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Full Length Research Paper

Human immunodeficiency virus and hepatitis B virus (HIV/HBV) co-infection in people living with HIV/AIDs identified in Yaoundé Central Hospital, Cameroon: Seroprevalence and impact on the disease progression

Djuidje Ngounoue Marceline[1,2]*, Ambassa Axel Cyriaque[1], Guiateu Tamo Ida Marlene[1] and Moundipa Fewou Paul[1]

[1]Department of Biochemistry, Faculty of Science, University of Yaoundé I, Cameroon.
[2]Ethics Committee on Health Research in Central Africa (CERSAC), Cameroon.

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Co-infection with HIV and hepatitis B virus (HBV) has become an important factor of co-morbidity and mortality. The aim of this study was to determine the seroprevalence of HIV/HBV co-infection and its effect on the disease progression in people living with HIV/AIDS identified in Yaoundé Central Hospital. Blood samples from 75 HIV positive patients were collected in Yaoundé Central Hospital from November 2015 to February 2016, for the determination of hepatitis B virus surface antigen (HBsAg) using immunoassays. Cluster of differentiation 4 (CD4) T-cells count and biochemical markers of liver function were also collected and analyzed. The socio-demographic data were also collected. The effect sizes were confirmed using G*Power version 3.1.9.2 software. The data were entered and analyzed using the SPSS Version 22.1 software. The statistical tests performed were x2, and Pearson correlation, with significant difference at the threshold p ≤ 0.05. Hepatitis B virus surface antigen (HBsAg) was identified in 12 patients out of 75 HIV-positive patients, for a HIV/HBV co-infection prevalence of 16%. The co-infection rate was higher in women 9 (12%) than in men 3 (4%). Among HIV infected patients, a negative and significant correlation was observed between CD4 count and ALT activity, and between the concentration of conjugated bilirubin and the activity of alkaline phosphatase (ALP) p≤ 0.05. The prevalence of HIV/HBV co-infection is higher among HIV positive patients in the Yaoundé Central Hospital. HIV associated with HBV plays a role in the disease progression. Consequently, it is important that a national management programme is in place in the country to monitor the incidence and morbidity rates of these affections.

Key words: Co-infection, seroprevalence, hepatitis B virus (HBV), human immunodeficiency virus (HIV), Cluster of differentiation 4 (CD4) T-cells, liver enzymes, disease progression.

INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) due to human immunodeficiency virus (HIV) is a major threat to the development of resources-limited countries. It is a poverty related disease that has destroyed many lives and contributed to maintain poverty. Sub-Saharan Africa with only 13% of the world population is the hardest hit

region, home to nearly 70% of people living with HIV/AIDS worldwide. In 2015, there were 36.7 million people living with HIV, with about 2.1 million new infections (UNAIDS, 2016). Western and Central Africa is home to 18% of these infections, right after the Eastern and Southern Africa (UNAIDS, 2016). Cameroon remains in a situation of generalized epidemics for HIV, with a seroprevalence of 4.3% in adults aged 15 to 49 years (National Institute of Statistics, 2011).

Essentially, the effectiveness of highly active antiretroviral therapy (HAART) in improving the quality and lifespan of HIV patients has revolutionized the field of HIV. However, co-infections with viruses like hepatitis B virus (HBV) appear to compromise the benefits of efficient antiretroviral drugs by increasing the morbidity and mortality in HIV-infected populations. HIV and HBV are blood-borne pathogens, and because of their shared modes of transmission, people at risk for HIV infection are also at risk for HBV infection (WHO, 2016). Cameroon is in an endemic area for HBV where HBV infection in the general population accounts for 12%, with high prevalence in the younger population (Noah et al., 2011; Njouom and Tejiokem, 2016). HIV-HBV co-infection would not be without impact on the progression of AIDS, and despite advances on HBV prevention, an affordable and widely accessible mean to eradicate HBV infection worldwide is still needed. Furthermore, HIV infection alters the natural history of HBV and accelerates the progression to chronic hepatitis, resulting in the complication of the patient's condition and leading to progressive deterioration of several vital organs specifically the liver; hence the abnormal level of the liver enzymes like alanine aminotransferase in the blood stream (Dieterich, 2007). Managing extremely such co-infections is therefore compulsory in people affected, and the effectiveness of antiretroviral treatment is contingent.

The identification of co-infected individuals is thus a critical step. Previous studies in sub-Saharan Africa showed that HBV infection prevalence among HIV positive people varies from one region to another: from 17.5% in a hospital setting in Dar Es Salaam, Tanzania (Nagu et al., 2008), 17% in Northern Uganda (Ochola et al., 2013), 12.8% in the North-Eastern Nigeria (Obi et al., 2012), 12.6% in the North-West region of Cameroon (Zoufaly et al., 2012), to 12.2% in The Gambia (Jobarteh et al., 2010). However, in many setting, the dual infection HIV and Hepatitis B virus still goes unnoticed due to the lack of diagnostic means: The spread of this co-infection is rapid while diagnostics means are still deficient. In addition, studies targeting determinants of HIV-HBV co-infection remain unsatisfactory. Given the high prevalence of HIV/HBV co-infection in the different African regions, it might be hypothesize that the infection rate of hepatitis B is higher among people living with HIV/AIDS in Cameroon, the most at risk population. Consequently, more data linking the seroprevalence of co-infection to the disease progression are needed for the management strategy in care hospitals.

In order to contribute to this management process, the purpose of this study was to investigate the seroprevalence of HIV/HCV co-infection and its impact on the disease progression in people living with HIV/AIDS Identified in Yaoundé Central Hospital, a tertiary level teaching hospital in Cameroon. Specifically, it was to determine the seroprevalence of HIV/HBV co-infection, to examine correlations between the biochemical liver markers and CD4-T cell count, and to scrutinize other risk factors associated to the co-infection.

MATERIALS AND METHODS

Biological material (serum, plasma) as well as laboratory equipment, reagents and consumable were used in this study.

Study design, period and population

This was a prospective and analytical study carried out in Yaoundé Central Hospital from November 2015 to February 2016. The study population consisted of patients in consultation and observation in the Yaoundé Day Care Central Hospital. A total of 75 HIV-positive patients were enrolled. Plasma and serum were obtained from the collected blood and directly analyzed, or stored at -20°C for subsequent analyses.

Inclusion and exclusion criteria

Participants in this study were aged 21 to 49 regardless of gender, ethnicity or tribe. The volunteers' participants who agreed to sign an informed consent form after being informed of the nature, the procedure of the study, the potential benefits and the foreseeable risks, were recruited. Patients with history of jaundice were excluded from this study.

Data collection procedure and laboratory analyses

To address confidentiality issue, an identification code without key was assigned to each patient for laboratory analyses, data entry and data analysis. Blood samples were collected under aseptic conditions, in both EDTA and dry tubes. Plasma and serum were separated by a low speed centrifugation at 1500 rpm for 5 min; two aliquots were made for subsequent use, and stored frozen at -20°C until tested. The first aliquot (plasma) was used to test the serology of Hepatitis B virus surface antigen (HBsAg) using the immuno-chromatographic method. The HBsAg serology was confirmed using enzyme linked immunosorbent assay (ELISA). The second aliquot (serum) was used to determine the activity of liver enzymes alanine aminotransferase (ALT), aspartate aminotransferase (AST) and alkaline phosphatase (ALP) using enzyme kinetic method, as

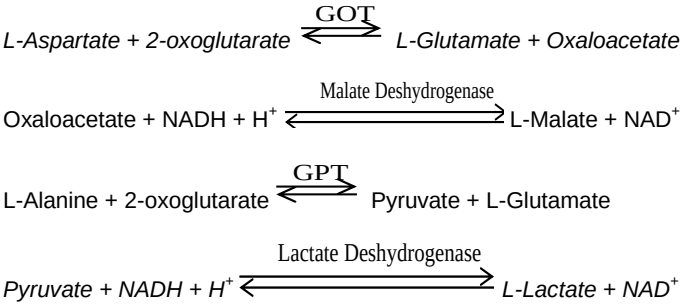
*Corresponding author. E-mail: djngmarceau@yahoo.fr.

Table 1. Distribution of HIV infection within age groups and sex.

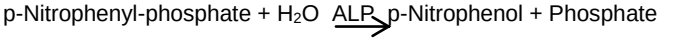
Age group (year)	Female	Male	Total
21 - 25	5[a](6.66%[b])	0 (0%)	5 (6.66%)
26 - 30	16 (21.33%)	1 (1.33%)	17 (22.66%)
31 - 35	15 (20%)	5 (6.66%)	20 (26.66%)
36 - 40	9 (12%)	2 (2.66%)	12 (16%)
41 - 45	7 (9.34%)	5 (6.66%)	10 (13.33%)
45 - 49	8 (10.76%)	2 (2.66%)	10 (13.33%)
Total	60 (75%)	15 (25%)	75 (100%)

a, size; b, percentage.

well as the serum concentration of conjugated or direct bilirubin (CB). Kinetic method for the determination of AST and ALT activities was performed according to the recommendations of the Expert Panel of the International Federation of Clinical Chemistry (IFCC), without pyridoxal-phosphate activation.
The principle is based on the following reactions:



ALP activity was determined using kinetic photometric test according to the International Federation of Clinical Chemistry and laboratory Medicine, based on the following reaction:



The serum concentration of bilirubin was determined using the colorimetric method. CD4 T-cells count results were also collected and analyzed.

Data preparation and analysis

The effective size for this study was computed using G*Power version 3.1.9.2 software, with post-hoc as type of power analysis. Data obtained were subsequently entered, cleaned and analyzed using the statistical package for social sciences (SPSS) software (version 22.1). Mean, frequencies and percentages were used to summarize descriptive statistics of the data. Chi-square (x2) test was used to assess relationships between selected and/or qualitative variables namely gender, sex, marital status, level of education and occupation. Pearson correlation was used to determine the relationship between the biochemical parameters and CD4 cells count. The significant difference was set at the threshold $p \leq 0.05$.

RESULTS

The effect size for this study was computed using G*Power version 3.1.9.2 software (Faul et al., 2007, 2009), with post-hoc as type of power analysis. The sample size (N=75) was in conformity with the effect size, 0.3 with x2 test, and 0.6 with the Pearson correlation. In this study, 75 HIV positive patients among other 15 (20%) men and 60 (80%) women were recruited. The average age was 36 years. The sex ratio male: female was 1:4. 60 (78. 65%) patients were aged between 26 and 45 (Table 1).

Seroprevalence of HIV/HBV co-infection and socio-demographic characteristics

The seroprevalence of HIV/HBV co-infection was 16%, the rate of co-infection was higher in female (12%) compared to male (4%), $p \leq 0.05$. The average age was 34 years. The co-infection rate was higher in single (9.33%), compared to married and widowed populations. The co-infection rate was higher in patients with higher level of education (10.66%). In addition, this co-infection rate was higher in daily labor workers (10.56%), compared to servants and patients who were jobless (Table 2).

CD4 count analysis

The mean CD4 count in HIV mono-infected patients were 336.32±239.31 cells/mm^3 (with a minimum and a maximum CD4 count of 12 and 1355 cells/mm^3 respectively), whereas the mean CD4 count in HIV/HBV co-infected were 353.08±229.30 cells/mm^3 (with a minimum and maximum CD4 count of 73 and 753 cells/mm^3 respectively). However, the difference was not statically significant (Table 3).

