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Physical Activity, Lipid Profile and other Cardiovascular Risk Factors in the Africans: Results of the Vitaraa Study

By Bilonda KAC, Bayauli MP, Ngoyi NG, Lemogoum D, Lepira BF, M'Buyamba-Kayamba JR, Degaute JP, Ditu MS, Kintoki VE, Kayembe KP, Diheka DJ & M'Buyamba-Kabangu JR
University of Kinshasa Hospital

Abstract- *Objective:* To assess the relationship between the level of physical activity (PA), plasma lipids and other cardiovascular (CV) risk factors in an African adult population.

Methods: Anthropometric data, blood pressure, heart rate, and plasma lipids were obtained in1, 292 persons aged ≥20 years (56.6% women) from an urban area in the Democratic Republic of Congo whose the level of PA was classified as low, moderateor high. Correlates of hypercholesterolemia were assessed.

Results: The level of PA was low in 645 participants (49.9%), moderate in438 (33.9%), and high in 209 (16.2%). Men were more likely to practice high PA compared to women (27% vs. 7.7%; $p<0.0001$) as were younger participants (<30 years) compared to those above 60 years (20.8% vs. 5.6%; $p<0.0001$).

Keywords: *physical activity, lipid profile, cardiovascular risk factors, africans.*

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Physical Activity, Lipid Profile and other Cardiovascular Risk Factors in the Africans: Results of the Vitaraa Study

Bilonda KAC [α], Bayauli MP [σ], Ngoyi NG [ρ], Lemogoum D [ω], Lepira BF [¥], M'Buyamba-Kayamba JR [§], Degaute JP [χ], Ditu MS [ν], Kintoki VE [Θ], Kayembe KP [ζ], Diheka DJ [£] & M'Buyamba-Kabangu JR [€]

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Conclusion: The data suggest a potential cardiovascular benefit of high PA through reduction of cardiometabolic and atherogenic dyslipidemia risk.

Keywords: physical activity, lipid profile, cardiovascular risk factors, africans.

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I. Introduction

Advanced technology has made it possible to achieve various daily tasks without excessive energy expenditure. People's physical activity (PA) has thus tremendously decreased. A sedentary lifestyle is now widespread in developed and, is on the rise in middle-income countries particularly among women[1]. Sedentary lifestyle increases by 20 to 30% the risk of all causes mortality. Every year, about 3.2 million persons die because of the lack of PA[2] and the cardiovascular risk linked to physical inactivity appears to be as high as that associated with major traditional risk factors[3].

Although the mechanisms underlying the benefit of PA are not fully understood, it was reported to correlate with the intensity and duration of the effort[4] and could be dependent on predominance of the isotonic or isometric type of exercise. Regular PA reduces the risk of chronic diseases, including cardiovascular disease[1], improves endothelial and platelet function and decreases insulin resistance. It corrects high blood pressure and lipid profile, increasing the level of HDL, lowering that of total and LDL-cholesterol[5]. PA slows the progression of atherosclerotic lesions. It diminishes the visceral fat mass in adults and the body mass index[6] and reduces the inflammatory phenomenon.

In the Democratic Republic of the Congo, a low level of PA was associated with a remarkable excess weight among diabetic patients[7]. On the other hand, in a semi-rural environment, one study reported a lower risk of pregnancy-induced hypertension among very active women with a diet rich in vegetables[8]. However, to the best of our knowledge, no exploration of the relationship between PA and lipid profile has been performed in the Congolese population. Partly because of the epidemiological transition following globalization, lifestyle and diet changes, the prevalence of intermediate cardiovascular risk factors such as overweight [9,10], high blood pressure[9,10], and diabetes mellitus[7,10] has increased, especially among urban dwellers. Therefore, in the framework of the VITARAA (Visite de la Tension Artérielle et du Risque Associéen Afrique) study, we evaluated the level of PA in a Congolese urban community and explored its

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relationship with plasma lipids and other cardiovascular risk factors.

II. Methods

The VITARAA study[10] enrolled a random sample of 1292 persons aged 20 years and over, 731 women (56.6%) and 561 males (43.4%) selected in the city of Kinshasa. From July 2007 to March 2008 trained interviewers visited chosen households between 6.0 and 9.0 pm. Participants were instructed to refrain from consuming coffee, alcohol, and tobacco the day the visit was scheduled. Interviewers collected socio-demographic data (age, gender) and information on PA and weekly frequency of vegetables, fruits, alcohol and/or tobacco consumption, medical history and current medication for chronic diseases. Body height, waist circumference, and weight with the subjects barefooted on loose clothing were measured. The body mass index was the ratio of weight (Kilograms) to the square of height (meters). After relaxation for at least five minutes, while sitting, two measurements of blood pressure and heart rate were performed using an electronic device (OMRON M6, HEM 7001E). A third record was required if the first two differed by at least ten mmHg. We used the average of these measurements in the analysis. Blood pressure monitors were recalibrated each month to a mercury device and a gap of 4 mmHg or more to disqualify the use. A 10 ml sample of venous blood was taken and immediately centrifuged. The collected plasma was stored at the temperature of -70 °C and later transferred to Belgium for lipid analysis (Erasmus Hospital, ULB, Brussels, Belgium).

Hypercholesterolemia was defined as a total cholesterol level >190 mg/dl, arterial hypertension as a systolic pressure ≥140 mmHg and/or diastolic pressure ≥90 mmHg or a history of taking antihypertensive medications[11]. A body mass index ≥25 kg/m^2 defined overweight/obesity[12]. A waist circumference ≥94 cm in men or ≥80 cm in women defined abdominal obesity[13]. Diabetes was a self-reported condition with or without current antidiabetic treatment[14]. We considered PA as:

- Low when the subject reported no or very weak and irregular activity;
- Moderate in participants with vigorous PA, capable of accelerating heart rate, but less than 30 minutes a day, less than three days a week;
- High in those whose the vigorous physical exertion lasted at least 30 minutes a day, three days or more per week.

a) Statistical analyses

The construction of the database and the statistical analyses were performed using SAS Software System, version 9.3 for Windows (SAS Institute, Cary, NC). We report the data as means ± standard deviations or frequencies and percentages. The analysis of variance with Scheffé posthoc test for multiple comparisons showed significant age difference between the various PA categories. We therefore expressed continuous variables as age-adjusted averages and 95% confidence intervals through analysis of covariance using the GLM procedure, and categorical variables as age-adjusted prevalence and 95% confidence intervals through logistic regression using the Genmod procedure. We modeled the odds of hypercholesterolemia in a multiple logistic regression analysis. The covariables considered in this model were gender, age, heart rate, overweight/obesity, abdominal obesity, diabetes, hypertension, and PA (coded 1 for high level, 0 for the other two levels).

III. Results

a) Level of physical activity

The proportions of participants by level of PA appear in Figure 1 for all participants and separately for each sex. Low PA level was reported by 645 participants (49.9%), moderate level by 438 (33.9%), and high level by 209 (16.2%). The respective proportions were 59.5%, 32.8% and 7.7% in women, and 37.4%, 35.3% and 27.3% in men. High PA predominated among men than women ($p < 0.0001$). The participants' age (37 ± 15 years) was similar in both sexes and averaged 39 ± 16 years, 37 ± 14 years and 33 ± 13 years, among low, moderate, and high PA subjects, respectively ($F = 14.96$; $p < 0.0001$). The proportion of participants with low PA increased with age, from 47% in youths (20-29 years) to 63.5% in participants ≥ 60 years; the respective proportions were 57.4% to 70.3% among women, 35.2% to 53.9% among men (Table 1). By contrast, within the same age groups, the overall proportion of participants with high PA decreased from 20.8% to 5.6%; it declined from 8.8% to 0% among women, from 34.4% to 13.5% among men. The prevalence of moderate PA did not vary significantly.

b) Characteristics of participants by level of physical activity

Body mass index, waist circumference, and heart rate significantly decreased with increasing level of PA with no significant change in blood pressure (Table 2). The prevalence of overweight / obesity, central obesity and hypercholesterolemia decreased significantly from low to high level of PA; the prevalence of arterial hypertension and diabetes mellitus was not significantly different in the three PA categories.

c) Plasma lipids, cardiovascular risk factors, and physical activity

Total and LDL-cholesterol decreased significantly from the low to the high level of PA (Table 3); average HDL-cholesterol and triglycerides were not different across PA categories. A separate analysis in women and men showed similar trends that

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were significant only in men for total cholesterol and LDL-cholesterol. For the whole study population the difference in plasma lipids between the low and the high level of PA (Table 3) was significant for total cholesterol (-7.7 [95% CI: -12.1;-3.1%) and LDL cholesterol (-11.2 [-14.4, -9.0] %). In men the difference was significant for total cholesterol (-8.0 [-8.3; -7.1] %), LDL cholesterol (-12.3 [-14.0, -11.6] %) and triglycerides (-4.5 [-5.1; -3.4]%); in women the only difference concerned LDL cholesterol (-6.5 [-13.5, -0.9]%). Between low and high levels of PA (Table 4), a significant difference was observed in the prevalence of overweight/obesity, central obesity, and hypercholesterolemia for the whole study population. There were no significant difference in women but in men for hypercholesterolemia and arterial hypertension. The difference between low and moderate levels of PA was only significant for hypercholesterolemia (-9.3 [-16.6; -2.1] %) and was also seen in men (-12.5 [-22.3; -1.9] %) but not in women taken separately. Finally, in the logistic model (Table 5), the probability of observing hypercholesterolemia increased with age (OR for +5 years, 1.12 [95% CI: 1.06; 1.18]; $p < 0.0001$), central obesity (present vs. absent, 2.01 [1.40; 2.88]; $p = 0.0001$) and decreased with high level of physical activity (0.72 [0.56; 0.93]; $p = 0.013$).

IV. Discussion

Participants aged ≥ 20 years enrolled in the VITARAA Study were allocated using a questionnaire to either low, moderate, or high category of PA. We assessed the relationships of these levels of PA to lipid profile, cardiovascular risk factors, and determinants of hypercholesterolemia. Our results indicate a high proportion of participants with low or moderate PA, especially among women. In both genders, the rate of active people considerably decreases with age. Participants with high level of PA exhibit a favorable lipid profile with low obesity indices, and sympathetic tone. Aging and abdominal obesity increase the likelihood of hypercholesterolemia that PA significantly decreases.

Almost half of the participants reported low physical activity and more than one third just a moderate one. Only 16% of adults had a higher level of PA. These observations are in agreement with a survey in 8000 Internet users which found 72% of the French people had no regular PA with 44% never practicing and 28% practicing from time to time; only 28% of the participants recognized a constant practice of PA.[15] Similarly, a study by the Scientific Institute of Public Health concluded that four out of ten Belgians aged ≥15 years had low PA.[16] A work on people's level of PA estimated that about one-third of the world's population had currently a low level of PA[17]. The prevalence of sedentary life varied from 17% in South Asia to 43% in the Americas and the Eastern Mediterranean[17]. This increase in physical inactivity is a relatively recent phenomenon that has accompanied industrial revolution and automatic technologies the advances of which have lessened energy expenditure during daily activities.

Because the categorization of PA in the present study as in many other is self-reported, one cannot ascertain to what extent some individuals, mainly women were misclassified due to incorrect interpretation of the questionnaire administered to establish its level. While responding, participants could have confounded the terms PA and sport which are often mixed in mind and the everyday language. Individuals practice more PA than sport. They could have omitted to take into account the one that is performed daily in the natural way. In the African context of limited education, this may partly account for the predominance of women among people with poor PA; women would not have capitalized the PA linked to various everyday tasks. Nevertheless, the already mentioned French[15], Belgian[16], and other surveys [2] have also pinpointed the preponderance of sedentary life among women. According to a US study, women in 2010 have devoted 11 to 14 hours per week to a PA, but six to seven more hours to surf the web or watch television[18]. Not only practicing sport is a culture that women do not have in the Congo but also unavailability of appropriate structures for women's leisure could partly explain their low level of PA in our setting.

The decrease with age in the proportion of subjects with high PA agrees with other studies [19,20]. The younger the people, the less sedentary they are. Hallal et al. have also observed an increase in physical inactivity with age [17] which can be accounted for by various factors. With age, impaired physical ability can result from ventricular remodeling, reduced lung capacity, decreased fast muscle fibers (or Type II fibers required during intense and rapid exercise), a decrease in bone mineral density, and chronic degenerative arthropathies. A sedentary lifestyle also leads to physical deconditioning to exercise. The person gets used to making daily efforts that alters his functional abilities creating a vicious circle. Finally, in our setting, the elderly subjects are often preserved from most kinds of vigorous PA.

The average plasma lipids levels lied within the values usually reported for sub-Saharan African populations. The rates were somewhat higher among women whose both the prevalence of obesity and the proportion of physically inactive subjects were high. Inactive subjects had higher total cholesterol and LDL cholesterol levels than participants in the moderate or high category of PA. The rate of subjects with abnormal lipids levels was less among participants with a high than among those with a low level of PA as illustrated by the lipid pattern among males compared to women in the present work. HDL-cholesterol level was significantly

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higher whilst the rate of triglycerides lower when the reported level of PA was high. Aadahl et al., in a five years longitudinal follow-up survey observed an improvement in HDL-cholesterol only in the male subjects[21]. Moreover, according to the Tromso Study [22] where 5220 male and 5869 female Norwegian aged 20 to 49, were monitored for 17 years, a dose-dependent inverse relationship was observed between the level of PA, lipid parameters, and body mass index. Men with a high level of PA had 9% and 28% lower cholesterol and triglycerides levels compared to the sedentary group, and a 12% higher HDL-cholesterol. The individuals who were initially sedentary, and whose PA increased over the 17 years of follow-up improved their lipid profile. Conversely, a worsening in lipid profile occurred in people who initially had a leisure activity and who became sedentary later[22]. In their study, Léon and Sanchez found a 3.7% decrease in triglyceride levels, a 5% LDL cholesterol and a 4.6% HDL-cholesterol increase during PA[23]. In the present study, in comparison to the low level of physical activity, total and LDL-cholesterol, and triglycerides were respectively 8%, 12.3%, and 4.5% lower in males with high PA levels; HDL-cholesterol was 4.8% higher.

The mechanisms underlying PA-induced plasma lipid changes are not fully understood. [24] Physical exercise appears to improve skeletal muscle ability to use lipids rather than glycogen, thereby reducing plasma lipid levels[24, 25]. Increase in lecithin-cholesterol-acyl-transferase (LCAT), the enzyme responsible for esters transfer to HDL-cholesterol [26] the rate of which rises as a result of a physical training program has been invoked[27]. The role of Lipoprotein lipase is controversial[28]. Lipid changes may depend on the involved energy costs. Ferguson et al.[29] stated that energy expenditure of 1,100 kcal was required to achieve elevation in HDL-cholesterol corresponding to a significant increase in lipoprotein lipase activity. The clearance process of cholesterol is known as "reverse cholesterol transport." After acute and chronic exercise, this process removes cholesterol from the circulation as the result of an increase in lecithin-cholesterol acyl transferase coupled with a reduction in cholesterol ester transfer protein (CETP), the enzyme responsible for transferring HDL cholesterol to other lipoproteins. Such an increase in enzyme activity enhances the ability of muscle fibers to oxidize plasma VLDL-cholesterol or triglycerides derived fatty acids.

The present work shows an inverse association between PA, the rate of overweight/obesity and central-type obesity, and sympathetic tone as evidenced by a slow heart rate. The prevalence of hypercholesterolemia increased with aging, overweight and, especially, abdominal obesity, and decreased with higher PA. Studies have shown a dose-response relationship between the level of PA and the rate of obesity, in particular, abdominal obesity[32,33]. Regular and prolonged PA increases muscle mass thus activating the consumption of energy substrates. It modifies the body fat distribution by decreasing visceral adipose tissue. To this regard, the present study provides further confirmation of the direct relationship between the intensity of PA, abdominal obesity, and hypercholesterolemia. Indeed, the lower rates of these risk factors, were only significant in male gender with a predominant rate of subjects with a high level of PA. The prevalence of hypertension and diabetes mellitus did not significantly differ across the various levels of PA. However, in men considered separately, the proportion of participants with hypertension was elevated among those with higher levels of PA. This observation contrasts with the results of a meta-analysis of intervention studies by Fagard et al.[34] showing a significant decrease in blood pressure for repeated exercise 3 to 5 times a week, for 30 to 60 min /day. The reasons for this discrepancy are not certain. One could invoke reverse epidemiology, the possibility of known hypertensive patients having adhered recently to the PA program as a non-pharmacological therapeutic measure. The cross-sectional nature of the present study precludes any decision without access to participants' previous blood pressure measurements. In agreement with the literature, high PA was associated with a low prevalence of metabolic syndrome presume-ably by improving tissue sensitivity to insulin and reducing insulin resistance through melting visceral fat [35,36].

Obvious limitations must be taken into account while interpreting the results of the present work. The intensity of PA attributed to participants was based solely on their responses to a questionnaire and may not accurately reflect their actual PA. Indeed, an incorrect interpretation of the research instrument singularly by women may have prevented them from capitalizing on the activity related to many of their daily tasks. However, the concordance between reported levels of PA, obesity indices and heart rate, is nonetheless an element of reliability. The blood pressure in our study is an average of only two measurements taken during an isolated visit to the participants' home. It may not reflect their usual blood pressure. Also, the cross-sectional nature of the survey does not provide a plausible explanation for the observation of increased blood pressure in the presence of a high level of PA. This analysis did not specify what type of physical exercise was predominant among the participants as the impact on blood pressure may depend on whether endurance or strength physical exercise was predominant[37]. Moreover, indication of how long the participants have had assigned level of PA is not available. Finally, it is not clear to what extent the results of this study can be reliably extrapolated to other Congolese or African populations.

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Nonetheless, our results draw some lines of recommendations for the secondary or even primary prevention of cardiometabolic pathologies in sub-Saharan Africa where these conditions have taken an epidemic run.

