

**INFLUENCE OF KNOWLEDGE OF ENVIRONMENTAL  
SANITATION ON HEALTH PRACTICES OF SENIOR  
SECONDARY SCHOOL STUDENTS IN TARABA STATE**

**BY**

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**MAY, 2009.**

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**DEPARTMENT OF PHYSICAL AND HEALTH EDUCATION,  
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**MAY, 2009.**

## **DECLARATION**

I declare that the work in this thesis entitled: “INFLUENCE OF KNOWLEDGE OF ENVIRONMENTAL SANITATION ON HEALTH PRACTICES OF SENIOR SECONDARY SCHOOL STUDENTS IN TARABA STATE” has been written by me in the Department of Physical and Health Education under the supervision of Dr (Mrs) C.O. Adegbite and Prof. J.A. Gwani. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at any university.

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Joro Jikenwu Adi

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Signature

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Date

## CERTIFICATION

This thesis entitled “INFLUENCE OF KNOWLEDGE OF ENVIRONMENTAL SANITATION ON HEALTH PRACTICES OF SENIOR SECONDARY SCHOOL STUDENTS IN TARABA STATE” by Joro Jikenwu Adi meets the regulations governing the award of the degree of Masters in Education of Ahmadu Bello university, Zaria and is approved for its contribution to knowledge and literary presentation.

\_\_\_\_\_  
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Date

## **DEDICATION**

This thesis is dedicated to Almighty God. It is also dedicated to my late mother, Mrs. Hauwa Adi, my beloved wife, Mrs. Florence Jikenwu Adi and my children, Blessing, Boani-ikpi, Amai-ukye, Ayini-Ikpi and Samuel Joro.

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## **ABSTRACT**

This study was conducted to find out the “Influence of Knowledge of Environmental Sanitation on Health Practices of Senior Secondary School Students in Taraba State”. To achieve the purpose of the study, sixteen senior secondary schools were used for the research. Nine hundred and sixty (960) respondents were randomly selected and were administered questionnaire. The researcher made use of 952 questionnaires for the research. The ex-post-facto research design was used. The data collected were analysed using students t-test for the difference between Senior Secondary School Students in their health knowledge. Pearson Product Moment Correlation was used to determine personal and environmental sanitation practices of Senior Secondary Schools Students in Taraba State.

It was found that:

- (i) Senior Secondary School Students in Taraba State had knowledge of environmental sanitation.
- (ii) There is a significant difference in the personal and environmental practices of Senior Secondary School Students who received instructions from health officials and those who did not.

It was therefore recommended that the students should be encouraged to put the knowledge of environmental sanitation into action or practice at School, home and Community. The Government should provide health-promoting facilities such as toilets, water supply, refuse bins, hand washing facilities, shovel

etc for proper execution of health practices to Senior Secondary Schools in Taraba State.



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# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 BACKGROUND**

The national primary school curriculum module (1987) emphasizes that “Primary Education is the foundation of all educational structures and the key, therefore, to the success or failure of the whole educational systems”. As such, success or failure of pupils’ health knowledge largely depends on the foundation they have at this level. A weak foundation leads to low health status, consequently affecting the general output to the nation’s economic production in the near future.

Hence, health appreciates every day and also depreciates everyday, which leads to its variation from time to time, but a balance of it makes individuals to assume being healthy. As stressed by Turner (1979): “Those with least state of health, value health the most, and that children at the age of between ten to eleven, tend to ignore personal hygiene”. That is to say that without the adequate provision of health knowledge, these children would relatively be dirty, and giving room for communicable diseases to spread. But as reported by Dare (1984) our school surroundings are weedy, littered, inadequate sanitary facilities, and ill ventilated, resulting to the outbreak of communicable disease among children who are the future leaders of the country. He added that the inspection of pupils finger nails, hairs, and school uniforms on the assembly lines every morning no longer happens. In addition, the teaching of personal hygiene has

been eliminated from time table of most schools. Furthermore, the pupils have developed unhygienic health habits inimical to good health practice.

Infectious and parasitic diseases associated with low standards of sanitation remain the leading cause of morbidity and mortality in many developing countries (Park, 2000). Human environmentally related diseases such as malaria, typhoid, diarrhea and dysentery are a constant threat to life (Lucas and Gilles, 1990). The lack of potable water supply and poor environmental sanitation are the reasons why diseases associated with unhygienic disposal of human faeces and refuse are so common in developing countries. The most important of such diseases are diarrhea and intestinal worm infections which account for over 10% of the total disease burden in developing countries. In addition, inadequate supply of potable water increases the risk of schistosomiasis, guinea worm and skin infections (Park, 2000).

These environmentally related diseases can be controlled and prevented through health promotion and improvement in environmental sanitation (Ugbonnaya, 2000). Health promotion aims at increasing the host's ability to withstand stress in the environment such as through good nutrition and health education. The objective of environmental sanitation is to create and maintain conditions in the environment that will promote health and prevent disease. This can be achieved through minimizing pollution of water, air, and soil; and by having a good focus on other measures of environmental



sanitation that will reduce the transmission of communicable diseases to children and adults.

Stubbs (1991) explains that our health is being threatened by air, water, and food pollution, and we are in danger of being engulfed in trash. That is, unless our children have adequate health knowledge of how one's carelessness could endanger self and others, the above problem as it is manifested now in our unhygienic environment, will increase our being engulfed in the trash. Therefore, the acquisition of health knowledge by our children being the leaders tomorrow should not be toyed with.

Many authors have shown that improvement should not only be based entirely on curative services, but also on the acquisition of scientific health facts. Turner et al, (1970) stated that in any good health scheme, there should be provision for social and basic knowledge of science of hygiene, which would enable people to live in harmony with their environments, which is accomplished through health education. People would continue to keep their environments clean and tidy, and observe some basic health rules in terms of preventive medicine, which could be helpful in directing individuals in making wise decisions as they are confronted with decision making in terms of factors affecting their health. In a nutshell, a large number of health problems pervading this community are self inflicted, manifested through community members drinking water from impure sources such as shallow wells, deep wells without adequate cover, streams and ponds. Eating in and from unhygienic and dangerous sources like uncovered food items sold by gutter sides, dumping sites, and eating

unhygienic vegetables are among other practices. Despite the fact that they are self inflicted, they are rarely self inflicted with the sole aim of self destruction, but rather commonly as a result of ignorance, confusion and apathy.

Studies carried out by Ogwuru (1995) Falade (1999), Nwanta and Achi (2002), reported that cities in Nigeria have in recent times become areas with high concentration of solid waste and garbage emanating from socio-economic activities of a rapidly growing urban population in discarding generated waste. In composition, this waste is largely of paper, glass, ceramics, plastics, metals, leather, rubber, wood, textile, animal dung, plant materials. Studies indicated that an average of 8,200 metric tones of garbage is generated in large urban centers such as Lagos, Kano, Kaduna and Ibadan. (Falomo, 1995 and Achi, 2000). showed that wastes generated by a person in Kaduna is at a rate of 0.8kg/person/day. These wastes are frequently carried from points of generation and deposited at communal bin or designated neighbourhood dumping grounds for final collection and evacuation by appropriate agencies. Studies carried out by (Falomo, 1995 and Ogwuru, 1995) indicated that this is primarily because evacuation is delayed or not carried out in most cases. Given this scenario where, rate of refuse generation has risen higher than the rate of evacuation, these temporary collection sites become excessively filled thereby blocking available spaces and roads. This situation usually results in the crisis situation of urban solid waste management.

Aina (1996), Uchegbu (1998) and Falade, (1999) also observed that resource in use is less than more population and the technology of mass

production have given impetus to the generation of waste under a climate of inadequate management responses. In some cases, refuse in temporary dumpsites are not evacuated or burnt and this pollutes the environment. Run-off from dumpsites also pollute ground water, streams etc and have created ecological hazards for aquatic flora and fauna. In addition to poor environmental sanitation, inadequate refuse collection and disposal system aided by wind, wastes all classes dust are litter the environment. Estimate show that between 30 – 50% of the solid waste generated are improperly disposed, find their ways into drains, open lands and uncompleted buildings.

Achi (2002) observed that the method of transporting the waste allows for fall offs and further distribution of the waste from one zone to another. Uncollected and poorly evacuated wastes provide breeding grounds for disease vectors and have brought about deplorable environmental conditions in Nigeria. According to Mabogunje, (1996), Nigeria is reported to be the dirtiest, most unsanitary and least aesthetically place in the world. For any meaningful development to take place in any State, the health of its citizens is a prerequisite. Although, health is not every thing, without it other things are valueless. Every State should be able to guarantee an appreciable level of health for its citizens. This is simply social justice. Good health only can ensure that people are socially and economically productive.

The stakeholders in the area of Environmental health should see to it that any policy on health is successfully executed. Many teaching staff and students fail to understand the importance of health and its practices. Some due to

insufficient knowledge in this field, while others due to ignorance or abuse of the application of appropriate health knowledge and practice of environmental sanitation for the achievement of optimum health by the students. Environmental Sanitation is broadly concerned with environment and public health. It includes sewage disposal, personal and food hygiene, provision of clean water domestic disposal, industrial pollution, housing and control of infectious disease. According to Ahmed (1994), environmental sanitation is defined as the cleanliness of the environment, the removal of refuse and anything that is injurious to health, purification of air, the supply and protection of potable water, good housing, streets and environmental noise control. Also, Turner (1974) indicates that environmental health involves the control of adequate drinking water supply, sewage disposal only (human waste) and refuse disposal, protection of food we eat, housing, the control of insects, rodents and pollution generated from industrial wastes.

The main concern here therefore is to investigate the influence of knowledge of environmental sanitation possessed by Senior Secondary School Students on health practices in the areas of water supplies, sewage disposal, refuse disposal, pest control, and environmental pollution.

## **1.2 STATEMENT OF THE PROBLEM**

Rivers are polluted with urination and defecation. Sewages are never cleared. Refuse litter every where – gutters, schools, roads, market places and town squares. Because of our unhealthy environment, insects, rodents are freely bred and these are a source of sickness. Repugnant odors are common in our

Towns and Cities because of water and atmospheric pollution. Public nuisances in our midst can afford to urinate or ease themselves in any where. Public toilets are a disgrace. The amount spend annually by individuals on drugs, the environmental hazards to which we are exposed because of lack of proper health education and the unwillingness to change, it is time that all of us are ideologically committed to our health problems. In most of the secondary schools in Taraba State, paper, plastics, food peels, broken bottles, suya sticks, leather for wrapping moi-moi, bread, ground-nut, maize, corns, food and its rem-nant etc. are littering all over the school compounds or premises. The students defecate behind their classrooms, hostels, dinning halls, they urinate behind their classroom and all over their school premises, and there is no specific place for urinating. The uncompleted buildings become their toilets. One therefore wonders if these students have any knowledge of good environmental practice.

#### 1.4 RESEARCH QUESTIONS

The following research questions are raised in order to address the problem:

- (i) Are the Senior Secondary School Students in Taraba State knowledgeable about environmental sanitation?
- (ii) Do Senior Secondary School Students practice good environmental sanitation?
- (iii) Do Senior Secondary Schools in Taraba State invite health specialist to talk to their Students on personal health and practice of environmental sanitation?

### 1.3 PURPOSE OF THE STUDY

The study aimed at evaluating the effect of knowledge of environmental sanitation on health practices of Senior Secondary School Students in Taraba State. This study's specific aims are as follows:

- (i) To find out whether Senior Secondary School Students in Taraba State are knowledgeable about environmental sanitation.
- (ii) To find out whether the Senior Secondary School Students put the health knowledge acquired into practices.
- (iii) To find out whether Schools invite specialist on health to talk to Senior Secondary School Students on their personal health and practices of environmental sanitation.

### HYPOTHESES

In attempting to determine the knowledge and practices of the Senior Secondary students on environmental sanitation. The following hypotheses was made for the study:

**Hypothesis I:** There is no significant relationship between health knowledge and practices in relation to the environment of Senior Secondary School Students in Taraba State.

**Hypothesis II:** There is no significant difference between the personal and environmental health practices of Senior Secondary School Students

in Taraba State who received instructions from health officials or specialist and those who did not.

#### 1.5 **BASIC ASSUMPTION**

(i) It is assumed that environmental sanitation is taught in Secondary Schools in Taraba State.

(ii) It is assumed that Student's knowledge of Environmental Sanitation would affect his/her health practices.

(iii) It is assumed that adequate facilities in Schools would promote good sanitation.

