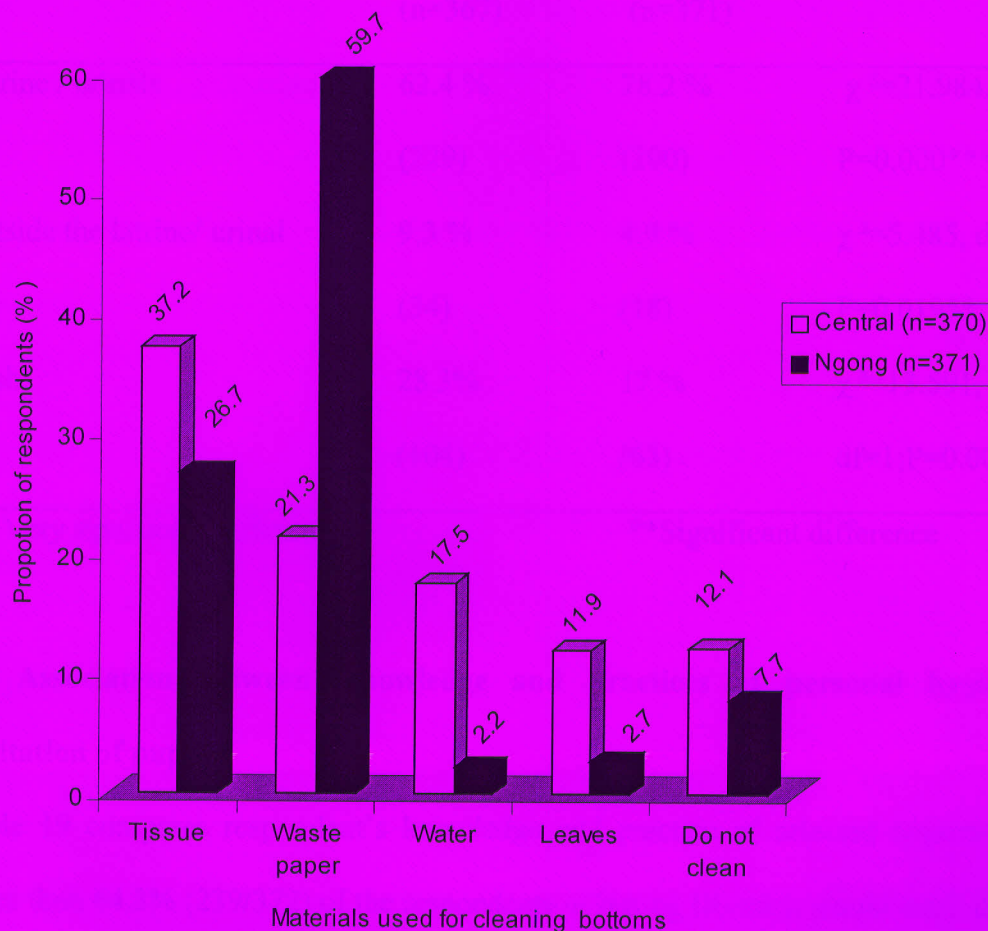
Figure 4: Materials used by respondents in this study to clean their “bottoms” after**long call**

Table 18 provides the responses given by the respondents when asked where they usually pass urine. In Ngong Division majority of the respondents 62.4% (229/367) used latrines, 9.3% (34/367) just outside the latrine and 28.3% (104/367) reported to be passing urine anywhere in the bush. Similarly majority of the respondents in Central 78.2% (290/371) go for their short calls in the latrine or the toilet, 4.9% (18/371) do it just outside the latrine and 17% (63/372) used the bush. The results indicated a significant difference in the practice on the safe disposal of urine between the two Divisions

Table 18: Sites used for short calls as reported by the respondents in this study

Places	Ngong (n=367)	Central (n=371)	Chi-square value
Latrine / urinals	62.4 % (229)	78.2 % (290)	$\chi^2=21.984$, df=1; P=0.000***.
Outside the latrine/ urinal	9.3 % (34)	4.9 % (18)	$\chi^2=5.485$, df=1; P=0.019**.
Bush	28.3% (104)	17 % (63)	$\chi^2=13.591$, df=1;P=0.000***.

***Very significant difference

**Significant difference

4.4 Association between Knowledge and Practices of personal hygiene and sanitation of pupils

Table 19 compares respondent's knowledge and practice of selected hygiene aspects. More than 64.3% (239/372) of the respondents in Ngong Division would wash their faces to prevent eye diseases, and about 86.7% (215/248) in the same Division claimed to be washing the face at least once a day. There was an association between knowledge and practice on the cleanliness of the face among respondents in Ngong Division ($\chi^2=60.844$, df 1;P= 0.000***). An association was also found in Central Division where $\chi^2=117.009$,df1; P=0.000***, with 82.3% (203/247) being knowledgeable on the importance of washing the face and 90.7% (224/247) of them observing the practice at least once a day.