Correlation between different parameters and disease progression

The (bivariate) correlation was investigated between parameters. In HIV mono- infected patients, Pearson correlation showed a negative and significant correlation between ALT activity and CD4 count ($r = -0.238$; $p =$

Table 2. Socio-demographic characteristics among HIV mono-infected and HIV/HBV co-infected patients.

Characteristics	Group		Total
	Co-infected	Mono-infected	
Sex			
Male	3[a] (4%[b])	12 (16%)	15 (20%)
Female	9 (12%)	51 (68%)	60 (80%)
Total	12 (16%)	63 (84%)	75 (100%)
Marital status			
Single	7 (9.33%)	36 (48%)	43 (57.33%)
Married	5 (6.6%)	19 (25.34%)	24 (32%)
Widowed	0 (0%)	3 (4%)	3 (4%)
Total	12 (16%)	63 (84%)	75 (100%)
Education			
Illiterate	0[a] (0%[b])	3 (4%)	3 (4%)
Elementary	0 (0%)	13 (17.33%)	13 (17.33%)
High school	8 (10.66%)	38 (50.66%)	46 (61.33%)
Certificate and above	4 (5.34%)	9 (12%)	13 (17.33%)
Total	12 (16%)	63 (84%)	75 (100%)
Occupation			
Servants	4[a] (5.34%[b])	4 (5.34%)	8 (10.56%)
Daily laborers	8 (10.56%)	38 (50.66%)	46 (61.33%)
Unemployed	0 (0%)	21 (28%)	21 (28%)
Total	12 (16 %)	63 (84 %)	75 (100 %)

a, size; b, percentage.

Table 3. Mean of biochemical parameters and CD4 count, and their association with HIV mono-infection and HIV/HBV co-infection.

Type of infection	HIV mono-infection	HIV/HBV co-infection	P value
Effectif	63 (84.0%)	12 (16.0%)	X^2 = 34.68 (P < 0.0001*)
AST (Iu/L)	28.20±16.06	28.74±16.84	P = 0.924
ALT (Iu/L)	20.61±17.38	36.10±45.55	P = 0.050*
ALP (Iu/L)	100.63±48.99	92.51±25.91	P = 0.607
CB (mg/dL)	0.014±0.011	0.018±0.016	P = 0.269
CD4 count/mm^3	336.32±239.31	353.08±229.30	P = 0.818

CD4 = Cluster of differentiation 4.

0.049) at the threshold 0.05. In HIV-HBV co-infected patients, negative and significant correlation was observed between conjugated bilirubin and alkaline phosphatase APL (r = -0.749; p = 0.005) at the threshold 0.01 (Table 4).

DISCUSSION

This study investigated the seroprevalence of Human immunodeficiency virus and hepatitis B virus (HIV/HBV) co-infection and effect on the disease progression in people living with HIV/AIDS identified in Yaoundé Central Hospital, Cameroon. In this study, HIV-HBV co-infection rate was 16%, which is higher compared to results obtained by previous authors, 12.5 and 12.6% respectively among HIV-1 infected Cameroonian adults initiating antiretroviral therapy in Cameroon (Zoufaly et al., 2012; Laurent et al., 2010). Also, this seroprevalence is higher compared to results in the general population. In Cameroon, HBV infection in the general population accounts for about 12%. However, the prevalence of HBV is lower in the elder populations. HBV prevalence is about 13% in people under 45 years of age, and between 8 to 9% in people above 45 years (Noah et al., 2011; Njouom ad Tejiokam, 2016). The prevalence in the present study is comparable to 16.8% obtained in studies from Senegal (Diop-Ndiaye), and from Uganda

Table 4. Correlation between biochemical liver markers and CD4 count among HIV mono-infected and HIV/HBV co-infected patients.

Parameter		AST	ALT	ALP	CB	CD4
CD4 mono-infected	Pearson correlation	-0.232	-0.238*	0.032	0.008	
	p	0.055	0.049	0.793	0.947	
	N	60	60	60	60	
CB co-infected	Pearson correlation	-0.144	-0.031	-0.749**		
	p	0.656	0.925	0.005		
	N	12	12	12	12	

** Significant correlation at the threshold 0.01; * Significant correlation at the threshold 0.05; ALT: Alanine amino transaminase; **AST**: Aspartate amino transaminase; **ALP**: Alkaline Phosphatase **CB** = conjugated Bilirubin; **CD4** = Cluster of differentiation 4.

(Ochola et al., 2013). It is however lower, compared to 19% reported in Northwest Ethiopia (Yoannes et al., 2014) and 20.4% reported in Malawi (Nyirenda et al., 2008). In the present study, the prevalence of co-infection was higher in women than in men (12 vs 4%) and the difference was statistically significant (P = 0.05). This finding is similar to studies from Uganda. This trend can be explained on the basis of higher rate of sexual promiscuity as well as the anatomy of the female genital organs that are most vulnerable. The mucous membrane surface during sexual act is bigger than that of man. In addition, virus concentration in sperm is higher compared to the vaginal secretions. Actually, a multitude of factors increase women's vulnerability to HIV acquirement, including biological, behavioral, socio-economic, cultural and structural risks (Mabala, 2006; Gita and Brodie, 2013). In the present study, the sex ratio male: female was 1:4. This result is in accordance with the UNAIDS epidemics update, 2016. In fact, women represent more than half of all adults with HIV worldwide, and HIV is the leading cause of death among women of reproductive age. Gender inequalities, differential access to service, and sexual violence are all hallmarks of women's vulnerability to HIV (UNAIDS, 2016).

In this study, there was no statistically significant difference between mean CD4 count in HIV mono-infected and HIV-HBV co-infected study participants. However, HIV-HBV co-infected participants in this study had a mean CD4 count (353.08±229.30 cells/mm^3) that differs for mean CD4 count of 141.6 cells/mm^3 and 121 cells/mm^3 in South African and Nigerian studies respectively (Odenyo et al., 2000; Olufemi et al., 2009). The minimum and maximum CD4 count were 73 and 753 cells/mm^3, respectively. These different results might be due to the differences in the immune status of the individuals and/or to the fact participants in the present study were newly identified with current history of HIV infection. ALT activity was significantly higher among HIV/HBV co-infected participants compared to HIV mono-infected ones. This is in agreement with findings resulting from other investigations in Cameroon and worldwide in which high level of ALT was reported (Zoufaly et al., 2012; Zhou et al., 2007). The ALT is found in serum and in various bodily tissues, but high level in the serum is most commonly associated with the liver damage (e.g. cytolysis). It has already been demonstrated that high ALT serum level activity principally reflects direct hepatocellular damage or liver dysfunction (Pratt and Kaplan, 2000). Consequently, both HIV and HBV create pressure on liver, leading to elevation of liver transaminase, alanine amino-transferase.

In the present study, no significant correlation was observed between different parameters among co-infected patients; though a significant and negative correlation at the threshold 0.05 was observed between CD4 T-cells and ALT in HIV mono-infected patients. Some HIV mono-infected patients had a rate of CD4 ≤200 cells/mm^3 (34%), and the minimum and maximum CD4 count values were 12 and 1355 cells/mm^3, respectively. In these patients, CD4 T-cells decrease while ALT activity increases.

Overall, based on the present findings, there is a critical need for management of HIV-HBV co-infections in Cameroon, in people living with HIV as well as in people from hepato-gastroenterology clinics. In 2013, it clearly appeared in the WHO Global policy report on the prevention and control of viral hepatitis that there is no written national strategy or plan that focuses on the prevention and control of viral hepatitis in Cameroon, as in other sub-Saharan African countries (WHO Global policy report, 2013). Four years after the remarks, these written strategies is an urgent need following the new policies currently launched in the Country.

Conclusions

This study has pointed out that the prevalence of hepatitis B virus surface antigen (HBsAg) is significant amongst HIV positive patients identified in the study's site, 16%. The co-infection rate is higher among women (12%) compared to men (4%). No significant increase in liver parameters was observed in HIV mono-infected patients. A negative and significant correlation was

observed between CD4 and alanine amino-transferase (ALT) activity, as well as between conjugated bilirubin and alkaline phosphatase (ALP) activity at the threshold 0.05. These results are without doubt useful in the management of hepatitis B virus in people with HIV/AIDS. Future investigation of hepatitis chronic carriers is required in the follow-up of patients.

RECOMMENDATIONS

Based on the research findings, a national management and active surveillance program for HIV and hepatitis co-infections is essential in the country, as a critical step to reduce the incidence and morbidity rates of these affections. The new policies shall integrate and consider viral hepatitis as serious as HIV infection.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study received an ethical clearance from the Cameroon National Research Ethics Committee for Human Health N° 2015/11/665/CNERSH/SP. In addition, informed consent of participants was obtained prior to their enrollment.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests with regard to this work.

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Full Length Research Paper

Towards a model for inputs evaluation for workplace HIV/AIDS IEC programme based on process evaluation theoretical framework

Umunnakwe, Anselm. C. R[1*], Grand, Balulwami[1], Moahi Kgomotso[1] and Umunnakwe Gertrude C.[2]

[1]Department of Library and Information Studies, University of Botswana, Gaborone, Botswana.
[2]Federal University of Technology, Owerri, Nigeria.

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The need for an appropriate evaluation model with respect to workplace HIV/AIDS information, education and communication (IEC) programme implementation necessitated this study. The study adopted the documentary research method. The documents review relied to a large extent on documents from the ILO, the Botswana governments' National Strategic Framework on HIV/AIDS and the Botswana Revised National policy on HIV and AIDS. Besides, the study also consulted other empirical literatures from electronic databases. These covered books, academic journals, official publications, websites of government and international HIV and AIDS organisations. In all, a total of 47 documents were reviewed. The criteria for the selection of the documents were being focused on HIV/AIDS policies, workplace HIV/AIDS information, education and communication programmes as well as theoretical frameworks. The key components of the input evaluation model (HIVADIEF Model) are programme intervention, resources, institutional support mechanisms and target groups. Each component had its measuring attributes. The study recommended HIVADIEF input evaluation model for researchers in the field of workplace HIV/AIDS information, education and communication programme evaluation in Botswana and elsewhere with a view to further developing and improving the input evaluation model for hospitality facilities.

Key words: Information, education and communication, workplace, theoretical framework, inputs evaluation, HIV/AIDS, Botswana.

INTRODUCTION

The Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) commonly referred to as HIV and AIDS is the most devastating disease to face humankind in the 20th century (Chileshe, 2010). In-spite of global, regional as well as national concerted efforts, the pandemic continues to pose challenges (ILO and SAfAIDS, 2010). For example, since its advent, 78 million people have become infected; out of which 39 million have died of AIDS-related illnesses worldwide. In response to the formidable challenges posed by the

*Corresponding author. E-mail: ansegert56@gmail.com.

pandemic, the Botswana government strategy has been very impressive; and the country has shown signs of achieving some measure of management and control of this epidemic (NACA, 2015). The critical aspect of the response strategy has been the multi-sectoral approach adopted by the government. This approach emphasizes the development and implementation of workplace HIV and AIDS Information, Education and Communication (IEC) programmes and strategies by all work organisations. This includes both government agencies and the private sector organisations. According to NACA (2014) the main objective of the multi-sectoral approach is to enable mainstreaming of HIV/AIDS issues in the work place. The entire national response was captured in the Botswana National Strategic Framework on HIV/AIDS.

