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Assessment of Information Sources, Knowledge, Perception and Practices towards COVID-19 among People Living with HIV/AIDs in Enugu State, Nigeria

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Abstract People with underlying health conditions, including people living with HIV/AIDs (PLWHA), are at great risk of contracting COVID-19, and when they do, are likely to suffer severe symptoms. PLWHA face heightened risks as a result of immune compromise, stigma-driven healthcare avoidance, and socioeconomic marginalisation, all of which were determinants extremely relevant in Nigeria's high-HIV-burden settings. This underlines the imperative for population-specific insights, a fact emphasized in all COVID-19 communications. This study, therefore, examined information sources, knowledge, and adherence towards COVID-19 among PLWHA in Enugu State, Nigeria. Data were gathered from 300 people living with HIV/AIDS with a 36-item four-point Likert scale questionnaire, while data analysis was done through descriptive and inferential statistics. Results indicated high exposure to COVID-19 information among PLWHA in Enugu State, Nigeria, with healthcare workers ($M=3.31$, $SD=1.07$) and social media/internet ($M=3.19$, $SD=0.86$) as the dominant sources of information. Knowledge of COVID-19 was high among PLWHA, while educational level ($\beta=0.043$, $p=0.010$), income level ($\beta=0.022$, $p=0.041$), information from family/friends/neighbours ($\beta=0.081$, $p=0.001$) and billboards ($\beta=0.066$, $p=0.004$) were positively associated with higher COVID-19 knowledge. In addition, there was a moderately positive perception of COVID-19 among PLWHA. However, they had a lower perception of the vulnerability of people with underlying health conditions. Receiving information from healthcare workers ($\beta=0.073$, $p=0.001$) was associated with positive perceptions of COVID-19, while exposure to television ($\beta=0.110$, $p=0.020$) predicted negative perceptions. Adherence with COVID-19 preventive practices was significantly higher among males compared to females ($\beta=0.171$, $p=0.000$), urban residence ($\beta=0.140$, $p=0.003$) and exposure to billboards ($\beta = 0.077$, $p = 0.021$). The findings of this study reinforce the need for targeted messages through trusted, contextually appropriate channels to address PLWHA's distinct vulnerabilities.

Keywords COVID-19, Health Information, Knowledge, Perception, Practices, PLWHA, Nigeria

1. Introduction

One of the important facts emphasized in COVID-19 communication is that while the disease is a health threat to the entire human population, people with underlying health conditions such as diabetes, hypertension, tuberculosis, cardiovascular diseases and HIV/AIDS among others face significantly higher risks of severe complications, hospitalisation and mortality if infected [1,2]. People living with HIV/AIDs (PLWHAs), chiefly those with unsuppressed viral loads or comorbidities experience immune dysfunction increasing susceptibility to opportunistic infections, including COVID-19 [3,4]. In Nigeria, which tops as Africa's second HIV epicentre, systemic barriers such as poverty HIV-related stigma, etc. further magnify these risks [5]. In the absence of cure and with vaccines that do not guarantee complete protection, adoption of preventive measures is imperative. This provides the rationale for extensive reliance on the mass media and interpersonal sources to inform and educate the population on the need to adhere to promoted safety protocols.

People's readiness to access health information may be influenced by the level of trust in the sources. They generally turn to the mass media whenever there is a health emergency [6], as studies have identified newspapers, magazines, radio, and television [7-13], social media/internet [14], billboards/infographics [15] as well as family and friends [16-18] as important sources of information on COVID-19. Other studies indicate that health workers [19], public broadcasting services [7] and printed newspapers [13] are trusted more for COVID-19 information. Furthermore, studies have also looked at the role of trust in the mass media and its influence on adherence to COVID-19 preventive measures. However, HIV-related stigma may prevent health information-seeking or disclosure among PLWHA, possibly detaching them from mainstream COVID-19 messaging [20].

