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Research Article

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Evaluation of Erythrocyte Sedimentation Rate in Tuberculosis Patients Attending University Teaching Hospital Sagamu Ogun State

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ABSTRACT

The erythrocyte sedimentation rate (ESR) is a common laboratory measurement as an indicator for systemic inflammation, HIV, cancer, and clinical pathologies which infection is among in clinical investigation. This present study evaluated the erythrocyte sedimentation rate among tuberculosis patients attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state. Blood samples were collected directly into the ESR tube (Westergren Method) and read after one hour. The results showed that tuberculosis patients had higher erythrocyte sedimentation rates higher than the normal reference value for both males and females ((56 mm/hr in males and 34 mm/hr in females). It is therefore recommended that more funds should be raised or donated to the anti-tuberculosis campaign programme. The infected patient should be given more orientation about disposing of the sputum in other not to spread the disease to others in the community.

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Erythrocyte, Inflammation, Sedimentation, Tuberculosis and Cancer

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INTRODUCTION

Tuberculosis (TB) one of the earliest known diseases and still a major cause of mortality even today, has many manifestations affecting the blood, bone, central nervous system and many other organ systems but it is primarily a pulmonary disease[1]. These organisms include *M. tuberculosis, M. bovis, M. africanum, M. microfti* and *M. canetti*[2]. Tuberculosis is a gradually progressive debilitating disease, it is a necrotizing bacterial infection with protein manifestations and wide distribution. It is an indicator of social organization & standard of living in the community[3]. The Erythrocyte Sedimentation Rate (ESR) measures the rate of fall of red blood cells in a vertical column of anticoagulated blood in 1 hour, and the units expressed in millimetres per hour[4]. Erythrocyte Sedimentation Rate (ESR) is an inexpensive, easily available investigation particularly in resource-poor countries, such as Nigeria, where tuberculosis (TB) is common. The Erythrocyte Sedimentation Rate (ESR) is commonly done as a non-specific test during the primary diagnostic workup for tuberculosis, a chronic bacterial infection[5]. This study is to evaluate the erythrocyte sedimentation rate among tuberculosis patients attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state, Nigeria.

METHODS

Study area

The research work was carried out at Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state, Nigeria.

Study population

The study population is made up of fifty (50) tuberculosis patients attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state.

Exclusion criteria

A thorough physical examination was performed by the clinician to exclude patients with other complications.

Inclusion criteria

Tuberculosis patients attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state subjects of both sexes were included.

Sample collection

Blood samples were collected following aseptic conditions, and using the Westergren method. 2.0 mL of venous blood was added into a tube containing 0 0.5 mL of sodium citrate. The sample tubes were placed vertically positioned in a rack for 1 hour at room temperature, after which the distance from the surface meniscus to the upper limit of the red cell sediment is measured. The distance of fall of erythrocyte expressed as millimetres in 1 hour, is the ESR.

Statistical Analysis

The results were analyzed using descriptive statistics of simple percentages and presented in form of tables.

RESULTS AND DISCUSSION

This present study assessed erythrocyte sedimentation rate in tuberculosis patient attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state.

Table 3.1: Shows the Age Distribution of the Tuberculosis Patients

Age Distribution	Frequency	Percentage (%)
15 -24	05	10
25-34	15	30
35-44	21	42
45-54	09	18
Total	50	100

The age distribution showed that 5(10%) of the tuberculosis patients are within the age bracket of 15-24 yrs, 51(30%) are within the age bracket of 25-34years, 21(42%) are within the age brackets of 35-44 years and 9(18%) are within the age bracket of 45-54 years.

Table 3.2: Sex Distribution of tuberculosis Patients

Sex Distribution	Frequency	Percentage (%)
Male	39	78
Female	11	22
Total	50	100

The sex distribution showed that 39(78%) of the tuberculosis patients were male while 11(22%) were female.

Table 3.3: Shows the age distribution of the tuberculosis patients in relation to ESR value (n=50)

Age Range	Frequency	Percentage (%)		
			Normal value 0-15mm/hr (Male) 0-20mm/hr (Female)	**Abnormal value** > 0-15mm/hr (Male) > 0-20mm/hr (Female)
15-24	05	10	---	(10%)
25-34	15	30	---	15(30%)
35-44	21	42	--	21(42%)
45-54	09	18	--	9(18%)
Total	50	100	--	50(100%)

References value for ESR, Male= 0-15mm/hr, Female = 0-20mm/hr (Monica, 2006)

Table 4.3 above shows the age distribution of the tuberculosis patients in relation to ESR values. Among age groups 15-24 years, normal ESR value (nil), abnormal ESR value 5(10%) . Age group 25-34 years; normal ESR value (nil), abnormal ESR value 15(30%). Age group 35-44 years; normal ESR value (nil), abnormal ESR value 21(42%) while age group 45-54 years; normal ESR value (nil) abnormal ESR value 9(18%).

Table 3.4: Shows the gender distribution of the tuberculosis patients in relation to ESR value (n=50)

Age Range	Frequency	Percentage (%)		
			Normal value 0-15mm/hr (Male) 0-20mm/hr (Female)	**Abnormal value** > 0-15mm/hr (Male) > 0-20mm/hr (Female) (mean value)
Male	39	78	---	56 mm/hr
Female	11	22	---	36 mm/hr
Total	50	100		92 mm/hr

References value for ESR, Male= 0-15mm/hr, Female = 0-20mm/hr (Monica, 2006 pp 329-331).

Table 4.4 above shows the gender distribution of the tuberculosis patients in relation to ESR values. Among male tuberculosis patient, normal value ESR (nil), abnormal value ESR 11(22%). Among female tuberculosis patient, normal value ESR (nil), abnormal value ESR 39(78%).

DISCUSSION

The erythrocyte sedimentation rate (ESR) is common laboratory measurements of systemic inflammation in clinical practice. This test is often used for the diagnosis and monitoring of a variety of conditions in particular rheumatic disease and in infections (Tishkowski and Gupta, 2022)[6].

This present study investigates the erythrocyte sedimentation rate among tuberculosis patients attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state. Blood samples collected directly into ESR tube (Westerngren Method) and read after 1hour.