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Author contribution

JR M'Buyamba-Kabangu, D Lemogoum and JP Degaute planned the study. JR M'Buyamba-Kabangu coordinated whilst PM Bayauli and JRJr M'Buyamba-Kayamba supervised and implemented the field work in Kinshasa, Congo. D Lemogoum and JR M'Buyamba-Kabangu constructed the database in Brussels, Belgium. JR M'Buyamba-Kabangu did the statistical analysis. AB and JR M'Buyamba-Kabangu wrote the first draft of the manuscript. All authors interpreted the results and approved the final version of the article.

Conflict of interest

The authors declare no conflict of interest.

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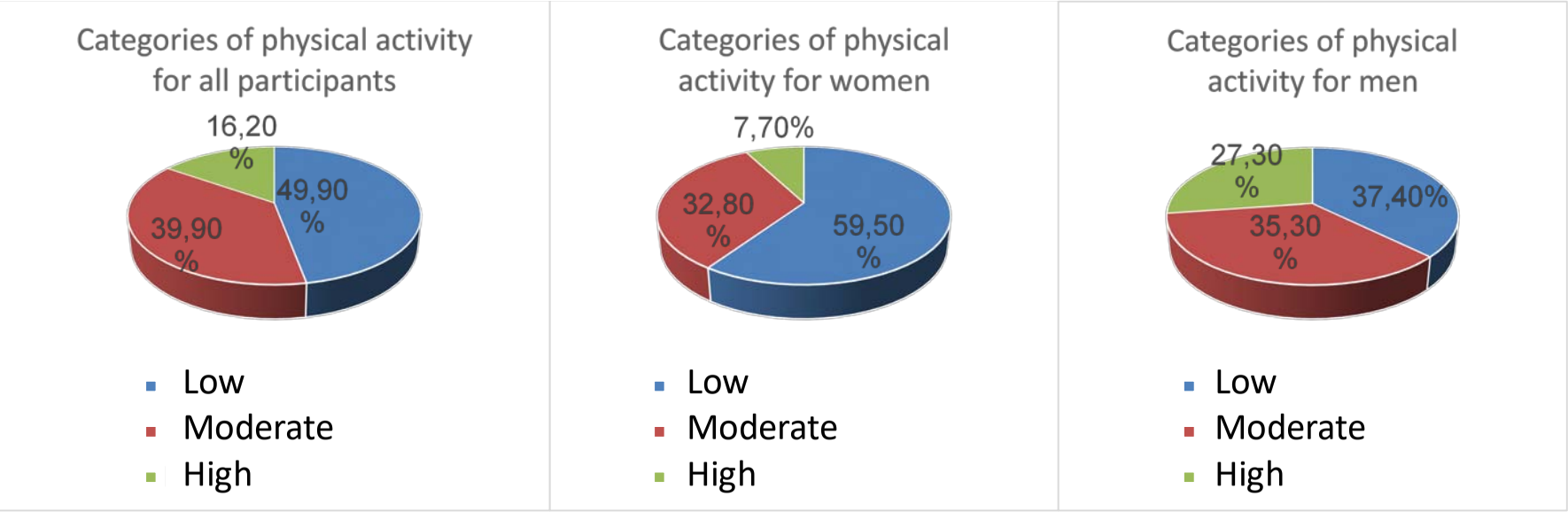


Figure 1: Categories of physical activity for all participants, women and men. Low PA, Moderate PA and High PA.

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Table 1: Participants' gender-age strata by level of physical activity.

Age, years	All			Women			Men		
	I	II	III	I	II	III	I	II	III
20-29	251 (47%)	172 (32.2%)	111 (20.8%)	163 (57.4%)	96 (33.8%)	25 (8.8%)	88 (35.2%)	76 (30.4%)	86 (34.4%)
30-39	146 (48.3%)	109 (36.1%)	47 (15%)	101 (57.1%)	63 (35.6%)	13 (7.3%)	45 (36%)	46 (36.8%)	34 (27.2%)
40-49	85 (47.5%)	67 (37.4%)	27 (15.1%)	62 (57.9%)	34 (31.8%)	11 (10.3%)	23 (31.9%)	33 (45.8%)	16 (22.2%)
50-59	83 (55%)	51 (33.8%)	17 (11.3%)	57 (64%)	25 (28.1%)	7 (7.9%)	26 (41.9%)	26 (41.9%)	10 (16.1%)
≥60	80 (63.5%)	39 (31%)	7 (5.6%)	52 (70.3%)	22 (29.7%)	0 (0.0%)	28 (53.9%)	17 (32.7%)	7 (13.5%)
	X^2= 49.119; P < 0.0001			X^2 = 14.855; P= 0.1374			X^2 = 33.212; P= 0.0003		

I = Low physical activity; II= Moderate physical activity; III= High physical activity.

Table 2: Participants' characteristics by level of physical activity

Characteristics	Level of physical activity			F	P
	Low	Moderate	High		
Age, years	39 ± 16	37 ± 14	33 ± 13	14.96	< 0.0001
Age adjusted mean (95% confidence intervals)					
Body mass index, kg/m^2	25.6 (25.2-26.1)	25.1 (24.6-25.6)	24.5 (23.7-25.2)$^{\$}$	38.97	<0.0001
Waist, cm	86 (85-87)	85 (83-86)	84 (82-85)	75.13	<0.0001
Systolic blood pressure, mmHg	126 (120-129)	126 (124-128)	127 (120-133)	4.077	0.078
Diastolic blood pressure, mmHg	82(78-86)	82 (79-88)	82 (76-87)	2.77	0.0891
Heat rate, beats/min	79 (78-80)	78 (77-80)	74 (72-76)	10.41	<0.0001
Age adjusted prevalence and 95% confidence interval of characteristic					
Hypertension	30.7 (27.3-34.2)	30.6 (26.7-34.5)	35.9 (30.2-41.6)		0.1348
Diabetes	4.9 (3.2-6.5)	3.7 (1.8-5.6)	4.1 (1.4-6.9)		0.6467
Overweight/obesity	46 (42-50)	42.1 (37.7-46.5)	35.1 (28.6-41.5)$^{\$}$		0.0046
Central obesity	34.8 (31.2-38.4)	27.2 (23.2-31.3)$^{\$£}$	19.2 (13.3-25.1)$^{\$}$		<0.0001

The lipids measurements were obtained in 786 participants (428 females and 358 men). $ = significant difference in comparison to low physical activity; £= significant difference in comparison to high physical activity.

Table 3: Serum lipids and differences by level of physical activity

Characteristics	Categories of physical activity			F	P
	Low	Moderate	High		
Age, years	39 ± 16	37 ± 14	33 ± 13	14.96	< 0.0001
Age adjusted mean and 95% confidence intervals					
Glycémie, mg/dl	111 (107-116)	106 (101-111)	109 (101-116)	11.28	<0.0001
Total cholesterol total, mg/dl	177 (173-182)	168 (164-173)$^{\$}$	164 (156-171)$^{\$}$	21.04	<0,0001
HDL-cholesterol, mg/dl	45 (43-46)	44 (42-45)	44 (42-47)	1.65	0.1774
LDL-cholesterol, mg/dl	107 (104-111)	101 (97-105)$^{\$£}$	95 (89-101)$^{\$}$	14.2	<0.0001
Triglycerides, mg/dl	126 (117-134)	125 (116-135)	127 (113-141)	1.31	0.2351
Difference (%) and 95% confidence intervals between insufficient and moderate to intense physical activity					
	All subjects	Women	Men		
Total cholesterol	-7.7 (-12.1; -3.1)	-4.5 (-10.4; 0.0)	-8.0 (-8.3; -7.1)		
HDL-cholesterol	2.2 (-2.3; 2.2)	0.0 (-6.8; 8.5)	4.8 (2.5; 6.7)		
LDL-cholesterol	-11.2 (-14.4; -9.0)	-6.5 (-13.5; -0.9)	-12.3 (-14.0; -11.6)		
Triglycerides	0.7 (-3.4; 5.2)	0.8 (-14.4; 13.5)	-4.5 (-5.1; -3.4)		

The lipids measurements were obtained in 786 participants (428 females and 358 men). $ = significant difference in comparison to low physical activity; £= significant difference in comparison to high physical activity.

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Table 4: Physical activity related difference in the prevalence of cardiovascular risk factors

Cardiovascular risk factors	All	Women	Men
Mean (%) and 95% confidence intervals of the difference in			
Overweight/Obesity	-10.0 (-17.3 ; -2.6)	2.1 (-11.2 ; 11.2)	-8.6 (-18.5 ; 1.2)
Central obesity	-14.2 (-21 ; -7.4)	-3.2 (-16.2 ; -9.8)	-1.4 (-7.7 ; 4.5)
Hypercholesterolemia	-17 (-26.2 ; -7.9)	-8.1 (-25.2 ; 9.0)	-15.9 (-27.0 ; - 4.7)
Diabetes mellitus	-0.8 (-4.0 ; 2.5)	1.2 (-4.6 ; 7.0)	-1.7 (-6.2 ; 2.6)
Hypertension	5.1 (-1.6 ; 11.9)	-0.9 (-13 ; 11)	10.3 (1.2 ; 19.5)

The difference is between low and moderate to intense physical activity.

Table 5: Odds ratio and 95% CI for hypercholesterolemia

Variable	Odds ratio	95% CI	P
Age	1.02	1.01 – 1.03	<0.0001
Central obesity	2.01	1.40 – 2.88	0.0001
Physical activity	0.72	0.56 – 0.93	0.0132

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Robotic Resection of a Posterior Mediastinal Unicentric Castleman's Tumor

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Abstract- Castleman's disease is a rare lymphoproliferative disease, that can either be unicentric or multicentric in presentation. It can affect various sites such as chest, neck, abdomen, and many others. Unicentric Castleman's disease commonly affects the mediastinum, arising in the anterior and middle compartment and less commonly the posterior compartment. Patients affected with the disease are usually asymptomatic, however, they may present with non-specific symptoms such as cough and dyspnea. The treatment of Unicetric Castleman's disease is surgical resection. In this case report we present a case of posterior mediastinal unicentric Castleman's tumor, which was completely resected via robotic surgery.

Keywords: *castleman's disease, posterior mediastinal mass, robotic resection.*

GJMR-F Classification: *NLMC Code: WF 970, WH 700*



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Robotic Resection of a Posterior Mediastinal Unicentric Castleman's Tumor

Derar S AlShehab, FRCSC [α], Essa M AlGhunaim, KBS [σ], Adel K. Ayed, FRCSC [ρ], Hafsa AlNajem, MD [ω], Maryam AlMurshed, FRCPathC [¥] & Alper Toker, FECTS [§]

Abstract- **Castleman's disease is a rare lymphoproliferative disease, that can either be unicentric or multicentric in presentation. It can affect various sites such as chest, neck, abdomen, and many others. Unicentric Castleman's disease commonly affects the mediastinum, arising in the anterior and middle compartment and less commonly the posterior compartment. Patients affected with the disease are usually asymptomatic, however, they may present with non-specific symptoms such as cough and dyspnea. The treatment of Unicetric Castleman's disease is surgical resection. In this case report we present a case of posterior mediastinal unicentric Castleman's tumor, which was completely resected via robotic surgery.**

Keywords: castleman's disease, posterior mediastinal mass, robotic resection.

I. Introduction

Castleman's disease (CD) is an uncommon lymphoproliferative disorder, of unknown etiology that was first reported by Castleman and Towne in 1954 [1]. Castleman's disease can be classified into 2 main categories, unicentric (localized) and multicentric (systemic) [4]. Castlemna's disease is often asymptomatic. The unicentric type of Castleman's disease is treated by complete surgical resection of the lesion and no further treatment is required after the surgery. In this paper we report a first case of a 43 year old female, presented with constitutional symptoms and a mediastinal mass that was treated by complete surgical resection utilizing Davinci Si robotic system.

II. Case Report

A 43 year old female patient, previously healthy, presented with 20 days history of persistent fever associated with rigors, weight loss, generalized body ache and fatigue. General physical examination was unremarkable. Routine lab tests revealed a microcytic anemia with a hemoglobin level 10.2 g/dL (N: 12-16 g/dL), MCV 73.8 fL (N: 82-97 fL), MCH 23.7 (N:27-33 pg); the rest of the lab tests were within normal limit. Pan CT done and it showed left posterior mediastinal retrocrural paravertebreal, well defined oval solid mass lesion measuring about 54 x 38 x 50 mm, with surrounding retrocrural lymph nodes sharing the same capsule largest suggestive of mediastinal neurogenic tumor likely paraganglioma. MRI of the chest done and it showed well defined paravertebral soft tissue lesion extending from D5 to D12 on the left side measuring 5 x 5 x 5 cm (fig 1, 2). The patient underwent complete excision of the lesion via a minimally invasive procedure with Robotic assisted thoracic surgery (Da Vinci Si model) 3 ports were used. The excised tissue was sent for histopathological testing.

a) Pathologic Findings

The specimen is received fixed in 10% buffered formalin, labeled with patient ID and as "Posterior mediastinal mass". Gross assessment of the specimen revealed a brown firm mass with nodular surface measuring 6.0 x 4.5 x 3.5 cm. Cut surface is brown in color with scattered tan tiny nodules. Another specimen was also received fixed, and labeled as "Pulmonary ligament lymph node". It consisted of a brown nodular tissue measuring 1.2x0.7x0.7cm. Cut surface showed similar changes to the large mass; other small lymph nodes were also included. Microscopic assessment of the mediastinal mass showed an enlarged lymph node composed of atretic small follicles with expanded intervening interfollicular region. Hyalinized vessels traversing the follicles are evident – lollipop sign. The follicular center is replaced by dendrocytes without evidence of atypia. The follicles are surrounded by thickened mantle zone in the form of concentric layering of lymphocytes- which is called as onion skinning. The interfollicular zone is replaced by hyperplastic, some hyalinized, venules and infiltrated by mature lymphocytes. The lymph node septa are thickened and sclerotic. Surrounding the mass, there was a vasculo-adipose tissue containing few peripheral nerves (fig 3). There is no evidence of associated lymphoma. No thymic tissue identified. The other small lymph nodes included show reactive changes only. The findings are of Castleman's disease, hyaline vascular type.

Post-operative follow up the patient had uneventful recovery with fever subsiding.

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The follicles are surrounded by concentric layering of lymphocytes- onion sin appearance- and the follicular center is replaced by dendrocytes. Hyalinized vessels are seen traversing the follicles (lollipop sign).

b) Comment

Castleman's disease (CD) is an uncommon disease of unknown etiology that is characterized by angiofollicular lymph node hyperplasia. There are 2 clinical forms of the disease: localized (unicentric) and systemic (multicentric) form. Histologically the disease can be classified into hyaline vascular type, plasma cell type and mixed type. In most case, the lesion were characterized by prominent vascular proliferation and hyalinzation [3]. In the case we presented her it was of a hyaline vascular type.

Clinical features of CD varies depending of the form of the disease. People with unicentric Castleman's disease (UCD) usually present with a slow growing mass in asymptomatic patients with no gender or race predominance [4]. Common sites of presentation in UCD include the chest (30%), neck (23%), abdomen (20%), retroperitoneum (17%), and, rarely, the axilla (5%), groin (3%), or pelvis (2%) [7]. The disease commonly affect the mediastinum; usually involving the anterior and middle compartment, but rarely the posterior compartment. Only 9 cases of posterior unicentric castleman's disease were reported in the literature. [5, 6].

Patients with intrathoracic disease involvement may present with cough, dyspnea, hemoptysis or chest discomfort, where as abdominal, retroperitoneal, and pelvic disease may present with abdominal or back discomfort [2]. On the other hand, Patients with multicentric Castleman's disease (MCD) usually present with systemic inflammatory manifestations like fever, night sweats, weight loss and fatigue. The physical examination in these patients usually reveals generalized lymphadenopathy, hepatosplenomegaly and signs of fluid retention. Common hematological abnormalities include anemia, elevated inflammatory markers, hypergammaglobulinemia, and hypoalbuminemia. [8] In this paper, we reported a case of UCD that presented with systemic symptoms including fever, weight loss, and fatigue, which is usually a presentation of a MCD.

Histologically the disease can be classified into hyaline vascular type, plasma cell type and mixed type. In most case, the lesions were characterized by hyaline vascular type, which is characterized by increased numbers of small, hyalinized blood vessels within and between follicles with obliteration of the medullary sinuses. [3] The case we presented above was of a hyaline vascular type.

The management of CD depends of the type of the disease. The management of UCD is complete surgical resection; in case the mass is not amenable for resection or the patient is not candidate for surgery, radiotherapy can be used. All 9 cases of posterior mediastinal CD that were reported were surgically resected via open surgical resection, either thoracotomy or sternotomy [5,6].This case is the first posterior mediastinal CD to be completely resected Utilizing robotic surgery (DaVinci SI).

On the other hand, treatment of MCD is include Rituximab, antiretroviral therapy, glucocorticoids, cytotoxic chemotherapy, and anti-Interleukin 6 Therapy. Rituximab can be used as monotherapy for patients with MCD. If the patient with MCD is HIV positive antiretroviral therapy showed be added. Glucocorticoids offer a short term control of symptoms and are usually helpful as an initial adjunct for acutely symptomatic disease. Chemotherapy can be used in cases of relapses or refractory MCD. [8]

III. Conclusion

Unicentric Castleman's disease is rare, and rarely found as posterior mediastinal mass. It may present with systemic manifestation. The treatment of choice is complete surgical resection ,in this case it was demonstrated that surgical resection can be performed using robotic assisted surgery .

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A Research into the Prevalence of HIV and Risk Factors that can Predispose Students of College of Health Sciences and Technology Ijero Ekiti to HIV Infection

By Omotayo Faith Olanrewaju

Introduction- HIV stands for "human immunodeficiency virus":"human" because the virus causes diseases only in people; "immunodeficiency" because the immune system, which normally protects a person from disease, becomes weak; "virus" because like all viruses, HIV is a small organism that infects living things and uses them to make copies of itself. HIV causes AIDS (acquired immune deficiency syndrome). AIDS is a group of diseases that occur when a person's immune system is damaged by HIV. When HIV is in the body, it start to destroy CD4+ cells which are white blood cells (WBC) that help the body to fight infections and diseases. HIV is spread when blood, semen or vaginal fluids from an infected person enters another person's body, usually through sexual contact, sharing of needles, injection of drugs or from mother to child during birth.

