



## MEDIATORS OF HIV/AIDS AWARENESS AMONG PRIMARY SCHOOL PUPILS IN NIGERIA

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### Abstract

**Background:** HIV/AIDS is endemic in Nigeria since the first case was reported in 1986. Several risk factors contribute to its prevalence, and the successive government has devised different programs to halt the spread. Awareness is one of those programs that helps to promote voluntary testing and prevention of HIV. The aim of this paper is to assess the level of awareness of HIV/AIDS among private and public primary school pupils in Ado-Odo, Ota, Southwest Nigeria.

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**Methods:** Questionnaire was used as the tool for data collection and  $p$ -value  $< 0.05$  was considered significant. Multistage sampling was used to select four primary schools divided into equal numbers of private and public schools. Thereafter, simple random sampling was used to administer the questionnaire to the pupils. The research was conducted in May 2019 and SPSS 23.0 was used in the data analysis. Mediation analysis was used to build the hierarchal models that describe the interrelationship among the variables that was used to measure the level of awareness.

**Results:** Out of 400 questionnaires distributed, 354 representing 88.5% were used for the final analysis. 173 (48.9%) and 181 (51.1%) of the primary school pupils (respondents) were males and females, respectively. The main results are given as follows: The awareness of mode of transmission was the highest and followed by knowledge of preventive measures, general knowledge of HIV/AIDS and knowledge of non-risk factors in descending order. Hierarchical regression analysis yielded two mediation models. Firstly, knowledge of preventive measures mediate the relationship between knowledge of mode of transmission and general knowledge of HIV/AIDS. Secondly, knowledge of non-risk factors mediates the relationship between knowledge of mode of transmission and general knowledge of HIV/AIDS.

**Conclusion:** Awareness of how the infection cannot be transmitted is low which connotes stigmatization. Attitudinal changes are needed and awareness campaigns should be channeled to private primary school. Also, the hierarchical models have provided the link through which possible preventive measures could be explored.

## 1. Background

Human immunodeficiency virus (HIV) is one of the most pandemic diseases in the world and Sub-Saharan Africa in particular. The infection respects no borders and has been isolated in almost all countries. The infection progresses if not slowed down, and reduces the capability of the human immune system to defend the body against several opportunistic infections like tuberculosis. The advanced stage of the infection is referred to as acquired immunodeficiency syndrome (AIDS). HIV is primarily

transmitted through unprotected vaginal, anal or oral sex, mother to child transmission during pregnancy, delivery or breastfeeding, transfusion of contaminated blood and via the use of unsterilized sharp objects or hypodermic needles. Although a fewer percentage of transmission is via the use of unsterilized objects, cultural practices could be implicated in the HIV transmission in Sub-Saharan Africa. Unsafe circumcision, female genital mutilation, traditional birth delivery, and tribal marks are some of such cultural practices. Unsafe sexual relations in sub-Saharan Africa are due to illiteracy, lack of awareness, poverty, child marriage, rape and sexual violence, clandestine love affairs, unregulated prostitution, homosexuality, sexual promiscuity indiscriminate sexual escapades and the use of rape as a weapon of war in crisis ravaged countries in sub-Saharan Africa. The unfortunate combination of the HIV/AIDS pandemic and other diseases of poverty could be responsible for the free fall of average life expectancy in the area. Safe sexual practices, abstinence, circumcision, tackling drug abuse, alleviating pervasive poverty [1], intervention programs created to raise awareness, sex education, provision of affordable health care services, provision of pre and post-exposure prophylaxis and antiretroviral treatments are some of the ways of preventing and treating the infection.