The results showed that tuberculosis patients had higher erythrocyte sedimentation rate higher than the normal reference value for both male and female ((0-15mm/hr in men and 0-20mm/hr in women). Western green method values. This study is inconsistence with the findings of Al-Marri, and Kirkpatrick (2000)[7] where out of 144

TB patients, 68 (47%) had an elevated ESR than normal values.

The results showed that tuberculosis patients had higher erythrocyte sedimentation rates higher than the normal reference value for both males and females ((56 mm/hr in males and 34 mm/hr in females).

CONCLUSION

It can be concluded that there is significant elevation in erythrocyte sedimentation rate in tuberculosis patients attending Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state.

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Isolation and Characterization of Microbes on Used Toothbrush of Selected Students of Ogun State College of Health Technology Ilese-Ijebu

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ABSTRACT

This study is based on isolation and characterization of microbes on used toothbrush of selected students of Ogun State College of Health Technology Ilese-Ijebu. Convenience and purposive sampling technique was used to select 51 students from Ogun State College of Health. 28g of the product was weighed, and added to mix 1 litre of deionized water and allowed to soak for minutes, stirred or swirled to mix them up, allow to cool at 470C so as to have homogeneous mixture and then poured on plate after cooling. Microorganisms were isolated and identified, by characterizing and identifying on the basis of their colonial, molecular, biochemical characteristics, and gram staining, coagulase, catalase, and oxidase test were performed. This study showed that all the used toothbrush were contaminated with pathogenic bacteria which are known to cause serious health problem in human, such as heart disease, bacteremia, and stroke, since toothbrush serve as a reservoirs for microorganism and play a major role in disease transmission and increase the risk of infection, their care should be given adequate attention. Based on the outcome of this study, it was discovered that staphylococcus aureus occur mostly and have the highest percentage among the bacteria isolation. Its was recommended that toothbrushes should be soaked in salt and warm water solution for 15-20 minutes for removal of bacteria present on toothbrush and should be kept in a ventilated area and not closed to the toilet and should be covered after dried with a perforated cover for easy flow of air.

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Microbes, Microorganisms, Colonial., Molecular, Bacteria

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INTRODUCTION

The most common way to maintain the complex of proper oral hygiene is the tooth brushing; its main goal is to remove the dental plaque which is responsible for a number of oral diseases: tooth decay, periodontitis, as well as halitosis. The first and most efficient tool for removing the oral biofilm and the soft debris out of the mouth, especially from the tooth and tongue surfaces, is the toothbrush (Beneduce, Baxter, Bowman, Haines, and Andreana, 2010).

The oral cavity contains a teaming population of different types of microorganisms some of which are transferred to a toothbrush during use. Tooth brushing plays an important everyday role for personal oral hygiene and effective plaque removal. It is the most commonly recommended and performed oral hygiene behaviour and is done ubiquitously in both developed and developing world. The toothbrush is used on a daily basis to clean the oral cavity (Frazelle and Munro, 2012).

Oral hygiene is the practice of keeping the mouth and teeth clean to prevent dental problems like, dental caries, gingivitis, periodontitis and bad breath. Tooth brushing, tongue cleaning, flossing, mouth rinsing with disinfectant mouth washes are some of the methods for maintaining oral hygiene. Tooth brushing is the most effective and commonly used method among them. Along with the brushing methods, disinfection of toothbrush is also equally important for maintenance of health of oral tissues (Susheela and Radha, 2016). Unfortunately, proper care of toothbrush is often neglected as toothbrushes are usually kept in bathrooms that harbor millions of microorganisms. This is mainly due to a lack of awareness regarding proper toothbrush maintenance. Therefore, the survival of microorganism on a toothbrush after brushing presents a possible mode of re-contamination upon a second usage.

Back in early 20's of the 20th century, it was reported that the toothbrush can cause recurrent infections in the mouth. A number of factors, including the long microbial surviving in the toothbrushes – from 2 days to one week , the inadequate keeping, the toothbrush use without decontamination – which leads to autoinoculation and the untimely changing of the toothbrush with new ones, may result in repeated entry of potential pathogens and crossed infection in the oral cavity, especially in children, elderly people, those with concomitant somatic disease, patients with high risk i.e. immunocompromised ones, those with transplanted organs or oncologic patients (Sammons, Kaur and Neal, 2014).

Although researches show that different microorganisms can grow on the toothbrushes after its usage (Beneduce et al, 2010), different microorganisms have been established while studies have recorded very few microbes, this makes the subject a controversial one and as a result catching the attention of researcher worldwide.

The pathogenic contamination in the vulnerable population, like critically ill patients, immunosuppressed patients, elderly persons,

pregnant women and children may raise the risk of infection and its transfer. It is obvious that there is insufficient information about microbes found on toothpaste residue on used toothbrush while it is also evident that enough researcher has not been done on the area of study which prompts the need for a study of this nature.

Research Questions

1. Are there microbes present on used toothbrush?
2. What are the different microbes present on used toothbrush?
3. What are the microbes often found on used toothbrush?
4. Are the microbes found dangerous to the oral health?

Broad Objective

This study is based on isolation and characterization of microbes on used toothbrush of selected students of Ogun State College of Health Technology, Ilese-Ijebu.

Specific Objectives

1. To investigate the presence of microbes on used toothbrush,
2. To ascertain different microbes found on used toothbrush,
3. To examine most frequent microbe on used toothbrush.
4. To examine the effect of microbes found on oral health.

Operational Definition of Terms

Isolation: he separation of a strain from a natural, mixed population of living **microbes**, as present in the environment

Characterization: Examination of Biochemical, physiological & molecular characteristics of microbes.

Microbes: Minute organism typically visible under a microscope and often causes danger to the oral health. Microbes include bacteria, fungi, and protozoan parasites

Toothpaste Residue: The leftover of toothpaste after routine brushing of the teeth with toothpaste and toothbrush.

Toothbrush: An oral hygiene instrument used to clean the teeth, gums, and tongue. It consists of a head of tightly clustered bristle--atop of which toothpaste can be applied-mounted on a handle which facilitates the cleaning of hard-to-reach areas of the mouth.

RESULTS

Age Group of Subjects

The age group of subjects is shown in the table below:

Age Group	Frequency	Percentage (%)	Mean	S.Dev.
15-24	45	88.24		
25-34	2	3.92	**1.196**	**.5664**
35-42	4	7.84		
Total	**51**	**100**		

From the table above, subjects aged 15-24 were 88.24%, other age groups were 25-34 (3.92%) ad 35-42 (7.84%). The result revealed that majority of subjects were between the age of 15 and 24.

