



# **The Economic Impact Of Typhoid Fever Among Students In Tertiary Institutions Of Yobe State**

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## **ABSTRACT**

This research work is carried on economic impact of typhoid fever among students in tertiary institutions in Yobe state. The study was aimed at identifying the cause, predisposing factors of typhoid fever among students of the institutions, the ill effect of typhoid fever on students' income, Consumption, standard of living and their academic performance and to identify the ways of controlling and preventing the scourge of the typhoid fever. Samples of 100 students were selected from Yobe state university, Umar Suleiman College of Education, Gashua and Federal College of Education (Technical) Potiskum. Questionnaires were distributed to the respondents and the 100 questionnaires were filled appropriately and returned. The 100 filled questionnaires were analysed using simple percentage and pie chart. The finding of the study revealed that the hostel sanitary conditions of the schools are poor and that typhoid fever reduced their income level as well as their consumption and their standard of living. It also have negative effect on their academic performance as it affect their class attendance, hours read, and psychologically. Hence, the researcher concluded that the standard of environmental hygiene, water supply and sanitation is inadequate despite the fact that the school authority provide water to students and do repair damage pipes and toilets at times. The researcher therefore recommended that the school authorities, student union governments, religious bodies as well as individual student should improve the sanitary conditions of the school campus and the quality of water consumed. The school authority should as well supply typhoid drugs at reduced prices to the students in the institutions.

**Keywords:** Typhoid fever, Antibiotic, sanitation, morbidity and mortality

## **1.0 INTRODUCTION**

Typhoid fever is caused by the Gram-negative bacterium Salmonella Serovar Typhi. The disease is mainly associated with low socio economic status and poor hygiene, with human beings the only natural hosts and reservoir of infection. It is considered one of the most serious infections disease threat to public health on global scale with the particular concerned over the rapid and widespread emergency of resistance to multiple antibiotic (Akingemi et al 2005, Feng 200). The global concern over typhoid is a common and a serious disease among children and adults in Kenya where highly publicised outbreaks have strengthened this view among the public and health professionals. One consequence is the use of the widal test to screen febrile children and adults in inpatients and outpatients settings as few centres have the capacity to perform blood or marrow culture, the accepted good standard diagnostic tests (Wilke et al 2002).

The annual incidence of typhoid fever is estimated to be about 17 million cases Worldwide (WHO 2008). In Africa, it has an estimated crude incidence of 362 cases per 100,000 persons per year (Buckler et al 2012). In most endemic areas, approximately, 90% of enteric fever is typhoid and caused about 216,500 deaths worldwide (Kothari et al 2008, Yang 2008).

In Nigeria, the facilities for isolations and identification of these organisms in most private hospitals and medical laboratories are rarely unavailable (Onunkwo et al 2001). Many hospitals in the rural areas lack facilities for blood cultures; therefore up to 94% of the patients are treated as outpatients.

The prevalence of typhoid fever among the students of Yobe state has drastically reduce their income and thus reduce their standard of living as most of them spent their income on the purchase of typhoid drugs. These have directly and indirectly affects the performance of students in the examination. This research work is therefore aimed at investigating the extent to which typhoid fever has reduced the standard of living of the students and their performance in their examination.

### **1.1 Statement of problem**

Typhoid fever is still a common infection in many parts of the developing countries where sanitation and water supply are common problems. A recent study placed the disease burden at 12,650,974 illness and 216,510 deaths during year 2000. The infection is a major cause of morbidity and mortality in Nigeria. The disease burden from typhoid fever in Nigeria is still high with associated serious complications which in most cases have been managed effectively with the use of potent antibiotic and surgical intervention. However, the typhoid problem has been compounded by the emergency and circulation of multi-drug resistant strains of the organism being sensitive only to the newer generation antibiotics. Typhoid fever remains a major public health problem in Nigeria. The disease burden from typhoid fever in Nigeria is still high with associated serious complications. The typhoid problem has been compounded by the emergency and circulation of multi drug resistance strains of the organism being sensitive only to the newer generation antibiotics.

In a developed countries, advanced in public health and hygiene have leads to the virtual disappearance of typhoid fever while the disease remains endemic in many developing countries like Nigeria. In a community setting like schools, hostels, church etc poor hygiene, and sewage contamination of water supply are the most important means of transmission.

Most of the students in the tertiary institutions in Yobe state are from low income family. These students spent their little income on drugs. These affect their standard of living in the campus. Most of them find it difficult to cope academically due to frequent typhoid fever diagnosis. While some use to miss their examination due to the illness, others their performance is poor because of their inability to study before their examination.

### **1.2 Objectives of the Study**

- i. Identify the cause of the incidence and the predisposing factors of typhoid fever among the students in tertiary institutions in Yobe state.
- ii. Examine the effect of Typhoid Fever on the students income level and their standard of living
- iii. Identify the effect of typhoid fever on students' performance in Yobe state.
- iv. Examine the ways of controlling and management of typhoid fever among the students in tertiary institutions in Yobe state

## **2.0 CONCEPTUAL FRAMEWORK**

Typhoid fever is common worldwide disease transmitted by ingestion of foods and water contaminated with feaces of a person which contain the bacterium, *Salmonella typhi*. Typhoid fever is defined as acute illness, associated with that in most often cause by *Salmonella typhi* bacterium (medicine plus Encyclopedia). Evason and Mike (2008) define typhoid fever as a life threatening illness caused by bacterial salmonella typhoid and diarrhea and rashes, most commonly due to type of bacteria called salmonella typhi. Anne and Allison (2010) defined typhoid fever as a type of enteritis caused by bacterium salmonella typhi ingested in contaminated food and water.

The disease typhoid fever is mainly associated with low socio economic status and poor hygiene with human being, the only known infection. It is considered one of the most serious infectious diseases, threat to public health on global scale with particular concern over the rapid and wide spread emergence of resistance to multiple antibiotics (Akingemi et.al 2005). To reduce disease like typhoid fever, cholera and malaria, the theory makes the connection between poor sanitation and disease.

## **2.1 Theoretical Framework**

The theoretical basis of this study was anchored on Nightingale theory of management or physical environment and Niamsa theory.

