



SERUM LIPIDS AND LIPOPROTEINS - A Curse or a Blessing?

**BAYERO UNIVERSITY KANO
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SUMMARY OF PRESENTER'S BIODATA

Professor Muhammad Atiku was born on 20th November, 1961 to late Alhaji Atiku Muhammad and late Hajiya Hadiza Atiku Muhammad (May Allah bless their souls, Amin). In his earlier years, he was enrolled into Mukaddami Islamiyya School under the tutelage of late Alh. Sa'idu Mukaddami, Alh. Adamu Muhammad and Alh. Habibu Muhammad. Later in 1968, Muhammad started his primary School education at Gwagwarwa Primary School. His teachers included late Mallama Maryam, Mrs. Yusuf, Mal Muhammad Usman, Mal. Usman Muhammad Tudun wada, etc.

While in Primary Five, Muhammad was selected to write a special examination with Primary Six pupils, to qualify for the Common Entrance Examination. Muhammad passed the examination and took fourth (4th) position. He therefore joined his seniors to write the National Common Entrance Examination in 1973 when, after having passed this too, in November, 1973, Muhammad began his secondary school education at Government Secondary School, Hadejia. His brilliance soon came to light, when the scripts of Geography test in Form One were distributed and the Geography teacher awarded an extra five (marks) to him, bringing his total scores to 105! That singular event marked the starting point of a five-year period of rigorous and competitive study at GSS Hadejia, which ended on 28th June, 1978.

Between August, 1978 and June, 1979, Muhammad was at the School of Basic Studies, Ahmadu Bello University, Zaria for the Interim Joint Matriculation Board (IJMB) programme. His performance in the IJMB examination qualified him for admission to study Biochemistry at the same university. Thereafter, Muhammad proceeded for his Masters programme in Biochemistry and finished in 1993. He then went to the University of Jos for his PhD, also in the same subject area.

After the compulsory national service which he completed in June 1983, Muhammad got an appointment with the Kano State Ministry of Education as Master II and worked at Government Teacher's College, Sumaila and Senior Secondary School Teacher's Education, Maigatari between October 1983 to February 1987. Professor Atiku later joined the services of Bayero University, Kano as a Graduate Assistant in 1987 and since that time to date, he has dedicated over half of his life to the service of the University, as senior academic and pioneer staff of the Department of Biochemistry together with the trio of Dr. C.V. Prasannan, late Dr. Mahmoud Enin, and Dr. K. K. Sen. Professor Atiku's name became synonymous with Biochemistry in

the early years of medical training in Bayero University. It is to his credit that all the medical students right from the first set of MBBS students, admitted in the 1986/87 session passed through him.

Responsibilities held by Professor Muhammad are as follows:

- i. Time-table Officer, Faculty of Medicine 1992 – 1997.
- ii. Assistant Faculty Examination Officer, Faculty of Medicine 1994 – 1997.
- iii. Assistant Coordinator, Community Based Medical Education and Services Programme (CBME & SP) 1997 – 2001.
- iv. Departmental Examination Officer, Department of Biochemistry Oct 1999 – Aug 2004.
- v. Head of Department, Department of Biochemistry Sep. 2004 – Mar. 2009.
- vi. Dean, Faculty of Basic Medical Sciences Nov. 2014 – May 2018.
- vii. Deputy Provost (Administration), College of Health Sciences, Bayero University, Kano April 2018 to date.
- viii. Member, Editorial Board, Proceedings of the 28th Annual Conference, Nutrition Society of Nigeria, 6th – 8th May, 2007, Bayero University, Kano.
- ix. Secretary, Local Organising Committee, 28th Annual Conference, Nutrition Society of Nigeria, Bayero University, Kano.
- x. Member, Kano State Athletics Association 1995 – 2002.
- xi. State Supervisor, Nigeria Food Consumption and Nutrition Survey, 2001.
- xii. Member, Editorial Board, Proceedings of the 27th Annual Conference, Nigerian Institute of Food Science and Technology, 13th – 17th October, 2003, Bayero University, Kano.
- xiii. Member, Editorial Board, Bayero University Press, 2015 to date.

Professor Muhammad’s membership of University committees is as follows:

- | | | |
|--|--------------|---|
| ● University Central Scheduling Committee | 1992 – 1997 | |
| ● University Vehicle Valuation Committee | 1996 – 1997 | |
| ● University Orientation Committee | 1997 | – |
| | 1999 | |
| ● University Sports Management Committee | 2000 – 2002 | |
| ● University Furniture Loans Committee | 2004 – 2009 | |
| ● Senate Bayero University, Kano | 2004 – 2009 | |
| ● Senate Bayero University, Kano | 2013 to date | |
| ● University Inaugural Lecture Committee | 2015 to date | |
| ● University Sports Consultative Committee | 2015 to date | |

Professor Muhammad is a member of:

- Nigerian Society of Biochemistry and Molecular Biology
- Nutrition Society of Nigeria
- Nigerian Society of Experimental Biology
- Nigerian Institute of Food Science and Technology

Professor Muhammad has served as external examiner for BSc., MSc., PhD and MBBS students at Usmanu Danfodiyo University, Sokoto, University of Maiduguri, University of Jos and Ahmadu Bello University, Zaria. He is a Member of the Editorial Board of Bayero University Journal of Pure and Applied Science (BAJOPAS) and *BEST* Journal. He has served as a Member of the NUC accreditation exercise to six universities. In the area of project Supervision, Prof. Muhammad has supervised (80) B.Sc. (Biochemistry), 20 M.Sc (Biochemistry), Projects, 3 PhD and is currently supervising five (5) Ph.D (Biochemistry) research projects.

Prof. Muhammad has attended nineteen (19) conferences both locally and internationally and has eighty-five (85) publications in peer-reviewed journals both locally and internationally.

Prof Muhammad holds the traditional title of *Walin Gwagwarwa*. He is happily married and has fourteen children (7 males and 7 females).

Serum Lipids and Lipoproteins – A Curse or a Blessing?

In the name of Allah the Beneficent, the Merciful.