Gender of Subjects

The gender of subjects is shown in the table below:

Gender	Frequency	Percentage (%)	Mean	S.Dev.
Male	12	23.53		
Female	39	76.47	**1.765**	**.4284**
Total	**51**	**100**		

The table above shows that, 12% of subjects were male while 39% were female. It can be inferred that majority of subjects used for the study were female.

Table 3: Percentage Growth of Organism on Used Toothbrush

Percentage Growth of Organism on Used Toothbrush is shown in the table below:

Gender	Frequency	Percentage (%)	Mean	S.Dev.
Growth (G"	47	92.2		
No Growth "NG"	4	7.8	**1.078**	**.272**
Total	**51**	**100**		

From table 3, the percentage of growth of miroorganisms on used toothsbrush was **92.2%,** also the mean value of **1.078 (SD=.272)** shows that majority of used toothbrushes harbours microorganism.

Table 4: Microorganisms isolated from the used manual toothbrush bristle.

Microorganisms isolated from the used manual toothbrush bristle are shown in the table below:

Isolate	Identity
1	*Klebsielle SPP*
2	*Escherichia coli*
3	*Pseudomonas auruginosa*
4	*Staphylococcus aureus*
5	*Proteus*

The table revealed microorganisms isolated from used toothbrush. The microorganism isolated from samples include: *Klebsielle SPP, Escherichia coli, Pseudomonas auruginosa, Staphylococcus aureus* and *Proteus*.

Table 5: Occurrence of bacteria Isolates on used manual toothbrush bristle

The occurrence of the microorganisms isolate on the used toothbrush is presented in the table below.

Organisms Isolated	No Isolated	Occurrence (%)
Klebsiella SPP	12	25.53
Escherichia coli	8	17.02
Pseudomonas aeruginosa	3	6.38
Staphylococcus aureus	23	48.94
Proteus	1	2.13
Total	**47**	**100**

Table 5 revealed that the occurrence of *Klebsiella SPP* was 25.53%, *Escherichia coli* was 17.02%, *Pseudomonas aeruginosa* was 6.38%, *Staphylococcus aureus* was 48.94% and *Proteus* was 2.13%.

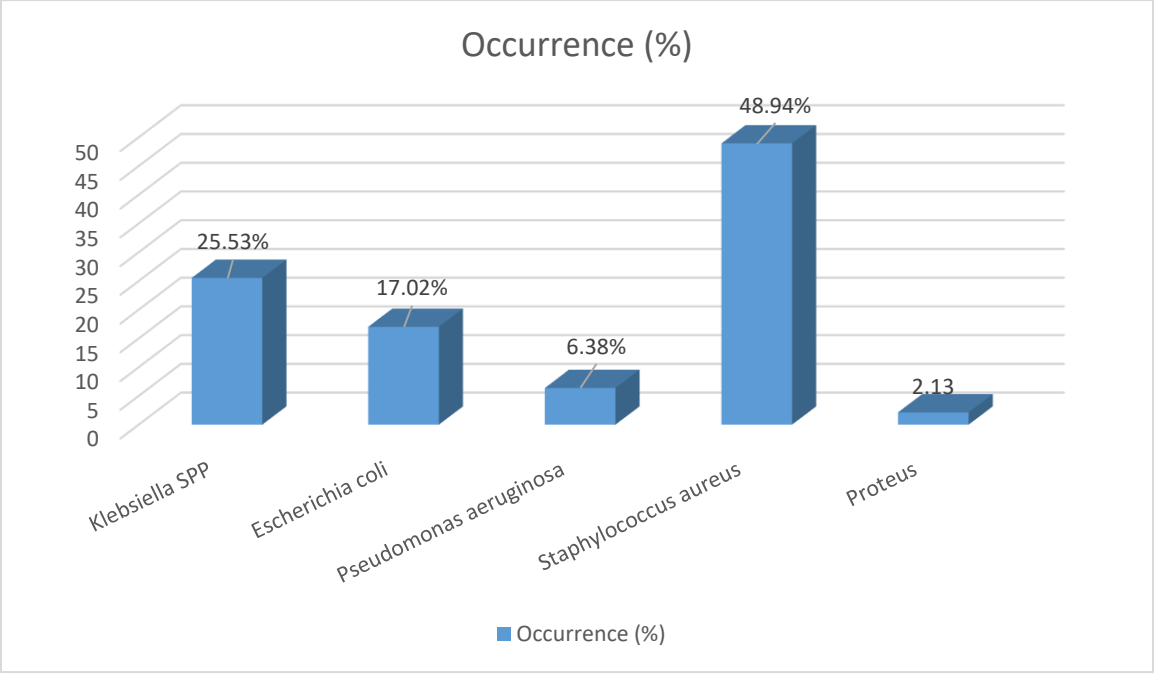

Figure 1: Showing occurrence of microorganisms isolated from used toothbrus

DISCUSSION

The oral cavity contain a teaming population of different types of microorganisms some of which are transferred to toothbrush during use and some are acquired from the environment where the toothbrush is kept for instance those kept in bathroom or toilet acquired more microorganisms due to the flushing of the toilet when the lid of the closet is not covered as well some carriers, vectors, serve as infection transmission agent.
A total of fifty one (51) used toothbrush bristle obtained from 51 students of Ogun State College of Health were examined, bacteriologically the

result shows majority (92.2%) of the used toothbrushes were contaminated with bacteria, the contamination of the used toothbrush by microorganisms come from the oral cavity, storage containers, storage environment, the water used for rinsing and also from users. Microorganisms isolated were identified from the used toothbrush. The bacterial were *Klebsiella SPP, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus* and *Proteus*.

Result from the study conforms with the study of Bello et al (2013) reported staphylococcus Escherichia, and pseudomonas in used toothbrush. This also supports the result in the study of Contreras et al (2015) who reported that the most frequent microorganisms found in toothbrush used by parents and children for one month were *enterobacteriacesae* and *pseudomonadacea*.