### **2.1.1 Nightingale Theory of Environment**

Florence Nightingale focuses on physical environment and she stated that “healthy surrounding where necessary for proper nursing care and also said that environment comprises of concept of ventilation, warmth, light, diet, cleanliness and noise free. Nightingale in her theory identifies five essential components of healthy environment which include. i. Pure Fresh Air, ii. Pure water: iii. Effective Drainage: iv. Cleanliness: v. Light especially direct sunlight: one or more of these factors could lead to impaired pan-cloning of life processes or diminished health status.

Nightingale identifies five importance of environment theory viz; i. Disease control ii. Sanitation iii. Waste disposal iv. Control of room temperature v. Noise management

### **2.1.2 Miasma Theory**

The Miasmatic position was that diseases were the products of environmental factors such as contaminated water, foul air, and poor hygiene condition. The Miasma theory was consistent with the observation that diseases were associated with poor sanitation condition (foul Odour) and sanitation improvement.

The global concern over typhoid is a common and serious disease among children and adult in Kenya where it is highly publicized out break have strengthened this view among the public and health professionals. One consequence is the use of the widal test to screen febrile children and adult in inpatients and outpatients setting.

## **2.2 Causes and Predisposing Factors of Typhoid Fever**

- i. Food and Water: Typhoid fever is contracted by drinking or eating the bacteria in a contaminated food or water. People with acute illness can contaminate the surrounding water supply through stool which contains high concentration of bacteria. Contamination of water supply can in turn taint the food supply. The bacteria can survive for weeks in water or dried sewage.
- ii. If an individual survives with poor or no treatment, such individual became a source of infection to another.
- iii. Low standard of personal hygiene and sanitary condition are keys to enteric fever (typhoid and paratyphoid fever).
- iv. Region: People who live or travel to areas where typhoid fever is endemic is at increased risk.
- v. Age: Children are of greater risk of contracting the disease. The symptoms are usually milder in children as compare to adults.
- vi. Occupation: Micro biologist and clinical workers are also at higher risk for typhoid fever.
- vii. Immunity: People with weak immune system (weakened by medications and diseases such as corticosteroid and HIV/AIDS respectively).

## **2.3 Effects of Typhoid Fever**

When individual is infected with typhoid fever, the disease manifest some varying degree of effect which includes relative bradycardia (less tachycardia than expected for the degree of fever) may occur in 50% the patient but not reliable diagnostic indicator, faintly erythematans macuta papules or rose spots occur on the trunk and may become hemorrhagos cervical adenopathy and haptatosplenomegally are often present. Intestinal bleeding may occur from ulceration of mucosal membrane overlying hyper- plastic ilceal peyer patches, altered mental status and seizures may occur (Cunha, 2004)

**2.4 Mode of Transmission of Typhoid Fever**

Typhoid fever is transmitted through food and drink which has been handled by a person who is shedding salmonella typhi (Athur 2006.). Typhoid fever is transmitted through feaco-oral transmission and by ingestion of contaminated Shell fish and other food substance. It can also be transmitted from infected person to healthy individual through contact with droplet from infected person.

**2.5 Prevention and Control Of Typhoid Fever**

Center for disease control programe 2010 (CDCP 2010), identified two basic actions in prevention of typhoid fever, these are: a. Avoid risk foods and drinks; b. Get vaccinated against typhoid fever; Mayo clinic staff 2012 also identified some principle of controlling and preventing typhoid fever as follows:-

**Vaccine:** Two vaccines are available one is injected in a single dose about weeks before exposure, and the other is given orally in four capsules, with one to be taken every other day. Since neither of the vaccine is 100% effective and both require repeated immunization as vaccine effectiveness diminishes over time.

**3.0 RESEARCH METHODOLOGY**

This research work is conducted in Yobe state, North East Nigeria. The study is a survey research. One tertiary institution will be randomly selected from each Zone of the state (Zone A, B and C). In Zone A, Yobe State University, in Zone B, Federal College of Education, Technical, Potiskum, and Umar Suleiman College of Education Gashua in Zone C were selected for investigation. The total numbers of the students living in hostels were considered as the population of the study. The sample sizes of study were selected using simple random technique. Thirty five students were selected from Yobe state University, twenty five students from Federal College of Education of Education (Technical) Potiskum and forty students from Umar Suleiman College of Education, Gashua. A total of hundred questionnaires were distributed. Questionnaires were randomly distributed to the respondents selected. Descriptive statistics (frequency, percentage and pie charts) were used to analysis the data collected.

A set of one hundred and ten questionnaires were made appropriate to the target populations. Out of the one hundred and ten questionnaires distributed, only one hundred questionnaires were returned and were analysed. The responses where summed up to frequencies, converted to percentage and degree, and presented in table and figure (pie chart) according to the set objectives of the study.

**4.1 Data Presentation and Analysis**

**Table 1:** School of Respondents

DESCRIPTION	FREQUENCY	PERCENTAGE %	DEGREE
YSU Damaturu	38	38	137
USCOE Gashua	42	42	151
FCET Potiskum	20	20	72
Total	100	100	360

**Source:** Field survey 2020

**Fig. 1: Schools of respondents**



Source: Researchers' computation 2020

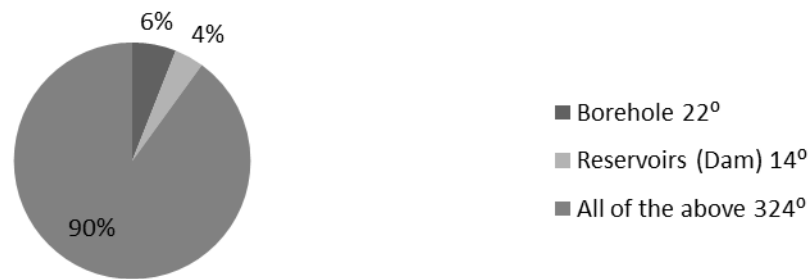
Chart 1 above shows that 38% of the respondents are in YSU, Damaturu,, 42% are in USCOE, Gashua and 20% are FCET, Potiskum.