Proclaim! And thy Lord is Most Bountiful (96 : 3)

He Who taught (the use of) the pen (96 : 4)

Taught man that which he knew not (96 : 5)

I feel extremely delighted to stand before you on this important and historic occasion to deliver my inaugural lecture titled: **Serum Lipids and Lipoproteins – A Curse or A Blessing?** My interest in serum lipids and lipoproteins as an area of research has roots in my early days as a Graduate Assistant, in the Department of Biochemistry, Bayero University, Kano. I was assigned to teach Lipids Chemistry in 1990 and Lipids Metabolism in 1991 to MBBS students. Prior to this, Prof. K. K. Sen (then Dr. K. K. Sen) suggested that I look at: “Serum Lipids Profile in the Hausa Community of Kano State” for my M.Sc. Research Project. After completion of the M.Sc. study, and teaching Lipids Chemistry and Metabolism, initially to MBBS students and later to B.Sc. Biochemistry students, the door opened for me to delve into research in lipids biochemistry with emphasis on variation of serum lipids and lipoproteins in health and disease. This therefore forms the bedrock of the title of this Lecture: Serum Lipids and Lipoproteins – A curse or a blessing?

INTRODUCTION

Serum Lipids and Lipoproteins

The term lipids (from the Greek “lipos” meaning fat) refers to any naturally occurring non-polar substance that is nearly or totally insoluble in water, but is soluble in non-polar solvents such as chloroform, ether, hot ethanol, etc. Lipids are a heterogeneous group of compounds which are related either actually or potentially to the fatty acids. Like carbohydrates, lipids are composed principally of carbon, hydrogen and oxygen, but unlike carbohydrates, lipids sometimes contain other elements such as phosphorous, and nitrogen. Lipids contain a smaller proportion of oxygen than carbohydrates ($C_6H_{12}O_6$ – Glucose, $C_6H_{12}O_2$ – Hexanoic acid).

Lipids can be classified into groups in many ways. Lipids may be classified into three according to the compounds making up the lipids moiety. The three classes are simple,

compound and derived lipids. Lipids may be classified on the basis of saponification (alkaline hydrolysis) into saponifiable and non-saponifiable lipids. Lipids may also be classified into neutral and polar lipids.

Biological Importance of Lipids

Lipids are important dietary components because they not only provide energy for the body, but also transport vitamins and enzymes. In the body, fat serves as an efficient source of energy both directly and potentially when stored in adipose tissue. Their chemical structure and composition confers a higher heat to them than carbohydrates and proteins. Fats delay gastric emptying and as a result have a high satiety value, prolonging the period before the recurrence of hunger. Fats also give palatability to foods and are essential emulsifiers for a number of drug preparations. Fats protect the body from mechanical injury when they are deposited in certain parts of the body, eg in the adipose tissue and other subcutaneous areas. Fats serve as insulation against the loss of body heat. The role of lipids in industry include: used in cooking, paints manufacture, as emulsifiers for tableting, production of body creams and oils, and in soap production.

Lipoproteins are a multi-component complex of lipids and proteins of characteristic density, molecular weight, size and chemical composition (Machebouf, 1929). These complexes of lipids and proteins are held together by non-covalent forces, although a low degree of covalent bonding may be present. Lipoproteins serve a variety of functions in cellular membranes and in the transport and metabolism of lipids. In blood, the lipoproteins transport lipids from the site of absorption to the various tissues of the organism that utilize lipids.

Four major classes of lipoproteins are found in the blood plasma. On the basis of electrophoretic pattern, the lipoproteins are classified as chylomicrons, pre-beta lipoproteins, beta lipoproteins and alpha lipoproteins. However, these lipoproteins have also been classified on the basis of ultracentrifugation as chylomicrons, very low density lipoproteins (VLDL), low density lipoproteins (LDL) and high density lipoproteins (HDL).

Functionally, chylomicrons and VLDL are responsible for transporting energy, in the form of triacylglycerols to peripheral tissues. LDL functions in the transport of cholesterol from liver to tissues, while HDL transports cholesterol from tissues to liver (reverse cholesterol transport).

The protein component of lipoproteins is known as apolipoprotein (apoprotein). The apoproteins have been named according to the A, B, C nomenclature (Alaupovic *et al.*, 1972a). ApoA is the major protein of HDL (Levy and Rifkind, 1980), Apo B is the major protein in LDL and VLDL, while. Apo C is found predominantly in VLDL (Lee and Alaupovic, 1974).

The apolipoproteins appear to have both structural and catalytic functions. Apo A – I performs an important functional role in the metabolism of HDL – cholesteryl ester (Alaupovic *et al.*, 1972b). ApoD may serve to catalyse cholesterol ester exchange from HDL to VLDL (Simons and Gibson, 1980). In contrast, apoB the major apoprotein of LDL may serve a primary role in maintaining the integrity of chylomicrons and VLDL during their transformation (Simons and Gibson, 1980).

Variations in Serum Lipids and Lipoprotein Patterns

Serum lipids and lipoprotein patterns vary according to geographical, racial, age and sex differences. (Thelle *et al.*, 1982, Ononogbu 1988). Thus, normal range of serum lipids and lipoproteins levels vary in different communities. With the knowledge of factors that affect serum lipids and lipoprotein patterns on community basis, I decided to venture into research on “Serum Lipids and Lipoprotein Patterns in the Hausa Community of Kano State”.

Geographical and Racial differences in Serum Lipids and Lipoproteins

Atiku *et al.* (1995a) worked on serum total cholesterol (TC), total lipids (TL) and high density lipoprotein cholesterol (HDL – CH) profile of apparently healthy males and female Hausa subjects resident in Kano metropolis, Nigeria. The values obtained in Kano were different from values reported in other parts of the country (Ononogbu, 1988; Essien *et al.* 1992) and elsewhere (Thelle *et al.*, 1982).

Differences in the serum levels of HDL-CH and low density lipoprotein cholesterol (LDL-CH) between communities have been employed in explaining the postulated relationship between lipoprotein levels and the incidence of coronary heart disease. Epidemiologic studies (Lewis *et al.*, 1974, Castelli *et al.*, 1977) indicate that communities in which the incidence of coronary heart disease is low, have low values of LDL-CH and high values of HDL-cholesterol. But is this the situation with the Hausa community of Kano State? My attempts to verify this assertion over the years point to the contrary.

It is surprising to find that in spite of the reported (Onitiri *et al.*, 1979) pre-ponderance of α -lipoprotein (i.e. HDL), about 43.5g of total serum lipoproteins in healthy Nigerian subjects, the HDL-CH concentrations found in apparently healthy Hausa subjects (Atiku *et al.*, 1995a) were very low when compared to HDL-CH concentrations obtained in communities in which the incidence of coronary heart disease is high. Over-dependence on groundnut oil for cooking in the Hausa community, dietary habits, relatively low indulgence in physical exercise, sample size used in the study, etc. may be responsible for the relatively low values of HDL-CH recorded in the Hausa subjects studied.