The Botswana national HIV and AIDS strategic framework is premised, among others, on both the prevention of HIV infection and research principles (UNDP, 2012). Under the research principle, the government of Botswana recognizes the important role research plays in identifying and implementing strategic responses to critical public health issues such as HIV and AIDS. Specifically, the research outcome is meant to assist government to develop strategies that will facilitate access to health-related programmes and services. To this end, the government has prescribed regular evaluation and monitoring of workplace HIV/AIDS programmes (UNDP, 2012). Meanwhile, there does not seem to exist any hospitality sector specific benchmark on which empirical investigations with respect to workplace HIV/AIDS information, education and communication (IEC) programme input could be based in Botswana.

Although there exists input evaluation theoretical frameworks, existing input evaluation models are based on the general principle of input, process and outcome. Basing evaluation on these models does not allow for in-depth evaluation of specific inputs which goes into workplace programmes. This is particularly so within the context of the hospitality sector workplace HIV and AIDS Information, Education and Communication (IEC) programmes in Botswana. To effectively evaluate a specific input workplace HIV/AIDS IEC programme, there is need for a model that plainly specify the input and its measuring attributes.

The goal of the study is to construct an input evaluation model suitable for adoption in the evaluation of workplace HIV and AIDS IEC programmes of the hospitality facilities within the hospitality sector in Botswana, and which is capable of being replicated anywhere else. Its essence is to limit the scope of the relevant data by focusing on specific variables and defining the specific viewpoint that a researcher will take in analysing and interpreting the data to be gathered (Labaree, 2014).

The theoretical underpinning for the proposed HIV/AIDS input evaluation model (HIVADIEF Model) is the Context, Input, Process, Product (CIPP) developed by Phi Delta Kappa Committee on Evaluation in 1971 (Tokmak, et al., 2013). According to the CIPP concept, evaluation can be categorised in terms of context, inputs, process and product (Boulmetis and Dutwin, 2011). In the CIPP context, input evaluation deals with the very foundation of the programme; and supports other activities. In the absence of an input evaluation model for the hospitality facilities workplace HIV/AIDS IEC programme, the concepts and constructs from the various theoretical models reviewed were combined to develop the HIVADIEF evaluation model.

Statement of the problem

Hospitality facilities in Botswana are known to be implementing workplace HIV/AIDS IEC programme in line with the country's revised national HIV/AIDS policy. However, there is no evidence of any input evaluation study with regards to hospitality facilities in the country (Carden and Alkin, 2012). In the same vein, available input evaluation models were found unsuitable for input evaluation of workplace HIV/AIDS IEC programme of hospitality facilities.

The purpose of the study was to review relevant literature and to propose a model suitable for inputs evaluation of workplace HIV/AIDS IEC programme for hospitality facilities in Botswana, which is capable of being adopted for hospitality facilities in general.

MATERIALS AND METHODS

This study adopted the documentary research method (Mogalakwe, 2006). In the course of the documents review the study relied to a large extent on several documents from the ILO, the Botswana governments' National Strategic Framework on HIV and AIDS as well as the Botswana Revised National policy on HIV and AIDS. Beside the aforementioned documents which formed the primary documents, the study also consulted other empirical literatures sourced from multiple electronic databases. These covered books, academic journals, official publications, websites of government and international HIV and AIDS organisations. In all, a total of 47 documents were reviewed. The criteria for the selection of the documents were that; the documents focused on information, education and communication in relation to HIV/AIDS policies, IEC programmes as well as theoretical frameworks.

Predominant evaluation theoretical perspectives

In the process of developing a requisite inputs evaluation model for the hospitality sector, various empirical literatures were consulted covering a wide range of evaluation theories. Among them are Van Berkel et al. (2013) "process evaluation of a workplace health promotion intervention…", Olsen et al. (2012) "how to use programme theory to evaluate the effectiveness of schemes..", Mark and Henry (2013) "logic models and content analyses for the explication of evaluation theories" and Greene (2013) "logic and evaluation theory". The programme theory was adopted by Van Berkel et al. (2013) while Tokmak et al. (2013) adopted the

programme theory in the framework of Context, Input, Process, Product (CIPP) evaluation model for evaluation. The diffusion of innovation (DOI) theories was successfully adopted by Botillen (2008) in the "analysis of HIV/AIDS IEC interventions in Malawi". Thus, DOI was established as an apposite theory for the study of HIV and AIDS IEC interventions within any environment.

Diffusion of innovation (DOI) theory

The diffusion of innovation (DOI) theory explains how innovation spreads within a given society and the fundamental considerations necessary for its adoption to take place. The basic assumption of the theory is that the process of adoption of an innovation is not a single straight forward continuum, but rather it is a series of inter-related actions each of which has the capacity to make for an adoption (Rogers, 2005). Accordingly, the DOI theory posits that diffusion of innovation can best be understood when considered as several theoretical perspectives that relate to the overall concept of diffusion rather than as a single all-encompassing theory. This realisation led Rogers to develop the concept of theory of rate of adoption, the individual innovativeness and the innovation-decision process theories; each of which is capable of being individually studied.

The theory of rate of adoption is influenced by such factors as relative advantage, innovation compatibility, complexity, trial-ability and, observability. Workplace HIV and AIDS IEC programme strategy qualifies as an innovation since it has the capacity of having a relative advantage to organisations and is compatible with the activities taking place within the hospitality sector, is trialable and observable. The individual innovativeness theory relates to the degree to which an organisation is relatively earlier in adopting new ideas than others within their social system. In other words, the theory is based on who adopts the innovation and when. Accordingly, adopters are classified into five categories, which are: Early adopters (13%), early majority (34%), late majority (34%) and the laggards (19%) (Botillen, 2008). The Workplace HIV and AIDS IEC programme strategy fits into the individual innovative theory because hospitality sector adopters can be classified into early, early majority, late majority and laggards, hence could be studied using the DOI theory. The innovation decision process theory looks at the process of communicating information for decision making to adopt and implement innovations. The process consists of the innovation, information awareness, communication channels and target groups. Like any process, each of the components is on its own influenced by other variables such as compatibility, complexity, trialibility, and observability for decision making to occur. It therefore follows that if any of the process components is lacking or neglected, diffusion may not be achieved. The workplace HIV and AIDS IEC programme strategy as an innovation complies with these processes, hence, is capable of being studied using the DOI theory.

On the bases of the postulations of DOI theory, there can be no effective programme evaluation if necessary components of the implementation process and their intervening variables are not properly applied. With respect to innovation and knowledge, the workplace HIV and AIDS IEC programme as an innovation can only be effective if there is adequate information and education with respect to HIV and AIDS Information Awareness (HIVIA), Voluntary Counselling and Testing (VCT), and Condom Promotion and Distribution (CPD) programmes. Other programmes include Prevention-of-Mother-to- Child Transmission of HIV (PMTCT), Antiretroviral Therapy (ARV) and Safe-Male-Circumcision (SMC) programmes, which are properly communicated over time to arouse positive decision taking by recipients to change their risky sexual behaviours. The HIV and AIDS IEC intervention programmes- the innovation- which conforms to DOI's attributes of compatibility, trialibility and observability were subsumed in the inputs evaluation framework. The technological compatibility within the DOI theory also informed the technological component of the input resource of the theoretical framework.

However, the DOI theory failed to meet the requirements for an input evaluation of a workplace HIV and AIDS IEC programme. With respect to programme evaluation process, the DOI theory is deficient in not explicitly highlighting each component of a programme inputs, such as resources (human, material and technological) institutional support mechanisms and target groups. This highlighted deficiency of the DOI made it inadequate to be used exclusively as an inputs evaluation framework. The authors, therefore, took into consideration such attributes as compatibility and complexity (that is, the items to be measured must be compatible to the hospitality sector in line with the complex nature of their activities), as well as trialibility and observability (that is, the new framework should be able of being tried and observed to affirm its suitability) in the development of HIVADIEF theoretical framework.

The programme theory

The programme theory is concerned with variety of ways of developing a causal model that links programme inputs and activities to a chain of intended or observed outcomes, and then using this model to guide evaluation (Legg et al., 2010; Rogers, 2008). The aim of programme evaluation is to determine the relevance of the programme, the fulfilment of objectives for which the programme was established, the development of efficiency, effectiveness and sustainability in the process (Rosen, et al., 2006). Programme theory is not just a list of tasks but a vision of what needs to happen, and how. Hence, programme theory provides a coherent picture of how change occurs and how to improve performance. Invariably, you cannot expect a great outcome if what is needed to happen and how it needs to happen had not taken place (Funnell and Rogers, 2011).

Programme evaluation can be categorised into process and outcome evaluations each of which is capable of being independently studied (Van Berkel et al., 2013). Process evaluation examines the extent to which the programme is delivered as designed. Process evaluation is concerned with the inputs, activities and the outputs segment of a programme. Outcome evaluation measures results. It looks at the direct effects of the programme implementation on target recipients (programme participants) by answering the question: How has the programme impacted the lives of participants on the short, medium and long term? (CDC, 2008). Since this paper is not interested in the outcome evaluation of the workplace HIV and AIDS programme strategy of the hospitality facilities in Botswana, only process evaluation has been reviewed.

Process evaluation theory: Logic model

Process evaluation Theory (PET) - logic model- refers to the systematic collection of information on a programme's inputs, the programme's context and other key characteristics (CDC, 2008). Process evaluation examines the activities and operations of a programme in order to understand how it is functioning (Olsen et al., 2012) and to ensure that the programme has been implemented as intended in the designing and planning processes (Rossi et al., 2004). The logic model is a visual framework that identifies components of a successful programme to be evaluated (Curry, 2008). The logic evaluation model can be drawn in different ways. Sometimes they are shown as a series of boxes. It can also be shown in a table, or as a series of results, with activities occurring alongside them rather than just at the start (Funnell and Rogers, 2011). This study chose to represent the logic model as a series of boxes (Figure 1).

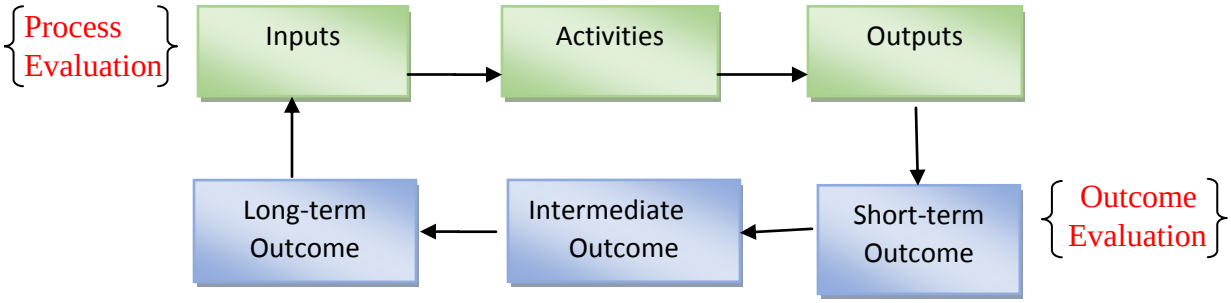

Figure 1. Programme theory: Logic model. Source: An Adaptation from Funnell and Rogers (2011).

Although the entire process evaluation can be evaluated as a one single study, each of the components (boxes) is capable of being studied as separate studies; that is, inputs, activities, and outputs evaluations just as the outcome can be studied on a short term, medium term and long term evaluations (Curry, 2008).