The aim of this paper is to assess the level of awareness of HIV/AIDS among primary school pupils in Ado-Odo, Ota, Nigeria. Assessing knowledge levels and attitudes toward HIV/AIDS is an important ingredient in designing efficient and culturally appropriate awareness and prevention intervention programs [2]. Adequate knowledge of prevention, transmission and treatment of HIV are key components of awareness programs [3]. Impactful intervention must be evidence-based [4] and targeted at a particular risk group. Researches have shown different levels of awareness of the mode of transmission, prevention and treatment of HIV/AIDS. One of the consequences of awareness is that it helps in increasing the likelihood of testing [5] and when an individual is aware of his/her HIV status, it helps in prevention and treatment and hence prevents the infection from deterioration into a full-blown AIDS. A study showed that 90% of the respondents are aware of HIV/AIDS but only 25% had ever tested for HIV [6]. Assessment

of knowledge level determines the extent to which an intervention program can be recommended as the infection thrives on ignorance and rigid attitudinal dispositions. Notably, it was found that educational level of individuals increases the odds of awareness [7].

Low rates of voluntary testing have been reported despite high awareness as seen in a study done in Sierra Leone [8]. Regrettably, awareness has not been to change people's behavior as it concerned with preventive measures as shown in a study carried out in Florida, United States [9]. One of such preventive measures is the use of condoms. High awareness of HIV/AIDS has not in some cases predicted condom use as seen in studies done in South Africa [10], India [11], and the Democratic Republic of Congo [12]. The situation becomes dangerous where low awareness of the effects of HIV/AIDS is prevalent in an area, probably due to illiteracy or geographical variables. In this case, risky sexual behavior prevails in that type of setting [13]. A study in Western Ethiopia, which is characterized by a weak social structure, showed that 33.3% of the participants frequently engage in risky sexual behavior [14]. Some of the risky sexual behaviors especially for the males are often encouraged by confidence derived from spirituality, superstitious beliefs, religiosity, a feeling of invincibility, and invulnerability [15]. Risky sexual behavior and drug abuse have the same heritage of high likelihood of HIV contraction, the levels of awareness notwithstanding [16].

Several researchers have cited stigmatization as the main reason while awareness has not translated to testing and the social stigma attached to HIV discourages people from knowing their status [17, 18]. Also, awareness has not utterly changed the attitude towards HIV/AIDS carriers. Stigma and social distancing are the common negative attitudinal disposition towards HIV positive individuals. A study in Bahrain showed that despite high knowledge of HIV/AIDS, negative attitudes towards HIV/AIDS are prevalent [19].

Different levels of awareness of HIV/AIDS have been reported in both developing and developed countries [20]. In some instances, awareness varies among the mode of transmission, prevention, treatment of HIV/AIDS,

attitude and practices. The variation is due to gender, age, level of educational and social status [21]. The following instances of awareness are given: A demographic survey carried out in Tajikistan showed that 40% of women are not aware of HIV/AIDS [22], however, listening to radio [23] would have increased the awareness if not that the country is one of the poorest in the world where most families reside in remote rural communities with little or no external contact. Hence, awareness of HIV/AIDS varies across geographies [24] and ethnicities [25], for instance, a recent study showed an 80.9% awareness rate among the rural communities in China [26]. A study in North East India found that pregnant women undergoing antenatal have a high level of HIV awareness and preventive measures against the infection [27]. High level of awareness of the role of male circumcision in the prevention of HIV was observed in Botswana [28]. The reference [29] reports an unsatisfactory level of the awareness of HIV and other sexually transmitted infections modes of transmission among Montenegrin sailors. Insufficient knowledge of the threat posed by the HIV pandemic by young Polish people has been reported [30]. Low awareness of the pre-exposure prophylaxis PrEP among men who have sex with men (MSM) in Brazil has been reported by [31] in an online study conducted in 2017. However, a recent study carried out in Brazil showed that the awareness of the use of PrEP has increased over the years among MSM and bisexual men [32]. Similarly, a review showed a low to moderate awareness of PrEP among transgender women [33]. An improvement in the awareness of the importance of antiretroviral treatment among HIV positive Kenyans has been reported [34]. A lack of awareness of HIV prevention among African immigrants to the western world has been reported and could be as a result of low educational levels of the immigrants [35].