#### 1.6 **SIGNIFICANCE OF THE STUDY**

Even though several studies have been carried out, relative to this topic in some parts of Nigeria and to the best knowledge of the researcher, no such study had been conducted in Taraba State.

1. The finding of the researcher would assist the Government in identifying the areas of weakness in the health education curriculum of Senior Secondary Schools as it pertains to environmental sanitation in Taraba State.
2. The research would also be of benefit to the future researchers and the readers on environmental sanitation in Senior Secondary Schools in Taraba State.

3. It would reveal the sanitary conditions of Schools in Taraba State and this would assist in making the Government discover the areas for improvement.

#### **1.7 DELIMITATION**

The study involved only Senior Secondary School Students in Taraba State Secondary Schools and it was delimited to finding information concerning the influence of knowledge of environmental sanitation on their health practices.

#### **1.8 LIMITATIONS OF THE STUDY**

The main problem encountered during data collection was that some of the Senior Secondary School Students could not read at all, talk less of interpreting what they read. That was why the copy of the questionnaire was read and explained to the students before they were duly filled.



## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.0 INTRODUCTION**

The research work is aimed solely at determining the influence of knowledge of environmental sanitation on health practices of senior secondary school students. This is indispensable to economic growth and development of any nation, as an adage says: health is wealth. Bearing this in mind, a review of related literature and research finding that cover influence of knowledge and environmental sanitation practice in Taraba State is imperative. This chapter contains the related literature to this study. The literature review is organized into the following sub-topics:

- 2.1 Concept of health knowledge
- 2.2 Health practices
- 2.3 Concept of environmental sanitation

- 2.4 Factors influencing sanitation
- 2.5 Components of environmental health
  - (a) Provision of safe water supply
  - (b) Proper wastes disposal
  - (c) Control of diseases vectors
  - (d) Preventions of air, water and land pollution.
- 2.6 Solid waste management
- 2.7 Pest control
- 2.8 Environmental health problems
- 2.9. Summary

## **2.1 CONCEPT OF HEALTH KNOWLEDGE**

Health knowledge is the understanding of scientific facts on personal hygiene, environmental and communicable diseases. According to Nkom and Essien (2002), the dimension of knowledge deals with peoples' basic understanding of what constitutes hygiene or unhygienic behaviour, environmental cleanliness, wholesome or good quality water/food as well as the relationship between health and sanitation, hygiene or clean water. In other words, do people have the basic information to enable them to understand, analyze and arrive at rational conclusions about the nature, risks, and consequences of their behaviour?.

Brooks and Brooks (1974) revealed that knowledge implies an understanding of specific, facts, terminology; conventions; ways and means of dealing with specifics, trends and sequences; classification and categories;

methodology; criteria; universals and abstracts; principles and generalizations and finally theories and structures. Hence, knowledge does not stop at knowing or understanding phenomenon only, but equally extend to application of what is learnt. It can be stressed that it equally implies comprehension; interpretation; application; analysis and synthesis; with evaluation of what is known. For example, if a child is observed being able to brush his/her teeth correctly, it will be concluded that the child knows how to brush the teeth (cognitive and psycho – motor experiences) but a youngster who knows how to, may not always do it and sometimes may do it wrongly. This is because affective learning experience is not adequately utilized, as a result of which the child does not appreciate the knowledge acquired.

## **2.2 HEALTH PRACTICES**

Availability of health facilities is a pre-requisite for putting health knowledge into action. Thus, knowledge is reinforced by practice. Health facilities include toilets, water supply, refuse bins, hand washing facilities etc. For example if a child or pupil is instructed to wash his/her hands after going to toilet, hand wash facilities must be available to make the action possible. Similarly, if the school children are instructed not to litter the school premises or classroom with paper, then waste paper bin or baskets should be provided to help them transform the instruction into action. These control functions constitute a major aspect. The responsibility for such control rest with each member of the family, teacher and other staff in the school, employers in the work places.

According to Nkom and Essien (2002), practices relate to those basic aptitudes, abilities or the technical competence to handle, in a very practical way, the problems, situations, emergencies and needs which exist or may arise with respect to water and sanitation including the ability to teach or impart these skills to others. Some of these skills, would also encompass the ability to design, construct, build, repair and maintain water and sanitation related infrastructure, installations and mechanisms.

For hygiene education to succeed, the people must not only be carried along they must actively participate in the design, implementation and evaluation of the programme. Sanitation or hygiene education is by its nature, not an immediate felt – need for rural community. The advantage in this particular project is that it enables government to use the water supply component which is a critical felt – need as a carrot to induce and push through a programme of sanitation and behaviour change which, though not a felt-need, is very fundamental in improving people’s welfare and health status.

SOIL: According to Umoh (2002), lack of certain mineral elements may result in deficiency in plants, animals and human beings living there e.g iodine deficiency causing goiter in man.

- Presence of certain minerals in excess amount could lead to poisoning e.g arsenic poisoning, lead poisoning.
- Poor soils in inadequate vegetation resulting in malnutrition in ruminants and subsequently, malnutrition in human beings.
- Malnutrition reduces resistance to diseases.

- Soil may be contaminated with human and animal wastes, which carry pathogens etc

### **2.3 CONCEPT OF ENVIRONMENTAL SANITATION**

According to Aleng (2005), environment is defined as man's immediate surrounding. The Oxford Advanced Learners English Dictionary (2001) defines environment as conditions, circumstances affecting peoples' lives". The Encyclopedia Britannica (1998) (vol. 4) sees environment as a "Complex of physical, chemical and biotic factors that act upon an organism or an ecologic community and ultimately determines its form and survival". Uchegbu (1998), defines environment as the sum total for all conditions that surround man at any point in time on the earths surface. However, the environment as a community of organisms is not the sum total of the participating members but a dynamic nature at complex levels of interactions, unfolding in drama sketches, stretching between the remotest past at creation and the enforceable future. According to Park (1998), the term 'environment' implies "the eternal factors-living and non-living, materials and non materials which surround man".

In its modern concept, environment includes not only the water, air and soil that form our surroundings but also those social and economic conditions under which we live. Viewing human environment from the economic point, Uchegbu (1998) describes it as natural capital and analogous to financial capital assets. He further explained that any damage done to the environment run down capital which sooner or latter reduces the value of its recumbent services. For residential ideals situation puts the health of its residents at stake. The residents

as well can be psychologically affected when any little damage (or disturbance from its ideal condition) is done to residential housing environment.

Nest (1991), defined environmental health as the “control of those factors in man’s physical environment which exercise or may exercise deleterious effects on man’s physical mental and social well being”. According to WHO (1977), the objective of environmental health is to create and maintain conditions in the environment that will promote health and prevent diseases. Man’s external environment contains elements that are essential for life and/or the maintenance of good health such as air, food, water, etc. In addition the environment contains potential hazards.

Man has a wide range of tolerance of environment conditions because of his ability to adapt and is able to withstand harmful conditions. Such biological adaptation has its limits and disease represents the break down of adaptation. For instance, a man can tolerate wide fluctuations of environmental temperature and he has various mechanisms (sweating to lower the temperature and shivering to increase heat) for coping with these changes. If however, the heat stress is excessive i.e. beyond his ability to cope, then adaptive mechanisms break down and disease result, perhaps in the form of heat stroke or some other heat disorder. Health can therefore be viewed as successful adaptation to the environment whereas disease represents a breakdown of adaptation.

WHO (1974), described infectious diseases as only one type of health threat. During the last 25 years, citizens have become more aware of health problems in the environment. The environment is made up of all the living and

men living things surrounding an individual of a community. Environmental health problems are often caused by pollution (the dirtying of the air, water, or soil by chemicals, disease, or waste products). Many forms of pollution have been linked with diseases, including cancer. Since the 1960s local, State, and national Governments have passed many laws to clean up and protect the environment. Despite much progress, pollution continues to be a health problem today.

According to WHO (1974) and Ebele (1993), environmental sanitation is the process of keeping the environment free of dangers of hazards to man. It deals with:

- A Disposal of wastes (refuse and sewage),
- B Air hygiene and prevention of atmospheric pollution,
- C Control of vectors, pests and rodents.

## **2.4 GENERAL SANITATION PROBLEMS**

According to Ibadan Study Series (1983), Sanitation problems refer to conditions in our environment which affect our health especially those which have to do with dirt and infections. If we look around us in our cities, towns and villages, we see several conditions which encourage dirt and the spread of infections. We seem so helpless about what to do yet this condition do exist simply because of our individual's habits and actions. It may be suggested that most Nigerians are not adequately educated about health to know that our environment is what we make of it, and that government expects us to play our

own part in keeping it healthy even while we look up to them to govern for leadership.

According to WHO (1974) infectious diseases are only one type of health threat. During the last 25 years, citizens have become more aware of health problems in the environment. The environment is made up of all the living and non living things surrounding an individual of a community. Environmental health problems are often caused by pollution is the dirtying of the air, water, or soil by chemicals, disease, or waste products. Many forms of pollution have been linked with sties diseases, including cancer, since the 1960s local, State, and national Governments have passed many laws to clean up and protect the environment. Despite much progress, pollution continues to be a health problem today.

Harold (1973) stated that, sanitation is the act of controlling a person's surroundings to promote health and comfort or the protection and preservation of public health. According to WHO (1974) since environment concerns all the conditions that surround person, environmental sanitation is broadly concerned with environmental and public health. It includes sewage disposal, personal and food hygiene, provision of clean water, domestic waste disposal, industrial pollution, housing and control of infections diseases.

All these environmental surrounding are more interrelated and must be protected in order to improve physical comfort and increase the life-span of man. The word environmental sanitation has a lot of meaning depending on the orientation of who defines environmental sanitation. The architect defines it on



physicals sphere, while the sociologists, psychologists, and of course, the Medical personnel will define it beyond physical sphere. They will go a long way to including even the family and other socializing institutions (Akinjide, 1997).

Environment is the aggregate of all external condition and influences affecting the life development of organism e.g. human being. While sanitation is the science of controlling Man's surrounding to promote health and comfort. It includes purifying water, removing wastes and inspecting foods (Akinjide, 1997).

Environmental sanitation is defined as the cleanliness of environment, the removal of refuse and anything that is injurious both liquid and solid waste, purification of air, the supply and protection of portable water, good housing, streets and environmental noise control. Ahmed (1994) defined environmental sanitation as the process of cleansing, tidying and beautifying the environment for the purpose of controlling, communicable diseases and promotes optimal health.

Turner (1974) stressed that human living generate waste. These wastes are generated from house hold wastes, industrial wastes, agricultural wastes, extraction wastes and sewage. These wastes include specifically papers, plastics, metals, glasses fabrics, wood, food peels and its remnants, dead animals. Turner (1974) stated that since environment concerns all the conditions that surround a person, environmental sanitation is broadly concerned with environmental and public health. It includes sewage disposal, personal and food hygiene, provision of clean water, domestic disposal, industrial pollution, housing

and control of infectious diseases. Turner (1974) further said, environment is the aggregate of all external condition and influences affecting the life development of organism e.g. human being.

Achi (2002) stressed that sanitation is the science of controlling man and his surrounding to promote health and comfort. It includes purifying water, removing and inspecting foods. This study was planned to assess the health knowledge and practice of environmental sanitation among the students of Taraba State Secondary Schools.

#### **2.4.1 Practice of Environmental Sanitation in Taraba State**

In the words of Wright (1997) there are various hygiene of the communities, basic knowledge, skills and human behaviours as well as social and cultural factors concerning health, life-styles and environmental awareness. These includes:-

- Personal hygiene (washing, dressing, eating etc)
- Household cleanliness (Kitchen, bathroom cleanliness, etc)
- Community cleanliness (waste collection, common places, etc)

Environmental sanitation strongly depends on social and cultural practices and beliefs and these have to be considered when planning interventions. To allow for transmission of infectious agents they have to be present in the immediate human environment, exposure has to take place and transmission has to occur by up take of the agents through unsafe practices. To interrupt the transmission, environmental sanitation can act on reducing exposure to

infections agents by limiting contact to waste or polluted media, and by changing hygiene and social-cultural practices.

There are many poisonous substances in the environment that can harm people and some of these occur naturally. But many of these poisons get into the air, or into water or the food we eat as a result of human activities such as smelting copper or spraying of crops with insecticides.

