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Original Article

KNOWLEDGE OF DIABETES MELLITUS-HIV CO-INFECTION AMONG HEALTH CARE WORKERS IN PRIMARY AND SECONDARY HEALTH FACILITIES IN OSUN STATE, SOUTH WEST NIGERIA

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ABSTRACT

Advent of drug combinations in Highly Active Antiretroviral Therapy (HAART) has been a major achievement in the management of HIV/AIDS. However, some of the drugs involved e.g. protease inhibitors have as side effects metabolic disorders like diabetes mellitus DM and dyslipidemia due to affectation of the pancreas and
other organs.

A cross-sectional study to determine the knowledge of health care workers on DM, HIV and how some of the drugs used in treating HIV infection secondarily cause metabolic disease like DM. Self-administered, pre-tested questionnaires were distributed to 279 health workers from the primary and secondary health care facilities in Osun state attending state wide workshops on GDM organized by Strategy for Improving Diabetes Care in Nigeria (SIDCAIN) team.

Two thirds (66.2%) of the respondents had good knowledge on DM, while about three quarters (76.3%) had good knowledge on HIV. Only about a third (32.4%) of all respondents had good knowledge on effects of drugs management of HIV on DM. Health care providers have poor knowledge of HAART induced DM. Regular update workshops are therefore recommended for such awareness.

Key words: HAART, HIV, DM, Health Care Providers, Knowledge

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INTRODUCTION

About 70% of people living with HIV/AIDS (PLWHA) worldwide are in Sub-Sahara Africa where nearly 30 million individuals with this condition live (WHO 2011). Similarlly, the burden of DM in Sub-Sahara Africa is expected to reach
23.9 Million by 2030 (IDF 2009). Both diseases are responsible for the death of millions of people in Sub-Sahara Africa annually (Mbanya et al. 2010). Therefore, it is imperative to focus attention on proper management of these chronic diseases as well as effective measures so as to stem the tide of the epidemics. In order to achieve these objectives, knowledge of the health care professionals in the sub-region must be up to date at all times as knowledge is power (Adeleke et al. 2014). Advent of drug combinations in highly active anti- retroviral therapy (HAART) has broken a major ground in the western countries and elsewhere in the struggle to reduce the morbidity and mortality that result from human immunodeficiency virus (HIV) infection and AIDS (EL et al. 2001). This has also helped the patients to cope better (improved quality of life) with the challenges posed by this chronic condition. However, administration of these drugs for a prolonged period of time has created another group challenges (such as drug side effects and complications) for the patients and their health care providers (Bakari et al. 2007).

Complications such as bone marrow suppression, dyslipidaemia, peripheral lipodystrophy, insulin resistance and occasionally frank DM have been reported in a number of patients on HAART (Kino et al. 2003 and Carr A et al. 1998). All anti- retroviral drugs have adverse effects, but they are indicated in HIV positive individuals irrespective of CD4 and T lymphocyte counts (Heath et al 2003). Emphasis is now on individualized careful drug selections to minimize both short and long term complications. Among factors influencing anti-retroviral drug action or toxicity are concomitant use of other medications with additive toxicity, co- morbidity and genetics (Saves et al. 2000 and Mallal et al. 2008). The silent implication is that a
good level of knowledge of health care providers is imperative in other not to swell further the population of people living with diabetes mellitus in Sub-Sahara Africa as a consequence of inappropriate use of HAART.

One of the objectives of antiretroviral therapy is to reduce the rate of viral replications while giving the patient's immune system some time to readjust and respond to the disease. The group of drugs used in HAART include the Nucleosides, Non- nucleosides and the Protease Inhibitors. The protease inhibitors have been particularly implicated in the development of hyperlipidaemia, insulin resistance and DM (Carr et al. 1998, Justman et al. 2003 and Brown et al. 2005). Detailed pathogenesis may not be fully understood, but it involved specific organ mitochondria injuries, and damage to the pancreas and the liver (Heath et al. 2003). Also in a Swiss HIV cohort study, HAART regimens containing protease inhibitors were found to predispose to the development of type 2 Diabetes Mellitus (Bruno et al. 2007)

In 2007 a case of Diabetes Mellitus induced by HAART in 48 years old male Nigerian who has been on anti-retroviral drugs for five years including six months of HAART was reported (Bakari, et al.
2007). The patient responded to Insulin therapy and modification of HAART. Nigeria has more than half a million people on anti-retroviral therapy (ART), Physicians managing these patients need to be aware of such complications in order to carefully select the drug combinations to prevent DM and to make early diagnosis whenever a patient developed such complication.

