Assessment of the Health Status of Both Locals and Students of Federal University Wukari, Taraba State, Nigeria

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ABSTRACT

It was important to undertake this study because the health status of students in universities affects not only their academic performance but also the overall health of society. Samples were collected from 80 donors, 20 each from the host community and the three faculties Federal University Wukari (FUW). Strip and rapid slide methods were used for the analyses of this research. Out of 80 blood donors, 17 (21%) were seropositive for HBV, with the host community having the highest prevalence of 30% within its group. Eight (8), which represented 10% of the 80 donors were seropositive for HIV, out of this figure, the highest seropositivity was observed from the host community. Regarding malaria, 61 out of total donors were seropositive, while the remaining 19 were found to be seronegative. Out of this seropositive figure, 85% i.e. 17 out of 20 was observed from samples obtained from the Faculty of Pure and Applied Sciences. On Typhoid, the total prevalence of seropositivity was found to be 16.25%, while seronegativity was observed to be 83.75%. However, the highest level of seropositivity prevalence was found in the Faculty of Humanities, Management, and Social Sciences. On the Packed cell volume, 52.5% of the total sampling was normal, out of which the host community recorded the highest. On the Body Mass Index (BMI), it was observed that 96.25% of the donors fell within the normal range, while 3.75% was found to be overweighed. All the donors examined in this study had normal range of white blood cells. Based on the results of this study, the host community appeared to be healthier than randomly selected final year student.

Keywords: Health status; University students; Wukari; Blood donor

INTRODUCTION

Health is the key to life. Irrespective of age students require regular medical attention both at home and in their learning environment. Besides, the university experience is of great value in providing emerging adults with a structured environment in building their knowledge, social and verbal skills, cognitive function, and their ability in decision-making. Regular cases of ill-health among students are due to malnutrition, dehydration, and the outbreak of diseases which are prominent in developing nations like Nigeria [1]. The potential obstacle to maximizing success in university is the high prevalence of occurring health conditions among the students. Research shows that at least 3 times a week, 60% of students have reported that they felt like dragging, tired, or sleepy [2]. The university years are a time of critical transition from adolescence to adulthood. The students having a prevalent health problem, no matter how minor it is, makes it difficult for them to focus on their everyday university life as these problems tend to interfere with concentration, problem-solving abilities, critical response, focus and overall performance leading to discomfort, moodiness, and irritability [2].

In Nigeria half of the deaths recorded occurred among children in primary and post-primary schools [3]. The infections responsible for this high infant and young child death rates are

diarrhea disease, which is caused by a combination of poor drinking water and poor hygiene practices. From all indications, lack of sufficient health services and safe water are responsible for the high morbidity and mortality rates in Nigeria. The World Health Organization in 1946 defined health as "a state of complete physical mental, and social well-being of an individual, not merely the absence of disease or infirmity "[4]. Health in a holistic form is concerned with promoting the maximum physical, social, emotional, and educational growth of individuals especially students in a learning environment who deserve to have good health. Over the years, there were many studies that have been conducted to investigate and prove how seasonal allergies could cost bright students lower grades and impaired learning ability [2]. It is, therefore, very essential that students especially university should be physically well, mentally alert, emotionally and socially stabilized. Igwe [5] opined that a school environment that seeks to promote the health of students should encompass a healthful day, good nutrition and feeding habit, campus safety program, good aesthetic environment and good lecturers/student' relationship.

The organization of healthful school day entails conducive time which should not overstretch the lecturers themselves, the feeding system of the students should be prepared in a hygienic environment and with good balance diet from a qualitative food material. Good food that is balanced will automatically build and maintain the physiological functioning of the body [6]. Good aesthetic environment contributes to positive emotion to both school students and their lecturers; with good design of the school building and location will provide adequate ventilation and avoid overcrowding.

MATERIALS AND METHODS

Sera from 80 donors from the Host Community and randomly selected final year students from three faculties. The donors were screened and tested for Human Immune Deficiency Virus (HIV), Hepatitis B (HBV), Malaria Parasite (MP), Typhoid fever, Packed Cell Volume (PCV), total White Blood Count (WBC) count and Body Mass Index (BMI). The host community served as control. 3 ml of whole blood was withdrawn aseptically from the cephalic vein of the ante-cubital fossa of each donor using a sterile syringe. The blood was transferred to a plain container and allowed to clot for separation [7]. The clotted blood was spun at 3000 g for 10 minutes; the serum was separated into a sterile plain container(s) and stored at -200°C until ready for the assay.

Packed cell volume test (Haematocrit)

Materials/Equipment:

Sample: Blood collected in EDTA.

