Title: Gender Differential in Media Access and Perceived HIV-related Stigma in Nigeria

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Abstract:
We examined the gender differential in the relationship between media access and perceived HIV-related stigma (PHS) in Nigeria. This cross-sectional design study used national survey data. PHS was measured using five variables, with each coded as 0 or 1. A score of 3-5 points was classified as high PHS, 1-2 as low, and 0 as none. Data were analyzed using Chi-square and Generalized linear model (Alpha=0.05). Approximately 18.0% of males and 24.9% of females reported that they will not stigmatize against the PLHA. The mean PHS score was significantly higher among individuals with none and poor media access compared with those who have good access and it was higher among males than females. This pattern persisted when other variables were included in the multivariate model. PHS was high in Nigeria but varies by gender. Media accessibility and sex-specific strategies are likely to facilitate the reduction of PHS in Nigeria.

Keywords: Stigmatization perception, People living with HIV/AIDS, Media access, Nigeria

Background:
HIV/AIDS is one of the topmost development challenges facing less developed countries. Nigeria has the second highest burden of HIV/AIDS worldwide with HIV prevalence of 2.1% among adults compared to other sub-Saharan African countries like South Africa (19.2%) and Zambia (12.9%).[1 2] About 3.5 million people are estimated to be living with HIV/AIDS in Nigeria and the estimated number of new infections and HIV/AIDS-related deaths was 390,000 and 217,000 respectively in 2013.[2] This high number of people living with HIV/AIDS (PLHA) will require care from those who don't have the disease. Research has shown that stigmatization against PLHA has a great influence on coping with the disease and survival chances.[3] Although the cure for HIV/AIDS is yet to be detected, some drugs can be used to reduce the death risk associated with the disease. However, stigmatization and unwillingness to provide care for PLHA might increase the psychological effect associated with the disease.[3] HIV/AIDS-related issues such as awareness, knowledge, and stigmatization are common discourses on radio, television, and newspapers in Nigeria. These aim at improving awareness about the disease, improving its knowledge, and reducing the level of HIV-related stigma. Given the multifaceted nature of the problems associated with HIV/AIDS in Nigeria, government and international agencies have been involved in intervention practices aimed at eliminating discrimination and stigmatization against PLHA.[2] Whereas many investigations have been conducted about HIV-related stigma in Nigeria, many questions remain unanswered on the relationship between media access and perceived HIV stigma by gender in Nigeria.

Methods
The study was conducted in Nigeria. The 2024 projection of the human population was 223.8 million. Nigeria has six geopolitical zones. Each zone is further divided into states, thus making 36 states including the federal capital territory. Nigeria has a heterogeneous population but there are three major ethnic groups, the Hausa, Igbo, and Yoruba. The Hausas are predominantly in the North and the Igbos and Yorubas are in the South. The Northerners are primarily Muslims whereas, the Southerners are mostly Christians. Undoubtedly, this kind of socio-political and religious delineation has a substantial effect on social interactions and interpersonal relationship patterns, of which stigmatization and access

to media information are important features. While culture and ideals are closely related to ethnic ideology in Nigeria, the dominance of foreign religious beliefs influences faithfulness and devotion to these cultural values.

The design of the study was cross-sectional and nationally representative in sample selection. The 2018 Nigeria Demographic and Health Survey data was used. During the data collection, a stratified three-stage cluster design was used. The sample was designed in such a way as to provide data that can be analyzed on HIV/AIDS-related issues and other social and health problems. In this study, we used women and men aged 15-49 years data-sets. However, our study focused on samples of 22918 women and 11460 men thus making a total sample of 34378 subjects. The reduction in the original sample was based on the completeness of information on variables necessary for the measurement of HIV stigma and media access.

Data were extracted from the measure DHS website. This includes women's and men's files. The two files were merged after selecting the variables relevant to the accomplishment of the study aims and objectives from each of the files. The data were weighted before use to limit some of the inadequacies that the cluster design approach that was used during the data collection exercise might cause to data analysis outputs.

The dependent variable was the perception of HIV-related stigma measured with the integration of five relevant questions obtained from the original questionnaire used during the survey. These are: willingness to care for relatives living with HIV/AIDS (Yes=0, No=1); a female teacher infected with HIV, but is not sick, should be allowed to continue teaching (Yes=0, No=1); Can you buy vegetables from a vendor with HIV? (Yes=0, No=1); People living with HIV should be ashamed of themselves (Yes=0, No=1); People living with HIV should be blamed for bringing disease to the community (Disagree=0, Agree=1). In these instances, 1 is an indicator of stigmatization. Aggregating the responses produced a maximum score of 5. Thus, an individual having a score of 3-5 was classified as high perceived HIV stigma, 1-2 as low, and 0 as none.