Adoption of positive health behaviour is generally the goal of health communication interventions. However, there is never a wholesale adoption of COVID-19 safety measures. Empirical evidence from Enugu state, where the study is focused showed high COVID-19 awareness but low adherence to preventive measures. Mask usage was low (33-34%) regardless of significant willingness if made available [21,22], while handwashing, sanitizer use and social distancing were prevalent [22,23]. While many studies report commendable adherence to the preventive measures among people with underlying health conditions [24-28], others report poor compliance among such vulnerable people, including those living with HIV and AIDs [27,29-31]. Wolf [32] also found in a study in the United States that despite perceiving the seriousness of COVID-19 infection, many of the respondents did not engage in the required behaviour change to protect themselves. Corroborating this, a study in Ethiopia found that only a little over 10% of the respondents with hypertension and diabetes mellitus reported good COVID-19 prevention practices [33].

The apparent knowledge-practice gap can be attributed to some psychographic and demographic factors. For instance, lack of trust in sources of health information may negatively affect adoption of safety measures. In some studies, trust in government sources predicted good preventive practices [24,34]. Two other studies in China and Nigeria found health workers as reliable and authoritative sources of information on COVID-19 [35,36]. Other factors that impinge on adherence to safety protocols include higher education [25,4,37], being female [27,38-40], and older folks [25,41-43]. While a good number of studies have interrogated the association between exposure to health information and adherence to COVID-19 preventive measures in many parts of the globe, very little has been done on how health information has influenced adherence to the promoted safety protocols among people living with HIV in Enugu State Nigeria. This is the gap this study seeks to fill. Consequently, investigating how PLWHA, a group specifically affected by biological, social and structural vulnerabilities access, perceive and act on COVID-19 information is critical for equity-driven pandemic response. This current research addresses these issues among a sample of respondents in Enugu State, Nigeria.

Equally, Health communication plays a crucial role in pandemic response by closing the gap between scientific evidence and public action [44]. Among vulnerable groups such as PLWHA, effective communication attempts to address information accessibility as it addresses barriers such as stigma that truncate access to conventional messaging [45]. Effective communication also improves source trustworthiness and message design through the adaptation of contents that tackle specific concerns such as HIV-COVID-19 interactions [46]. This study therefore applies the Health Belief Model (HBM) to analyze how perceived susceptibility and communication sources affect actions among PLWHA. HBM is a psychological framework that predicts individual perceptions concerning health behaviours and actions through these constructs: perceived susceptibility, severity, barriers, benefits, cues to action and self-efficacy [47,48]. Therefore, in the context of the current research, HBM possesses the capability to explain how levels of perceived susceptibility, barriers to adoption of healthy behaviours during pandemic and how cues might facilitate corresponding actions among PLWHA.

2. Methodology

The study was a survey of people living with HIV/AIDS in Enugu State, Nigeria and made use of a sample of 300 respondents. Enugu state lies in the South-East region of Nigeria, with an estimated population of 4.4 million as of mid-2023. The state has about 59 per cent residing in rural communities and 42 per cent in urban and semi-urban settings. The state also has 17 Local Government Areas (12 rural, 5 urban/semi-urban) [49,50]. Economically, the state remains largely agrarian in rural areas (farmers), while urban centres like Enugu are hubs for trade, services, civil service and education. The state is equally well-literate at 89.5 per cent and hosts 33 tertiary institutions, placing it among the top 10 educated states [51]. The public healthcare in the state is supported by the District Health System, with primary, secondary and tertiary facilities. Regardless, health infrastructure is unequally distributed, wherein urban LGAs have more clinics compared to the rural LGAs [52,53]. Based on a 2024 survey about psychosocial barriers in Enugu, the state has about 3,736 individuals living with HIV aged 15-49 (adult prevalence ≈ 1.9 per cent), which is remarkably greater than the national average of 1.4 per cent in the same age group [50,54]. Consequently, our sample of 300 respondents embodies approximately 8 per cent of all recognized PLWH in care (with age ≈ 18-60), even though several PLWH may not have access or have been lost to follow-up, which could culminate in under-coverage.