Kozai et al (2014) also reported that pathogenic microorganisms can be transferred readily when a toothbrush is used increasing the risk of dental caries and infectious diseases. *Staphylococcus aureus* was most frequently isolated from the used toothbrushes with a percentage occurrence of 48.94% while *Proteus* had the lowest percentage occurrence of 2.13% on used toothbrush examined. Others are *Klebsiella spp*. (25.53%), *Escherichia coli* (17.02%), *Pseudomonas aeruginosa* (6.38%)

Sammons et al (2014) however isolated pseudomonas 15% from used toothbrushes while Osho et al (2013) isolated Escherichia cola, staphylococcus aureus, and pseudomonas aeruginosa from used toothbrush.

Staphylococcus aureus was detected in 23 of the used toothbrushes examined, *Klebsiella spp*. from 12 toothbrushes, *Escherichia coli* from 8 toothbrushes, *Pseudomonas aeruginosa* from 3 toothbrushes and *Proteus* from 1 toothbrush.

Staphylococcus are common skin in habitants. Their presence on the used toothbrushes in high number may come from handling and rinsing of toothbrushes after use, they are known to produce potent toxins which are injurious to health. They are also capable of producing many oral infectious diseases. Pseudomonas aeruginosa are opportunistic pathogens responsible for many nosocomial infections. They are also ubiquitous in nature including water. They are presence in use toothbrushes may be attributable to the storage environment such as a bathroom, toilet, and washing sinks, rinsing water in the air. The bathroom provides a humid environment that encourages the growth of microorganisms.

Escherichia coli are coliforms and member of the family Enterobacteriaceae. They are also pathogenic to human insignificant numbers. The

presence of Escherichia coli on the toothbrushes examined was indicative of fecal contaminations. The used toothbrushes must have been stored in unhygienic environment such as toilet, bathroom, sinks. These bacteria may also have entered the toothbrush through the rinsing water.

Different brands of toothbrushes are marketed to the public every year with little information on their contaminations by bacteria with use. The use of uncontaminated toothbrushes will assist in the maintenance of sound oral hygiene and reduce the health risk posed by the contaminating bacteria to humans.

CONCLUSION

Majority of the used toothbrush bristle used in this study were contaminated with pathogenic bacteria which are known to cause serious health problem in human, since toothbrush serve as a reservoirs for microorganism and play a major role in disease transmission and increase the risk of infection, their care should be given adequate attention. They must be adequately rinsed with sterile water and allowed to dry in air before storage in hygienic dry container. In addition, sharing of toothbrush should be discourage.

RECOMMENDATIONS

- Toothbrushes should not be kept in toilet or close to toilet to avoid contamination.
- Tooth brush should be soaked in salt and warm water solution for 15-20 minutes in removing of bacteria present on toothbrush then it should be kept in a ventilated area i.e (presence of air),
- Toothbrushes should be covered after use with a perforated cover for easy flow of air.
- Toothbrushes should be replaced every 3 to 4 months
- It is advised that people should not share toothbrushes as this may compromise oral health.

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Article

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The Prevalence of Intestinal Helminths in Comprehensive High School, Ilese-Ijebu, Ogun State, Nigeria

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ABSTRACT

Intestinal parasitic infections are a public health concern in tropical countries, such as Nigeria. The infection is associated with complications such as retarded growth, low cognition, gastrointestinal obstruction, etc. A total of 100 samples were collected from Students attending Comprehensive High School, Ilese-Ijebu in Ogun State, Nigeria, between January to February 2022 for Intestinal Helminthes using the direct wet preparation method. The results of the study showed that out of 74 (74%) female -students' stool examined 22 (29%) students had intestinal helminths and, the 26 male (s) students accounted for 9 (34%), making a total of 31%) students were being infected. The parasites' distribution was thus as follows: Ascaris lumbricoides was 48%; Hookworm 17%; Strongyloides stercoralis 13%; Taenia species 22% respectively. The result of this shows that parasitic infection exists among secondary school students in Nigeria. Therefore personal hygiene, regular deworming, eating washed fresh fruits and regular health education are recommended.

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Ascaris lumbricoides, helminths, hygiene, Parasitic, Strongyloides stercoralis

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INTRODUCTION

Infestation by intestinal helminths is a major public health problem which causes chronic inflammatory disorders such as chronic anaemia, growth stunting, protein-calorie malnutrition, fatigue, poor cognitive performance, reduced long-term survival, diminished physical fitness and school attendance in school-age children[1, 2]. The most common intestinal parasites within the group of helminths are STHs, including *Ascaris lumbricoides* (roundworm), *Necator americanus* and *Ancylostoma duodenale* (hookworm), and *Trichuris trichiura* (whipworm), have been considered to infect over a thousandth of million people, and much more are at risk of infections[3, 4, 5]. In tropical and sub-tropical nations many situations caused the observed high prevalence of intestinal parasites, such as climatic conditions, poor sanitation, a lack of safe water and inadequate modern toilet facilities[6]. And, some cultural behaviours may influence exposure to infection with specific pathogens; for example, eating raw fruits with food-borne parasites, and also working barefoot on the farm can lead to hookworm infection[7, 8]. World Health Organization pointed out that more than a quarter of a million preschool children and over half a billion school-going children reside where the parasitic infection is common and immediate interventions are necessary[9]. The prevalence and distribution of intestinal helminths vary from place to place in any population[10]. Hence, this cross-sectional survey is to study the Prevalence of Intestinal Helminths in Comprehensive High Schools, in Ilese- Ijebu, Ogun State, Nigeria.

METHODS

Study area

The project work was carried out at Comprehensive High School. Ilese- Ijebu. Ilcse-Ijebu, Ijebu- Ode, Ogun State. Ilese- Ijebu is a town founded after Ijebu- Ode along the old Benin Expressway. Ogun State College of Health Technology can be used to locate the town Ilese-Ijebu. Ilese Ijebu is under Atan town, the headquarters of Ijebu North-East Local Government in Ogun Slate. Nigeria. It has an estimated population of 10. 000 according to the 2006 population census. The predominant occupation is farming and trading. The borehole is their source of water.