In Central Division, a great percentage difference was noted between respondents that knew the health importance of brushing teeth (89% 186/209) and those that actually brushed (35.9% 75/209). However there was an association between the two ($\chi^2=14.465$, df 1; $P= 0.000***$). In Ngong, about 72.3% (111/153) had the knowledge and about 22.9% (35/153) claimed to be brushing their teeth ($\chi^2=17.171$, df 1; $P= 0.000***$). There was an association between knowledge and practice concerning brushing of teeth in the two Divisions.

A greater percentage of the respondents from both Divisions knew why it was important to take a bath compared to the percentage that actually practiced. The average number of respondents in Central Division who thought cleanliness of the body helps prevent bad body smell and skin diseases, were 92.3% (229/248) and only 52%(129/248) took a bath every day. Ngong had 81% (201/248) very knowledgeable respondents, yet only 54.3% (135/248) bathed every day. Nevertheless, the association between knowledge and practice in regard to taking a bath was significant in both Divisions ($P= 0.000***$).

Table 19: The proportional differences between knowledge and practice in selected hygiene aspects

Division	Hygiene aspect	Knowledge (Prevent health problems)	Practice (Once a day)	Significance
Central	Brushing teeth	89 % (186/209)	35.9% (75/209)	$\chi^2=14.465$, df =1;P=0.000***
	Washing the face	82.3 % (203/247)	90.7 % (224/247)	$\chi^2=0.117$, df =1;P=0.000***
	Bathing	92.3 %(229/248)	52 % (129/248)	$\chi^2=70.548$, df =1;P=0.000***
Ngong	Brushing teeth	72.3 % (111/153)	22.9% (35/153)	$\chi^2=17.171$, df =1;P=0.000***
	Washing the face	64.3 % (239/372)	86.7 % (215/248)	$\chi^2=60.844$, df=1;P=0.000***
	Bathing	81% (2201/248)	54.3 % (135/248)	$\chi^2=241.522$, df =1;P=0.000***

*** Very significant difference

4.5 Views from the Focus Group Discussion and Observations of School Sanitary Facilities

Four FGDs were conducted in each school and each FGD dealt with different topics concerning sanitation. Views from majority of the groups, 75 % (6/8) showed that most school latrines were in bad conditions and in unusable state. In all groups, 100 % (8/8) of the pupils complained of inadequacy of school latrines. A member from one of the groups reported “we have to make long queues especially at break time in order to enter the latrine”. It was confirmed through observation that some schools had as few as four latrines for more than 300 pupils. About 37.5 % (3/8) of the groups complained of the school latrines being either full or extremely dirty and unusable.

Although the pupils cleaned majority of the school latrines in turns, a few schools had the latrines being cleaned by pupils as punishment (school late comers or class noise makers). Through the FGD, it was also found that most pupils knew the health problems caused by a dirty latrine. About 62.5 % (5/8) of the groups reported that they would prefer using a bush than enter a dirty and messy latrine. It was therefore realized that some of the poor sanitation practices such as using the bush for short calls, previously reported in the interviews, could be attributed to the poor status of school latrines.

It was reported from 87.5 % (7/8) of the groups that school latrines did not provide the girls with enough privacy since their latrines were adjacent to those of the boys. A member of a certain group was captured saying, “sometimes boys peep our latrine through the roof or through cracks on the walls”.

Lack of water and enough privacy made the girls stay at home during the days they received their menses. The finding from the FGD therefore, concurs with a study carried out in Wajir by UNICEF (2000).

4.5.1. Observations made on the personal hygiene of the respondents

An observation checklist was used to find out whether the respondents had observed some of the personal hygiene practices. Majority had clean uniforms, hair, and fingernails and also carried handkerchiefs with them. When allowed to go for a short break before the beginning of the interview, majority visited the latrines. Most pupils in the intervention site remembered to use the leaky-tins to wash their hands. However, this was not the case in the control site since the schools lacked water and had no improvised hand washing facilities (Appendix 1g).

CHAPTER 5: DISCUSSION

5.1 Socio- demographic information

A total of 744 respondents consisting 372 respondents from each of the two Divisions were interviewed. Boys were the majority (55.2%) while girls constituted (44.8 %). There was a significant difference in gender representation, $\chi^2=8.177$, $df=1$; $P=0.004^{***}$. This could be probably due to the people's cultures preference for the boys' education than that of the girls.

Being primary school respondents, majority of them were aged between 11 and 13 years (45.7%). However, a few were found to be above 17 years even in standard 3, this was attributed to the "free education policy" that has made it compulsory for all the children to be in school.

Regarding their religious faiths, majority of the respondents were Christians (79.6%) and only (18.1 %) were Muslims. Central Division had majority of those who said that they belong to the Muslim faith (29 %) than Ngong Division (7.9%). This can probably be explained by the fact that one of the sampled schools in Central Division was purely a Muslim school.