The main objective of the study was to assess the knowledge of diabetes mellitus(DM) and

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Human immunodeficiency virus (HIV) - coinfection and the aetiological role of HAART among health care workers in primary and secondary health facilities in Osun state, south west Nigeria.
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We assessed the basic knowledge of DM and HIV among different categories of health care Providers. To determine their knowledge of HAART induced DM among HIV positive patients

MATERIALS AND METHODS

This was a cross-sectional study that intended to determine the knowledge of health care workers on DM, HIV and how some of the drugs used in treating HIV infection can cause DM.

The study employed the use of self-administered pre-tested questionnaires which were distributed to health workers from the primary and secondary health care facilities in Osun state attending state wide workshops on GDM organised by Strategy for Improving Diabetes Care in Nigeria (SIDCAIN) team.

Participants were drawn from the 9 General Hospitals, 44 Comprehensive Health Centres and the Primary Health Centres in the state. Three training sessions were held in each of the 3 senatorial districts in the state spread across 9 major towns.

The categories of health care workers included Medical doctors – Health care professionals that possess at least the basic qualification of MBBS or the equivalent registered by the Medical and Dental Council of Nigeria; Nurses/Midwives – Health care professionals with certificates registered by the Nursing Council of Nigeria. Also included were Pharmacists, Medical laboratory scientists and Community health extension workers (CHEW).

Section A of the questionnaire contained the demographic data of the respondents. Sections B and C addressed basic knowledge on DM and HIV respectively while Section D was on how drug therapy of HIV causes DM. The questionnaires were distributed and filled on the last days of the trainings.

Ethical approval was sought and obtained from the College of Health Sciences, Health Research and Ethics Committee of the Osun State University. Confidentiality of information and respondents identities were assured and maintained throughout the study.

Data Management

Generated data were analysed using the SPSS version 17.0 software. Frequency and percentage tables were drawn where appropriate. Outcome measures were tested for significance with a p- value less than 0.05 considered significant
Each correct knowledge question was assigned a score of 1 while incorrect answers were awarded 0, thus a maximum score of 15 was obtainable for Section B (Knowledge on DM) with the least score being 0. Corresponding scores for Section C (knowledge on HIV) and Section D (HIV/DM management) were 12 and 0 and 13 and 0 respectively. For each section, respondents who had up to 50% of the scores were classified as having good knowledge while those who scored below were classified as having poor knowledge.

RESULTS

A total of 219 respondents took part in the study. One hundred and seventy nine, 179 (81.7%) were females and 122 (55.7%) aged 40 years and above while the rest 44.3% were below 40 years. Almost half (48.4%) of the Health Care Providers (HCP) were Nurses and/or midwives, 29.7% were Community Health Extension Workers (CHEWs),
13.7% were Doctors, 4.6% were Pharmacists and

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3.7% were Laboratory Scientists. Almost two thirds (63.5%) of the respondents (HCP) practiced in urban areas and the remaining 36.5% in rural areas. In terms of Health Care Facility Practice level, 51.6% of the HCP practiced at the Primary level of care and 30.6% at the secondary level of care while 17.8% practiced at private hospitals. With regards to duration of practice, 43.8% of the HCP had practiced for 10 years or less, while 24.2% had practiced for between 11-20 years and 32% had practiced for upwards of 21 years (Table 1).

Table 1: Socio-demographic characteristics of respondents

VARIABLE	Frequency	Percentage n=219
AGE GROUP		
Below Middle age (22-39	97	44.3
Middle Age (40-60 yrs)	122	55.7
SEX		
Male	40	18.3
Female	179	81.7
LOCATION OF PRACTICE		
Urban	139	63.5
Rural	80	36.5
HEALTH CARE PROVIDER (HCP) PROFESSIONAL GROUP		
Doctors	30	13.7
Nurses/ Midwives	106	48.4
Pharmacists	10	4.6
Laboratory	8	3.7 scientists
CHEWs	65	29.7 others
HEALTH CARE FACILITY PRACTICE LEVEL		
Primary	113	51.6
Secondary	67	30.6
Private	39	17.8
DURATION OF PRACTICE		
≤ 10 years	96	43.8
11-20 years	53	24.2
21-35 years	70	32.0

** Others- Medical Record Officers especially.

Overall, two thirds (66.2%) of the HCP respondents had good knowledge on DM, while about three quarters (76.3%) had good knowledge on HIV. Only about a third (32.4%) of all respondents had good knowledge on effects of Management of HIV on DM (Fig1).