Several channels have been used in creating awareness. Some platforms appear to be more suitable in some demographic settings while in some instances, it is skewed towards the choices of the majority of the respondents. The stigma attached to HIV/AIDS determines to a large extent the choice of dissemination of information as privacy is paramount especially for those living with HIV [36]. In this case, telephone hotline is

mostly preferred [37]. Health care professionals are primarily the most commonly listed source of information because of their position [38] and the authenticity of the information at their disposal [39, 40]. The Internet seems to be a fast medium for assessing information about HIV/AIDS [41]. Unfortunately, Internet coverage is low in some developing countries and the problem is compounded by endemic poverty, low energy sources and illiteracy. The use of mass media like television, radio, newspapers [42], and free publicized materials [43] might be a better option. Schools appear to be the main source of information but the medium is often restricted to young people of school-age [44].

## **2. Methods**

### **2.1. Study area, population and eligibility criteria**

The study area is Ota in Ado-Odo/Ota local government area of Ogun State, Southwest Nigeria. The sampling frame is all the primary schools in the area and the respondents are the pupils in private and public schools now called basic 1 to 6 in Nigeria's new educational system. Special schools for intellectual disability persons and adult education schools were excluded. Religious considerations were excluded as the schools and pupils were chosen irrespective of their religion.

### **2.2. Sampling technique**

Multistage sampling was used to select four primary schools divided into equal numbers of private and public schools. Thereafter, simple random sampling was used to administer the questionnaire to the pupils. The research was conducted in May 2019.

### **2.3. Description of the questionnaire**

The questionnaire is a modification of the online version available on <http://docbeecee.co.uk/>. Strongly agree (SA), agree (A), not sure (NS), disagree (D) and strongly disagree (SD) were scored from 4 to 0 in descending order. The cumulative of the responses (variables) were used in the data analysis.

#### **2.4. Ethics**

The research was approved by the Covenant University Public Health Committee. Parental consent for the selected pupils was obtained through the respective school management. The investigators administered the questionnaires to the pupils after parental consent and school approvals were obtained. Verbal consent was used since the investigators were closely monitored by the respective school authorities. The teachers and other officials were present to ensure security, although they were not directly involved in the process. Moreover, the questionnaire was designed to ensure confidentiality. The names of the schools were not stated in compliance with ethical rules. The exclusion of special schools for intellectual disability persons means that the risk status is considerably low.

#### **2.5. Variables**

Seven (7) demographic variables and four awareness variables were used in this work. The demographic variables are age, gender, religion, ethnicity, custodian, class and school type. The first awareness variable is the general knowledge of HIV/AIDS, knowledge of the mode of transmission, knowledge of the preventive measures and the knowledge of the non-risk factors.

#### **2.6. Statistical analyses**

The mean of the questions was used to compute the four major awareness variables. The general knowledge of HIV/AIDS was computed using questions 1 to 6. The knowledge of the mode of transmission was computed using questions 7 to 10. The knowledge of the preventive measures was computed using questions 11 to 14. The knowledge of the non-risk factors was computed using questions 15 to 19. Descriptive statistics were used in the analysis of the responses while Kolmogorov-Smirnov and Shapiro-Wilk tests were used for the test of normality. *p*-value less than 0.05 was considered significant. Mediation analysis was done to determine the effects of some selected variables on others.