5.2 Pupils' knowledge on personal hygiene and sanitation

Majority of the respondents know what personal hygiene entailed. However Central Division had more knowledgeable (above average) respondents. The difference in level of knowledge between the two Divisions was very significant ($\chi^2=13.884$, $df=1$; $P=0.000^{***}$). Understanding the sources of personal hygiene information is valuable in planning programmatic interventions aimed at improving the personal hygiene of

pupils. In particular it can help delineate optimal channels for awareness campaigns. From the research findings it is clear that most pupils 54.8% received information on hygiene from their schoolteachers. This can be supported by the fact that nearly all (95%) of the teachers interviewed claimed to be teaching some aspects of personal hygiene and sanitation during Home science and Science lessons. Mothers 39.7% (n=744) were also found to be important in passing hygiene information to their children. It was therefore clear that in one way or another hygiene education was reaching the school children.

The findings of this study indicate that majority of the respondents knew the importance of personal hygiene. For instance almost 80% (595/744) would ensure good personal hygiene practices to avoid getting diseases as well as bad smell. The perception of the pupils on the causes of illness is therefore, in line with the MOH report, that the major causes of morbidity among children in Kenya are diseases and conditions arising from environmental management and poor hygiene practices (National Development Plan Kenya, 2002-2008).

However, more respondents in Central than Ngong Division were knowledgeable concerning the usefulness of personal hygiene in their lives and the difference was significant ($\chi^2=9.889$, $df=1$; $P=0.002^{**}$).

Flies transmit eye diseases such as trachoma when people do not wash their faces. A few respondents had no knowledge of the importance of washing the face; however majority knew that a dirty face may lead to eye infections through flies, even so, the level of

knowledge in the two Divisions differed significantly ($\chi^2=30.794$, $df=1$; $P=0.000^{***}$). Central Division had the highest percent of those that would wash their faces to avoid getting eye diseases hence having more knowledgeable respondents.

Brushing of teeth is important in prevention of tooth decay and bad breath and children need to know early the importance of this practice. The findings indicate that more than 89% of the respondents in Central and 72% in Ngong Divisions would brush their teeth to prevent both tooth decay and bad mouth smell. More respondents in Central than Ngong Division were more knowledgeable as far as dental hygiene was concerned. The difference between the two Divisions was significant ($\chi^2= 39.558$, $df=1$; $P=0.000^{***}$).

Feecal –oral transmission occurs mostly through feecal contamination of food, water, and hands. Hands are contaminated after defecating or touching contaminated objects. Although the findings clearly indicated that majority of the respondents knew when it was necessary to wash their hands, the two Divisions differed significantly in terms of knowledgeable pupils. More respondents 79.6% knew that it was important to wash hands before eating and after using the latrine compared to Ngong Division which had 69.9% of the respondents that gave a similar response; $\chi^2=9.225$, $df=1$; $P=0.002^{**}$.

Studies have shown that hand washing with soap and water alone can reduce diarrhoeal diseases by 35 % or more. This practice can also reduce the prevalence of eye infection such as conjunctivitis and trachoma (Almedom *et al.*, 1997). Therefore children should be educated on the importance of hand washing in preserving their health.

Provision of adequate water and hand-washing facilities is also a factor that will determine the practice. In Central Division where water problem is extensive, it was observed that the school provided improvised hand washing facilities (leaky-tins) filled with soapy water. Schools in the control site lacked water in the school and had no hand washing facilities. Therefore, pupils never washed their hands after visiting latrines.

Taking a bath and frequent washing of clothes are practices that should be encouraged in children as they grow up. The perceived importance of the mentioned hygienic practices, may determine how often one may carry them out. Studies have shown that skin diseases such as scabies and the infestation of external parasites such as fleas and lice can be greatly reduced if personal hygiene is practised (Nyamwaya and Oduol 1994).

For majority of the respondents in both Divisions, taking a bath and washing of clothes was important in prevention of external parasites that causes skin diseases. More respondents in Central (92.3%) than Ngong (81%) knew the health importance of taking a bath ($\chi^2=13.702$, $df=1$; $P=0.000***$).

Similarly more respondents in the same Division (84.3%) knew the health importance of washing clothes than those in Ngong (75.4%), and the difference was significant ($P=0.014**$).

The differences in knowledge between Central and Ngong Divisions in regard to various hygiene issues, implies the impact the PHASE project has made in Central Division. A similar evaluation conducted on a School Health Action Project in primary schools in

Pokot West revealed that health knowledge after hygiene education campaigns had successfully imparted knowledge and skills among pupils. This is to suggest that schools are a key factor in initiating change by helping to develop useful life skills on health and hygiene. Children are often eager to learn and willing to absorb new ideas. New hygiene behaviour learned at school can lead to life-long positive habits (UNICEF,2000).