HIV makes it difficult for the body to fight off infections I.e. when a person is infected with HIV, the person may get some infections, otherwise known as opportunistic infections (O.I), that the body can no longer fight off. The HIV attacks the immune system, and if the immune system is damaged, it increases the risk of developing a serious infection or disease.

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ARESEARCHINTOTHEPREVALENCEOFHIVANDRISKFACTORSTHATCANPREDISPOSESTUDENTSOFCOLLEGEOFHEALTHSCIENCESANDTECHNOLOGYIJERODEKITITOHIVINFECTION

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A Research into the Prevalence of HIV and Risk Factors that can Predispose Students of College of Health Sciences and Technology Ijero Ekiti to HIV Infection

Omotayo Faith Olanrewaju

I. Introduction

HIV stands for "human immunodeficiency virus":"human" because the virus causes diseases only in people; "immunodeficiency" because the immune system, which normally protects a person from disease, becomes weak; "virus" because like all viruses, HIV is a small organism that infects living things and uses them to make copies of itself. HIV causes AIDS (acquired immune deficiency syndrome). AIDS is a group of diseases that occur when a person's immune system is damaged by HIV. When HIV is in the body, it start to destroy CD4+ cells which are white blood cells (WBC) that help the body to fight infections and diseases. HIV is spread when blood, semen or vaginal fluids from an infected person enters another person's body, usually through sexual contact, sharing of needles, injection of drugs or from mother to child during birth.

HIV makes it difficult for the body to fight off infections I.e. when a person is infected with HIV, the person may get some infections, otherwise known as opportunistic infections (O.I), that the body can no longer fight off. The HIV attacks the immune system, and if the immune system is damaged, it increases the risk of developing a serious infection or disease.

The question people often ask is where did HIV come from? The origin of HIV/AIDS has been a puzzle to the whole world. Scientists have professed many theories about the origin of HIV/AIDS but none has proven conclusively. According to Children's Aid Fund, the actual region of the virus origin may never be known (CAF2006).

The illness first came to light in the late 1970s in the USA. From 1979-1981, Doctors in Los Angeles and New York began to report rare types of pneumonia, cancer and other illnesses among a number of gay male patients that seemed stubbornly resistant to any treatment. These were conditions not usually found in people with healthy immune system but it was quickly noticed that all the men were suffering from a common syndrome.

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In 1982, public health officials began to use the term "Acquired Immune Deficiency Syndrome" or AIDS to describe the occurrences or opportunistic infections. Kaposi Sarcoma and Pneumocystis Carini Pneumonia in previously healthy men (CAF, 2006). Final tracking (surveillance) of AIDS cases began in the same 1982 in the United States.

In 1983, Scientists isolated the virus that causes AIDS. The virus was at first named HTLV-111 (Human T-cell Lymph tropic Virus-Type 111; Lymphadenopathy-Associated Virus (LAV) by an international Scientific Committee (Children's Aids Fund). It was also called AIDS Related Retrovirus (ARV). Later, this name was changed to HIV (Human Immune Deficiency Virus) probably to depict its mode of infection in man.

After the recognition of this disease, there were many arguments as to the relationship between HIV and AIDS and how it began to cause disease in humans. Scientists began to seek evidence of its origin to better understand its mode of transmission, as well as gain insight into potential treatments and control measures.

As information came in increasing quantum to the United State Centres for Disease Control and Prevention (CDC) in Atlanta, it became clear that the United States was not the only country experiencing this epidemic. Cases in Europe were soon identified and traced to Central Africa.

But the question is; did the disease really originate from Africa? This gave too many theories on the origin of HIV.

The first two causes of HIV/AIDs in Nigeria were identified in 1985 and were reported at an international AIDS conference in 1986. In 1987, the Nigerian health sector established the national AIDs advisory committee, which was shortly followed by the establishment of the National AIDS Advisory Committee on AIDs (NEACA).

At first, the Nigerian government was slow to respond to the increasing rate of HIV transmission and it was only in 1991that the federal ministry of health made the first attempt to asses Nigeria AIDS situation. The result showed that around 1.8 percent of the populations of Nigeria were infected with HIV.

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Subsequent results revealed that during the 1990's, HIV prevalence rose from 3.8 percent to 4.5 percent in 1998.

When Olusegun Obasanjo became president in 1999, HIV prevention, treatment and care became one of the Government's primary concern. The presidents committee on AIDS and the national action committee on AIDS (AIDS) were created, and in 2001, the government set up a three year HIV/AIDS Emergency Action Plan (HEAP).

In 2005, a new framework was developed covering the period from 2005 to 2009 despite increased effort to control the epidemic by 2006, it was estimate that just 10percent of HIV infected woman and men were receiving antiretroviral therapy and only 7 percent of pregnant woman were receiving treatment to reduce the risks of mother to child transmission of HIV.

In 2010, NACA launched its comprehensive National Strategic framework to cover2010 to 2015, which required an estimated 756 billion naira to implement. Some of the main aims included in the framework are to reach 80 percent of sexually active adults and 80percent of most at risk populations with HIV counseling and testing by 2015; sand to improve access to quality care support service to at least 50 percent of people living with HIV by 2015.

Of all the people living with HIV globally, 90% of them live in Nigeria. This shows that the prevalence of HIV among Nigerians is very large. This infection cuts across different age groups including adults, youths and children. Remarkably, the most highly affected population are the young people. Chiefly among the young people with the highest risk of HIV infection are students of higher learning across the country including but not limited to universities, polytechnics, colleges of health etc.

This is not only the case in our country, Nigeria. It is global. Around 2,100 young people and adolescents are infected with HIV everyday. In 2013, four million young people aged 15-24 were living with HIV, with 29% aged under 19.AIDS remains the number one killer of adolescents in Africa and the second leading cause of death among adolescents worldwide. The majority of young people living with HIV are in low and middle –income countries, with 85% in sub-saharan Africa of which Nigeria is one of the countries in this region already have a youthful populations and this trend is expected to increase until 2050. The number of AIDS – related deaths among youths and adolescents rose by 50% between 2005 and 2015. This is in comparison to a 30% fall among people of all ages living with HIV.

The question begging for answer is why are young people vulnerable to HIV? Young people are vulnerable to HIV at two stages of their lives; the first decade of life when HIV can be transmitted from mother to child, and the second decade of life when adolescence brings new vulnerability to HIV. This second stage is where interest lies as far as this research work is concerned.

In HIV transmission in the second decade of life and into the third decade, unprotected sex is the most common cause of HIV among students and young people in general. The second of this cause of HIV is sharing of infected needles, youth and adolescence associated with experimentation of risky sexual and drug related behaviors, increasing a young person's vulnerability to HIV.

For some, this is a result of not having the correct knowledge about HIV and how to prevent it, highlighting the need for HIV and sexual and reproductive health education. For others, it is the result of being forced to have unprotected sex, or to inject drugs.

Whilst programs to prevent mother to child transmission of HIV (PMTCT) have been hugely successful in recent years, reducing new infections among adolescent, youths and students is more difficult. There are many factors that can put young people at an elevated risk of HIV, chief among this is the fact that they are excluded from national plans. They are often forgotten in national HIV and AIDS plans which typically focus on adults and children. Consequently, there are lack of youth friendly health sciences.

Vulnerability via unprotected sex is also a risk factor. Also the age of sexual debut is reducing, showing a negative change in attitudes among young people with regards to sexual behavior. The use of condoms among young people is usually low. The number of sexual partners young people have is rising with many young people engaging in multiple relationships.

Also, young people are usually part of key populations such as sex workers, men who have sex with men, people who inject drugs or transgender people. Young people with HIV fall under at least one of these groups.

In view of the above stand points, the issues and risk factors that predispose young people to HIV infection should be taken into heart and tackled squarely by government and the general populace especially parents, school heads, leaders of religious groups and Non – Governmental organizations (NGO's)

a) Backgrounds of study

According to centers for disease control and prevention, AIDS was first discovered in early 1980 and HIV was identified as the cause. A few years later, the infection has become a worldwide epidemic.

HIV infection and spread has taken a geometric increase among the youths in the last few years. Its prevalence has been an alarming increase. National data on HIV infection in Nigeria suggest that 1.3% of

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young women (15-24 year old) are living with HIV and 0.7% of young men. Only 25% of young people in 2012 could currently identify ways to prevent sexual transmission of HIV and reject common myth.

Early sexual abuse is common in Nigeria which begins at less than 15years for 15% of Nigeria youth. This is one fact that increases HIV vulnerability among young people, alongside very low HIV testing rate. Only 17% of young people known their HIV status.

The current trend of moral decadence and deterioration among student and Nigeria youths in general has become so rampant that the society is lost of where it all went wrong form. There is a growing public concern and findings from the governmental agencies e.g. National Agency for the control of AIDS (NACA) and other bodies have shown that explosion in population of youths living with HIV and AIDS are not unconnected with the risky behaviors and moral bankruptcy that have greeted the Nigeria youthful population in recent years.

What has helped matters is also the fact the youthful age is the age of self-exploration. It's also the stage of life of sexual activeness. Also, a higher percentage of the populations live below the poverty line and there are students and youths from families in this category of the population. Problems associated with these self-exploration, sexual activeness and poverty have presented a huge threat to the fight against HIV and AIDS pandemic among the youths and the country in general. This is because a significant number of infections and death as far HIV and AIDS is concerned have been traced to one or more of the above factors.

Treatment facilities nationwide are now gradually being over burdened with HIV related problems and cases. The need to prevent HIV infection among the general population and specifically, the youthful population thus becomes imperative. The problem of HIV infection poses a far greater health hazard and economic implication that most imagine.

b) Statement of problem

The population of student in Nigerian's tertiary institutions has increased tremendously in recent times. Statistically data shows that about one million, five hundred thousand students are enrolled in more than 344 institutions in the country. Survey has revealed that Nigeria has about 63 colleges of education, 50 polytechnics, 61 monotechnics, 70 professional institutions including school of nursing, colleges of health technology, vocational institutes etc. Figures in the last few years show that Nigeria has over 100 universities altogether. In this figure, 33% accounts for federal university while 44% account for the state university and 23% account for the private university. The number of higher learning continue to increase.

The Nigerian youths constitutes 70% of the entire population which is 124.95 million out of 178.5 million of the general population. A very high percentage of this population of youths are students of higher institutions. Recent trends indicate that the spread of HIV has dramatically increased particularly to claim the lives of millions of people annually. In recent years, the federal government has approved billions to AIDS agencies National action committee on AIDS (NACA); state Action committee on AIDS (SACA) and local Action committee on their global AIDS control and prevention programs to establish and maintain research and counseling centers for risk and infected persons and also for widespread media sensitization on the causes, risk, prevention, infection, and as well, counseling services.

Statistical and demographical analysis by the W.H.O showa that a total of 90% of people living with HIV globally live in Nigeria, that is to say HIV infection has become a major problem nationally. Evidence as earlier stated showa that the people who can contribute effectively to the economy of the country, there is therefore no gain saying that increasing youth's infection of HIV is a major threat to national development of the country.

As already established, the youth's are the most at risk of HIV infection, the reasons are not far-fetched. Youths are the ones that are majorly engaged in taking illicit substances such as drugs thereby injecting them into the body through the use of needles, mostly youths are present in higher institutions some of them are from a poor family background which led to their finding any means to cater for themselves and sustain hardship living thereby engaging in risk factors such as premarital sexual activities that can pose their lives to HIV infection. The students age most times is seen as the age of sexual and sex exploration by youths. Incidents of forced sex or rape are rampant on campuses.

Sex workers, men who sleep with men and people who inject drugs makeup only 10% of Nigeria population, yet account for around 23% of new HIV infection every year. In response to this, the Nigeria National HIV/AIDS strategic plan (NSP) 2010-2015 calls for enhanced behavioral change communication for key affected population. This key affected population are the sex workers which as data have it 19% of male sex workers and 25% of female sex workers in Nigeria living with HIV; men who sleep with men which as data as have it have 17% of men who do this living with HIV infection in Nigeria are among people who inject drugs. This is not to mention rape cases and unprotected sex, these key population are common among students.

It has been observed that despite many programs organized by governments to inform people about the problems of HIV/AIDS, the rate of infection continues to be on the increase. Moreover, the incidence of these problems has been attributed to some factors, parts of which are listed below:

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1) Lack of knowledge of HIV/AIDS: this might be as a result of un-evenly spread of government organized programs on HIV/AIDS.
2) Educational background : this may be as a result of being illiterate of basic health education
3) Ignorance: this may be in the aspect of protection and abstinence of sex or making use of unsterilized sharp objects out of ignorance

To this end judging from the problems and data outlined above, this research aims at assessing the risk factors that can predispose students to HIV infection in college of health sciences and technology Ijero Ekiti.

c) Justification of the study

The importance of this study is to provide resource materials for as many individuals, groups, organizations and even the government of the causes, prevention and most importantly, the risk factors that predispose youths and students to HIV infection as well as the prevalence of HIV.

This project research will serve as encouragement to organizations like National Action Committee on Aids (NACA), global health organizations like world health organizations (WHO), other non-governmental parastasals and ministries to establish more HIV/AIDS counseling centers, epidemiological centers, develop workable policies and framework and generate evidence-based prevention programs for HIV and AIDS pandemic.

Recent studies show that the rate of HIV infection has drastically increased among youths, especially among students of higher learning across the country, this problem has a unique slant because Nigeria tertiary institution admit students in their mid adolescence, the minimum age requirement is 16 years, misconduct appears or even escalates in adolescence. It is at this stage that juvenile deliquesces like rape, unprotected sex, multiple sexual partners, use of drugs etc. become pronounced. These deliquesces all have links to HIV infections which is a great public health concern.

College of Health sciences and Technology Ijero Ekiti is an institution with students from diverse ethnicities, cultures and climes and has championed the chunning out of highly qualified workers for the country's health sector. Therefore, this research work will be of immense help to youth's and the general populace.

d) Objective of the study

i. *Main objectives*

The main objective of this study is to assess the prevalence of HIV and risk factors that can predispose students to HIV infection in College of Health Sciences and Technology Ijero Ekiti, Ekiti State.

ii. *Specific objectives*

1. To assess the knowledge of students about HIV infection, causes and prevention.
2. To find out the risk factors of infection among students.
3. To establish the degree of exposure to these risk by students.
4. To assess the consequences of HIV infection among students.

e) Method of research

The study included both qualitative research methods, questionnaire was distributed among students in the college. Multistage sampling method and random sampling method was applied for each department. The questionnaire explored the risk that can predispose students in the college to HIV.

f) Structure of the study

Chapter 2 provides an overview of relevant literature, it firstly explores various factors that might predispose students to HIV, it then took a general look on that are mostly vulnerable to HIV infection. Chapter 3 outlines the research methodology used in the study, chapter 4 presents findings on research project, in chapter 5 the findings are discussed and interpreted while chapter 6 concludes the findings and outlines recommendation.

g) Scope of study

The scope was conducted among students of College of Health Sciences and Technology in Ijero Ekiti.

h) The significance of the study

Findings of this study if communicated will help to;

1. Enlighten students and the public in the risk factors that can lead to HIV infection.
2. Enlighten students and the public on the consequences and ways of escape of these risk factors.
3. Know the level of exposure of students to the risk factors that can predispose them to HIV and AIDS through the help of data collected.

i) Definition of terms

AIDS: (Acquired Immunodeficiency Syndrome) is a life threatening disease.

HIV: (Human Immunodeficiency Virus) is the virus that causes AIDS.

Prevalence: This is the number of cases of a disease which are present within the population at a particular period of time including both and new cases.

Assessment: This is the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand and can do with their knowledge as a result of their educational experiences.

Survey: An act of examining and recording the measurements features etc.

Elisa Test: (Enzyme-Linked Immunosorbent-Assay). The test carried out for diagnosing HIV/AIDS.

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Infection: The entry and multiplication of an infectious agent in the body tissues of man or animal resulting in cellular injury.

Epidemic: The occurrence of cases of similar nature in human populations in a geographical area, clearly in excess of the usual incidence.

Pandemic: An epidemic disease affecting people in several countries or continents.

STDs: Sexually transmitted diseases.

Antibodies: Chemical substances formed by the body in response to the invasion of Antigen.

Subvention: An amount of money that is given by a government to help an organization.

ERA: A period of time usually in history, which is different from other periods because of particular characteristics or events.

WBT: (Western Blot Test) a test used in diagnosing HIV/AIDS.

ARVs: Anti-Retroviral Drugs.

HAART: Highly Active Anti-Retroviral Therapy.

Disease: A disorder with a specific cause and recognizable signs and symptoms. Failure of the body to function normally.

UNAIDS: The Joint United Nations Programme on HIV/AIDS.

LTNPS: Long Term Non-Progresso's.

Treatment: The act, manner or method of handling or dealing with someone or something.

Hospital: A large building where people who are ill, sick or injured are given medical treatment and care.

Tuberculosis: A serious infectious disease in which swellings appear on the lung and other affected parts of the body.

Sterilized: The elimination of microbiological organisms.

Opportunistic: Making use of an opportunity; taking advantage of something.

Immune System: A system of biological structures and processes within an organism that protects against disease. I.e. it is a system that defends the body against infections and diseases.

MTCT (Vertical Transmission): Mother-to-Child Transmission.

Haemophiliacs: People with genetic deficiency which prevent their blood from clotting in cases of cuts and injuries.

Factor 8: Substance that is made from blood. It is given to hemophiliacs to aid blood clotting.