Many evaluators tend to be biased towards outcome (impacts) evaluation because it provides helpful information for top management in decision-making about the future direction of a programme (Sylvia and Sylvia, 2004). However, measuring programme outcomes without investigating the programme process can lead to incorrect conclusions about a programme such as assuming that a programme was not effective when in reality it might not have been implemented with fidelity (Curry, 2008). Nevertheless, the study is of the opinion that there can be no effective impact evaluation if the inputs process is not adequately addressed.

"By itself, program theory clearly does not provide guidance on gathering the evidence for monitoring and evaluation; it needs to be combined with evaluation expertise to draw appropriately from methods for research design, data collection, and data analysis" (Funnell and Rogers', 2011: 39 - 40). This implies that to be able to collect appropriate data that measures items compatible with the hospitality facilities, programme planning and execution must be in alignment with the complexity and context of the nature of the programme (HIV and AIDS) and the field of interest (hospitality sector).

RESULTS AND DISCUSSION

A model for input evaluation

The results of the study revealed that the key questions that inputs evaluation models need to address include: What are the interventions or programmes? What resources support the implementation of the programmes? What institutional support mechanisms are required? And who are the target groups? A satisfactory answer to each of these questions is a confirmation that the programme structure is well founded.

The HIVADIEF inputs evaluation model was based on an adaptation of the process evaluation framework. The need for a schematic presentation of an evaluation model flows from the fact that a visual depictions helps to clarify its most important features, components as well as their attributes (Hansen et al., 2012; Greene, 2013). The study's adoption of logic evaluation model is anchored on many evaluation scholars who have adopted the model to articulate, compare and develop and analyse evaluation theoretical models (Mark and Henry, 2013; Vo, 2013; Dillman, 2013; Luskin and Ho, 2013).

On the bases of results of this study, the proposed inputs evaluation model (HIVADIEF Model**)**, should comprise of the workplace HIV/AIDS IEC programmes, resources, institutional support mechanisms and IEC target groups (Figure 2).

Workplace HIV/AIDS IEC programmes

Workplace HIV/AIDS IEC programmes input include HIV/AIDS Information Awareness, Condom Promotion and Distribution, and Prevention of Mother-to-child Transmission programmes as well as Safe-male-circumcision, Voluntary Counselling and Testing and Antiretroviral Therapy IEC programmes (ILO, 2001; 2010; Botswana National Strategic Framework, 2010-2016). HIV/AIDS Information Awareness Programme (HIVIAP) provides requisite information and education about the pandemic to appropriate stakeholders. The aim is to empower them as part of efforts to curb the spread of HIV (ILO, 2001; 2010; National AIDS Council of Zimbabwe, 2010; Ministry of Labour and Social Security of Jamaica, 2011).

The basic information contained in HIVIAP include what HIV/AIDS is and what it is not, the difference between HIV and AIDS, the ways through which HIV is transmitted (sex, sharing of needle, and blood transfusion), and factors that aid their spread such as poverty, risky behaviours, alcoholism among others (Njororai et al., 2010; Keetile, 2014). Furthermore, the information should include the relationship between STIs and HIV and AIDS spread as well as prevention methods (Stangl et al., 2013). This would help to disabuse the minds of the stakeholders about the disease and reduce stigmatization and discrimination against people living with HIV and AIDS (PLWHA). Voluntary Counselling and Testing Programme aims at encouraging beneficiaries of AIDS information at the workplace to willingly want to subject themselves to proper medical testing procedures in order

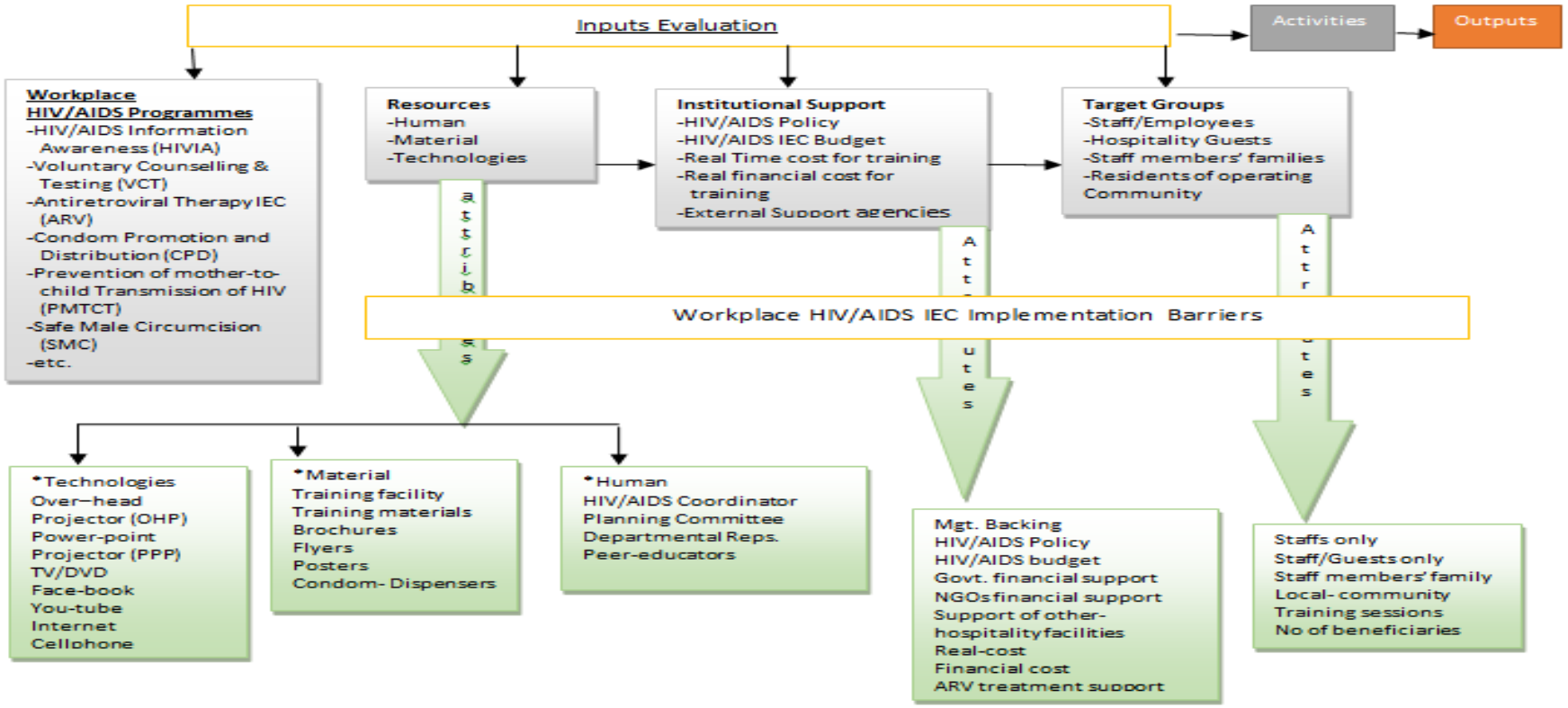

Figure 2. Proposed workplace HIV/AIDS IEC inputs evaluation model (HIVADIEF Model).

for them to get to know their HIV status (National AIDS Council of Zimbabwe, 2010). By combining personalized counselling with knowledge of one's HIV status, VCT is designed to motivate people to change their behaviours towards the acquisition and transmission of HIV. By so doing, they reduce anxiety over possible infection, facilitate safe disclosure of infection status that will aid organisations to plan for and improve access to HIV prevention and treatment services (Tedrow et al., 2012).

Condom Promotion and Distribution (CPD) IEC programme at the workplace aims at encouraging sexual partners to make use of condoms (Male and female) in situations of uncertainty about the HIV status of their partners for prevention from HIV and other STIs infections as well as prevent unintended pregnancy (Keetile, 2014). In the design and implementation of a successful CPD IEC programme at the workplace, there is need to establish organizational support for condom promotion and distribution activities as well as encourage condom use (CDC, 2014). Because of the empirical evidence about its efficacy, the ILOAIDS and other national HIV/AIDS coordinating agencies stipulate Condom Promotion and Distribution IEC programme as a key component in any workplace HIV and AIDS IEC programme implementation (ILO, 2010).

Mother-to-child transmission (MTCT) of HIV has been documented to be by far the most common way through which children become infected with HIV, either during pregnancy, labour, delivery or

breastfeeding. Hence, Prevention of Mother-to-Child Transmission of HIV/AIDS (PMTCT) IEC Programme is aimed at educating pregnant mothers and child bearing adults about safe motherhood (CDC, 2014). The would-be pregnant mothers that are positive are educated on how to prevent passing the virus to their partners and their new-born babies in addition to how to manage HIV and AIDS conditions (UNDP, 2012). Those that are negative are educated on how not to contract the virus and about happy mothering (CDC 2014).

Bio-medical trials have established that ARV treatment when started early has the propensity to elongate the lifespan of HIV-positive people very close to that of comparable HIV-negative people (Atuyambe et al., 2008). Because this treatment works (Setswe, 2009), the ILOAIDS requires that business organisations as part of the overall process of treatment and care for people living with HIV and AIDS (PLWHA) should implement workplace antiretroviral (ARV) IEC Programme. This entails assisting staff members particularly PLWHA to receive requisite information about treatment and care, and or access Highly Active Antiretroviral Therapy (HAART) treatment.

Safe-Male-Circumcision IEC programme is a sexual health intervention that aims at encouraging males to undertake safe circumcision at properly designated circumcision centres as part of efforts to reduce HIV transmission (Gray et al., 2007). The advent of HIV and AIDS and the need to limit its continued transmission and spread has heightened the health reasons for circumcision. Its adoption as a HIV and AIDS prevention programme (commonly referred as Safe-Male-Circumcision programme) followed medical and empirical evidence that it works (Setswe, 2009).

Although Safe Male circumcision does not completely protect against HIV, it is however rapidly becoming one of the most important science-based strategies for preventing HIV in Africa (WHO, 2015). UNAIDS and WHO project that, if adopted successfully as an additional HIV prevention method, male circumcision could be responsible for the prevention of millions of new cases of HIV (Herman-Roloff et al., 2011). The expectation is that most organisations mainstreaming the workplace HIV/AIDS IEC programmes in Botswana and elsewhere should implement the programme (UNAIDS, 2015). Nonetheless, there does not seem to be any theoretical model that incorporates these programmes that can provide a benchmark for scientific evaluation of a workplace HIV and AIDS IEC programmes.

Resources

Resources required for effective implementation of any workplace HIV/AIDS IEC programme include human, material and technological resources. Each of these resources has its critical role in the final effective implementation of the programme (ILO and SAfAIDS, 2010). Human resources refer to the various personnel requirement for an effective implementation of workplace HIV/AIDS IEC programme. They comprise of the HIV/AIDS coordinator who is responsible for planning, developing and coordinating all HIV and AIDS activities. The HIV/AIDS coordinator should be assisted by an implementation committee (a team of specialists), workers committee as well as peer educators (Jamaica Hotel and Tourist Association, 2007; ILO and SAfAIDS, 2010). Recognising that some organisations might be small, made up of few staff, it has been recommended that the operational/general manager and one or two members of staff could constitute the implementation committee.

