SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA, LEGON

ASSESSMENT OF ENVIRONMENTAL SANITATION AND DISEASES AMONG STUDENTS IN UNIVERSITY OF GHANA LEGON

BY

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DECLARATION

I declare that this dissertation has been the result of my own field research. I sincerely therefore declare that this dissertation has not been accepted in substance of any other degree nor is it being concurrently submitted in candidature for any other degree.

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DEDICATION

To

My Mother, Wife, Son and Senior Brother

Mariamu Mahamah

Rubabatu Iddrisu

Koji Micdad Ewuntomah

And

Bumawura J.M. Mahamah

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It takes a lot of effort, commitment and support to achieve scholarly ambition. I therefore wish to acknowledge with much thanks the support I received from many people who in diverse ways helped me to produce this work.

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ABSTRACT

The recent emergence of concern about environmental sanitation is not a new problem in Ghana. In most third world countries provision of sanitary facilities lag behind the growing population thereby increasing the risk of sanitation related infections among the people especially in schools. This study assessed the level of environmental sanitation and disease conditions among students on the campus of the University of Ghana, Legon.

It was a cross-sectional descriptive study. Data for the study was obtained using both qualitative and quantitative study techniques. Qualitative data was collected using in-depth interviews, observation and physical inspection of sanitary facilities in the residential and lecture halls and the general grounds while structured self-administered questionnaires were administered to resident students in the traditional halls. Data on diseases reported by students at the University health facilities during clinical consultations was obtained from the facility registers. Ethical review was obtained from the ethical review committee of Ghana Health Service. All statistical analysis was done using statistical software packages of EPI Info (version 3.3.2) and SPSS (version 16.0).

The study found that Sanitation in the halls had improved tremendously with the outsourcing of janitorial services to private contractors. However, environmental sanitation and waste management in the University remained poor. Accommodation and Sanitary facilities in the traditional halls were inadequate despite expansion in toilets and washrooms. About 80 percent of disease conditions reported in the University health institutions were linked to environmental sanitation, personal hygiene and overcrowding.

Continuous health education of student and the University community on good sanitation and outsourcing of curatorial services and refuse evacuation to contractors remains the best indicator for waste management and improved health of students

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ACRONYMS

ARI	Acute Respiratory Infection
CDC	Centre for Disease Control
CI	Confidence Interval

GH¢	Ghana Cedi
GHS	Ghana Health Service
GIT	Gastroenteritis
GSS	Ghana Statistical Service
IDI	In-Depth Interview
IRI	Internet Research Institute
JCR	Junior Common Room
MDGs	Millennium Development Goals
OPD	Out Patients Department
PTA	Parent Teachers Association
TREND	Training, Research and Networking for Development
SCD	Sickle Cell Disease
UG	University of Ghana
UNDP	United Nations Development Programme
UNICEF	United Nations International Children Emergency Fund
UNWATER	United Nations official Mechanism for follow up of the water related decisions
URTI	Upper Respiratory Tract Infection
USA	United States of America
UTI	Urinary Tract Infection
VIP	Ventilated Improved Pit latrine
WC	Water Closet
WHO	World Health Organization
SOS	Shit-on-shit

DEFINITION OF TERMS

'Perching': This is a situation where a student who is not officially given a place or room in a particular hall is able to secure accommodation with the assistant of the bona fide member of a particular room and benefit from facilities of that room or hall

'Percher' A student who reside in a hall or room without being officially provided a place of residence in that hall or room but with the help of a bona fide member of the room

Sanitation related Disease: Diseases whose predisposition is associated with insanitary conditions e.g. diarrhoea, enteritis, etc.

Sanitary Facility: This is a facility such as a toilet, urinal, washroom, etc. which is clean and promote hygiene by preventing human contact from hazard of waste to promote health

Shit-on-shit This is a situation where students defaecate on each others faeces as a result of lack of water to flush the toilets

Poor Sanitation: Sanitation condition that is not very clean and hygienic

Satisfactory Sanitation: Sanitation condition which is clean, hygienic and generally acceptable

Good Sanitation: Sanitation condition that is quiet clean, hygienic, good, pleasant and acceptable

'Free Range': The indiscriminate defaecation in bushes around the University by students

Waste Management: The collection, transportation, processing, recycling or disposal of waste materials such as garbage, pieces of paper, plastic rubber bags etc. produced by human activity, and is generally undertaken to reduce their effects on human health, the environment or aesthetics

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Sanitation was originally understood to mean the promotion of hygiene and prevention of disease by maintenance of sanitary conditions. In the nineteenth century the term sanitation was understood to relate to health, or used in the disposal especially of domestic waterborne waste (Merriam-Webster's Collegiate Dictionary, eleventh edition). The concept has evolved significantly. The 1999 Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes defined sanitation as "the collection, transport, treatment, and disposal or reuse of human excreta or domestic wastewater, whether through collective systems or by installations serving a single household or undertaking"(WHO, 2008 update).

Worldwide, millions of people lack access to reliable basic sanitation facilities. UNICEF (2006) has noted that about 2.6 billion people worldwide – two in five – do not have access to improved sanitation facilities. Barely more than one third of the population uses adequate sanitation facilities in West and Central Africa (36%), South Asia (37%) and Eastern and Southern Africa (38 percent) UNICEF (2006) noted. Indeed lack of safe water and sanitation facilities is the world's single largest cause of illness. The toll on children is especially high as about 4,500 children die each day from unsafe water and lack of basic sanitation facilities (UNICEF 2007) while countless others suffer from poor health, diminished productivity, and missed opportunities for education.

Schools partly determine children's health and well-being by providing a healthy or unhealthy environment. Although water and sanitation facilities in schools are increasingly recognized

as fundamental for promoting good hygiene behaviour and children's well-being, (UNICEF 2007), many schools have very poor sanitation facilities. For some, the conditions vary from inappropriate and inadequate sanitary facilities to the outright lack of latrines and safe water for drinking and hygiene (UNICEF *2007)*. Poor sanitation means that people especially students would have direct contact with environmental contaminants, which may result in sanitation related diseases. The challenge of inadequate sanitation facilities has burdened humanity for centuries (Checkley, 2004). The University of Ghana campus is no exception where there is overcrowding and greater stress on facilities that were supposed to cater for a lesser population than was currently witnessed.

1.2 Statement of the Problem

It is increasingly accepted that environment and sanitation factors are significant determinants of health and illness in poor countries (Shyramsundar, 2002). Statistics estimates that about 400 million people or one-third of the population in developing countries do not have safe drinking water and safe sanitary facilities (Nsiah-Gyaabah 2002).Similarly many studies on the impact of water, environmental sanitation and hygiene and health indicate that lack of sanitation and hygiene puts people at highest risk of diarrhoea a disease resulting from lack of safe water and sanitation (Warner 1997, Caincross et. al. 2003, Yahaya 2007,). Hunt (2006) and UNICEF (2007) observed that inadequate availability of water for hygiene and lack of access to sanitation facilities together contributed to about 88 percent of deaths from diarrhoea and other sanitation related diseases. Ghana Statistical Service (2005) further reiterated that only 4.8 percent of refuse was collected by local authorities and about 20 percent of the population still had no toilet facility as at 2003.

The problem of poor environmental sanitation in Ghana like many other Sub-Saharan countries (Bukari, 2008) and on the campus of the University of Ghana, Legon (Legon Shelter, 2006) is a reality. The state of poor environmental sanitation on the campus of the University ranges from choked gutters, weedy and littered environment to inadequate sanitation facilities (Legon Shelter, 2006), overflowing refuse containers and uncontrolled sale of food in insanitary markets. Indeed two earlier studies by Owusu (1996) and Akroway (1997) in the University of Ghana and subsequent reports from the Legon Shelter (2006) strongly indicated that sanitation in the halls was a major problem. Though the effect of inadequate water, poor sanitation and unhygienic practices among university students in the University of Ghana had not been explored and documented in detail, it was speculated that insanitary conditions coupled with overcrowding in the halls of residence and lack of control of food vendors might be a recipe for health hazard in the university. This was heightened by an outbreak of food poison in the University in October 2007. This situation clearly indicates that the university faces major challenges brought about by the mounting insanitary and environmental conditions that have the potential to cause diseases and disease epidemics as witness in October 2007.

1.3 Rationale for Study

The Plan of Implementation of the World Summit on Sustainable Development in 2002 emphasized sanitation in schools as a major priority action (UNICEF 2006). Similarly, the United Nations General Assembly declared 2008 as the year of sanitation in view of the poor progress the world has made towards achieving the sanitation target in the Millennium Development Goals (MDG). Indeed in most third world countries including Ghana, the provision of sanitary facilities lag behind the growing population thereby exposing the people to high risk of communicable diseases related to water, hygiene and sanitation (Nsiah-

Gyaabah 2002, Caincross et. al. 2003, TREND 2005, Hunt 2006). Research has shown that health and education are inseparable: when students are ill, or where the school environment is unhealthy or threatening, school attendance is sure to suffer (Yulukantigil et. al 2002, TREND 2005). TREND (2005) reiterated that a healthy and secure learning environment is necessary for student participation and learning. Adequate sanitation is therefore a foundation for development (Yahaya 2007) and the social and environmental health cost of ignoring the need to address sanitation issues including hygiene and water are far too great (UNWATER 2006).

Poor state of environmental sanitation in some halls of residence in the University of Ghana is well noted and documented (Owusu 1996 & Akroway 1997). The Legon Shelter (2006) observed that while population on campus is growing steadily from year to year there was no corresponding sanitary facilities to accommodate the increasing number of students. This dramatic increase in the student population was not matched by adequate sanitary provision as sanitary facilities remain virtually the same over the years (Legon Shelter 2006). The population increase has also resulted in mass littering of the campus, indiscriminate and unauthorised dumping, overcrowding in halls and indiscriminate eating of unhygienically prepared foods in the markets. This situation may be compounded by the current student population of 28,482 in the university in the 2007/2008 academic year (UG 2007) and this will definitely have implications for water, hygiene, sanitation and accommodation conditions and health in the university. The purpose of this study is to provide the necessary information to inform policy that will improve sanitation and health care in the University.

1.4 Study Objectives

1.4.1 Main Objective

To assess the level of environmental sanitation and disease conditions among students on the campus of the University of Ghana, Legon.

1.4.2 Specific Objectives

- To describe the level of sanitation and hygiene in the halls of residence and sanitary facilities in lecture halls
- To assess the state of general environmental sanitation on the grounds of the campus of the University
- To assess the adequacy of existing accommodation and sanitary facilities for resident students
- To describe disease conditions that affect resident students in the University

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Environmental Sanitation, Hygiene and Sanitary Facilities in Schools

Although the importance of water and sanitary facilities for schools is acknowledged, in practice the sanitary situation in many schools is deplorable (Cairncross 1998, 2003). This author affirmed that while efforts were made to provide sanitation facilities in schools it is often found that toilets and latrines are either absent or do not function properly; latrines are padlocked because children are not trusted to use them properly; children, specifically girls, do not attend school because appropriate sanitation facilities are lacking. If school sanitation and hygiene facilities are absent, or are badly maintained and used, schools can become a health hazard (Akbar 2000). The lack of and/or poor maintenance of water and sanitation facilities in schools perpetuates the cycle of water-related illnesses and has debilitating effects on school attendance and children's potential to learn in school Akbar (2000).

In a situation report in Burkina Faso on water and sanitation in six Sub-Saharan African countries, UNICEF (2000) showed variations in water and sanitation facility distribution between homes and schools. For most of the countries, the report observed lower coverage in school water and latrines compared to the general population and low state of usage and maintenance. The same report asserted that in Cote d'Ivoire only 30% and 32% of schools respectively had water and latrines. In the same study in Yopougon, Cote d'Ivoire 62% of water closets (WCs) did not work while there was about one WC or latrine per 381 students UNICEF (2000). UNICEF (2000) further reported that in a surveye of 90 primary schools in crisis-affected districts of north and west Uganda it was found that only 2% had adequate latrine facilities. In another study in Ecuador, latrines designed for use by 30 to 40 pupils, in reality served as many as 180 pupils (WHO, 1994). Experience shows clearly that mere

provision of sanitary services, be it within schools or at household level, will not lead to their sustainability. The facilities need to be maintained, and in order to be maintained there must be a recognized need and demand for water as well as sanitation at schools.

According to a pilot survey of 14 countries in primary schools in some of the poorest countries in Africa, it was found that the schools have inadequate sanitation facilities (UNICEF, 1997). The survey report further stressed that the average number of users of sanitation facilities is often higher than 50 students per toilet in city schools and stressed that none of the 14 countries studied had increased the number of school toilet by more than 8% since 1990, suggesting that they are barely managing to keep up with the rise in student populations. The use of toilets and latrines are a basic right and an essential way of controlling sanitation problems at source therefore in examining the larger issues of waste disposal, we should not forget the role played by the humble latrine noted UNICEF (2001). Far more people lack access to a properly managed toilet or latrine, than to water (WHO, 1994). In two recent surveys in Uganda, it was observed that only a third of schools had adequate sanitation (WHO 2001). The studies reported that there was only one toilet for every 700 Ugandan pupils, compared to one for every 328 pupils in 1995 (WHO 2001). Improved hygiene and sanitation facilities including proper use and maintenance of the facilities and good personal and domestic hygiene are a crucial health intervention that can lead to the realization of full health benefits (Carr and Strauss, 2001). In a survey in the southern Province of Zambia, Graczyk et.al (2003) demonstrated high prevalence of *Endolimax* nana and *Blastocystis hominis* which are associated with diarrhoea and blamed this on deficient sanitation and low hygiene standards.

Though there is not enough literature on the consequences of lack of adequate water, hygiene and sanitation facilities in the university, Owusu (1996) and Akroway (1997) bemoaned the fast deterioration in hall sanitary facilities and reported that every floor in Commonwealth hall had at least a toilet and a wash basin that was out of order or not functioning well, so also were the lights on the corridors. The two authors believed that a similar situation existed in the other (traditional) halls of residence.

2.2 Population Growth, Water, Hygiene and Sanitary Facilities in Institutions

Rapid growth in population in recent decades with centralized facilities and opportunities available in urban areas has created tremendous overcrowding in urban centres worldwide. Most of the developing nations are unable to meet the demand of the increased population not only in the cities, towns and villages but also in schools especially in tertiary institutions.