5.3 Pupils' personal hygiene and sanitation practices

To achieve the health impacts of environmental health interventions, access to water and sanitation must be accompanied by promotion of hygiene practices. Research has shown that access alone typically brings little or no health impact. For instance, a baseline study carried out in Bolivia, showed that diarrhoea prevalence was highly correlated with poor hygiene practices among mothers and caretakers, not with water source or type of sanitation. In Bangladesh, an integrated intervention project installing hand pumps and pit water-sealed latrines together with promotion of hygienic practices such as the use of water and latrines, resulted in 25% fewer episodes of diarrhoea in the intervention area compared to the control area (Snel *et al.*, 2002).

It is on this understanding that, other than assisting to put up sanitation facilities such as latrines in schools, PHASE has been able to accompany this with a detailed curriculum on personal hygiene and sanitation education in the view of promoting knowledge and hygiene behaviour. The percentage difference of knowledgeable pupils between Ngong and Central Division is an evidence of positive results of an integrated programme. However, despite the provision of water, latrines and health education in PHASE schools

same facilities lack in the homes that the pupils come from, therefore impeding good practice.

Given that the children attend school five days a week and that a face not washed would be easily noticed by the teachers, washing of the face was found to be inevitable among the pupils. Nevertheless, despite the intervention by the PHASE programme in Central Division, there was no significant difference between the two Divisions ($\chi^2=1.968$, $df=1$; $P=0.161$) regarding the correct practice of this hygiene aspect (washing of the face daily). Trachoma is an example of a disease caused by lack of frequent washing of the face. Studies have shown that regular washing of the face with soap and water can greatly reduce the prevalence of such infections in an area (Nordberg, 1999). Therefore, parents and teachers should put a greater emphasis on the health importance of washing the face daily to the children.

On the other hand, the two Divisions differed significantly ($\chi^2=7.067$, $df=1$; $P=0.008^{**}$) in the dental hygiene practice. About 22.9 % and 35.9% in Ngong and Central Divisions respectively, brushed their teeth after meals. Brushing of teeth after every meal is the best practice to ensure healthy teeth. However, it can be understood that pupils lack adequate time to brush after every meal, and especially after lunch during school days. Nevertheless, in Central Division where lunch was provided in school, pupils were found to pluck chewing sticks for brushing their teeth after the meal.

A baseline survey made in the same study site by AMREF (2001), had 60% of the interviewed pupils reporting to be taking a bath on daily basis. The findings in this study

showed a slightly lower percentage of those that bathed daily in both the control and the intervention sites. A greater percentage of respondents in Ngong took baths more frequently compared to those in Central with a percentage difference of 14.4%. The difference between the two Divisions was very significant as far as this practice was concerned ($\chi^2=15.478$, $df=1$; $P=0.000***$). Though the pupils knew the importance of taking a bath daily, scarcity of water in Central Division could have been a factor determining frequency of bathing. On the other hand, although schools in Ngong lacked water majority of the pupils lived in town where water was not very scarce. Although most teachers (79.2 %) thought that personal hygiene should be given more emphasis during the health education lessons, there is need to integrate programmes on hygiene promotion and provision of hardware at home to enable children translate knowledge into practice at all times

Diarrhoea as well as skin, eye and worm infections can be greatly reduced if good personal hygiene and sanitation practices are observed especially among children (Nyamwaya and Oduol 1994). Proper disposal of human waste in this case therefore is of great importance. Considering the respondents that lacked latrine in their homesteads, there was an evident significant difference between the two sites in the manner in which human waste was disposed ($\chi^2=7.960$, $df=1$; $P=0.000***$). Only 9.4 % in Central Division used the neighbours' latrine; the rest defecated either in the bush or in the farm. Ngong Division had the highest number of the respondents, (40.8%) who preferred to use the neighbours' latrine, other than using the bush or the farm. Through observation, homesteads in Central Division were scattered, such that one has to walk a distance of a

kilometer or more in search of a latrine. Given that most homes have thick bushes surrounding them, majority of the children would be tempted to use the bush. This was different in Ngong Division, where most households had latrines/toilets, and homesteads were less scattered, hence increasing the possibility of the children using the neighbours' latrines to help themselves. When people get into contact with excreta in the bush, worms such as hookworm may get into the body through the feet. This leads to poor health, which later affects their prospects in life. A study carried out by Nokes and Bundy (1993) showed that children with worm infection have higher absenteeism than non-infected children. Basically this means that children with worm infections have less time in school and therefore disadvantaged in the learning process. Effective school and home sanitation as well as hygiene education should help reduce these infections.

Other diseases such as diarrhoea may be rampant in an area where human excreta are washed by rainwater into other water sources such as rivers and wells. A study by Almedom *et al.*, (1997) shows that, hygiene- related practices such as the use of pit latrine by both adults and children can reduce diarrhoea by 36% or more. This is because proper excreta disposal interrupts the cycle of disease transmission by preventing human, animal and insects from coming into contact with faeces and urine.