**Table 2: Major source of water in the institution**

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Borehole	3	6	22
Reservoirs (Dams)	2	4	14
All of the above	45	90	324
<b>Total</b>	<b>50</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020

**Figure 2: Major Source of Water in the Institution**



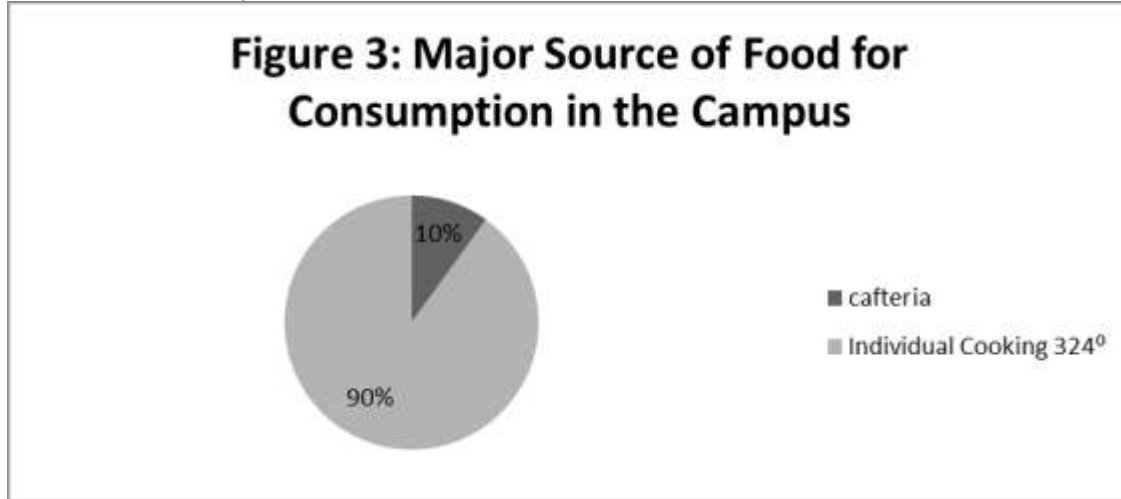
Source: Researcher's computation 2020

Figure 2 revealed that 6% (22°) of the respondents' source of water supply comes from borehole, 4% (14°) from reservoirs (Dam) and 90% (324°) from both borehole and reservoirs. All the identified source of water is available on the campus.

**Table 3:** Major source of food for consumption on the campus

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Cafeteria	10	10	36
Food Vendor	-	-	-
Individual Cooking	90	90	324
All of the above	-	-	-
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field Survey 2020



Source: Researcher's computation, 2020

Figure 3 Shows that 10% (36<sup>0</sup>) of the respondents commented that cafeteria is a major source of feeding and 90% (324<sup>0</sup>) said it is from individual effort.

**Table 4:** Sanitary condition of students' hostel

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Good	10	10	36
Sanitation is fair	20	20	72
Sanitation is Occasional	70	70	252
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020.

**Figure 4: Sanitary Condition of Student's Hostel**



Source: Researcher's computation, 2020

The above table and figure 4 shows that 10% of the respondents comments that sanitary condition of the hostel is good, 20% comment that the sanitary condition is fair while 70% comment that sanitation in the hostel is occasional.

**Table 5: Sanitary condition of respondent's toilet and laundry**

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Clean	15	30	108
Clean some times	30	60	216
Dirty	5	10	36
<b>Total</b>	<b>50</b>	<b>100</b>	<b>360</b>

Source: Field survey, 2020

**Figure 5: Sanitary Condition of Respondent's Toilet and Laundry**



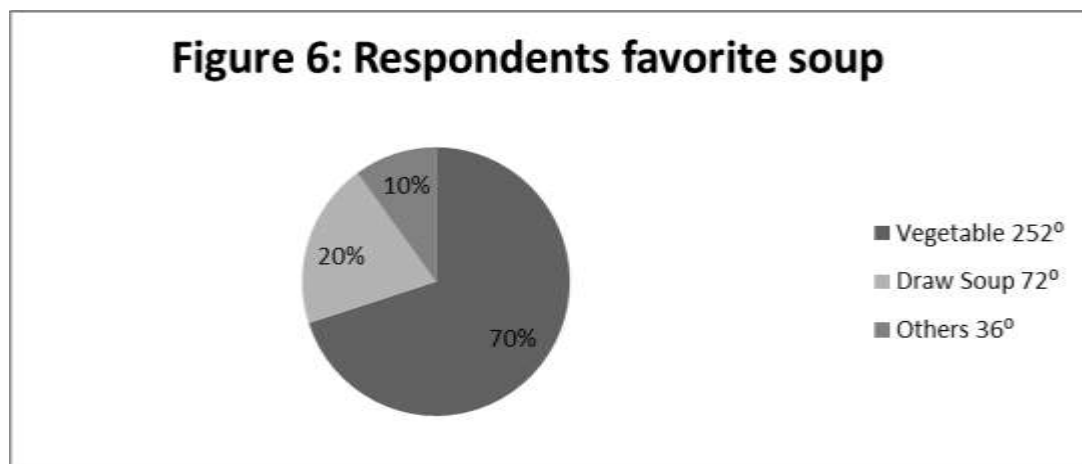
Source: Researcher's computation, 2020

Table 5 and figure 5 revealed that 305 of the respondents agreed that the toilet and laundry are clean, 60% agreed that toilet and laundry are clean some times while 10% agreed that the toilet and laundry are dirty.