Materials

Sterile Universal bottles, Applicator sticks, Microscope slides, Coverslip, Normal saline, LugoPs Iodine and Microscope. 2.3 Sample collection Well-labelled Sterile Universal bottles were given to Fifty (50) students of Comprehensive High School, Ilese- Ijebu to put about 5gm of stool they defecated. 2.4 Sample analysis Macroscopic and microscopic examinations of stool were done to reveal intestinal parasites in the stool sample collected following the standard operating procedures (SOPs) as recommended by the WHO[11].

RESULTS AND DISCUSSION

The results of the study showed that out of 74 (74%) female -students' stool examined 22 (29%) students had intestinal helminths and, the 26 male (s) students accounted for 9 (34%), making a total of 31%) students were being infected. The

parasites' distribution was thus as follows: Ascaris lumbricoides (round worm) was 48%; *Ancylostoma duodenale* (Hookworm) 17%; *Strongyloides stercoralis* (Threadworm) 13%; Taenia species (tapeworm) 22% respectively.

TABLE 1: Age of participants selected for intestinal helminthes

Age (Years)	Number Examined	Number of Infected	% Infected	Number not Infected	% Not Infected
11-12	44	10	22.73	34	77.27
13-14	28	10	35.71	18	64.29
15-16	17	7	41.18	10	58.82
17-18	11	4	36.36	7	63.64
Total	100	31		69	

Table 2: Sex of participants selected for intestinal helminths Infection

	MALE			FEMALE			TOTAL	
Age (year)	No examined	No infected	% Infected	No examined	No infected	% Infected	Total Infected	% Infected
11-12	8	3	33.33	36	7	31.82	10	32.26
13-14	7	3	33.33	21	7	31.82	10	32.26
15-16	6	2	22.22	11	5	22.73	7	22.58
17-18	5	1	11.11	6	3	13.63	4	12.90
Total	26	9	99.99	74	22	100.00	31	100.00

Table 3: The distribution of helminths on participants

Age (year)	*Ascaris lumbricoides*	Hooworm	*Strongyloides stercoralis*	Taenia species
11-12	4	2	2	2
13-14	5	2	2	1
15-16	4	1	1	1
17-18	2	0	0	2
Total	15	5	5	6

DISCUSSION

From the results obtained 31% prevalence of intestinal parasite (helminth) infection among students of Comprehensive High School, Ilese-Ijebu was recorded which was higher than that recorded from a Previous study in Babile town of overall prevalence of intestinal helminthiasis to 27.2%[10]. In Ethiopia, the prevalence of Ascaris lumbricoides infection was relatively high across different regions. 29% in the mountains, 35% in

the cool areas and 38% in the lowlands. The prevalence of hookworm infection was highest in the lowlands (24%) followed by the temperate (15%) and highlands (7%). The notable differences in the studies are explained by changings in geography, socio-economic conditions, and cultural practices of the population under consideration. Conclusion Results show there was a high prevalence 31% of intestinal parasite (helminth) infection among students of Comprehensive High School, Ilese-Ijebu which was due to not deworming at least ones in every three months, washing raw vegetables properly before eating and adopting personal hygiene and community hygiene.

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Fourier-transform infrared spectroscopy Analysis of Hexane/ Methanol extract of *Jatropha curcas* L. (Eupharbiaceae) Latex Silver Nanoparticles

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ABSTRACT

The utilization of plants in the biosynthesis of nanoparticles involves the content of secondary metabolites as reducing agents, and are being considered as the best candidates for synthesis of AgNps. Medicinal plants like Jatropha curcas have played a major role in treating various diseases, including bacterial and fungal infections. Fourier-transform infrared spectroscopy is a high-resolution analytical technique to characterize compounds using their functional group's contents in the compounds and the structure of the molecules. This study is aimed at the characterization of the reduction of silver nitrate to nanoparticles by Jatropha curcas latex utilizing Fourier-transform infrared spectroscopy. The latex of Jatropha curcas used in the biosynthesis of AgNPs gave a brown colour after incubation and this could be linked to the surface plasmon resonance of silver. The peaks ranged from 3242 per cm - 1043 per cm. The peak at 3242 per cm was assigned as – OH stretching in alcohol and phenolic compounds with strong hydrogen bonds. The peak of 2143 per cm is assigned with C≡C stretching in alkynes. The Peak at 1617.7 per cm that is relevant to the C=O bond of the carbonyl group and the stretching vibrations of amides also emerged in this range. The peak at 1442.5 per cm was assigned as P-C with organo-phosphorus (aromatic bond) compounds. The peaks ranged from 1222.8 per cm to 1013.8 per cm stretching and were assigned as C-O with ethers/ aromatics compounds. SEM analysis shows high-density AgNPs synthesized by jatropha curcas latex. It was shown that organic nanofibers, crystalline, are interconnected to each other forming three-dimensional network structures of AgNPs. This study showed that plants' latex and other parts might be used to biosynthesize AgNPs, which may be utilized by the pharmaceutical industries and other biomedical applications.

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INTRODUCTION

Nanoparticles are particles with a size of 1–100 nm and, the nano-material has novel, distinct, and superior physicochemical properties with respect to its bulk structure, as a result of an increase in the spatial quantity of the material or the theparticle[1]. The utilization of plants in the biosynthesis of nanoparticles involves the content of secondary metabolites as reducing agents[2]. Biological agents had been identified as reducers, and stabilizers, sometimes acting as both in forming nanoparticles[3].

Medicinal plants like Jatropha curcas have played a major role in the treatment of various diseases, including bacterial and fungal infections. The scientific name of the physic nut is “Jatropha curcas." The genus name Jatropha derives from the Greek word jatr´os (doctor) and troph´e (food), which implies medicinal uses[4]. And it belongs to the Euphorbiaceae family, a shrub or tree that can withstand dryness, well distributed in the wild or semi-cultivated areas in any part of the world [5,6,7]. All of its parts have been used in folk fare medicine for centuries[8]. Plants can be employed for green synthesis, and are being considered the best candidates for the synthesis of AgNps[9]. It was also reported that nano-silver is non-toxic to humans at low doses[10,11].

Para and Bhanu[12] carried out the FTIR spectroscopic analysis of the methanol leaf extract of Ampelocissus latifolia for antimicrobial compounds. Similarly, Thangarajan Starlin and co[13] detected the elements and functional groups in the ethanol extract of the whole plant of Ichnocarpus frutescens using the FTIR spectroscopic method. Hence, this present study is to analyze the functional groups of bioactive compounds present in the Jatropha curcas Latex Silver Nanoparticles.