II. Literature Review

a) Overview of risk factor

The purpose of this report is to discuss the factors and prevalence of HIV as well as identify the most significant demographic, socio-economic, biomedical and behavioral determinants of HIV risk in college of health sciences and technology Ijero Ekiti, The first major risk factor to be identified is sexually transmitted diseases (STDs) and treatment seeking behaviors in respect of these infections. STDs increase the risk of HIV transmission. Rates of STDs are particularly high among ladies, and ladies also appear to be more likely to delay or avoid seeking treatment. Asymptomatic STDs are particularly common among ladies, and this is a further reason for women not receiving treatment. A second risk factor is knowledge and beliefs about HIV/AIDS. Most students know of HIV/AIDS, and know that it is spread sexually. However, there are many misconceptions regarding other forms of transmission and cures for HIV/AIDS. Evidence suggests, though, that knowledge by itself does not provide much protection against HIV infection. A number of sexual behavior factors affect the risk of HIV infection. Young ladies are particularly vulnerable to rape and violence in sexual relationships, and in many cases they have limited control over their sexual relationships. It is also clear that many ladies depend on sex as a source of income or support, and these women are vulnerable because they have limited power in negotiating safe sex practices workers and other unsafe sex behaviors. While promiscuity is also a risk factor, it is clear that many individuals are at risk because of whom they have sex with, rather than how many people they have sex with. Certain forms of sexual intercourse are also associated with higher risks of HIV transmission. Sex without a condom is the most common form of high-risk sexual intercourse among students in the college. Anal sex also significantly increases the risk of transmission, and has been one of the reasons for the high levels of HIV prevalence among men who have sex with men. Dry sex and sex during menses are suspected to increase the risk of HIV transmission, although much of the evidence suggests that their effect is not significant, and there is little to suggest that their practice is common. Other predisposing factors are that many are accommodated in single sex hostels, and many engage in casual sexual relationships as a result of being separated from their regular partners. Their regular partners are also not necessarily faithful to them in their absence, often for economic reasons

For biological and socio-economic reasons, females are in general at a higher risk of HIV infection than males. Male and female prevalence patterns also differ substantially with respect to age.

A variety of other factors has been identified, but have not been discussed in much detail due to a lack of information on these factors. These factors include the use of hormonal contraceptives; modes of transmission other than heterosexual intercourse; and psychological factors. The most important conclusion to

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be drawn from this study is the importance of distinguishing between risk factors that determine the individual's own sexual behavior patterns, and risk factors that determine the level of infection in the group of people from which the individual is likely to choose a sexual partner. Into the first group can be placed factors such as age, gender, knowledge of HIV, and STD treatment seeking behavior.

HIV/AIDS has become a global epidemic. It has awakened the consciousness of governments, organizations and individuals with fear and anxiety. Every day on television screen, radio, in the newspapers, here and there, people talk about HIV/AIDS amidst fear, confusion and a lot of unanswered questions.

HIV/AIDS is one of the most challenging health problems of this area of study, since the first reported case of HIV/AIDS in Nigeria, the Federal Government as continued to respond to epidemic through the implementation of various awareness programs aimed at preventing, controlling and mitigating its impact. One of such programs the National Anti-Retroviral Drug (ARV) Access Programs. This was initiated in the year 2001 to provide affordable ARV's to the many Nigerians living with HIV/AIDS.

The private sectors, non-governmental organizations, faith-based organizations, and international bodies have also been on immense assistance in the provision of ARV's.

John Hubley (2002): The most common screening test for HIV is the Enzyme-Linked Immunosorbent-Assay (ELISA) test.

Florence Uchendu (2008): Enzyme-Linked Immunosorbent-Assay (ELISA) is a screening test which identifies antibodies to HIV. It is very sensitive and so may show false-positive result. False-positive result might be as a result of serious connective tissue disease or influenza vaccination.

Adeoye (2002): Research has shown that it is possible for some people infected with HIV to live for many years without developing symptoms of AIDS. These groups of people are called Long Term Non-Progressor (LTNPs). They have immune system containing a particular gene called "HLA5701" which those who easily manifest AIDS symptoms do not have.

There is no cure for HIV/AIDS. However, there are treatments that can slow down its progression. All the people living with HIV/AIDS have to make do with the anti-retroviral drugs and treatments around. With anti-retroviral drugs, the viral load is reduced and the people living with HIV/AIDS can still live longer than they should. According to centers for disease control and prevention, AIDS was first discovered in early 1980 and HIV was identified as the cause. A few years later, the infection has become worldwide epidemic.

The first case of AIDS was identified in Nigeria in 1986. Since then, HIV prevalence has witnessed an increase from 1.8% in1991 to 5.8% in 2001. However in 2003 and 2005 the national prevalence dropped to 5% and 4.4% respectively.

The rate of HIV infection among young people is growing rapidly with about 67% of newly infected individual in the developing world being young age between 15 and 24 years, especially young women and young girls who constitute 64% of the youth in the developing countries. About 2.5million children under 15years are living with HIV (UNAID, 2007).

The International Labor Organization (ILO) estimates that 6,000 youths become infected with HIV an The first case of AIDS was reported in Nigeria in 1986. Since then, the HIV prevalence has witnessed an increase from 1.8% in 1991 to 5.8% in 2001. However, in 2003 and 2005, the national prevalence dropped to 5% and 4.4% respectively.

Vos et'al (2005): AIDS affect the body's immune system reducing its defense against attacks, so the patient develop and often die of usual infection or tumor within few years.

Dr. Robert Gallon (an American) and Dr. Luck Mantayner) a French man, who called their discoveries HIV-1 and HIV-2 respectively.

The first official report on AIDS appeared in June, 1981 in the United State of America (USA), when some gay men in New York California suddenly began to develop some opportunistic infections and cancer that seemed stubbornly resistant to any treatment.

Dr. Anthony Franci, Director of the National of Allergy and Infectious Disease wrote thus, HIV infection is rising more rapidly among women than men in many parts of the world. Half of all adults living with HIV/AIDS worldwide are females, compared with 41% in 1997, according to Joint United Nation.

Not only has scientists isolated the responsible agents, which is Human Immune Deficiency Virus (HIV), this weakens the immune system, making people vulnerable to infection and illness they normally would have been able to resist.

Gray et'al (2000): these opportunistic infection and malignancies are the major clinical manifestation of HIV infection and indeed defile the illness. Grant et'al (2000): also stressed that the pattern of opportunistic infection associated with HIV varies from one country to another, even within the developing world.

In developed countries, pneumocystis carinni (pneumonia) is the most prevalent opportunistic infection with about 64% of HIV/AIDS patients in United State infected. Tuberculosis is the most prevalent opportunistic infection in Brazil, Congo and Ivory Coast affecting more than 40% of all people living with HIV/AIDS. The *window period of HIV* is the period

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between potential exposure to HIV infection and the point when the test will give an accurate result.

During the window period, a person can be infected with HIV but have a negative HIV test. This period is known to be highly dangerous as any test conducted which depends on the presence of antibodies will be negative.

The window period for a 4th generation antigen/antibody is four weeks. At this time, this test will detect 95% of infections. After three months window period after exposure, the confirmatory test will detect 99.97% of infections.

The first HIV protein (antigen) that can be measured is p24 (from 1 to 8 weeks after exposure). Viral load and p24 tests are not accurate for diagnosing early if the results are negative.

An HIV antibody response can be detected as early as two weeks. In a few people and in more than 99.9% of people by 12 weeks. An antibody test at 4 weeks will detect 95% of infections. Antibody testing at 4 weeks can give you a good medication of your HIV status, but you need a test at 12 weeks after the exposure to be considered HIV negative.

During the window period, the infected person can still look and feel healthy in spite of the vast amount of HIV present in the body fluids; these are fluids such as semen, vaginal secretion and blood.

The incubation period is the period between the times an individual got infected with HIV and clinical manifestation of AIDS. The period from infection to development of anti-HIV antibodies is usually less than a month, but may be up to 3 months; newer tests have a shorter window period, where a false negative result may be obtained early in infection.

The interval from HIV infection to the diagnosis of AIDS ranges from about 9 months to 20 years or longer with a median of 12 years. There is a group of people with a more rapid onset of disease who develop AIDS within 3-5 years of infection, and another smaller group who do not seem to progress to AIDS.

HIV/AIDS has become a major global public health issues especially in Sub-Saharan Africa. However, in 2007, 33.2 million (30.6-36.1 million) people were estimated to be living with HIV, 2.5 million (1.8-4.1million) people became newly infected and 2.1 million (1.9-2.4 million) people died of AIDS (UNAIDS, 2007).There were estimated 1.7million (1.4-2.4million) new HIV infections in Sub-Saharan Africa in 2007, a significant reduction since 2001. However, the region remains most severely affected. An estimated 22.5million (20.9-24.3million) people living with HIV, or 68% of the global total are in Sub-Saharan Africa. Eight countries in this region now account for almost one-third of all new HIV infections and AIDS death globally.

Since 2001, when the United Nations Declaration of Commitment on HIV/AIDS was signed, the number of people living with HIV in Eastern Europe and Central Asia has increased from 630,000 (490,000-1.1million) to 1.6million (1.2-2.1million) in 2007. In Asia, the estimated number of people living with HIV in Viet Nam has more than doubled between 2000 and 2005 and Indonesia has the fastest growing epidemic.

HIV/AIDS in Africa in 2007 is 1.7million new infections, 2.4million death, 22.5million victims and life expectancy with HIV in 47 years, 62 years without AIDS. UNAIDS report shows that for every ten young men (15-24 years) infected with HIV in Kenya and Mali, there are as many as forty-five infected women (UNAIDS, 2007).

It is unfortunate that South Africa has the highest number of infected people of any country in the world, estimated at 4.7 million. In South Africa, about 5000 babies are born HIV positive every month.

The first case of AIDS was identified in Nigeria in 1986. Since then, the HIV prevalence has witnessed an increase from 1.8% in 1991 to 5.8% in 2001. However in 2003 and 2005, the National prevalence dropped to 5% and 4.4% respectively. In addition, state prevalence rates varied from as low as 1.0% in Kebbi State to as high as 12% in Benue State.

The rate of HIV infection among youths is growing rapidly with about 67% of newly infected individuals in the developing world being young women aged between 15 and 24 years especially young women and girls who constitute 64% of the youths in the developing countries. About 2.5 million children under 15 years are living with HIV (UNAIDS, 2007).

Florence Uchendu et'al (2008): It is pathetic to note that states like Cross River, Edo, Kano and Osun that were not affected (0.0% prevalence) as at 1991/ 1992, became heavily affected by 2003 especially Cross River state (12%) and was the highest of all the 36 states of the Federation.

Since 1999, Nigeria has adopted a multi-sectoral approach in fighting the HIV/AIDS epidemics. HIV/AIDS scourge is on the increase in some states in Nigeria. The 2005 National HIV prevalence survey conducted among pregnant women attending antenatal clinic in Nigeria revealed that HIV/AIDS is still on the increase in some States.

However, the collective effort of the Federal Government of Nigeria foreign aids, Non-Governmental Organization (NGOs), Community Based Organizations (CBOs), Faith Based Organizations (FBOs) and other stakeholders are yielding more fruits.

Many Government Organizations and Non-Governmental Organization (NGOs) have come out to fight the dreaded HIV/AIDS. In the four-front of this fight is the former president of Federal Republic of Nigeria, President Olusegun Obasanjo.

After 2006, International Conference on AIDS and Sexual Transmitted Infections in Africa (ICASA),

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Nigeria made a major pronouncement by declaring free anti-retroviral treatment for the people living with HIV/AIDS.

Federal Ministry of Health (FMH) has provided a leading role in fighting and eradicating the disease in the areas where there is comparative advantage. Programmes put in place by the Federal Ministry of Health include a Comprehensive Anti-retroviral drug (ARV) treatment programme for the people living with HIV/AIDS, Prevention of Mother-to-Child transmission (PMTCT), Voluntary Confidential Counselling and Testing (VCCT) in government hospitals etc.

The religions are not left out, the leader of Redeemed Evangelist Mission; Pastor Enoch Adeboye also uses a media programme to campaign against HIV/AIDS. They also sponsor a religious drama that create awareness that HIV is real and has no cure.

Many State Governors are also included in this fight against HIV/AIDS in Nigeria. For instance, former Governor of Cross River State, Nigeria, Donald Duke promised to use state, media to provide information about HIV/AIDS on daily basis in 2005; he organized one month Christmas festival titled "Fight against AIDS".

National Agency for the Control of AIDS (NACA) is a very important agency on AIDS under Federal Ministry of Health. NACA has published so many books on HIV/AIDS which are distributed freely to secondary and primary schools in the country. The committee also facilitates the formation of the Nigeria Business Coalition against HIV/AIDS (NIBUCAA). Seventy-four antiretroviral sites have been created across the country.

Gill Gordon, Tony Klouda et'al (1988): Our blood contains White and Red Blood Cells. Normally, the White Blood Cells fight off and kill any germs which enter the body. They do this by eating up the germs and producing chemicals called antibodies which kill them. In this way, the body fights off many different germs and stays healthy. Sometimes, there are symptoms of illness when the White Blood Cells win and we get better.

HIV weakens this immune system by entering and finally destroying the white cells. As more and more white cells are killed, the body becomes less able to fight off many different germs which live around and in the body all the time. Finally, people living with AIDS die from one of a number of serious and rare diseases which their bodies cannot resist.

HIV can also attack the brain cells and various system directly causing mental and co-ordination problems.

Test Done For HIV/AIDS (Florence UCHENDU, 2008)

1) *$CD4^+$ Cell Count:* $CD4^+$ cells are the cells targeted by the HIV virus for destruction. As the $CD4^+$ cells are destroyed by the virus, their count in the blood decreases. $CD4^+$ cells are makers of immunity.

The test is done to predict HIV progression to AIDS opportunistic infections or cancer (malignancy).

2) *Complete Blood Count:* This is used to detect advanced HIV infection. In advance HIV infection, a drop in all blood cells (both red and white) is common.
3) *Plasma Viral Load (Plasma HIV RNA) Test:* This test is done to measure the amount of HIV virus in the blood. The viral load helps to determine what will be the state of the HIV infection if a person doesn't get his/her antiretroviral treatment.
4) *Antigen detection (P24):* This can detect HIV infection during window periods. It is highly sensitive, technically demanding and expensive. It is recommended for use of blood meant for blood transfusion.
5) *Immunofluorescence:* These are methods that use antibodies chemically linked to a fluorescent dye to identify or quantify antigens in tissue sample.
6) *Enzyme-Linked Immunosorbent Assay (ELISA) Test:* It is a screening test which identifies antibodies to HIV. It is a very sensitive test and so may show false-positive results. The test should be repeated and confirmed with western blot test.
7) *The Western Blot Test:* it indicates antibodies present and is thus much more reliable and so more specific for HIV infection.
8) Precipitation
9) Passive Agglutination
10) Polymerase Chain Reaction (PCR) Radio Immunoassay Precipitation

Enzyme Linked Immunosorbent Assay (ELISA) and the Western Blot confirmatory test are the most common tests carried out.

Human Immune Deficiency Virus (HIV) can be found in blood or blood clotting products, semen, breast milk, vaginal fluid, sweat, saliva, tears and body organs such as liver, kidney, brain of an infected person (NWOKEDI, 2013). HIV can only pass from an infected person to an uninfected person when the blood and blood products, semen, vaginal fluid, breast milk or body organs (kidney) of an infected person enters the body of an uninfected person. HIV virus can enter the body through the lining of the anus or rectum, lining of the body of the vaginal and of cervix, the opening of the penis, the mouth, other mucus membrane (e.g. eyes, or inside of the nose), cuts or open sores.

b) Analysis of risk factors

A large number of factors affect the risk of HIV infection, and interactions between these factors can be complex. Although the major factors are analyzed separately below, and attempts have been made to control for variations in other factors as far as possible, it needs to be emphasized that these risk factors are highly inter-linked. The purpose of the discussion that

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follows is both to identify the effects that the various factors have on HIV risk (independently of associations with other risk factors) and to describe how each factor relates to other risk factors.

i. *STDs and treatment seeking behaviors*

There is a large body of evidence that suggests that STIs play a role in increasing the infectiousness of HIV-positive individuals and the susceptibility of HIV-negative individuals. However, the relationship between STIs and HIV is complex, and the evidence is at times contradictory or difficult to interpret due to the presence of confounders. The sections below discuss the impact of STIs on HIV transmission and some of the challenges in determining the relationship between the two and STD such as herpes, chlamydia, syphilis, or gonorrhea may cause changes in the tissue of the vagina or penis that make it easier for HIV to pass to you while having sex.

One of the most significant bio-medical factors driving the epidemic in Ijerois the high prevalence of sexually transmitted diseases (STDs). STDs greatly increase the risk of HIV transmission, and there is thus a significant correlation between STD and HIV prevalence. A second problem is that even when symptoms occur, individuals will often not seek treatment, either because treatment is inaccessible or because the infection is not regarded as being serious. Wilkinson et al (1997) estimate the average time before treatment for STD symptoms is sought to be 10 days for men and 18 days for women. The increased risk of transmission of HIV when one sexual partner is infected with an STD has been reported in numerous studies. Rehle et al (1999), for example, estimate the probability of HIV transmission per sexual contact to be 6% if either partner is experiencing genital sores or ulcers. This compares with HIV transmission rates in the absence of STD infection of 0.2% (for the probability of an infected male infecting an uninfected female) and 0.1% (for the probability of an infected female infecting an uninfected male). Many individuals do not cease to have sex when experiencing STD symptoms. O'Farrell et some ladies continue to have sex despite experiencing genital ulcers, and Williams et al (2000) have found that only 24% of men and 19% of women seek to protect their partner by abstaining from sex or using a condom if they have an STD. Individuals who frequently experience STDs and who do not receive prompt treatment for their STDs are thus more likely to be HIV positive. In the Carletonville study (Williams et al, 2000), it was found that there was a strong positive correlation between HIV prevalence, syphilis prevalence and prevalence of gonorrhea. The correlation between STD prevalence and HIV prevalence is also evident from a comparison of STD and HIV prevalence data at a provincial level of STD prevalence and HIV prevalence in Northwest.

ii. *Knowledge and belief about HIV/AIDS*

A number of studies show that there is good knowledge of the basic facts surrounding HIV/AIDS: that it is spread sexually, and that the risk of infection can be reduced by using condoms (Van der Ryst et al (2001), KFF (2001), Williams et al (2000), DOH (1999(b))). However, there are many misconceptions about other forms of transmission. An extremely common belief, for example, is that HIV can be spread by blood-sucking insects, and there are also substantial numbers who believe that sharing food with an HIV positive person, using public toilets, and touching HIV positive people can lead to transmission (Williams et al (2000), DOH (1999(b)). There are also many misconceptions about cures for HIV/AIDS. A national survey of teenagers (KFF, 2001) suggested that 7% of teenagers believed that a person could be cured of AIDS by having sex with a virgin, 13% believed that traditional African medicine had a cure for AIDS, and 15% believed that Western medicine had a cure. Equally concerning is the belief that HIV positive individuals can always be identified by their symptoms; over 30% of those sampled in the Carletonville study expressed this view (Williams et al, 2000). Beliefs such as these can give individuals a very false sense of their risk of infection. It may therefore be hypothesized that higher HIV prevalence is associated with poor knowledge of HIV, if this false sense of risk results in risk-taking behavior. Williams et al (2000), however, found no such association, although it was found that substantial proportions of those who did not regard themselves as being at risk of infection were in fact HIV positive. High levels of awareness are not necessarily indicative of a low risk of infection. Some individuals may have actively sought knowledge because of their high-risk status, and others may not act on the knowledge they have. Levels of knowledge and awareness of HIV/AIDS are typically substantially lower among students.

iii. *Sexual behavioral pattern*

The CDC has identified sexual abuse as one of the key risk factors for HIV among ladies (CDC, 2007). Sexual victimization is a serious issue for college students. Ladies have been found to be at a slightly greater risk for certain types of sexual abuse, including being called derogatory names, threats to leave a relationship if the woman does not agree to have sex, or forced sex without protection. Furthermore, ladies who had been abused had low self esteem, were insecure, and lacked the skills to leave such a relationship (Berkel et al., 2005).