Findings of this study, appeared to be a preliminary exercise, meant to pave way for further studies aimed at examining the serum lipids and lipoprotein pattern of a wider segment of the Hausa community. Specifically, the effect of factors such as physical activity, diet, cigarette smoking, disease condition, pregnancy/lactation, drinking water, marital status, educational status and occupation were assessed in later studies. The results of these are presented as follows:

i. Pregnancy and Lactation

In our work on serum total cholesterol and high density lipoprotein cholesterol profile in pregnant and lactating women of Dawakin-Kudu, Kano State, Nigeria (Atiku *et al.*, 1995b) we found that mean TC and HDL-concentrations increased with age during pregnancy and lactation respectively. Highest HDL-CH and TC levels were recorded at 16 – 20 weeks and 36 – 40 weeks of pregnancy respectively and at 21 – 25 weeks and 6 – 10 weeks of lactation respectively. In a similar study, we examined the link between body weight versus serum total cholesterol and high density lipoprotein cholesterol levels in pregnant and lactating women of Dawakin Kudu, Kano State, Nigeria (Atiku *et al.*, 1998). Serum total cholesterol (TC) and high density lipoprotein cholesterol (HDL – CH) levels were estimated in pregnant women (PW n= 102) and lactating women (LW, n= 88). The subjects were divided into four (4) groups on the basis of body weight. In PW, serum TC and HDL – CH concentrations increased with increase in body weight except for women in weight groups 60 – 69kg and 70 – 79kg respectively. In lactating women, serum TC level increased with increase in body weight except in the 60 – 69kg group. Serum TC and HDL – CH levels did not differ significantly ($P>0.05$) between the two (2) groups of subjects (PW VS LW). For all the four (4) weight groups, serum TC and HDL – CH concentrations did not correlate with body weight in the two groups of subjects (PW and LW).

An attempt was made to look at the effect of menstruation and blood group type on serum total cholesterol and HDL – cholesterol levels in selected female subjects resident in Kano Metropolis, Nigeria (Atiku and A’isha, 1998). Serum TC and HDL – CH levels were estimated in thirty (30) apparently healthy female subjects (mean age 22 years) resident in Kano Metropolis. The subjects were grouped on the basis of period of menstruation and blood group type. Subjects with blood group A+ had higher mean serum TC levels than those with blood group O+. Those with blood group O+ had higher HDL – CH level than those with blood groups B+ and A+. Menses and blood group type are factors that may influence serum lipids profile in female subjects.

In 2009, Salisu and Atiku studied the serum lipids profile in non-pregnant and pregnant Hausa-Fulani women at second and third trimesters of pregnancy in Kura Local Government Area, Kano State Nigeria. Mean serum TC, HDL-CH and LDL-CH values were significantly higher ($P<0.05$) in second trimester subjects than third trimester subjects.

ii. Sex, Occupation and Marital Status

Comparative study (Atiku *et al.*, 2005a) on serum total cholesterol, HDL-cholesterol and dietary habits in subjects from Jos-North and Kano metropolis, revealed differences in TC and HDL-CH levels amongst the study subjects. Specifically, male and female subjects from Kano metropolis who consumed fatty foods daily had significantly higher ($P<0.05$) mean serum TC levels than their counterparts from Jos North.

The influence of marital status and occupation on serum TC and HDL-CH were studied (Atiku and Yusuf, 2011) in sixty-one (61) adult male and female Hausa subjects aged 20 – 50 years. Irrespective of marital status and occupation, female subjects had higher mean serum TC and HDL-CH levels than male subjects. Married subjects of both sexes had higher mean serum TC and HDL-CH levels than their non-married counterparts. Male subjects (students) had significantly higher ($P<0.05$) mean serum TC than the other male subjects (university workers).

iii. Cigarette Smoking and Dietary Habits

Atiku *et al.* (2001) worked on cigarette smoking versus blood pressure, body mass index, serum total cholesterol and high density lipoprotein cholesterol levels in hypertensive subjects resident in Kano Metropolis, Nigeria. Blood pressure ($P<0.05$),

body surface area, BSA ($P<0.05$), TC ($P<0.01$) and HDL-CH ($P<0.025$) were found to be significantly higher in male subjects while BMI ($P<0.05$) was found to be significantly higher in female subjects. Smoking was found to be associated with a significant decrease in BMI ($P<0.05$), a significant increase in HDL-CH ($P<0.025$) and diastolic BP ($P<0.025$). Higher serum TC level and BP reading (both systolic and diastolic) in smokers than non-smokers could be due to the direct effect exerted by nicotine in cigarettes on body physiology. Nicotine in cigarettes (Deng *et al.*, 1986) has been reported to increase the levels of cholesterol and free fatty acids in blood, increase cardiac output by about 15 – 30%, and to raise systolic blood pressure to about 10mmHg above normal. On the effect of smoking on serum HDL-CH levels our results contradict earlier reports (Gouldbourt and Malochi, 1977) that indicate significantly low HDL-CH concentration in smokers than non-smokers. In addition, the serum HDL-CH concentration rises when cigarette smoking is stopped.

Forty-four (44) type II diabetic subjects (23 males and 21 females, mean age 49.6 years) were studied (Atiku and Abiodun, 2010) in order to assess the effect of body mass index (BMI), smoking and dietary habits on serum TC and HDL-CH levels. Results of the study indicated that female subjects had significantly higher mean serum HDL-CH ($P<0.05$) and lower mean serum TC ($P<0.05$) levels than male subjects. Consumption of de-hulled cereals, soft drinks, use of “Ajino moto” and smoking were all associated with significantly lower mean serum HDL – CH ($P<0.05$) levels.

The effect of kolanut (*Cola nitida*) chewing on serum total cholesterol (TC), high density lipoprotein-cholesterol (HDL-CH), urea and creatinine levels was studied in ninety ($n=90$, age range 35 – 80 years) type II diabetic patients of both sexes (57 males and 33 females). Questionnaire analysis revealed that fifty-eight percent (58%) of the subjects chew kolanuts. Non-chewers of kolanut had significantly higher ($P<0.05$) mean serum urea and glucose levels than chewers of kolanut. Mean serum HDL – CH level was significantly higher ($P<0.05$) in kolanut chewers than in non-chewers. Even though reduced levels of mean serum TC, urea and creatinine and raised mean serum HDL – CH level observed in chewers of kolanut are beneficial with respect to the development of coronary heart disease (CH) more work needs to be done to confirm this finding (Atiku and Akpan, 1999).