Problems of high population density with an increased number of persons in limited space; results in an increase in solid waste generation, unhygienic surroundings and an increased demand for water supply and sanitation facilities are evident of this. It is one of the main reasons that rural and urban poor including school children frequently suffer from sanitation and water related diseases such as diarrhoea, typhoid, dysentery and cholera. WHO and UNICEF (2000) observed that approximately 1.1 billion (one-sixth) of the world's population has no access to dependable water supply and 2.4 billion (two-fifths) lack access to sanitation facilities and majority of these people live in Asia and Africa (Unicef 2002). A survey of sanitation facilities in schools in Bloomsbury, London by Jewekes & O'connor (1990) found that 15 schools did not have the minimum number of toilets and hand basins established in the school premises, 18 of the toilets were not kept adequately clean. The authors described this situation as potential for the spread of infectious diseases. These problems are peculiar to Ghana. As early as the 1960s when University of Ghana's population was about 2,000 it was

observed that hall facilities were already inadequate to meet the student population (Agbodeka 1998, Akroway (1997).

2.3 Maintenance and Sanitation in Halls of Residence

As the student population increased, demand for residential accommodation swelled up putting more stress on residential facilities in the university. As far back as late 1960 investigations revealed there were difficulties in providing adequate accommodation in the halls for the students (Agbodeka 1998). In his book 'A History of University of Ghana: Half a Century of Higher Education' Agbodeka (1998) reported that a student cited Commonwealth hall as fast wearing away due to misuse, overuse and lack of maintenance. Similarly, Akroway (1997) observed "every room in Commonwealth hall had at least a toilet and a wash basin that were out of order or not functioning well, as also were the lights on the corridors". Writing about the state of sanitation in the university, Owusu (1996) expressed regret that Legon Hall's students who in the past were described as 'gentlemen' "because of their neatness caused the Hall in 1990s to lose its fame as a result of indiscriminate littering of refuse around the Hall". Owusu (1996) further noted that similar poor sanitation conditions were observed in the other halls in the university.

2.4 Water, Hygiene and Sanitation and Health

Safe water is essential for life and health. Students' health is influenced in many ways by the physical and human environment of the school and as such they need a safe and caring human environment in school to be able to learn (TREND 2005). In Ghana, most schools were built without consideration for water and latrine facilities (TREND 2005) and where they were found, they were most invariably not adequate to cater for the needs of the school

population (Akroway 1997, Agbodeka 1998, UNICEF 2000 & 2002). In rural areas, TREND (2005) and Cairncross (2003) observed most schools only had a makeshift pit latrine provided mainly by the Parent Teacher Associations (PTAs). TREND (2005) stated that an unsanitary school environment is a major contributory factor to most diarrhoeal diseases, the largest preventable killer of children under five. Ghana Statistical Service (2000) in their report on Ghana Living Standard Survey and TREND (2005) observed that in Ghana, dehydration from severe diarrhoea was a major cause of ill health and death among children. Similarly one of the major causes of anaemia in children in Ghana was intestinal worms accounting for about 80 percent prevalence rate of anaemia among rural children (Ghana Health Services (2003). TREND (2005) noted that in most low-income countries, worm infestation was one of the greatest causes of diseases among children aged 5-14 years. Studies showed that the highest exposure to diarrhoea causing agents was through the use of contaminated water, poor excreta disposal and unhygienic practices (TREND 2005).

The developing countries in Asia and Africa face a difficult challenge in dealing with water- and sanitation related infections. Levine et al. (1976) reported cholera and diarrhoea outbreaks were as a result of the consumption of contaminated tube-well water in Bangladesh. Diarrhoeal diseases are a major cause of sickness and death among young children in most developing countries (Feachem *et al.* 1983). Affirming this Cairncross *et al.* (1990) characterized poor peoples' life in the third world as continuous ill health. The authors made the painful statement that 'most poor die young in the third world' as a result of poor sanitation. Again WHO and UNICEF (2000) reiterated that about 4 billion cases of diarrhoea occurred every year due to insanitary conditions and they caused 2.2 million deaths worldwide. Expressing similar sentiments, Snyder & Merson (1982) noted that 744–1,000

million episodes and 4.6 million deaths due to diarrhoeal diseases in children under 5 years of age in Africa, Asia (excluding China) and Latin America occur. Water, sanitation and hygiene are associated with other diseases, such as trachoma, worm-related illnesses and those caused by intestinal worms (ascariasis and hookworm) Graczyk et.al (2002). Worm infestations predominately affect children of school age resulting in reduced physical growth, weakened physical fitness and impaired cognitive functions observed (UNICEF 2006). Reporting further UNICEF (2006) emphasized that as the intensity of infection increases, academic performance and school attendance decline substantially. According to the WHO (2007), the number of cholera cases during 2006 was 236,896, with 6,311 deaths in 52 countries, a rise of 79% on the previous year. The importance of sanitation in preventing cholera and other diarrhoeal diseases was recognised in the Millennium Development Goals (MDGs), which set a target of halving the number of people without access to basic sanitation by 2015. A review of the evidence from several studies (Press & Mariotti 2000) suggested that improving personal, domestic and community hygiene and water would provide a sustainable reduction in the spread of trachoma. Gwatkin and Guillot (1999) have claimed that diarrhoea accounts for 11% of all deaths in the poorest 20% of all countries. This toll according to them could be reduced by a key measure such as improving water supplies, sanitation facilities and hygiene practices by 26%. Even more impressive, deaths due to diarrhoea were reduced by 65% with these same improvements (Esrey et al., 1991). Of the 2.2 million people that die from diarrhoea each year, many of those deaths are caused by one bacterium - Shigella. Shekhar et al. (1995) in a study of primary school children in Malaysia reiterated that improved water supply, toilet facilities and sanitation have lowered the prevalence of waterborne diseases in the study area. Simple hand washing with soap and water reduces Shigella and other diarrhoea transmission by 35% (Kotloff et al., 1999; Khan, 1982 & White et. al 2001).

Human excreta have been implicated in the transmission of many infectious diseases including cholera, typhoid, infectious hepatitis, polio, cryptosporidiosis, and ascariasis. WHO estimates that 2.1 million people die annually from diarrhoeal diseases and that 10% of the population of the less-industrialised world suffer from parasitic worm infections related to improper waste and excreta management (WHO, 2000; WHO, 2000b WHO, 2001). Nearly two million of these deaths are in children of less-industrialised countries (WHO, 1999).

In the United States of America, the number of detected waterborne disease outbreaks and the number of affected individuals per outbreak has increased since 1940 (Hunter, 1997). In a survey of 1,062 pre-school children in the Niger Delta, Arene et. al. (1986) found that there were high rates of intestinal parasites (77.6%) among the school children. The authors associated the high infection rate to poor sanitary conditions prevalent in the area. Another study conducted among 2,500 secondary school students in Calabar, Nigeria parasitic infection among the students showed that amoebiasis caused by Entamoeba histolytica was prevalent in the school (Umeche 1983). The author attributed the infection to poor sanitation.

It is important that children especially school children have potable water to drink and wash hands whilst in school to avoid contracting water and sanitation related infections (White et. al 2001). However the majority of schools, especially rural ones do not have water and sanitation facilities on the school compounds (TREND 2005) culminating in school children getting infected with sanitation related diseases. In a study of the effect of hand hygiene on illness rate among students in university residence halls, White et. al (2001) confirmed that hand hygiene using alcohol gel sanitizer decreases the incidence of upper respiratory illness

among students living in university residence halls from 14% to 39.9% and total improve illness to 20% and absenteeism. This study stretched the turf further to describe the health implication of lack of adequate water, hygiene and sanitation facilities on students in the University of Ghana. This was an area that had not been explored adequately in the University of Ghana though it is known that water and sanitation related infections plague children in first and second cycle schools.

CHAPTER THREE

3.0 METHODOLOGY

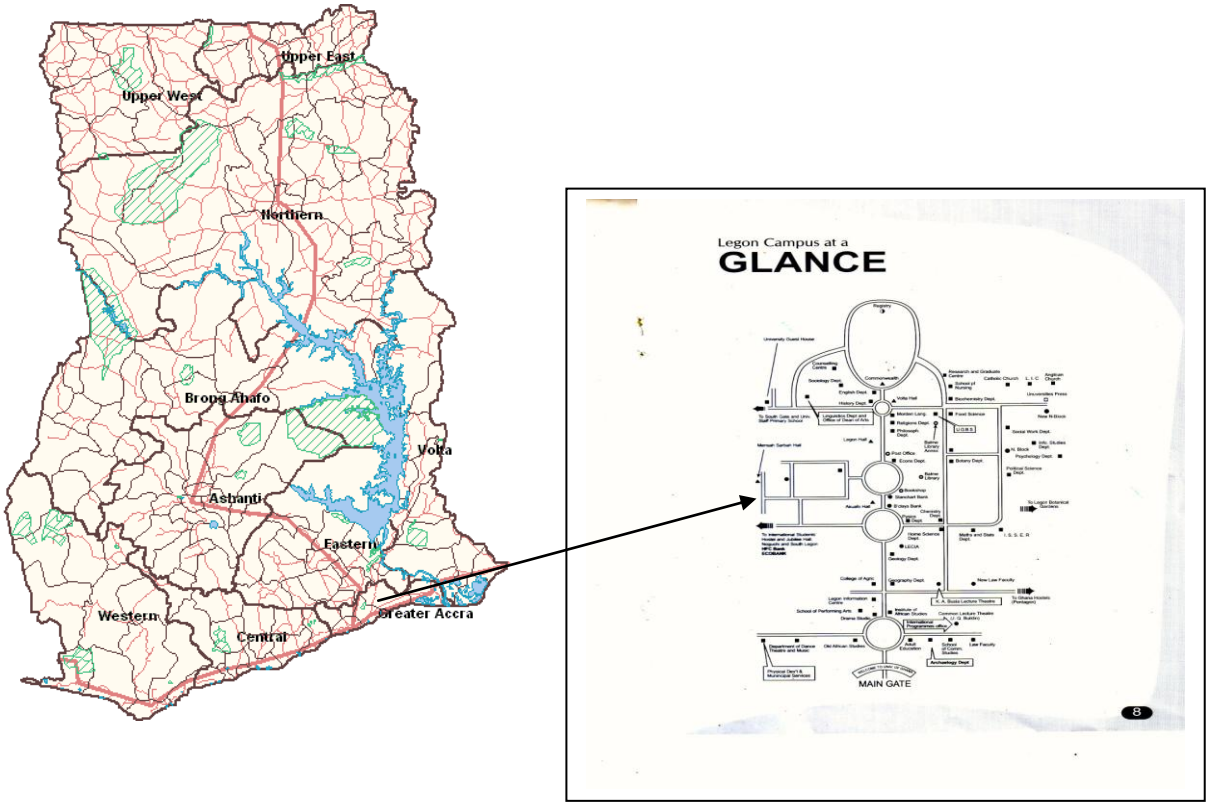
3.1 Study Type

This study was a cross-sectional descriptive study that used both qualitative and quantitative research methods to collect data on the campus of the University of Ghana.

3.2 Study Location

The study took place in the University of Ghana campus, Legon (fig 1).

Figure 1: Map of Ghana showing Greater Accra Region and the Campus of the University of Ghana, Legon



3.2.1 Geography

The University of Ghana is located on the Legon Hill, about twelve kilometres north-east of the centre of Accra on the Accra-Dodowa road (Agbodeka 1998). It is located on longitude 50 38'3"N and latitude 00 11'13"W (UG website, 2008). The University is the oldest and largest of all the five public universities in Ghana.

3.2.2 Student Population

In 1970 when the university was fully established, the number of students on campus was in the region of 2,000 of which Legon, Akuafo and Volta halls accommodated 300 students each, Mensah Sarbah and Commonwealth halls had not less than 600 students' altogether and the annexes had a little over 600 (Agbodeka 1998). The actual figure in residence Agbodeka (1998) noted far exceeded these numbers because most non-residence students ended up "perching" with their friends in the halls. Though originally planned to be fully residential, only about one-third of the student population of 28,482 are currently accommodated in residence while about 5.11 percent perched in the halls (Legon Shelter 2006).

3.3 Variables

Sex

Age

Students' level

Environment

Sanitation

Hygiene

Sanitary facilities

Level of sanitation

Health facilities

Sanitation related diseases

Student clinic

Reported diseases

Halls of residence

Accommodation

Standard room size

Environmental quality

3.4 Sampling

The study used both quantitative and qualitative research techniques.

3.4.1 Study Population

Six study populations were used. These were:

- Residential students
- Junior Common Room (JCR) Presidents
- Hall Tutors/Masters
- Director Physical Development
- Director of University Health Services and
- Sanitary labourers

3.4.2 Sample size

3.4.2.1 Sample Size for Qualitative Data

The sample size for the qualitative data was twenty-two (22). They comprised five (5) Hall Masters/Tutors and Junior Common Room (JCR) presidents, the Directors for Physical Development and University Health Services. However, the Sanitary Labourers (10) made up of two (2) each from each of the five (5) traditional halls were randomly selected.

3.4.2.2 Sample Size for Residential Students

Since the expected prevalence of the selected variables in the study population was not known, the sample size of 400 was chosen based on p equals 50% (0.50) or 95% confidence level with a margin of error of 5 percent using this formular:

$$n = \frac{Z^2\ P(1-P)}{d^2}$$ (Appendix 6).

3.4.3 Sampling Method

3.4.3.1 Selection of Halls

The University has ten halls and hostels. However, the five traditional halls namely Legon, Akuafo, Commonwealth, Volta and Mensah Sarbah were purposely selected for the study because they were the most challenged in terms of age of facilities, over crowding of students and insanitary facilities.