Cleaning one's "bottoms" after defecating is an important practice which when learnt at the young age will continue into adulthood. People have different ways of doing this depending on culture, beliefs, religion and economic status. With regard to the economic status of a family, a child could have the opportunity to carry a tissue paper to school; others would use waste papers or water, yet others will never clean themselves after the

long call. Majority of the respondents in the two Divisions observed this practice, however, more pupils in Ngong (92.2%) than Central (87.9%) cleaned themselves after the long call ($\chi^2=3.891$, $df=1$; $P=0.049^{**}$). Due to the proximity of the control (Ngong) to the Nairobi city, most pupils were from middle class families, hence the access of tissue paper. Those that had carried tissue papers displayed them for confirmation.

More respondents in Central Division (55.9%) reported the use of latrine when in need of passing urine compared to 44.1% in Ngong Division who did the same ($\chi^2=21.984$, $df=1$; 0.000^{***}). Observation in the control site found most of the school latrines (both pupil and staff) in pathetic conditions. The unusable condition of school latrines had compelled the pupils to result to the use of near by bushes. It was different in intervention area, where the PHASE project has constructed VIP latrines in most of the schools.

5.4 Association between Knowledge and pupils' personal hygiene and sanitation practices

There were an association between knowledge and practice of pupils in most of the selected hygiene aspects in both the experimental and the control sites (Table 13.0). In most cases P was always less than 0.05. For example in Ngong Division, about (86.7%) washed their faces at least once a day and 64.3%) knew the health importance of doing so. On the same health aspect, Central Division had 82.3% who had the knowledge and (90.7%) who reported to be washing their faces on daily basis. The results also indicated that most school pupils would wash their faces, not because they want to prevent any diseases but due to other reasons such as avoiding punishment at school. There is need

therefore, to ensure that pupils understand health implications of personal hygiene aspects for them to sustain the practice.

Fewer respondents in Ngong Division (54.6%) brushed their teeth compared to those that knew the health importance of doing so (72.3%). Again the pupils would brush their teeth for other reasons other than to prevent teeth decay. While in Central 89% of the respondents knew the importance of brushing teeth and 82.3% actually brushed. Despite the fact that more school children would be having knowledge on the importance of brushing teeth, other factors such as lack of teeth cleaning materials could contribute to lack of implementation. Others would forget since they have to rush to school in the morning. Teachers and parents need to encourage pupils to use cheaper materials such as chewing sticks to brush their teeth.

A significant difference was found between the two study sites, regarding the importance of taking a bath and those that carried out the practice at least once a day. In Ngong Division 81 % were very knowledgeable, yet only 54.3 % of them reported to be bathing on daily basis. Despite the intervention programme, Central Division had (92.3%) that knew the health importance of bathing but only (52 %) acknowledged bathing every day. ($P=0.000^{***}$). A larger number of the pupils knew the importance of taking a bath but few observed the practice daily. This concurs with the literature that suggests, the integration of Health Education in the School Health Curriculum is not a guarantee that children are taught to think and act critically (UNICEF, 2000). However lack of practice despite the pupils having the knowledge, could be attributed to other confounding factors

such as lack of adequate water supply in the area. The district does not have adequate water sources for livestock and human consumption. To a greater part Kajiado District depends on ground water (ROK, 2001). This was confirmed by the responses regarding their water sources. Slightly above a half of the respondents in Central (59.4%) reported to be getting water from boreholes, (24.5%) buy water, while (13.2%) depended on rainwater.

In conclusion, it is agreed that one way to improve children's health, involves providing effective instruction. Research indicates that more than 50 classroom hours of instruction are needed to create a significant effect on children's health knowledge, attitude and practices (Connell *et al.*, 1985). The findings of this study have therefore, indicated a positive impact of PHASE programme on the level of knowledge of pupils in the intervention site. This could be attributed to the mode of information delivery for example use of Health Learning Materials (flipcharts and flash cards) for teaching specific topics.

Observation also confirmed that the use of the HLM by the pupils for small group discussions. According to the findings of this study, all the teachers from the intervention site had attended refresher courses on hygiene education. A research carried out by Wiley, (1993) found out that only teachers who had completed at least one formal health education course and regularly attended health education workshops, were more likely to teach health education as a regular part of their weekly lessons. Therefore, since children rely on adults to provide accurate trustworthy information, the need to adequately prepare teachers to provide such information cannot be assumed.

CHAPTER 6: A SUMMARY OF CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH WORK

6.1. Conclusions

Regarding the pupils' knowledge on personal hygiene and sanitation

- a) The intervention site (central Division) had more knowledgeable pupils regarding the importance of observing personal hygiene (washing of the face, brushing of teeth, washing of hands, bathing and washing of clothes) with a mean of 86% compared to the control site, which had 73.1%.