METHODS

Collection of Samples

A Fresh sample of crude latex of *Jatropha curcas* was collected from its stem by incision with a sharp sterile knife. The milky latex was stored air-tight in a brown bottle and refrigerated at 4 °C for other use.

Production of Silver Nanoparticles (AgNPs)

The hexane/ methane (1:1) extract of the *Jatropha curcas* latex was used for the biosynthesis of silver nanoparticles. One hundred milliliters of 1 mM of the aqueous solution of silver nitrate (AgNO3) was prepared in 250 mL Erlenmeyer flasks and 40 mL of 3 % of the hexane/ methane latex extract was added into labelled conical flasks for the bio-reduction of the silver- nitrate (AgNO3) into Silver (Ago) ions. This mixture was observed for colour changes and later placed in an incubator for the complete bio-reduction at a temperature of 37ºC for 24 hours to 72 hours[14].

Characterization of *Jatropha Curcas* Latex extract Silver Nanoparticles

Visual observation

The gradual colour change of the mixture in the Erlenmeyer flask was visually observed and noted.

Ultraviolet-visible spectra analysis

The optical property of the formed AgNPs was characterized by using 1 ml samples of the

suspension collected periodically in order to allow for the monitoring of the completion of bio-reduction of Ag+ in an aqueous solution, followed by dilution of the samples with 2 ml of deionized water and subsequent scan in UV-visible (vis) spectra, between a wavelength of 200-900nm in a spectrophotometer having a resolution of 1 nm. The UV-Visible spectra were recorded at intervals of 24, 48 and 72 hours.

Scanning Electron Microscopy Analysis (SEM)

The Jatropha curcas latex extract silver nanoparticles were characterized for nanoparticles shape with a scanning electron microscope (ZEISS EVO-MA 10, Oberkochen, Germany)[15].

Fourier-Transform Infrared Spectroscopy

Analysis Fourier-Transform Infrared (FTIR) was done to identify the functional and composition of silver nanoparticles. The analysis of the dried SNPs was carried out through the potassium bromide (KBr) pellet (FTIR grade) method in a ratio of 1:100[16]. The spectrum was recorded using JASCO FT/ IR-6300 Fourier transform infrared spectrometer equipped with JASCO IRT-7000 Intron Infrared Microscope using transmittance mode operating at a resolution of 4 per cm.

RESULTS

Visual observations

Plate 1: Visual observations of the bio-synthesized AgNPs

Ultra-Violet spectra of the AgNPs

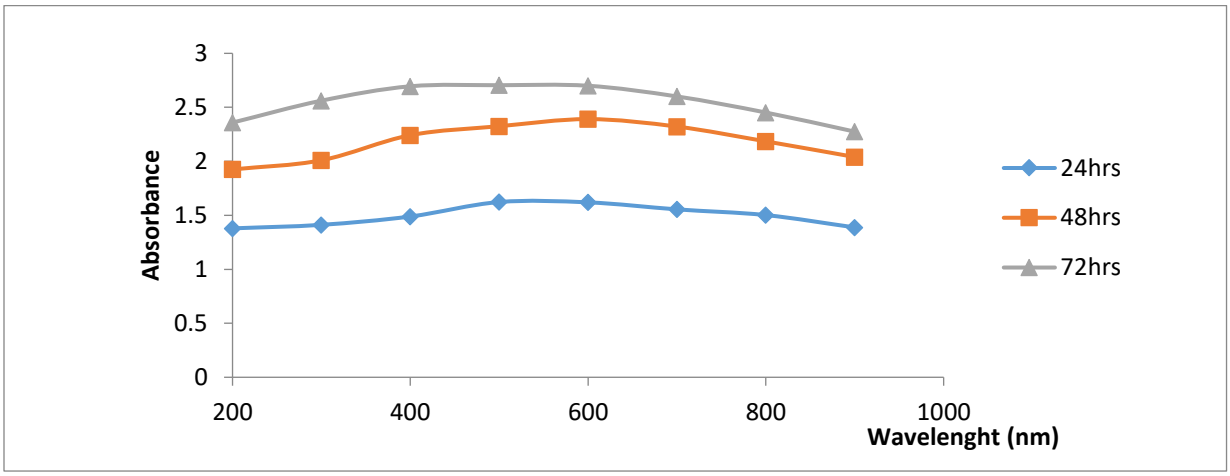

Figure 1: shows UV the spectra of the AgNPs produced using the latex of *Jatropha curcas*.

In Figure 1, at 24 hours and 48 hours the peak was at 500 nm, and at 72 hours there was Surface Plasmon Resonance at 400 nm peak.

Scanning Electronic Microscopy

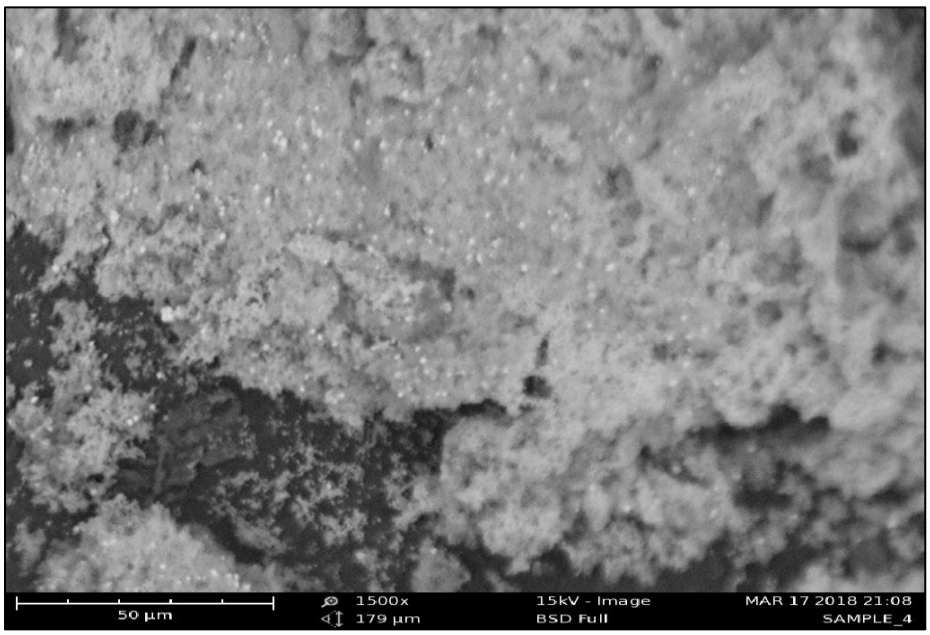

Figure 2: SEM image for AgNPs using *Jatropha curcas* latex white (mag.1500X)

SEM analysis shows high-density AgNPs synthesized by Jatropha curcas latex (Figure 2). It was shown that organic nanofibers are interconnected to each other forming three-dimensional network structures of AgNPs.