3.4.3.2 Selection of Rooms and Resident Students

Multistage sampling technique was used to select rooms and resident students (including 'perchers') in the halls. The following four-stage sampling procedure was used:

i. In each hall, except Commonwealth hall which has no annexes, the main blocks were purposively selected. These were the original halls built to accommodate a maximum of two students with minimum number of sanitary facilities. They are therefore the most challenged in terms of residential facilities to house students.

ii. In a selected main block, simple random technique was used to select a floor where to start the interview. The number of floors in the main block were identified and written on pieces of paper and one was randomly selected.

iii. One each floor, simple random method was used to select rooms. The first room was selected using simple random technique (lottery method) where the rooms on the floor were numbered and the numbers written on pieces of paper and randomly selected one out of the number of pieces of paper. From the first room subsequent rooms to my right were selected.

iv. In each selected room, two students were randomly selected using lottery method where the names of each student in the room was written on pieces of paper folded, mixed and selected without replacement till the two students

were picked This was followed till the 80 respondents were chosen from the main halls.

4.4.3.3 Selection of Respondents for In-Depth Interviews

Hall Masters/Tutors, JCR presidents, and the Directors for Physical Development and University Health Services were purposively selected for In-Depth Interview (IDI) because they were responsible for maintaining the facilities being studied including the provision of sanitary facilities and health care services to the students. Their input was therefore needed to arrive at good results.

4.3.3.4 Selection of Sanitary Labourers for Interview

Simple random sampling technique was used to select the sanitary labourers for in-depth interview. In each hall, two 'Yes' and the rest 'No' were written on pieces of paper (equal to the number of labourers), folded and mixed and selected by the labourers. The two respondents who picked 'Yes' were then interviewed.

3.5 Data Collection Techniques/Methods and Tools

The table 3.1 shows the data collection techniques and tools that were used to collect data from the respondents. The techniques comprise qualitative and quantitative ones.

Table 3.1: Data Collection Techniques/Methods & Tools for data collect 2008 UG, Legon

No.	DATA COLLECTION TECHNIQUES	DATA COLLECTION TOOLS
1.	In-Depth Interview (IDI)	Interview guide, Tape Recorder, Writing pad, pen
2.	Observation/Physical inspection of sanitary facilities and the general environment/grounds	Checklist and pencil
3.	Review of health facility records	Checklist, Data collection form, and pen
4.	Interview of resident students	Structured self administered questionnaire

All instruments used for these techniques are at the appendix 2 and appendix 3.

3.5.2 Ethical Issues

3.5.2.1 Permission to Proceed

Permission was sought from the Hall Master/Tutors, the Junior Common Rooms Executives, the Directors of Physical Development and University Health Services and the students. Permission to conduct the study was also solicited from the hall Masters/Tutors and the Directors for Physical Development and University Health Services by the School of Public Health.

3.5.2.2 Ethical Clearance

The proposal protocol was first vetted and reviewed by the School of Public Health for appropriate and scientific content. The study proposal was then reviewed by the Ethical Review Committee of the Ghana Health Service.

3.5.2.3 Respondents Consent

Informed consent from respondents was obtained through oral communication and also using consent forms. Each participant was informed about the objectives, purpose and methods of the study. Confidentiality was guaranteed to protect respondent's privacy and rights.

3.5.3 Training of Research Assistants

Research assistants were trained in the administration of questionnaires though it was a self-administered questionnaire. This was to help them to assist the respondents/students who needed support in filling out their responses.

3.5.4 Pre-test and Review of Instrument/Tools

All the data collection techniques, instruments and tools were pre-tested to assess their appropriateness, consistency and flow. They were pre-tested on students who reside in Jubilee hall with similar characteristics who were not part of the study population.

3.5.5 Quality Control

The following quality control checks were instituted to ensure that quality data was collected.

- Data collected was checked in the halls to ensure that all information had been properly collected and recorded. Also completeness and consistencies in information recorded was checked.
- Where a questionnaire was not filled out properly, the respondent was made to fill a new form. However where the student was unwilling to continue participation in the study he/she was replaced and the wrongly fill out form was discarded and excluded from the questionnaires collected.

- Where an inconsistency arose due to participants misunderstanding of the questions and a research assistant's failure to rectify the mistake, it was checked with the interviewer and responses corrected
- Computer data entry and analysis including quality control checks and verification were made. The data was coded and entered into the computer

These quality control checks were done by the supervisors and researcher immediately in the halls.

3.6 Data Processing and Analysis

Data processing and statistical analysis was done manually and by computer. In both cases the data was coded to translate the responses to questions into numerical form for data entry and processing. Data entry and verification was done in both excel 8.0 and EPI-Info (version 3.3.2). However statistical analysis was done using SPSS (version 16.0) and EPI Info (version 3.3.2)

3.6.1 Statistical Analysis

For the quantitative data appropriate measures of centrality (mean and median) and dispersion (standard deviation) was used. Frequencies were used for categorical data which were summarized in tables.

3.7 Limitation of Study

The main limitation to this study was the non-availability of adequate and accurate data for determining the trend of the burden of diseases among resident students who used the university facilities. Most of the registers used to capture data were not found and at the same

time the computer with some data had been broken down. This therefore did not allow the study to obtain the required data for the period (2004 – 2008) under consideration.

The second challenge was the use of observation, in-depth interview and record review. For instance the use of observation was subjective because not all events can directly and accurately be observed. This brought into question the reliability of the data since the assignment of the same category of event by different observers or the same observer at different times could lead to differences of opinions. Reliability was however, achieved through proper training of the research team and also through a thorough pre-testing of the interview schedules.

CHAPTER FOUR

4.0 RESULTS

4.1 Background Characteristics of Respondents

A total of 400 students made up of one hundred and sixty four (41%) females and two hundred and thirty six (59.0%) males were interviewed. The mean age of the students was 22.6 ± 3.33 SD. The youngest student was 18 years and the oldest 36 years. Seventy eight (20.2%) of the students were aged 22 years and slightly over 60% (236) were below 23 years with a median age of 22 years. About 26 percent (102) of the students were level 400 students. Three hundred and sixty three (90.8%) of the student sampled were Christians. Table 4.1a and 4.1b show respondents' basic characteristics. Majority (69.8%) were in the age group 20-24 and only five (1.2%) were above age 35 years table 4.1.

Table 4.1: Age Grouping of Respondents

Age Group	Frequency	%
< 19	47	11.8
20 – 24	279	69.8
25 – 29	52	13.0
30 – 34	17	4.2
35+	5	1.2
Total	**400**	**100.0**

Source: Ewuntomah E. Mahamah

One third (N=133, 33.2%) of respondents in residence were level 100 students, probably in line with the university's, in-out and out-in, policy. Levels 100 (133) and 400 (102) students accounted for 58.7 percent of resident students who were sampled (table 4.2).

Table 4.2: Academic Level of Respondents

Level	Frequency	%
100	133	33.2
200	78	19.5
300	80	20.0
400	102	25.5
600	5	1.2
700	2	0.5
TOTAL	**400**	**100.0**

Source: Ewuntomah E. Mahamah

4.2 Health Seeking Behaviour of Students

Three hundred and twenty (80.0%) out of the 400 respondents fell ill on campus since they were admitted into the University. Over 50% of this number sought clinical consultation in the university health facilities. Two hundred and thirty six (60%) out of the 320 respondents who utilized the university health facilities were male students. The participants in the study (146) who did not use the health care services did so for various reasons. A high number of them (N=54, 37.0%) practised self medication while about a quarter of them (N=42, 28.8%) blamed their unwillingness to access the university health care services on long waiting time (28.8%) in obtaining services. Table 4.3 provides reasons for the students' failure to access health services in the facilities.

Table 4.3: Reasons for Failure to Seek Health Care in University Health Facilities, University Of Ghana Legon

Reason	Frequency	Percent
Attitude of health workers towards clients	9	6.2
Illness not considered serious	41	28.1
Long waiting time	42	28.8
Self medication	54	37.0
Total	**146**	**100.0**

Source: Ewuntomah E. Mahamah

4.3 Residential Facilities and Student Population

On the average 5.8 students occupied a room originally designed to accommodate two students. Over a quarter (N=142, 35.5%) of the students sampled lived five in a room. In Mensah Sarbah and Legon halls as many as 14 and 16 students were found in some rooms that were allocated to five or eight students table 4.4. This was due mainly to 'perching' by students. A Junior Common Room (JCR) executive recognised this when he asserted:

> *"Yes students are overcrowded in the hall. We have about 1,500 students' allocated beds and closed to 800 perching"*

A Hall Master observed:

> *"The hall was built with the thinking that there will be at most a maximum of two people in one room but we have five people in one room now, that is overcrowding"*

Placement of five students in a room was practised more in Volta hall where fifty six (70%) of the respondents live five in a room. Maximum number of student in a room in Volta hall was eight and minimum two.

Tables 4.4 shows room occupancy by students in the five traditional halls on the campus of the university.

Tables 4.4: Number of Students in a Room by Halls of Residence in 2008

Number of Students	Hall						
Per Room	**AH[1]**	**CH[2]**	**LH[3]**	**MSH[4]**	**VH[5]**	**TOTAL**	**%**
1	2	0	0	0	0	2	0.5
2	2	8	1	2	16	29	7.2
3	4	10	2	5	2	23	5.8
4	15	17	5	7	3	47	11.8
5	20	15	25	26	56	142	35.5
6	9	9	8	11	1	38	9.5
7	10	4	10	5	1	30	7.5
8	6	4	15	6	1	32	8.0
9	4	5	4	3	0	16	4.0
10	8	3	6	8	0	25	6.2
11	1	2	3	3	0	9	2.2
12	0	2	0	2	0	4	1.0
13	0	0	0	1	0	1	0.2
14	0	0	1	0	0	1	0.2
16	0	0	0	1	0	1	0.2
TOTAL	**80**	**80**	**80**	**80**	**80**	**400**	**100.0**

[1] **Akuafo Hall**
[2] **Commonwealth Hall**
[3] **Legon Hall**
[4] **Mensah Sarbah Hall**
[S] **Volta Hall**

Tables 4.5 shows room occupancy by level of students. More males (N=236, 59%) than female student lived in residence.

Table 4.5: Number of Students per Room, by Level and by Sex University of Ghana, Legon 2008

	Academic Level of Students							
No. Of Students per Room	**100**	**200**	**300**	**400**	**600**	**700**	**Total**	**%**
1	0	0	0	2	0		2	0.5
2	2	4	9	13	1	0	29	7.2
3	0	5	3	13	1	1	23	5.8
4	23	7	7	9	1	0	47	11.8
5	64	33	22	22	1	0	142	35.5
6	12	7	11	7	1	0	38	9.5
7	8	8	7	7	0	0	30	7.5
8	10	7	6	9	0	0	32	8.0
9	2	2	3	8	0	1	16	4.0
10	8	4	7	6	0	0	25	6.2
11	2	1	2	4	0	0	9	2.2
12	1	0	1	2	0	0	4	1.0
13	0	0	1	0	0	0	1	0.28
14	1	0	0	0	0	0	1	0.2
16	0	0	1	0	0	0	1	0.2
Total	**133**	**78**	**80**	**102**	**5**	**2**	**400**	**100.0**

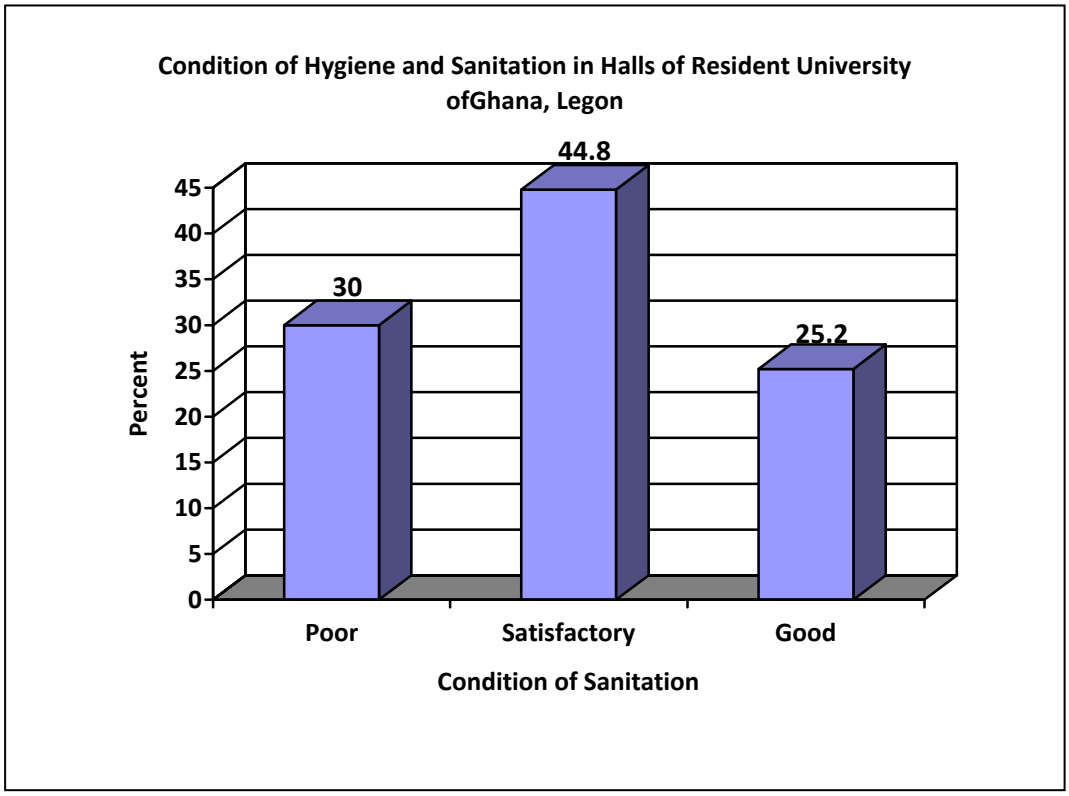
The number of students living in a room was fairly distributed among levels 100 to 400 table 4.5. Slightly over a quarter (N=142, 35.5%) of all the levels live five in a room. However, more (N=64, 48.0%) level 100 students were in residence than the other levels. Some levels 100 and 200 students live fourteen and sixteen in a room. There was no female respondent who lived in a room alone as against their male colleagues in the other halls who enjoyed such status. Only male respondents live thirteen and more in a room.

4.4 State of Hygiene and Sanitation in Halls of Residence and Lecture Halls, University of Ghana Legon 2008

4.4.1 Sanitation in the Halls

One hundred and seventy nine (44.8%) respondents described state of cleanliness in the halls as satisfactory whilst over one third (30.0%) said hygiene and sanitation conditions in the halls was appalling (Figure 4.1).