Table 1: *Kolanut Chewing Versus Serum TC, HDL – CH, Urea, Creatinine and Glucose Levels in Diabetic Subjects Irrespective of Sex*

Variables	Kolanut Chewers (n=52)	Non Chewers (n=38)	t-value
TC (mg/dl)	210.52± 73.68	221.62± 54.81	1.3105
HDL – CH(mg/dl)	33.74 ±19.40	24.64 ± 14.40	2.479 (P<0.05)
Urea (mmol/L)	9.79 ±4. 01	9.90 ± 4. 13	0.16921
Creatinine(mmol/L)	4.38 ± 1.63	5.52 ± 2.38	2.7142 (P<0.05)
Glucose (mmol/L)	6.59 ± 3.23	8.43 ± 4.03	2.4353 (P<0.05)

Results are mean ± standard deviation. n= number of subjects.

Table 2: *Kolanut Chewing Versus Serum TC, HDL – CH, Urea, Creatinine and Glucose Levels in Diabetic Subjects According to Sex*

Kolanut Chewing Status	Variables	Males n= 39	Females n= 13	t-value
Kola nut Chewing	TC (mg/dl)	211.40 ± 78.46	207.88 ± 59.74	0.1478
	HDL – CH (mg/dl)	36.41 ± 21.11	27.80 ± 14.10	1.3688
	Urea (mmol/L)	10.10 ± 3.76	8.59 ± 4. 53	1.1889
	Creatinine (mmol/L)	4.24 ± 1.71	4.65 ± 1.51	0.7707
	Glucose (mmol/L)	6.25 ± 2.97	7.67 ± 3.83	1.4118
Non Kola nut Chewing		Males (n=18)	Females (n=20)	
	TC (mg/dl)	221.83 ± 56.17	229.25 ± 52.94	0.4257
	HDL – CH (mg/dl)	34.16 ± 20.90	32.67 ± 24.10	0.2055
	Urea (mmol/L)	21.40 ± 4.08	8.78 ± 4.16	9.5606 (P<0.05)
	Creatinine (mmol/L)	5.52 ± 1.33	5.25 ± 3.17	0.3418
	Glucose (mmol/L)	7.25 ± 4.23	7.46 ± 3.66	0.1666

Results are mean ± standard deviation n= number of subjects.

iv. Physical Activity

It is well known that physical exercise helps to prevent heart disease both in young and healthy adults and in rehabilitation after myocardial infarction (Allen *et al.*, 1980). To this end, we examined the relationship between pre-training TC and the change in TC (Δ TC) subsequent to an endurance training programme that lasted eight (8) weeks (Danladi and Atiku, 2001). The training programme consisted of continuous jogging of 3.2km distance three days a week for 8 weeks at an intensity of 80% of

subjects age predicted maximal heart rate. Significant zero order correlations ($P < 0.01$) were found between ΔTC and pre-training TC ($r = -0.544$) and change in body weight (ΔBW ; $r = 0.438$) for the combined male and female subjects. Pre-training TC, ΔBW and ΔVO_2 max were significant predictors of ΔTC for women, while in men, none of the variables was important in predicting ΔTC . In conclusion, when assessing the effect of exercise training on TC, aside from the initial levels of TC, initial levels of body weight and VO_2 max are other important variables that could affect the outcome of this study.

In another study, we looked at the effect of interval training on lipids profiles of adolescent Nigerian boys and girls (Adeyanju *et al.*, 2009). lipids profile parameters assessed in the study included very low density lipoprotein (VLDL – CH), LDL – CH and HDL – CH. Pre-, mid- and post –test values of these lipoprotein sub-fractions were determined from blood samples collected from participants 24 hours prior to training, after 6 weeks and at the end of exercise programme respectively. Subjects were randomly selected and divided into two equal groups of 30 subjects (M = 15; F = 15). Experimental group was subjected to 12 weeks training while the control group did not participate in the training programme. Our finding indicated significant sex-specific reductions in VLDL – CH ($P < 0.05$), LDL – CH ($P < 0.05$) and a significant sex specific increase in HDL – CH ($P < 0.05$).

v. Age, Sex and Disease Condition(s)

In a study of serum lipids and lipoprotein pattern in the Hausa, Community of Kano State, significant ($P < 0.05$) increases in the serum concentration of TC, HDL – CH and VLDL/LDL – CH were recorded with increase in age in healthy male subjects. Healthy female subjects aged 20 – 29 years had significantly ($P < 0.05$) higher serum concentration of TC and VLDL/LDL – CH than their male counterparts (Atiku, 1993). When the non-healthy and healthy subjects were compared, significant ($P < 0.05$) decreases in the serum concentration of HDL – CH and TC were recorded in male subjects aged 20 – 29 years. Differences in the serum levels of HDL – CH and LDL – CH between communities has been employed in explaining the postulated relationship that exist between serum lipoprotein levels and the incidence of coronary heart disease. The relatively low serum total cholesterol values for healthy male subjects aged 20 – 29 years recorded in this study, could be ascribed to the poor feeding pattern of the subjects, who were mostly students. The use of animal fat (Manshanu or cow fat) to make soup more delicious is a practice in Hausa land. However, the practice is now on the decline, probably due to the availability of cheaper substitutes in the form of maggi cubes or monosodium glutamate (MSG). Additionally, the use of palm oil in cooking

is not as common as the use of groundnut oil in the Hausa community. Comparatively, the HDL – CH levels recorded in this work are very low in relation to HDL – CH levels reported for communities in which the incidence of CHD is high. Over dependence on groundnut oil for cooking in the Hausa community, dietary habits, relatively low participation in physical activity, age, sex, etc may be responsible for this observation.

Table 3: Comparison of Serum Total Cholesterol Concentration (mg/dl) in Adult Hausa Subjects (Healthy/Non – Healthy)

	Subjects	Age (years)			Total
		20 – 29	30 – 39	≥40+	
Healthy	Males	<i>a, c, d</i> 129.36 ± 27.5 (26)	<i>a</i> 194.75 ± 35.3 (3)	-	29
	Females	<i>b</i> 175.27 ± 41.0 (7)	165.54 ± 63.4 (2)	-	9
Non-Healthy	Males	<i>c, d</i> 101.97 ± 26.3 (4)	<i>c</i> 162.43 ± 29.7 (1)	175.28 ± 22.0 (10)	18
	Females	144.52 ± 31.5 (2)	179.93 (1)	161.16 ± 32.1 (12)	15
Total (n)		39	10	22	71

Results are expressed as mean ± standard deviation

n= number of subjects in parenthesis.

In the comparison of subjects (in terms of age, sex and healthy/non-healthy) figures in same row or column bearing similar superscripts are significant.