Data were elicited in August of 2023, which was nearly three years following Nigeria's first COVID-19 wave. By mid-2023, HIV screening was commonly accessible, and routine ART coverage had improved. Data were gathered from the respondents with a 28-item 4-point Likert scale questionnaire with the help of case managers at six health facilities in the State. The study used three dependent/outcome variables which included knowledge, perception and practices. The exposure to health information scale contained four items; the knowledge scale had seven items, perception scale, eight and adoption, nine. Responses ranged from strongly agree, agree to strongly disagree and disagree. The key independent variable was exposure to health information through channels like radio, television, newspapers, billboards, social media/internet and interpersonal channels (family/friends/neighbours). The study further used individual-level explanatory variables including gender, age, educational qualification, marital status, occupation, income level, and place of residence.

Our sample is composed of 60 per cent females. UNAIDS suggests that around 64.8 per cent of individuals (≥15 years) living with the disease in Nigeria are female [55]. While no single state-specific figure for female portion among PLWHA in the state was available, national trends suggest that women are probably the majority. Respondents were selected from six health facilities (primary or secondary) in three urban and three rural areas. Although the respondents were selected from health facilities, this does not suggest that they are better aware or more likely to adhere to recommendations, as some may access care only when symptoms degenerate or due to external prompts rather than proactive health-seeking behaviour.

Both descriptive and inferential statistical techniques were adopted for data analysis. Descriptive statistics were employed to provide a comprehensive overview of the dataset, including measures of central tendency and dispersion for continuous variables (Mean and standard deviation), as well as frequencies and percentages for categorical variables. Subsequently, inferential analyses were conducted to explore relationships and differences among variables. Independent samples *t*-tests were used to compare means between two independent groups, ANOVA (Analysis of Variance) to assess mean differences between multiple independent groups, and regression analysis (*R*) to investigate the predictive relationships between predictor variables and outcome variables. All statistical analyses were carried out using IBM SPSS Statistics version 26, with a specified alpha level of 0.05 used to assess statistical significance.

2.1. Ethical Clearance

Ethical clearance with certificate No: REC/DMC/UNN/10004-240903 was obtained from the Research Ethics Committee of the Department of Mass Communication, University of Nigeria, Nsukka.

3. Results

i. Demographic characteristics of respondents

As shown in Table 1, females comprised the majority of respondents (59.5%), and their ages ranged from 18 to 61 and above, with a third (33.6%) belonging to the most populated category, 51-61 years. The highest proportion of respondents had completed the Senior Secondary Certificate Examination/General Certificate of Education (35.6%). The majority of respondents were married (63.3%) and lived in urban areas (61.2%). Also, civil servants constituted more than a quarter of the respondents (29.1%) in terms of occupation. Income levels were diverse, with a slight majority (50.2%) earning a paltry sum of less than ₦30,000 (US$24) monthly.

ii. Exposure to Health Information on COVID-19

According to the data summarised in Table 2, respondents indicated a high level of exposure to COVID-19 health information, with a mean and standard deviation of 3.53(0.79). However, the frequency of getting this information differed. Respondents reported limited exposure to COVID-19 information on a daily basis (mean = 1.18, SD = 0.41) and two to three times per week (mean = 1.22, SD = 0.44), with exposure more than three times per week being slightly higher (mean = 1.73, SD = 0.45). The grand mean of 1.78 (SD = 0.22) suggests an overall low to moderate level of frequent information exposure among respondents.

Further data analysis indicated that, the most common sources of COVID-19 information among PLWHA were healthcare staff (mean = 3.31, SD = 1.07) and social media/Internet (mean = 3.19, SD = 0.86). These sources had the highest means, indicating that they were most often accessed and used by respondents. Newspapers (Mean = 1.19, SD = 0.39) and billboards (Mean = 1.31, SD = 0.73) were the least mentioned sources, indicating that conventional media played a minor role in conveying COVID-19 information to this demographic. The overall mean for information sources was 2.17 (SD = 0.60), indicating a moderate dependence on a range of information sources, with significant variation in their use.