Pupils' practice on personal hygiene and sanitation

- b) Pupils in the control site (Ngong) observed hygiene and sanitation practices more (mean of 56.6%) compared to pupils in the intervention site (Central Division), which had a mean of (47.7%). Due to lack of sanitation facilities at home.

Association between knowledge and practice

- c) There were significant associations between knowledge and practice in both Divisions as far as brushing of teeth, washing of the face and bathing was concerned ($P < 0.05$).

6.2. Recommendations

- a) There is need for the teachers to follow up the children through daily inspections, with the aim of finding out whether the knowledge passed to them in class is translated into practice. This is because the study found out that more pupils were knowledgeable on hygiene issues but less practice.
- b) Most homes lack sanitation facilities such as water and latrines. To ensure that children observe personal hygiene and sanitation practices periodic home visits should be done by public health officers and teachers.
- c) Ministry of Education Science and Technology (MOEST) need to consider incorporating health education as an independent subject in the primary school teacher training institutes. There is also need to provide refresher courses for those already in the field to ensure they are equipped with more effective methods of delivering hygiene education, for example use of teaching aids such as charts and picture.
- d) The PHASE approach as been found effective, therefore, integration of PHASE in the National Health Education Curriculum by the (MOEST) would benefit all school children.
- e) The MOH/MOEST need to pay more attention on the school sanitation facilities especially the school latrines.
- f) School sanitation facilities such as hand washing facilities need to be improved in order to create an environment that is conducive for behaviour change among children.

- g) Schools need to provide special washrooms to ensure adequate privacy for girls when they have their menses. This will reduce the need for them to miss classes.

6.3. Suggestions for further research work

Further research should be carried out in the following areas:

- a) The suitability of Teacher Training Colleges in preparing teachers to deliver health education information.
- b) The relationship between hygiene related diseases and the school attendance by pupils.
- c) The role of parents in promoting personal hygiene and sanitation practices of children.

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APPENDICES

APPENDIX 1: DATA COLLECTION INSTRUMENTS

a) Questionnaire for standards 5 and 7 pupils

Introduction

- The purpose of this study is to find out whether there is any difference regarding knowledge and practices of pupils in personal hygiene and sanitation between an intervention and a control site.
- The objective would be achieved through giving **honest information**.
- Information given will be used for the **purposes of this study only and confidentiality will be ensured**. You do not need to write your name any where on the questionnaire.
- Please tick the appropriate answer or fill in the blank spaces.

SERIAL NO'.....

SCHOOL.....

DIVISION.....

Demographic information

1. Age ()
2. sex a) Male () b) Female ()
3. Standard/Class ()
4. Religion a) Muslim () b) Catholic () c) Protestant () d) others-----

SECTION A

5. Have you heard about personal cleanliness a) Yes b) No
6. If yes, where from? a) my mother () b) teacher () c) religious teachers () (you can choose more than one)
7. What is personal cleanliness a) Cleanliness of one's body and clothes () b) cleanliness clothes only () c) being obedient to parents ()
8. How is it helpful to you? -----

9. What happens if one does not practice personal cleanliness? a) may get sick and smell in class () b) Will smell in class only () c) will be punished by the teacher ()

10. Why is it important to wash one's face? a) avoid getting eye disease () b) be able to see properly () c) avoid punishment from the teacher ()
11. Why is it important for one to brush his/her teeth? a) to prevent tooth ache and bad smell () b) to make my teeth white () c) the teachers says we should brush
12. When do you think it is necessary to wash your hands? a) before eating and after visiting the latrine () b) before eating only c) not very necessary
13. Name 3 illness/diseases one would get if he/she does not wash hands after visiting the latrine
- i. -----
- ii. -----
- iii. -----
14. Why is it important to wash your body? a) prevent body smell and skin diseases () b) To look smart () c) To avoid punishment from the teacher ()
15. Why is it important to wash one's clothes?

SECTION B

16. How often do you wash your face? a) Daily () b) weekly () c) only when the teacher says so ()
17. Do you clean you teeth? a) Yes b) No
18. If yes, how often do you clean your teeth? a) After meals () b) once a day c) when I remember ()
19. If you don't clean your teeth, why? a) I have no tooth brush () b) it is not important () c) I don't remember () d) Others (specify)-----
20. Where does your family get water that you use at home? a) We have piped water b) from a borehole c) we buy water d) we use rainwater collected in a tank.
21. How often do you wash your body? a) Every day () b) weekly c) only when the teacher says so ()
22. Do you have a pit latrine/toilet at home? a) Yes b) No
23. If yes who uses the latrine? a) Father () b) mother and father () c) visitors d) all of us ()
24. If not, where do you go when you have a long call? a) in the neighbours pit latrine () b) any nearby bush () c) far away on the farm () d) any other specify-----
25. What do you use to clean your "bottoms" after the long call? -----