Figure 1: Knowledge on Diabetes, HIV and effects of Management of HIV on DM

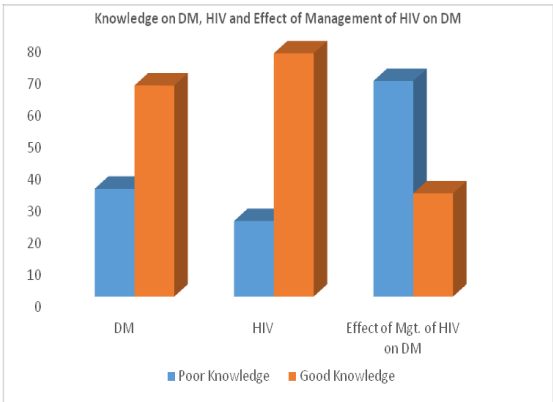

Table 2 shows that when the socio-demographic characteristics and knowledge of respondents on DM were compared there was a statistically significant difference {P=0.002} among the HCPs' various professional groups with all the eight Laboratory scientists having good knowledge followed by 86.7% of Doctors. Similar figures for others were- Pharmacists (70.0%), Nurses/Midwives-65.1%, while CHEWs and others had the lowest proportion of those who had good knowledge with 53.8%. There were also statistically significant differences for the variables sex, and duration of practice with males and those who have practised for 10 years or less having higher proportions of those who had good knowledge compared to females and those who had worked for more than 10 years respectively.

There were no statistically significant differences for the variables age group, location and level of practice on the knowledge of DM.

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Table 2: Comparison of socio-demographic characteristics and knowledge of respondents on DM

VARIABLE		KNOWLEDGE CATEGORY		Total per Variable. N=193	Remark
		Poor (%)	Good (%)		
Sex	Male	7(17.5)	33(82.5)	40(100.0)	df= 1 χ2 =5.805 p= 0.016*
	Female	67(37.4)	112(62.6)	179(100.0)	
Age Group	Below Middle age	26(26.8)	71(73.2)	97(100.0)	df= 1 χ2 = 3.798 p=0.051
	Middle Age & above	48(39.3)	74(60.7)	122(100.0)	
HCP Professional Group	Doctors	4(13.3)	26(86.7)	30(100.0)	df= 4 χ2 = 17.523** p=0.002*
	Nurses/ Midwives	37(34.9)	69(65.1)	106(100.0)	
	Pharmacists	3(30.0)	7(70.0)	10(100.0)	
	Laboratory scientists	0(0.0)	8(100.0)	8(100.0)	
	CHEWs, others	30(46.2)	35(53.8)	65(100.0)	
Level of Practice	Primary	42(37.2)	71(62.8)	113(100.0)	df= 2 χ2 = 1.299 p=0.522
	Secondary	21(31.3)	46(68.7)	67(100.0)	
	Private	11(28.2)	28(71.8)	39(100.0)	
Duration of practice	10 years& below	23(24.0)	73(76.0)	96(100.0)	df= 2 χ2 = 7.963 p=0.019*
	11-20 years	20(37.7)	33(62.3)	53(100.0)	
	21-35 years	31(44.3)	39(55.7)	70(100.0)	
Location of Practice	Urban	43(30.9)	96(69.1)	139(100.0)	df= 1 χ2 = 1.386 p=0.239
	Rural	31(38.8)	49(61.3)	80(100.0)	

* Statistically significant at P< 0.05 ** - Likelihood ratio value used because at least one cell has an expected value of less than <5.

Table 3 shows that when the socio-demographic characteristics and knowledge of respondents on HIV were compared there was a statistically significant difference {P=0.024} among the HCPs' various professional groups with 90.0% of Doctors and Pharmacists having good knowledge Similar figures for others were- Nurses/Midwives-79.2%, Laboratory scientists- 75.0% while CHEWs and others had the lowest proportion of those who had good knowledge with 63.1%. There were no statistically significant differences for all other variables sex, age group, location, level and duration of practice on the knowledge of HIV.