Table 1. Demographic characteristics of respondents

Variable	Category	Freq (%)
Gender	Male	117 (40.5)
	Female	172 (59.5)
Age	18-28	19 (6.6)
	29-39	64 (22.1)
	40-50	79 (27.3)
	51-61	97 (33.6)
	61 and above	30 (10.4)
Education	No formal Education	45 (15.6)
	First School Leaving Certificate	63 (21.8)
	Senior Secondary Certificate Examination/General Certificate of Education (SSCE/GCE)	103 (35.6)
	National Certificate in Education/Ordinary National Diploma (NCE/OND)	36 (12.5)
	Higher National Diploma/Bachelor of Science (HND/BSC)	35 (12.1)
	Master's Degree	6 (2.1)
	Ph.D.	1 (0.3)
Marital Status	Single	45 (15.6)
	Married	183 (63.3)
	Divorced/Separated	27 (9.3)
	Widowed	34 (11.8)
Occupation	Unemployed	28 (9.7)
	Student	30 (10.4)
	Farmer	59 (20.4)
	Civil Servant	84 (29.1)
	Trader	68 (23.5)
	Artisan	20 (6.9)
Income Level	Less than ₦30,000 (Approx. $24 or less)	145 (50.2)
	₦30,000-39,000 (Approx. $24-$31)	75 (26.0)
	₦40,000-49,000 (Approx. $32-$39)	23 (8.0)
	₦50,000-59,000 (Approx. $40-$47)	13 (4.5)
	₦60,000-69,000 (Approx. $48-$55)	13 (4.5)
	₦70,000-79,000 (Approx. $56-$63)	4 (1.4)
	₦80,000-89,000 (Approx. $64-$71)	6 (2.1)
	₦90,000-99,000 (Approx. $72-$79)	3 (1.0)
	₦100,000-109,000 (Approx. $80-$87)	3 (1.0)
	₦110,000 and above (Approx. $88 and above)	4 (1.4)
Place of Residence	Rural	112 (38.8)
	Urban	177 (1.2)

Table 2. Exposure to health information on COVID-19 among PLWHA

Statement	Mean	Standard Deviation
I was exposed to health information on COVID-19	3.53	0.79
I received information on COVID-19: Almost every day	1.18	0.41
I received information on COVID-19: Two – three times per week	1.22	0.44
I received information on COVID-19: More than three times per week	1.73	0.45
Grand Mean	1.78	0.22

Also, the most trusted information sources for COVID-19 among PLWH were social media/internet (mean = 3.58, SD = 0.80) and government radio/television stations (mean = 3.53, SD = 0.82). These sources received the highest means, suggesting that respondents believed them to be the most dependable and trustworthy. Private radio/television stations (Mean = 2.64, SD = 1.18) and newspapers (Mean = 2.75, SD = 1.30) were less trusted, indicating that these sources had a lower level of trustworthiness. The overall mean for most trusted information sources was 3.15 (SD = 1.02), showing a rather high degree of trust in available information sources, with some much more trusted than others.

In addition, analysis of the extent to which PLWHA in Enugu State were exposed to health information on COVID-19 across demographic variables as shown in Table 3, indicated significant findings for occupation (F = 5.713, p <.001, η^2 =.019) and place of residence (t = 3.713, p <.001, Cohen's d =.0045). Individuals' occupations and area of residence were strongly associated with their exposure to COVID-19 health information. When comparing occupation types, artisans had the highest mean level of exposure (M = 1.82), followed by traders (M = 1.81) and farmers (M = 1.81). Unemployed persons, on the other hand, reported the lowest mean level of exposure (M = 1.60). In terms of place of residence, those in urban regions had a greater mean level of exposure (M = 1.84) than those in rural areas (M = 1.74).

There were no significant variations in gender (t = 1.77, p =.078), age (F = 0.447, p =.775), marital status (F = 0.073, p =.212), education, or income level (F = 0.621, p =.779). The findings imply that occupation and place of residence significantly influence PLWH's exposure to COVID-19 health information in Enugu State, while gender, age, marital status, education, and income do not.

iii. Knowledge about COVID-19 across Demographics and Sources of Information among PLWHA

Respondents living with HIV/AIDs in Enugu State have a high level of knowledge about COVID-19. The total mean score of 3.05 (SD = 0.34) indicates an in-depth understanding of various aspects of the disease, including its cause, symptoms, transmission modes, and preventive measures. High mean scores were obtained for understanding of symptoms such as cough (M = 3.32), trouble breathing (M = 3.41), and loss of smell (M = 3.31), as well as transmission by air and droplets (M = 3.61), and the importance of getting the COVID-19 vaccination (M = 3.55). However, knowledge about the vulnerability of people with underlying diseases (M = 2.40) and the necessity of wearing face masks (M = 1.91) was relatively lower. Overall, the respondents demonstrated a high level of knowledge about COVID-19 (Table 4).