Figure 4.1



Source: Ewuntomah E. Mahamah

Table 4.6 shows students' opinion on hygiene and sanitation in the halls. Twenty nine (36.2%) students in Volta hall described sanitation in the hall as satisfactory while 47 (58.8%) said it was good, clean and neat due to the privatization of janitorial service in the hall. Some respondents in Akuafo (25.0%), Commonwealth (37.5%), Legon (48.8%), and Mensah Sarbah (33.7%) halls perceived sanitation situation in their halls as poor despite the janitorial services being offered there by janitorial contractors since August 2007. The five contractors contracted to the halls since August 2007 were Makleans Janitorial Service, DAS Janitor Service Ltd, Mob Ventures, and J.L. Ventures. On the whole however, sanitation in the halls was satisfactory.

Table 4.6: State of Hygiene and Sanitation in Halls of Residence University of Ghana, Legon 2008

State of Sanitation	AH[1]	CH[2]	LH[3]	MSH[4]	VH[5]
Poor	20 (25.0%)	30 (37.5%)	39 (48.8%)	27 (33.7%)	4 (5.0%)
Satisfactory	43 (53.8%)	36 (45.0%)	29 (36.2%)	42 (52.5%)	29 (36.2%)
Good	17 (21.2%)	14 (17.5%0	12 (15.0%)	11 (13.8%)	47 (58.8%)
Total	**80 (100.0%)**	**80 (100.0%)**	**80 (100.0%)**	**80 (100.0%)**	**80 (100.0%)**

[1] **Akuafo Hall**
[2] **Commonwealth Hall**
[3] **Legon Hall**
[4] **Mensah Sarbah Hall**
[S] **Volta Hall**

The respondents asserted that the condition of sanitation deteriorates whenever water stops flowing in the halls when especially toilets cannot be flushed. When water stops flowing therefore they adopt alternative measures as shown in table 4.7 to respond to natures call. A student leader observed:

"When water stops flowing the toilets smell so students who do not have water to flush prefer the bush to SOS (shit on shit) in the halls. Some other students go to other halls and departments where water flows and use the toilets there".

A hall Master agreed with the concerns of the respondents in an in-depth interview when he said:

"There is still a problem. They do the cleaning alright but it means that whoever goes into the toilet and does not have water (because they do not provide water) for flushing, the place will be messy. They just clean the bathrooms and toilets so there is still that problem but then in the day even when there is no water the bathrooms will be cleaned"

Table 4.7: Alternative Places Students Use When Water Stops Flowing in the Halls

Alternative Places of Defaecation	Frequency	%
Continue to use toilets without flushing	107	26.8
Fetch water from poly tanks to flush toilets	217	54.2
Use open spaces ('free range') around campus	48	12.0
Go to public toilets outside campus	5	1.5
Use department facilities	1	0.2
Use other halls' facilities	16	4.0
No response to question	6	1.5
Total	**400**	**100.0**

Two hundred and seventeen (54.2%) respondents fetched water from reservoirs to flush toilets after use. One hundred and thirty one (60.4%) of those who fetched water to flush toilets were female students. Some female students in the University also practice 'free range' in times of lack of water. Out of the forty eight respondents (12.0%) who practiced 'free range', 4.8 percent of them were female students. The lawn tennis court area served as the

main (47.9%) site for the practice. Table 4.7 provides the details of unapproved sites used by students.

Table 4.8: Unapproved Areas Where Some Students Defaecate Indiscriminately on the Campus

SITES FOR 'FREE RANGE'	Frequency	%
New University stadium area	10	20.8
Maintenance Park	9	18.8
Lawn tennis court	23	47.9
Bush behind Commonwealth Hall	5	10.4
Bush outside campus	1	2.1
Total	**48**	**100.0**

Table 4.9 show the number of times sanitary facilities were cleaned. Majority of the respondents (88.5%) said the halls were cleaned once a day.

Table 4.9: Number of Times Toilets and Urinal are Cleaned in Halls of Residence, University of Ghana Legon 2008

Frequency of Cleaning	Response	%
Not at all	10	2.5
Daily	354	88.5
Twice daily	21	5.2
Thrice daily	5	1.2
Once a week	6	15
Don't know	2	0.5
Total	**400**	**100.0**

The respondents also said sanitary labourers used disinfectants (64.2%) to clean the halls. Over half (57%) of the respondents described the once daily cleaning of the hall as inadequate. Fifty one percent (51.3%) of them suggested that twice daily cleaning would be adequate to keep the halls clean and neat.

However, a Hall Master in-depth interview reported:

> *"Eh! They clean between 2 and 3 times in a day. They clean when they come in the morning, and some where during the day and then before they leave at 3.00 o'clock. One at 8.00am, another at 3.00 pm and somewhere in between the two they do it again".*

A good number of the students (N=82, 20.5%) could not tell whether disinfectants were used to clean the sanitary facilities or not.

4.4.2 Waste Management in the Halls

Nearly all the respondents (98.5%) reported the presence of refuse containers and bins on the floors in the halls for students to lodge their waste into. These containers and bins majority (82.2%) noted were emptied once daily. The respondents however, reported that even in the presence of the bins in the halls some students (1.5%) still deposited their waste in polythene bags in the rooms or on the corridors while others throw them outside onto the ground and litter the halls. A Senior Health Manager who was appalled by the behaviour of the students observed:

> *"The bins are there very well sited and inscribed that drop your litter in here and if you are in the university you should be able to read and do the least expected of you by dropping your litter in the bins to keep the environment clean".*

4.4.3 Sanitation in Lecture Halls

Lecture halls in the University have been departmentalized and directly managed by the departments. Sanitation conditions of the urinal and toilets in the lecture halls were satisfactory when they were inspected in the morning and late evening. A director at Physical Development office during in-depth interview indicated that most of the broken and non – functioning WCs were replaced in 2007.

4.5. Condition of Environmental Sanitation on the Main Grounds on the Campus of the University of Ghana, Legon

4.5.1 Outlook of Environmental Sanitation on the Campus

The level of general sanitation on the grounds of the main campus of the university during the period of study was perceived by the students as good (70.5%). However 8.5 percent of the students thought the state of sanitation on the campus was very bad. Table 4.10 gives a break down of the concerns of the respondents.

Table 4.10: Level of General Environmental Sanitation on the Grounds of the Main Campus of University of Ghana Legon 2008

State of General Sanitation	Frequency	%
Bad	65	16.3
Very bad	34	8.5
Good	282	70.5
Very good	19	4.7
Total	**400**	**100.0**

Source: Ewuntomah E. Mahamah

When the data was disaggregated into halls, slightly over 70 percent of respondents in the halls except those in Volta hall said environmental sanitation on the campus and around the residence was good. However, a good number (24.8%) also reported that the level of sanitation on the grounds was bad.

Table 4.11: Level of General Environmental Sanitation on the Grounds of the Main Campus by Hall, University of Ghana, Legon 2008

State of Gen. Sanitation	Number of Responses by Hall				
	AH[1]	CH[2]	LH[3]	MSH[4]	VH[5]
Bad	7 (8.8%)	12 (15.0%)	19 (23.7%)	24 (30.0%)	2 (2.5%)
Very bad	5 (6.2%)	11 (13.8%)	13 (16.3%)	3 (3.7%)	3 (3.7%)
Good	64 (80.0%)	54 (67.5%)	46 (57.5%)	52 (65.0%)	66 (82.5%)
Very good	4 (5.0%)	3 (3.7%)	2 (2.5%)	1 (1.3%)	9 (11.3%)
Total	**80 (100.0%)**	**80 (100.0%)**	**80 (100.0%)**	**80 (100.0%)**	**80 (100.0%)**

[1] **Akuafo Hall**
[2] **Commonwealth Hall**
[3] **Legon Hall**
[4] **Mensah Sarbah Hall**
[S] **Volta Hall**

Table 4.11 shows the level of general sanitation on the ground of the main campus as perceived by students in the halls of residence. Sixty six (82.5%) of Volta Hall students rated the level of sanitation in and around their hall as good. In general females ranked the state of sanitation on the campus as good compared with their male colleagues.

Figure 4.2 shows the scene around most refuse container sites on the campus of the University.

Figure 4.2: Refuse Container around one of the Hall on Campus University of Ghana, Legon 2008

Date: 29/04/08

Observations made during physical inspection of the grounds show that the state of sanitation on the main campus at the time of the study was appalling. The entire campus was littered with sachet water bags, plastic rubbers, and pieces of paper. Refuse containers were engulfed by mounting refuse figure 4.2 while the whole campus was 'swallowed' up by weeds/grass.

4.5.2 Waste Management on Campus

Three hundred and twenty five (81.2%) of respondents recognised the presence of refuse containers at vantage points around the halls. Out of the 325 students, 57.5 percent said the

containers were emptied daily. However, 28.5 percent of them did not know how often the containers were emptied.

Figure 4.3: Refuse Scattered around the Site of a Refuse Container near one of Halls University of Ghana, Legon

Date: 29/04/08

Figure 4.3 shows the picture of the level of filth on the campus. It was taken during physical inspection of the environment on the campus close to a hall. The picture shows a waste bin engulfed by waste. This was a common sight around some of the halls and sites of refuse containers. This was waste cart from a hall dumped at a site close to a refuse container to be emptied into the container awaiting conveyance by Zoomlion Waste Management Company.

4.6 Sanitation Facilities in Halls of Residence, University of Ghana, Legon 2008

Majority of the respondents (N=332, 83.0%) described sanitary facilities such baths, toilets, etc. in the halls as grossly inadequate compared to the population of students in the halls. A student executive summed up the frustrations of students due to inadequate facilities in these words:

> *"There is always a queue in the bath house".*

Hall Masters interviewed recognised the inadequacy of sanitary facilities in the halls. However, hall managements had expanded some of the facilities especially wash rooms and toilets while maintenance had been done on the existing ones to accommodate more students. A Hall Tutor observed that the continuous increase in students' population year by year was thwarting all efforts at providing the required facilities. Their frustration was summed up by one of them:

> "*It's difficult enough with there being five people in one room legally. But what makes it even more difficult is the perching situation in the hall. You give one room to five people and you plan how to handle these five people per room which in itself is difficult already and then the room ends up being occupied by a minimum of eight to ten people and that is about double what we planned for, so that is very difficult".*

4.7 Disease Conditions that Affect Resident Students in the University of Ghana, Legon

The University had two health facilities; the University hospital and the Student Clinic. The student clinic provides only out-patient services to students while the hospital offers all services including special clinical services at both OPD and admissions. On the average the clinic sees 100 patients per day.

4.7.1 Health Facility Records Review

Data capture, storage and management at the University health facilities especially at the student clinic were very poor. Most of the registers used to capture data were not found and at the same time the computer with some data had broken down. This therefore did not allow the study to obtain the required data for the period (2004 – 2008). For Out-Patients Departments (OPD) consultations data obtained were for academic years of 2000/2001 and 2007/2008, and second semester 2001/2002 and first semester 2004/2005. The only data available for in-patient was for 2007/2008 academic year.

Table 4.12: Summary of Reported Diseases by Semester, University Hospital and Student Clinic 2008

Academic Year	Semester 1	Semester 2
2000/2001	906	1,842
2001/2002	1,110	*
2002/2003	*	*
2003/2004	*	*
2004/2005	*	4,825
2005/2006	*	*
2006/2007	*	*
2007/2008	2,329	3,964
Total	**4,345**	**10,631**

*** Data could not be obtained at the health facilities**

Table 4.12 shows a summary of data (students' attendance at the University hospital and students' clinic) obtained by academic years and by semester. This exposed the data gap in the facilities. It shows that more cases of diseases were reported in the second semesters. Second semester of 2004/2005 academic year however, saw more students' attendance at OPD than the rest of the semesters for the data obtained.

The concern on data was expressed by a senior member of the University health authority on why data management and storage was not the best in the student clinic.

> "*I am the first person to say that data management is not adequate and that is the reason why I have pushed and pushed for the whole place to be computerised. I have difficulty in getting data from the students' clinic and it turned out that the officer in charge then was mentally challenged and that affected data management there".*

4.7.2 Students' Attendances at the University Health Facilities

About 60 percent (9,168) of students who obtained OPD services in the university clinic did not have their sex captured in the clinic registers. Analysis of those whose sex was captured (6,658) showed that more males (N=4,067, 61%) had clinical consultation at the health facilities at both OPD and in-patients. The mean age of students who avail themselves of the health care services in the university was 23.2 (± 4.690SD).

Table 4.13: Age-Specific Attendance of University of Ghana Students at the University Health Facilities, Legon 2008

	Out-Patients		**In-Patients**	
Age Group	**Frequency****	**%**	**Frequency**	**%**
< 19	739	11.5	76	13.1
20 – 24	4,233	65.9	364	63.0
25 – 29	842	13.1	90	15.6
30 – 34	380	5.9	30	5.2
35 – 39	134	2.1	15	2.6
40 – 44	63	1.0	5	0.5
45 - 49	24	0.4	0	0
50+	14	0.2	0	0
Total	**4,429**	**100.0**	**580**	**100.0**

**. This excludes 9,237 students whose ages had not been indicated in the registers for OPD clients

The data showed that the bulk of students, who sought health care at both OPD (65.9%) and in-patient (63.0%) were in the 20-24 age group tables 4.13. At the OPD majority (27.4%) of the students came from Mensah Sarbah Hall while at in- patients, majority (31.8%) were from Legon Hall table 4.14.

Table 4.14: Health Services Utilization by Hall of Residence University of Ghana, Legon 2008

	Out-Patients		In-Patients	
Hall	**Frequency**	**%**	**Frequency**	**%**
Akuafo	3,600	23.0	119	20.6
Commonwealth	2,744	17.5	77	13.2
Legon	3,625	23.1	184	31.8
Mensah Sarbah	4,289	27.4	134	23.2
Volta	1,380	8.8	64	11.1
Total	**15,638**	**100.0**	**578**	**100.0**

[1] **This excludes 28 (0.2%) clients whose halls of residence was indicated in OPD registers**

A quarter (30.9%) of student clients was from level 400 while level 500 reported least cases (0.1%) table 4.15.