**Table 5:** Respondents favorite Soup

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Vegetable	70	70	252
Draw Soup	20	20	72
Others	10	10	36
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020



Source: Researcher's computation, 2020

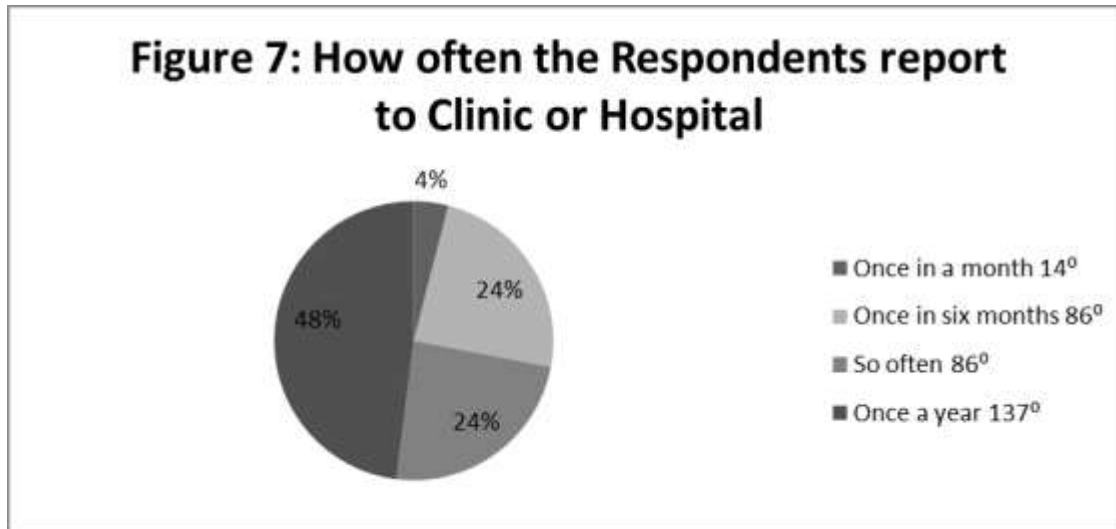
Table 6 and Figure 6 shows that 70% of the respondents agreed that vegetable is their favourite soup, 20% choose draw soup while 10% choose others. Vegetable soups if not properly prepared are source of bowel infection.

**Table 7:** How often the respondents report to clinic or hospital

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Once a month	4	4	14
Once in six months	24	24	86
So often	24	24	86
Once a year	48	48	173
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020





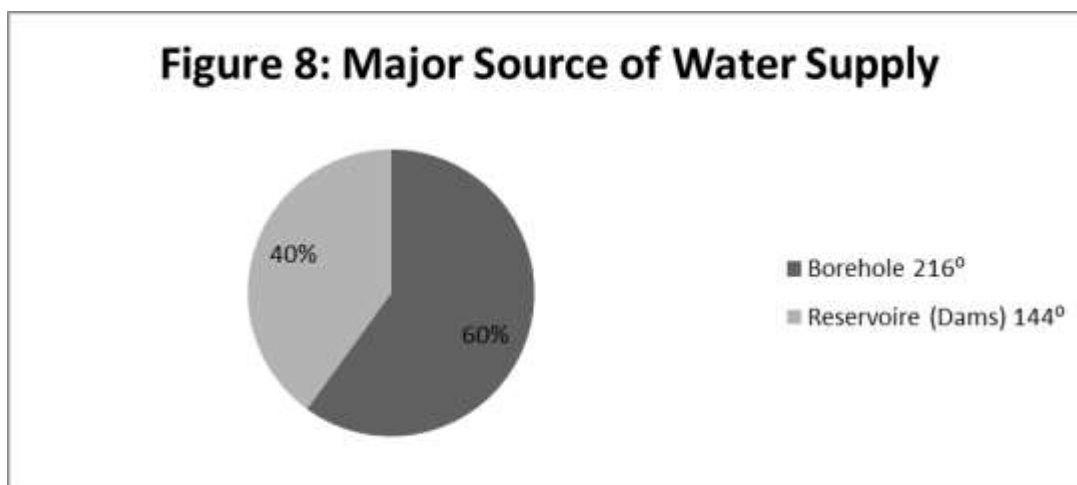
Source: Researcher's computation, 2020

Table 7 and figure 7 shows that 4% (14<sup>0</sup>) of the respondents report stomach disorder to clinic or hospital once in a month, 24% (86<sup>0</sup>) once in six months, and so often while 48% (173<sup>0</sup>) report once in a year.

**Table 8:** Major source of water supply during rainy season

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Borehole	60	60	216
Water Vendors	-	-	-
Reservoirs	40	40	144
All of the above	-	-	-
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020



Source: Researcher's computation, 2020

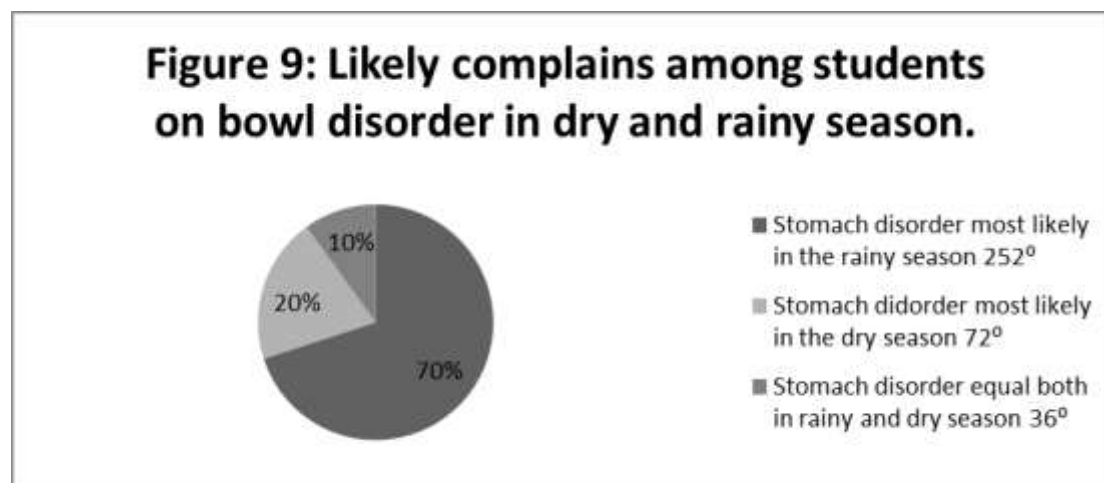
Table: 8 and figure 8 shows that 60% (216<sup>0</sup>) of the respondent agreed that borehole is the major water supply during rainy season while 40% (144<sup>0</sup>) said the reservoir (Dams). With the absence

of water vendors, generally rainy season is associated with high level of infection with water borne disease.