Material resource input for a workplace HIV and AIDS IEC programmes implementation refer to the various items which when available enhance programme delivery. As per ILO (2001, 2010) provisions, organisations intending to implement workplace HIV and AIDS IEC programmes are required to provide necessary materials. These include training facility (classroom, environment for training), training materials (teaching aids, flipcharts and writing platforms and print materials (posters, brochures, banners and flyers), as well as condoms and condom dispensers (National AIDS Council of Zimbabwe, 2010; Ministry of Labour and Social Security of Jamaica, 2011). Because of its importance to an effective workplace HIV and AIDS IEC programmes delivery, it is expected that all organisations implementing the programme should have appropriate material resources in place.

Although technological resources for communicating HIV and AIDS information at workplaces vary, the ILO and many national HIV and AIDS policies recommend that mainstreaming work organisations provide such technological resources as cell phones (via WhatsApp, SMS, MMS, etc.), computer systems via the internet, Face-book, and You-Tube as well as radio, and television (Ajuwon, 2006; Jennings et al., 2013). Other technologies for conducting seminars and workshops include manual overhead projectors and the electronic power-point projectors. The expectation is that the availability of these resources will enhance the effective delivery of workplace HIV and AIDS IEC programmes of organisations (Ministry of Labour and Social Security, Jamaica, 2011).

Institutional support mechanism

Institutional support mechanism (ISM) refers to series of actions and efforts put in place by an organisation to reinforce the successful implementation of its workplace HIV/AIDS IEC programme strategies. ISM is the starting point for any workplace HIV and AIDS IEC programme delivery. Without a robust institutional support mechanism an organisation may not be able to effectively implement its workplace HIV/AIDS IEC programme strategy (ILO,

2010). The constituents of institutional support mechanism include management backing for the programme. This is crucial not only because HIV/AIDS affects the workforce, but because the management develops the workplace HIV/AIDS policies and determines resource allocation of their organisations (ILO, 2010).

Other elements of institutional support mechanism include allocation of dedicated budget for the implementation of the programme. This is critical to workplace HIV/AIDS successful implementation. Without a specific budgetary allocation, the implementation of the programme may become constrained (National AIDS Council Zimbabwe, 2010). Besides, the provision of annual budget for HIV/AIDS by a facility shows the level of importance the facility attaches to the fight against the pandemic as well as helping in the calculation of facility level, sector as well as national cost of fighting HIV/AIDS. Furthermore, the model provides for external financial support for workplace HIV/AIDS programmes. This is in line with ILO (2001; 2008) provisions which require private sector organisations to explore innovative approaches in the form of internal and external financial support to defray costs for their programmes.

Within the institutional support mechanism are workplace HIV/AIDS IEC trainings that are targeted at, and adapted to the hospitality facilities different target groups. Imbedded within the training sessions is their timing. It is proposed that trainings be at real-time (conducted using the facilities official time) and at real-cost to the hospitality facilities (conducted at no extra cost to the participants). The assumption of the HIVADIEF model with respect to training is that regular training would help to constantly update target groups on HIV/AIDS issues. In addition, conducting the trainings at real cost and time encourages greater participation of target groups thus ensuring maximisation of training benefits.

Proposed within the institutional support mechanism component is workplace HIV/AIDS IEC policy. The policy gives credence and direction to the programme (Bakuwa and Mamman, 2012). It spells out the reasons why a hospitality facilities is embarking on HIV/AIDS IEC programmes, how the policy relates to other company policies, the rights of those affected by HIV/AIDS and the issue of stigma and discrimination. The HIV/AIDS IEC policy thus presents a road map for proper programme implementation. Without it, the programme will lack direction and the prospects for successful programmes implementation might turn out to be a wishful thinking (Zengeni and Zengeni, 2012).

ARV IEC and treatment support forms part of the institutional support mechanisms of the proposed input evaluation model. The ILO and Botswana National workplace HIV/AIDS policy among others have specifically provided for staff members of mainstreaming workplace HIV/AIDS organisations to be supported in the area of ARV IEC as well as in accessing treatment. According to ILO recommendation "*...these services could include the provision of antiretroviral drugs, treatment for the relief of HIV-related symptoms, nutritional counselling and supplements, stress reduction and treatment for the more common opportunistic infections"* (ILO, 2001:17). This is irrespective of the fact that many national governments (e.g. Botswana) do provide free ARV treatments for their citizens.

Not including and implementing the ARV IEC programme on the premise of government free treatment availability could be counterproductive to both organisations and the nation as a whole. Failure to extend ARV IEC and treatment support to staff who are non-citizens may at the end exacerbate the progression of HIV and its related opportunistic diseases; which can come back to haunt the facilities or the country. Assuming that HIV/AIDS is someone else's problem, or ignoring the affected staff and hoping that the disease is not there or that it will simply go away, are but grave assumptions at the peril of a hospitality facility (Keba Africa, 2014).

IEC target groups

Workplace HIV/AIDS IEC programme target groups refer to different individuals and or groups for whom the HIV/AIDS IEC programmes of a business organisation are destined. These include staff, their family members, and guests/customers as well as residents of the hospitality facility local community. Staff members include all cadres of staff from managers to shop-floor personnel (ILO and SAfAIDS, 2010). The proposed model recognises the inclusion of all cadres of staff in workplace HIV/AIDS education programmes.

The importance of including staff members' families in the proposed workplace HIV/AIDS programmes of hospitality facilities stems from the symbiotic relationship between staff of hospitality facilities and their families. In the first place, a staff member who has left an HIV sick person at home will be unable to perform maximally. Secondly, staff members' families are also part of the business operating environment. Hence, incorporating them in the workplace HIV/AIDS IEC programme of an organisation enhances their knowledge of the pandemic and contributes to their moderation of behaviours too (Forsythe et al., 2006; ILO, 2012).

The need to incorporate the residents of local communities in the workplace HIV/AIDS IEC programmes of organisations flows from different reasons. Firstly, there is an interdependent relationship between a hospitality facility and its local environment. Whatever affects the residents affects the facility's business also. Secondly, the fact that members of staff and their families reside and interact with other residents of that community who often times interact with one another as well as with foreign visitors exposes them to the risk of HIV infection.

Thirdly, a local resident who is not educated sufficiently on the modus-operandi of the disease who eventually enters into un-protected sexual relationships that leads to being infected puts her/him and all in the community at further risk of HIV infection and spread of the disease. The need to also target tourist or hospitality guests in any workplace HIV/AIDS IEC programme implementation flows from the reasons already advanced (Johnson, 2014; ILO, 2011).

The basic proposition of the logic model approach of the HIVADIEF input evaluation model lie in its visual depiction of the features of its component parts and their requisite measuring attributes. Thus, an evaluator has a clear picture of the essential input required for an effective workplace HIV/AIDS IEC programme implementation; as patterns across the theoretical logics are readily apparent when examining their visual representations (Miller, 2013). This corroborates some previous logic evaluation models, Mark and Henry (2004) and Cousins (2013) who adopted the model to describe aspects of evaluation practice (Mark and Henry, 2013). Although the logic model is majorly criticized as being static in relation to its environment as the dynamics of a particular model is not sufficiently described in a linear form (Miller, 2013). HIVADIEF input evaluation model has done well to eliminate this shortcoming by being linearly interactive (Figure 2).

Challenges of workplace HIV/AIDS IEC programme implementation

The implementation of workplace HIV/AIDS IEC programme within the hospitality sector may be the panacea to curbing further spread of HIV from the place of work. However, the successful implementation of the programme is faced with series of challenges. Prominent among the immediate challenges are fear to disclose HIV status and fear for stigma and discrimination on the side of members of staff in the event of disclosing HIV status; time to set aside to conduct HIV/AIDS IEC trainings and financial cost of implementing the programmes. Other constraints on the long run include low level HIV/AIDS information awareness on the part of hospitality facilities management as to their role in the implementation of workplace HIV/AIDS IEC programmes; the small size of most hospitality businesses and lack of requisite human, material and technological resources. The general societal impression that government is already doing much to that effect could also be a constraint. However, that government is doing much on its own does not foreclose hospitality facilities from supplementing the government by implementing their own workplace HIV/AIDS programmes/policies (Asingwire and Birungi, 2006). On the part of government and its agencies the key challenge is that of monitoring and supervision to ensure compliance by hospitality facilities.

CONCLUSION AND RECOMMENDATIONS

The HIVADIEF evaluation model has helped to broaden the knowledge base in the field of workplace IEC studies, workplace HIV and AIDS evaluation studies, and especially with respect to the hospitality sector. Its successful adoption and utilisation in evaluation studies means it is capable of being progressively adapted to suit future studies across different academic disciplines. The study now recommends HIVADIEF input evaluation model for researchers in the fields of library and information science, HIV and AIDS evaluation studies and other health programmes evaluation studies.

The HIVADIEF theoretical model has been developed specifically for the hospitality sector. The study recommends the model to hospitality facilities in Botswana

The study recommends the model to future inputs evaluation researchers in Botswana and elsewhere with a view to further developing and improving the HIVADIEF theoretical framework model.

Conflicts of Interests

The authors have not declared any conflict of interests.

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Determinants of perceived stigmatizing and discriminating attitudes towards people living with HIV/AIDS among women of reproductive age in Nigeria

Motunrayo A. Shodimu[1], Oyindamola B. Yusuf[1*], Joshua O. Akinyemi[1], Adeniyi F. Fagbamigbe[1], Elijah A. Bamgboye[1], Evelyn Ngige[2], Kawu Issa[2], Emmanuel Abatta[2], Onoride Ezire[2], Perpertual Amida[2] and Adebobola Bashorun[2]

[1]Department of Epidemiology and Medical Statistics, College of Medicine, University of Ibadan, Nigeria.
[2]National AIDS/STD Control Programme, Federal Ministry of Health, Abuja, Nigeria.

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Human immunodeficiency virus/acquired immune deficiency syndromes (HIV/AIDS)-related stigmatization and discrimination have been acknowledged as an impediment to mitigating the HIV epidemic and little is known about its contributory factors in Nigeria. Therefore, this study investigated factors associated with HIV/AIDS perceived stigmatization and discrimination among women of reproductive age in Nigeria. This was a retrospective analysis of data on 15,639 women of reproductive age (15 to 49 years) collected during the National HIV/AIDS and Reproductive Health Survey (NARHS Plus II) conducted in 2012. Perceived stigma was measured using specific questions and scored as follows: less or equal to 3 points (low stigma), 4 to 6 points (moderate stigma) and greater than or equal to 7 points (high stigma). Data were summarized using descriptive statistics while chi square test was used to assess significance of association of qualitative variables and level of stigma. A multinomial logistic regression model was fitted to determine variables associated with stigma at 5% level of significance. The mean age of women was 29 ± 9.54 years. About 44, 21 and 35% reported low, moderate and high stigma, respectively. Level of education and HIV knowledge were significantly associated with perceived stigmatization (p<0.001). Respondents with poor HIV knowledge were three times more likely to report high level of stigma (odd ratio (OR) = 3.38, 95% confidence interval (CI) = 2.54 - 4.49, p< 0.001). In addition, respondents with primary education were 4 times more likely to report high stigma when compared with those that have higher education (OR = 3.80, 95% CI = 2.36-6.13, p <0.001). Perceived HIV/AIDS-related stigmatization was common among women of reproductive age in Nigeria. Low education level, condom and antiretroviral drug awareness were significantly related to perceived stigmatization among women of reproductive age in Nigeria.

Key words: Perceived stigmatization and discrimination, human immunodeficiency virus/acquired immune deficiency syndromes (HIV/AIDS), women of reproductive age.