### 3. Results

#### 3.1. Demographics analysis

Out of 400 questionnaires distributed, 354 representing 88.5% were used for the final analysis while the remaining were excluded because of non-response. 173 (48.9%) and 181 (51.1%) of the primary school pupils (respondents) were males and females, respectively. 29 (8.2%), 158 (44.6%) and 167 (47.2%) are aged between 5 and 7, 8 and 10, and 11 and 16, respectively. 253 (71.5%), 100 (28.2%) and 1 (0.3%) identified themselves as Christians, Moslems and other religions, respectively. As expected, 284 (80.2%) of the pupils are of Yoruba extraction while 35 (9.9%), 3 (0.8%) and 32 (9%) are of Igbo, Hausa and other ethnic affiliations, respectively. 330 (93.2%), 22 (6.2%) and 2 (0.6%) live with their parents, guardians and others, respectively. 20 (5.6%), 15 (4.2%), 20 (5.6%), 48 (13.6%), 134 (37.9%) and 117 (33.1%) are of classes 1, 2, 3, 4, 5 and 6, respectively. Majority of the respondents are in classes 5 and 6. 156 (44.1%) and 198 (55.9%) of the pupils attend private and public primary schools, respectively.

#### 3.2. Descriptive statistics and normality tests of the responses

The summary of the descriptive statistics of the general knowledge of HIV/AIDS, the mode of transmission, preventive measures, and knowledge of the risk factors and their variables are presented in Table 1 and the following can be deduced:

- The awareness of mode of transmission was the highest and followed by knowledge of preventive measures, general knowledge of HIV/AIDS and knowledge of non-risk factors in descending order.
- In the subdomain of general knowledge, awareness on the full meaning of HIV was the highest while the knowledge that HIV is the same with AIDS is the least.



- In the subdomain of knowledge of the mode of transmission and preventive measures, the pupils have a high level of awareness in all the eight questions.
- Awareness of how HIV cannot be transmitted is generally low.
- The Kolmogorov-Smirnov and Shapiro-Wilk tests showed that none of the domains and the questions is normally distributed. This is an indication that responses are skewed towards a particular option of each of the 19 questions posed in Section B in the questionnaire.

**Table 1.** Mean ranking of the knowledge among the respondents

	Mean	Rank	K-S test	S-W test
General knowledge	2.76	3	0.082*	0.981*
Mode of transmission	3.62	1	0.274*	0.749*
Preventive measures	3.37	2	0.238*	0.838*
Non-risk factors	2.47	4	0.134*	0.912*

K-S test implies Kolmogorov-Smirnov test, S-W test implies Shapiro-Wilk test, \* $p$ -value < 0.05

### 3.3. Hierarchical regression analysis

Hierarchical regression is performed to understand the interconnectivity among the four general HIV/AIDS awareness variables used in this paper which are general knowledge (GK), mode of transmission (MT), preventive measures (PM) and non-risk factors (NF). Mediation analysis was the chosen regression model and two distinct models were obtained. The result was obtained using the Hayes macros available at [www.afhayes.com](http://www.afhayes.com) and [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3), respectively.

#### The first mediation model

The dependent variable ( $y$ ) is the GK, the independent variable ( $x$ ) is MT and the mediating variable or mediator ( $m$ ) is PM.

The first regression submodel is significant ( $F = 50.7866$ ,  $p = 0.0000$ ,  $MSE = 0.3206$ ) and the model is able to explain 12.61% ( $R$  square

= 0.1261) of the variation between the mediator (PM) and the independent variable (MT).

The independent variable MT is significantly related to the mediator PM (coefficient = 0.4079,  $p = 0.0000$ ) as presented in Table 2.

**Table 2.** Summary of the relationship between the mediator PM and MT

Variable	Coefficients	SE	<i>t</i>	<i>p</i> -value	LBC	UBC
Constant	1.8944	0.2092	9.0540	0.0000	1.4829	2.3059
MT	0.4079	0.0572	7.1265	0.0000	0.2953	0.5204