26. If you don't clean your bottoms, why-----
27. Where do you pass urine? a) In the latrine () b) just outside the latrine ()
c) in the bush () d) any other.....
28. List down three things that you learn in school about cleanliness and teach others.
- i. ----- iii. -----
ii. -----
29. Tick any illness that you suffered from the last t one month. a) Diarrhoea () b) eye disease
c) skin disease () d) none()

b) Pupils' observation check list standard

1. School uniform very clean () clean () dirty ()

2. Pupils' hair very clean () clean () dirty ()

3. With shoes/sandals with () with out ()

4. Washing hands after visited the latrines () washed Hands () Didn't wash hands ()

Using the toilet

5. Finger nails clean () dirty ()

6. Handkerchief with () without ()

c) Interview Questions for standard 3

Introduction

- The purpose of this study is to find out whether there is any difference regarding knowledge and practices of pupils in personal hygiene and sanitation between an intervention and a control site.
- The objective can be achieved through giving **honest information**.
- Information given will be used for the **purposes of this study only and confidentiality will be ensured**. Your name will not appear any where on the interview sheet.

SERIAL NO'.....

SCHOOL.....

DIVISION.....

Demographic information

1. Age ()
2. Gender a) Male () b) Female ()
3. Standard/Class ()
4. Religion a) Muslim () b) Catholic () c) Protestant () d) Traditional ()

SECTION A

5. What is personal hygiene? a) Cleanliness of one's body and clothes () b) cleanliness of clothes () c) being obedient to parents ()
6. Who teaches you about personal cleanliness? a) My mother () b) our teacher () c) my elder brother/sister d) others-----
7. What happens if one does not practice personal cleanliness?) .a) may get sick and smell in class() b) Will smell in class only () c) will be punished by the teacher
8. Why is it important to wash one's face every day? a) avoid getting eye disease () b) helps one to see properly () c) avoid punishment from the teacher ()
9. Why is important for one to brush his/her teeth? a) to prevent tooth ache and bad smell () b) to make my teeth white () c) the teachers says we should brush
10. When do you think it is necessary to wash your hands? a) before eating and after visiting the latrine () b) before eating only c) not very necessary

SECTION B

11. Do you brush your teeth every morning? a) Yes b) No
12. If yes, what do you use? -----
13. If you don't clean your teeth, why? a) I have no tooth brush () b) it is not important ()
c) I don't remember () d) Others (specify)-----
14. Where does your family get water that you use at home? a) We have piped water b) from a bore hole
c) we buy water d) we use rain water collected in a tank.
15. How often do you take a bath?) a) Every day () b) weekly () c) only when the teacher says so ()
16. Do you have a pit latrine/toilet at home? a) Yes b) No
17. If yes who uses the latrine? a) Father () b) mother and father () c) everybody ()
18. If not, where do you go for long call? a) in the neighbours pit latrine () b) any nearby bush ()
c) far away on the farm () d) any other -----
19. What do you use to clean your bottoms after defecating-----
20. if you don't clean you bottoms why-----
21. Where do you pass urine? a) In the latrine () b) just out side the latrine () c) in the bush ()
d) others specify

d) Teachers' questionnaire

Introduction

- The purpose of this study is to find out whether there is any difference regarding knowledge and practices of pupils in personal hygiene and sanitation between an intervention and a control site.
- The objective can be achieved through giving **honest information**.
- Information given will be used for the **purposes of this study only and confidentiality will be ensured**. You do not need to write your name anywhere on the questionnaire
- Please tick the appropriate answer or fill in the blank spaces

SERIAL NO'..... SCHOOL..... DIVISION.....

Demographic information

1. Which classes do you teach? -----
2. Which subjects do you teach? -----
3. What is your professional qualification: a) trained () Un trained ()
4. Age a) 18-24 () b) 25-35 () c) 36-45 () d) 46-55 ()

SECTION A

5. Do you teach any topic on personal hygiene and sanitation? If yes, how often are the topics taught in a week? (-----)
6. If not, please explain why? a) It is not an examinable area () b) there is no time ()
c) Pupils can learn on their own () d) It is the responsibility of the health workers. ()
e) Any other specify-----
7. Which areas in hygiene education do you feel that need more emphasis? (Give reasons for your answer)-----

8. Do you think it is important to teach personal hygiene and sanitation education as a separate subject in schools?.....
9. Do you use any teaching materials to teach hygiene education? a) yes b) no