According to Mackean et al. (1984) and Fredrick (1987) 'refuse' and 'garbage' are names given to solid waste that accumulated as a result of domestic and industrial activity. It includes paper, cartons and cane, and may also include unused food materials that can harbour micro-organism and food creature such as flies and rate which acts as diseases vectors. Urine and faeces carry bacterial and these organisms may be pathogens. By urinating and defecating carelessly about the places, people can make it easy for such vectors as house flies, cockroaches and rat to become infected with pathogen which can then be spread to other healthy people. Carelessness over these functions also results in spread of the cysts of amoebic dysentery, the egg of tapeworm and blood fluke and the larves of hookworm. Nigerian is careless and permissive society. Although God has given us good weather, good soil and luxuriant vegetation, we just carelessly refused to make better use of them.

Our rivers are polluted with urination and defecation. Sewage are usually not cleared. Refuse litter everywhere – gutters, schools, roads, market places and town squares. Because of our unhealthy environment, insects, rodents are freely bred and these are source of sickness (Adeoye 1982).

Repugnant odours are common in our cities because of water and atmosphere pollution. Public nuisances in our midst can afford to urinate or ease themselves any where, public toilets are a disgrace. In many hotels, restaurants, beer palours, flies usually are welcome visitors. This should not to be so if hotel proprietors know or are told that flies play major role for instance in the transmission of trachoma and dysentery Adeoye (1982).

Adeoye (1982) expressed that population explosion, urbanization and industrialization are the growing problems of Air, water, pollution, and the disposal of domestic and industrial wastes. Our health is being threatened by air and water pollution and we are in danger of being engulfed in trash. The continuity processes of urbanization and industrialization are increasing processes of urbanization and industrialization are increasing amount of waste products produced. Man increasingly polluted environment that will demand government action and citizen co-operation.

The first immediate environment that man comes in contact with is the family. The family as socialization agent should teach the child the importance of neatness.

Turner (1971), University of Ibadan, study series (1983) short listed the General Sanitation problems as follows:

1. Water supply
2. Sewage disposal
3. Refuse disposal
4. Housing

5. Control of pesticides etc.

#### **2.4.2 STRATEGIES TO IMPROVE ENVIRONMENTAL SANITATION**

According to Essien (2002), strategies to improve environmental sanitation the following:

1. Sanitation needs to be addressed as a whole including improvement of facilities, environmental conditions and behavioral change.
2. Sanitation programmes should be demand based and the community should be fully involved in the process. High risk group should be identified for better targeting of funds and efforts;
3. Sanitation should be a component of other health promoting or disease control programmes.
4. Awareness needs to be raised and sanitation set as a priority in national and local government and also in the population at large. Systems have to be sustainable cost sharing and cost recovery need to be addressed carefully.

Sanitation is the protection and improvement of society by organized community effort. It is a broad field employed not only by doctors and nurses but sanitary engineers, veterinarians, industrial chemist, microbiologists, statisticians, behavioural scientists, economists, educations, nutritionists and laboratory technicians. Many areas of research are involved in the field of sanitation including vital statistics, epidemiology social analysis and health economics (Adewole, 1999).

Akinjide (1997) defined “environmental sanitation as the control of all those factors which may contribute to disease transmission and or causation. Environmental sanitation is essential because, it is a means by which man tries to overcome the effect of his activities in his environment. It is a process of taming the environment so that it can no longer constitute a hazard to man. The main objectives of environmental sanitation is to create or maintain conditions in the environment that will promote health and prevent diseases.

## **2.4 FACTORS INFLUENCING SANITATION**

According to Institute of Education, University of Ibadan (1983), conditions of modern way of life have created many problems relating to man’s environment. They identify three sub-factors of environment which affect the human health, namely; physical factors and biological factors. Examples of physical factors, whether, climate, housing, soil, water and food supply, air (clean or polluted) and other physical things surrounding us. Examples of biological factors were given as germs, insects, rodents, plants, animals and even human beings.

### **2.4.1 PHYSICAL ENVIRONMENT FACTORS**

According to Umoh (2002), physical environment refers to the non-living part of the environment: air, water, soil, waste, mineral salts, furniture, housing, food items, and climatic factors such as temperature, humidity, sunshine, rainfall, etc.

Air is essentially necessary for life to exist. This is the reason why adequate ventilation is a fundamental consideration in the design of residential

housing. Air is polluted when there is the presence of substances there in quantities, characteristics of duration, such that may affect health of human beings, animals, plants, properties and structures.

Water bodies from the home of fishes and some other aquatic life. Our water environment must be clean if these life forms will function most effectively. To reduce water related infections, water required for domestic use must be wholesome or pure.

Land is a very vital natural resources, which is the home of our mineral resources, terrestrial animals, valuable forestry resources and important factors for our physical development, etc. It is therefore very necessary that the soil be protected. The Institute of Water and Environmental Management underscored the need to protect our land from pollution through effective waste management..

Umoh (2002) classified physical environment factors as follows: climate, attitude, soil, air, chemical, radiation. According to Umoh (2002).

#### **2.4.2 BIOLOGICAL ENVIRONMENTAL FACTORS**

According to Uchegbu (1998), all the living things in an area: - plants animals and micro organisms constitute the biological environment. They are dependent on each other and ultimately on their physical environment.

Man deliberately manipulates the biological environment. He cultivates useful plants to provide food, clothing and shelter, and he raises farm animals for their meat, milk, leather, wool and other useful products. He hunts and kills wild animals and other predators, and destroys insects, which transmit disease or compete with him for food.

In many parts of the tropics, insects, rodents and other vectors of diseases grow and multiply rapidly. This is partly because the natural environment favours their survival and also because in some of these areas, relatively little has been done to control these agents.

**2.4.3 CLIMATIC FACTORS:** Is divided into six categories: temperature, rainfall, relative – humidity, sunlight, wind speed. He said that during hamartan, low relative humidity and high wind speed predispose to respiratory tract infections. During the rainy season, high temperature and humidity allow for rapid proliferation of arthropod vectors (ticks and insects) leading epidemics of vector borne disease, and six development of helminth larvae.

According to Umoh (2002), decrease in air pressure may lead nitrogen bubbles in bloodstream resulting in “bends”. Poorly constructed houses may predispose to disease. In general, climate variations in a given geographic area may markedly influence the epidemiological patterns of certain infections severe climatic extremes may have direct on man resulting in morbidity and even mortality.

## **2.5 COMPONENTS OF ENVIRONMENTAL HEALTH**

The kind of environment which we live poses a kind of menace to our health, the air we breath is constantly polluted with carbon monoxide from motorists, factories and industries. The water we drink is always half-way purified due to unconventional attitudes by some of those entrusted with the work. Most of the food is either not nutritious or polluted right from the source up to consumer end. The land we use is always polluted as a result of some peoples



behaviour of indiscriminate urination and defecation; the houses of most of our people are not adequately planned for ventilation and drainage which creates intensive heat and formation of many stagnant gutters where mosquitoes and other insects breed. Most of our peoples' life-style is discouraging because it endangers the health of the others. Smoking, drinking of alcohol, excessive eating of fatty food, sedentary life – style, unhygienic living, drug-abusing and excessive work without adequate rest and sleep, lack of love and trust among many people, poverty are indices that denies many people the right to live hygienically.

All these environmental factors contribute immensely to the health problems facing our people. There is constant outbreak of microscopic organism diseases such as cholera, typhoid fever, and meningitis in strategic places. Rodents nuisance, outbreak of malaria infections, sleeping sickness, obesity, and heart diseases are common feature in our society. The cause of these health problems is attributed to both micro organism and peoples' behaviour. However, in the actual sense, peoples behaviour is the predominant feature in the diseases causative trend, because if people attitudinal patterns will change from what we are seeing now, most, if not all of the above health problems will be eradicated. Although, tragically, the way people live is all too frequently characterized by ignorance and misinformation regarding health matters. Therefore life style and misinformation are learned phenomena, the ones which result in self inflicted diseases and those wrong information received can be replaced by new and more beneficial ones, by means of health education.

### **2.5.1 SAFE WATER SUPPLY**

WHO (1984) stated that safe drinking water is that which is “wholesome and not prejudicial to health”. Simplicity in this definition is the requirement that the water is without risk of causing chemical irritation or intoxication and microbial infection.

The safest water is perhaps the treated pipe borne water, but since this is not available to the majority of the population, deep wells and springs are recommended especially for the people in the rural areas, where water must be fetched from surface sources such as rivers, lakes and streams known to be contaminated with human waste. It is absolutely necessary that any of the methods for purification of water be adopted. For example, the heat destroys bacteria. Boiling of water for some minutes will completely sterilize it and make it safe for drinking.

Other methods include filtration and disinfections. Filtration is done with a clean white piece of cloth spread over a clean container and suspected water poured over it. The piece of cloth then suspended particles in water.

The disinfections involved the use of chemicals such as “tincture of iodine” and chlorine solution (made from chloride of lime). Alum has been known to be used in purification also. It is important to point out that when the quality of water is not certain, it is advisable to boil and strain it before consumption.

Sanitary supervision of water supplies is necessary in order to ensure their safety for drinking purpose. Investigation of small individual sources of supply is a simple procedure and their safety can usually be determined by careful

observation without examination of the water. Local officials or the owner, with the aid of the information which is furnished in health department bulletins on the location, construction and operation of private supplies, can usually pass upon the safety of small private wells, springs etc. A public health engineer who is competent to make correct field observations and interpret results should investigate the more complicated water supplies.

According to Institute of Education, University of Ibadan (1983) and WHO (1984), the safe water is perhaps the treated pipe – borne water, but since this is not available to the majority of the population, deep wells and springs are recommended especially for people in the rural areas. Where water must be fetched from surface sources such as rivers, lakes and streams known to be contaminated with human wastes, it is absolutely necessary that it undergo purification processes.

### **2.5.2 WATER BORNE DISEASES**

According to Umoh (2002), diseases – producing germs do not normally multiply in water, but they can survive in water and remain in a state that can set up an infection in a new host. Water serves as an important vehicle for the transfer of diseases of the alimentary canal as well as of worms, such as guinea-worm or hook-worms. But the four major infections which are transmitted through water, notably by drinking or eating any food washed with infected water, are typhoid fever, paratyphoid, cholera and bacillary. Other infections are amoebic dysentery, poliomyelitis and hepatitis, although it is not generally agreed

in medical circles that they are usually also transmitted through consumption of contaminated water.

### **2.5.3 TYPHOID FEVER**

According to Nwanta and Achi (2002) typhoid fever is caused by a bacillus, which sets up an infection in the intestinal tract and then enters the blood to be carried to all parts of the body. During the course of this disease, ulcers of the intestine develop which may lead to severe bleeding or perforation of intestinal contents to get into the abdominal cavity with resulting peritonitis.

Ten percent of typhoid fever patients die. In the past, typhoid fever was an exceedingly prevalent disease in the country, but improved sanitation has almost completely eradicated it. The danger of typhoid fever, however, will remain for many years and outbreaks can be expected whenever sanitation precaution is relaxed.

Typhoid carriers cause most outbreaks of typhoid fever. These are individuals who, although apparently perfectly well, harbor the germs in their bodies and discharge them with their excreta. One or two percent of person who recovered from typhoid bacilli become carriers of typhoid for years or for life. Some of these contaminate water or milk supplies. Others engage in food handling and though soiled hands contaminate food which may serve as a source of infection for others.

The control of typhoid fever has been one of the great achievements of public health. We must assume that sources of infection still exist, and take precaution accordingly. All sewage must be considered infectious and all rivers

which pass through urban communities must be considered contaminated. When traveling in foreign countries, individual resistance to typhoid should be increased by the use of typhoid vaccine. In addition, we should use only milk products which have been pasteurized or boiled water not known to be safe, such as one encounters when touring or camping, should be boiled for otherwise disinfected.

#### **2.5.4 PARATYPHOID**

Adewole (1999) stressed that paratyphoid fever is similar to but milder than typhoid, it is transmitted and controlled in exactly the same way.

#### **2.6.5 DYSENTERY**

In the view of Adewole (1999), severe diarrhea with blood in the stool is called dysentery. There are two major types of dysentery; amebic and bacillary. Amebic dysentery is caused by a single cell organism called *Amoeba histolytica*. It is contracted from food or drink that has been contaminated with intestinal discharges containing the infective organism. The distribution of Amebic dysentery is probably world-wide, but it is much more common in the tropics and sub-tropics than in temperate regions.

Where sanitary conditions are poor, the occurrence of the disease may be high. Prevention depends upon providing safe drinking water and avoiding raw fruits and vegetables which may have been contaminated with the organism.