INTRODUCTION

Various studies demonstrated human immunodeficiency virus (HIV)-related stigma as common worldwide phenomenon which occurs in a variety of contexts including family, community, workplace, markets and healthcare settings (Mahendra et al., 2007).

The mental well-being, social and economic effect on

people living with the virus, has a devastating impact on their families and the community (Mutalewa et al., 2008). Fear, stigma and discrimination have continued to accompany the HIV pandemic. People who are infected, or even suspected of having HIV, have experienced emotional, physical, and structural abuse (Dlamini et al., 2007), and the fear of experiencing such stigma discourages people living with HIV/AIDS (PLWHA) from seeking medical care (Pulerwitz et al., 2010). HIV/AIDS-related stigma and discrimination has negative effect to willingness to test for HIV or to disclose positive outcome to partners. Stigma is often associated with discrimination and human rights which has several undermining effects.

Studies have shown that PLWHA, were often time rejected, restricted from sharing toilets, canteens and sports facilities. Some lost their jobs, some were threatened with dismissal, job duties were changed, some lost prospects for promotion and were excluded from insurance schemes (Chinwe, 2005, 2007).

According to Stangl et al. (2013), stigma and discrimination are broadly significant in diverse ways. Some people are avoided by family, peers and the wider communities, while others face maltreatment in healthcare and educational settings, erosion of their human rights, and psychological damage resulting to a limiting access to HIV testing, treatment and other HIV services. A study by Dlamini et al. (2009) also reveals that stigmatization undermines prevention, voluntary counseling and testing, care and support as well as increases the impact of the infection on individuals, families, communities and nations.

Nigeria is the second largest HIV epidemic in the world (National Agency for the Control of Aids [NACA], 2015). Although HIV prevalence among adults is remarkably small (3.1%) compared to other sub-Saharan African countries such as South Africa (19.2%) and Zambia (12.9%) (UNAIDS, 2016).

In Nigeria, as in most cases, HIV/AIDS is perceived to be a disease of other people living on the margins of society, whose lifestyles are considered perverted and sinful (Nduonofit et al., 2012). Stigmatization and discrimination attached to being diagnosed with HIV/AIDS is far greater and significantly different than that linked to being diagnosed with other illnesses such as cancer and psychiatric disorders (Nduonofit et al., 2012).

HIV-related stigmatization and discrimination has been acknowledged as an impediment to mitigating the HIV epidemic since its early days, yet programming and activities to reduce stigma and discrimination have received much less attention than other aspects of the disease. Recently, there has been an increase in the literature on HIV-stigma, as the issue has gained visibility and greater conceptual clarity (Nyblade et al., 2013; Stein and Li 2008; Akanbi et al., 2010). A significant challenge to the success of achieving universal access to HIV prevention, treatment, care and support by 2010 is HIV-AIDS stigma and discrimination (Emmanuel et al., 2009).

Prior studies that examined stigmatization in HIV-positive women have focused predominantly on either socio-demographic (Ogilvie et al., 2007; Oladapo et al., 2005) or psychological correlates (Rao et al., 2007; Wingood et al., 2007) and HIV-Stigma structural equation (Rao et al., 2012). A previous study by Olalekan (2012) also examined the relationship between psycho demographic factors and perceived stigmatization among people living with HIV/AIDS in Ibadan, Nigeria which revealed a significant relationship between perceived stigmatization and both HIV cognition and HIV disclosure. This study showed that females are more stigmatized than males and younger females with poor HIV cognition had the highest HIV disclosure and stigmatization (Olelakan, 2012). Although, none of these studies focused on the stigmatizing effect among women of reproductive age who are HIV positive. This study was conducted to fill this gap by identifying the socio demographic and psycho-demographic factors influencing HIV stigmatization among women.

Nonetheless, a study by Kinsler et al. (2007) looked at some of the issues surrounding HIV stigma amongst women in a low-income setting. The study reveals that lack of access or delayed access to care influences the quality of life of its patients, health opportunities and psychological well-being of HIV positive women.

Globally, HIV is the leading cause of death among women of childbearing age (UNAIDS, 2014). Women accounted for more than half of the people infected with HIV and represent a growing proportion of people living with HIV/AIDS (Kola et al., 2005). Also, women have greater likelihood than men of being infected in heterosexual encounters (WHO, 2006). HIV affects all aspects of women's reproductive health such as pregnancy, childbirth, breastfeeding, abortion, use of contraception, exposure, diagnosis and treatment of sexually transmitted infections (STIs) and their exposure to sexual violence. It also affects their sexual health and well-being.

Young women may be unable to negotiate condom use and are more likely than men to experience coerced sex (Krug et al., 2006). In many Africa countries, women are disproportionately affected, not only by HIV/AIDS disease, but also by the related stigma and discrimination (Chinwe, 2005). Leclerc-Madlala (2002) opined that the attachment of gender discrimination to HIV stigma has led to women being blamed for spreading the epidemic.

*Corresponding author. E-mail: bidemiyusuf1@gmail.com.

Due to the stigma and discrimination attached to HIV/AIDs, it is particularly important that health service providers protect the reproductive rights of women living with HIV. These rights include having access to sexual and reproductive health services, decision on whether to be sexually active or not, spacing and timing of childbearing and the right to make these decisions free of discrimination, coercion and violence (UNAIDS, 2006). Also, women who experience fear or stigma have less access to health care services, and research has shown that pregnant women who anticipate HIV related stigma are less likely to get tested for HIV (Turan et al., 2008).

As postulated by Jonathan HIV-Stigma is the third phase of the HIV pandemic which poses a serious threat to prevention and treatment (Mann, 1987). Also, Nigeria aimed to achieve her national policy on HIV/AIDS, by controlling the spread of the infection and its impact, as well as the needs to address the issue of stigmatization and discrimination. It is therefore very important to tackle HIV/AIDS and its consequential stigmatization and discrimination among women of reproductive age who are known to be sexually active. The global health community has set some important goals as part of efforts to control and end HIV/AIDS scourge by 2030, a prevailing drive established towards ensuring that 90% declined in deaths of people living with HIV/AIDS by 2020 via early diagnosis, treatment and viral suppression (USAID, 2014). In Nigeria, issues relating to stigmatization and discrimination of people living with HIV/AIDS (PLWHAs) among reproductive women have not been fully explored. Information on the stigmatization of AIDS in Nigeria has focused on workplace discriminations, prevention programs, counseling and health provider's anxiety among others (Chinwe, 2007; Oku et al., 2013; Vanden et al., 2009). Hence, this study utilized a nationally representative sample to determine the socio and psycho demographic factors affecting perceived stigmatization and discrimination against PLHWA among women of reproductive age in Nigeria.

METHODOLOGY

Study design and population

A retrospective data analysis of the Nigeria Federal Ministry of Health (2013) and National HIV/AIDS and Reproductive Health Survey 2012 (NARHS Plus) was carried out. The 2012 NARHS Plus was a cross sectional study of men and women of reproductive age. A stratified multistage cluster sampling technique was used to select a nationally representative probability sample of women aged 15 to 49 years and men aged 15 to 64 years living in households in rural and urban areas in all the 36 states and the Federal Capital Territory (FCT), Nigeria.

First stage of sampling involved the selection of rural and urban localities from each state and FCT. Second stage involved the selection of Enumeration Areas (EA) within the selected rural and urban localities. The third stage involved the listing and selection of households. Thirty-two households were sampled from each of the 30 sampled EA (clusters) from each state. A total of 32543 (91.6%) out of selected 35520 individuals were selected using structured. questionnaires. However, all analyses in this study are based on responses by 15639 women respondents that are within reproductive age of 15 to 49 years. The data was weighted to reflect differences in population sizes of the states.

Data management

Descriptive statistics were used to summarize the data. Chi-square test was used to investigate association between categorical variables (perceived stigmatization and the explanatory variables) and multinomial logistic regression analysis was used to further investigate association and the contribution of explanatory variables (factors) on perceived stigmatization. Analysis was done using the statistical package for social sciences (SPSS) Version 20.0 (SPSS, Chicago IL, USA). The dependent variable HIV-related perceived stigmatization and discrimination was measured using seven questions about respondents' discriminatory attitudes against people living with HIV/AIDS. These questions were selected based on previous studies (Ochako et al., 2011; Sophoan, 2013).

Questions used to measure perceived stigmatization and discrimination include:

(1) Would you be willing to eat from the same dish with a person you knew had the virus that causes AIDS (HIV)?
(2) If a male relative of yours became ill with AIDS, would you be willing to care for him in your household?
(3) If a student has the virus that causes AIDS (HIV) but is not sick, should he or she be allowed to continue attending school?
(4) If a female relative of yours became ill with AIDS, would you be willing to care for him in your household?
(5) If a female teacher has the virus that causes AIDS (HIV) but is not sick, should she be allowed to continue teaching in school?
(6) If you knew a shopkeeper or food seller who had the virus that causes AIDS (HIV), would you buy food from him/her?
(7) In your own view, do you think your community cares and support PLWHA.

These seven questions were used to create and compute the dependent variable. Values were assigned to responses and were scored as follows: agree =0, neutral =1, and disagree =2 which was summed up to generate total scores with a minimum and maximum score of 0 and 14, respectively.

The total scores were disaggregated into 3 categories using percentile ranges. The 25, 50 and 75th percentiles were 2, 4 and 7, respectively. Values less than 4 (0-3) were categorized as "low" stigma, values between 4 and 6 represented "moderate" stigma, and values ≥ 7 indicated "high" stigma (Adewuya and Makanjuola, 2008; Bogardus, 1925). Pearson's chi square test was used to determine the association between perceived stigmatization and each of the independent variables. Multinomial logistic regression analysis was employed to determine the relationship between perceived stigmatization and the explanatory variables. The explanatory variables that were utilized in the multinomial logistic regression analysis were socio (age, education, marital status, occupation and religion) and psycho demographic variables such as alcohol use, sexual history and behavior, STIs, HIV knowledge, prevention, misconceptions, testing and risk perception. Odds Ratio (OR) and their 95% confidence intervals (CI) were determined. P-value < 0.05 was considered statistically significant.

Seven questions were used to measure comprehensive knowledge of HIV/AIDS (UNGASS, 2010; Ochako et al., 2011; Sophoan 2013). One point was awarded for a correct answer and 0 point for an incorrect choice or no response. Total scores for each respondent ranged from 0 to 7. 'Score 0 to 6', indicates the persons had poor knowledge about HIV transmission routes and beliefs, and 'Score 7' indicates the persons had a good knowledge about HIV transmission routes and beliefs. Correct responses to all the seven

Table 1. Distribution of perceived stigmatization among respondents.

Characteristics	n[a]	Percentage
Would you be willing to eat from the same dish with a person you knew had the virus that causes AIDS (HIV)?		
Agree	6168	44.9
Neutral	830	6.0
Disagree	6752	49.1
If a male relative of yours became ill with AIDS, would you be willing to care for him in your household?		
Agree	9622	70.0
Neutral	918	6.7
Disagree	3208	23.3
If a student has the virus that causes AIDS (HIV) but not sick, should he or she be allowed to continue attending school?		
Agree	8978	65.3
Neutral	1181	8.6
Disagree	3589	26.1
If a female relative of yours became ill with AIDS, would you be willing to care for him in your household?		
Agree	9636	70.1
Neutral	960	7.0
Disagree	3152	22.9
If a female teacher has the virus that causes AIDS (HIV) but is sick, should she be allowed to continue teaching in school?		
Agree	7844	63.6
Neutral	1249	9.1
Disagree	3755	27.3
If you knew a shopkeeper or food seller who had the virus that causes AIDS (HIV), would you buy food from him/her?		
Agree	5557	40.4
Neutral	936	6.8
Disagree	7254	52.8
In your own view, do you think your community cares and support PLWHA		
Agree	5003	36.4
Neutral	5714	41.6
Disagree	3021	22.0

n[a]: Frequency of respondents.

questions were categorized as good knowledge while a wrong response to at least one question was rated as poor knowledge (UNGASS, 2010).