A multiple linear regression was performed to predict knowledge about COVID-19 among PLWHA in Enugu State based on their exposure to health information about the disease. The findings from the regression analysis indicate a significant model. The overall statistics are (F(14, 273) = 6.106, p< .000), showing that the predictors collectively have a significant impact on the dependent variable knowledge of COVID-19. The R-squared (R^2) value is 0.238, which suggests that approximately 23.8% of the variance in knowledge of COVID-19 can be explained by the model's predictors.

Among the predictors, education level (β = 0.043, p = 0.010), income level (β = -0.022, p = 0.041), information from family/friends/neighbours (β = 0.081, p = 0.001), and billboards (β = 0.066, p = 0.004) show statistically significant associations with knowledge of COVID-19, as shown in Table 5. Higher education levels, as well as obtaining information from family/friends/neighbors and billboards, are positively associated with higher COVID-19 knowledge. Higher income levels, on the other hand, are inversely associated with COVID-19 knowledge, albeit by a modest margin. Other variables, such as gender, age, marital status, occupation, place of residence, and information sources, such as healthcare workers, government and private radio/television stations, newspapers, and social media/internet, had no significant individual effects. Nonetheless, the overall model emphasises the role of education, income level, and specific sources of information in shaping COVID-19 knowledge among PLWHA.

Table 3. Exposure to health information on COVID-19 across Respondents' Demographics

Variables	Test	*F* or *t* Value	*P* value	Effect size
Gender	Independent samples *t* test	1.77	.078	-
Occupation	ANOVA	5.713	.000	.019
Place of residence	Independent samples *t* test	3.713	.000	.045
Age	ANOVA	.447	.775	-
Education	ANOVA			-
Marital status	ANOVA	.073	.212	-
Income level	ANOVA	.621	.779	-

Table 4. Knowledge about COVID-19 among PLWHA

Statement	Mean	Std. Deviation
COVID-19 was caused by the novel SARS Coronavirus 2	3.02	0.88
Fever is a symptom	3.13	0.69
Fatigue is a symptom	2.73	0.86
Cough is a symptom	3.32	0.88
Difficulty breathing is a symptom	3.41	0.82
Nausea is a symptom	3.22	0.93
Loss of smell is a symptom	3.31	0.89
Touching the eyes, nose, and mouth after touching an infected person or surface	3.15	1.02
Air and droplets from the mouth of infected persons when they speak, laugh, sing or sneeze	3.61	0.60
Every person can be infected with COVID-19	2.95	0.87
People with underlying diseases are more vulnerable to COVID-19	2.40	1.00
People living with HIV/AIDS are more likely to have severe symptoms if they contract COVID-19	3.45	0.63
Wearing face mask when outdoors	1.91	0.805
Regular washing of hands with soap under running water	3.13	0.82
Use of hand sanitizer	3.00	0.68
Observing physical distancing	2.57	0.92
Taking COVID-19 vaccine	3.55	0.55
Overall Mean	3.05	0.34

Table 5. Knowledge of COVID-19 across Demographics and Sources of Information of PLWHA