Bacillary dysentery is caused by a germ called the dysentery bacillus. Like amebic dysentery it occurs most frequently in tropical and subtropical

regions and is transmitted by food and drink which have been contaminated by the intestinal discharges of patients or carriers. Prevention depends upon the same general sanitary measures as are employed for the prevention of amebic dysentery.

Cholera is severe and highly fatal disease of the intestinal, with such violent diarrhea and vomiting that the body literally shrinks from the loss of water. The cholera germ is spread almost entirely through drinking water and its spread is effectively controlled by adequate purification and sanitation of water supplies.

#### **2.5.5 WATER SUPPLY**

According to Ministry of Education in Nigeria (1958) and WHO (1996), an adequate supply of pure water for drinking, cleansing and industrial processes of every kind is the single most important need of a modern community. In most of the large towns in Great Britain the average supply of water per head is 30 to 40 gallons a day, though this figure (which includes water used for personal, municipal and industrial purposes) may rise to as much as 80 to 100 gallons because of the number or nature of local industries. In many areas it is not easy to ensure adequate water supplies, particularly where industrial use or the population is rising; the avoidance of waste has already become a matter of great importance and careful use begins with the individual. The sources are usually wells, springs, rivers or lakes. Water taken from shallow wells or rivers must undergo a systematic process of purification in view of possible pollution by sewage, animals, factory effluent and sometimes house refuse; the pollution of wells through cesspools, manure- heaps, or decomposing animal matter reflects

personal inadvertence, and each individual citizen shares the responsibility for preventing such nuisance from developing at the outset. Where there is pollution, disease germs such as those of typhoid fever may gain access to water derived from a well or river near to some source of pollution. If (perhaps in emergency) the purity of a particular water supply is suspect, any water intended for drinking should be boiled first. But water supplied through the public mains has normally been purified at the outset, filtration and chlorination are the basis of water purification all over the world. In this country the water supply of towns is rarely a danger to health, as elaborate precautions are taken to prevent its contamination at the source, during transit or in any other way. Another major source of pollution may be the presence of chemicals, such as lead in solution; lead is sometimes found in very soft water, as a result of acids in the water attacking unlined lead pipes, and boiling is no protection against such a danger.

#### **2.5.6 WATER SUPPLY AND USE**

According to Institute of Education, University of Ibadan (1983) Water is a prime necessity of life, second only to the air we breathe. Apart from the fact that we drink it, water is used for domestic purposes such as cooking, bathing, washing, eating utensils clothes. Water is also used for manufacturing and industrial purposes, as well as for irrigation etc. The human population is on the increase, industries continue to expand, and the uses of water continue to multiply yet the quantity of water remains in most cases the same or even greatly reduced. Water still remains the most important commodity man consumes, and

the consumption will continue to go up steadily, with regard to domestic, industrial and irrigation purposes.

## **2.6 REFUSE DISPOSAL**

Institute of Education University of Ibadan (1983) stressed that refuse includes all the solid waste materials from human habitations except sewage – primarily ashes, rubbish, and garbage. Refuse also accumulates from industrial establishments. Ashes are now of minor importance in household wastes of many cities due to the use of oil, gas, and electricity for the heating of dwellings. Garbage is the refuse (vegetable, animal and food waste) resulting from the preparation cooking and serving of food.

Rubbish includes oil household and business refuse like rags paper, excelsion and other packing materials, wood, grease, crockery, metals, plastics and other solid wastes.

Most cities in advanced countries collect refuse at regular intervals. In some cities, all types of refuse are mixed and collected together. In other cities garbage and rubbish are kept in separate containers and collected separately. In some cases there is separation of the noncombustible from the combustible rubbish. Turner (1971), states that refuse consists essentially of garbage, ashes, and rubbish (boxes), paper, plastic wasted and occasionally such things as dead animals, leaves, grass and shrub cuttings where these occur need to be disposed and they also constitute refuse. Garbage is the domestic or kitchen



waste product. It is one of the most significant health problems of the school because it provided feeds for insects, rodents and dogs.

Nkom and Essien (2002) stressed that the government has the responsibility both for the collection and the disposal of garbage and refuse. Government here implies State government, Local government or their agencies, whatever, government agency is charged with the job; the health authority must shoulder the responsibility for proper sanitation relating to refuse. There will be need for the Health Ministry of a State or Health Committee of a Local Government to work in collaboration with the government agency and assigned duty of refuse collection and disposal.

### **2.6.1 REFUSE COLLECTION**

According to WHO (1971) this refers to the point where and how the various household bins or bins used in markets stall and offices are emptied. In most Nigerian urban centers, since the institution of sanitation authorities, collection points have been provided along the streets and in some cases collection services workers move round with their vehicles with bells in their hands for every household to empty their bins into their collection vehicles.

In most rural communities, however, collection service is not available. Household bins are emptied by the roadside and carelessly spilled even on the premises. As the government intensifies proper collection of refuse the urban areas, towns union and village health communities should embark on sound collection in our rural communities.

Disposal of refuse: At present some of the following methods of disposal are recognized;

- a) Controlled tipping
- b) Pulverization
- c) Incineration
- d) Burning
- e) Dumping in the sea or river
- f) Composting or decomposition
- g) Open dumping.

The first three methods above (a-c) are recommended while we discourage the use of the last four methods (d-g),

- a) **Controlled tipping:** Pits or dry land may be used in this method. The rubbish is tipped each day in a planned manner and covered with a layer of soil. The earth cover is compacted. If pits are used instead of dry land as explained above, the pit should have a cover and in an enclosed place with a door leading to the pit.
- b) **Pulverization:** This is a method whereby refuse is broken into pieces by machines. It is recommended because it is sometimes used as a preliminary to controlled tipping. It may also serve a useful mixture for fertilizing and lightening heavy soil. Above all, it is incombustible.
- c) **Incineration:** This is a method whereby solid refuse is burnt in an incinerator. The rubbish is put inside the incinerator and burnt. The ash

formed is removed to make room for another burning. This seems the most hygienic method of disposal.

- d) Burning: Burning is the same as the burning described in incineration except that burning in incineration is controlled while in this, burning is the open type in this type of burning cans and broken bottles litter the place while smoke and odours pollute the air it is also a fire risk.
- e) Dumping in the river or sea: This as the name implies is collecting all the rubbish and dumping it into the river. It soils the rivers and litter the shore lines to the extent of constituting an accident hazard to users of such a river.. Composting or Decomposing: This is not easy because all bottles, tins, ashes, etc. must be removed first which require further disposal. A large pit is made and the rubbish collected into it is then covered to allow the action of bacteria. It requires frequent turning.
- f) Open dumping: a good number of rural communities practice this. It simply means dumping refuse in any open space which are not covered. They are worst if they are close to houses. It provides ideal breeding places for vectors, pests and rodents.

### **2.6.2 GARBAGE:**

According to Patrick (1980) because all communities generate garbage established routines for the control, storage, collection, and disposal of garbage will be required. These needs must be reflected in initial site planning. If uncontrolled, the accumulation of garbage is both unpleasant and unhealthy. Rodent-and insect-borne diseases increase with improper garbage disposal.

UNICEF (1995) recommended that the collection of garbage from containers should take place on a regular, daily basis, if possible in daily collection centers.

The above suggestions for garbage storage, collection, and disposal are of particular concern for high-density camps, where the problem and dangers are greatest.

Nwanta (2002) stated that, there are several methods of refuse disposal used by many of the advanced countries of the world. These include the open dumps, sanitary land fill, incineration (burning) hog-feeding (feeding garbage to pigs) reduction and grinding. We shall discuss those methods that are more common in Nigeria.

### **2.6.3 TOXIC WASTES:**

According to WHO (1974) each year the average American produces up to one ton of waste materials. Most of the waste produced is not harmful. However, some of the waste, especially materials produced by factories, is toxic. Toxic is a term that means deadly or poisonous.

For many year, toxic wastes were just buried in the ground in dumps around the country. Often they were not even put in protective containers. Some of these wastes have leaked into the soil and into water supplies.

Some of the toxic wastes that were stored in containers have begun to leak out in the 1970s, people living near the Love Canal in Niagara Falls, New York, found out how dangerous toxic waste could be. Toxic waste that has been dumped in the Love Canal leaked into the ground and into the community's water supply. People became sick. Some of the waste seems to have been mutagenic. A

mutagenic substance (Myoo tuh JEN IK) is one that causes changes in genes leading to birth defects or miscarriages. In 1979, only two of the twelve babies born to women living near the Love Canal were normal. People had to move from their homes to avoid further poisoning. Despite efforts to clean up the toxic wastes, some of the poison remains in the water supply.

Chemicals found in toxic waste can cause many health problems. Many are carcinogenic, or cause cancers. Scientists and public health officials are working to find safer ways of getting rid of toxic wastes. Cleaning up the most dangerous of the oil dumps will also be necessary. The EPA estimates that it will cost over 11 Billion dollars to clean up 2000 of the worst toxic waste dumps in the United States Akinjide (1997).

#### **2.6.4 DUMPS**

Akinjide (1997) Dump is simply a selected spot in which all the garbage and refuse are collected. It is therefore a central point. Sometimes, the dump is set on fire, but it can create smoke and smell. In addition, dumps provide breeding places for rats, cockroaches and other germs. However, if the dump is in an isolated area, far from the human community, it can be a good method with adequate supervision.

#### **2.6.5 SANITARY LAND-FILL**

According to Akinjide (1997) sanitary landfill is a depression or an excavated ditch in the ground into which the refuse is dumped and then covered with earth or soil. This method, apart from being free from rats and insects,

serves to reclaim waste lands and makes them useable for farming in due course.

#### **2.6.6 INCINERATION (BURNING)**

Adeoye (1992) stated that, this method, the garbage and refuse are put into the furnace of the incinerator. In the well-equipped incinerator, magnetic separators remove cans, tins and other metal objects. Oil, gas or coal is sometimes used to help in maximum burning of the garbage and refuse. This is the most acceptable method of disposal, but it is a most expensive method that Nigeria can least afford. But we can continue to use the improvised incineration method often seen around. This is made of mud or cement wall with an opening at the top like chimney outlet for smoke and a square or rectangular passage at the base through which the rubbish is shoveled into the incinerator. However this method has the terrible smoke and smell problem, like the open dump discussed first.

#### **2.6.7 REDUCTION OF LITTERS**

According to Tawfiq Ladan (1999) Garbage and refuse are things we cannot run away from, and efforts must be made by our government to contain the situation. But what can we do as individuals? Has it ever occurred to us that we can help to keep our environment clean and healthy by not littering things about? How many times have seen passengers in commercial vehicles throw orange or banana peel out of the vehicle? Every woman is anxious to keep her immediate surrounding clean even though it means that she has to sweep the rubbish made by her into the passage way. When every one on both sides of the

passage way does the same thing it is little wonder that the passage becomes a little ridge which customers try to stride over. While the collection and disposal of garbage and refuse are the responsibility of the government agencies, it is necessary as citizens for us to contribute our quota by trying to maintain and attractive environment.

#### **2.6.8 DISPOSAL GARBAGE AND REFUSE**

Tawfiq Ladan (1999) noted that garbage can be disposed by burying it at designated locations on the site or removing it from the site. Open dumping of garbage onsite should be avoided if garbage has to be dumped, it should be dumped far from the displaced people. The ashes should be covered with a layer of soil after each burning.

The safe disposal of all medical waste requires particular attention.. Needles and scalpels are especially dangerous. Medical waste must be tightly controlled. It should be collected transported, and disposed of separately. Medical waste should always be turned without delay. This should be done in an incinerator to ensure a hot complete burning. Designated areas where medical garbage and/or ashes to be buried should be located far from dwellings and fenced to restrict access.

#### **2.6.9 DUST**

Patrick (1980) observed that large amounts of dust carried through the air can contaminate food and be harmful to human health by irritating eyes, the respiratory system, and skin. Dust control can be achieved by spraying roads

with water or oil, especially around health facilities and feeding centers, as well as limiting or banning traffic from certain areas.

### **2.7.0 SEWAGE DISPOSAL (HUMAN WASTE)**

Turner (1974) and WHO (1988) stressed that, sewage is the materials discharged into sewers of city or community. It is more than 99% water. (Sewage should not be confused with the word sewer, which is the pipe or with sewerage, which refers to the collection systems plus the treatment works).