- a) P<0.005 for healthy male subjects aged 20 – 29 and 30 – 39 years.
- b) P<0.005 for healthy male/female subjects aged 20 – 29 years
- c) P<0.025 for male subjects aged 20 – 29 and 30 – 39 years in the healthy/non-healthy groups.
- d) P<0.05 for male subjects aged 20 – 29 years in the healthy/non-healthy group.

Table 4: Comparison of Serum HDL – Cholesterol Concentration (mg/dl) in Adult Hausa Subjects (Healthy/Non – Healthy)

	Subjects	Age (Years)			Total
		20 – 29	30 – 39	≥40	
Healthy	Males	<i>a, c</i> 25.37± 12.72 (24)	<i>a</i> 39.87 ± 9.84 (3)	-	27
	Females	26.05 ± 9.70 (6)	29.63 ±15.71 (2)	-	8
Non-Healthy	Males	<i>b, c</i> 13.33 ±0 (3)	<i>b</i> 34.26 ± 13.98 (4)	28.61 ± 9.78 (8)	15
	Females	18.51 ± 5.24 (2)	14.81 (1)	28.65 ±15.90 (11)	14
Total (n)		35	10	19	64

Results are expressed as mean ± standard deviation

n= number of subjects in parenthesis.

In the comparison of subjects (in terms of age, sex and healthy/non-healthy) in same row or column bearing similar superscripts are significant.

- a) P<0.05 for healthy male subjects aged 20 – 29 and 30 – 39 years.
- b) P<0.05 for male subjects aged 20 – 29 and 30 – 39 years in the non-healthy group.
- c) P<0.005 for male subjects aged 20 – 29 years in the healthy/ non-healthy groups.

Table 5: Comparison of Serum VLDL/LDL – Cholesterol Concentration (mg/dl) in Adult Hausa Subject (Healthy/Non – Healthy)

Subjects	Age (Years)			Total
	20 – 29	(30 – 39)	≥40	
Healthy	Males	a, c 100.54 ± 23.9 (23)	a 154.39 ± 33.7 (3)	- 26
	Females	145.98 ± 44.6 (6)	129.71 ± 52.5 (2)	- 8
Non-Healthy	Males	c, e 88.47 ± 30.8 (3)	c, d 125.24 ± 17.0 (4)	d, e 146.59 ± 15.8 (8) 15
	Females	121.74 ± 22.4 (2)	162.19 (1)	130.60 ± 26.5 (11) 14
Total (n)		34	10	19 63

Results are expressed as mean ± standard deviation

n= number of subjects in parenthesis.

In the comparison of subjects (in terms of age, sex and healthy/non-healthy) figures in same row or column bearing similar superscripts are significant.

- P<0.005 for healthy male subjects aged 20 – 29 and 30 – 39 years.
- P<0.005 for healthy male/female subject aged 20 – 29 years
- P<0.05 for male subjects aged 20 – 29 and 30 – 39 years in the non-healthy group.
- P<0.05 for male subjects aged 30 – 39 and 40 years and above in non-healthy group.
- P<0.005 for male subjects aged 20 – 29 and 40 years and above in the non-healthy group.

Body weight/height, blood pressure (BP) measurements and estimation of serum total cholesterol (TC) and serum high density lipoprotein cholesterol (HDL – CH) levels were carried out in 60 hypertensive and 60 diabetic subjects of both sexes aged 30 years and above, attending Murtala Mohammed Specialist Hospital (MMSH), Kano. Body mass index (BMI), BP (both systolic and diastolic), serum TC and HDL – CH values were higher in diabetic females than males. However, amongst hypertensive subjects the above trend was not recorded in BMI and BP (both systolic and diastolic) values. Hypertensive male subjects had higher BMI and BP (systolic and diastolic)

values than their diabetic counterparts, while serum TC and HDL – CH levels were higher in diabetic than in hypertensive subjects. Irrespective of sex and disease type, BMI and BP values did not correlate with serum TC and HDL – CH levels in the study subjects. Sample size and methods of statistical analysis are factors that may have contributed to the non-association between BMI, BP and serum TC and HDL – CH levels observed in this study (Atiku *et al*, 2000).

Table 6: BMI Blood Pressure (mmHg), Serum Total Cholesterol and High Density Lipoprotein Cholesterol (mg/dl) levels in Hypertensive and Diabetic Subjects

	Subjects	BMI	BP	TC	HDL – CH	HDL-CH/TC
Hypertensive	Males n = 30	24.81 ± 6.21	161 ± 17.74 98.50 ± 9.33	141.69 ± 37.26	23.47 ± 8.41	0.16
	Females n= 30	23.80 ± 3.00	155.49 ±36.03 93.30 ± 12.31	155.49 ± 36.03	31.10 ± 7.21	0.20
Diabetics	Males n= 30	23.00 ± 4.29	142.17 ±21.73 89.13 ±15.69	150.30 ± 34.25	28.49 ± 8.71	0.19
	Females n= 30	26.90 ± 7.01	144.51 ± 24.62 91.01 ± 15.18	158.88 ± 49.01	31.50 ± 9.84	0.20

Values are mean ± standard deviation. For BP readings, upper figures represent systolic pressure while lower figures represent diastolic pressure. n = number of subjects.

Serum total lipids (TL) concentration in apparently healthy adults and typhoid fever patients were compared in order to detect the possible contribution of lipid A component of *Salmonella typhi* endotoxins (lipopolysaccharides) to the serum lipids concentration. A total of one hundred and seventy seven (177) hydrolysates of sera were evaluated. Eighty (80) of the sera were obtained from apparently healthy adults, while 97 were from patients with symptoms of typhoid fever, who had *S. typhi* O antibody titre of equal or greater than 160. Results indicated significant difference ($P<0.05$) between the mean serum TL level of 253.10 ± 84.72 mg/dl obtained in the apparently healthy adults and the mean value of 949.50 ± 54.21 mg/dl in patients with typhoid fever. There was no significant difference ($P>0.05$) between the mean TL levels in males and females among the apparently healthy subjects and the patients. The findings suggest the possible diagnostic significance of lipids profiles (Faruk and Atiku, 2003) in typhoid fever.