Fourier-Transform Infrared Spectra

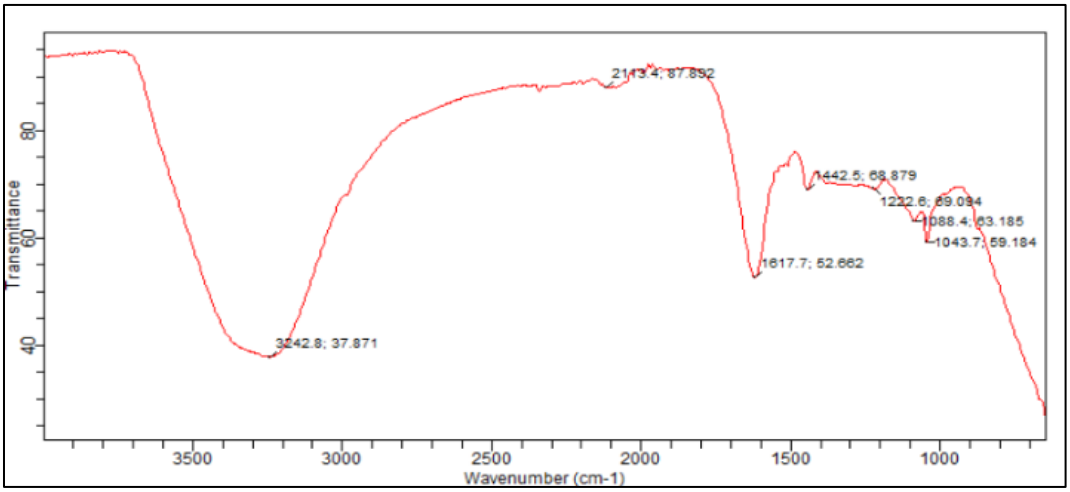

Figure 3, FTIR spectra of *Jatropha curcas* latex.

In Figure 3, Seven peaks were observed which ranged from 3300- 1045 per cm. The peak at 3242 per cm was assigned as – OH stretching in alcohol and phenolic compounds with strong hydrogen bonds. The peak of 2143 per cm is assigned with C≡C stretching in alkynes. The Peak at 1617.7 per cm that is relevant to the C=O bond of the carbonyl group and the stretching vibrations of amides also emerged in this range. The peak at 1442.5 per cm was assigned as P-C with organo-phosphorus (aromatic bond) compounds. The peaks ranged from 1222.8 per cm to 1013.8 per cm stretching and were assigned as C-O with ethers/ aromatics compounds.

DISCUSSION

Nanotechnology is a new form of technology which has great development in various fields. Due to the unique features and applications of the nanoparticles, they are very useful, especially in the field of biotechnology, medical imaging and catalysis.

UV-vis spectra confirmed the synthesis of *J. curcas* nanoparticles as evident from the peak at 600 nm (Figure 1). The UV-vis spectra showed surface plasmon resonance (400nm) at 72hr. The change in colour from milky white to deep brown with time is due to excitation in surface plasmon resonance (**plate 1**). There is no colour change in *J. curcas* latex extract and AgNO3 solution alone, confirming that components from latex extract actually reduced the metallic silver into AgNps.

SEM analysis shows high-density AgNPs synthesized by *jatropha curcas* latex. It was shown that organic nanofibers (crystalline) are

interconnected to each other forming three-dimensional network structures of AgNPs.

Organic functional groups like OH, N=O, and C=O linked to the surface of nanoparticles are found by FTIR[17]. FTIR spectra of the latex of Jatropha curcas showed a pattern of spectra which ranged from 3242.8 per cm– 1043.7 per cm. The vibrational bands (FTIR) observed in the Jatropha latex-AgNps indicated the presence of various secondary metabolites such as flavonoids, phenols, glycosides, terpenoids, and tannins which were earlier reported for synthesis and stabilization of nanoparticles[18].

CONCLUSION

This study was able to confirm that silver nanoparticles were produced using *Jatropha curcas* latex, being simple, cost-effective, and secure in production. UV – vis. spectrophotometer and SEM techniques have confirmed the reduction of AgNO3 to AgNps.

FTIR analysis as shown in the study reflected the possible involvement of amines, aromatic groups, -OH in the reduction process and may act as the reducing and capping agents.

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Research Article

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The Distribution Pattern of ABO and Rhesus D Blood System among Fresh Students of Ogun State College of Health, Ilese-Ijebu

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ABSTRACT

The distribution pattern of ABO and Rhesus D blood groups varies from race to race. This research work assessed the distribution pattern of ABO and Rhesus D blood grouping among fresh students of Ogun State College of Health, Ilese-Ijebu. The blood samples were collected from the study population into disposable sample bottles and then analyzed using forward grouping with the tile method. The Results showed that blood group O had the highest percentage of 47% followed by blood group A at 31%, blood group B had 16% and blood group AB with the lowest percentage of 6%. And, O Rh. D positive had the highest percentage 45%, which is followed by A Rh D positive with a percentage frequency of 31%, B Rh D positive has 16%, AB Rh D positive with 6% and O Rh D negative has 2%. The distribution of the ABO and Rhesus (D) blood groups is in agreement with the findings of previous studies; Blood group O is the most prevalent and AB the least prevalent, and there is high Rhesus (D) positivity in the population. These findings justify the further need for blood typing and proper documentation for patient management in the study area.