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Table 3: Comparison of socio-demographic characteristics and knowledge of respondents on HIV

VARIABLE		KNOWLEDGE CATEGORY		Total per Variable. N=193	Remark
		Poor (%)	Good (%)		
Sex	Male	5 (12.5)	35 (87.5)	40(100.0)	df= 1 χ^2 = 3.417 p= 0.065
	Female	47 (26.3)	132 (73.7)	179 (100.0)	
Age Group	Below Middle age	23(23.7)	74 (76.3)	97(100.0)	df=1 χ^2 = 0.000 p=0.992
	MiddleAge& above	29 (23.8)	93 (76.2)	122 (100.0)	
HCP Professional Group	Doctors	3 (10.0)	27 (90.0)	30 (100.0)	df= 4 χ^2 = 11.193** p=0.024*
	Nurses/ Midwives	22 (20.8)	84 (79.2)	106 (100.0)	
	Pharmacists	1 (10.0)	9 (90.0)	10 (100.0)	
	Laboratory scientists	2 (25.0)	6 (75.0)	8 (100.0)	
	CHEWs, others	24 (36.9)	41(63.1)	65 (100.0)	
Level of Practice	Primary	31 (27.4)	82 (72.6)	113 (100.0)	df= 2 χ^2 = 1.772 p=0.412
	Secondary	13 (19.4)	54 (80.6)	67 (100.0)	
	Private	8 (20.5)	31 (79.5)	39 (100.0)	
Duration of practice	10 years& below	21 (21.9)	75 (78.1)	96 (100.0)	df= 2 χ^2 = 0.824 p=0.662
	11-20 years	15 (28.3)	38 (71.7)	53 (100.0)	
	21-35 years	16 (22.9)	54 (77.1)	70 (100.0)	
Location of Practice	Urban	32 (23.0)	107 (77.0)	139 (100.0)	df= 1 χ^2 = 0.110 p=0.740
	Rural	20 (25.0)	60 (75.0)	80 (100.0)	

* Statistically significant at P< 0.05 ** - Likelihood ratio value used because at least one cell has an expected value of less than <5.

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Table 4 shows that when the socio-demographic characteristics and knowledge of respondents on effects of Management of HIV on DM were compared there was a statistically significant difference {P=0.001} among the HCPs' various professional groups with 62.5% of Laboratory scientists having good knowledge followed by 60.0% of Doctors. Similar figures for others were- Pharmacists (50.0%), Nurses/Midwives-26.4%, while CHEWs and others had the lowest proportion of those who had good knowledge with 23.1%. There were also statistically significant differences for the variables sex, age group, location and duration of practice with males, those below 40 years, those located in urban areas and those who have practiced for 10 years or less having higher proportions of those who had good knowledge compared to females, those 40 years and above (middle age),those located in rural areas and those who had worked for more than 10 years respectively.

There was no statistically significant difference for the variable level of practice on the knowledge of effects of Management of HIV on DM

Table 4: Comparison of socio-demographic and other characteristics and knowledge of respondents on effects of Management of HIV on DM

VARIABLE		KNOWLEDGE CATEGORY		Total per Variable. N=193	Remark
		Poor (%)	Good (%)		
Sex	Male	19(47.5)	21(52.5)	40(100.0)	df= 1
	Female	129(72.1)	50(27.9)	179(100.0)	$\chi2$ = 9.006* p= 0.003*
Age Group	Below Middle age	55(56.7)	42(43.3)	97(100.0)	df= 1
	MiddleAge& above	93 (76.2)	29(23.8)	122(100.0)	$\chi2$ =9.406 p=0.002*
HCP Professional Group	Doctors	12(40.0)	18(60.0)	30(100.0)	df= 4
	Nurses/ Midwives	78(73.6)	28(26.4)	106(100.0)	$\chi2$ = 18.484** p=0.001*
	Pharmacists	5(50.0)	5(50.0)	10(100.0)	
	Laboratory scientists	3 (37.5)	5(62.5)	8(100.0)	
	CHEWs, others	50(76.9)	15(23.1)	65(100.0)	
Level of Practice	Primary	83(73.5)	30(26.5)	113(100.0)	df= 2
	Secondary	41(61.2)	26(38.8)	67(100.0)	$\chi2$ =3.675 p=0.159
	Private	24(61.5)	15(38.5)	39(100.0)	
Duration of practice	10 years& below	57(59.4)	39(40.6)	96(100.0)	df= 2
	11-20 years	35(66.0)	18(34.0)	53(100.0)	$\chi2$ = 7.936 p=0.019*
	21-35 years	56(80.0)	14(20.0)	70(100.0)	
Location of Practice	Urban	83(59.7)	56(40.3)	139(100.0)	df= 1
	Rural	65(81.2)	15(18.8)	80(100.0)	$\chi2$ = 10.751 p=0.001*

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DISCUSSION

There is a dearth of works that considered the knowledge of the effect of HIV disease treatment on the incidence of diabetes mellitus either within a particular group of health workers e.g. Doctors, Nurses or among the various categories of health care providers.