Table 7: Mean Serum Total lipids Concentration (mg/dl) in Apparently Healthy Adults and Adult Patients with Typhoid Fever (mg/dl)

Subjects	Apparently Healthy	Typhoid Fever Patients
Males	236.16 ± 82.90^a	1000.41 ± 59.71^b
Females	273.81 ± 81.00^a	890.01 ± 47.18^b
Mean of all	253.10 ± 84.72^c	949.50 ± 54.21^c

Values are mean \pm standard deviation a, b: $P<0.05$ c: $P<0.001$

Table 8: Sex Distribution of the Study Subjects

Subjects	Apparently Healthy	Typhoid Patients
Males	46 (57.5%)	52(53.6%)
Females	34 (42.5%)	45 (46.4%)
Total	80 (100%)	97 (100%)

Ibrahim *et al.* (2009) studied the effect of highly active antiretroviral therapy(HAART) on serum lipids profile on HIV/AIDS patients attending “Immune Suppressed Clinic,(ISS) Mbarara, Regional Referral Hospital, Uganda”. In the study, TC, triglycerides (TG) and HDL – CH were determined using standard enzymatic methods. LDL – CH, HDL and TC: HDL ratios were obtained by calculations. The results indicate that HIV patients on HAART attending ISS Clinic, Mbarra Regional Referral Hospital (Uganda) have significant changes in lipids profile which predispose them to risk of CVD.

Studies (Jacques, 1992; Osilesi *et al.*, 1991) conducted on the effect of ascorbic acid on serum lipids profile are contradictory in nature and results from experiments carried out on laboratory animals have not improved our understanding of the effect of ascorbic acid on serum lipids profile. To this end, (Atiku and Fagge, 1998) worked on the relationship between body mass index (BMI) and serum ascorbic acid and lipids profile in diabetes mellitus. Serum total cholesterol (TC), high density lipoprotein cholesterol (HDL – CH) and ascorbic acid (AA) levels were estimated in 50 diabetic subjects (25 males and 25 females, aged 21 – 75 years) resident in Kano metropolis, Nigeria. Body weight and height measurements were taken for each subject. Fifty-three apparently healthy age and sex matched subjects were used as controls. Mean serum TC levels were significantly higher in diabetic males ($P<0.01$) and females ($P<0.005$) than their healthy counterparts. The difference in mean serum AA between the diabetic subjects and the healthy subjects was not statistically significant. BMI correlated with serum HDL – CH in female diabetic subjects. Significant differences ($P<0.05$) were recorded in mean serum TC, HDL – CH AA and BMI values with variation in BMI range classes of underweight, normal and overweight.

Table 9: Serum Total Cholesterol, HDL – Cholesterol, Ascorbic Acid Levels and Body Mass Index in Study Subjects According to Sex

Subjects		Total Cholesterol (mg/dl)	HDL-Cholesterol (mg/dl)	Ascorbic Acid (mg/dl)	Body Mass Index (kg/m ²)
Diabetics	Males n=25	109.80a ± 40.4	57.70 ± 29.39	1.54 ± 0.76	22.90 ± 5.75
	Females n=25	195.88b ± 39.15	68.04 ± 26.00	1.50 ± 0.75	25.33 ± 6.82
Healthy	Males n=26	173.22a ± 29.17	64.43 ± 6.59	1.30 ± 0.56	24.28 ± 5.70
	Females n=27	153.78b ± 42.08	68.40 ± 8.24	1.45 ± 0.32	26.05 ± 8.33

Results are mean ± standard deviation, n= number of subjects

Figure bearing similar superscripts are significant

a: P<0.01

b: P<0.005

Work on Hypolipidaemic Effect of Plants

Atiku *et al.* (2005b), worked on the effects of *Vernonia amygdalina*, *Achillea millicolifolium* and *Gymnena sylvestre* on serum glucose, total cholesterol and total protein in normoglycaemic rats. Of the three plants *G. sylvester* produced the most pronounced effect of lowering the serum glucose, total cholesterol and total protein compared to the control group.

The hypoglycaemic and hypolipidaemic effects of the aqueous leaf extract of *Murayya koenigii* in normal and alloxan – diabetic rats was studied by Lawal *et al.* (2008). The extract was administered orally at 100mg/kg, 150mg/kg and 200mg/kg body weight each to respective groups of animals (Groups I, II and III) for seven days. Group IV received normal saline and served as control for the normal rats. For the alloxan-induced diabetic rats, the same dosage pattern was administered to three groups of rats for seven days (Groups V, VI and VII), while group VIII which received normal saline served as control. At the various dose levels administered, the glucose lowering effects was more pronounced in the alloxan-diabetic rats than in control rats. However, except

for lowered TG levels in Group I compared to Group IV, there were no clear cut trends in the variation of plasma TC, HDL-CH and LDL-CH levels between the groups.

In another study, Ibrahim *et al.* (2010), studied the effect of crude aqueous extract of *Gymnema sylvestre* on serum glucose, lipids profile and weight of rabbits. The study specifically evaluated serum glucose in normoglycaemic (N), glucose-induced hyperglycaemic (H) and alloxan – diabetic (D) rabbits. Serum total cholesterol (TC), and high density lipoprotein-cholesterol (HDL-CH) levels were determined. Serum TC decreased significantly ($P<0.05$) at 70mg/kg and 90mg/kg administered doses.

Synergistic effects of *Anacardium occidentale* (AO) stem bark and *Gymnema sylvestre* (GS) stem extract on serum glucose, lipids and liver enzymes in alloxan-induced diabetic rats were investigated (Atiku *et al.*, 2010). Twenty (20) white albino rats were divided into four groups of five animals each (Groups 1,2,3 and 4). Group I served as the control (non-diabetic). Groups 2 and 3 were diabetic and each received 800mg/kg body weight of AO and GS ethanolic extracts respectively, Group 4 received a combination of AO and GS ethanolic extracts each 800mg/kg body weight; administration of the extracts lasted for a period of fifteen (15) days. Mean serum total cholesterol (TC), LDL-CH and triglyceride levels were lower in group 2 compared to group 1. The difference in mean serum HDL-CH level between Groups 2,3 and 1 was statistically significant ($P<0.05$). At the doses administered, AO and GS extracts have potential as lipids lowering agents.

The effect of oral administration of aqueous seed extract of *Ricinus cummunis* at three graded concentrations (3.80, 7.60 and 11.40mg/kg body weight) on lipids profile of female wistar albino rats was studied (Mohammed *et al.*, 2012). Total cholesterol, triglyceride, high density lipoprotein (HDL), low density lipoprotein (LDL) and very low density lipoprotein (VLDL) cholesterol levels were determined four (4) weeks post administration. The results showed no significant difference ($P>0.05$) in the serum levels of TC, HDL, LDL and VLDL cholesterol in the groups administered 3.80mg/kg and 7.60mg/kg compared to the control. However a significant increase ($P<0.05$) in parameters was observed in rats administered 11.40mg/kg body weight.