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INTRODUCTION

The human red blood cell (RBC) membrane is complex and contains a significant number of blood group antigens, the most clinically significant being the ABO and the Rhesus antigens[1]. The blood group system of ABO is based on the identification of antigen A and antigen B and the four major groups are A, B, AB and O) which existed based on these antigens individually as A or B, and jointly as doubling AB or non-presence of both antigens A and B, being denoted as O. Individuals who have the antigens A and B on their red cells lack the group-specific agglutinins in the serum[2]. The D antigen is the most important determinant of the Rhesus blood group classification. Individuals who have the D antigen on their red cells are known as Rhesus positive while those without antigen D in their RBCs are Rhesus negative[3]. The Antibodies to Rh D protein develop after an individual encounters Rh D antigens through transfusion, pregnancy and/or organ transplantation. The Anti-Rh D (or anti-D) antibodies usually antagonize Rh D-positive red cells and can lead to blood killing. The most common cause is rhesus incompatibility when antibodies from an Rh-negative mother target and destroy 'foreign' red blood cells from an Rh-positive fetus[4]. The distribution of ABO and Rhesus blood groups differs from race to race in a population. Certain types of blood groups are more related to a particular disease and environment. Hence, their knowledge can be used for establishing prevention strategies[5].Therefore it becomes increasingly important to obtain knowledge and information about blood groups in any population[6]. Hence, the distribution pattern of ABO and Rhesus D blood group among fresh students of Ogun State College of Health Technology, Ilese-Ijebu, was investigated.

METHODS

Research design

The research work is a cross-sectional experimental design that assessed the distribution of genotype and blood group among freshers in Ogun State College of Health Technology, Ilese-Ijebu. Study area

Study area

The study location is Ogun State College of Health Technology, Ilese-Ijebu. It is located in Ijebu North-East local government area in Ogun State.

Study population

The study population is made up of one hundred (100) fresh students of Ogun State College of Health Technology, Ilese-Ijebu.

Sample size /sampling technique

Sample size /sampling technique A total of one hundred fresher's from Ogun State College of Health, Ilese-Ijebu were randomly selected to constitute the sample size.

Sample collection

Sample collection Two to five milliliters of blood samples were collected aseptically via vein puncture using a disposable sterile syringe and needle.

Sample analysis / Principle of ABO and Rh blood grouping

It was based on the Antigen-antibody reaction, where antigens on the surface of RBCs react with the corresponding antibodies coated in the anti-sera which brings about agglutination. They were observed macroscopically for agglutination and results were recorded in comparison with the controls. 2. Results and discussion Blood samples were collected from one hundred (100) fresh students in Ogun State College of Health, Ilese-Ijebu, into EDTA bottles and then analyzed for the ABO blood group and Rhesus. Results from this present study showed that the mean age of the study participants is 20.7±2.0 with the age range of 17 to 28years.

RESULTS AND DISCUSSION

Table 1. Age group distribution of the participants

Age (Years)	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
17-20	58	58	58	58
21-24	24	24	24	82
25-28	18	18	18	100
Total	100	100	100	

Table 1 shows that 58% of the study participants are between the ages of 17-20yrs, 24% are between the ages of 21-24yrs, and 18% are between the ages of 25-28yrs. From the table above, the majority of the study participants are within the age group of 17-20yrs representing 58%.

Table 2: Sex distribution of the participants

Sex	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Male	22	22	22	22
Female	78	78	78	100
Total	100	100	100	

Table 2 showed that 22% of the study participants are male while 78% are female, majority of the study participant are female representing.

Table 3: The distribution of ABO blood group in relation to the age group of the study population (n=100)

Age (Years)	Frequency examined	Blood group ABO				Total
		A	B	AB	O	
17-20	58	17(17%)	7(7%)	2(2%)	32(32%)	58(58%)
21-24	24	12(12%)	4(4%)	-	8(8%)	24(24%)
25-28	18	2 (2%)	5(5%)	4(4%)	7(7%)	18(18%)
Total	100	31 (31%)	16(16%)	6(6%)	47(47%)	100 (100%)

Table 3 showed the distribution of the ABO blood group in relation to the age group of the study population. Within the age group, 17-20yrs; 17% had blood group A, 7% had blood group B, 2% had blood group AB, and 32% had blood group O. Among the age group 21-24years; 12% had blood group A, 4% had blood group B, (none) had blood group AB, 8% had blood group O. Among age group 25-28years; 2% had blood group A, 5% had blood group B, 4% had blood group AB and 7% had blood group O.

Table 4: Rhesus (Rh) groups distribution among the study population (N=100)

ABO	Rh^+	Rh^-	Total
A	31(31%)	-	31(31%)
B	16(16%)	-	16 (16%)
AB	6(6%)	-	6(6%)
O	45(45%)	2(2%)	47 (47%)
Total	98(98%)	2(2%)	100(100%)

Table 4 showed the Rhesus factor among the fresh in Ogun State College of Health Technology, Ilese-Ijebu, 31% of the students have A Rhesus D positive, 16% have B Rhesus D positive, 6% have AB Rhesus D positive, 45% have O Rhesus D positive and 2% O Rhesus D negative. From the table above, the majority of the study participants (98%) have Rhesus D positive. In other studies, blood group O has been found to be the most predominant blood group. This present study is in agreement with the

finding of 2 and among the Caucasians in the United States, the distribution was, group O, 47%, group A, 41%, group B, 9% and group AB, 3%). In Lagos, Nigeria, blood group O is 55.3%, blood group A, is 25.3%, blood group B is 16.7% and blood group AB is 2.7%[7]. In this study, blood group AB has the least percentage; which is similar to other previous studies. Rhesus D

distribution also varies within any group of the human population. In this study, it was observed that blood group O Rh D positive had the highest percentage 45%, which is followed by A Rh D positive with a percentage frequency of 31%. B Rh D positive has 16%, AB Rh D positive 6% and O Rh D negative has 2%. This study showed a total percentage of Rh D positive distribution of 98(98%), this is similar to the study of Adeyemi and Soboyejo (2016) which was 97.7%.

CONCLUSION

The distribution of the ABO, and the Rhesus (D) blood groups are in concurrence with the findings of previous studies; Blood group O is the most prevalent and AB the least prevalent, and there is high Rhesus (D) positivity in the population. It is recommended that medical professionals should be augmented by the knowledge of the distribution of ABO and Rh blood groups at local and regional levels for effective management of blood banks and safe blood transfusion services.

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