Table 4.15: Health Services Utilization at OPD by Level of Students University of Ghana, Legon 2008[2]

Level	Frequency	%
100	305	20.7
200	326	22.2
300	358	24.4
400	454	30.9
500	1	0.1
600	26	1.8
Total	**1,470**	**100.0**

[2] **This is for clients' whose levels were recorded in the clinic registers. In-patient register did not have clients' level**

4.7.3 Top Ten Reported Diseases by Students

For all students, the top ten disease conditions diagnosed at OPD included Malaria, Acute Respiratory Infections (ARI) including Upper Respiratory Tract Infections (URTI), Skin Infections, Abdominal Pain, Headache and Enteritis. The rest were Dyspepsia, Vaginal Candidiasis, Urinary Tract Infections (UTI) and Chickenpox table 4.16. In-patients also suffered some of these disease conditions including Appendicitis, and Sickle Cell Disease (SCD). Malaria persistently accounted for 5,876 (37.5%) of outpatients' morbidity for all the semesters covered by the study and 219 (37.9%) percent of in-patient conditions for 2007/2008 academic year. The top ten most frequently reported diseases at both outpatient and in-patient consultation accounted for over 70% of all reported disease conditions in the university health facilities.

Table 4.16 shows the league table for the ten top causes of morbidity at outpatients' level. Malaria, ARI and Skin diseases followed the trend by position of the typical OPD reported cases of diseases in health facilities in Ghana.

Table 4.16: Major Causes of Out-Patients[3] Attendants between 2000 & 2008 Academic Years, University of Ghana, Legon

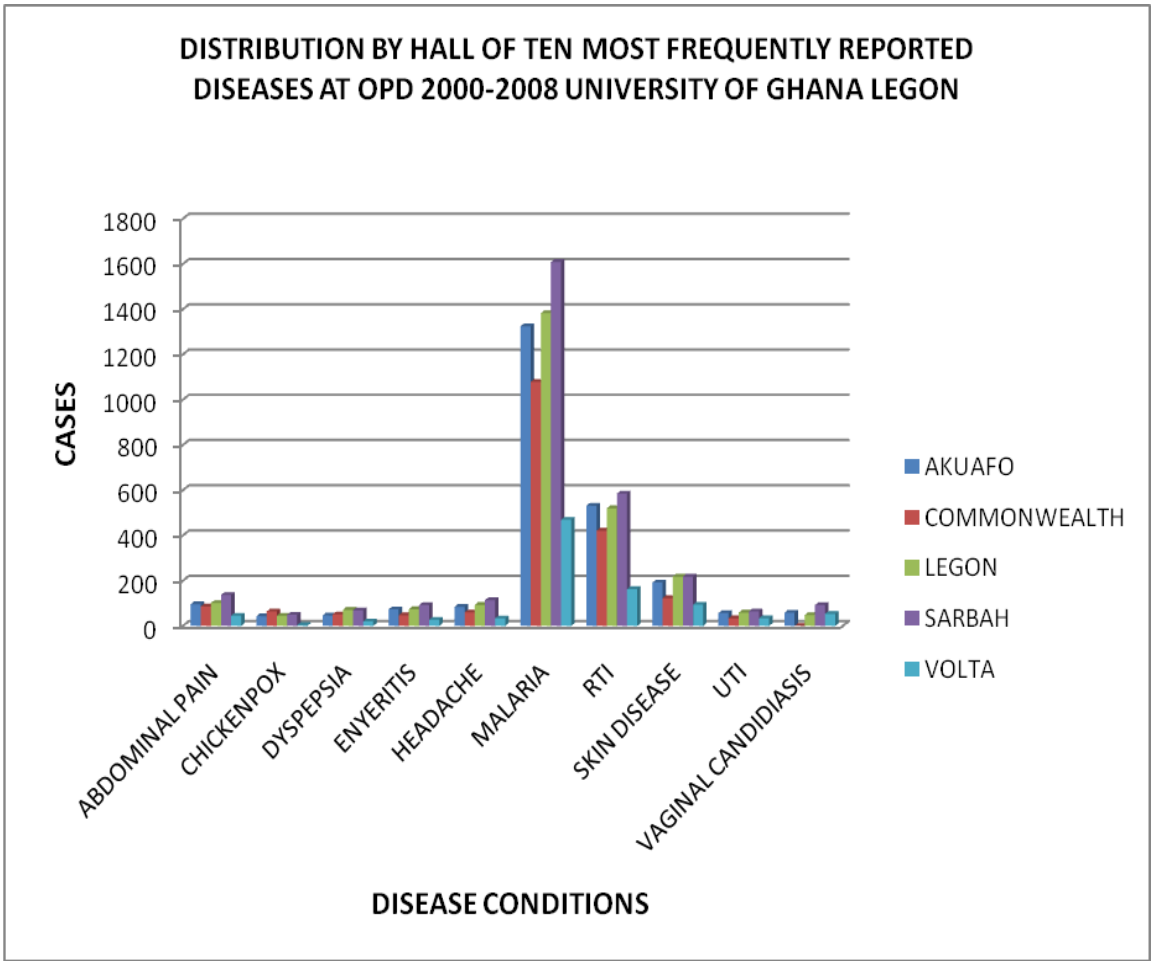
Disease	Frequency	%
Malaria	5,876	37.5
ARI[4]	2,222	14.2
Skin Diseases[5]	849	5.4
Abdominal Pain	468	3.0
Headache	384	2.5
Enteritis	313	2.0
Dyspepsia	257	1.6
Vaginal Candidiasis	251	1.6
UTI	249	1.6
Chickenpox	206	1.3
All Other Diseases	4,591	29.3
Total	**15,666**	**100.0**

[3] OPD clients include 2000/2001& 2007/2008 academic years, first semester 2001/2002 and second semester 2004/2005
[4] ARI Includes URTI
[5] Skin Disease includes Ulcers, Dermatitis, Cellulitis, Skin Rashes & Sepsis, Myecotic, and Eczema

Figure 4.4 shows the summary distribution by hall of the top ten causes of morbidity at OPD in the students' clinic. Cases of malaria were higher at Mensah Sarbah than the rest of the

halls. Again for all the disease conditions, Mensah Sarbah recorded high cases. Respiratory tract infections were significant cause of morbidity among the students in all the halls.

Figure 4.4:



Chickenpox appeared to be endemic in the university as it was reported in almost all the semesters with increasing burden especially in 2007/2008 academic session. UTI appeared to be very common among female students. Drug reaction (not among 10 top diseases) was observed to be common among female students.

Table 4.17 show the pattern of diseases at in-patients' attendance in the University health institutions. The trend was not different from that of the OPD cases. Malaria still occupied

the top most position. Chickenpox was second on the league table compared with ARI at OPD. Urinary tract infection recorded the lowest cases.

Table 4.17: Major Causes of In-Patients Attendances between 2000 & 2008 Academic Years, University of Ghana, Legon

Disease	Frequency	%
Malaria	219	37.9
Chickenpox	61	10.6
Sickle Cell Disease	46	8.0
Appendicitis	32	5.6
Gastroenteritis	22	3.8
ARI[4]	19	3.2
Abdominal Pain	12	2.1
Gastritis	12	2.1
Enteritis	12	2.1
UTI	10	1.7
All Other Diseases	133	23.0
Total	**578**	**100.0**

[4] ARI Includes URTI

Table 4.18 shows the stand of the halls for the top ten causes of utilisation of health care services in the University health institutions. Mensah Sarbah Hall students had the highest share (27.4%) of the ten top causes of morbidity whilst Legon Hall students suffered more admissions. Volta Hall students appeared to have experienced less of the disease burden at both OPD and admissions. Malaria was predominant in all the halls than any other disease conditions. Volta Hall recorded the least cases of Chickenpox.

Table 4.18: Ten Most Frequently Reported Diseases at the Student Clinic (OPD[6]) by Halls of Residence University of Ghana, Legon between 2000 & 2008 Academic Years

	Hall[7] of Residence						
Disease	**AH**	**CH**	**LH**	**MSH**	**VH**	**Total**	**%**
Malaria	1,324	1,079	1,383	1,609	469	5,876	53.2%
ARI	531	421	520	585	163	2,222	20.1%
Skin Diseases	192	123	218	218	94	849	7.7%
Abdominal Pain	96	86	101	137	45	465	4.2%
Headache	84	60	93	114	33	384	3.5%
Enteritis	73	47	74	92	27	313	2.8%
Dyspepsia	46	51	71	69	20	257	2.3%
Vaginal Candidiasis	58	0	48	92	53	251	2.2%
UTI	57	34	59	64	34	249	2.2%
Chickenpox	43	64	45	49	4	205	1.8%
Total	**2,504**	**1,965**	**2,612**	**3,029**	**942**	**11,052**	**100.0**

ARI Includes URTI
Skin Disease includes Ulcers, Dermatitis, Cellulitis, Skin Rashes & Sepsis, Myecotic, and Eczema
[6] OPD clients include 2000/2001& 2007/2008 academic years, first semester 2001/2002 and second semester 2004/2005
[7] These are cases whose halls of residence had been indicated in the registers

Table 4.19 shows health facility attendance at OPD by sex by respondents in the University. Male students experienced higher burden of the top ten causes of morbidity and admission except for Vaginal Candidiasis for the periods of the study. Malaria at both OPD and admission had nearly a ratio of 2:1 burden between male and female student clients. However, more females (69.6%) suffered more sickle cell disease at in-patient than their male counterparts. Relationship between Sex and disease outcome was statistical significant ($P<0.001$) for all diseases.

Table 4.19: Students Health Facility Attendance (OPD) by Sex University of Ghana, Legon between 2000 & 2008

Disease	Female	Male
Malaria	1,201	2,218
ARI	562	1,027
Skin Disease	252	208
Abdominal Pain	90	120
Headache	82	104
Enteritis	73	125
Dyspepsia	30	57
Vaginal Candidiasis	196	0
UTI	75	63
Chickenpox	30	145
Total	**2,591**	**4,067**

NOTE:

- **ARI Includes URTI**
- **Skin Disease includes Ulcers, Dermatitis, Cellulitis, Skin Rashes & Sepsis, Myecotic, and Eczema**
- **These are cases whose sex had been indicated in the registers**
- **OPD clients include 2000/2001& 2007/2008 academic years, first semester 2001/2002 and second semester 2004/2005**

Table 4.20 shows health facility admissions by sex by respondents in the University. Malaria for admission was even for both male and female student. However, more females (32) suffered more sickle cell disease at in-patient than their male (14) counterparts.

Table 4.20: Utilization of Health Services at In-Patients Level by Sex University of Ghana, Legon between 2000 & 2008

Disease	Female	Male
Malaria	109	110
Chickenpox	7	54
Sickle Cell D	32	14
Appendicitis	10	12
Gastroenteritis	14	8
ARI	8	11
Abdominal Pain	9	3
Gastritis	6	6
Enteritis	7	5
UTI	6	4
Total	**208**	**227**

NOTE:

- **ARI Includes URTI**
- **Skin Disease includes Ulcers, Dermatitis, Cellulitis, Skin Rashes & Sepsis, Myecotic, and Eczema**
- **These are cases whose sex had been indicated in the registers**
- **OPD clients include 2000/2001& 2007/2008 academic years, first semester 2001/2002 and second semester 2004/2005**

A comparison between first and second semester's use of health care services showed that second semesters registered more attendances for almost all the ten top disease conditions. For instance, in the first semester of 2000/2001 academic year the total disease burden was 906 but this rose to 1, 842 during the second semester. Similarly the first semester of 2007/2008 academic year recorded 2, 329 reported cases as against 3,964 for second semester. In all these malaria burden ranged from 33.9 percent to 40.6 percent. The burden of acute respiratory infection increased from 8.6 percent in the second semester of 2000/2001 to 21.7 percent of 2007/2008 first semester. More (252) females suffered skin infections than males.

CHAPTER 5

5.0 DISCUSSION

Worldwide, many people lack access to basic sanitation facilities. UNICEF (2006) estimates that about 2.6 billion people worldwide that is- two in five- do not have access to improve sanitation. In West and Central Africa one third of the population uses adequate sanitation facilities. Sanitation coverage in Sub-Saharan Africa was estimated to be 36 percent (Hunt, 2006). A major cause of morbidity and mortality in Ghana (GDHS 2003) was attributed to the use of contaminated water, unhygienic food preparation and lack of hand washing. Despite the lack of information on the effects of poor sanitation in the University of Ghana, Owusu (1996), Akroway (1997) and Legon Shelter (2006) gave a strong indication that sanitation in the university was a major problem.

5.1 Residential Facilities and Student Population in the Traditional Halls

The findings from the study showed that residential facilities were woefully inadequate to meet the demand of the steady increasing student population over the years. A hall master observed:

> "*Well it is being like that all along. There is nothing different. What we had is what we have".*

While residential facilities remained virtually the same, students' allocation into the halls increases every academic year. For instance in January 2005, the number of students in residence was 7,934. This increased to 8,918 in January 2006 (Legon Shelter 2006) and 9,399 in January 2007[1]. The inadequacy of residential facilities to match the rapid increase of students' population has compelled Halls to allow on average five students to live in a room

that was designed to accommodate a maximum of two students. This confirms the assertion by WHO/AFRO (2006) that fast increasing populations are characterized by slum dwelling, inadequate water and sanitation facilities and services. Probably this might have fuelled the increase in perching in the Halls as students believe living in residence offers optimal use of academic facilities (Legon Shelter, 2006) and its attendant pressure on sanitary facilities and worsening environmental sanitation on the campus.

It was estimated that about 33 percent of students are offered residential placement every year and about another 5 percent perch in the halls (Legon Shelter 2006). This was without a corresponding expansion in residential facilities and might have resulted in the pressure on the residential facilities.

5.1.1 Sanitary Facilities in the Halls of Residence

The sanitary facilities in the halls were inadequate. As far back as 1997 and 1998 Akroway (1997) and Agbodeka (1998) reported that hygiene and sanitation facilities had long been identified as inadequate even when the student population was only 2,000. Similarly the Legon Shelter (2006) re-iterated that the steady growing population of the students was not matched by corresponding expansion of sanitary facilities to accommodate the increasing numbers of students. The Legon Shelter (2006) lamented further that sanitary facilities had remained virtually the same while student population assumed drastic increases. However, this is not peculiar to the University alone. Jewels and O'connor (1990) found that fifteen

Estimated figure using 33.3%, a percentage used to estimate population of resident students

(15) Schools did not have the minimum number of toilets and wash hand basins built in the school premises in Bloomsbury, London. Likewise TREND (2005) observed that most schools in Ghana were built without considerable sanitary facilities such as water and latrine/toilets. The seriousness of the lack of adequate sanitary facilities was expressed by a student executive who said:

"There is always a queue in the bath houses"

One Hall Master also noted that on the average 8 to 10 students use a water closet (WC) in the halls. He said:

"So what it means is that between 8 and 10 people to a WC".