**Table 9:** likely complains among students on bowl disorders in dry season compared to the rainy season of the year.

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Stomach disorder most likely in the rainy season	70	70	252
Stomach disorder most likely in the dry season	20	20	72
Stomach disorder equal both in rainy and dry season	10	10	36
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey, 2020



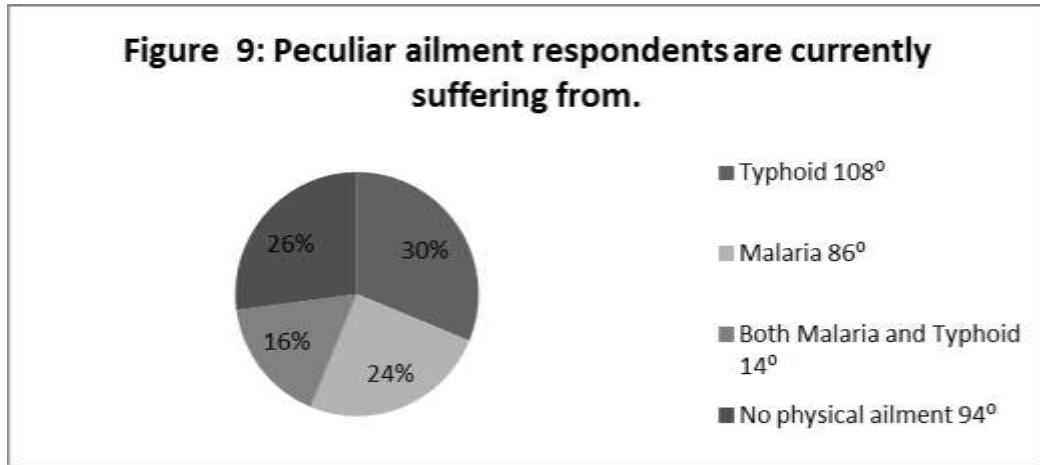
Source: Researcher's computation, 2020

Table 9 and figure 9 revealed that 70% (252°) of the respondents confirmed bowl disorder in the rainy season and 20% (72°) agreed to have stomach disorder in dry season while 10% (36°) in both rainy and dry season.

**Table :** Peculiar ailment respondents are currently suffering from.

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Typhoid	30	30	108
Malaria	24	24	86
Both Typhoid and Malaria	16	16	58
Others	4	4	14
No any physical ailment	26	26	94
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020



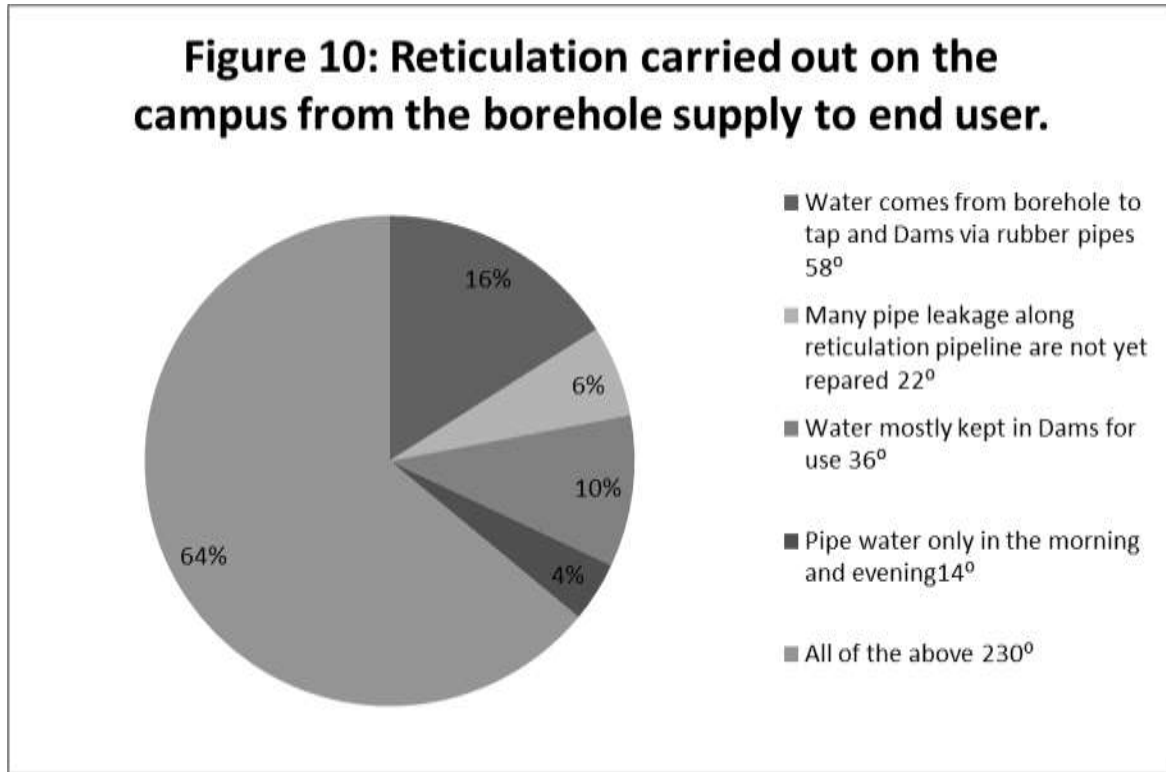
Source: Researcher’s computation, 2020

Table 9 and figure 9 indicate that currently 30% of the respondents are suffering from typhoid, 24% (86<sup>0</sup>) from malaria, 16% (58<sup>0</sup>) from both malaria and typhoid, 4% (14<sup>0</sup>) from others and 26% (94<sup>0</sup>) are not suffering from any physical ailment.