Model	B	Std. Error	T	Sig.	95% Confidence Interval for B
Gender	0.066	0.038	1.736	0.084	-0.009, 0.141
Age	0.010	0.019	0.532	0.595	-0.028, 0.048
Education	0.043	0.016	2.591	0.010	0.010, 0.075
Marital Status	-0.016	0.025	-0.651	0.515	-0.065, 0.033
Occupation	-0.002	0.014	-0.146	0.884	-0.029, 0.025
Income Level	-0.022	0.011	-2.057	0.041	-0.044, -0.001
Place of Residence	0.009	0.039	0.233	0.816	-0.068, 0.087
Healthcare workers	0.016	0.027	0.621	0.535	-0.036, 0.069
Family/friends/neighbours	0.081	0.024	3.420	0.001	0.034, 0.128
Government radio/television station	0.006	0.026	0.221	0.825	-0.046, 0.057
Private radio/television stations	0.003	0.023	0.137	0.891	-0.042, 0.048
Newspapers	0.036	0.019	1.927	0.055	-0.001, 0.072
Social media/internet	0.038	0.026	1.500	0.135	-0.012, 0.089
Billboards	0.066	0.023	2.939	0.004	0.022, 0.111
F	6.106				
R^2	0.238				

iv. Perception of COVID-19 across Demographics and Sources of Information of PLWHA

As shown in Table 6, perception of COVID-19 among PLWHA demonstrates a generally cautious attitude. Higher averages for issues regarding the seriousness (Mean = 2.91, SD = 0.93) and presence of COVID-19 in Nigeria (Mean = 3.23, SD = 0.70) indicate that PLWH recognize the gravity and prevalence of the virus. On the other hand, lower averages concerning issues about the severity of symptoms in people with underlying conditions (Mean = 1.78, SD = 0.76) and the specific risks for PLWH (Mean = 2.29, SD = 0.95) suggest that they perceive their personal risk as somewhat lower. The overall mean score of 2.62 (SD = 0.33) indicates a moderate perception of COVID-19. PLWH acknowledge the seriousness and risks associated with the virus, but their perception is not overly negative.

For this study, a positive perception suggests heightened awareness and acknowledgment of the risks presented by the pandemic, including personal susceptibility. Contrarily, a negative perception encapsulates underestimation of risks or doubt in the severity or existence of the virus. Consequently, the total mean score (2.62) indicates a moderate level of risk awareness and severity concerning COVID-19, although some gaps persist, specifically in comprehending personal vulnerability.

Regression analysis was conducted to investigate the impact of demographics and information sources on COVID-19 perception of risks and seriousness among PLWHA. Only a few predictors show statistically significant correlations with perception (Table 7). Notably, healthcare staff (β = 0.073, p = 0.001), exposure to television (β = -0.110, p = 0.020) and interaction with family/friends/neighbors (β = -0.171, p = 0.012) had substantial effects. Specifically, PLWH who obtain information from healthcare providers have a more positive perception of COVID-19, whereas those who are influenced by family, friends, or neighbours and Television have a negative perception. Other factors, such as income level (β = -0.021, p = 0.073) did not reach statistical significance.

Table 6. Perception of Risks and Seriousness of COVID-19 among PLWHA

Statement	**Mean**	**Std. Deviation**
COVID-19 is a serious disease	2.91	0.93
COVID-19 is in Nigeria	3.23	0.70
COVID-19 is serious only in western countries	2.97	0.81
COVID-19 can kill	2.78	0.91
COVID-19 kills only White people	2.53	1.20
Any person can be infected with COVID-19	2.50	0.98
People with underlying diseases are likely to have severe symptoms when they contract COVID-19	1.78	0.76
PLWHA are at great risk of contracting COVID-19 and are likely to have more severe symptoms if they contract it	2.29	0.95
Total Mean and SD	2.62	0.33

Table 7. Perception of Risks and Seriousness of COVID-19 across Demographics and Sources of Information