This was noticed in Volta Hall where there were 82 toilets (WCs) available to 814. This gave a ratio of about 10 students to a toilet/WC. However, there were differences in the ratio by block/floors. For instance in one block the ratio was about 13 students to a WC while in another it was 6 students to a WC. This problem seems to be wide spread as it was also observed in a school survey in Code d'Ivoire by UNICEF (2006) where there was about one WC or latrine per 381 students. This may have implications for health as there is a link between poor sanitation and diseases outcome in human populations.

To ease the tension however, halls had made modest expansion to toilets and baths and replaced all broken down WCs. This was observed in all the halls visited during physical inspection of the halls. Responding to a question on state of WC in the hall a Hall Tutor reported:

> *"Oh, we have virtually changed them all. In the main hall we have virtually changed all. In fact even in the annexes we virtually have changed all. Yesterday I went round there are no old ones again. So I will say that what we use to have from 2004-2005, we started changing them and we completed it more than 3 years ago".*

This is good since clean and well maintained sanitary facilities could lead to a reduction in diseases among people especially students

5.1.2 State of Hygiene and Sanitation in Halls of Residence

Results from the study showed a mixed reaction to condition of sanitation in the halls by the respondents. Many of the respondents (44.8%) reported improvement in sanitation conditions while others (30%) thought that it was not as anticipated and described it as still appalling. Cairncross (1998, 2003) echoed similar sentiments when he noted that sanitation in many schools is deplorable. The appalling situation of sanitation in the halls was confirmed by earlier studies (Owusu 1996, Akroway 1997 and Agbodeka 1998). This was also observed by a senior official of the University health services when she noted:

> *"I mean the whole thing is changed. On the two occasions I have had to go down, I was appalled. I think students these days are not committed to looking after the environment themselves. They are expecting things to be done for them. And even when things have been facilitated so that they can look after the environment, they still don't do it. I mean if I have provided a bin just a few feet away from your room, what stops you from walking that short distance to drop in your litter but drop it in your room and expecting that the cleaner will come and clean? So yes, the facilities have been over stretched but we have a generation that is also not very, very committed to maintaining the environment".*

The situation of low sanitation coverage is a global issue as only 58 percent of the world population and 36 percent of the population of sub-Saharan Africa had access to adequate sanitation (WHO/AFRO 2006). The students may have thought that with the outsourcing of the janitorial services dramatic changes would have taken place and hence their concern. What seemed apparent however was that the state of sanitation in the halls had improved. This was attested to by a Hall Tutor who said:

> *"Definitely I see a huge difference especially early first semester there was a huge, huge difference until the number of students increased again but then there was still improvement. I won't say that we have not had a few reasons to complain about, but then there is a difference; the stench that we were confronted with before they started work, that stench is no more but their work can be improved a lot if there was a constant flow of water;* ***sanitation is water"***.

Another Hall Master emphasized that the outsourcing of the janitorial services to contractors had really helped to improve conditions of toilets, washrooms and the hall environment.

> *"... So the outsourcing of the janitorial services has helped to ensure that the toilets, the environment and in fact the toilets within the blocks in particular have been kept clean"*.

These opinions of the Hall Tutors had confirmed that sanitation in the halls had really improved due to the contracting of janitorial services to the janitorial contractors and it is anticipated that this could lead to the reduction of diseases linked to sanitation such as malaria, enteritis ARI etc that form the bulk of OPD attendances.

5.1.3 Sanitation and Waste Management in the Halls

Sanitation especially and waste management in the halls of residence remained one major issue confronting the university for many years. Indeed the problem of poor sanitation and waste management in the halls (Akroway, 1997) existed until when janitorial services were outsourced to janitorial contractors in August 2007. The situation was compounded by the steady growth in student population (Agbodeka, 1998) without corresponding increase in sanitary facilities to cater for the increasing number of students (Legon Shelter, 2006). Hence much still remained to be done as some students do not still see the need to drop refuse into bins and continue to litter the halls. This behaviour of the students suggested that such students might be irresponsible under the guise of ignorance. Happily, the presence of janitorial services by the contractors would help to tidy this up with the assurance that support will be given to the contractors to carryout their job effectively and efficiently. Their presence had ensured better state of sanitation in the halls.

5.2 Environmental Sanitation on the Campus of the University of Ghana, Legon

5.2.1 General Sanitation of the Grounds

Figure 5.1 shows a typical situation of the ground environment on the campus of the University.

Figure 5.1: Picture Showing Weeds/Bush between two halls in the University of Ghana, Legon

Picture was taken during physical inspection of the ground on campus in June 2008.

Despite the high ranking (70.5%) of general sanitation on campus as good by the respondents, the picture depict that the state of sanitation on the campus was different (figure 5.1). Physical inspection of the campus at the time of study painted a bad picture of the ground on the campus. Just like major cities and towns in Ghana (Bukari 2008), the insanitary condition on campus especially at sites of refuse containers was an eyesore. The entire environment was literally engulfed by bush/weeds, sachet water bags, pieces of paper and choked gutters. Most lawns and open spaces were overgrown with weeds providing fertile grounds for the breeding of insects and reptiles such as snakes as depicted in figure 5.1. Choked gutters, plastic containers and empty tins scattered around provided temporary receptacles for water and serve as "maternity homes" for mosquito breeding (Akunabi 2008).

The state of general sanitation on campus was compounded by commercial activities and influx of hawkers (Legon Shelter 2006) who indiscriminately dump refuse at open spaces and more importantly the irresponsible behaviour of students.

This behaviour of the students was bemoaned by a Senior Health Official who said:

> *"The bins are there very well sited and inscribed on that drop your litter in here and if you are in the university you should be able to read and do the least expected of you by dropping your litter in the bins to keep the environment clean but the students will not do that".*

This behaviour by the students, and commercial activities coupled with the inability of the Physical Development department to manage general environment and sanitation had helped to compound the state of sanitation on the grounds of the University.

5.2.2 Waste Management

Despite the provision of waste containers at vantage points, waste management has become a major problem in the University and this might have prompted the Campus Beautification Committee to initiate and published the Dos and Don'ts on environmental issues (Legon Shelter, 2006) reminding members of the University community on steps to keep the university community environmentally clean. Typical messages read:

> "*Remember to keep the environment healthy. Do not throw waste water or any other material on the balcony or veranda*[2]*".*

The problem with waste management was stressed by Ghana Statistical Service (2005) when it noted that only 4.8 percent of refuse generated was collected by local authorities in Ghana.

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[2] **Culled from Legon Shelter 2006 volume 1 # 2**

This difficulty might have permeated into all sectors of the society including the university. A key observation all over the campus was that refuse containers were over-flowed with refuse while indiscriminate dumping went on close to the containers at the designated collection sites. Additionally sanitary labourers were seen dumping and leaving waste such as organic waste (garbage, paper, etc.), plastics, metals, etc. from the halls besides the containers. It is estimated that refuse from the Halls consist of 30 percent paper and water sachet constitute 20 percent of refuse generated on the campus (Legon Shelter, 2006). Even sometimes when the containers were empty the area around the containers remained littered (Bukari, 2008) and virtually 'swallowed' up by refuse. On this a sanitary labourer complained:

> *"The refuse bin is heavy and we cannot carry it and climb the steps provided close to the container to throw the rubbish into it. So we pour it down for the other labourers to clear it into the container".*

This behaviour by the sanitary labourers had resulted in the indiscriminate dumping of refuse around the refuse containers whether full or not. In addition to this concern raised by the sanitary labourer, a Hall Tutor re-iterated:

> *"The main problem we have here is that we put the rubbish in big liners before we put them in the containers. There are some people who come on campuses and compounds, go into the bins and they actually want to take things out of the rubbish so they just open all the bags and pick out from them what they need and leave the rubbish scattered. So what it means is that it defeats the purpose of students putting the rubbish in a bin liner. I think it is an unnecessary cost now".*

For whatever reasons, the fact remained that waste management on campus was not the best and steps should be taken to assist Zoomlion, the waste collection company who was contracted to empty the containers to contain the menace.

5.3 Common Diseases of Resident Students in the University of Ghana, Legon

This may be the first study to describe and document common reported ailments in the university by resident students in the University of Ghana, Legon. The study met a number of challenges the major one being the non-availability of adequate and accurate data for determining the trend of the burden of diseases among students who use the facilities. Nevertheless, the available data from some of the facilities registers accessed provided useful information on the causes of students' clinical consultation in the health facilities.

The fact that Out-Patient and In-Patient utilization of the University health institutions by resident students was predominantly diseases whose predisposing factors showed strong link to environmental variables (Ablekpe 2008), food and accommodation was not surprising looking at environmental situation on the campus. Similar linkage has been observed by a number of studies. WHO/AFRO (2006), has noted that indoor air pollution has direct impact on people and has been linked to ARI and other illnesses such as lung cancer, heart diseases, asthma and bronchitis. Overcrowding without adequate sanitation, water etc. according to WHO/AFRO (2006) lead to very unhealthy environment that makes microbes flourish and results in infectious diseases epidemic such as the October 2007 food poison in the University.

The high burden due to the top ten reported diseases in the University may be the result of the physical environment, sanitation, students eating and dressing habits ((Irving et. al 1998). Similarly the students' proximity and exposure to predisposing factors such as warm and humid climates, overcrowding (Hancox et. al 2004 & Jha and Gurung 2006), and poor indoor air quality due to the difficulty in maintaining decent sanitation and environment which are

clearly essential for the transmission of the infection and constitute necessary and immediate factors for the diseases (Heggenhougen et. al 2003). Personal hygiene, sanitation and overcrowding are linked to respiratory infections as found by this study. Their incidence could be reduced by providing decent and clean sanitary including hand wash facilities and adequate accommodation in the halls as White et. al (2001) confirmed that hand hygiene alone decreased the incidence of upper respiratory illness among students living in University resident halls from 39.9 percent to 14 percent and total improve illness to 20 percent.

Hygiene arrangements among food vendors in the University were very poor just like in most developing countries because adequate running water, toilets, and washing facilities are rare, food is not usually protected from insects, and poor handling increases the transmission of microbes (WHO/AFRO 2006). These conditions might have led to the high burden of diseases such as enteritis, stomach pains and dyspepsia as found by this study.

The high complain of headache by the students may be due to study and examination stress, tension, (Gary et. al 1993) and anxiety which are identified as common precipitants of tension headache (Badoe and Owusu 2004) .The continued presence of chickenpox in the university may be linked to the poor indoor air circulation and overcrowding and this is a major worry and should be looked at critically. This sentiment was expressed by a Director at the University hospital:

> *"It used to be that we saw it (chickenpox) only in the first semester but now I mean for the past year or two, it's been year round. It is not just confined to the first semester. This year for instance, second semester, we had lots of them and the period moved into examination period and most of them took beds that were meant for general*

patients on the ward because they were too ill to go home and examination was around the corner, they had to be in the vicinity of the university to take the examinations".

This concern confirms that chickenpox was virtually endemic in the University and its burden continues to increase semester after semester.

The presence of these disease conditions in the University poses a number of challenges. Malaria, an environmental related vector infection topped the top ten diseases. Its diagnosis was often clinical and the cases labelled malaria at the outpatients department could best be described or labelled in most cases as "febrile illness" presumed malaria (GHS GAR 2006). There is a strong need to do a detail study of this to establish whether all these cases were true clinical malaria. This study was to document diseases that student mostly report to the facilities and hence did not look into that. Chickenpox has become endemic with increased burden. Abdominal pain, enteritis, and dyspepsia, burden may due to the food (with uncontrolled use of ingredients) sold in the food markets and poor sanitation. These challenges are wake-up calls to the Hall and University authorities to re-think the issue of effective management of the sanitation, environment and the feeding of students on the campus.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

- Sanitation in the halls has improved tremendously with the outsourcing of janitorial services to private janitorial service contractors in August 2007.

- Waste management in the University remained poor and challenging even with the contracting of the evacuation of refuse to Zoomlion Waste Management Company. Very little improvement was achieved as refuse containers were over-flowing with refuse at the period of the study.

- Not much has been achieved at addressing the problem of poor environmental sanitation on the main campus of the University. Many areas of the University environment were beset with littering of sachet water bags, waste paper, choked gutters and weeds.

- Accommodation and sanitary facilities in the traditional halls remained woefully inadequate despite some expansions in toilets and washrooms while student population continues to increase.

- About 80 percent of disease conditions seen in the University health institutions may be attributed to environmental sanitation, personal hygiene, food, and overcrowding.

- Data management and storage in the health institutions especially in the university clinic was very poor.

6.2 RECOMMENDATIONS

Based on the findings, the following recommendations are proposed:

1. University Administration

- The University Management with support from the Hall Administrations should ensure total involvement of students in sanitation issues to make them feel to be part of the problem and hence the solution too. In addition all laws on sanitation on campus must be enforced and applied where necessary to ensure that such laws and regulations work to the letter to instil in student self-discipline and sanitation consciousness.

2. University Hall Authorities

- To maintain and improve upon the current good sanitation in the halls, Hall management and students should give the private janitorial service contractors the needed support to enable them confront the herculean task of dealing with sanitation in the Halls. In addition Hall management should ensure prompt payment and cooperation from especially students to enable the contractors to deliver quality service

- The Hall Administrations in collaboration with Environmental health unit should prevail upon the sanitary labourers and the people who come round to pick things out of the refuse containers to ensure that all garbage and waste are lodged in the refuse containers. Where necessary the people who scatter the garbage in search of other things should be prevented from doing so by ensuring that the University security enforces such directives

- Hall Administrations should link with the Environmental Health unit to provide sanitary labourers refuse bins of sizes that they can carry on their heads and therefore

able to empty their contents into the refuse containers to prevent them from pouring the garbage at the sites of refuse containers.