OUTSTANDING WORK

The search for answers to research questions is a continuous exercise. The following are research questions awaiting answers:

- a) Why low HDL-CH levels in the Hausa community of Kano State in spite of relatively low incidence of coronary heart disease compared with the Western world?
- b) Is the low HDL-CH value peculiar to the Hausa community of Kano State compared to other Hausa communities from other parts of the country?
- c) What is the serum lipoprotein pattern of other ethnic groups who have stayed in Kano for a long period of time?
- d) How does serum lipoprotein pattern differ according to location (urban, peri-urban, etc) and nature of drinking water?
- e) What is the effect of stress on serum lipids and lipoproteins?
- f) How does the serum lipoprotein pattern vary with menstruation and blood group type in female subjects of reproductive age and after menopause in Kano State?

CONCLUSION

Viewed from the double-edged sword perspective, lipids may either be a blessing or a curse depending on their functions in normal or diseased conditions respectively. Lipids play important functions in the body and at the same disturbances in lipids levels in the body lead to disease conditions. It therefore becomes necessary that lifestyle and dietary habits that do not lead to abnormal lipids levels be encouraged. Indulgence in regular physical exercise, reduction in stress levels, decrease in consumption of fat-rich food items, non-indulgence in cigarette smoking and alcohol consumption should be our guide.

Let me at the end, close this lecture with the following wise words!

- a) “How far you go in life depends on your being tender with the young, compassionate with the aged, sympathetic with the striving and tolerant of the weak and strong. Because someday in life you will have been all these”.
- b) “The world is a ladder for some to go up and down” But on your way to the top, carry some along with you, for you may come across them on your way down.

Let us ponder over the import of these words in our lives and our daily interactions with one another.

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The important place of parents in one's life cannot be over-stressed. I have no words to express my appreciation and gratitude to my late parents: late Alh. Atiku Muhammad and late Haj. Hadiza Atiku Muhammad. May Allah in His infinite mercy bless their souls and reward them with Al-Jannat- Firddausi Amin!!!.

To my primary school mates and teachers, I remain grateful for the spirit of friendship that still binds us. Specifically, let me mention Coach Ahmed Abdu (Pele), Usman Sani Fagge, Alh. Sani Ahmed Fasaraga, Prof. Ali Muhammad Abdulkarim and our teacher, Mal. Muhammad Usman Fagge. Members of HASSOBA Class 78 Chapter are not left out. Alh. Sarki Shehu Kabara, Bala Kabir (Volorous), Isyaku Umar Faruruwa, Tijjani Yusuf, Rabi'u Shuaibu, and many others deserve special mention. Alh. Ibrahim Abdulhamid was my Principal at GSS Hadejia from 1973 to 1977 Professor Muhammad Abdullahi Yola (Science and Technology Education Department) was our Biology teacher in Forms Four and Five.

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To all my students right from secondary school till date, I remain indebted for without you, the challenge of teaching and research would have been an insurmountable one. Mal. Aliyu Abba Mukhtar stands out, because I taught him at Teacher's College, Sumaila, he was my student at BSc. and MSc. levels and is currently pursuing his PhD in the Department. Added to this is the fact that he was with the Department of Biochemistry as Chief Technologist before his transfer to Centre of Biotechnology Research.

To all members of **Shehu Atiku Family Forum** and **Late Sheikh Sa'idu Yaman Forum**, I remain grateful for all the support and encouragement I have received from you. I hope I am a good ambassador of the two Associations.

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To all my colleagues in the Department, I really enjoy working with you and look forward to the day that all members of the Biochemistry family will all deliver their inaugural lectures. We are many in the Department. Allow me to mention a few: Prof. K.K. Sen, Prof. M. Y. Gwarzo, Prof. Hafiz Abubakar, Prof. M. S. Sule, Prof. A. M. Wudil (Mr White), Prof. A. J. Alhassan (Head of Department), Dr. Y. Y. Muhammad, Dr. A. A. Imam and Haj. Aisha Isyaku Kiru.

To the village Head of Gwagwarwa, I am grateful for finding me worthy to be conferred with the title of *Walin Gwagwarwa*.

The untiring efforts of the chairperson, University Professorial Inaugural Lecture Committee, Prof. (Dame) Esther Oyeyi and her team is warmly acknowledged and appreciated.

Lastly to my immediate family I am short of words to express my gratitude for your patience and endurance during hard and difficult times. You endured whenever I was away on either study leave, conference/workshop attendance and national assignments. I equally hope that I have not disappointed you in any way in my official engagements. I remain proud of each one of you. May Allah bless us all.

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LIST OF PROFESSORIAL INAUGURAL LECTURE TO DATE

S/N	NAME	DEPT	DATE	TOPIC
1 st	Emmanuel Ajayi Olofin	Geography	4 th March, 1992	The Gains and Pains of Putting a Water Lock on the Face of the Drylands of Nigeria
2 nd	Garba Dahuwa Azare	Education	24 th June, 2000	BASIC CONCERNS: Revitalizing Nigeria's Primary Education in the New Millennium
3 rd	Dajuma Abubakar Maiwada	Education	29 th July, 2000	Improving Teaching and Learning in University Education with Particular Reference to Bayero University, Kano
4 th	Majekodunmi Oladeji Fatope	Chemistry	7 th July, 2001	NATURAL PRODUCTS SCIENCE: Looking Back and Looking Forward
5 th	Muazu Alhaji Zaria Sani	Nigerian Languages	13 th October, 2001	A focus on Some Segmental and Suprasegmental Features in Hausa Phonology
6 th	Isa Hashim	Political Sciences	20 th March, 2004	Planning and Budget Implementation in the Health Sector
7 th	Abdulla Uba Adamu	Education	24 th April, 2004	SUNSET AT DAWN, DARKNESS AT NOON: Reconstructing the Mechanisms of Literacy in indigenous Communities
8 th	Auwalu Hamisu Yadudu	Private and Commercial Law	5 th June, 2004	LAW AS INTERPRETATION: An Exploratory inquiry from Islamic Law Jurisprudence