Model	**B**	**Std. Error**	**T**	**Sig.**	**95% Confidence Interval for B**
Gender	-0.025	0.042	-0.605	0.546	-0.107, 0.057
Age	0.012	0.020	0.581	0.562	-0.028, 0.052
Education	0.010	0.019	0.518	0.605	-0.027, 0.046
Marital Status	0.001	0.026	0.037	0.970	-0.051, 0.053
Occupation	0.003	0.014	0.206	0.837	-0.025, 0.031
Income Level	-0.021	0.012	-1.800	0.073	-0.044, 0.002
Place of Residence	0.008	0.043	0.182	0.856	-0.077, 0.092
Family/friends/neighbours	-0.171	0.068	-2.533	0.012	-0.305, -0.038
Radio	0.051	0.070	0.723	0.470	-0.088, 0.190
Television	-0.110	0.047	-2.334	0.020	-0.202, -0.017
Newspaper	0.064	0.062	1.026	0.306	-0.058, 0.185
Billboards	-0.034	0.031	-1.115	0.266	-0.094, 0.026
Social media/Internet	0.011	0.024	0.477	0.634	-0.036, 0.059
Healthcare workers	0.073	0.021	3.513	0.001	0.032, 0.114
F	3.48				
R^2	0.15				

The F-value of 3.48 ($p < 0.000$) indicates that the model's predictors explain a significant amount of the variance in COVID-19 perception of risks and seriousness among PLWH. The R^2 value of 0.15 indicates that the variables in the model account for approximately 15% of the variability in perception. While not extraordinarily high, this implies a significant amount of explanatory power.

v. Adherence to COVID-19 Prevention across Demographics and Sources of Information of PLWHA

The data shown in Table 8 demonstrate that PLWHA commonly recognised the importance of preventive measures, with high agreement concerning the efficacy of masks, handwashing, and vaccines (Mean = 3.52). Regardless, self-reported adherence varied. While hand sanitizer use was regular (Mean = 2.93), steady mask wearing (Mean = 2.74) and physical distancing (Mean = 1.89) were less practiced. This implies a gap in behaviour.

Regression analysis showed that gender, and place of residence significantly predicted adherence to COVID-19 prevention (Table 9). Males ($\beta = -0.171$, $p = 0.000$) and urban dwellers ($\beta = 0.140$, $p = 0.003$) revealed higher adherence. Other demographic characteristics, such as age, education, marital status, occupation, and income level were not significant.

Table 8. Adherence to COVID-19 Prevention Practices among PLWHA

Statement	Mean	Std. Deviation
The use of face masks, regular hand washing, physical distancing, hand sanitizer, and COVID-19 vaccines can protect one against COVID-19	3.52	0.70
To protect myself against COVID-19 I regularly wore face mask when outdoors	2.74	1.01
I regularly washed my hands with soap under running water	2.21	1.04
I observed physical distancing	1.89	0.91
I regularly used hand sanitizer	2.93	0.82
I took COVID-19 vaccine	2.72	0.80
I only wore face mask when I was compelled to do so such as at the bank or to avoid trouble with law enforcement officers	2.62	1.09
I only washed my hands when I wanted to eat	1.63	0.86
I did not always observe physical distancing	1.99	1.11

Table 9. Adherence to COVID-19 across Demographics and Sources of Information

Model	B	Std. Error	*T*	Sig.	95% Confidence Interval for B
Gender	-0.171	0.046	-3.755	0.000	-0.261, 0.082
Age	-0.002	0.022	-0.069	0.945	-0.046, 0.043
Education	-0.026	0.020	-1.259	0.209	-0.066, 0.015
Marital Status	0.023	0.029	0.789	0.431	-0.034, 0.079
Occupation	-0.026	0.016	-1.646	0.101	-0.056, 0.005
Income Level	0.006	0.013	0.512	0.609	-0.018, 0.031
Place of Residence	0.140	0.047	2.985	0.003	0.048, 0.233
Family/friends/neighbours	-0.072	0.074	-0.975	0.331	-0.218, 0.074
Radio	0.057	0.077	0.731	0.465	-0.096, 0.209
Television	-0.038	0.052	-0.732	0.465	-0.139, 0.064
Newspaper	-0.026	0.068	-0.382	0.703	-0.160, 0.108
Billboards	0.077	0.033	2.314	0.021	0.012, 0.143
Social media/Internet	0.001	0.026	0.025	0.980	-0.051, 0.052
Healthcare workers	0.014	0.023	0.612	0.541	-0.031, 0.059
F	3.20				
R^2	0.14				

Furthermore, the influence of diverse sources of information on adherence to COVID-19 prevention appears to be minor, as seen by non-significant coefficients. Exposure to billboards was associated with somewhat higher adherence ($\beta = 0.077$, $p = 0.021$). Although this suggests a possible influence of billboard messaging, the results are based on self-reported behaviour. The model's statistical significance ($F = 3.20$, $p<0.001$) and R^2*value* of 0.14 suggest that the combination of predictors accounts for 14% of the variability in adherence to COVID-19 procedures among PLWHA. Gender and place of residence play notable roles. For example, adherence to COVID-19 preventive practices was significantly higher among males compared to females. Other demographic factors and sources of information have limited influence on adherence, highlighting the complexity of factors influencing behaviour in this population.