We have learned that human waste could be great threat to human health if not properly managed because it may carry disease germs that can cause typhoid fever, dysentery, cholera, hookworm and other intestinal diseases. We have also learned that improper disposal of human wastes, house hold garbage and refuse may not only contaminate the water, food and soil but also endanger the live and health of the people.

Sewages systems collect domestic and industrial wastes and carry them to a sewage treatment plant or directly to a point of discharge, usually the discharge is into a river or large lake, but rarely is there sufficient dilution to permit this without serious objection. This means that in most situations sewage treatment is necessary. Such treatment may be not more than a settling process which removes the solids from the sewages and permits the liquid part to drain off into lake or river. On the other hand, the sewage treatment may be so complete that the end product is neither objectionable nor dangerous to health. Complete sewage treatment involves first a settling process, than oxidation,



filtration, and finally chlorination of the liquid effluent. In the absence of sewage systems, cesspools, chemical toilets or privies may be utilized.

### **2.7.1 CESSPOOLS**

According to Turner (1971), a common type of cesspool is built somewhat like a large well with the sides made of bricks or stones but laid so that the water may pass between them into the surrounding soil. Solids which accumulate at the bottom are greatly reduced in volume by the action of bacteria. If they are well constructed so to avoid contamination of drinking water, they will serve as one of the best methods of sewage disposal for a long period of time.

### **2.7.2 CHEMICAL CLOSETS**

Turner (1974) May be used inside the house in the absence of running water. They consist of a jar or an iron tank. The excreta are received into a strong solution of caustic soda which liquefies and disinfects the materials. Tanks which permit several months' storage are emptied by drainage into a cesspool or into a scavenger wagon. These closets are nearly free from odour, are sold by many manufacturers and can be used as a temporary expedient until a water carriage system can be installed.

### **2.7.3 PRIVIES**

Turner (1974) A sanitary privy requires a pit of proper depth and capacity, a tight building so constructed so as to protect the excreta from flies, chickens, domestic animals, rats etc, a floor above the ground level, a tight door that closes automatically seat covers that close when not in use, and durable screens over all openings for ventilation.

#### **2.7.4 UNDERGROUND SEWAGE DISPOSAL**

Turner (1974) stated ground constructions which carry away human wastes from the school principals or owners simply make connection from the school to the main public pipe. The human wastes from the city or town is then pumped to a central point where it undergoes a combination of several modern sewage treatment processes. Some of these treatments are septic tank and chlorination etc. Chlorination is only application in the city while septic tank can apply in the rural areas.

#### **2.7.5 SEPTIC TANK**

According to Turner (1974) septic tank is constructed with cement blocks and plastered. The excreta from the toilet enter one side of the tank. The liquid accompanying the excreta passes out from the opposite end of the tank while the action of the bacteria reduces the volume or amount of solid. But since the solid residue builds up with time, it becomes necessary to empty the Septic Tank periodically by pumping out the contents.

Turner (1971) stated that, an important duty of every school or community is the satisfactory removal and disposal of waste matter. Important disposal of domestic sewage and industrial waste not only endangers the public health but it may destroy fish and other aquatic life becomes such a public nuisance as to result in depreciation of property values. Pollution of lakes and streams may render them unfit for recreational purposes and for domestic and industrial uses. The use of streams for the disposal of sewage and industrial wastes introduced problems which are essentially of inter school or intercommunity concern.

Usually the pollution occurs down stream from the municipality when the wastes are derived. Hence the nuisance so created is of no concern to the school or community responsible for the nuisance but may be of vital concern to the schools or communities down stream. Frequently these rivers pass into another state so that stream pollution acquires an interstate aspect.

It is obvious, therefore, that a satisfactory solution to the problem of stream pollution requires exercise of the regulating authority by a larger unit of government than the local municipality. Many State health departments are charged with varying degrees of authority over this aspect of sanitation. Important and desirable as this may be, it does not attack the difficult interstate problems. The solution of the litter requires either interstate compacts or the investment of a federal agency, preferably the public Health service, with authority to regulate the pollution of interstate water Gyuse (1980).

#### **2.7.6 Sewage Disposal**

According to Fredrick (1987), the term sewage means more than human excreta and urine. Though it includes household waste and even factory discharges all of which are carried away by water for their disposal. Only the disposal of human excreta and urine will be discussed here. As human faeces and urine favour the breeding of many disease producing organisms, it is necessary that they should be disposed in such a way as to prevent the spread

of germs that may cause diseases. Apart from the spread of diseases, poor disposal of these materials is not good at sight and may produce bad smells.

**Surface Latrine:** People go into the bush and defecate, faeces accumulate on top of the ground. This should be discouraged (Fedrick 1987).

**Pit Latrine:** Pits are dug and constructed into a latrine. A sitting or squatting platform is usually provided with a concrete or wooden slab for a center taken away the flies and reduce the odour. This method seems the most popular in our rural communities and so requires a little more discussion. Pipes whose tops and open ends are covered with wire to prevent flies getting in or out of the latrine are fitted into the pit latrine to help reduce the heat that is usually produced by the decomposing materials in the pit. It should be swept, washed and disinfected daily (Fedrick 1987).

**Bucket Latrine:** Faeces are passed into buckets which are collected and emptied in the night. People who use such fresh and untreated faeces for fertilizing their soil stand the chance of spreading diseases. The bucket type of latrine should be strictly prohibited (Turner 1971).

**Bore-hole Latrine:** This is almost the same as the pit latrine. The only difference is that this may have some pool of water in it and it is much deeper than the ordinary pit latrine. The faeces in them gradually become liquid and may be absorbed by the soil Turner (1971).

**Drop Latrine:** Planks or logs of wood are used to construct a bridge over a stream such that people squat on them and “drop” their faeces into the river or stream which carries them away. The greatest danger here is that such streams

pass through other towns who may depend on it for their water supply Gyuse (1980).

**Chemical Latrine:** A water tight metal container is made into which faeces are passed. They are filled with caustic soda which act on the faeces causing their digestion and making them less dangerous. The tank is usually emptied and refilled with caustic soda Gyuse (1980).

**Trench Latrine:** In places where they are used, trenches are dug and sticks put across them such that people "perch" on them, and drop their faeces into the trench. It is open and the trench is usually shallow Turner (1971).

**Chess Pit:** In this, faeces are received in a large container and in a modern cesspit a mechanism is devised to pump the cesspit with a suction pump directed into certain pipes which drain them Gyuse (1980).

The septic tank and sewage works are the safest and most modern of disposing of faecal matter. They are very advanced methods which require money to be installed Turner (1971).

Environmental problems manifest in various forms and dimension, and the efforts are felt locally, nationally, continentally and globally. Nationally, every State of our Federation across the various ecological zones, suffers from one environmental degradation or the other. The North "blows" away erosion wind due to draught and desertification while the coastal South "wastes" away into the ocean. Gully erosion ravages the middle belt and most Southern States especially in the east, there are also the problems of flood and sewage, deforestation, agro-chemicals, bush burning, soil pollution, noise pollution, toxic

waste banned and expired hazardous chemicals, municipal wastes and general urban infrastructural decay Adetoye (1999).

Samuel (1991) expressed that population explosion; urbanization and Industrialization are the growing problems of air, water pollution and the disposal of domestic and industrial wastes. Our health is being threatened by air and water pollution, and we are in danger of being engulfed in treat. The continuing process of urbanization and industrialization are increasing the amount of waste products produced. Man increasingly polluted environment thereby increasingly demanding for government action and citizen co-operation.

Turner (1979) noted: some areas of world even today are without sanitary systems for the disposal of human and animals waste. They have neither rural septic system nor city sewage system. In these areas there exists a related prevalence of hookworm disease, typhoid fever and dysentery.

The problem with these refuse as source of pollution is that we are pouring more pollutants in to environment than it can be handled or disposed readily. For this reasons mountains of refuse litter around houses and streets thus hampering movement of traffic and the health of the citizens. The sheer force of poverty which drives people away from the rural areas into the exploding cities are producing even more skewed and undesirable environment where slums and poor sanitation produce the worst environmental conditions man has ever endured.

Human living generates waste. These wastes, according to Samuel (1991), are generated from house hold wastes, industrial wastes, agricultural

wastes, extraction wastes and sewage. Those wastes include specifically papers, plastics, fabrics, food peels, metals, glasses, wood and its remnant etc.

Turner (1979) and Samuel (1982) contributed that the problems that may result from poor sewage disposal and rapid decomposition of faeces in the tropics and consequent attraction of flies and spread of burns of diseased that constitute risks to human health.

Udoh (1980) stated that our rivers are polluted with urination and defecation, sewages are never cleared. Refuse litter everywhere, gutters, schools, roads, market places and town squares. Because of our unhealthy environment, insects, rodents are freely bred and these are source of sickness. He further stated that Nigerians naturally relish filthy surroundings. Regardless of the paucity of modern amenities, our great grand parents in rural areas have remained citadels of hygiene throughout the ages.

The problems of polluted environments are therefore, basically a disturbing phenomenon of urbanity, like several others sphere of our quince with all the attendant negative re-precautions on the environment.

### **2.7.7 WASTEWATER:**

According to WHO (1973) and UNICEF (1995), excess water from washing, bathing, and food preparation is considered wastewater will stand in malodorous, stagnant pools that provide breeding places for insects, especially mosquitoes wastewater should generally not be permitted to enter the latrine, as this will cause the latrine pit or trench to fill very quickly. However, if latrine pits or trenches are sufficiently large and the amount of water used for bathing is

relatively small, displaced people should be allowed to use the latrine area for bathing because it provide privacy and drainage. To avoid problems like those special separate washing areas with duck – boards or stones and proper drainage should be constructed.

#### **2.7.8 STORAGE:**

According to UNICEF (1995), to store garbage, garbage containers made of metal or plastic with a minimum capacity of 50 L should be provided. A 200 L oil drum cut in half is often used. Storage containers should have lids and drainage holes in the bottom. A ratio of 1 container per 10 families has proven to be effective. Containers should be placed throughout the camp so that no dwelling is located more than 15 m from a garbage container.

#### **2.7.9 DISPOSAL OF EXCRETA**

According to Turner (1971), safe disposal of excreta is critical because agents of most infections diseases are passed from the body in excreta. These excreted infections fall into four main groups: viruses, bacteria, protozoa, and worms (helminthes). Excreta, unless properly isolated, can also provide a breeding ground for insects, which act as either direct or indirect transmitters of disease.

Links between diseases, infection, means of transmission, and the sanitation system must be kept under constant surveillance. But the links are not always the most obvious. For example, the most important human link in transmission of an infection is the carrier who shows little or no sign of disease. Conversely, persons in an advanced state of diseases may have little or no importance in transmission.



Human waste is more dangerous than animal waste; therefore, the safe disposal of animal waste. Human faeces are much more dangerous than urine. However, in areas of African and the middle East where the schistosome *haematilum* species of bilharzias exists and in all areas where typhoid is common and endemic, disposal of urine requires special attention.

#### **2.7.10 SELECTION OF A SYSTEM-IMMEDIATE CONSIDERATIONS**

According Turner (1971) and Evans (1996) the selection of an appropriate excreta disposal system requires consideration of a number of factors. In an emergency, however, time is the critical factor. Pollution of the environment by excreta, with all its attendant risks, cannot be stopped without immediate sanitation measures. Thus, the range of choices is always much more limited at the very outset of an emergency; weeks or months cannot be lost in waiting for expert advice, construction to be completed, or material to arrive.

Temporary system to meet immediate needs can be improved or replaced later. In an emergency situation, act first and improve later. Emergency conditions may therefore dictate at least the initial use of trench latrines. These can be dug quickly and need less space than individual family units. While shallow trenches may be an initial quick solution, deep – trench latrines are incomparably more effective. Where space and soil conditions allow, the simplest and most common individual family unit is the pit latrine.

Once a temporary system has been established, more time and care should be expended to establish the most appropriate waste disposal system. Two main factors will affect the choice of an excreta disposal system: the traditional sanitation practices of the displaced people and the physical

characteristics of the area, including the geology, availability of water, rainfall, and drainage. Failure to take proper account of either factor can cause the system to rapidly become a health hazard. Above all, cleanliness of latrines and their ease of access will determine whether or not they are used.