Firstly, violence can increase the risk of HIV infection where a lady is forced to have sexual intercourse. Secondly, violence may mean that a lady is less able to negotiate the use of preventive measures such as a condom. Thirdly, links have been found

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between physical and sexual abuse during childhood and high levels of risk-taking behavior in adolescence and adulthood. Ladies who are infected and disclose their HIV status may be at increased risks of violence. Violence is thus both a determinant and a potential consequence of HIV infection. The effect of having sex while experiencing STD symptoms, for example, has already been described. Further forms of high-risk sexual behaviour are discussed below. Anal inter course A large number of studies demonstrate a significantly increased risk of male-to-female transmission from anal intercourse relative to vaginal intercourse (Douglas, 2001). This association may be due to the higher trauma associated with anal sex relative to vaginal sex. Although it is commonly hypothesized that the risk of HIV transmission is much greater when ladies use drying agents, most African studies do not show any significant relationship between use of drying agents and HIV prevalence. Sex during menses It is hypothesized that the bleeding that occurs during menstruation may allow a more direct route of transmission of HIV, and that ladies who have sex during menses are thus more likely to pass the virus on to their partners. Some studies find that sex during menses results in a significantly increased risk of female-to-male transmission and others have found that sex during menses has no significant effect on the risk of transmission (Douglas, 2001). Being sexually active, rather than being promiscuous, is the major determinant of HIV risk. This is perplexing, as one would expect the HIV prevalence to continue to rise with the increasing number of partners. It has been suggested that it is possible for certain individuals to develop a resistance to infection with HIV (O'Farrell, 2001), and this is one possible explanation for the prevalence patterns observed. However, it should also be recognized that significant confounding with age is likely in this analysis.

iv. *Sharing needles*

The other big risk is reusing needles, syringes, or other equipment an HIV-positive person used to inject drugs, whether they were prescribed by a doctor or illegal. HIV can be transmitted from a needle used for piercing or tattooing if it wasn't sterilized after piercing or tattooing someone with HIV.

However, there are a number of studies that have examined the risk to those sharing needles and syringes relative to those who do not share, and where the HIV status of the injecting partner was unknown. Despite inconsistencies in how sharing needles and syringes was measured, the epidemiological studies that investigated the risk of HIV transmission associated with needle and syringe sharing have all found a positive relationship

An accidental stick from a contaminated needle or medical device could *cause HIV*, but that's very rare.

v. *Having unsafe sex*

One of the most common ways one can get HIV is by having vaginal or *anal sex* with someone who has HIV. It could pass HIV during oral *sex*, too, but that's less common. It's also risky when one doesn't know whether or not the partner is HIV-positive, because they could be. The more sexual partners one has, the more your odds of catching HIV go up.

Using *condoms*, barriers, and dental dams will help a lot to keep safe, but they're not perfect.

The choice of partner also matters. Having sex with someone who has a higher chance of getting (and therefore having) HIV, a sex worker or an IV drug user, for example -- raises chances of contacting HIV as well.

a. *Anal intercourse*

Anal intercourse carries a higher risk of HIV transmission for both receptive and insertive partners when compared with vaginal intercourse. This is because rectal mucosa differs from vaginal mucosa. There is a higher density of lymphoid follicles (i.e., HIV target cells) in rectal mucosa and it is more susceptible to abrasions than vaginal mucosa. The risk of transmission to the receptive partner resulting from receptive anal intercourse has been estimated to be between 5 and 18 times higher than the risk from receptive vaginal intercourse.

b. *Vaginal intercourse*

Several studies have examined the risk of sexual transmission among heterosexual populations, without specifying the nature of the sex acts (i.e., vaginal versus anal intercourse). However, it is likely that the majority of the sex acts were penile-vaginal. However, as in the case of risk estimates for anal intercourse, the summary risk estimates should be interpreted with caution due to the significant heterogeneity in (a) the infectiousness of HIV-positive individuals and (b) the susceptibility of their partners. Higher rates have been reported for male-to-female sexual transmission compared with female-to-male sexual transmission. This may be due to biological mechanisms, such as a larger anatomical surface and/or higher numbers of vulnerable cell types in the vagina compared with the penis. However, at present it is not clear whether ladies are at higher risk than males in a discordant relationship.

c. *Oral intercourse*

The risk of HIV transmission through oral intercourse has been difficult to quantify, in part because many individuals do not practice oral intercourse to the exclusion of other sex acts. However, it is clear that the risk of transmission by oral intercourse (whether penile-oral or vaginal-oral) is markedly lower than for anal or vaginal intercourse. The oral cavity has a thick epithelial layer, a low number of CD4 target cells, and antiviral antibodies, all of which make it relatively

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resistant to HIV transmission. In a meta-analysis of 10 studies, only four studies reported a non-zero estimate of risk from unprotected oral intercourse. While a pooled estimate of risk was not produced due to small sample sizes, their review suggested a low but not a zero probability of transmission. While precise measures of risk have been difficult to develop, it is likely that ejaculation and the presence of oral ulcers or oropharyngeal inflammation or STIs increase the risk of HIV transmission to the receptive partner during oral intercourse. There is a concern that while the risk of HIV transmission from oral intercourse is assumed to be low, this sex act may contribute to HIV transmission if there is a high frequency of unprotected oral intercourse in relation to higher risk practices, which are more likely to be protected. Unprotected oral intercourse has been identified as a significant route of transmission in the recent resurgence in syphilis cases among students.

vi. *Risk of transmission among people who use non-injection drugs*

Use of some non-injection drugs has been reported as independent risk factors for HIV transmission. Crack smoking alone and amphetamines have been found to be independent risk factors for HIV seropositivity, increasing the risk. Important limitations with these studies include their dependence on self reported data and the difficulty of properly adjusting the analyses for confounding factors. Non-identified confounding factors outside of the knowledge of the investigating team could be at play, and answers to some questions have the potential to be biased. Information on the mechanisms of HIV transmit-ssion solely through smoking or snorting is limited. Sharing drug paraphernalia like straws, banknotes and crack pipes or stems has been proposed as a transmission route.

However, transmission of HIV through nasal secretion is low unless there is blood in the secretions. Blisters, sores, and cuts on the lips and in the mouths of crack smokers may facilitate oral transmission of HIV, with the evidence supporting this causal relationship building but still sparse HIV transmission among people who use drugs through non-injecting routes may also be due to sexual contact. Studies have found that the exchange of sex for drugs and drugs for sex is pervasive in this group. It has also been suggested that high rates of HIV in people who use non-injection drugs may be the result, in part, of the effects of "bridging", due to overlapping social and sexual networks. Ladies are especially vulnerable due to a greater likelihood of overlap between their drug and sexual networks. Drug use can alter sexual behaviours by increasing risk taking. Research that has investigated this issue has focused mainly on crack cocaine and amphetamine use. Crack smoking has been associated with increased numbers of sex partners, exchanging sex for drugs or money, and unprotected sex. Amphetamines have also been associated with the risk of HIV transmission because they are often used to enhance and prolong sexual pleasure and to reduce sexual inhibitions. Use of marijuana, ecstasy, poppers, cocaine, opiates, alcohol and erectile dysfunction medications has also been linked to risk taking behaviours during sexual encounters, those who did reported risky sexual behaviours similar to those of younger drug users. Among the older drug users, those who smoked crack were at especially high risk of engaging in risky sexual behaviours. Overall, the risk of HIV per sexual act in non-injection drug users is comparable to that of the rest of the population Drug users higher risk of contracting HIV stems predominantly from an increased frequency of risk-taking behaviours during sexual encounters and prolonged intercourse before orgasm due to difficulties associated with ejaculation.

vii. *Other risk factors*

These factors include the use of hormonal contraceptives; modes of transmission other than heterosexual intercourse; and psychological factors.

III. Methodology

This chapter discussed the method adopted by researcher, area of study, Advocacy penetration, study population, inclusion criteria, exclusion criteria, study consent, research design, sample size technique/ determination, validity of the research instrument, sampling technique, data collection, data processing and analysis.

Research design: The research method adopted is descriptive cross-sectional study design was used. This involves collection of data in order to provide answers to arising questions concerning current status of the subject and make generalization of its finding about the population from which the subject has been selected. This was achieved by the use of questionnaires as the method of collecting data needed.

Validity of research instrument: the first draft of the questionnaire was given to the project supervisor for correction before final typing and distribution to make sure that the instrument measures what it is supposed to measure.

a) Description of the study area

College of Health Science and Technology, Ijero Ekiti is a tertiary institution located in the ancient town of Ijero Ekiti. Ijero Ekiti is a town located in Ekiti State of Nigeria in West Africa. Ijero Ekiti is the headquarters of Ijero Local Government since 1976. The total population of Ijero Ekiti as at 2006 National Population Census was 221,406.

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This population can be projected with an annual growth rate of 3.2% to about 221,413 at the end of 2013. The people of Ijero Ekiti are mainly of the Ekiti sub-ethnic group of the Yorubas'. Ijero local government has a state owned School of Health Technology now, College of Health Science and Technology, Ekiti State Cooperative College, Government Technical College Ijero Ekiti and several secondary, primary and nursery schools (both private and government owned).

Various commercial enterprises such as Telecommunication Center, Mobile Network Station, Power Holding Company of Nigeria (PHCN), Police Command, Specialist Hospital, Factories, Sawmill, Bakeries, Filling Station, Banks, e.t.c. operate in Ijero Ekiti.

The Ijero local government has a largely agrarian population producing cash crops such as cocoa, kola nuts, coffee, kola, cashew, and timber. The town also produces food crops such as yam, cocoyam, cassava, pepper, tomatoes and bananas, all produced in large quantities with good qualities. The town is also the seat of mineral resources such as tourmaline, colombalt, vesper, and crystal stone.

The College of Health Science and Technology Ijero Ekiti is a state owned tertiary institution which was established as School of Health Technology in 1997 following the creation of Ekiti State in October 1996. The state government believed that there was need to increase the strength of middle-level health personnel in order to supplement the existing manpower in Ekiti state.

Academic programs commenced formally in January 1999 with two courses. They were Community Health Extension Workers (C.H.E.W.) in training and Junior Community Health Extension Workers (J.C.H.E.W.) in training. On 2nd January 2000, the Institution introduced four additional courses. They were Medical Laboratory Assistants (M.L.A.) in training, Pharmacy Technician (P.H.T.) in training, Medical Records Technician (M.R.T.) in training, and Environmental Health Assistant (E.H.A.) in training programmes.

Moreover the long awaited Bill for the establishment of the college was assented to on the 21stof January, 2011. It was a profound experience in the annals of history of the institution that its status by this development, metamorphosed from school to College.

b) Advocacy/Community penetrarion

Introduction letter was obtained from Pharmacy Technician Department, College of Health Science and Technology, Ijero Ekiti. The letter was taken to the Authorities of College of Health Science and Technology, Ijero Ekiti seeking their permission to carry out the research among the students' in the college premises.

c) Study population

The study population included all students of College of Health Science and Technology, Ijero Ekiti, whom by the virtue of their provisional admission letter, are students of the College.

d) Inclusion criteria

All the students of the College who agree to participate in the study were eligible for inclusion in the study.

e) Exclusion criteria

All students of the College who are not willing to participate in the study were excluded. Students not physically present, or visitors during the data collection process were also excluded.

f) Study consent

Verbal consent was obtained from the respondents after detailed explanation of the objectives, scope, and benefits of the study had been made known to them.

g) Study design

A descriptive cross-sectional study design was used for the study.

h) Simple size determination

The fisher formula for sample size determination was used to calculate the sample size from the population of student in the college thus:

$$n = \frac{z^2pq}{d^2} \quad \text{and} \quad nf = \frac{n}{1^{+n}/N}$$

Where:

n= desired sample size when total population is $\leq$10,000

z= (standard normal deviation) = 1.96 i.e 1.96 at 95% confidence level

p= The knowledge of substance abuse is put at 0.92 (92/100)

q= 1- p = 1.0 – 0.92= 0.08

d= degree of accuracy (from the confidence level) set at 0.05 i.e.5%

nf= desired sample size when population is less $<$10,000

N= estimate of the population size.

i. *Calculations*

$$n = \frac{z^2pq}{d^2}$$

$$= \frac{1.96^2(0.92 \times 0.08)}{(0.05)^2}$$

$$n = \frac{3.84 \times 0.0736}{0.0025}$$

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$$n = \frac{2.826 \times 10^{-1}}{2.5 \times 10^{-3}}$$

$$n = \frac{2.826 \times 10^{2}}{2.5}$$

$$n = \frac{282.6}{2.5}$$

$$n = 113.04$$

$$\approx 113.$$

Since estimated target population is <10,000

$$\text{Nf is used} = \frac{n}{1+{}^{n}/N}$$

$$= \frac{113}{1+({}^{113}/2524)}$$

$$= \frac{113}{1+ (0.0447)}$$

$$= \frac{113}{1.045}$$

$$= \frac{113}{1+ 0.045}$$

$$= 108.1$$

$$\approx 108$$

The minimum sampling required for the study was estimated at 108. However a total of 125 questionnaires were distributed. A total of 120 Respondents successfully filled and returned their questionnaires.

i) Sampling technique

Multistage sampling method was used in the selection of the participants for the study using self administered questionnaire.

i. *First stage*

The first step was selection of two third of the twenty one departments in the college of health sciences and technology, Ijero Ekiti which is 14 departments by using simple random sampling by balloting. The selected 14 departments are;

Table 1

S/N.	Departments	Number of Level	Total
1	Health Information	3	466
2	Pharmacy Technician	3	65
3	Orthopeadic Technician	2	71
4	Community Health Extension Worker	3	173
5	X-ray Technician	3	97
6	Medical Laboratory	3	388
7	Health technician	3	334
8	Food Hygiene	3	63
9	Dental Technician	3	170
10	Ophthalmic Technician	3	109
11	Environmental Health Technology	4	190
12	Junior Community Health Worker	2	100
13	Environmental Health Technician	3	145
14	Human Nutrition and Dietetics	3	54
	Grand Total	41	2425

The second step is the proportional allocation of the sample size across the 14 selected department within the college thus:

$$\frac{\text{Number of students in each level}}{\text{Total number of students in the 14 selected departments}} \times \text{sample size}$$

At health information management department: The three existing levels or arms in health information management department were randomly picked.

$$100 \text{ level: } \frac{180}{2425} \times 125 = 9$$

$$200 \text{ level: } \frac{148}{2425} \times 125 = 8$$

$$300 \text{ level: } \frac{138}{2425} \times 125 = 7$$

At Pharmacy Technician department: The three existing levels or arms in Pharmacy Technician department were randomly picked.

$$100 \text{ level: } \frac{25}{2425} \times 125 = 1$$

$$200 \text{ level: } \frac{25}{2425} \times 125 = 1$$

$$300 \text{ level: } \frac{15}{2425} \times 125 = 1$$

At Orthopedic Technician department: The two existing levels or arms in Orthopedic Technician department were randomly picked.

$$100 \text{ level: } \frac{41}{2425} \times 125 = 2$$

$$200 \text{ level: } \frac{30}{2425} \times 125 = 2$$

At CHEW department: The three existing levels or arms in community health extension workers department were randomly picked.

$$100 \text{ level: } \frac{56}{2425} \times 125 = 3$$

$$200 \text{ level: } \frac{50}{2425} \times 125 = 3$$

$$300 \text{ level: } \frac{67}{2425} \times 125 = 3$$

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At XRAY department: The three existing levels or arms in XRAY Technician department were randomly picked.

100 level: $\frac{50}{2425} \times 125 = 3$

200 level: $\frac{19}{2425} \times 125 = 1$

300 level: $\frac{28}{2425} \times 125 = 1$

At Medical Laboratory Technician department: The three existing levels or arms in Medical Laboratory Technician department were randomly picked.

100 level: $\frac{138}{2425} \times 125 = 7$

200 level: $\frac{120}{2425} \times 125 = 6$

300 level: $\frac{130}{2425} \times 125 = 7$

At Health Technician department: The three existing levels or arms of Health Technician department were randomly picked.

100 level: $\frac{60}{2425} \times 125 = 3$

200 level: $\frac{190}{2425} \times 125 = 10$

300 level: $\frac{84}{2425} \times 125 = 4$

At Food Hygiene department: The three existing levels or arms in Food Hygiene department were randomly picked.

100 level: $\frac{12}{2425} \times 125 = 1$

200 level: $\frac{25}{2425} \times 125 = 1$

300 level: $\frac{26}{2425} \times 125 = 1$

At Dental Health Technician department: the three existing level or arms in Dental Health Technician department were randomly picked.