Media exposure was measured using the frequency of listening to the radio, the frequency of watching television, and the frequency of reading newspapers. The responses to be chosen from are: Not at all, less than once in a week=1, at least once in a week=2, and almost every day=3. These options produced an overall maximum score of 9. This was later disaggregated into three categories none, poor, and good if a respondent scores 0, 1-4, and 5-9 points respectively. Other independent variables are; sex, age, region, residence, education, and religion. Others are; ethnicity, wealth index, marital status, work status, ever been tested for HIV, and HIV knowledge.

Data were analyzed using Chi-square, and a Generalized linear regression model at a 5.0% level of significance. The Chi-square was used to test an association between stigmatization perception (none, low, high) and the independent variables. The Generalized linear regression model was used to identify the determinants of stigmatization perception.

$$\eta_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} \ldots + \beta_p x_{pi}$$

The response $\eta_i, i = 1,2,..n$ is modeled by a liner function of explanatory variables $x_j, j = 1,2,...p$. Using this model, for the categorical variables, a dummy coding was created by making many variables out of the original variable. A categorical variable with k levels was transformed into k-1 variables each with two levels. Careful construction of the variables resulted in uncorrelated dichotomous variables and the variables have the advantage of simplicity of interpretation and are more ideal than the correlated predictor variables. Dichotomous variables like place of residence, sex, were directly entered into the regression model. For those with more than two categories, like religion, household wealth, age etc., dummy coding was used to recode the variables as shown below;

$$x_{pi} = \begin{pmatrix} x_{c_1} \\ x_{c_2} \\ \vdots \\ x_{c_i} \end{pmatrix} = (1 \quad 1 \quad \ldots \quad 1) \begin{pmatrix} 1 & 0 & \ldots & 0 \\ 0 & 1 & \ldots & 0 \\ \vdots & \vdots & \ldots & \vdots \\ 0 & 0 & \ldots & 1 \end{pmatrix}$$

Eleven models were used to describe the relationship between perceived HIV-related stigma and the independent variables. In models 1 and 4, only media exposure was included to examine its singular influence on stigmatization perception among males and females respectively. In models 2 and 5, the interaction between media exposure and HIV-related variables was examined for the two sex groups. Models 3 and 6 are the full models for males and females respectively. In each model, the Akaike information criteria were calculated. The 7-11 models were based on merging the data in the two sex groups to examine the relationship between sex, media exposure, and perceived HIV-related stigma.

Results

The data revealed that 46.7% and 35.1% of males and females have a high level of stigmatization. About 18% of males reported that they will not be stigmatized by the PLHA as against 24.9% of the females. Among all the respondents (males and females combined), 39% have a high level of stigmatization against PLHA while 22.7% said they will not stigmatize PLHA. The media exposure was found to be significantly associated with the perception of stigmatization against PLHA. Among the males, 71.4%, 51.8%, and 26.9% of those with no, poor, and good media exposure respectively have a high level of stigmatization perception against PLHA ($p<0.001$). Approximately, 20.5% of women who have good exposure to media have a high stigmatization perception compared with 43.8% of their counterparts with no media exposure ($p<0.001$). In the male group, across the 6 regions in Nigeria, high stigmatization perception against PLHA was mostly found in the North-West (66.6%) while the least was observed among those in the North-Central region (29.1%).

Having a high level of stigmatization perception falls consistently with increasing levels of education and increased wealth index in the two sex groups. For instance, a high level of stigmatization perception was 66.4% among males who had no formal education as against only 19.9% found among those with higher levels of education. This observed pattern was found among females but males consistently have a higher proportion of their members reporting high HIV-related stigma than females across all levels of education and wealth index. According to the religious group, the male data showed that a higher percentage of respondents who are Muslims (60.8%) have a higher stigmatization perception against PLHA than Christians (34.6%). In either male or female sex composition, the percentage of people who have ever been tested for HIV and those who have good knowledge of HIV have a lower perception of stigmatization against PLHA compared to those who have not undergone an HIV test and those with poor HIV knowledge ($p<0.001$).