**Table 10:** Reticulation carried out on the campus from the borehole supply to end user.

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Water comes from borehole to tap and dams via rubber pipe	16	16	58
Many pipes leakage along reticulation pipeline are not yet repaired.	6	6	22
Water mostly kept in dam for use	10	10	36
Pipe water only in the morning and evening	4	4	14
All of the above	64	64	230
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020



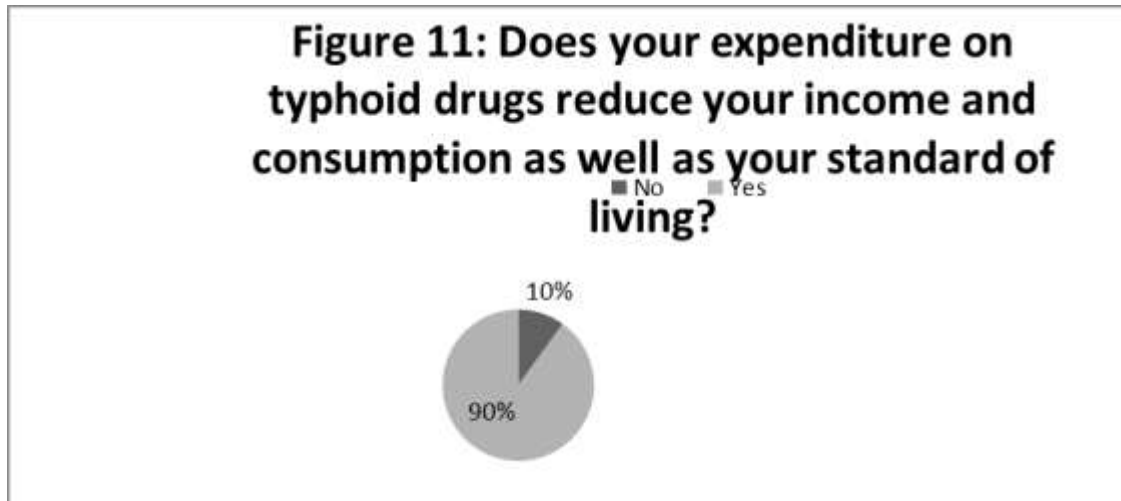
Source: Researcher's computation, 2020

Table 10 and Figure 10 shows that 16% (58°) of the respondents comment that water comes from boreholes tank to tap and dam via rubber pipe, 6% (22°) comment that many pipes leakage along reticulation pipeline are not yet repaired, 10% (36°) said that water mostly kept in dam for use, 4% (14°) said that pipe water is normally open in the morning and evening while majority of the respondents 64% (230°) agreed to all of the above option in the table. Poor reticulation of water supply and poor maintenance culture could lead to the risk of water borne diseases.

Table 11: does your expenditure on typhoid drugs reduce your income and consumption level as well as your standard of living?

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Yes	90	90	324
No	10	10	36
<b>TOTAL</b>	100	100	360

Source: Field survey 2020



Source: Field survey 2020

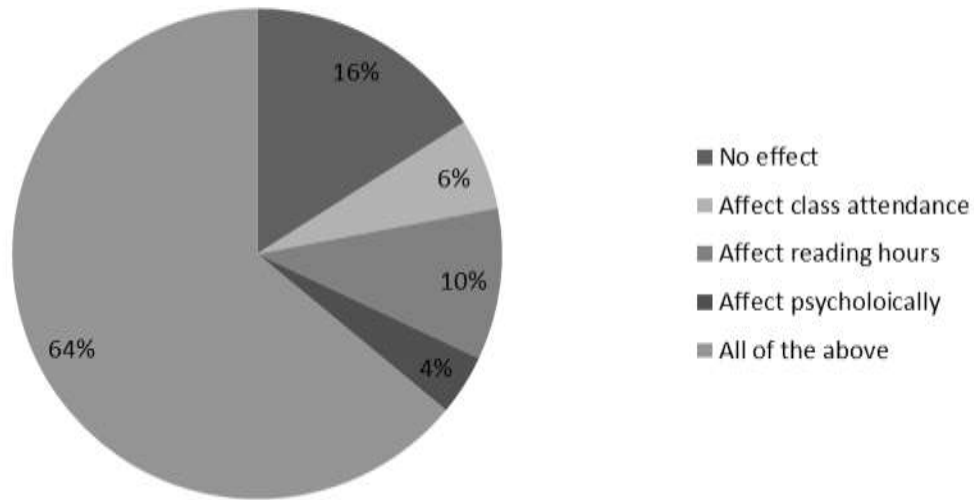
Figure 11 Shows that 90% (324<sup>0</sup>) of the respondents' income, consumption and standard of living are negatively affected by their expenditure on typhoid drugs while 10% (36<sup>0</sup>) are not.

**Table 12;** How does typhoid fever affect your academic performance?

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Affect your class attendance	6	6	22
Affect your reading hours	10	10	36
Psychologically	4	4	14
All of the above	64	64	230
No effect	16	16	58
<b>Total</b>	<b>100</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020

**Figure 12: How does typhoid fever your academic performance?**



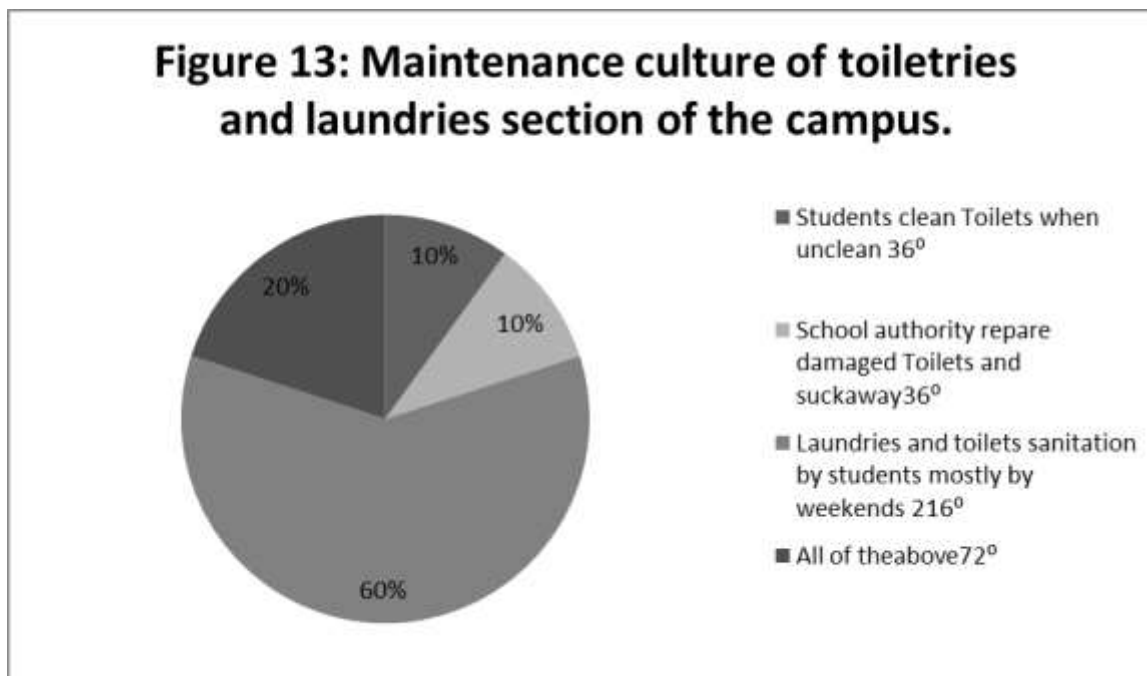
Source: Researcher’s computation, 2020.