100 level: $\frac{56}{2425} \times 125 = 3$

200 level: $\frac{43}{2425} \times 125 = 2$

300 level: $\frac{71}{2425} \times 125 = 4$

At Ophthalmic Technician department: The three existing levels or arms in Ophthalmic Technician department were randomly picked.

100 level: $\frac{46}{2425} \times 125 = 2$

200 level: $\frac{27}{2425} \times 125 = 1$

300 level: $\frac{36}{2425} \times 125 = 2$

At Environmental Health technology department: The four existing levels or arms in Orthopedic Technician department were randomly picked.

100 level: $\frac{60}{2425} \times 125 = 3$

200 level: $\frac{38}{2425} \times 125 = 2$

300 level: $\frac{31}{2425} \times 125 = 2$

400 level: $\frac{61}{2425} \times 125 = 3$

At JCHEW department: The two existing levels or arms in Junior Community Health Extension Workers department were randomly picked.

100 level: $\frac{50}{2425} \times 125 = 3$

200 level: $\frac{50}{2425} \times 125 = 3$

At Environmental Health Technician department: The three existing levels or arms in Environmental Health Technician department were randomly picked.

100 level: $\frac{33}{2425} \times 125 = 2$

200 level: $\frac{28}{2425} \times 125 = 1$

300 level: $\frac{84}{2425} \times 125 = 4$

At Human Nutrition department: The three existing levels or arms in Human Nutrition and Dietetics department were randomly picked.

100 level: $\frac{10}{2425} \times 125 = 1$

200 level: $\frac{17}{2425} \times 125 = 1$

300 level: $\frac{27}{2425} \times 125 = 1$

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ii. *Second stage*

The first step at this stage was the use of a systemic random sampling in each of the department thus:

Total number of students in each level = The sampling interval
Proportion allocated to each level

At Health Information management sampling interval is:

$$100 \text{ level} = \frac{180}{9} = 20$$

$$200 \text{ level} = \frac{148}{8} = 19$$

$$300 \text{ level} = \frac{138}{7} = 20$$

Thus, 20 was used as sampling interval for 100 level and 300 level while 19 was used for 200 level students of Health Information management department.

At Pharmacy Technician department sampling interval is:

$$100 \text{ level} = \frac{25}{1} = 25$$

$$200 \text{ level} = \frac{25}{8} = 25$$

$$300 \text{ level} = \frac{15}{1} = 15$$

Thus, 25 was used as sampling interval for 100 level and 200 level while 15 was used as sampling interval for 300 level students of Pharmacy Technician department.

At Orthopedic Technician department sampling interval is:

$$100 \text{ level} = \frac{41}{2} = 21$$

$$200 \text{ level} = \frac{30}{2} = 15$$

Thus, 21 was used as sampling interval for 100 level while 15 was used as sampling interval for 200 level students of Orthopedic Technician department.

At CHEW department sampling interval is:

$$100 \text{ level} = \frac{56}{3} = 19$$

$$200 \text{ level} = \frac{50}{3} = 17$$

$$300 \text{ level} = \frac{67}{3} = 22$$

Thus 19 was used as sampling interval for 100 level,17 for 200 level while 22 was used as sampling interval for 300 level students of Community Health Extension Workers department.

At X-RAY Technician department sampling interval is:

$$100 \text{ level} = \frac{50}{3} = 17$$

$$200 \text{ level} = \frac{19}{1} = 19$$

$$300 \text{ level} = \frac{28}{1} = 28$$

Thus, 17 was used as sampling interval for 100 level, 19 for 200 level, while 28 was used as sampling interval for 300 level students of X-RAY Technician department.

At Medical Laboratory Technician department sampling interval is:

$$100 \text{ level} = \frac{138}{7} = 20$$

$$200 \text{ level} = \frac{120}{8} = 20$$

$$300 \text{ level} = \frac{130}{7} = 19$$

Thus, 20 was used as sampling interval for both 100 level and 200 level while 19 was used as sampling interval for 300 level students of Medical Laboratory Technician department.

At Health Technician department sampling interval is:

$$100 \text{ level} = \frac{60}{3} = 20$$

$$200 \text{ level} = \frac{190}{10} = 19$$

$$300 \text{ level} = \frac{84}{4} = 21$$

Thus, 20 was used as sampling interval for 100 level , 19 as sampling interval for 200 level while 21 was used as sampling interval for 300 level students of Health Technician department.

At Food Hygiene department sampling interval is:

$$100 \text{ level} = \frac{12}{1} = 12$$

$$200 \text{ level} = \frac{25}{1} = 25$$

$$300 \text{ level} = \frac{26}{1} = 26$$

Thus, 12 was used as sampling interval for 100 level, 25 as sampling interval for 200 level while 26 was used as sampling interval for 300 level students of Food Hygiene department.

At Dental Health Technician department sampling interval is:

$$100 \text{ level} = \frac{56}{3} = 19$$

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$$200 \text{ level} = \frac{43}{2} = 22$$

$$300 \text{ level} = \frac{71}{4} = 18$$

Thus,19 was used as sampling interval for 100 level, 22 for 200 level while 18 was used as sampling interval for 300 level students of Dental Health Technician department.

A Opthalmic Technician department sampling interval is:

$$100 \text{ level} = \frac{46}{2} = 23$$

$$200 \text{ level} = \frac{27}{1} = 27$$

$$300 \text{ level} = \frac{36}{2} = 18$$

Thus, 23 was used as sampling interval for 100 level, 27 for 200 level while 18 was used as sampling interval for 300 level students of Ophthalmic Technician department.

At Environmental Health Technology department sampling interval is:

$$100 \text{ level} = \frac{60}{3} = 20$$

$$200 \text{ level} = \frac{38}{2} = 19$$

$$300 \text{ level} = \frac{31}{2} = 16$$

$$400 \text{ level} = \frac{61}{3} = 20$$

Thus 20 was used as sampling interval for 100 level and 400 level students, 19 was used as sampling interval for 200 level, while 16 was used as sampling interval for 300 level students of Environmental Health Technology department.

At Junior Community Health Extension workers department sampling interval is:

$$100 \text{ level} = \frac{50}{3} = 17$$

$$200 \text{ level} = \frac{50}{3} = 17$$

Thus, 17 was used as sampling interval for both 100 and 200 level of Junior Community Health Extension Workers Department.

At Environmental Health Technician department sampling interval is:

$$100 \text{ level} = \frac{33}{2} = 17$$

$$200 \text{ level} = \frac{28}{1} = 28$$

$$300 \text{ level} = \frac{84}{4} = 21$$

Thus, 17 was used as sampling interval for 100 level, 28 was used as sampling interval for 200 level while 21 was used as sampling interval for 300 level students of Environmental Health Technician department.

At Human Nutrition department sampling interval is:

$$100 \text{ level} = \frac{10}{1} = 10$$

$$200 \text{ level} = \frac{17}{1} = 17$$

$$300 \text{ level} = \frac{27}{1} = 27$$

Thus, 10 was used as sampling interval for 100 level, 17 was used as sampling interval for 200 level while 27 was used as sampling interval for 300 level students of Human Nutrition and Dietetics department.

j) Data collection

A semi structured self–administered questionnaire was used to collect qualitative data. Questions were specific, brief and polite. The questionnaire has four sections with section A relating to the socio-demographic characteristics of respondents, Section B deals with the knowledge that the respondents have about HIV infection, section C is about the level of predisposure of students to HIV infection and section D is concerned with the awareness and consequences of HIV infection among students.

k) Data processing and analysis

The questionnaires were retrieved, sorted, cleared, checked properly and code entering using SPSS software package. Frequently distribution table and simple percentages were used to present data, cross tabulation of important variables was also done. Thr indices of measurement included students awareness about HIV infection.

Chi square test was used to determine the statistical significance of differences in variables observed and p-value was set at $p \leq 0.050$.

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IV. Results

Section A: SOCIO – Demographic Characteristics

Table 4.1: Socio- Demographic Characteristics of Respondents (N=120)

Variable	Frequency	Percentage (%)
Age Group (In Years)(N=220)		
16-20	31	25.8
21-25	63	52.5
26-30	19	15.8
Above 30	7	5.8
Total	120	100
Gender		
Male	45	37.5
Female	75	62.5
Total	120	100
Marital status (N=120)		
Single	70	58.3
Married	18	15
Engaged	24	20
Divorced	8	6.7
Total	120	100
Level (N=120)		
100	41	34.2
200	38	31.6
300	37	30.8
400	4	3.3
Total	120	100
Family Background (N=120)		
Polygamous	49	40.8
Monogamous	71	59.2
Total	120	100
Who they presently live with (N=120)		
Parents	38	31.6
Father	12	10
Mother	14	11.7
Friend	17	14.1
Guardian	13	10.8
Alone	26	21.7
Total	120	100

From table 4.1 above, the total number of respondents was 120. Most respondents 63 (52.5%) were between the age of 21- 25 years with the least being those that were 30 years and above 7(5.8%). Minimum age category was 16- 20 while maximum age category was 30 years and above.

There were 41 (34.2%) respondents from 100 level, 38 (31.6%) from 200 level, 37 (30.8%) respondents from 300 level and 4 (3.3%) respondents from 400 level. There were more females respondents 75 (62.5%) than the males 45 (37.5%) out of the total 120 correspondents. 70 (58.3%) were single, 18 (15%) were married, 24 (20%) were engaged and 8 (6.7%) accounts for divorced couple. 71 (59.2%) accounts for respondents from polygamous family background while 49 (40.8%) accounts for those from monogamous family background, 38. (31.6%) lives with their parents, 12 (10%) lives with their father, 14 (11.7%) lives with their mother, 17 (14.1%) lives with their friends, 13(10.8%) lives with their guardian while 26(21.7%) lives alone.

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Section B: Knowledge of HIV Infection

Table 4.2: Shows the Respondents Knowledge on HIV Infection

Variable	Frequency	Percentage (%)
Source of Information about HIV Infection (N=120)		
Hospital	16	15.2
Radio	8	7.6
Television	10	9.5
Poster	9	8.6
Friends	10	9.5
School	19	18.1
Workshop	11	10.5
Seminar	15	14.3
Others (multiple choice)	7	6.7
Total	105	100
Knowledge of HIV Infection (N =120)		
Yes	105	87.5
No	15	12.5
Total	120	100
Opinions if Ekiti state is one of the states in nigeria with alarming rate of HIV infection (N=120)		
Yes	50	41.7
No	70	58.3
Total	120	100
Individuals at higher risk of contacting HIV infection (N=120)		
Both male and female	15	12.5
Male	37	30.8
Female	63	52.5
Children	5	4.2
Total	120	100
Opinions if HIV infection can be spread without thr use of condom (N=120)		
Yes	88	73.3
No	32	26.7
Factors contributing to spread of HIV infection (N=120)	120	100
Poverty	26	21.6
Illiteracy	35	29.2
Sexual urge	29	24.2
Ignorance	25	20.8
Others (multiple choice)	5	4.2
Total	120	100
Increasing rate of contacting HIV infection due to lack of diligence (N=120)		
Yes	90	75
No	30	25
Total	120	100
Contribution to fighting HIV infection (N=120)		
Yes	80	66.7
No	40	33.3
Total	120	100
Ways of contribution to fighting HIV infection (N=120)		
Practicing safe sex	13	16.2
Abstinence	25	31.2
Staying away from non-sterilized sharp objects	15	18.8
Being faithful to partner	22	27.5
Others	5	6.3
Total	80	100

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Table 4.2 shows that 16 (15.2%) of respondents heard of HIV infection from hospital, 8 (71.6%) heard about it from radio, 10 (9.5%) heard about it from television, 9 (8.6%) heard about it from poster, 10 (9.5%) heard of HIV infection from friends, 19 (18.1%) heard about it from school, 11 (10.5%) heard about it from workshop, 15 (14.3%) heard about it from seminar, while 7 (6.7%) heard from more than one source.

Also, 105 (87.5%) respondents have the knowledge of HIV infection while 15 (12.5%) does not have the knowledge of HIV infection. However, 50 (41.7%) respondents are of the opinion that Ekiti state is one of the states in Nigeria with alarming rate of HIV infections while 70 (58.3%) respondents does not support the opinion that Ekiti state has alarming rate of HIV infection in Nigeria.

37 (30.8%) respondents believe that males are at higher risk of contacting HIV infection, 63 (52.5%) believes females are more at risk of contacting HIV infection, 15 (12.5%) are of the opinion that both male and females are at risk of contacting HIV infection while 5 (4.2%) believes children are at risk of contacting HIV infection.

88 (73.3%) respondents believed that having sex without the use of condom can predispose them to contacting HIV while 32 (26.7%) believe that having sex with the use of condom can still predispose them to contacting HIV. 35(29.2%) respondents believed that illiteracy is a factor that can contribute to having HIV infection, 26 (21.6%) also believed that poverty is the factor contributing to spread of HIV infection, 29 (24.2%) as well believed sexual urge is a major factor contributing to spread of HIV, 25 (20.8%) are of the opinion that ignorance is a factor that can contribute to the spread of HIV infection among students, 5 (4.2%) have multiple choices.

90 (75%) respondents believed in the increasing rate of HIV infection spread due to lack of diligence while 30 (25%) doesn't support the opinion of contacting HIV infection due to lack of diligence. 40 (33.3%) respondents does not contribute to fighting HIV infection, 80 (66.7%) respondents contributes to fighting HIV infection. 13 (16.2%) contributes through practicing safe sex, 25 (31.2%) contributes through abstinence, 15 (18.8%) contributes by staying away from non sterilized sharp object, 22(27.5%) contributes by being faithful to their partner, 5(6.3%) have multiple choices.

Section C: Level of Predisposure to Factors that can cause HIV Infection

Table 4.3: Shows the Level of Predisposure Factors to HIV among Students

Variable	Frequency	Percentage (%)
Had sex or use a non sterilized sharp recently (N=120)		
Yes	36	30
No	84	70
Total	120	100
Have gotten tested for HIV infection recently (N=120)		
Yes	40	33.3
No	80	66.7
Total	120	100

Table 4.3 is to show the level of predisposure factors of HIV infection among students, this revealed that 36 (30%) had sex or used a non sterilized sharp recently while 84 (70%) didn't have sex or used a non – sterilized sharps recently. 40 (33.3%) have gotten tested for HIV infection recently while 80 (66.7%) have not gone for HIV test recently.

Section D: Awareness and Consequences of HIV Infection

Table 4.4: Shows the Awareness Consequences of HIV Infection

Variable	Frequency	Percentage (%)
Possibility of reduction of HIV level in the college (N=120)		
Yes	71	59.2
No	49	40.8
Total	120	100
Awareness of consequences of HIV infection (N=120)		
Yes	68	56.7
No	52	43.3
Total	120	100

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Table 4.43 shows the awareness and consequences of HIV infection, out of 120 respondents that submitted their questionnaires 71 (59.2%) believed that the level of HIV infection can be reduced in the college while 49 (40.8%) are of the opinion that HIV level in the college cannot be reduced. The table further reveals that 68 (56.2%) are aware of the consequences of HIV infection while 52(43.3%) are not aware of the consequences of HIV infection.

Section E: Cross Tabulation

Table 4.5: Shows the Cross Tabulation between Gender of Respondents and their Knowledge about HIV Infection

Gender	Knowledge of HIV Infection		Chi –Square	Degree of Fredom	P-Value
	Yes	No			
Male	39 (86.7%)	6 (13.3%)	0.046	1	0.831
Female	66 (88%)	9 (12%)			

Table 4.5 shows that more females have more knowledge of HIV infection than their male counterparts. The findings was however not statistically significant because its p-value of 0.831 is greater than the 0.050 alpha level of significance.

Table 4.6: Cross Tabulation between Age of Respondents to their Knowledge about HIV Infection

Age Group	Knowledge of HIV Infection		Chi -Square	Degree of Fredom	P-Value
	Yes	No			
16 – 20	26 (83.9%)	5 (16.1%)	2.608	3	0.456
21 – 25	57 (90.5%)	6 (9.5%)			
26 – 30	17 (89.5%)	2 (10.5%)			
30 and above	5 (71.4%)	2 (28.6%)			

Table 4.6 shows that the respondents between the ages of 21- 25 have more knowledge of HIV infection than respondents from other age group, The findings is not statistically significant because its p-value of 0.456 is greater than the 0.050 alpha level of significance.

Table 4.7: Cross Tabulation between Marital Statud of Respondents to their Knowledge of HIV Infection

Marital Status	Knowledge of HIV Infection		Chi -Square	Degree of Fredom	P-Value
	Yes	No			
Single	64 (91.4%)	6 (8.6%)	2.797	3	0.423
Married	15 (83.3%)	3 (16.7%)			
Engaged	20 (83.3%)	4 (16.7%)			
Divorced	6 (75%)	2 (25%)			

Table 4.7 shows that the respondents with marital status of single have more knowledge of HIV infection than respondents from other categories, this finding is not statistically significant because its p-value of 0.423 is greater than the 0.050 alpha level of significance.

Table 4.8: Cross Tabulation between Level of Respondents to their Knowledge of HIV Infection

Level	Knowledge of HIV Infection		Chi –Square	Degree of Fredom	P-Value
	Yes	No			
100	35 (85.4%)	6 (14.6%)	6.102	3	0.106
200	34 (89.5%)	4 (10.5%)			
300	34 (91.9%)	3 (8.1%)			
400	4 (66.7%)	2 (33.3%)			

Table 4.8 shows that the respondents from 100 level have more knowledge of HIV infection than respondents from other departmental level, This findings is not statistically significant because its p-value of 0.106 is greater than the 0.050 alpha level of significance.

Table 4.9: Cross Tabulation between Family Background of Respondents to their Knowledge about HIV Infection.

Family Background	Knowledge of HIV Infection		Chi –Square	Degree of Fredom	P-Value
	Yes	No			
Monogamous	66 (93%)	5 (7%)	4.736	1	0.029
Polygamous	39(79.6%)	10 (20.4%)			

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Table 4.9 shows that the respondents from monogamous family background have more knowledge of HIV infection than respondents from polygamous family background, this findings is statistically significant because its p-value of 0.029 is less than the 0.050 alpha level of significance.