To ascertain the influence of education on high HIV-related stigmatization levels across the three ethnic groups. The analysis was restricted to women who had high levels of stigmatization and the result shows that among males, 90% and 68.2% of Yoruba men who have no formal education and primary education have the highest high HIV-related stigma respectively across the three major ethnic groups in Nigeria. This is also the pattern exhibited by women. Six models were used to present the relationship between media exposure, sex, and stigmatization perception against PLWHA. Models 1, 2, and 3 are for males while 4, 5, and 6 are for females. β is the mean difference ($x_{ki} - x_{kj}$) between the HIV-stigma score of a specific category *i* and the reference category *j* of a variable *k*. In the models, positive values of β are indications of a higher risk of HIV-related stigma than the reference categories. Models 1 and 4 show a singular relationship between media exposure and HIV-related stigma among males and females respectively. Models 2 and 5 represent the influence of HIV-related variables in the relationship between media exposure and HIV-related stigma.

In model 1, the data indicated that the risk of stigmatization perception against PLWHA was higher among individuals with no ($\beta=1.30$, S.E=0.05, $p<0.001$) and poor ($\beta=0.90$, S.E=0.03, $p<0.001$) exposure to media respectively than those with good exposure among males. This is because the mean

difference in HIV-stigma score between the men who have poor, no access to media exposure and those with good access was positive. However, the risk was higher among those with no access than those with poor access to media. This observed pattern by males was also exhibited by females (model 4). In each of the sex groups, this was the situation when other variables were included in the model (models 2, 3, 5, and 6). In both sexes, HIV stigma was higher in the South-West than in any other region in Nigeria. Among the females, the mean HIV stigma was 1.25(S.E=0.05, $p<0.001$) higher in the South-West than those in North-Central.

In models 2 and 5, the interactions between media exposure and HIV-related variables show that people with no and poor exposure to media have a higher perception of stigmatization than those with good exposure in both sexes. For instance, men who have never undergone an HIV test have (β=0.76, S.E=0.03, $p<0.001$) a higher perception of stigmatization against PLHA than those who have had an HIV test. The risk of stigmatization perception was (β=0.67, S.E=0.03, $p<0.001$) higher among men who have poor knowledge of HIV than those with good HIV knowledge. These patterns persisted when other variables were used as controls in both sexes. In the full model for either males or females, the identified predictors of stigmatization perception against PLHA are media exposure, age, ever undergone HIV test, region, HIV knowledge, residence, education, religion, ethnicity, and wealth index (models 3 and 6). In these models, the risk of stigmatization perception was higher among individuals with poor and no media exposure respectively compared to those with good media exposure.

When the data for males and females were pooled together to establish the relationship between sex, media exposure, and HIV stigmatization perception amid other confounding variables. The data show that the mean difference of HIV-stigma was 0.33(S.E=0.02, $p<0.001$) higher among males than females and the difference was more (β=0.46, S.E=0.18, $p<0.001$) when media exposure was included in the model (Model 9). Also, the risk of HIV-related stigma was higher among males (β=0.44, S.E=0.02) than females when other possible confounding variables were introduced into the model (Model 11). In Nigeria, the risk of HIV-related stigma was 0.56(S.E=0.003, $p<0.001$), and 0.37(S.E=0.37, $p<0.001$) higher among people with no and poor media exposure respectively than those with good exposure in the full model (Model 11). The likelihood of stigmatizing against PLHA was higher among younger individuals than older ones and was more 0.19(S.E=0.19, $p<0.001$) and 0.11(S.E=0.11, $p<0.001$) among people in the age group 15-24 and 25-34 years respectively than those in the age group 35-49 years (Model 11). HIV-related stigma was higher among those who had poor knowledge of HIV, those who had not had HIV tests, and those who lived in rural areas than those with good knowledge, undergone HIV tests, and those who lived in urban areas respectively. HIV stigma is reduced with increasing levels of education and increasing household wealth. The best model that fits the relationship between HIV stigma, media exposure, and gender was the full model (model 11) because of its lowest value of Akaike Information Criteria (AIC=122177.679).

Conclusion

The perceived HIV-related stigma was high in Nigeria and reduced with an increasing level of media access, but higher among males than females. Study findings highlight gender and media access as important predictors of perceived HIV-related stigma in Nigeria. Interventions to reduce HIV-related stigma in Nigeria must take into account of gender and access to media.

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