Table 12 and Figure 12 shows that 6% (6<sup>0</sup>) of the respondents comment that typhoid fever affect them in terms of class attendance, 6% (22<sup>0</sup>) comment that it affect their reading hours, 4% ( 36<sup>0</sup>) said that it affect them psychologically, , 64% (14<sup>0</sup>) said that it affect them in terms of class attendance, reading hours and psychologically while 16% (230<sup>0</sup>) agreed that it has no effect on their income, consumption and their standard of their living.

**Table 13:** Maintenance culture of toiletries and laundries section of the campus.

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Students clean toilets when unclean	5	10	36
School authority repair damaged toilet suck away	5	10	36
Laundry and toilet sanitation by students mostly at weekends	30	60	216
All of the above	10	20	72
<b>Total</b>	<b>50</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020.



Source: Researcher's computation, 2020.

Table 13 and Figure 13 shows that 10% (36<sup>0</sup>) of the respondents agreed that students clean toilet when unclean, 10% (36<sup>0</sup>) also said that school authority repair damaged toilet such way when necessary, 60% (216<sup>0</sup>) said that toilet sanitation are done by the students over the weekend while 20% (72<sup>0</sup>) said all of the above.

Table 14: Method of process fresh fruit and foliage for consumption while at school.

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Washing with clean water	35	70	252
Washing with clean water and salt	10	20	72
All of the above	5	10	36
<b>Total</b>	<b>50</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020.

**Figure 14: Method of process fresh fruit and foliage for consumption while at school.**



**Source:** Researcher's computation, 2020.

Table 14 and Figure 14 Indicate that 70% (252°) of the respondents wash their fruits and foliage with water before eating, 20% (72°) wash with water and salt and 10% (36°) do not wash either with water or salt before consumption.

Those that wash with water only with those that do no wash at all are subjected to the risk of typhoid fever.

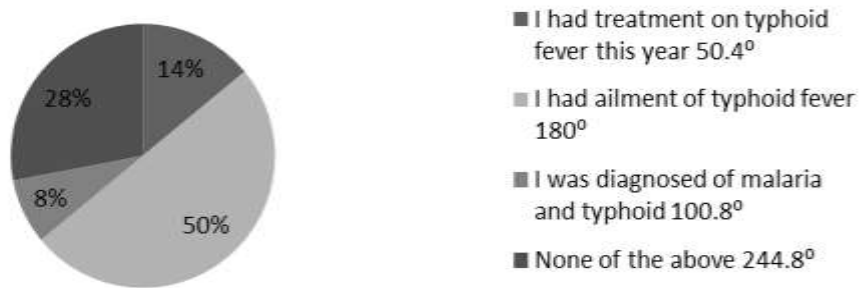
**Table 15:** Respondents medical history in respect to the incidence of typhoid fever in the course of your study.

<b>DESCRIPTION</b>	<b>FREQUENCY</b>	<b>PERCENTAGE (%)</b>	<b>DEGREE</b>
I had treatment of typhoid this year	7	14	50.4
I had ailments of typhoid fever.	25	50	100.8
I was diagnosed of malaria and typhoid	14	28	28.8
None of the above	4	10	36
<b>Total</b>	<b>50</b>	<b>100</b>	<b>360</b>

**Source:** Field survey 2020.



**Table 15: Respondents medical history in respect to the incidence of typhoid fever in the course of your study.**



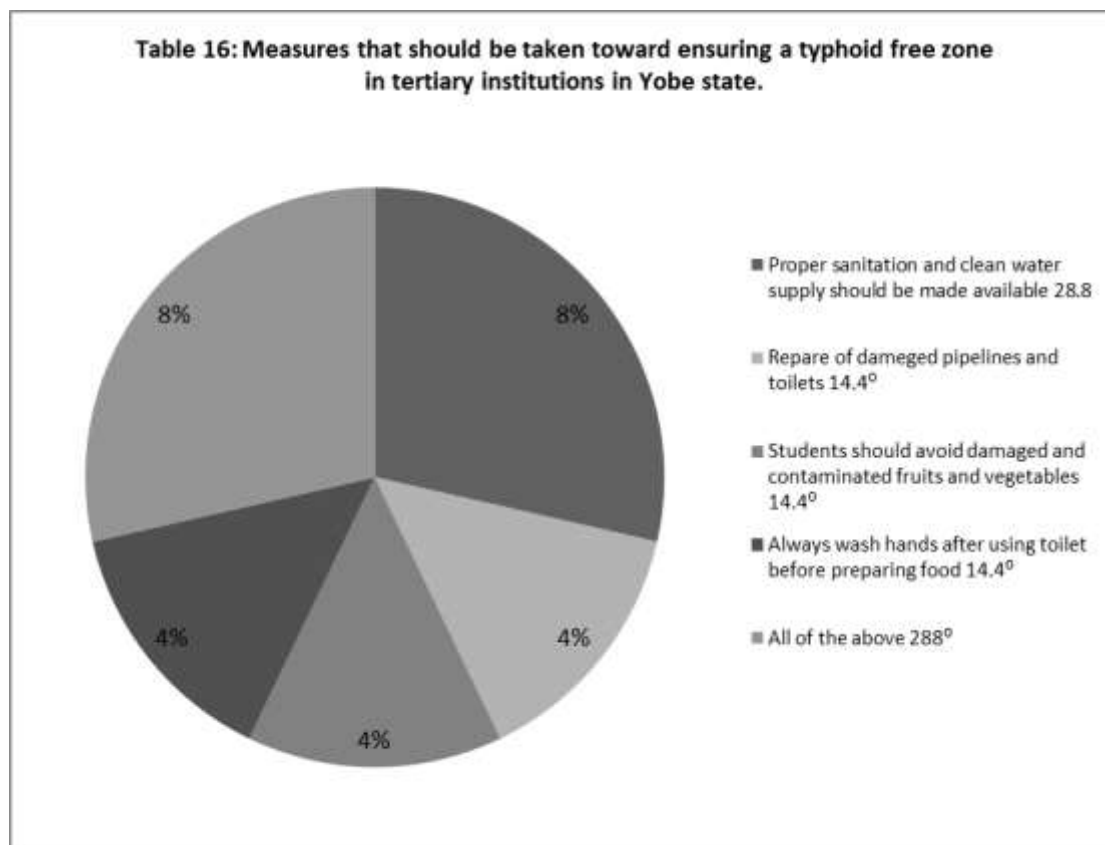
Source: Researcher’s computation, 2020.