First, it must be determined how the displaced people can modify their traditional practices to reduce health hazards during the emergency situation. Over one-half the world's population does not use latrines. This and other factors must be considered at the planning stage and it directly affect the type of system to be established. Other cultural factors to consider include:

- \* Previous sanitation system and practices.
- \* Method of anal cleaning.
- \* Preferred position (sitting or squatting).
- \* Need for privacy
- \* Segregation of sexes and other groups or individuals with whom it is culturally unacceptable to share a latrine.
- \* Cultural practices for children
- \* Cultural taboos (for example, avoiding contact with anything that may have touched excreta of others).
- \* Social factors, including likelihood of community action to ensure proper use of proposed system.
- \* Need for special orientation (direction) of latrine. Systems used locally in neighborhood of site.

In addition to these considerations, arrangements must be made to ensure the availability of appropriate anal-cleaning materials at or near all latrines. This is essential to the maintenance of hygiene. Also, latrines must be safe for children and women and be accessible at night. For individual units, families may provide their own lamps, but some form of lighting should be provided for communal units. In some cases, guards may be needed near the latrines to ensure security.

#### **2.7.11 IMMEDIATE ACTION:**

According to Oladipo (1990), in his consideration, suggested that the first group of displaced people arriving at a site should construct an adequate disposal system. Without proper facilities, displaced people are likely to defecate indiscriminately, contaminating their environment and possibly their water supply in consultation with community leaders, the first step is to localize excreta; that is, control surface defecation. If space allows, designate an area or areas away from dwellings and downwind but accessible and close in proximity. Fence the area(s), ensure privacy, and provide a shallow trench and spades, if possible, cover such areas where the surface runoff during rain will not cause contamination, and protect the area with cutoff ditches.

A publicity campaign will be required to encourage the population to use specified areas and not defecate indiscriminately near dwellings. Measures must also be taken to prevent defecation or urination in or near the water supply. Immediate action in both regards can significantly reduce public health hazards.

If the ground is flooded or marshy or has a high water table, arrangements must be made as soon as possible to physically contain the excreta. Under such conditions, the location of the area, away from dwellings and the water source, is very important. Pending a proper containment system, a simple raised structure (for example a wooden stage some 50cm high) can prevent the population from being contaminated by their own excreta. Empty 200-L(45-Gallon) oil drums can also be used if one end of the drum is cut out and then inserted opened down into a hole that is as deep as the water allow, with the last half meter of the drum left above ground. A small hole should be cut into the above ground end of the drum to transform it into a squatting plate. These options should be viewed as very short-term sanitation interventions.

#### **2.7.12 LONG-TERM OPTIONS:**

According to Gyuse (1980), for a number of reasons, expert advice is required to develop the most appropriate waste disposal system. The nature of the soil will be important; if it is highly impervious, some systems will be precluded. The availability of water and cultural considerations must also be considered. There are many simple options, if properly constructed and maintained, that will meet all public health requirements. In most emergencies, two main types of latrines will be required, even for displaced people unaccustomed to them. Trenches, pits, or holes in the ground can be used as dry latrines water-dependent latrines can be flushed. There are also systems based on the composting or cartage of excreta.

In hot, dry climates where sufficient space is available, localized defecation areas located away from dwelling may be the best long-term arrangement, as heat and sunlight render the faeces harmless with time. Flack rock is the best surface. Under these conditions, potential health hazards in the area (for example, an increased number of rats) should be periodically reviewed.

If the camp is on the coast, displaced people may choose to defecate in the water. While this is less harmful for the displaced people than to indiscriminately defecate on land, it should be discouraged unless there is no other option. The dangers of defecating in the water increase greatly with numbers. Such practices contaminate the high water line, and increase the health hazards of washing in the sea. Defecation in bays, estuaries, or lagoons where fish or shell fish are caught should be greatly discouraged, since this may be a source of infection.

### **2.7.13 LATRINE STYLES AND CONSIDERATION:**

According to Gyuse (1980), there are three basic latrine styles: individual family units, centralized units with each latrine allocated to an individual family, and communal systems. Individual family units are the preferred solution, because people will always make more of an effort to keep their own latrine clean than a communal facility. To determine the most appropriate latrine style, consideration must be given to a number of factors, such as the number and sitting of latrines, population density, soil, available water, drainage, and construction materials.

- (a) Number and sitting of Latrines. As a rule, at least 1 latrine (drop hole) should be provided for every 20 people. Latrines should be located at least 6m from dwellings, 10m from feeding and health centres, and at least 15 m (and preferably farther) from wells or other drinking water sources. Although all these distances depend on latrine and soil and soil type, latrines should be located no more than 50 m from user. If people must walk a considerable distance to a latrine, they will defecate in a more convenient location, regardless of the health hazard.
- (b) Even when in working order, latrines will not be used unless they are clean. Individual family latrines are generally preferable, because people will always make more of an effort to keep their own latrine clean than a communal facility. Emergency conditions may dictate at least the initial use of trench latrines. The following standards for pit latrines are desirable:

FACILITY	STANDARD
Latrines family	Not more than 4 families per latrine without organized, paid maintenance. Latrines should be locate at least 6 m from dwellings, 10m from feeding and health centers, and at least 15m (and preferably farther) from wells or other drinking water sources, but no more than 50 meters from users.

Trench latrines, shallow (for a few days)	30cm wide by 1m to 1.5m deep by 3.5m long 100 people
Trench latrines, deep (for a few months)	70 cm to 100 cm wide by 2m to 2.75m deep by 3.75 long/100 people.

### **2.8.0 CONTROL OF DISEASES VECTORS**

According to Turner (1971), the environment in a displaced person emergence is conducive to the proliferation of disease – carrying insects and rodents (vectors) that can also destroy or spoil large quantities of food. Flies tend to breed in areas where food or human excreta are present, and mosquitoes is critical. Rats are also a problem as they live where there is food, garbage, and cover, as a result of overcrowding and inadequate problems.

Reducing the numbers of flies, mosquitoes, and rodents quickly in an emergency may be difficult but physical screens can be used to control the immediate problem. The most effective long-term method of controlling insect and rodents is to make the environment less favourable for the vectors. This is done by improving personal hygiene, sanitation, drainage, garbage disposal and food storage and handling practices. Practical measures including removing stagnant wastewater, collecting garbage on a regular basis, using oil in latrines, and providing soap and sufficient water for washing. These measures should be integrated into a regular inspected program with other health measures.

Vector control methods using insecticides and poisons can be dangerous like all methods using chemicals. They should be closely followed, monitored by

specialists and supervised. All major efforts to control insects and rodents must be closely coordinated with national programs and practices, especially with the national malaria control program. Although several methods may be used, insect breeding grounds and the displaced people's dwellings may be sprayed. Since insects may already have, and can quickly develop a resistance to chemicals, a rotation system using different sprays may be necessary. Local knowledge of existing resistance is required. Poison and traps may be used against rats in food storage and handling areas. Particular care must be taken in disposing of dead rats, which may carry plague-bearing fleas. Chemicals spraying and rodent poison can be dangerous to humans, if not handled with care.

The body louse, usually found on inner clothing seems is the only proven vector of louse-borne (epidemic) typhus and epidemic relapsing fever. If there is a serious increase in body louse infestation, quick action is required by properly trained personnel. This generally includes dusting individuals inner clothing and bedding with an insecticides or fumigation clothing. There is widespread resistance of lice to some insecticides, especially DDT, and expert/local advice must be sought. Mass washing of clothing is not recommended as a water temperature of at least 52°C must be maintained to kill the lice.

## **2.10 SOLID WASTES MANAGEMENT IN NIGERIA**

According to WHO (1971) the term solid waste refers to refuse from human habitation except sewage primarily ashes, rubbish and garbage. Refuse also accumulates from industrial establishments. Ashes are now of minor importance in household wastes of many cities due to use of oil gas from the



heating of dwelling Ogundele (1985). Garbage is the refuse resulting from the preparation of cooking and serving of food. Rubbish includes household and business refuse not classified as garbage or ashes (rags, paper, wood, glass metals and plastics).

Gyuse (1985) defined solid waste as whatever is considered useless by the user and therefore discarded. This material that has been used and is no longer serviceable or it could be raw material left over from some other utilitarian pursuit. Solid waste is one of the fundamental environmental health problems in our urban and peri-urban cities of the world, Nigeria inclusive. Although the general public is now becoming increasingly aware of the danger inherent in inadequate solid waste disposal, the state of affairs is that solid waste management problem is related to concentrated nature of the population and consequent concentration of solid waste as well as the greater likelihood of pathogenic contact with humans.

Gyuse (1985) stated that with the recent growth of villages to towns and towns to cities, it is now becoming highly impossible to cope with the solid wastes, therefore new methods of solid waste management has to evolve. From time immemorial, waste would be converted to manure by the process of biodegradation, but with the advent of technological sophisticated products such as plastic, bottles etc are no longer easy to bio-degrade. For instance, most cities in Nigeria in the last decade has grown at an alarming rate. Lagos, for instance, has grown at a phenomenal rate of 14% per annum (Gyuse, 1985) and today nearly all Nigerian, live in a center of population of 5,000 or more.

Gyuse (1985) also asserted that since 1840 the world cities has been growing at phenomenal rates. In USA, for instance, only 15% of the population was urban in 1800 by 1900 AD there were 40% and by 1976 fully 75% of the population lived in urban settlements with the populations of 2,500 and above.

From all these information given above, there is bound to be differed types of waste products and various ways of discarding the wastes in order not to make it a health hazard to the inhabitants living closer to the disposal zone.

One classification quoted by Gyuse (1985) grouped all solid wastes into seven categories namely garbage, rubbish, ashes, street refuse, dead animals, abandoned automobile, demolition wastes and construction wastes. Method of solid waste management in Nigeria is controlled tipping, this is an effective and proven method for hygienic disposal of refuse and can be used whenever efficient and suitable land is available, Basically, it consists of four steps Udoh (1980) namely:

- (1) Depositing refuse in a planned control manner.
- (2) Spreading and compacting it into layers to reduce its volume
- (3) Covering the material with a layer of earth
- (4) Compacting the earth cover.

The initial investment is low and health hazards fire and nuisance are eliminated. At household level, very few house outside the elite GRA's are refuse receptacles. Refuse are deposited on the street. In a study at Ibadan (Udoh, 1980) it was found that only 18% of plots had any street refuse receptacles. This creates a number of problems. The refuse decomposition on the street is a

nuisance because of odours, it is also a breeding ground for flies which may carry diseases like dysentery and in some cases the refuse blocks water channels creating stagnant pools favoured as breeding ground for mosquitoes.

## **2.11 ENVIRONMENTAL HEALTH PROBLEMS**

University of Ibadan Study Series (1983) stressed that conditions of modern way of life have created many problems relating to man's environment. There are three sub-factors of environment which affect the human health, namely physical factors, biological factors and social factors. Examples of physical factors are; weather, climate, housing, soil, and food supply, air (clean or polluted) etc.

Examples of biological factors were given as germs, insects, rodents, plants, animals and even human beings. We will however focus attention on the following problems areas in our environment. General sanitation problem, water supply and use, sewage and refuse disposal, control of pesticides (insects and rodents) housing and ventilation and recreational activities.

Akinjide (1997) reported that, "although man is but a component of the environment", we usually define environment within the context of environmental management entities outside of man and supporting the existence of man, whether on land, in water or air, the environment is undoubtedly the very basis of human existence. A drama whose containerize time and grand finals, if any, are lost to use mortals (Akinjide, 1997). Resulting from this Drama of interaction are various problems such as those of natural hazards which we call disasters when they result in human and economic loses as well as social misery. There are

also the man-made or man provoked problems due to bad planning, poor management excessive consumption pattern, resources depilation.

## 2.12 **SUMMARY**

In this chapter, the related literature to health knowledge and environmental sanitation were reviewed. health involves the control of adequate drinking water supply, sewage (human waste) and refuse disposal; protection of food we eat, housing, the control of insects rodents and pollution generated from industrial wastes. These control functions constitute a major aspect of the environmental health programme. The responsibility for such controls rest with each member of the family, teachers and other staff in the school, employers in the work places.



## **CHAPTER THREE**

### **METHODOLOGY AND PROCEDURE**

#### **3.6 Introduction**

The population and sample used for this study and the method with which the population was obtained were described in this chapter. The chapter also contained the description of the instrument used for the collection of data and the statistical method adopted in analyzing the data collected.

#### **3.7 Research Design**

The study adopted ex-post facto research design since it was concerned with investigation of past occurrences. A survey method was therefore adopted in determining the level of the health knowledge of the Senior Secondary School Students in the Taraba state. The research is one in which a group of items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The research is therefore a descriptive type using specifically a survey design.