Table 4.10: Cross Tabulatiom between who they Live with to their Knowledge about HIV Infection.

Who they presently live with	Knowledge of HIV Infection		Chi –Square	Degree of Fredom	P-Value
	Yes	No			
Parents	35 (92.1%)	3 (7.9%)			
Father	10 (90.9%)	1 (9.1%)			
Mother	10 (76.9%)	3 (23.1%)	2.248	5	0.787
Friend	15 (88.2%)	2 (11.8%)			
Guardian	10 (83.3%)	2 (16.7%)			
Alone	25 (86.2%)	4 (13.8%)			

Table 4.10 shows that the respondents who lived their parents have more knowledge of HIV infection than other categories, this findings is however not statistically significant because its p-value of 0.787 is greater than the 0.050 alpha level of significance.

V. Discussion

The aims and objective of this research work has been clearly stated in chapter one, chapter two which is the literature review discuss the following, meaning of HIV /AIDS, origin of HIV/AIDS, HIV/AIDS in Nigeria, global prevalence of HIV/AIDS in Africa, HIV/AIDS in Nigeria as well as risk factors that can predispose students in the college to HIV.

HIV is either of the two retrovirus that infect and destroy helper T cells of the immune system causing the marked reduction in numbers that is diagnostic of AIDS, it makes it difficult for the body to fight off infections i.e. when a person is infected with HIV, the person may get some infections otherwise known as opportunistic infections (OI) that the body can no longer fight off.

HIV is a microscopic organism, it survives only in human being and it lowered the bodys ability to fight infections. HIV enters into the body through blood semen, vagina fluid or breast milk of an infected person.

AIDS is an advanced form of HIV infection the first cause of AIDS was reported in Nigeria in 1986, since then, the HIV prevalence has witnessed an increase.

For the research on the prevalence of HIV and risk factors that can predispose students of college of health sciences and technology Ijero Ekiti to HIV infection, 125 questionnaires were distributed among students of the 14 selected departments. However a total of 120 (96%) questionnaires were retrieved.

The total number of respondents was 120. Most respondents 63 (52.5%) were between the age of 21-25 years with the least being those that were 30 years and above 7 (5.8%). Minimum age category was 16-20 while maximum age category was 30 years and above. There were 41 (34.2%) respondents from 100 level, 38 (31.6%) from 200 level, 37 (30.8%) respondents from 300 level and 4 (3.3%) respondents from 400 level. There were more females respondents 75 (62.5%) than the males 45 (37.5%) out of the total 120 correspondents, 70 (58.3%) were single, 18 (15%) were married, 24 (20%) were engaged and 8 (6.7%) accounts for divorced couple. 71 (59.2%) accounts for respondents from polygamous family background while 49 (40.8%) accounts for those from monogamous family background, 38.(31.6%) lives with their parents, 12 (10%) lives with their father, 14 (11.7%) lives with their mother, 17 (14.1%) lives with their friends, 13 (10.8%) lives with their guardian while 26 (21.7%) lives alone.

Further analysis shows that 16 (15.2%) of respondents heard of HIV infection from hospital, 8 (71.6%) heard about it from radio, 10 (9.5%) heard about it from television, 9 (8.6%) heard about it from poster, 10 (9.5%) heard of HIV infection from friends, 19 (18.1%) heard about it from school, 11 (10.5%) heard about it from workshop, 15 (14.3%) heard about it from seminar, while 7 (6.7%) heard from more than one source. Also, 105 (87.5%) respondents have the knowledge of HIV infection while 15 (12.5%) does not have the knowledge of HIV infection. However, 50 (41.7%) respondents are of the opinion that Ekiti state is one of the states in Nigeria with alarming rate of HIV infections while 70 (58.3%) respondents does not support the opinion that Ekiti state has alarming rate of HIV infection in Nigeria. Furthermore, 37(30.8%) respondents believe that males are at higher risk of contacting HIV infection, 63 (52.5%) believes females are more at risk of contacting HIV infection, 15 (12.5%) are of the opinion that both male and females are at risk of contacting HIV infection while 5 (4.2%) believes children are at risk of contacting HIV infection. 88 (73.3%) respondents believed that having sex with the use of condom cannot predispose them to contacting HIV while 32 (26.7%) believe that having sex with the use of condom can still predispose them to contacting HIV. 35 (29.2%) respondents believed that illiteracy is a factor that can contribute to having HIV infection, 26 (21.6%) also believed that poverty is the factor contributing to spread of HIV infection, 29 (24.2%) as well believed sexual urge is a major factor contributing to spread of HIV, 25 (20.8%) are of the opinion that

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ignorance is a factor that can contribute to the spread of HIV infection among students, 5 (4.2%) have multiple choices. 90 (75%) respondents believed in the increasing rate of HIV infection spread due to lack of diligence while 30 (25%) doesn't support the opinion of contacting HIV infection due to lack of diligence. 40 (33.3%)respondents does not contribute to fighting HIV infection, 80 (66.7%) respondents contributes to fighting HIV infection. 13 (16.2%) contributes through practicing safe sex, 25 (31.2%) contributes through abstinence, 15 (18.8%) contributes by staying away from non sterilized sharp object, 22 (27.5%) contributes by being faithful to their partner, 5 (6.3%) have multiple choices.

Findings revealed that 36 (30%) had sex or used a non sterilized sharp recently while 84 (70%) didn't have sex or used a non –sterilized sharps recently. 40 (33.3%) have gotten tested for HIV infection recently while 80 (66.7%) have not gone for HIV test recently.

Out of 71 (59.2%) believed that the level of HIV infection can be reduced in the college while 49 (40.8%) are of the opinion that HIV level in the college cannot be reduced. The analysis further reveals that 68 (56.2%) are aware of the consequences of HIV infection while 52 (43.3%) are not aware of the consequences of HIV infection.

Further analysis shows that out of 105 respondents that have the knowledge of HIV infection more females have more knowledge than males, the difference was however not statistically significant as its p-value of 0.831 is greater than the 0.050 alpha level of significance.

Respondents between the ages of 21–25 years have more knowledge about HIV infection than those from other age groups, this findings is not statistically significant because its p-value 0.456 is greater than the 0.050 alpha level of significance.

Respondents with marital status of single have more knowledge about HIV infection than those from other categories, this is because most respondents in the college and that filled the questionnaire are single, this findings is not statistically significant because its p-value 0.423 is greater than the 0.050 alpha level of significance.

Respondents from 100 levels have more knowledge about HIV infection than those from other level; the table revealed that the observation is statistically significant because its p-value 0.106 is greater than the 0.050 alpha level of significance.

Respondents from monogamous family background have more knowledge of HIV infection than those from polygamous family background, this findings is statistically significant because its p-value 0.029 is greater than the 0.050 alpha level of significance.

Respondents who live with their parents have more knowledge about HIV infection than those from other categories, this findings is not statistically significant because its p-value 0.787 is greater than the 0.050 alpha level of significance.

VI. Conclusion

HIV is a problem that is of great concern to the society and the country at large, it is a retrovirus transmitted by sexual contact, blood products, through the use of contaminated needles, or vertically from mother to fetus. Two subtypes of HIV has been identified, the most common is HIV-1 which occurs worldwide, HIV -2 id found mainly in west Africa and is associated with a slower progression to AIDs than HIV-1. HIV uses the CD4 receptor and the CCR5 or CXCR4 co receptors to enter T lymphocytes and monocytes/macrophages where viral RNA is reverse transcribed into DNA and inserted into the host genome, viral replication results in immune activation and progressive depletion of CD4+ T lymphocyte.

Based on the findings previously reported in this study, the following conclusion was drawn:

- HIV infection is a life threatening disease
- Most students in the college have the knowledge of HIV infection
- Females are more at risk of contacting the infection
- Lack of diligence can contribute to having HIV infection
- Majority of the students in the college have not gotten tested for HIV infection recently.

Finally, many students are of the opinion that the level of HIV infection in the college can be reduced through the following suggestions:

a) Introduction of HIV related courses and workshops to educate staff and students in the college on HIV infection
b) Organizing seminars and workshops to educate staff and students
c) Creating awareness through posters, billboard, etc to disseminate related vital information on HIV infection
d) Lastly, organizing HIV test for members of staff and students occasionally so they can know their status.

VII. Recommendations

Analysis with the major findings of the survey and interpretation of the qualitative data with the help of qualitative data collected from focus group sessions (students of college of health sciences and technology Ijero Ekiti) have been done. By so doing, the objectives of the studies have been fulfilled which are:

1. To assess the knowledge of HIV infection, causes and prevention.

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2. To find out the risk factors of infection among students
3. To establish the degree of exposure to these risk by students
4. To assess the consequences of HIV infection among students.

Final task is to make some broad recommendations on the basis of findings and related services for the students to be aware of HIV infection prevalence as well as predisposure risk factors.

In view of the highlights of this study, the following recommendations are suggested to reduce HIV infection level among students.

- Designing a curricula on HIV infection, ministry of Education at all level (federal, state, local) should as a matter of urgency add the curricula of HIV to all level of education.
- Providing educative posters and advertisements on every medical journal platform to constantly remind people on the negative effects of HIV
- Establishment of counseling centres for HIV
- Establishment of programs those are highly effective by both federal and state governments that will be made available and easily accessible to all citizens.
- Voluntary organizations like NGO's should be encouraged in the society to render useful services where necessary so as to divert peoples mind from unhealthy practices that can predispose people to contacting HIV infection e.g. Having unprotected sexual intercourse, sharing sharps and unsterilized sharp objects e.t.c.
- Parents should try to take proper care of their children so as to prevent them from bring lured into immoral acts which contributed high rate of HIV/AIDS infection such as commercial sex workers, all in the name of money and other materials.
- Health providers should be careful in delegating their duties to patients in the hospital.
- Individuals (both infected and non infected) should support and contribute to fighting in the reduction and prevalence of HIV infection.
- People who are already infected should be faithful to others especially their sexual partners about their status.
- Individuals should try not to keep not more than one sexual partner and practice safe sex if they cannot abstain.
- Some professionals whose jobs put them at risk of contacting the infection such as Medical Doctors, Nurses, Medical laboratory staff etc should be extraordinarily careful so as to keep them safe from being infected.

VIII. Further Recommendation

Further recommendations that can help to reduce the spread of HIV infection include:

1) Using a new condoms every time you have sex: if you don't know the HIV status of your partner, use a new condom every time you have anal or vaginal sex. Women can use a female condom, use only water-based lubricants. Oil-base lubricants can weaken condoms and cause them to break, during oral sex, use a non-lubricated, cut-open condom or dental dam- a piece of medical grade latex.
2) Tell your sexual partners if you have HIV: it is important to tell anyone with whom you had sex that you are HIV positive. Your partners need to be tested and to receive medical care if they have the virus. They also need to know their HIV status so that they don't infect others.
3) Use a clean needle: if you use a needle to inject drugs, make sure its sterile and don't share it. Take advantage of needle exchange programs in your community and consider seeking help for your drug abuse.
4) If you're pregnant get medical care right away: if you're HIV positive, you may pass the infection to the unborn baby, but if you may receive treatment during pregnancy, you can cut your baby's risk significantly.
5) Consider male circumcision: there's evidence that male circumcision can reduce a man's risk of acquiring HIV. In sub-saharan Africa, circumcision has been found to reduce HIV infection in heterosexual men by 38-66% over two years (Siegfried 2009). The world health organization and UNAIDS have both recommended male circumcision method of preventing female –to- male transmission (WHO 2007). At present it is unclear whether circumcision is of benefit among man who have sex.
6) Post Exposure Prophylaxis: PEP is standard care following risk of occupational exposure to HIV a 28-day course of antiretroviral medication. It can also be used following sexual exposure (PEPSE).
7) All health-care workers should routinely use appropriate barrier precautions to prevent skin and mucous-membrane exposure when contact with blood or other body fluids of any patients is anticipated. Gloves should be worn for touching blood or other body fluids, mucous membranes, or non- intact skin of all patients, for handling items or surfaces soiled with blood or other body fluids and for venipuncture and other vascular access procedures.

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APPENDIX I

College of Health Sciences and Technology, Ijero Ekiti

Department of Pharmacy Technicians

Questionnaire.

A Research into the Prevalence of HIV and Risk Factors that can Predispose Students of College of Health Sciences and Technology Ijero Ekiti to HIV Infection.

The research is a required academic exercise; therefore all gathered information shall only be used for academic reasons. Your anonymity is highly guaranteed, provision of true information can advance the knowledge. Thanks for your anticipated cooperation.

Instruction: Tick (✓) as appropriate please.

Section A (Bio – Data)

1) Sex : male ( ), female ( )
2) Age : 16 – 20 ( ), 21 – 25 ( ), 26 – 30 ( ), 30 and above ( )
3) Marital status: single ( ), married ( ), Engaged ( ) Divorced( )
4) Department_____
5) Level: 100 ( ), 200 ( ), 300 ( ), 400 ( ).
6) What kind of family are you from? Polygamous ( ), monogamous ( )
7) Who do you presently live with? Parents ( ), father ( ), mother ( ), friend ( ), guardian( ), Alone ( ).

Section B. (To Access the Knowledge of HIV).

8) Have you heard anything about HIV before now? yes ( ), no ( )
9) If yes to question 8 above, from which source? Hospital( ),radio ( ),Television( ) Poster ( ),friends ( ), school ( ), workshop ( ), seminar ( ), others specify_____
10) If yes to question 8 above, what are your views about HIV?_____
11) Do you think Ekiti is one of the states with alarming rate of HIV infection in Nigeria? yes ( ), no ( ).
12) Who do you think is at higher risk of contacting HIV infection? Children ( ), male ( ), female ( ), both male and female ( )
13) Do you think having sex without the use of condom can predispose you to contacting HIV? Yes ( ), no ( ).
14) What major factor do you think can contribute to the alarming risk factors of HIV in the college community? Poverty ( ), illiteracy ( ), sexual urge ( ), ignorance ( ), if others specify_____
15) Do you agree with the fact that lack of diligence among students can contribute to getting HIV infection? yes ( ), no ( ).
16) If yes to question 15, in what aspect? Using an infected syringe ( ), using sharps and other non sterilized materials ( ), if others please specify_____
17) Do you personally contribute to fight against HIV infection yes ( ), no ( ).
18) If yes to question 17, in what way, practicing safe sex ( ), Abstinence ( ), Staying away from non – sterilized sharp objects ( ), Being faithful to your partner ( ), if others please specify_____

Section C (Level of Predisposure to Factors that can Cause HIV Infection)

19) Have you ever had sex or used a non – sterilized sharps recently? Yes ( ), no ( ).
20) If yes to question 19 above, when? _____
21) Have you ever been tested for HIV infection? yes ( ), no ( )
22) If yes to question 21 above, when?_____

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23) If no to question 21 above, why _____

Section D (Awareness and Condequences of HIV Infection).

24) Do you think the level of HIV infection risk factors can be reduced in the college ? yes ( ), no ( ).

25) If yes to question 24 above, how? _____

26) Are you aware of the consequences of HIV infection? yes( ) no ( )

27) If yes to question 26 list some _____

APPENDIX II

Total Population of Students in College of Health Sciences and Technology, Ijero Ekiti.

Departments	100 Level	200 Level	300 Level	400 Level	Total
Pharmacy Technicians	25	25	15	----	65
Medical Laboratory technician	138	120	130	----	388
X-ray Technician	50	19	28	----	97
Health Information Management	180	148	138	----	466
Ophthalmic Technician	46	27	36	----	109
Biomedical Engineering	7	11	----	----	18
Health Technician	60	190	84	----	334
Health Assistant Management	----	4	----	----	4
Dental Health Technician	56	43	71	----	170
Public Health Nursing	3	5	----	----	8
Orthopedic Technician	41	30	----	----	71
Community Health Extension Worker	56	50	67	----	173
Junior Community Health Extension Worker	50	50	----	----	100
Human Nutrition And Dietetics	10	17	27	----	54
Occupational Health	----	2	4	----	6
Health Education	7	12	----	----	19
Food Hygiene	12	25	26	----	63
Environmental Health Technology	60	38	31	61	190
Environmental Health Technician	33	28	84	----	145
Environmental Health Assistant	----	20	----	----	20
Remedial Studies	----	----	----	----	28
Grand Total					2528

APPENDIX III

P- Value Table

	P										
DF	0.995	0.975	0.20	0.10	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	0.0000393	0.000982	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.550	10.828
2	0.0100	0.0506	3.219	4.605	5.991	7.378	7.824	9.210	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.860	16.924	18.467
5	0.412	0.831	7.289	9.236	11.070	12.833	13.388	15.086	16.750	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.690	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.180	11.030	13.362	15.507	17.535	18.168	20.090	21.955	24.352	26.124
9	1.735	2.700	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588

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Clinical Evaluation of Anemia in Elderly Patients- A Hospital based Observational Study

By Dr. Jyoti Vora, Dr. Tehsim Memon, Dr. Pratik Akhani & Dr. Harsh Oza

Abstract- Anemia is a common concern in geriatric age group (more than 60 years of age) and can lead to more severe complications than anemia in younger adults. WHO criteria determine anemia when the hemoglobin level is < 13g/dl in male and < 12 g/dl in female, respectively. This decrease in oxygen carrying capacity is a common problem in older people and can have significant morbidity and mortality. Because anemia is a sign, not a diagnosis, a complete evaluation is necessary to identify the underlying cause. The purpose of this study was to evaluate the clinical profile, the characteristics of different hematological types and the etiological profile of anemia in elderly patients, which in turn can lead to early detection of such patients, their early treatment, which would improve the overall outcome & quality of life. A Hospital based observational study was conducted in which 110 PATIENTS above the age of 60 years with anemia were included. Clinical profile with laboratory studies and diagnostic tests to fix the etiology were studied. Majority of these patients had normocytic blood picture of anemia even though iron deficiency anemia was the commonest cause among them.