The above table 15 shows that 15% of the respondents have a medical history of incidence of typhoid fever, 50% had ailment of typhoid fever, 28% were medically diagnosed of malaria and typhoid fever and 8% had neither typhoid nor malaria in the course of their studies.

Table 16: Measures that should be taken toward ensuring typhoid free zone in tertiary institutions in Yobe state

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
Proper sanitation and clean water supply should be made available.	4	8	28.8
Repair of damaged pipelines and toilet.	2	4	14.4
Students should avoid damaged and contaminated fruits and vegetables.	2	4	14.4
Always clean hand after using toilet before preparing food.	2	4	14.4
All of the above	40	80	288
<b>Total</b>	<b>50</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020.



Source: Researchers computation, 2020.

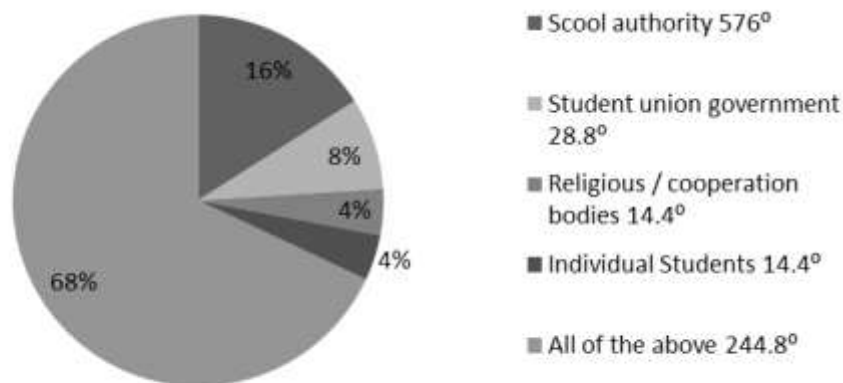
Table 16 shows that 8% of the respondents suggest proper sanitation and clean water supply as a measure to control typhoid fever in the campus 4% suggest repair of damaged pipeline and toilet, 4% suggest that students should avoid damaged and contaminated fruit and vegetables also 4% suggest on always clean hands after using toilet and before preparing food while 80% suggest that all the measure has to be taken to control typhoid in the campus.

**Table 17: Individual/body to ensure compliance on suggestion in question 16**

DESCRIPTION	FREQUENCY	PERCENTAGE (%)	DEGREE
School authority	8	16	57.6
Student Union Government	4	8	28.8
Religious/cooperative bodies etc (FCS/Islam)	2	4	14.4
Individual students	2	4	14.4
All of the above	34	68	244.8
<b>Total</b>	<b>50</b>	<b>100</b>	<b>360</b>

Source: Field survey 2020.

**Table 17: Individual/body to ensure compliance on suggestion in question 16.**



**Source:** Researcher's computation, 2020.

In the table above 16% of the respondent suggest school authority to ensure the compliance, 8% suggest student's union government 4% suggest religious and cooperative bodies, 4% suggest individual student while 68% suggest that both the school authorities, student union governments, religious bodies as well as the individual students should ensure typhoid free zone in the tertiary institutions.

#### 4.2 Summary

The major source of water in the institution is borehole and dams and individual cooking is their major source of food consumption in the campus. The sanitary condition of the students hostel and toilet are clean at times, vegetable soup is their favorite soup and majority (90%) of the income, consumption and their standard of living are a negatively affected by their expenditure on typhoid drugs while 64% of the respondents commented that their academic performance is affected as it affect their class attendance, their reading hours and also psychologically. Most of the respondents complain of bowls disorder during the rainy season. Most of the respondents process fresh fruits and foliage for consumption by washing with clean water and others with clean water and salt.

#### 4.3 Conclusion

The study revealed that students in the in the institutions are prone to typhoid fever due to poor hostel and toilet sanitary condition, water contamination and contaminated food, as well as improper processing of vegetable and foliage for consumption predisposes the students to typhoid forever in the institution. The incidence of typhoid fever has reduced the students' income level, their standard of living as well as their academic performance.

#### 4.4 RECOMMENDATIONS

Based on the findings the following recommendations were made.

- i. The school authority should provide and maintenance damaged pipes and toilets.
- ii. The sanitary condition of student's hostel and toilets should be improved. This should be the combined work of both school authority and students.
- iii. The school authority should provide a proper sewage disposal system in the student's hostel.

- iv. The school authority should provide a suitable cafeteria for students feeding.
- v. The students should avoid food and beverages from street vendors. It is difficult for food to be kept clean on the street.
- vi. Students are to avoid raw vegetables and fruits that cannot be peeled.
- vii. The students are also to eat food that have been thoroughly cooked and that are still hot and steaming.
- viii. Students are to get vaccinated against typhoid fever.
- ix. The school authorities are to provide typhoid drugs at reduced price in their clinic.

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