10. If yes, which particular materials? a) Charts () b) pictures () c) video tapes () d) PHASE learning materials ()
11. If not, please explain why-----
12. Do you think using of Teaching Aids such as Charts in delivering hygiene education is necessary?
a) Yes () b) no () (Give reasons for your answer)-----
13. Have you attended any training/refresher courses on hygiene related topics? a) Yes () b) no ()
14. If yes, please explain about the training you received-----
15. If not, please explain why not-----
16. What do you think influences the pupils' personal hygiene and sanitation practices? a) Home background () b) health education knowledge () c) the community's culture () d) others specify -----
17. If culture does, please explain how. -----
18. Is there follow up to ensure hygiene practices are practised by the pupils? a) Yes () b) no ()
19. If yes, please explain how it is carried out-----
20. If not, briefly explain why not-----
21. Whose responsibility is it to provide school sanitation facilities? a) The parents () b) the school committee () c) the parents () d) the government () e) I don't know ()
22. ^{Do} you think the status sanitation facilities in schools could affect the girls' attendance. a) Yes b) No (). (Please explain your answer)-----
23. Who cleans the school latrine? a) a cleaner () b) the punished pupils () c) all pupils () d) I don't know ()
24. Are there health clubs in your school? a) yes b) no
25. If yes, what is the role of the club in the school?-----

26. What is the parents' role in ensuring a health environment in your school?

Thank you for taking time to fill this questionnaire.

f) Focus Group Discussion

Introduction

- The purpose of the FGD was to collect qualitative information on pupils' knowledge concerning consequences of poor hygiene practices and also how they rated the state of their school sanitation facilities

GROUP ONE

1. How many latrines do you have in your school? (Give the number for girls and for boys)
2. How would you describe the condition of your school latrines?
3. Do you think the latrines are enough for all the pupils in your school?

GROUP TWO

1. Who cleans your school latrines?
2. How would a dirty latrine affect the people using it?
3. Would you use a dirty latrine or would you use the bush?
4. What are the health problems of helping your self outside the latrine

GROUP THREE

1. Have you some times found people using the latrine to dispose rubbish?
2. What do you think would happen if a latrine is used to dispose rubbish?

GROUP FOUR (Standard 7 girls only)

1. Do you think the school latrines provide enough privacy for girls?
2. Do you think the condition of the school latrines can affect the girls' school attendance during their menstrual period days? (Please explain your answer)
3. What do you think your school should do to make the school latrines friendly for girls

g) Observed Personal Hygiene Practices

Schools	Personal hygiene practices										
	School uniform (n= 31)			Pupils hair n= 31)			Washed hands	Finger nails (n=31)		Hand- Kerchief (n=31)	With sandals (n=31)
	Very clean	Clean	Dirty	Very Clean	Clean	Dirty		Clean	Dirty		All
Kibiko											
3	1	2	10	0	29	2	0/31	17	14	14/31	All
5	1	25	5	3	25	3	0/22	16	15	14/31	All
7	10	20	1	2	24	5	0/26	25	6	15/31	All
Ngong township											
3	0	19	12	2	22	7	0/31	26	5	17/31	All
5	4	17	10	4	22	5	0/30	21	10	15/31	All
7	5	20	6	8	20	3	0/25	20	11	11/31	All
Enoomatasiani											
3	1	26	4	0	27	4	0/27	23	8	14/21	All
5	2	17	12	5	16	10	0/25	24	7	18/31	All
7	4	17	10	2	23	7	0/25	27	4	9/22	All
Embul-bul											
3	1	14	16	2	19	10	0/27	21	10	15/31	All
5	1	20	10	0	19	12	0/24	26	5	17/31	
7	1	23	7	0	21	10	0/26	28	3	21/31	

Schools	Personal hygiene practices											
Kajiado township	School uniform (n= 31)			Pupils hair n= 31)			Washed hands	Finger nails (n=31)		Hand-Kerchief (n=31)	With sandals (n=31)	
	Very clean	Clean	Dirty	Very Clean	Clean	Dirty		Clean	Dirty		All	
3	1	27	3	1	26	4	15/25	28	3	20/31	All	
5	1	26	4	2	25	4	20/30	29	3	22/31	All	
7	5	23	3	3	26	2	16/28	29	2	22/31	All	
Mopei												
3	1	28	2	1	25	4	20/25	25	6	24/31	All	
5	1	28	2	3	26	2	12/24	27	4	25/31	All	
7	2	27	2	3	26	2	15/25	28	3	24/31	All	
Al-huda												
3	2	27	2	3	27	1	2/26	24	7	17/31	All	
5	1	28	2	0	29	2	13/16	26	5	19/31	All	
7	1	27	2	0	29	2	19/25	29	2	21/31	All	
Nkoile												
3	1	20	10	1	25	5	10/27	25	6	20/31	All	
5	5	23	3	3	26	2	-	26	5	22/31	All	
7	1	28	2	0	31	0	-	29	2	25/31	All	

Appendix 2:**Plates Showing Different Sanitation Facilities and Practices**

a)



b)

a) and b): School latrines in very poor conditions



c) A school latrine (VIP) in good condition and a leaky- tin on the side



d) A school boy washing his hands after using the latrine