Equipment required:

1. Capillary tubes 75 mm in length with an internal diameter of 1 mm

2. Micro-hematocrit centrifuge

3. Reading device

Procedure:

1. The capillary tube was placed in the venous blood sample allowing blood to enter the tube by capillary action. The last 15 mm was left unfilled

2. The tube was sealed with modeling clay, it was ensured that there is no air trapped between the clay and the column of blood

3. The tube was placed in the micro-hematocrit centrifuge with the sealed end to the outer rim and centrifuge at 12000 gm for 5 minutes

4. The result was read using a micro-hematocrit reading device

Normal value:

Men: 0.45 ± 0.05L/L or 45 ± 5%

Women: 0.41 ± 0.05 L/L or 41 ± 5%

Hepatitis B Test

Sample: Human serum

Materials: Assays (test kits), micro-pipette, cotton wool

Procedure:

1. Test kits were opened and placed on a ceramics slide

2. 0.5 μl of the serum was collected and poured on the test kit

3. The serum move up through capillary action

4. It was observed and the reading in mg taken

Total white blood cell count

Materials: Turk's solution, whole blood, Neubauer counting chamber, test tubes, micropipette microscope.

Procedure:

1. 380 μl of Turk's solution was added into test tubes

2. 20 μl of well mixed whole blood was added into the test tube containing the Turks fluid

3. The solution was mixed and allowed to stand and react for about 3-5 minutes

4. The counting chamber was charged and allowed to settle

5. It was then viewed under a microscope using times 10 (10X) Objective

Differential white blood count

Materials: Grease free slide, coverslip, microscope, Leishman stain, buffer distilled water (pH of 6.8).

Procedure 1 (Film making):

1. On a grease-free slide, a drop of well-mixed whole blood was added

2. Coverslip was placed in front of the drop of blood

3. It was dragged backward and the coverslip was allowed to touch the drop of blood

4. The blood was allowed to spread to the edges of the coverslip, then push forward

5. Then it was allowed to dry

Procedure 2 (Leishman staining):

1. The dry film was placed on a staining rack

2. the film was covered with Leishman stain and allowed for two minutes

3. the stain was diluted with buffer distilled water and allowed for eight minutes

4. The stain was washed with tap water, and the back of the slide was clean with cotton wool

Procedure 3 (Reading of slide):

1. A drop of immersion oil was added and viewed under the microscope using the 100X objective lens

Body mass index (BMI)

Required equipment: Tape measure, scales, pen and clipboard

Procedure:

1. The testing protocol was described to the client, that, we are going to calculate your BMI by weighing you and measuring your height

2. The client's height was measured, it was ensured that the client removes their shoes and stand up straight with their heels against the walls and recorded in meters

3. The client's weight was measured, it was ensured they removed their shoes and wear

Range description:

- <18 you are very underweight and possibly malnourished
- 18: 1-20 you are underweight and could afford to gain a little weight
- 20: 1-26 You are a healthy weight range for young and middle-aged adults
- 26: 1-30 you are overweight
- <30 you are obese

HIV (AIDS) test

Materials: Buffers' solution, pricker and lancet, HIV test strip, cotton wool, methylated spirit, and hand gloves

Procedure:

1. The alcohol swab was open (i.e. cotton wool that has been soaked inside alcohol) and rubbed in the area where the blood was sampled (fingertip) and discard

2. The test stripe was removed from the foil and place on a clean dry surface

3. The lancet cover was opened and pressure exerted on the tip of the finger from where the blood was sampled

4. The finger was pricked with the open lancet

5. As the blood was oozing out, a drop was made to fall on the sample pad behind the allow mark at the bottom of the test strip

6. A Buffer was added to facilitate the testing process

7. The specimen was allowed to react as it migrates slowly along with the membrane action

8. A color line was seen on the test strip

Positive result: In addition to the control line, a distinct colored line also appears in the test region (T).

Negative result: Only one color band appear in the control region (C) as no apparent band on the test region (T).

Malaria parasite test

Materials: Microscope slide, microscope, lancet, field stain "A", field "B", staining rack.

Procedure:

1. The tip of the finger was pricked with the lancet

2. Blood from the finger was smeared on the slide to make a thick film

3. The slide was allowed to dry

4. The slide was then stained with field stain "A" for 1minute and washed off, then stained again by field stained "B" and washed immediately

5. The Slide was allowed to dry

6. Immersion oil was added and the sample was the view for the presence of Malaria Parasite under the 100X objective lens

RESULTS AND DISCUSSION

These data offer a comprehensive exploration of the diseases, health condition, and well-being of the students in this institution. Identification of these health-related issues is critical because the health status of the students in the University affects not only their academic performance but also the overall health of society.

Out of 80 blood donors, 17 (21%) were seropositive for Hepatitis B Virus (HBV) while 63 (79%) were seronegative for HBV as shown in (Table 1).