LBC - lower bound of coefficient; UBC - upper bound of coefficient

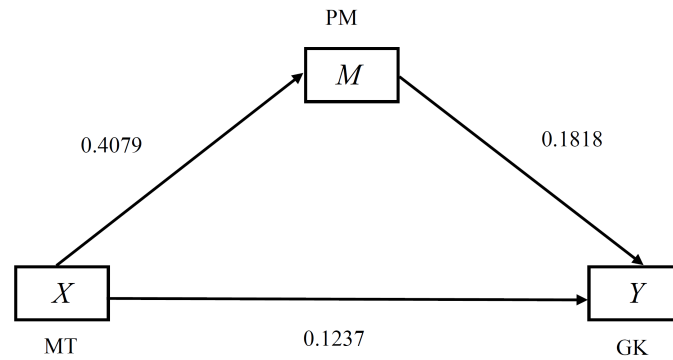
The second regression submodel is significant ( $F = 10.2804$ ,  $p = 0.0000$ ,  $MSE = 0.3678$ ) and the model is able to explain 5.53% ( $R$ -square = 0.0553) of the variation between the dependent variable GK and the independent variable MT mediated by PM.

The second regression submodel yielded some coefficients that explain the relationship between the dependent variable GK and independent variable MT mediated by PM as shown in Table 3.

**Table 3.** Summary of the relationship between GK and MT mediated by PM

Variable	Coefficient	SE	<i>t</i>	<i>p</i> -value	LBC	UBC
Constant	1.7034	0.2488	6.8454	0.0001	1.2140	2.1928
MT	0.1237	0.0656	1.8864	0.0600	-0.0053	0.2527
PM	0.1818	0.0571	3.1848	0.0016	0.0695	0.2941

There is a direct significant relationship between MT and GK (coefficient = 0.1237,  $p = 0.06$ ) and the direct relationship between the mediator PM and the dependent variable GK is also significant (coefficient = 0.1818,  $p = 0.0016$ ). The coefficients of the two submodels are depicted as a single regression model (Figure 1).



**Figure 1.** Knowledge of preventive measures mediating the relationship between knowledge of mode of transmission and general knowledge of HIV/AIDS.

### The second mediation model

The dependent variable ( $y$ ) is the GK, the independent variable ( $x$ ) is MT and the mediating variable or mediator ( $m$ ) is NF.

The first regression submodel is significant ( $F = 5.4930$ ,  $p = 0.0196$ ,  $MSE = 1.4171$ ) and the model is able to explain 1.54% ( $R$  square = 0.0154) of the variation between the mediator NF and the independent variable MT.

The independent variable MT is significantly related to the mediator NF (coefficient = 0.2820,  $p = 0.0196$ ) as presented in Table 4.

**Table 4.** Summary of the relationship between the mediator NF and MT

Variable	Coefficients	SE	$t$	$p$ value	LBC	UBC
Constant	1.4515	0.4399	3.2997	0.0000	0.5864	2.3166
MT	0.2820	0.1203	2.3437	0.0196	0.0454	0.5186

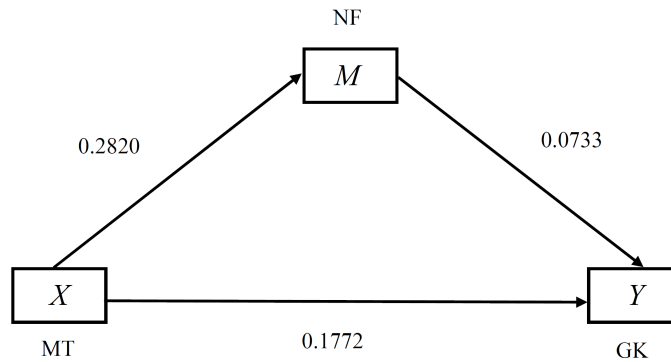
The second regression submodel is significant ( $F = 8.7828$ ,  $p = 0.0002$ ,  $MSE = 0.3708$ ) and the model is able to explain 4.77% ( $R$ -square = 0.0477) of the variation between the dependent variable GK and the independent variable MT mediated by NF.

The second regression submodel yielded some coefficients that explain the relationship between the dependent variable GK and independent variable MT mediated by PM as shown in Table 5.