In this study, about two thirds of respondents had good knowledge on DM and over three quarters had good knowledge on HIV disease, meaning that a majority of them fared well separately on DM and HIV disease. However, less than a third of them scored good knowledge on the effect of HIV disease treatment on DM. This showed that a good majority of them didn't appreciate the role HIV treatment could play in secondarily making patients with unguided chemotherapy develop DM. Studies have been carried out that showed that antiretroviral therapy especially prolonged use of Protease Inhibitors in HIV disease patients could increase their susceptibility to type 2 DM (Christine A Hughes et al 2005 and Andeel A. Butt et al 2009). In one such study, it was made known that prolonged use of ARV drugs generally could increase the incidence of DM in these patients (Shrestha M et al
2015). The implication is that, patients should be selected in the choices of HAART regimen they would be treated with. In the same vein, pre-existing DM should be ruled out so as to discern in
the event of occurrence of DM, whether it predated the commencement of HAART or not. Management algorithms for HIV under certain medical conditions could be helpful so as to know the parameters to be weary of when treating HIV/AIDS patients.

Concerning knowledge of respondents on DM, all the health workers were found to have good knowledge with all the Laboratory Scientists taking a significant lead (P<0,05) closely followed by the Doctors with over 85% of them also having a good knowledge. This may not be surprising if one considers the fact that Laboratory Scientists play crucial role in making the diagnosis of
uncomplicated DM many times. The CHEWs and others out of whom 53.8% had good knowledge occupied the lowest level. Our work is in contrast with other closely related studies in which health care workers including Physicians were found to possess inadequate knowledge. In one such study over three quarters of pharmacy personnel were found to have a poor knowledge on diabetes mellitus management despite the fact that the majority of patients consult with them more than the physicians (Jinqi M, Nansseu JR, Noubiap JJ 2015). Also, from a recent study in Cameroon, Physicians' knowledge towards diabetes evaluation and management was found not to be optimal (Ruud KW, Srinivas SC, Toverud EL 2014). This trend poses a great danger considering the silent nature of DM and also hypertension at their initial stages.

Though no study had evaluated DM knowledge of health care workers as regards sex of personnel and duration of practice, we found in our study that male personnel and those who had practised for 10 or more years significantly occupied greater percentages among those having good knowledge. The additional pressure from home management could affect the women while many times duration of practice could positively affect knowledge, though with negligence and failure to update the reverse may be the case.

Concerning the knowledge of respondents on HIV, all the health workers in this study again were found to have good knowledge with the Doctors taking the lead with 90% of them exhibiting good knowledge and CHEWs and others just like for DM scored the least though about 63 % of them also had good knowledge. In a study done in South Africa evaluating the knowledge of health care providers on HIV and its treatment, Nurses and Auxiliary staff were found to have some basic knowledge about

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symptoms and mode of transmission of HIV, but great uncertainty was seen regarding treatment with ARV drugs. As much as 39% of the Nurses claimed that nutritious food could also treat HIV disease (Ruud KW, Srinivas SC, Toverud EL 2014). No doubt, good diet is necessary so as to respond to treatment and to supply the minerals that help immunity to build, but treating an ailment that has a causation factor entails either the removal, incapacitation or slowing the replication of such factor as the case may be.

CONCLUSION

Respondents in this survey demonstrated good level of knowledge of MD and HIV, but poor awareness of HAART induced metabolic disorder. For health care providers to offer the best treatment options to their patients, they must possess good knowledge of the diseases and must be aware of the short and long term effects of the treatment options including medications they chased.

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Conflict of Interest:

None declared

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By the authors

Contributions by Authors

Dr Farinloye – Conceptualisation, Methodology, Data Collection, Discussion
Dr Adeleke – Introduction, Data Collection, Abstract
Dr Adebimpe – Result, Data Analysis
Dr Abiodun – Data Collection

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