Table 1: HBV prevalence.

Total No. of samples	No. of reactive	No. of non-reactive	p-value
80	17 (21%)	63 (79%)	<0.05

Table 2 shows the result in each Faculty. Out of the 20 subjects each considered, members of the Host Community have the highest prevalence of HBV with 6 (30%), followed by both Faculty of sciences and Agric, with 4 (20%) and Faculty of Humanities has the least prevalence with 3 (15%). There was a

significant decrease (p<0.05) in the prevalence of HBV in all the Faculties in comparison with the Host community.

Table 2: Prevalence of HBV according to faculty.

Faculties	No. of samples	No. of reactive	No. of non-reactive
Pure and applied sciences	20	4 (20%)	16 (80%)
Agric. and life sciences	20	4 (20%)	16 (80%)
Humanities, Mgt. and Soc Sci.	20	3 (15%)	17 (85%)
Host community	20	6 (30%)	14 (70%)

p<0.05

This is in line with Musa's findings, where he discovered that approximately 14% of Nigeria citizens are exposed to HBV between 2000-2013 [8]. 8 (10%) out of the 80 donors were seropositive for Human Immune-Deficiency Virus (HIV) while 72 (90%) were seronegative for HIV (Table 3).

Table 3: HIV prevalence.

Total No. of samples	No. of reactive	No. of non-reactive
80	8 (10%)	72 (90%)

p<0.05

20 subjects each considered from the Faculties and the Host community, show that the host community has the highest prevalence of 4 (20%). Followed by Faculty of sciences which has 2 (10%) and finally, both Faculties of Agriculture and Humanities have 1 (5%). Here too there is a significant decrease (p<0.05) in the prevalence of HIV in the Faculties than the Host Community. This was supported by a report which claimed that an estimated number of about 3,222,757 people living with HIV in Nigeria [9] (Table 4).

Table 4: Prevalence of HIV according to faculty.

Faculties	No. of samples	No. of reactive	No. of non-reactive
Pure and applied sciences	20	2 (10%)	18 (90%)
Agric. and life Sciences	20	1 (5%)	19 (95%)
Humanities, Mgt. and Soc Sciences	20	1 (5%)	19 (95%)
Host Community	20	4 (20%)	16 (80%)

p<0.05

48 (60%) were seropositive for Malaria Parasite (MP) prevalence from a population of 80 donors, while 32 (40%) were seronegative. Faculty of sciences has the highest prevalence of MP with 17 (80%), while the Host community has the lowest with 13 (65%). The level of MP for the Faculties was significantly higher (p<0.05) than the Host community. 13 (65.25%) were seropositive for Typhoid prevalence from 80 donors. While 7 (83.75%) were seronegative for the prevalence of Typhoid. Faculty of Humanities has the highest prevalence with 4 (20%), while others have 3 (15%). There is no significant difference (p>0.05) in the selected donors. This is probably due to the low level of hygiene and poor eating habit in the hostels [10]. 28 (35%) have normal Pack Cell Volume (PCV), while 52 (65%) have low PCV from a total of 80 donors. The Host community has the highest prevalence of normal PCV of 14 (70%), while the Faculty of science have the highest prevalence of low PCV, this means that they are anemic, this can be attributed to poor dietary habit reported by Kumar et al. [11]. 77 (96.25%) has a normal weight out of 80 donors, while 3 (3.75%) are overweight. Faculty of Sciences, Agric, and Humanities has the highest prevalence of normal weight 20 (100%), while the Host Community has 3 (15%), overweight individuals. The entire subject has normal White Blood Cell count (WBC) (Tables 5-14).

Table 5: Prevalence of Malaria parasite.

Total No. of samples	No. of reactive	No. of non-reactive
80	61 (76.25%)	19 (23.75%)

Table 6: Prevalence of Malaria parasite (MP) according to faculty.

Faculties	No. of samples	No. of reactive	No. of non-reactive
Pure and Applied Sci.	20	17 (85%)	3 (15%)
Agric. and Life Sci.	20	15 (75%)	5 (25%)
Humanities, Mgt. and Soc Sci.	20	16 (80%)	4 (20%)
Host community	20	13 (65%)	7 (35%)

p<0.05

Table 7: Prevalence of Typhoid fever.

Total No. of samples	No. of reactive	No. of non-reactive
80	13 (16.25%)	67 (83.75%)

Table 8: Prevalence of Typhoid fever according to faculty.

Faculties	No. of samples	No. of reactive	No. of non-reactive
Pure and Applied Sci.	20	3 (15%)	17 (85%)
Agric. and Life Sci.	20	3 (15%)	17 (85%)
Humanities, Mgt. and Soc Sci.	20	4 (20%)	16 (80%)
Host community	20	3 (15%)	17 (85%)

p>0.05

Table 9: Packed cell volume (%).