**Table 5.** Summary of the relationship between GK and MT mediated by NF

Variable	Coefficient	SE	<i>t</i>	<i>p</i> -value	LBC	UBC
Constant	1.9414	0.2285	8.4974	0.0000	1.4921	2.3908
MT	0.1772	0.0620	2.8565	0.0045	0.0552	0.2992
PM	0.0733	0.0273	2.6892	0.0075	0.0197	0.1269

There is a direct significant relationship between MT and GK (coefficient = 0.1772,  $p = 0.0045$ ) and the direct relationship between the mediator NF and the dependent variable GK is also significant (coefficient = 0.0733,  $p = 0.0075$ ). The coefficients of the two submodels are depicted as a single regression model (Figure 2).



**Figure 2.** Knowledge of non-risk factors mediating the relationship between knowledge of mode of transmission and general knowledge of HIV/AIDS.

#### 4. Discussion

The present study has shown that pupils in the study area have a high level of awareness of mode of transmission and prevention of HIV/AIDS which corroborated the findings of [45] although the former surveyed secondary school students in Onitsha, Southeast, Nigeria. The low awareness level on how HIV cannot be transmitted corroborates the findings in

[46]. This can be traced to the negative attitude directed towards HIV persons and endemic culture of stigmatization against those living with HIV/AIDS [47]. The present work showed a high level of misconceptions about the transmissions of HIV which is contrary to the findings of [48]. The homogeneous nature of the respondents could be culpable contrary to the present work that surveyed pupils of different tribes, religion and ethnicity. People living with HIV/AIDS are afraid of disclosure of their status because of the fear of social distancing [49]. Superstitious beliefs are the offspring of a dearth of knowledge about the transmission, prevention and misconceptions of the transmission modes of HIV/AIDS [50]. The present work showed appreciably improvements in the general knowledge of HIV/AIDS compared with the findings of [51]. The average level of awareness of the full meanings of HIV and AIDS is an improvement over the study of [52] where only 5% of the respondents are aware of the full meanings of HIV and AIDS.

Hierarchical regression analysis yielded two mediation models. Firstly, knowledge of preventive measures mediates the relationship between knowledge of mode of transmission and general knowledge of HIV/AIDS. The knowledge of mode of transmission positively influences the knowledge of preventive measures, which in turn positively influences the general knowledge or awareness of HIV/AIDS among the respondents. Secondly, knowledge of non-risk factors mediates the relationship between knowledge of mode of transmission and general knowledge of HIV/AIDS. The knowledge of mode of transmission positively influences the knowledge of non-risk factors, which in turn positively influences the general knowledge or awareness of HIV/AIDS among the respondents. In conclusion, this research has provided models that link various aspects of HIV/AIDS awareness.

## **5. Conclusion and Policy Implications**

The present work considered a population not usually studied by researchers probably because of the age of the pupils. This work has

revealed high awareness among the pupils. The present study should be replicated in all the states in Nigeria in order for policymakers to come up with sustainable plans to thoroughly educate children before they advanced into adolescents [53]. Further works are needed to assess the awareness levels of out of school children especially in the northern part of Nigeria. HIV awareness should not be limited to the high-risk groups but extended to the parents and guardians who should be mandated to educate their wards on the dangers inherent in risky sexual behaviors [54]. Religious leaders should be included in policy plans for the fight against the scourge of HIV/AIDS. Vigorous awareness campaign encourages voluntary HIV testing and hence, a good strategy if a reduction in the transmission of the infection is anticipated [55]. The present work proposes that awareness of HIV/AIDS should start from primary schools because of the falling age of menarche and sexual debuts [56]. Age of sexual maturation and initiation appears to be decreasing and good intervention programs can delay early sexual intercourse and hence reduced the risk of HIV transmission. The mediation results have shown that the general awareness of HIV/AIDS depends on the awareness of the non-risk factors, mode of transmission and preventive measures of HIV/AIDS. Campaign against HIV/AIDS should not be limited to only on aspect but must incorporate all the aspects for maximum impact [57].

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### **Data Availability**

The Research Questionnaire and Data are available upon reasonable request from the corresponding author.

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