RESULTS

A total of 15,639 records were available for analysis. The mean age of the women was 29 years (SD=9.5 years). The respondents' age, education, marital status, occupation and religion were found to be significantly associated with stigmatization.

About 6039 (44%) respondents reported low stigmatization, 2907 (21%) moderate stigmatization, and 4805 (35%) high stigmatization.

Frequency distribution of items on perceived stigmatization

Slightly less than half (44.9%) agreed to eat from the same dish with person they knew had the virus that causes HIV/AIDS. Majority of the respondents (70.0%) agreed to care for male relatives that are ill with AIDS in their household while 23.3% disagreed. About 64% agreed that a female teacher with the virus that causes AIDS (HIV) should be allowed to continue teaching in school while 27.3% disagreed. Table 1 shows the

distribution of the respondents by perceived stigmatization.

Association between socio-demographic factors and perceived stigmatization among women of reproductive age

The proportion with high stigmatization reduced significantly with increasing levels of education (primary: 36.6%, secondary: 31.0%, tertiary: 16.1%) (p<0.001). About 40% of unemployed respondents had high stigmatization compared with 31% who were students and 35% who were self-employed (p<0.001).

A larger proportion (36.4%) reported high stigmatization among the 15 to 24-year-old compared to 33.5% in the 25 to 39 years and 35.5% in the 40 to 49 years. The proportion with high stigmatization was significantly higher among those who were separated/divorced (39.7%), compared to those who were currently married (35.8%), never married (32.1%) and widowed (34.9%) (p=0.001).

Table 2 shows the distribution of the women of reproductive age by level of perceived stigmatization and socio-demographic characteristics.

The relationship between psycho-demographic factors and perceived stigmatization among respondents

About half (48.8%) of the respondents that have heard about male condom had low stigmatization compared to 32.6% who were unaware (p< 0.001). Of the 1112 respondents that had more than one sexual partner at the same time, 48.2, 20.7 and 31.1% reported low, moderate and high stigmatization, respectively (p= 0.007).

About 40% with poor HIV knowledge had low stigmatization compared with 64.6% who had good knowledge. Of the 6859 respondents who had heard of antiretroviral drugs, 40.4, 23.3, and 36.3% had low, moderate and high stigmatization, respectively (p<0.001). Of the 3960 respondents that have ever tested for HIV, 45.1, 22.9 and 32.0% reported low, moderate and high stigmatization, respectively (p <0.001).

About 44.5% of the respondents that were willing to test for HIV had low stigmatization compared with 22.8 and 32.7% with moderate and high stigmatization, respectively (p<0.001).

Out of 2477 respondents willing to get HIV test results, 43.9% had low stigmatization, while 22.3 and 33.8% reported moderate and high stigmatization, respectively (p =0.009).

Respondents that have heard about HIV prevention messages through media had low stigmatization (43.6%) and those that have not heard about HIV prevention messages had high stigmatization (34.3%) (p=0.042) (Table 3).

Multinomial logistic regression analysis of perceived stigmatization and selected socio-demographic and psycho-demographic variables

Moderate stigmatization relative to low stigmatization

Table 4 shows the results of a multinomial logistic regression model of perceived stigmatization on both socio demographic and psycho-demographic variables.

For moderate stigmatization, relative to low stigmatization the results revealed that among the occupation categories, respondents that were unemployed/not working were about 2 times more likely to exhibit moderate stigma relative to those that were skilled/professional (OR = 1.79, 95% CI = 1.11-2.90, p = 0.02). Respondents that were self-employed were 2 times more likely to report moderate stigma when compared with those that had skilled occupations (OR = 1.87, 95% CI= 1.18-2.99, p=0.008). Respondents who had heard about special antiretroviral drugs were about 2 times more likely to exhibit moderate stigma when compared with respondents that have not heard about antiretroviral drug (OR =1.63, 95% CI=1.21-2.18, p= 0.001). Respondents with poor knowledge about HIV were about 2 times more likely to experience moderate stigma relative to those that have good knowledge about HIV (OR = 1.71, 95% CI =1.33-2.19, p < 0.001). Respondents who have not heard about HIV prevention through media were likely to report moderate stigma when compared with those who have heard about HIV prevention through media (OR = 1.35, 95% CI = 1.08 - 1.68, p = 0.008).

High stigmatization relative to low stigmatization

Table 5 shows the results of a multinomial logistic regression model of perceived stigmatization on both socio demographic and psycho-demographic variables.

For high stigmatization, relative to low stigmatization, respondents in age group 15 to 24 years were more likely to exhibit high stigmatization when compared with those in age group 40 to 49 years (OR = 1.40, 95% CI = 1.03 - 1.91, p= 0.034).

Respondents with no formal education were 3 times likely to report high stigmatization when compared with those that have higher education (OR = 3.04, 95% CI = 1.90-4.86, p < 0.001). Furthermore, respondents with primary education were 4 times more likely to exhibit high stigma relative to those that have higher education (OR = 3.80, 95% CI = 2.36-6.13, p <0.001). Respondents with secondary education were 2 times more likely to report high stigma when compared with those that have higher education (OR = 2.20, 95% CI = 1.43 -3.39, p < 0.001). The respondents with knowledge of condom use were 33% less likely to exhibit high stigmatization compared to those that do not have knowledge of condom use (OR = 0.70, 95% CI = 0.52 -0.86, p = 0.002). Respondents who

Table 2. The distribution of respondents by the level of perceived stigmatization and their socio-demographic characteristics.

Characteristics	Stigma n(%)			Total[a]	Chi	p
	Low	Moderate	High			
Alcohol in-take during last 4 weeks						
Everyday	99 (39.3)	51 (20.2)	102 (40.5)	252		
Less than once a week	249 (42.9)	130 (22.4)	201 (34.7)	580	8.05	0.429
A least once a week	379 (45.7)	186 (22.4)	264 (31.8)	829		
Never	5269 (44.0)	2520 (21.0)	4191 (35.0)	11980		
Not sure	31 (47.0)	14 (21.2)	21 (31.8)	66		
Ever heard of male condoms?						
Yes	4684 (48.8)	2103 (21.9)	2817 (29.3)	9604		
No	1348 (32.6)	799 (19.3)	1985 (48.0)	4132	469.8	<0.001
Ever had sex in exchange for money/favour or gifts						
Yes	300 (43.1)	142 (20.4)	254 (36.5)	696		
No	4763 (44.2)	2291 (21.3)	3726 (34.6)	10780	1.098	0.577
Ever had more than one sexual partner at the same time?						
Yes	536 (48.2)	230 (20.7)	346 (31.1)	1112		
No	4571 (43.6)	2224 (21.2)	3694 (35.2)	3694	9.87	0.007
Ever heard of diseases that can be transmitted through sexual intercourse (STIs)?						
Yes	4564 (47.8)	2180 (22.8)	2804 (29.4)	9548		
No	1471 (35.1)	724 (17.3)	1997 (47.6)	4192	428.1	<0.001
Having symptoms of STI?						
Absent (No)	5477 (43.5)	2670 (21.2)	4452 (35.3)	12599		
Present (Yes)	5560 (48.9)	235 (20.7)	347 (30.5)	1138	14.05	0.001
HIV knowledge						
Poor knowledge	4138 (39.8)	2306 (22.2)	3962 (38.1)	10406		
Good Knowledge	1810 (64.6)	524 (18.7)	468 (16.7)	2802	615.2	<0.001
Heard of ART						
Yes	2771 (40.4)	1595 (23.3)	2493 (36.3)	6859		
No	1236 (47.2)	543 (20.7)	841 (32.1)	2620	35.69	<0.001
Awareness of HIV test center						
Yes	3569 (43.5)	1818 (22.2)	2811 (34.3)	8198		
No	1680 (42.7)	800 (20.3)	1454 (37.0)	3934	9.99	0.007
Ever Tested						
Yes	1784 (45.1)	908 (22.9)	1268 (32.0)	3960		
No	3467 (42.4)	2203 (21.0)	2996 (36.6)	8177	25.32	<0.001
Willingness to collect test result						
Yes	1087 (43.9)	552 (22.3)	838 (33.8)	2477		
No	546 (47.3)	277 (24.0)	332 (28.7)	1155	9.33	0.009
AIDS risk						
High	66 (39.5)	36 (21.6)	65 (38.9)	167		
Low	2164 (41.8)	1158 (22.4)	1855 (35.8)	5177		

Table 2. Contd.

No risk at all	2492 (44.3)	1234 (21.9)	1899 (33.8)	5625	11.27	0.08
Already have AIDS	21 (33.3)	17 (27.0)	25 (39.7)	63		
Prevention message heard through media						
No	3035 (44.6)	1383 (20.3)	2387 (35.1)	6805		
Yes	2943 (43.6)	1490 (22.1)	2311 (34.3)	6744	6.36	0.042
Prevention method ever had						
Yes	223 (42.8)	124 (23.8)	174 (33.4)	521		
No	2733 (43.6)	1376 (22.0)	2158 (34.4)	6267	0.96	0.618

[a]Each row total constitutes a 100%.

Table 3. The distribution of respondents by the level perceived stigmatization and psycho-demographic characteristics.

Variable	Stigma n (%)			Total	Chi	P
	Low	Moderate	High			
Alcohol in-take during last 4 weeks						
Everyday	99 (39.3)	51 (20.2)	102 (40.5)	252		
A least once a week	379 (45.7)	186 (22.4)	264 (31.8)	829		
Less than once week	249 (42.9)	130 (22.4)	201 (34.7)	580	8.05	0.429
Never	5269 (44.0)	2520 (21.0)	4191 (35.0)	11980		
Not sure	31 (47.0)	14 (21.2)	21 (31.8)	66		
Ever heard of male condoms?						
Yes	4684 (48.8)	2103 (21.9)	2817 (29.3)	9604		
No	1348 (32.6)	799 (19.3)	1985 (48.0)	4132	469.75	<0.001
Ever had sex in exchange for money/favour or gifts						
Yes	300 (43.1)	142 (20.4)	254 (36.5)	696		
No	4763 (44.2)	2291 (21.3)	3726 (34.6)	10780	1.098	0.577
Ever had more than one sexual partner at the same time?						
Yes	536 (48.2)	230 (20.7)	346 (31.1)	1112		
No	4571 (43.6)	2224 (21.2)	3694 (35.2)	3694	9.87	0.007
Ever heard of diseases that can be transmitted through sexual intercourse (STIs)?						
Yes	4564 (47.8)	2180 (22.8)	2804 (29.4)	9548		
No	1471 (35.1)	724 (17.3)	1997 (47.6)	4192	428.07	<0.001
Having symptoms of STI?						
Absent (No)	5477 (43.5)	2670 (21.2)	4452 (35.3)	12599		
Present (Yes)	5560 (48.9)	235 (20.7)	347 (30.5)	1138	14.05	0.001
HIV Knowledge						
Poor knowledge	4138 (39.8)	2306 (22.2)	3962 (38.1)	10406		
Good Knowledge	1810 (64.6)	524 (18.7)	468 (16.7)	2802	615.22	<0.001
Heard of ART						
Yes	2771 (40.4)	1595 (23.3)	2493 (36.3)	6859		
No	1236 (47.2)	543 (20.7)	841 (32.1)	2620	35.69	<0.001
Awareness of HIV test center						

Table 3. Contd.