GJMR-F Classification: *NLMC Code: WH 155*



Strictly as per the compliance and regulations of:

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Clinical Evaluation of Anemia in Elderly Patients- A Hospital based Observational Study

Dr. Jyoti Vora [α], Dr. Tehsim Memon [σ], Dr. Pratik Akhani [ρ] & Dr. Harsh Oza [ω]

Abstract- Anemia is a common concern in geriatric age group (more than 60 years of age) and can lead to more severe complications than anemia in younger adults. WHO criteria determine anemia when the hemoglobin level is < 13g/dl in male and < 12 g/dl in female, respectively. This decrease in oxygen carrying capacity is a common problem in older people and can have significant morbidity and mortality. Because anemia is a sign, not a diagnosis, a complete evaluation is necessary to identify the underlying cause. The purpose of this study was to evaluate the clinical profile, the characteristics of different hematological types and the etiological profile of anemia in elderly patients, which in turn can lead to early detection of such patients, their early treatment, which would improve the overall outcome & quality of life. A Hospital based observational study was conducted in which 110 PATIENTS above the age of 60 years with anemia were included. Clinical profile with laboratory studies and diagnostic tests to fix the etiology were studied. Majority of these patients had normocytic blood picture of anemia even though iron deficiency anemia was the commonest cause among them.

I. Introduction

Anemia is a common concern in geriatric age group and can lead to more severe complications than anemia in younger adults and can greatly hamper the quality of life [1]. All the types of anemia are known to occur in this age group. However anemia should not be accepted as an inevitable consequence of ageing. [2] Studies indicate that the prevalence of anemia increases with advancing age and under age 75 years, anemia is more common in females, but over age 75 years it is more common in males. [3] Multiple pathophysiologic abnormalities in a single elderly patient with anemia are well known. Micronutrient deficiencies as a cause of anemia have been repeatedly documented in the elderly. They are thought to be due, among other factors, to lower energy requirements of the elderly which lead to reduced food intake.[4] Suboptimal iron, folic acid and vitamin B12 status has been shown to impair cognitive function and immune status [5]. It is, therefore, essential to be aware of the coexistence of anemia in elderly, although the presenting manifestation may be for a different reason. It, therefore, becomes all the more important to look for severity of anemia, type of anemia, possible etiologies and appropriate correction. Untreated geriatric anemia is associated with greater risk of death, co-morbidities, and impaired functional status [6]. Similar data for Indian geriatric population are sparse and hence this study was undertaken to determine the prevalence, patterns and causes of anemia.

It is easy to overlook anemia in the elderly, since symptoms such as fatigue, weakness, shortness of breath may be due to the ageing process itself but the decrease of hemoglobin and simultaneous increased degree of anemia with age is not necessarily a result of normal ageing [1,7] . So anemia should not be accepted as an inevitable consequence of ageing. WHO criteria determine anemia to be present when the hemoglobin level is < 13g/dl in a man and < 12 g/dl in a woman [2]. Therefore, we have studied the proportion and the morphological patterns of anemia in elderly patients attending in a tertiary care hospital.

II. Materials & Methods

A hospital based observational study of 110 patients was carried out on patients aged 60 years and above (either sex) presenting with anemia. Patients fulfilling the WHO criteria of anemia (hemoglobin (Hb) <13 gm% in males, Hb<12gm% in females) [2] were included in this study. Their detailed history, complete general, physical examination and systemic review of the patients were undertaken. The following hematological investigations were carried out for all the patients - Hb, Total Leucocyte Count (TLC), Differential Leucocyte Count (DLC), Erythrocytic Sedimentation Rate (ESR), Platelet Count, Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), Mean Corpuscular Hemoglobin (MCH), Packed Cell Volume (PCV), and peripheral smear for blood picture. Other investigations like Stool for Occult blood, blood urea, Liver function tests, serum ferritin, serum Iron, serum B12 level, imaging studies, Bone Marrow biopsy and Endoscopic studies & ANA Profile (as and when needed) were also done. Statistical analysis was done by using instant graph pad and mean. Patterns of anemia were classified based on RBC indices and further correlated by peripheral smear. Microcytic anemia was defined as MCV below 80 fl, normocytic as MCV between 80 and 100 fl and macrocytic anemia by an MCV above 100 fl. Dimorphic anemia are suspected when RDW is more than its normal range (11-15%) and then correlated by

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peripheral smear. IDA was defined when serum iron level <50ug/dl in females & <60 ug/dl im males and serum ferritin level <45ng/ml.

III. Result

The age in the present study ranged from 60 to 96, with the mean age being 68.04. The maximum number of patients were in the age group between 60 and 75, comprising 85% of the study population. The number of males (57%) with anemia were higher than that of the females (43%) with anemia. Of the 110 patients, the commonest symptom was easy fatiguabilty (in 74.54%), followed by Abdominal Distension (22%), and the commonest sign was pallor (in 92.72%) followed by pedal edema (in 20%). The examination of peripheral smear in this study showed Normocytic Normochromic anemia to be the commonest (50.9%) pattern, followed by microcytic hypochromic (40.9.%). Out of the various etiologies of anemia, the commonest in our study was Iron Deficiency Anemia (due to low socioeconomic status and poor dietary patterns) followed by Anemia of Chronic Inflammation.

Table 1: Distribution of male and female patients according to age group & severity of anemia

	No. of Males(%)	No. of Females(%)	Total no. of Patients (%)
Age group			
60-70	50 (52.63)	45 (47.36)	95 (86.3)
71-80	10 (83.3)	2(16.6)	12 (10.90)
>80	3 (100)	0 (00)	3 (2.73)
Total no. of patients (%)	63 (52.27)	47(43.73)	110 (100)
Severity of Anemia			
MILD(10-12 gm%)	18 (56.25)	14 (43.7)	32
MODERATE (7-9.9 gm%)	25 (55.50)	20 (44.4)	45
SEVERE (<7 gm%)	20 (60.60)	13 (39.40)	33
Total no. of patients (%)	63 (57.27)	47 (42.72)	110

Of the 110 patients studied 95 patients [86.36 %] fall in the age group of 60 to 70 years, out of which 50 (52.63%) were males & 45 (47.36%) were females. Out of 110, 12 patients [10.90%] fall in the age group 0f 71 – 80 years, out of which 10 (83.3%) were males & 2 (16.6%) were females. And out of 110, 3 patients fall in the age group of > 80 years, which included only males. Of the 110 cases studied total 63 patients (52.27%) were men and 47 patients (43.73%) were women.

Based on the WHO criteria, [8,9] anemia can be classified into mild anemia with hemoglobin level between 10-12 gm/dl, moderate anemia with hemoglobin level between 7 and 9.9 gm/dl and severe with hemoglobin level less than 7 gm/dl. Of the 110 cases studied 32 had mild anemia out of which 18 were men and 14 women, 45 had moderate anemia of which 25 were men and 20 were women and 33 had severe anemia of which 20 were men and 13 were women.

Table 2: Etiology of Anemia

Diagnosis	No. of Patients	%
Iron Deficiency Anemia	46	41.81
Anemia of Chronic Inflammation	35	31.81
Unexplained Anemia of Elderly	14	12.72
Anemia of Chronic Kidney Disease	11	10.00
B12 or Folate deficiency Anemia	4	3.63

Among the causes for anemia, Iron Deficiency Anemia *(IDA)* was the commonest constituting 41.81% of the cases followed by Anemia of Chronic Inflammation *(ACI)* which constituted 31.81 % of the cases. The next common cause for anemia was Unexplained anemia of elderly *(UAE)* (12.72%) and then anemia of chronic kidney disease *(A- CKD)* (10.%).

Table 3: Mean values of hematological parameters in various types of anemia (pathological).

	Number	Hb (gm %)	MCV (fl)	MCH (pg)	MCHC (%)	Number of patients (%)
NcNc anemia	56	8.5	78.10	26.3	32.7	56 (50.9)
McHc anemia	45	8.3	69.08	25.7	31.8	45 (40.90)
Dimorphic Anemia	5	7.7	77.64	24.7	29.6	5 (4.54)
Macrocytic Anemia	4	8.5	74.8	24.5	33.2	4 (3.63)

The mean values of RBC indices in normocytic normochromic *(NcNc)* anemia is as follows: Mean Cell Volume *(MCV)* 78.1 fl, Mean Corpuscular Hemoglobin *(MCH)* 26. 3 pg/cell, Mean Cell Hemoglobin Concentration *(MCHC)* 32.7%, in microcytic hypochromic anemia *(McHc)* is as follows: MCV- 69.08 fl, MCH 25.7 pg/cell,

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MCHC 31.8%, in Dimorphic Anemia is as follows: MCV-77.64 fl, MCH-25.7pg, MCHC-29.6%, and in Macrocytic anemia is MCV 82.9 fl, MCH 27.1pg/cell, MCHC 37.2%.

Table 4: Correlation of Peripheral Smear Findings in Number of Patients with the Intensity of Anemia

	Erythrocyte			WBC			Platelet		
	NC NC	MC HC	Dimorphic	Normal	Leucocytosis	Leucopenia	Normal	Thrombo-Cytopenia	Thrombo-Cytosis
Mild Anemia	18	11	1	27	0	6	25	4	3
Moderate Anemia	24	20	1	26	4	13	36	6	3
Severe Anemia	14	16	3	27	3	5	20	9	4
Total	56	47	5	80	7	24	81	19	10

Normocytic normochromic erythrocytes is seen in a total of 56 patients out of which 18 were mildly anemic patients, 24 were moderately anemic patients and 14 were severely anemic patients. Microcytic hypochromic erythrocytes were found in a total of 47 patients of whom 11 were mildly anemic, 20 were moderately anemic and 16 were severely anemic patients. Dimorphic blood picture was seen totally 5 patients of whom 1 were mildly anemic, 1 was moderately anemic and 3 were severely anemic patients.

Normal WBC counts were seen in 27 mildly anemic, 26 moderately anemic and 27 severely anemic patients whereas leucocytosis was seen 0 mildly anemic, 4 moderately anemic, 3 severely anemia and leucopenia was seen 6 mildly anemic, 13 moderately and 5 severely anemic patients.

Platelet counts were normal in 81 patients of whom 25 were mildly anemic, 36 were moderately anemic and 20 were severely anemic. Thrombocytopenia was present in 19 patients out of which 4 were mildly, 6 were moderately and 9 severely anemic group. Thrombocytosis was seen in 10 patients of which 3 were mildly anemic, 3 patient was moderately anemic and 4 patient was severely anemic.

Table 5: Mean value of haematological parameters in various type of anemia

Heamatological Parameters	*IDA*	*ACD*	*A-CKD*	*UAE*
Mean Hb (g/Dl)	7.9	8.2	9.1	9.5
Mean MCV (fl)	79.5	77.9	81.6	75.2
Mean MCH (pg/RBC)	25.7	26.1	28.1	25.6
Mean MCHC (%)	31.5	33.2	32.1	32.2
FERRITIN (ug/L)	69.3	147.5	182.9	94.12
IRON (ug/L)	43.9	49.3	47.3	47.4
TIBC (Total Iron Binding Capacity)	358.9	331.5	302.1	306.3

The average levels of Hb (Hemoglobin) among the IDA, ACI, A- CKD and UAE was 7.9 gm/dl, 8.2gm/dl, 9.1 gm/dl and 9.5 gm/dl respectively. The average of MCV, MCH and MCHC in IDA was found to be 79.5fl, 25.7 hb/cell and 31.5% where as in Anemia of Chronic Inflammation it was seen to be 77.9fl, 26.1pg and 33.2%. In A-CKD average MCV was 81.6 fl, MCH was 28.1pg and MCHC was 32.1 % and in UAE it was 75.2 fl, 25.6pg and 32.2%.

The average levels of Ferritin among the IDA, ACI, A- CKD and UAE was 69.3µg/L, 147.5µg/L, 182.9µg/L and 94.12µg/L respectively. The average of Iron in IDA was found to be 43.9µg/L, where as in Anemia of Chronic Inflammation it was seen to be 49.3µg/L. In A-CKD average Iron was 47.3µg/L, and in UAE it was 47.4µg/L.

IV. Discussion

This study, conducted in a tertiary hospital, included 110 old age persons with anemia (hemoglobin less than 13 gm/dl in men and less than 12 gm/dl in women).

With regard to the various clinical features of anemia in old age in this study, the most common symptom was easy fatiguability which was seen in 74.54% of patients followed by abdominal distension seen in 22 % and palpitations in 9.09% of patients. These features corroborate closely with the results of the study by *A Bhasin et al*[1]. The clinical signs seen in this study was pallor in 92.72%, pedal edema in 20%, glossitis in 11.81%, koilonychia in 7.27%, splenomegaly in 6.36% and hepatomegaly in 5.45% and All the clinical signs were of higher incidence than that seen by *A Bhasin et al*[1] except pedal edema which was similar in incidence.

Regarding the age, the age in the present study population ranged from 60 to 96 years with the mean age being 68.04. This mean age is similar to the studies conducted by *Amit A Bhasin et al*[1], slightly lower than that seen in study by *Tettamanti M et al*[10] and *SR Srivastava et al*[11]. In the present study the maximum numbers of patients were in the age group between 60 and 75 years comprising 85 % of the study population and this is similar to the study by *Tettamanti M et al*[10]. The number of men (57%) with anemia is higher than

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that of women (43%) with anemia in the present study and this similar to the studies conducted by *Kaur et al*[5] and different from those by *Tettamanti M et al*[10] and *SR Srivastava et al*[11], in which the percentage of women with anemia was found to be higher.

Table 6: Comparison of peripheral smear findings in the present study with other studies

Peripheral smear	SR			
	Present Study (n=110)	Kaur et Al [10] (n=100)	Srivastava et al [9] (n=654)	Tettamanti M et al [8] (n=11608)
NCNC Anemia	50.9%	56%	69.80%	16.90%
MCHC Anemia	40.90%	34%	11.60%	72.30%
Dimorphic Anemia	4.5%	8%	4.44%	-

The examination of peripheral smears in this study showed normocytic normochromic anemia to be the commonest seen in 50.9% of the patients which is similar to the study by *Kaur et al*[5] and lower than that seen in *Tettamanti M et al*[10], and higher than that seen by *SR Srivastava et al*[11]. This is due to most anemia of chronic inflammation are normocytic. This is followed by microcytic hypochromic anemia which was found in 40.90% of patients which is slightly higher than that seen in the study by *Kaur et al*[5] and significantly higher than that seen in study by *SR Srivastava et al*[11],*Tettamanti M et al*[10]. Dimorphic anemia was seen in 4.5% of patients in this study which is slightly lower than that seen in study by *Kaur et al*[5].

Table 7: Comparison of etiology of anemia in the present study with other studies

	IDA	ACD	Unexplained Anemia	A- CKD	Megaloblastic Anemia
Present Study	41.81%	31.81%	12.72%	10.00%	3.63%
NHANES III[11]	14%	20%	34%	8%	14%
Tettamanti M Et al[8]	16%	17.40%	26.40%	15%	10.10%

Regarding the various etiologies for anemia the commonest cause in the present study was iron deficiency anemia which differed from other studies like National Health and Nutrition Examination Survey *(NHANES III)*[12], *Tettamanti M et al*[10], which show Unexplained Anemia to be the commonest cause. This is due to different dietary patterns and low socioeconomic status of patients in our study. The second most common cause for anemia in the present study was Anemia of Chronic Inflammation followed by anemia due to chronic kidney disease and unexplained anemia.

Regarding the iron parameters in normocytic normochromic anemia it was 114.2 μg/dl, in microcytic hypochromic anemia the ferritin values had a mean value of 58.6μg/dl, in dimorphic anemia it was 30.21 μg/dl which varied from other studies.

Of the 46 patients with iron deficiency anemia only 34 patients had peripheral smear showing the characteristic microcytic hypochromic picture even though the iron studies showed values suggestive of iron deficiency. Of the 46 patients only 6 patients had history of GI bleed. Hence chronic blood loss could not be attributed to the iron deficiency and the deficiency is probably due to nutritional causes since almost all of the persons in the study population belong to the low socioeconomic status.

While studies suggest that vitamin B12 (cobalamin) deficiency is the cause of anemia in 5–10% of elderly patients, the actual prevalence of vitamin B12 deficiency is likely to be much higher.[13] Vitamin *B12 deficiency is difficult to detect in the elderly. First, the symptoms and signs of vitamin B12 deficiency are not reliably present in the elderly. Only about 60% of such patients are anemic*. In addition, neurologic symptoms of B12 deficiency can develop before the patient becomes anemic.[14] *Second, although this anemia is usually macrocytic and megaloblastic, it can be normocytic or even microcytic. Third, serum B12 levels do not reliably reflect tissue B12 deficiency*. Up to 30% of patients with low-normal serum vitamin B12 levels have anemia and neurological disease.[15]

V. Conclusion

This study showed that the commonest cause for anemia among elderly patients is iron deficiency anemia followed by anemia due to chronic disease and both of these are mainly associated with the advanced age. Thus, anemia can be an important marker in the investigation of health in older adults. And also the study showed that anemia in elderly can be asymptomatic which is incidentally stumbled upon when one is evaluated for other symptoms. Not many clinical signs are consistent with anemia except for pallor even which can be absent in cases of mild anemia.

Even though iron deficiency anemia is the commonest cause the peripheral smear studies in this study showed that normocytic normochromic picture was the commonest even when MCV levels were suggestive of microcytic anemia.

Geriatric anemia is a disease that often goes unreported hence every effort should be made to

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identify the disease and evaluate the cause and it should not be ignored as merely being a part of ageing or due to nutritional deficiency and blanket treatment with hematinics should be avoided.

Acronyms

ACI- Anemia of chronic inflammation.

MCH- Mean Corpuscular Hemoglobin.

MCV- Mean Corpuscular Volume.

MCHC- Mean Cell Hemoglobin Concentration.

McHc ANEMIA - Microcytic Hypochromic ANEMIA.

NcNc- Normocytic Normochromic.

NHANES- National Health and Nutrition Examination Survey.

UAE/UA- Unexplained anemia of elderly.

WHO- World Health Organisatlon.

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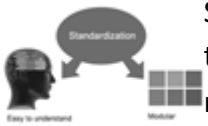


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15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. Multitasking in research is not good: Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. Never copy others' work: Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. Think technically: Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

Informal Guidelines of Research Paper Writing

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



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Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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