S/N	NAME	DEPT	DATE	TOPIC
9 th	Mohammed Sanni Abdulkadir	History	31 st July, 2004	STRUCTURING, STRUGGLING AND SURVIVING ECONOMIC DEPRESSION IN NORTHERN NIGERIA: The 1930s As Preview of the present
10 th	Muhammad Sani Sule	Bio-chemistry	23 rd March, 2013	Enzymology and Radiation Biology in the Understanding of Biochemistry
11 th	Essiet Unanaowo Essiet	Agriculture	22 nd May, 2013	AGRICULTURE SUSTAINABILITY IN THE DRYLAND OF NIGERIA: Realities and Prospects
12 th	Aliyu Kamal	English Studies	5 th March, 2014	The Islamic Novel Style and Structure
13 th	Abdu Ahmed Manga	Agriculture	9 th April, 2014	Horticulture as a Panacea for Food Insecurity and Unemployment
14 th	Sa'idu Muhammad Gusau	Nigerian Languages	26 th May, 2014	Wakar Baka Bahaushiya (The Hausa Oral Songs)
15 th	Abdulla Uba Adamu	Mass Communication	9 th July, 2014	IMPERIALISM FROM BELOW: Media Contra-Flows and Emergence of Metro-Sexual Hausa Visual Culture

S/N	NAME	DEPT	DATE	TOPIC
16 th	Ghaji Abubakar Badawi	Library and Information Sciences	29 th July, 2015	THE ROLE OF PUBLIC LIBRARIES AS CENTERS OF INFORMATION TO DISADVANTAGED GROUPS: A 2004 - 2014 Study of the Information Needs of Gada Prostitutes in Dawakin Kudu Local Government Area of Kano State, Nigeria.
17 th	Mohammed Kabir	Community Medicine	16 th September, 2015	Public Health Concern for Chronic Non-Communicable Diseases Surpasses Anxiety Over Most Infections
18 th	T.I. Oyeyi	Biological Sciences	30 th March 2017	Linking Schistosomiasis and Water Resources Development in Kano State Nigeria: Public Health Impact and Mitigation
19 th	Abdulrazaq G. Habib	Medicine	27 th April, 2017	Medicine, Science and Society – The Global Health Imperative
20 th	S. Y. Mudi	Chemistry	6 th July, 2017	Natural Products: Plants as Potential Sources of Drugs
21 st	Sani Ibrahim	Biological Sciences	27 th July, 2017	BETWEEN LIFE AND DEATH: Water Quality and Resource Evaluation - The Place of Hydrobiologists
22 nd	J. Afolabi Falola	Geography	26 th October, 2017	The Poor We Have With Us Always

S/N	NAME	DEPT	DATE	TOPIC
23 rd	Umar G. Danbatta	Electrical Engineering	2 nd November, 2017	GETTING OUT OF THE WOODS: Diversifying Nigeria's Economy Through the Telecommunications Sector
24 th	Adelani W. Tijani	Nursing	23 rd November, 2017	Wholesome Alimentation: Path to Radiant Health
25 th	Juwayriya Badamasiuy	Private and Commercial Law	21 st December, 2017	Uncovering Patriarchy in the Law: Feminist Movement for Re- Interpretation of Islamic Law in Focus.
26 th	Isa Mukhtar	Nigerian Language	25 th January, 2018	STYLISTIC THEORIES AND THE LINGUISTICS OF HAUSA PROSE TEXTS: the (SFL) approach.
27 th	Ganiyu Sokunbi	Physiotherapy	29 th March, 2018	TODAY IT HURTS, TOMORROW IT WORKS: Complimentary and Alternative Therapy for Failed Back Syndrome
28 th	Aminu K. Kurfi	Business Admin. and Entrepreneurship	19 th April, 2018	Micro-finance as an Elixir for Poverty Alleviation and Wealth Creation in Nigeria
29 th	Muhammad S. Khamisu	Arabic	17 th May, 2018	Substitution in Arabic Languages Rules and Types
30 th	Habu Nuhu Aliyu	Pure and Industrial Chemistry	21 st June, 2018	SCHIFF BASES AND THEIR TRANSITION METAL COMPLEXES: The Drug for the Next Generation
31 st	Hashim M. Alhassan	Civil Engineering	19 th July, 2018	EASING THE BURDEN OF TRAVEL: Can Roadway Capacity Modeling Help?
32 nd	Habu Mohammed	Political Science	13 th September, 2018	TUG OF WAR OR ECHO IN THE DARK? Civil Society Organizations (CSOs) and the Fight Against Corruption in the Era of Change Mantra in Nigeria

S/N	NAME	DEPT	DATE	TOPIC
33 rd	Bello Idrith Tijjani	Physics	20 th September, 2018	NAVIGATING THE DATA LABYRINTH: Application of Some Advanced Statistical Analysis in Atmospheric Physics
34 th	Mohammed Ajiya	Electrical Engineering	18 th October, 2018	SEAMLESS GLOBAL CONNECTIVITY AT THE SPEED OF LIGHT: Converting Intrinsic Phenomena in Optical Fibers to Capacity Increase.
35 th	Abdulrahman Abdul Audu	Pure and Industrial Chemistry	25 th October, 2018	MY ACADEMIC VOYAGE IN WATER INTO THE WORLD OF HEAVY METALS
36 th	Ibrahim Rakson Muhammad	Animal Science	21 st February, 2019	FORAGE AND FODDER PRODUCTION IN NIGERIA: Its Sensitivity in Sustainable Ranching.
37 th	Muhammad Bashir Ibrahim	Department of Pure and Industrial Chemistry	14 th March, 2019	WATER POLLUTION AND THE QUEST FOR ITS REMEDIATION: The Natural Resource Option
38 th	Oyerinde O. Oyeseun	Department of Physical and Health Education,	4 th April, 2019	MAN DOES NOT DIE BUT KILLS HIMSELF: The Dilemma of the Health Educator and the Moderating Influence of Health Education
39 th	Danladi Ibrahim Musa	Department of Physical and Health Education	25 th April, 2019	WAGING WAR ON THE DEADLY QUARTET AND ITS COMORBIDITIES: A Physical Activity Panacea
40 th	Kabiru Isa Dandago	Department of Accounting	2 nd May, 2019	THE ACCOUNTING IN HUMANITY KNOWS NO BOUNDS
41 st	Mustapha Hassan Bichi	Department of Civil Engineering	20 th June, 2019	MAN, ENVIRONMENT AND WATER - The <i>Moringa oleifera</i> (Zogale) Intervention

S/N	NAME	DEPT	DATE	TOPIC
42 nd	Mustapha Muktar	<i>Department of Economics</i>	27 th June, 2019	PEOPLE, PLANET AND PROFIT: Peaceful Bed Fellows at the Best of Times But Strange Roommates at Present - The Economist's Approach to a Peaceful and Sustainable Co-Existence
43 rd	Mohammed Atiku Kano	<i>Department of Biochemistry</i>	25 th July, 2019	Serum Lipids and Lipoproteins - A Curse or a Blessing?