#### **3.8 Population of the Study**

The study was carried out in some selected areas in eight Local Government Areas of Taraba State. The population of the study consisted of mainly Senior Secondary School Students between SSS I, SSS II and SSS III. In this study the total population is estimated to be 6,299 students with age ranging below 12 and 16 years. The list of the selected Local Government Areas are shown in Table 3.1.

**Table 3.1: Selected Local Government Areas and with the population of students**

<b>LGA</b>	<b>No of Schools in LGAs</b>	<b>Schools</b>	<b>Total Students Population</b>	<b>Sample selected</b>
Bali	6	GTTS Bali	211	50
		GDSS Suntai Bali	58	10
Gashaka	3	GDS A S serti	764	85
		GDSS Serti	501	75
Gassol	6	LGDSS Mutun Biyu	308	63
		GdSS Tella	257	55
Sarduna	4	GSSS Gembu	480	65
		GDSS Dorofi	185	38
Wukari	13	GDSS Wukari	904	98
		GDSS R/Kada	220	52
Takum	13	GCSS Takum	518	78
		GDSS Nyayirim	106	35
Ibi	8	GSS Ibi	771	95
		GDSS Danpar	97	25
Kurmi	7	GSS Baissa	636	80
		GDSS Abong	283	56
<b>Total</b>	<b>60</b>		<b>6299</b>	<b>960</b>

### **3.4 Sample Selection and Technique**

For the purpose of this study, the sampling technique used was multi-stage random sampling technique. There are three senatorial zones in Taraba States, namely; Northern Senatorial Zone, Central Senatorial Zone, and Southern Senatorial Zone. Out of the three senatorial Zones, two zones were chosen by simply tossing the names of the three zones written on pieces of

paper and picking only two. The two zones picked were: Central Senatorial Zone and South Senatorial Zone.

In the two senatorial zones picked, there are a total of five Local Government Areas. Another round of paper tossing took place and four Local Government Areas were picked from each of the senatorial Zones – making a total of 8 Local Government Areas from the two zones.

Thereafter, the list of all schools on each of the eight Local Government Areas (totaling 60) were compiled out of which two schools in each Local Government Area were randomly selected giving a total of 16 schools. It is out of these 16 schools that students were randomly selected for this study. To choose the respondents in the schools, the researcher numbered some pieces of papers and others he did not number and folded them. He then asked the students to pick. Those that picked with numbers were those that the questionnaire were given and those that picked the blank papers, questionnaires were not given to them. This was followed with explanation and interview. Out of a total of 6,299 estimated enrolled student population in the 16 Local Government Areas, 960 students were eventually used as target respondents. However, 952 students filled questionnaires were eventually used as six copies were not returned and two were considered invalid. (See Table 3.1).

### **3.5 Research Instrument**

The instrument used for this study consisted of mainly a Researcher developed questionnaire (see Appendix I). Apart from the demographic variables



of the respondents, all items were measured along the 4 point modified Likert Scale system. With points assigned were as stated below.

Strongly Agree	-	4 points
Agree	-	3 points
Disagree	-	2 points
Strongly Disagree	-	1 point
Undecided	-	0 point

### **3.6 Validity of the Instrument**

In validating the research instrument, the researcher presented a draft copy of questionnaire designed to his supervisors for their evaluation of items stated based on the variables of the study. The prepared questionnaire was distributed to experts within and outside the Faculty of Education, Ahmadu Bello University, Zaria. These experts served as jurors for vetting and assessing the face validity of the instrument. Their comments and suggestions were taken into consideration and reflected on the final draft of the questionnaire, which was administered to the respondents in the study.

### **3.7 PROCEDURE FOR DATA COLLECTION**

I carried these questionnaires schedule personally and distributed to schools. Collection of data involved writing initially to solicit for permission, cooperation and assistance of principals and teaching Staff of Senior Secondary Schools in the eight Local Government Areas selected. The Senior Secondary Schools were randomly selected and copies of the questionnaire were distributed

to the various students in the 16 schools in Taraba State. The data were collected with the aid of the principals and teaching staff of the 16 schools from eight Local Governments Areas of Taraba State. The School teachers who were conversant with the students helped in the collection of the filled questionnaire.

### **3.8 ADMINISTRATION OF INSTRUMENT**

The researcher visited each of the school selected for the study. The researcher visited the schools in the morning to see how students perform their morning functions. Questionnaire were given to the students and they were instructed on how to fill it. Those served with the questionnaires were instructed to wait behind after closing hours. After school, all the students that were given questionnaires assembled and were instructed on how to complete the questionnaires and return them the next day. Nine hundred and sixty questionnaires were given to the respondents. However six questionnaires were not return and two questionnaires were not properly filled and therefore unused, 952 questionnaires were used for data analysis.

#### **Procedure for Data Analysis**

Data collected for this study were subjected to statistical analysis using descriptive statistics such as frequencies, means, standard deviation and standard Error in describing the responses of students to the various items in the questionnaire. In the test of the hypotheses, Pearson Product Moment

Correlation (PPMC) procedure and the t-test procedure were used. All hypotheses were accepted or rejected at 0.05, level of significance.

## **CHAPTER FOUR**

### **RESULT AND DISSCUSIONS**

#### **5.0 Introduction**

This chapter discussed the data collected from the respondents, through the questionnaire administered on Influence of knowledge of environmental sanitation on health practices of senior secondary schools students in Taraba State. In the course of the discussions of the result from the data, tables of frequencies and percentages were used along items such as mean score. In this chapter, the hypotheses raised in the study were also tested and solution proffered to the research questions raise in the study. At the end of the chapter, a discussion of the finding was presented.

#### **5.1 Presentation of demographic variable**

The researcher made use of nine hundred and fifty two (952) students for the study. Nine hundred and fifty two (952) senior secondary school students made up of 560 or 58.8% males and 392 or 41.2% females were involved in this study. Table 4.1a showed the demographic characteristics of the respondents.

#### **Table 4.1a Demographic variables of the respondents**

Age distribution		
Range	Frequency	Percentage
< 12yrs	157	16.5
13-14yrs	229	24.1
14-16yrs	262	27.5
>16yrs	304	31.9
Total	952	100.0

Table 4.1b shows that the age of the students was skewed towards 16 years and below.

Generally this is expected among senior secondary school students since they started at the lower age and move on with the time in the school. The distribution of the students by their classes as shown in Table 4.1b showed that all the students were in the senior secondary school level.

Table 4.1b Secondary school levels of respondents

Class	Frequency	Percentage
SS I	328	34.5
SS II	353	37.1
SS III	271	28.5
Total	952	100.0

These demographic characteristics of the students were some of the independent variables used in the test of the hypotheses. Along these demographic characteristics of the students are some basic questions, which provide the background of the students' health Knowledge. These questions were items 4 and 5 in section A of the instrument used for this survey. The first question was whether students receive teaching on personal hygiene in their respective schools.

Table 4.1c Teaching of Personal hygiene to the respondents

	Frequency	Percentage
Yes	582	61.1

No	370	38.9
Total	952	100.0

To this question, 582 (61.1%) of the students answered yes while 370 (38.9%) of the students said they did not receive such training or instructions in their schools.

**Table 4.2: Students' response on Health knowledge on environmental Sanitation**

Items on students' health knowledge	Mean	SD
1. Spring water is the best type of water for drinking	2.809	1.328
2. Rain water is the best source of drinking water	2.875	1.176
3. River water is better than all other sources water for drinking	2.500	1.389
4. Tap water is better than either of the above water for drinking	2.451	1.398
5. A good drinking water should be colourless, tasteless and free from smell	1.983	0.954
6. For a good environment to be maintained, all gutters must be free and allow free flow of water	2.070	1.339
7. The best method for waste disposal is to burn them	2.167	1.300
8. Burning waste is better than throwing them any where in the environment	2.653	1.035
9. Human waste are best disposed off in the places designated for them e.g. Latrine, toilet etc	2.568	1.235
10. To maintain a good hygienic condition, it is better we wash our hands after visiting latrine, Medical laboratories and other such places	2.564	1.167
11. It is preferable that every household owns a toilet system	2.858	1.114
12. Both adults and children should not be allow to defecate in open spaces	2.584	1.294
13. Bush burning should not be encouraged in the community	2.301	1.313
14. It is a good practice to clean the toilet daily	2.313	1.223
15. It is good to isolate people affected with communicable diseases in the community	2.221	1.212

16. A dirty environment contributes to the spread of diseases	2.083	0.814
17. Pollution of any kind should be avoided where possible	2.879	1.089
18. Pollution can be in form of water	2.813	1.231
19. Pollution can be in form of air	2.555	1.302
20. A clean environment is necessary for good health	2.747	0.973
Total mean	2.4997	

#### **4.2 Analysis of students' Health Knowledge on Environmental Sanitation**

The health knowledge on environmental sanitation of senior secondary school students were examined in this section. Items used in this analysis were measured with the modified Likert Scale system. Twenty items were used in assessment of influence of knowledge of environmental sanitation on health practices of senior secondary schools students. The highest score for each of the item is 4 while the minimum score is 0, representing the undecided option in the modified. Nworgu (1991) stated that based on the foregoing, the "undecided"(uncertain or neutral) point should mark the beginning of the scale. This point can be interpreted as absolute Zero since it corresponds to a complete absence of opinion/attitude in a particular circumstance. Table 4.2 showed the mean and standard deviation for each of the items scored by the respondents. Since 2 is the highest value for disagreement, the scores for the items were therefore tested against 2 for significant difference on the modified Likert Scale. In the first five items of the table, the students' knowledge of drinking water was

examined. Their score for the items 1-5 in Table 4.2 showed that they were knowledgeable about adequate good drinking water. The scores for each of the first four (4) items were higher than 2 which stands for disagreement on the Likert Scale. The only exemption to this general observed scores for the five items was item 5 in which the score is below 2 thereby indicating that even though the student have the knowledge of the source of good drinking water, they lacked the knowledge of the properties of good water.

On items 6 to 9, the students knowledge of the environment examined, shows that they have good knowledge on how a good environment should be maintained. For each of the items the score was higher than 2, which implied that the students agreed with most of the items suggested for the maintenance of a good environment in the area.

The responses to Items 10 to 12 are related to personal hygiene. From the scores on the items, it is clear that the students could not be said to be ignorant of the necessities and mode of maintaining personal hygienic condition. The score for each of the items is higher than 2, which is for disagreement on the modified Likert Scale.

Items 13 to 20 are on personal and environmental sanitation of the students and their environment. The response to item 13 in Table 4.2 showed that most of the students agreed that bush burning should not be encouraged in the community. The score for this item in the table was 2.301 with a standard deviation of 1.313. In the same vein, most of the students agreed that it is a good practice to clean the toilet daily. The score for this item (14) was 2.313 with a

standard deviation of 1.223. The students also agreed that it is good to isolate people affected with communicable diseases in the community so that epidemic could be avoided. The mean score for this item (15) was 2.221

In terms of the environmental sanitation, there was also an agreement by the students that a dirty environment could contribute to the spread of diseases in the community. And they agreed that pollution of any kind should be avoided where possible. The means scores for the last three item in the table shows that the students were aware of the various types of pollution, which could be in form of water and air. They therefore agreed that a healthy environment should be maintain. The general observation of the responses in the table clearly points to the fact that the senior secondary school students have good health knowledge on personal and environmental sanitation.

**Table 4.3: Analysis of students' sanitation practices**

Items on students' health practices	Mean	SD
1. The water we drink is from tap	2.063	1.374
2. Often times, we drink water that is coloured	2.696	1.240
3. We clean our gutters on a regular basis	2.708	1.311
4. Most of the times, we defecate in open spaces because we did not have a toilet system	1.220	1.411
5. Students in our school defecate freely in open spaces within the school environment	1.592	1.285
6. There is no proper waster disposal system in our school, individual throws refuse any where they wish	1.317	1.180
7. Our school is swept regularly	2.369	1.192
8. Every body is advice to get vaccinated against communicable diseases	1.685	1.199
9. I discourage burning of bushes in the home and in the school	2.133	0.867
10. I will rather encourage members of the community to have their individual toilets in their homes	2.570	1.397
11. It does not worry me if people defecate in open spaces in the community	2.397	1.373
12. It is not really a bad practice if members of the community embark on bush burning	2.463	1327



13. I did not believe that the best way to keep the school clean is to sweep it on a daily basis	2.735	1.275
14. It is a good practice if members of the community have dust bins in their houses for refuse disposal	2.505	1.205
15. It is not good to dump hazardous waste into gutters, rivers and other such places	2.503	1.150
16. Burning of tyres on the road is not good for the environment	2.388	1.180
17. It is necessary to keep human waste off from useable areas	2.548	1.190
18. The use of antiseptics helps to keep the environment free from contaminations	2.386	1.160
19. Washing of toilet is part of personal hygiene	2.489	1.171
20. Brushing of teeth every day is a good practice of personal hygiene	2.564	1.143
Total Mean	2.26655	

#### 4.3 Analysis of students' sanitation practices

In this section, the practices and others activities carried out by the students or others within the community are evaluated. Twenty items were used in this assessment. The items were basically concerned with practices of the students in terms of personal hygiene and sanitation practices that could have negative or positive effects on the environment. Table 4.3 showed the responses of the students on the sanitation practices in relation to their personal and environmental activities within their communities or schools.