3. Physical Development Directorate

- The Physical Development Directorate should consider private participation in the waste management and curatorial services on campus by contracting them out to many waste management and curatorial contracting companies just as the janitorial service. And to ensure that such companies live up to expectation, the unit should ensure the necessary financial resources are provided to meet its commitment to the contractors

4. University Health Services

- The University Health Services should collaborate with the Campus Beatification Committee and the Environmental Health unit and embark on continuous and aggressive education on the need for a clean environment for the prevention of sanitation related infections. Students must be made to understand how they acquire some of diseases to assist them adopt preventive measures against them. In addition Insecticide Treated Nets (ITNs) should be made available at affordable prices to the students to help bring down the burden of malaria on campus.

- The University Health Services should establish a good health information system that is capable of capturing and storing all data and information on every patient and

services in the two health facilities. To facilitate this data clerks' capacity should be built and strengthen to ensure effective management of data in the institutions

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APPENDICES

Appendix 1: Consent Form for Survey Participants

Purpose of the study:

Sanitation especially in schools is a major cause of infection among the population. It is estimated that unsafe water and a lack of basic sanitation and hygiene facilities every year claim the lives of more than 1.5 million children under five years old from diarrhoea and other water and sanitation related diseases(UNICEF 2005). This tragic statistic underscores the need for assessment of the state of sanitation and its related disease condition among the student of the university. The outcome of the study will help the institution to put in place the necessary measures to improve sanitation in the institution. I am a student in the school of Public Health, College of Health Sciences, University of Ghana, Legon.

Permission:

You have been selected to be part of this study but to be part of the study your permission will be required. I need a better understanding of the state of sanitation on the university campus and especially in residence and lecture halls. You have the right to refuse or withdraw from this study. It will have no effect on your right to accommodation, health care and treatment and to enjoy other facilities in the university as pertained already.

Confidentiality:

The information that I will collect from this survey will be kept confidential. In addition information that will be collected about you will be stored under lock and key and will not be accessible to anyone except me and my supervisor or authorised personnel who will require the information for research purposes only.

Benefits:

This study seeks to assess impact of sanitation and disease trend among students in the university. The findings will therefore informed management decision and possibly contribute to improve water, sanitation and hygiene in the university for the benefit of all living on the campus and beyond.

Ethical review:

This proposal will be reviewed by the ethical committee of Ghana Health Service, which is the accredited body whose task is to ensure that research participants are protected from harm.

Undertaken:

I have read the above information. I have also had the opportunity to ask questions. I am satisfied and therefore consent voluntarily to be a participant in this survey.

Name of Respondent/Subject:	Date & Signature of respondents
.....	.....
Name of researcher/Assistant	Date & Signature of researcher/ Assistant
.....	.....

Appendix 2: Interview Guide for In-Depth Interviews

IN-DEPTH INTERVIEW GUIDE FOR HALL TUTORS/MASTERS AND JCR PRESIDENTS ON ENVIRONMENTAL SANITATION IN THE HALLS

Introduction:

You are welcome and thank you for accepting to respond to this interview. I am an MPH student with the School of Public Health, College of Health Sciences University of Ghana, Legon. I am conducting in-depth interviews with Hall Tutors, JCR Presidents, the Estate Manager and the Director of University Health Services to find your views about the state of environmental sanitation in the university. Your opinion is very important and will help the university to improve the level of sanitation in the university especially in the halls of residence. Please, there is no right or wrong answers. Your contribution is valuable. In order not to loose any important information that you will give, I will like to seek your permission to tape record the interview. Whatever you say will be confidential so feel comfortable to express your opinion. You also have the right to leave, if you wish, in the course of the interview but I would plead with you complete it since your contribution is needed. You may listen to the recorded discussion at the end of the session.

(NB: take background information of respondent before starting the interview)

A: SANITARY FACILITIES AND STUDENT POPULATION

1. Please what would you say about the student population in the hall?

2. Do you think the hall is overcrowded with students? *Probe for student population including 'perching' students*
3. What in your opinion should be the standard population per room?
4. How is the hall able to cope with the increasing number of students? *Probe for details especially on sanitary facilities?*
5. Do you think sanitary facilities in the hall are adequate for the students?

B: WATER, SANITATION AND HYGIENE

6. What is the situation of water, sanitation and hygiene in the hall?
7. What do you do when water stops running in the hall? *Probe whether the toilets are locked, where water is gotten to flush the toilets etc.*
8. Do you have hand washing facilities (basins) for the students?
9. How often are sanitary labourers supposed to clean the toilets and washrooms and also empty the sanitary bins? *Probe for whether they do it as expected*
10. Do you provide the labourers with disinfectants to clean the toilets and washrooms? *Probe for type of disinfectants provided, supervision of labourers etc*
11. What are some of the steps the hall is putting in place to overcome the challenges of water, sanitation and hygiene?
12. In your opinion, do you think some of the students get sanitation related diseases?

C: MAINTENANCE OF SANITARY FACILITIES

13. How many toilets/baths are in each floor and how may are functioning?
14. How old are some of these WCs?
15. How often is maintenance carried out on the sanitary facilities in the hall? P*robe to know the last time any attempt was made to replace them*

16. What efforts are in place to systematically replace the non-functioning facilities (if any)?
17. What other sanitation issues are of concern to you which we have not discussed?

IN-DEPTH INTERVIEW GUIDE FOR DIRECTOR OF PHYSICAL DEVELOPMENT ON ENVIRONMENTAL SANITATION IN THE RESIDENCE AND LECTURE HALLS

Introduction:

You are welcome and thank you for accepting to respond to this interview. I am an MPH student with the School of Public Health, University of Ghana, Legon. I am conducting in-depth interviews with Hall Tutors, JCR Presidents, the Estate Manager and the Director of University Health Services to find your views about the state of environmental sanitation in the university. Your opinion is very important and will help the university to improve the level of sanitation in the university especially in the halls of residence. There is no right or wrong answers. Your contribution is valuable. In order not to loose any important information that you will give, I will like to seek your permission to tape record the interview. Whatever you say will be confidential so feel comfortable to express your opinion. You also have the right to leave, if you wish, in the course of the interview but I would plead with you to complete it since your contribution is needed. You may listen to the recorded discussion at the end of the session.

(NB: take background information of respondent before starting the interview)

A: STUDENT POPULATION & HALL FACILITIES

1. Please what would you say about the student population in the halls?
2. Do you think the halls are overcrowded with students?

3. What should be the standard population of students per room?
4. Do you think sanitary facilities in the lecture halls are adequate for use by students? *Probe for details especially on sanitary facilities?*

B: WATER, SANITATION AND HYGIENE

5. What is the situation of water, sanitation and hygiene on the campus especially in the halls?
6. Do you have hand washing facilities for students in residential and lecture halls? *Probe for why such facilities are not provided and future plans*
7. Have you designated sanitary sites for refuse collection and how close are these to residential facilities?
8. Do you have alternative toilet facilities for students to use when water stops flowing? *Probe for reasons for these lapses etc.*
9. What plans has your outfit to overcome the challenges of water, sanitation and hygiene on campus?
10. In your opinion, do you think some of the students get sanitation related diseases?

C: MAINTENANCE OF SANITARY FACILITIES

11. How many toilets/baths are in each floor and how may are functioning?
12. How old are some of these WCs? P*robe to know the last time any attempt was made to replace them*
13. How often is maintenance carried out on the sanitary facilities in the halls?
14. What efforts are in place to systematically replace the non-functioning facilities (if any)?
15. What other sanitation issues are of concern to you which we have not discussed?

IN-DEPTH INTERVIEW GUIDE FOR DIRECTOR OF UNIVERSITY HEALTH SERVICES ON SANITATION AND DISEASES STUDENTS REPORT TO THE HEALTH FACILITIES IN THE UNIVERSITY

Introduction:

You are welcome and thank you for accepting to respond to this interview. I am an MPH student with the School of Public Health, University of Ghana, Legon. I am conducting in-depth interviews with Hall Tutors, JCR Presidents, the Estate Manager and the Director of University Health Services to find your views about the state of environmental sanitation in the university and disease conditions reported by resident students. Your opinion is very important and will help the university to improve the level of sanitation in the university especially in the halls of residence. Please, there is no right or wrong answers. Your contribution is valuable. In order not to loose any important information that you will give, I will like to seek permission to tape record the interview. Whatever you say will be confidential so feel comfortable to express your opinion. You also have the right to leave, if you wish, in the course of the interview but I would plead with you to complete it since your contribution is needed. You may listen to the recorded discussion at the end of the session.

(NB: take background information of respondent before starting the interview)

A: STUDENTS CLINICAL CONSULTATION IN HEALTH FACILITIES

1. Please what would you say about health service delivery in the university?
2. On the average how many students do you see in a day in the health facilities? *Probe for student numbers who report there*
3. What are the main complains or diseases reported by students?

4. How many disease epidemics have you recorded since 2004 and what was/were the main cause(s) of the outbreaks? *Probe for details especially on sanitation related diseases*
5. In your opinion, do you think some of the students get sanitation related diseases?
6. How would you rate sanitation situation on the campus especially in the halls of residence and their association with sanitation related diseases seen in the health facilities? ***Probe for exact diseases seen etc.***
7. What other sanitation and sanitation related infection issues are of concern to you which we have not discussed?

Appendix 3: Questionnaire for Survey

Assessment of Environmental Sanitation and Disease among University Students on the University of Ghana Campus

[Questionnaire for resident students]

IDENTIFICATION:

Date of Interview: _____ Questionnaire ID _____

Name of Respondents: _____ Respondent's Level: _____

Hall of Residence: _____ Floor No: _____

Number of students in the room: _____

Name of Research Assistant: _____

Directions: *Please answer all questions by ticking your choice(s) in the corresponding box.*

Provide written response where indicated e.g. specify.

SECTION A: BACKGROUND INFORMATION			
No.	**QUESTIONS**	**CODING CATEGORY**	***Tick/circle appropriate number/box(s)***
A1	Age (years)	Specify ……	
A2	Sex	Male	□ 1
		Female	□ 2
A3	Level	One	□ 1
		Two	□ 2
		Three	□ 3
		Four	□ 4

		Other (Specify) _____	□ 5
A4	Hall of residence	Specify _____	
A5	Religion	Christian Moslem Traditional No religion Others (specify): _____	□ 1 □ 2 □ 3 □ 4
SECTION B: HEALTH ACRE SEEKING			
B1	When was the last time you fell ill on campus?	This week Last week Two weeks ago Last month Last year Other specify: _____	□ 1 □ 2 □ 3 □ 4 □ 5
B2	Did you visit any of the university health facilities?	Yes No	□ 1 □ 2
B3	If no, why not?	_____ _____	
B4	If yes, what condition(s) did the Doctor diagnosed? (***Multiple responses possible)***	Diarrhoea Typhoid Dysentery Cholera Food Poison Malaria Parasitic Infection Don't know	□ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □ 8

		Others (specify): _____	
SECTION C: WATER, SANITATION & HYGIENE			
C1	What sanitary facilities are available to you on the hall/floor? ***(multiple responses possible)***	Hand washing basins Toilets Urinals Washrooms Litter Bins Refuse Bins Others (specify) _____	□ 1 □ 2 □ 3 □ 4 □ 5 □ 6
C2	How many of them are functioning?	Specify: _____	
C3	For those that are not functioning for how long have they been out of use?	1 week 2 weeks 1 month 6 months 1 year Don't know Other (specify) _____	□ 1 □ 2 □ 3 □ 4 □ 5 □ 99
C4	How would you describe the number of sanitary facilities in relation to the student population in the hall/floor?	Not adequate Adequate	□ 1 □ 2
C5	What do you do when water stops flowing in the hall?	Continue to use toilets Go to 'free range Other (specify): _____ _____	□ 1 □ 2 □ 3
C6	If 'free range' where do you go?: _____		

	_____		
C7	Why do you go to where you go?: _____ _____		
C8	How frequently are the toilets and urinals cleaned?	Not at all Daily Twice a day Thrice a day Other (specify): _____	□ 1 □ 2 □ 3 □ 4 □ 5
C9	Would you say this is enough to keep toilets and washrooms clean for use by students?	Yes No	□ 1 □ 2
C10	If no, how many times of cleaning in a week would you suggest that they should be cleaned?	Daily Once Twice Thrice Other (specify): _____	□ 1 □ 2 □ 3 □ 4
C11	Do the sanitary labourers use disinfectants to clean the sanitary facilities?	Yes No	□ 1 □ 2
C12	If no, how do they clean the toilets and washrooms?	Use water alone Water with Omo/Ariel etc. Water with liquid soap Other (specify): _____ _____	□ 1 □ 2 □ 3 □ 4
C13	How would you describe the state of sanitation in your	Very poor Poor	□ 1 □ 2

	floor or hall	Average Good Very Good Excellent Others (specify) _____	□ 3 □ 4 □ 5 □ 6
SECTION D: GENERAL ENVIRONMENTAL SANITATION			
D1	Is there a refuse container or bin on your floor/hall?	Yes No	□ 1 □ 2
D2	If yes how often is it emptied?	Not at all Once a day Twice a day Once in a week Other (specify): _____	□ 1 □ 2 □ 3 □ 4
D3	If no where do you dispose of your refuse or waste?	Specify: _____ _____	
D4	Is there a movable refuse or waste container around your hall?	Yes No	□ 1 □ 2
D5	If yes, how often is it emptied or replaced in a week?	Daily Once Twice Thrice Four times Don't know Other (specify): _____	□ 1 □ 2 □ 3 □ 4 □ 5 □ 99
D6	If no, where do the sanitary labourers dispose of the	Designated area around the hall In a waste container in another hall	□ 1 □ 2

	waste from the hall?	Store the waste in hall waste bins Other (specify): _____ _____	□ 3
D7	How would you describe the general environmental sanitation around your hall and on campus?	Bad Very bad Fair Good Very good Other (specify): _____	□ 1 □ 2 □ 3 □ 4 □ 5
D8	What in your opinion should be done to institute good sanitation in the hall?	_____ _____	