Yes	3569 (43.5)	1818 (22.2)	2811 (34.3)	8198		
No	1680 (42.7)	800 (20.3)	1454 (37.0)	3934	9.99	0.007
Ever tested						
Yes	1784 (45.1)	908 (22.9)	1268 (32.0)	3960		
No	3467 (42.4)	2203 (21.0)	2996 (36.6)	8177	25.32	<0.001
Willingness to collect test result						
Yes	1087 (43.9)	552 (22.3)	838 (33.8)	2477		
No	546 (47.3)	277 (24.0)	332 (28.7)	1155	9.33	0.009
AIDS risk						
High	66 (39.5)	36 (21.6)	65 (38.9)	167		
Low	2164 (41.8)	1158 (22.4)	1855 (35.8)	5177		
No risk at all	2492 (44.3)	1234 (21.9)	1899 (33.8)	5625	11.27	0.08
Already have AIDS	21 (33.3)	17 (27.0)	25 (39.7)	63		
Prevention message heard through media						
No	3035 (44.6)	1383 (20.3)	2387 (35.1)	6805		
Yes	2943 (43.6)	1490 (22.1)	2311 (34.3)	6744	6.36	0.042
Prevention method ever had						
Yes	223 (42.8)	124 (23.8)	174 (33.4)	521		
No	2733 (43.6)	1376 (22.0)	2158 (34.4)	6267	0.96	0.618

Table 4. Multinomial logistic regression analysis of factors associated with perceived stigmatization.

Variable[a]	95% CI			SE	p
	OR	Lower	Upper		
Age group					
15-24	1.197	0.852	1.682	0.173	0.299
25-39	1.024	0.785	1.335	0.135	0.861
*40-49					
Education					
Quranic/No formal education	1.021	0.669	1.558	0.216	0.924
Primary	1.474	0.96	2.264	0.219	0.076
Secondary	1.166	0.811	1.676	0.185	0.409
*Higher					
Occupation					
Unemployed/Housewife/Pensioner/Other	1.787	1.105	2.891	0.245	0.018
Student	1.49	0.843	2.633	0.29	0.17
Unskilled/Informal sector/Hawkers/Vendors	1.659	0.918	2.999	0.302	0.093
Self-employed/Farmer/Forestry/Fishing/Mining	1.874	1.176	2.987	0.238	0.008
*Skilled/Professional/Directors/Clerk/Civil servant					
Marital status					
Currently married	0.806	0.463	1.404	0.283	0.588
Never married	1.236	0.638	2.396	0.338	0.494
Separated/Divorced	0.757	0.328	1.749	0.427	0.657

Table 4. Contd.

*Widowed					
Religion					
Islam	1.975	0.24	16.265	1.076	0.527
Christianity	4.935	0.606	40.223	1.07	0.136
*Traditional/Others					
Condom awareness and usage					
Yes	0.759	0.533	1.082	0.146	0.127
*No					
Have you ever had more than one sexual partner at the same time?					
Yes	0.759	0.533	1.082	0.181	0.127
*No					
Any symptoms of STI?					
Absent (No)	2.601	1.764	3.836	0.198	<0.001
*Present (Yes)					
Do you know place where you can go to get an HIV (AIDS) test?					
Yes	0.995	0.688	1.44	0.188	0.98
*No					
Have you ever been tested to find out if you have the virus that causes AIDS?					
Yes	3.391	0.415	27.72	1.072	0.255
*No					
Did you get the result of the test?					
Yes	0.889	0.712	1.11	0.113	0.3
*No					
Have you heard of antiretroviral drugs that help HIV infected people to live longer					
Yes	1.625	1.213	2.177	0.149	0.001
*No					
HIV knowledge					
Poor Knowledge	2.21	1.97	2.482	0.059	<0.001
*Good knowledge					
Heard about HIV prevention through media?					
No	1.346	1.079	1.679	0.113	0.008
*Yes					

*Reference category. [a]Reference category is low stigmatization.

have poor knowledge of HIV were 3 times more likely to report high stigmatization compared with those that have good knowledge of HIV (OR = 3.38, 95% CI = 2.54 - 4.49, p< 0.001).

DISCUSSION

To our knowledge, this is the first report of a nationally representative study of HIV/AIDs on perceived stigmatization among women of reproductive age in Nigeria. Stigmatization against infected and affected individuals with HIV/AIDS has been identified as a restraint to addressing HIV epidemic in Nigeria. The stigmatization and discrimination attitudes create a situation that facilitates the spread of the disease; and this can be reduced by developing effective strategies.

Table 5. Multinomial logistic regression analysis of factors associated with perceived stigmatization.

Variable	95% CI			SE	p
	OR	Lower	Upper		
Age group					
15-24	1.4	1.026	1.91	0.158	0.034
25-39	0.973	0.761	1.243	0.125	0.825
*40-49					
Education					
Quranic/No formal education	3.038	1.899	4.861	0.24	<0.001
Primary	3.797	2.356	6.12	0.244	<0.001
Secondary	2.199	1.426	3.392	0.221	<0.001
*Higher					
Occupation					
Unemployed/Housewife/Pensioner/Other	0.857	0.548	1.34	0.228	0.497
Student	0.671	0.375	1.202	0.297	0.18
Unskilled/Informal sector/Hawkers/Vendors	1.126	0.662	2.916	0.271	0.66
Self-employed/Farmer/Forestry/Fishing/Mining	0.934	0.607	1.437	0.22	0.757
*Skilled/Professional/Directors/Clerk/Civil servant					
Marital Status					
Currently married	0.992	0.578	1.701	0.275	0.976
Never married	1.127	0.581	2.186	0.338	0.723
Separated/Divorced	1.184	0.552	2.538	0.389	0.665
*Widowed					
Religion					
Islam	1.659	0.416	6.608	0.705	0.473
Christianity	2.434	0.617	9.608	0.701	0.204
*Traditional/Others					
Condom awareness and usage					
Yes	0.669	0.519	0.86	0.129	0.002
*No					
Have you ever had more than one sexual partner at the same time?					
Yes	0.77	0.549	1.08	0.173	0.13
*No					
Any symptoms of STI?					
Absent (No)	1.182	0.874	1.599	0.154	0.278
*Present (Yes)					
Do you know place where you can go to get an HIV (AIDS) test?					
Yes	1.159	0.804	1.67	0.187	0.43
*No					
Have you ever been tested to find out if you have the virus that causes AIDS?					
Yes	0.754	0.224	2.537	0.619	0.649
*No					
Did you get the result of the test?					

Table 5. Contd.

Yes	1.056	0.853	1.308	0.109	0.614
*No					
Have you heard of antiretroviral drugs that help HIV infected people to live longer					
Yes	1.274	0.981	1.655	0.133	0.069
*No					
HIV Knowledge					
Poor knowledge	4.237	3.836	4.666	0.05	<0.001
*Good knowledge					
Heard about HIV prevention through media?					
No	0.989	0.798	1.226	0.11	0.921
*Yes					

Values marked * are reference category. CI: Confidence interval; OR: odds ratio; SE: Standard Error; p: p-value. [a]Reference category is low stigmatization.

The results from this study showed that age, education, occupation, use of ART, HIV knowledge and condom awareness were significant determinants of perceived stigmatization. The finding that perceived stigmatization was significantly higher among younger women (15 to 24 years of age) than older women (those within the 40 to 49 years) is consistent with findings by Chellan (2011) who reported that males below 24 years of age usually have erroneous beliefs about the modes of transmission and prevention practices which leads to stigmatizing attitude. This was further corroborated by Kola et al. (2005) who revealed that younger women within 15 to 24 years were more likely to stigmatize against PLHWA due to misconceptions on the mode of HIV transmission. The belief that PLHWA are promiscuous is stronger among young people which may explain the higher stigmatizing attitudes.

Level of education, HIV knowledge and exposure to media campaigns were significant determinants of stigmatization attitudes among the study population. These findings are consistent with other previous studies (Lau and Tsui, 2005; Ezeiru and Odeyemi, 2013). These studies explored the impact of targeted health education on knowledge of HIV and stigmatization practices among market women in Lagos, Nigeria. There was an increase in the proportion of women showing less stigmatizing attitudes towards PLWHA after receiving the intervention. More than half of the intervention group had secondary education or less. This suggests that women with lower levels of education can benefit from educational programmes designed specifically to improve their knowledge and attitude. Our findings also highlighted the contribution of mass media campaigns in increasing HIV knowledge. This corroborates with the findings by Bekalu et al. (2014); that identified the role of mass media and its association to HIV-related stigma, which revealed that mass media publicity decreases the gaps in HIV knowledge that exists in sub-Saharan Africa.

HIV knowledge around transmission, prevention and exposure to mass media campaigns were strongly associated with perceived stigmatization. Similarly, a study in India showed that persons who had received HIV related information through NGOs and those who were aware of prevention and control services in the area were less likely to discriminate against PLWHA (Challen, 2011).

The association between condom awareness/usage and perceived stigmatization has also been previously reported (Challen, 2011). A possible explanation may be that people who use condoms are very cautious about contracting HIV and realize that the virus may be carried by even healthy-looking people.

Certain characteristics such as religion, marital status, alcohol consumption, willingness to test and having multiple sexual partners did not achieve statistical significance for perceived stigmatization. Christianity and Islam when compared with traditional religions did not show any significant relationship with perception of stigmatization. This may be because religious people are more likely to reach out to the downtrodden, the sick and many faiths based organizations have been major partners in HIV control programmes (James et al., 2009). However, this is contrary to the findings of another study in Hong Kong which revealed that religious people are more likely to make value laden judgments about PLWHA (Lau, 2005). This also corroborated with the report by Asonibare (2009) on religious leaders' perception about PLWHA in Ilorin, Metropolis, Nigeria. It was discovered that perceptions of religious leaders were different based on religious affiliation, age and educational qualifications.

This study also revealed that knowledge of antiretroviral drugs was associated with stigmatization. People who are aware that antiretroviral drugs for PLWHA make them

live longer may tend to report less stigmatizing behavior. This was contrary to Ekama's (2012) study on the pattern and determinants of antiretroviral adherence among Nigerian pregnant women in Lagos State. It was reported that even though maternal desire to protect their unborn child was the greatest adherence motivator for some, majority of these women missed their drugs nor partake in any other HIV-related services because of stigmatization and discrimination associated to being identified as HIV positive. These women had higher tendencies of self-stigmatization and were less aware that antiretroviral drugs help to increase their quality of life (Ekama, 2012).

Conclusions

Stigmatization rates or levels varied among women of reproductive age with less than half reporting low stigma. Low level of education, younger age (15to 24 years of age), poor HIV knowledge, condom use and awareness, as well as antiretroviral drugs and HIV prevention via exposure to media messages were related to perceived stigmatization among women of reproductive age in Nigeria.

This study therefore suggests that in addition to the existing global and national programmes such as Family Life and HIV Education to curb HIV-related stigma, more efforts should be made on reinforcing the effects of stigmatization.

Conflicts of Interests

The authors have not declared any conflict of interests.

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