The responses to items 1 and 2 showed that the students practice in terms of the water they drink could be attributed to their awareness. However, other factors, such as availability of the water could be a major factor in this regard. These external factors could be responsible for the response to item two where the students agreed that they drink coloured water some times.

The students also agreed from the mean score to item 3 in Table 4.3 that they clean the gutters regularly. And the mean score to item 4 shows that most of

the students disagreed that they defecate in open spaces because they did not have a toilet system. Also the students did not agree that students in the school defecate freely in open spaces within the school environment. And the students agree that there is no proper waste disposal system in their school, and as such, individual throws refuse any where they wish. However, they agreed that they clean and sweep their school compound on a regular basis.

On personal protection from communicable diseases, the students did not agree that every body should get vaccinated. The mean score for the item was less than 2, which implies that most of the students disagreed with the notion that every body should be advised to get immunized against communicable diseases in the area where they live and in the school.

On the practice of protecting the environment, most of the students agreed that they discourage burning of bushes in the home and in the school. Also, most of the students agreed that they would rather encourage members of the community to have their individual toilets in their homes rather than embarking on open space defecation. However, most of the students as indicated by the score of 2.397 of item 11 in table 4.3 showed that they did not seem worried if people in their community are practicing open space defecation. And most of the students did not see it as a problem when members of the community embarks in indiscriminate burning of bushes neither did most students believed that the best way to keep their school clean was to sweep it on a daily basis. But most of the students agreed that it would be a good practice if members of the community have dust bins in their houses for refuse disposal and also that it is a bad

practice to dump hazardous waste into gutters, rivers and other such places. Thus most of the students, as indicated by their mean score agreed that burning of tyres on the road has negative effect on the environment

In terms of personal hygiene, most of the students were of the opinion that it is necessary to keep human waste off from useable areas and that the use of antiseptics should be encouraged in order to keep the environment free from contaminations. The students also agreed with other personal sanitations like regular washing of teeth and toilets. These are indicated with the scores to the last two items in Table 4.3. The observation is in line with the postulation of Adetoye (1999) where it was advanced that awareness could have positive impact on practices carried out in an environment.

Table 4.4 Invitation of Health specialists. The third objective of this study was to find out whether schools invite specialists on health to talk to Senior Secondary School Students on their personal health and practices of environmental sanitation.

In response to this, most (498 or 52%) of the students indicated that their schools do not invite such health specialists to their schools. Only 454 (47.7%) of the students agreed that their schools do invite health officers to their schools (Table 4.4).

	Frequency	Percentage
Yes	454	47.7
No	498	52.3
Total	952	100.0

This indicate however that most of the schools do not invite health specialists to their schools. This does not augur well for the student health development. It is the health specialists who would import knowledge of health practices to students and when they are not given opportunity to do this, the students are denied knowledge of it.

#### 4.4 Test of the study's hypotheses

Two null hypotheses were raised in this study aimed at determining the knowledge and practice of personal hygiene and sanitation in relation to their environment. The hypotheses are as follows:

Hypothesis I: There is no significant relationship between student's health knowledge and practices in relation to their environment among senior secondary schools students in Taraba State.

This hypothesis stated whether the health related knowledge of students is reflected in their sanitation practices at both personal and at the societal level. The scores on Tables 4.2 and 4.3 above were used for this hypothesis. The Pearson Product Moment Correlation procedure was used for the test. Table 4.5 shows the result of the test.

**Table 4.5: Correlation between students' health knowledge and practice among senior secondary schools in Taraba state.**

Variables	Mean	SD	SE	R	DF	P
Knowledge	2.4997	0.3738	0.0121	0.4202	950	
Practice	2.26655	0.4188	0.0136			

$r$  critical df 950 0.05 = 0.062

The observed coefficient of correlation in Table 4.5 above is 0.4202 at 950 degree of freedom and the observed significant level is 0.0000 ( $P < 0.05$ ). This means that the two variables are significantly related. In other words, the health knowledge of the senior secondary school students is reflected in their personal sanitation practices as well as to their environmental sanitation. The null hypothesis is therefore rejected.

**Table 4.6: t-test on students' sanitation practices by students who received from specialist and those who did not.**

<b>Any instruction</b>	<b>Mean</b>	<b>SD</b>	<b>SE</b>	<b>t</b>
Yes	2.530	0.359	0.015	3.17
No	2.452	0.392	0.020	

t, df 950, 0.05 = 1.96

**Hypothesis II:** There is no significant difference between the personal health practices and environmental sanitation practices of Senior Secondary School Students in Taraba State who received instructions from health officials or specialist and those who did not.

Table 4.6 showed the result of Hypothesis II. The result showed that students who received health instruction on personal and environmental sanitation have higher score than those who did not. As indicated by the observed t-value and the significance in the table value, there is significant difference between the two groups ( $P < 0.05$ ). The null hypothesis could thus be rejected. The students who had health specialist invited to their schools were better in their personal and environmental sanitation practices than those who had no such health officials invited to their schools. The finding from this hypothesis tends to support Olayemi (1997) suggestion that people should be educated on their activities in the environment in which they live. They opined that such education would enlighten such people about the negative consequences of their action on their persons and the environment.

#### **4.5 DISCUSSION**

The questionnaire used for the study was directed to elicit information from the subjects regarding some variables. In response to whether personal hygiene was taught in the Schools, majority of the subjects 61.1% (582) responded that they were taught. This is in line with Nkom and Essien 2002 who are of the belief that practices relate to aptitudes abilities or the technical competence to handle needs that may arise with respect to water and sanitation including the ability to teach or impact these skills to others. On whether health specialists were invited to talk to students in the school, 52.3% (498) of the students responded that specialist were not invited.

Regarding students' response on Health knowledge and environmental sanitation, the students means score on 19 of the 20 items were above 2 which is the minimum for agreement this shows that the students have knowledge of environmental sanitation. Analysis of students' sanitation practices 16 of the 20 items were rated above 2 i.e the level of agreement which indicates that the student have some level of sanitary practices. For instance the student agree that burning of tyres on the road has negative effect on the environment which is in line with WHO (1971) observation, that open burning not only produces smokes and ordours that pollute the air but is also a fire risk. The respondents also agree that it is necessary to keep human waste off from useable areas, this is in line with the warning of WHO(1988) that improper disposal of human waste may not only contaminate the water, food and soil but also endanger life and health of people.

The two hypotheses tested were rejected thus showing that there is a significant relationship between the students knowledge and practice. Also it is revealed that students who received health instruction from health specialist have better practices of Environmental sanitation than those who did not.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

#### **5.1 Introduction**

The purpose of this chapter is to summarize the study, draw conclusions from the findings and make recommendations that will help to improve the environmental sanitation among the schools in Taraba State.

The chapter is organized according to the following sub-headings:

- Introduction;
- Summary of findings;
- Conclusion; and
- Recommendations.

#### **5.1 SUMMARY OF FINDINGS**

The findings of the study revealed that:

1. Senior Secondary School Students of Taraba State have some knowledge of environmental sanitation.
2. There is a significant difference in the personal and environmental practices of Senior Secondary School Students who received instructions from health

- officials and those who did not.
3. Fewer students had the privilege of invitation of health specialists to their schools.

## **5.2 CONCLUSION**

The findings from this study revealed, among others, that there was the need for health officials to be visiting secondary schools promoting enlightenment on environmental sanitation among secondary school students in Taraba State. Also, the study shows that students who are directly controlled and enlightened have better disposition in their environmental sanitation and practice.

## **5.3 RECOMMENDATIONS**

Based on the findings of this study, the researcher made the following recommendations:

1. The students should be encouraged to put their knowledge of environmental sanitation into action or practice.
2. The schools should invite expert or specialists to talk to students about environmental sanitation.
3. The Government should assist in providing health promoting facilities such as toilets, water supply, refuse bins, hand washing facilities, shovel etc in Senior Secondary Schools in Taraba State for proper executing of health practices.

## **5.4 FURTHER AREAS FOR RESEARCH**

Further research should be conducted on Health knowledge and practices of environmental sanitation in Secondary Schools, Federal and State Colleges of Education and Universities in Nigeria.



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## **APPENDIX A**

**DEPARTMENT OF PHYSICAL AND HEALTH EDUCATION  
AHMADU BELLO UNIVERSITY, ZARIA**

### **QUESTIONNAIRE**

#### **INSTRUCTION**

Please carefully read the statement below and tick the box that best agree with your opinion.

#### **SECTION 'A'**

##### **DEMOGRAPHIC VARIABLES**

1. Sex: Male ( ) Female ( )

2. Age: Below 12 ( ) 12 – 14 ( )  
 15 – 17 ( ) 18 years and above ( )
3. Class: SS I ( ) SS II ( )  
 SS III ( )
4. Do you receive teaching on personal hygiene in your schools?  
 Yes ( ) No ( )
5. Does the school invite health personnel to inspect and instruct students on health knowledge and practice in your school?  
 Yes ( ) No ( )

**SECTION 'B'**  
**HEALTH KNOWLEDGE OF THE STUDENTS**

**NOTE:**

- SA** - Strongly Agree  
**A** - Agree  
**D** - Disagree  
**SD** - Strongly Disagree  
**U** - Undecided

		SA	A	D	SD	U
1	Spring water is the best type of water for drinking					
2	Rain water is the best source of drinking water					
3	River water is best than all other water for drinking					
4	Tap water is better than other water drinking					
5	A good drinking water should be colourless, tasteless and free and free from smell.					
6	For a good environment to be maintained, a gutter must be free and allow free water to flow					
7	The best method for waste disposal is to burn them.					
8	Burning waste is better than throwing them any where in the environment					
9	Human waste are best disposed in the place designated for Them e.g. latrine, sock away etc.					
10	To maintain a good hygienic condition it is better we wash our hands after visiting latrine, laboratory etc.					
11	It is refer to ensure that every household is having toilet system.					
12	Humans, both adult and children should not be allowed to defecate in open space.					
13	Bush burning should not be the practice of the community.					
14	It is good to clean latrine daily.					
15	It is not good to isolate people affected with communicable diseased in the community.					
16	A dirty environment contributes to the spread of diseases.					
17	Pollution of any kind should be avoided where possible					

18	Pollution can be in a form of water					
19	Pollution can be in a form of air					
20	A clean environment is necessary for a good health.					

## SECTION 'C'

### SANITATION PRACTICE

		SA	A	D	SD	U
1	The water we drink is from tap.					
2	Often times we drink water that is coloured					
3	We clean gutter regularly.					
4	Most of the times we defecate in open space because we do not have toilet system.					
5	Students in our schools defecate freely in open space within the school environment.					
6	There is no proper waste disposal system in our school, individual throws refuse any where they wish					
7	Our school is swept regularly					
8	Every body is advised to get vaccinated against communicable diseases					
9	I discourage burning of bushes in the home and in the school					
10	I will rather encourage members of the community to have their Individual toilets in their homes.					
11	It does not worry me if people defecate in open spaces in the community					
12	It is not really a bad practice if member of the community embark on bush burning					
13	I did not believe that the best way to keep the school clean is to sweep it on a daily basis					
14	It is a good practice if members of the community have dust bins In their houses for refuse disposal					
15	It is not good to dump hazardous waste into gutters, rivers and other such places.					
16	Burning of tyres on the road is not good for the environment.					
17	It is necessary to keep human waste off from useable areas					
18	The use of antiseptics helps to keep the environment free from Contaminations					
19	Washing of toilet is part of personal hygiene					
20	Brushing of teeth every day is a good practice of personal hygiene					