THANK YOU FOR YOUR TIME

Appendix4: Data Collection form for Students Clinical Consultation

HEALTH FACILITY DATA COLLECTION FORM FOR STUDENTS CLINICAL CONSULTATIONS AT THE UNIVERSITY OF GHANA HEALTH FACILITIES

No.	Age	Sex	Level	Hall of Residence	Disease Condition Diagnosed	Date of Visit	Remarks
Total							

Appendix5: Protocol/Checklist for Observation and Physical Inspection

PROTOCOL/CHECKLIST (SURVEY FORM) FOR OBSERVATION AND PHYSICAL INSPECTION OF SANITATION FACILITIES IN RESIDENTIAL AND LECTURE HALLS AND THE GENERAL ENVIRONMENT, UNIVERSITY OF GHANA, LEGON

A. Halls of Residence

Name of Hall:_____ Date:_____

1. No. of WCs on the floor:_____
2. No. of WCs functioning:_____
3. Evidence of:

	Yes(clear)	Little (hardly noticeable)	No
a. Toilets cleaned	□	□	□
b. Wash rooms/baths clean	□	□	□
c. Hall floor cleaned	□	□	□
d. Toilet smells	□	□	□
e. Wash rooms smells	□	□	□
f. Flies in and around the toilet	□	□	□
g. Fouling around the toilet	□	□	□
h. Fouling in wash rooms	□	□	□

4. Presence of:
   a. Hand washing basins □ yes □ no
   b. Soap on the basins □ yes □ no
   c. Waste bins on the floors □yes □ no
   d. Litter (pieces of paper, waste materials etc.) □ yes □ no
5. General state of sanitation of the toilets:

□ very bad □ bad □ good □ very good

6. General condition of washrooms:

□ very bad □ bad □ good □ very good

7. Condition of waste bins

□ very bad □ bad □ good □ very good

8. Waste containers/bins emptied □ yes □ no

9. General impression about sanitation in the hall:_____

_____

B. Lecture Halls

Type of lecture hall:_____ Date:_____

1. No. of WCs in the toilets:_____
2. No. of WCs functioning:_____
3. Evidence of:

	Yes(clear)	Little (hardly noticeable)	No
a. Toilets cleaned	□	□	□
b. Urinals cleaned	□	□	□
c. Toilet smells	□	□	□
d. Urinal smells	□	□	□
e. Flies in and around the toilet	□	□	□
f. Fouling around the toilet	□	□	□
g. Fouling in urinals	□	□	□

4. Presence of:
   a. Hand washing basins □ yes □ no
   b. Soap on the basins □ yes □ no
   c. Waste bins in lecture halls □yes □ no
   d. Litter (pieces of paper, waste materials etc.) □ yes □ no
5. General state of sanitation of the toilets

   □ very bad □ bad □ good □ very good

6. General condition of urinals

   □very bad □ bad □ good □ very good

7. General impression about sanitation in and around the lecture hall:

   _____

C. General Sanitation of the Environment/Grounds

Location:_____ Date:_____

1. Presence of refuse or waste containers

   □ yes □ no

2. State of waste containers

   a. Emptied □ yes □ no

   b. Filled with refuse or waste □ yes □ no

   c. Presence of waste or refuse at site of container □ yes □ no

   d. Stench smell at site of refuse container □ yes □ no

3. Presence of:	Yes	No
a. Garbage piles around the halls/lecture theatres	□	□
b. Garbage piles in drains/gutters	□	□

4. State of lawns on the campus

   □ weedy □ trimmed □ very neat

5. State of drains/gutters

   □ choke with refuse □ filled with stagnant water □ cleaned

7 General impression about sanitation in and around the lecture hall:

_____

_____

Appendix 6: Sample Size Calculation

Sample Size Calculation for Quantitative Survey

Sample size for the quantitative data (structured interview) was four hundred (400) residential students with an average of 80 resident students per hall. The sample was obtained using the following formular:

$$n = \frac{Z^2\ P(1-P)}{d^2}$$

where:

n = Sample size

Z = Z-Score at 95% Confidence Interval (CI)

P = Proportion students in resident

d = Margin of error

This formular was used because though official number of students provided accommodation in each hall was known the total population of students in residence was unknown due to the problem of 'perching' which is not sanctioned by the university authority. As a result it was difficult to get the actual proportion of resident students in each hall and hence the exact population of students in residence. A preliminary estimate of 0.50 or 50 percent was used in computing the sample size at a proportion of 0.5 to obtain a maximum sample size. This was done at 95 percent confidence level and a margin of error of 5 percent.

8.7 Appendix 7. Top Ten Reported Diseases by Semesmter for OPD Cases

Table 4.16: Ten Top Reported Diseases at OPD 2000/2001 Academic Years, University of Ghana, Legon

FIRST SEMESTER 2000/2001			**SECOND SEMESTER 2000/2001**		
Disease	**Frequency**	**%**	**Disease**	**Frequency**	**%**
Malaria	307	33.9	Malaria	679	36.9
ARI	80	8.8	ARI	159	8.6
Abdominal Pain	70	7.7	Abdominal Pain	110	6.0
Skin Diseases	69	7.6	Skin Diseases	106	5.8
Headache	42	4.6	Headache	49	2.7
Bodily Pain	29	3.2	Dyspepsia	37	2.0
Ear Infections	18	2.0	Enteric Fever	37	2.0
Eye Problems	17	1.9	Enteritis	37	2.0
UTI	17	1.9	Bodily Pain	36	2.0
Enteric Fever	15	1.7	UTI	32	1.7
All Other Disease	242	26.7	All Other Disease	560	30.4
Total	**906**	**100.0**		**1,842**	**100.0**

Table 4.17: Ten Top Reported Diseases at OPD 2001/2002 & 2004/2005 Semesters University of Ghana, Legon

FIRST SEMESTER 2001/2002			SECOND SEMESTER 2004/2005		
Disease	**Freq**	**%**	**Disease**	**Freq**	**%**
Malaria	412	37.1	Malaria	1,838	28.1
ARI	127	11.4	ARI	711	14.7
Headache	77	6.9	Skin Diseases	242	5.0
Skin Diseases	69	6.2	Dyspepsia	165	3.4
Abdominal Pain	61	5.5	Abdominal Pain	120	2.5
Chest Pain	34	3.1	UTI	93	1.9
Enteritis	23	2.1	Bodily Pain	91	1.9
Eye Problems	19	1.7	Enteritis	87	1.8
Dyspepsia	19	1.5	Headache	87	1.8
Sore Throat	17	1.4	Myalgia	83	1.7
All Other Disease	255	23.0	All Other Disease	1,308	27.1
Grand Total	**1110**	**100.0**	**Grand Total**	**4,825**	**100.0**

Table 4.18: Ten Top Reported Diseases at OPD 2007/2008 Academic Years University of Ghana, Legon

FIRST SEMESTER 2007/2008			SECOND SEMESTER 2007/2008		
Disease	**Freq**	**%**	**Disease**	**Freq**	**%**
Malaria	924	39.7	Malaria	1,608	40.6
ARI	506	21.7	ARI	848	21.4
Skin Diseases	127	5.5	Abdominal Pain	210	5.3
Vaginal Candidiasis	113	4.9	Skin Diseases	192	4.8
Enteritis	52	2.2	Enteritis	107	2.7
Abdominal Pain	51	2.2	Chickenpox	105	2.6
Headache	49	2.1	Headache	68	1.7
Chickenpox	42	1.8	Vaginal Candidiasis	64	1.6
UTI	40	1.7	Myalgia	49	1.2
Chest Pain	40	1.7	UTI	49	1.2
All Other Disease	385	16.5	All Other Disease	664	16.8
Grand Total	**2,329**	**100.0**	**Grand Total**	**3,964**	**100.0**

8.8 Appendix 8. Reported Diseases at the Health Facilities (OPD/In-Patients)

Table 8.7a Reported Diseases at the University Health Institutions, 2007/2008 Academic Year, University of Ghana, Legon

First Semester 2007/2008		Second Semester 2007/2008	
Disease	**Cases**	**Disease**	**Cases**
Malaria	924	Malaria	1608
URTI	452	URTI	806
Vaginal Candidiasis	113	Vaginal Candidiasis	64
Enteritis	52	Enteritis	107
Candidiasis	52	Candidiasis	70
Abdominal Pain	51	Abdominal Pain	210
Skin Disease	49	Skin Disease	49
Headache	49	Headache	68
Chickenpox	42	Chickenpox	105
UTI	40	UTI	45
Chest Pain	40	Chest Pain	11
Gastritis	34	Gastritis	48
Tinea Corporis	29	Tinea Corporis	10
Bodily Pain	28	Dermatitis	26
Dermatitis	24	Conjunctivitis	20
Conjunctivitis	23	RTI	45
RTI	23	Cough	30
Cough	21	Peptic Ulcer Disease	23
Peptic Ulcer Disease	21	Allergy	9
Allergy	16	Vaginitis	46
Vaginitis	15	Pharyngitis	6

Pharyngitis	14	Eye Infection	8
Eye Infection	14	Furunculosis	38
Furunculosis	14	Food Poison	2
Vaginal Discharge	12	Rhinitis	18
Food Poison	12	Diarrhoea	7
Rhinitis	8	Tonsilitis	31
Diarrhoea	7	Fever	16
Tonsilitis	7	Lumbago	3
Dizziness	6	Acne	6
Fever	4	Arthralgia	7
Lumbago	3	Dysentry	5
Acne	3	Herpes	5
Asthma	3	Enterocastis	4
Arthralgia	2	Otalgi	4
Gastroenteritis	2	Hpt	4
		Cellucitis	4
		Gingivitis	3
		Anxiety	3
		Halitosis	2

Table 8.7a Reported Diseases at the University Health Institutions, 2000/2001 and 2004/2005 Semesters, University of Ghana, Legon

Second Semester 2000/2001		Second Semester 2004/2005	
Disease	**Cases**	**Disease**	**Cases**
Malaria	679	Malaria	1838
Respiratory Tract Infection	159	Respiratory Tract Infection	711
Abdominal Pains	110	Skin Disease	242
Headache	49	Dyspepsia	165
Skin Disease	106	Abdominal Pains	120
Dyspepsia	37	UTI	93
Enteric Fever	37	Bodily Pain	91
Enteritis	37	Enteritis	87
Bodily Pain	36	Headache	87
UTI	32	Myalgia	83
Vaginal Discharge	29	Vaginal Candidiasis	73
Waist Pain	28	Pharyngitis	62
Eye Problem	27	Conjunctivitis	53
Boil	21	Enteric Fever	53
Chickenpox	21	Eye Problem	44
Chest Pain	19	Chest Pain	42
Ear Pain	18	Vaginitis	37
Fever	17	HPT	34
Vaginitis	16		
Dysentry	15		
Sinusitis	14		
Backache	12		
Diarrhoea	12		
HPT	12		
Sore Throat	12		
Cyesis	9		
Dental Problem	9		

Knee Pain	9	Otitis Media & Externa	30
Neck Pain	9	PUD	30
Palpitation	9	Tinea Corporis	28
RTA	9	Back Pain	27
Rhinitis	9	Waist Pain	26
Burning Sensation	8	Vaginal Discharge	25
Joint Pain	8	Chickenpox	22
Conjunctivitis	7	Ear Pain	22
Otitis Media	7	Helminthiasis	22
Tonsilitis	7	Boils (Furunculosis)	20
Cough	5	Cough	20
Anxiety	4	Gastritis	19
Breast Pain	4	Dysentry	18
Gastritis	4	Othalgia	18
SCD	4	Arthralgia	17
Constipation	3	Arthritis	17
Epigastric Pain	3	Urethritis	13
Herpes	3	Neck Pain	12
Lumbago	3		
Lump in Breast	3		
Menstrual Problem	3		
Peptic Ulcer	3		
PID	3		
Shoulder Pain	3		
STI	3		
Typhoid	3		
Urethritis	3		
Vaginal Itching	3		
Asthma	3		

Table 8.7a Reported Diseases at the University Health Institutions, 2001/2002 Academic Year, University of Ghana, Legon

First Semester 2001/2002		Second Semester 2001/2002	
Disease	**Cases**	**Disease**	**Cases**
Malaria	307	Malaria	412
RTI	80	URTI	127
Abdominal Pains	70	Headache	77
Skin Disease	69	Skin Disease	67
Headache	42	Abdominal Pains	61
Bodily Pain	29	Chest Pain	34
Ear Pain	18	Enteritis	23
Eye Problem	17	Eye Problem	19
Uti	17	Dyspepsia	17
Enteric Fever	15	Sore Throat	16
Waist Pain	15	UTI	14
Cut	13	Bodily Pain	13
Vaginal Discharge	12	Vaginal Discharge	13
Chest Pain	11	Ear Pain	11
Boil	10	Otitis Media & Externa	9
Dyspepsia	10	Backache	8
Burning Sensation	9	Boil	8
Chickenpox	9	Chickenpox	7
Dizziness	8	Knee Pain	7
Urethritis	8	HPT	6
PUO	7	Joint Pain	6
HPT	6	Burning Sensation	5
Knee Pain	6	Dental Problem	5
RTI	5	Rhinitis	5
Sore Throat	5	Dizziness	4
Tonsilitis	5	Furunculosis	4
Vaginitis	5	RTA	4
Backache	4	Urethritis	4

Breast Pain	4	Breast Pain	3
Dysentry	4	Conjunctivitis	3
Lumbago	4	Cyesis	3
Neck Pain	4	Dysentry	3
Peptic Ulcer	4	Epigastric Pain	3
Anxiety	3	Fever	3
Foot Rot	3	Herpes	3
Palpitation	3	Lumbago	3
RTA	3	Neck Pain	3
Shoulder Pain	3	Palpitation	3
Sinusitis	3	Pharyngitis	3
Swollen Gum	3	Sinusitis	3
Allergy	2	Vaginal Itching	3
Constipation	2	Vaginitis	3
Cyesis	2	Waist Pain	3
Dental Problem	2	Catarrh	3
Epigastric Pain	2	Enteric Fever	2
Foot Pain	2	Peptic Ulcer	2
Itching Ear	2	Shoulder Pain	2
Joint Pain	2	STI	2
Rib Pain	2	Tonsilitis	2
STI	2	Toothache	2
		Typhoid	2
		Allergy	1
		Bloody Stool	1
		Cough	1
		Dysmenorrhoea	1