Total No. of samples	Normal	Low
80	42 (52.5%)	38 (47.5%)

Table 10: PCV according to faculties.

Faculties	No. of samples	Normal	Low
Pure and Applied Sci.	20	10 (50%)	10 (50%)
Agric and Life Sci.	20	7 (35%)	13 (75%)
Humanities, mgt. and Soc Sci.	20	11 (55%)	9 (45%)
Host community	20	14 (70%)	6 (30%)

Normal value:

Men: 0.45 ± 0.05 L/L or 45 ± 5%

Women: 0.41 ± 0.05L/L or 41 ± 5%

Reduced Hematocrit is seen in anemia

Increased hematocrit is seen in polycythemia

Table 11: Body mass index (BMI).

No. of sample	Normal	Underweight	Overweight	Obese
80	77 (96.25%)	0 (0%)	3 (3.75%)	0 (0%)

Table 12: BMI According to faculties.

Faculties	No. of samples	Normal	Underweight	Overweight	Obese
Pure and Applied Sci.	20	20 (100%)	0 (0%)	0 (0%)	0 (0%)
Agric. and Life Sci.	20	20 (100%)	0 (0%)	0 (0%)	0 (0%)
Humanities, Mgt. and Soc. Sci.	20	20 (100%)	0 (0%)	0 (0%)	0 (0%)
Host community	20	17 (85%)	0 (0%)	3 (15%)	0 (0%)

Range Description

<18 you are very underweight and possibly malnourished

18: 1-20 you are underweight and could afford to gain a little weight

20: 1-26 you are a healthy weight range for young and middle-aged adults

26: 1-30 you are overweight

<30 you are obese

Table 13: Total WBC.

No. of sample	Normal	Abnormal
80	80 (100%)	0 (0%)

Table 14: Total WBC according to faculties.

Faculties	No. of samples	Normal	Abnormal
Pure and Applied Sci.	20	20 (100%)	0 (0%)
Agric. and Life Sci.	20	20 (100%)	0 (0%)
Humanities, Soc. Sci.	20	20 (100%)	0 (0%)
Host community	20	20 (100%)	0 (0%)

Normal range=3,500-10,500

CONCLUSION

This demographical analysis showed that donors from the Host community had a high prevalence of HBV (30%) and HIV (20%) compared to other groups. Faculty of Pure and Applied sciences had the highest prevalence of malaria parasite with 17 (85%) with respect to other groups. Faculty of Humanities, Management, and Social Sciences had the highest prevalence of Typhoid fever with 4 (20%). The Host Community had the highest value of 70% for normal packed cell volume, compared to the lowest value of 35% which was recorded in the Faculty of Agriculture and Life Sciences for the same parameter. Also, the host community recorded the highest value for overweight based on BMI to be 15% in its group, while other groups recorded 0% per group. In all, it appeared randomly selected members of the host community are healthier than the randomly selected final year male students from three Faculties in the University.

REFERENCES

1. UNICEF News. AIDS epidemic update. Can water mean health? UNICEF News 2007:16.

2. Prajapati SK, Ali AN, Iqbal MZ, Mohanananaidu K, Mei LL, Ningzee C. Health status of students in a private university in Malaysia. Madridge J Pharm Res. 2007;1:27-32.

3. National Health Policy. Promoting the health of Nigerians to accelerate socio-economic development. 2016.

4. WHO. The preamble to the constitution of the world health organization as adopted by the International Health Conference, New York. 1946.

5. Igwe SO. Professional handbook for teachers. Owerri: Milestone Publishers. 2000.

6. Abanobi O, Ewuzie M. Health and illness: A behavioural approach. 2000.

7. Cheesbrough M. Collection of blood for Hepatitis C virus. District laboratory practice in tropical countries. Part 2, Cambridge University press. 2005:53-357.

8. Musa B, Bussell S, Borodo MM, Samaila AA, Femi OL. Prevalence of Hepatitis B virus infection in Nigeria, 2000-2013: A systematic review and meta-analysis. Niger J Clin Pract. 2015;18:163-172.

9. Olusegun E, Ogundele BS. HIV epidemiology in Nigeria. J Biol Sci. 2016;3:1-6.

10. Ishaleku D, Sar TT, Houmsou RS. Salmonella typhi infection in a tertiary institution in Nasarawa State, Nigeria. Asian Pacif J Trop Med. 2011:137-139.

11. Kumar B, Shill, Palash K. Anaemia among University in Noakhali Region Bangladesh. Health Popul Nutr. 2014;32:103-111.