4. Discussion

This study assessed information sources, knowledge, perception, and practices towards COVID-19 among people living with HIV/AIDS in Enugu State, Nigeria. Results indicate a high level of exposure to information on COVID-19 among PLWHA in Enugu consistent with other studies [56,57]. The reported high level of exposure to information on the pandemic is not surprising considering its global impact and extensive coverage by the mass media. Health care workers, followed by the social media/internet, emerged as the most common sources of information. The strong demonstration of health care workers as sources of information on COVID-19 is in sync with previous research [19]. The plausible explanation for this outcome might be that PLWHA frequently rely on health care workers for necessary information on issues that concern their health [58]. The social media/internet were also important sources of information. The world over, millions of people access information through these channels, and during the pandemic they played pivotal roles in information dissemination. Huang [14] equally found the internet as an important source of information on COVID-19. It is also noteworthy that the social media/internet were found to be the respondents' most trusted sources of information along with public broadcast stations. The trust placed on government broadcast media in a nation where the government suffers from a trust deficit may be linked to the fact that the Presidential Task Force on COVID-19 was the official committee for managing the crisis in Nigeria and engaged the media regularly for updates. Other studies [7,35,36] also reported trust in the public media. Our findings underscore how PLWHA's dual burden of medical vulnerability and systemic marginalization determines COVID-19 knowledge and practices. As an example, reliance on healthcare practitioners for trusted information buttresses the need to incorporate pandemic messaging into HIV care pathways, while stigma may explain lower risk perception among some respondents.

When exposure to COVID-19 information was considered, it was found that artisans/traders and urban residents had the highest mean level of exposure. This might be due to the fact that most artisans depend on daily wages for their livelihood and would naturally seek information on COVID-19 and how different policies such as shelter-in-place policies affected their businesses. In the same vein, urban dwellers were more impacted by COVID-19 restrictions and were more likely to seek information on the pandemic.

Knowledge about COVID-19 was generally high among the respondents. Other studies [12,10] equally reported good knowledge of COVID-19 among their study populations. With the global community being swamped with information on the pandemic through mass media and interpersonal channels, it should be expected that people would have good knowledge of the health crisis. Furthermore, higher education, information from interpersonal channels (family/friends/neighbours) and billboards were positively associated with knowledge of COVID-19. The positive impact of education on knowledge agrees with other studies [11,59]. Educated people due to their cognitive abilities not only intentionally seek knowledge, but can understand health information better than the uneducated. Higher income however, was found to be negatively associated with knowledge. This is inconsistent with a study conducted in Malaysia which found that higher income predicted knowledge of COVID-19 [60]. The poor knowledge among high-income earners might be due to misinformation or the fact that, at some point people felt overwhelmed with too much information and stopped paying attention to the mass media.

While PLWHA showed high knowledge of the pandemic (i.e., transmission modes, symptoms), their perception of personal risk was lower, specifically concerning susceptibility as immunocompromised persons. Such discrepancy is reflected in previous research [61], where 39% of PLWHA underestimated their risk of contracting the disease, probably as a result of misinformation (i.e., false beliefs about ARVs conferring immunity). These kinds of gaps emphasize the need for tailored messaging to address misconceptions.

The disconnect between high knowledge and low personal risk perception among PLWHA could be explained by a variety of factors. First, narratives in Nigeria usually frame severe illnesses as "foreign" or meant for specific demographics, possibly weakening personal risk assessment [62]. Second, PLWHA may rank HIV management over emerging threats, perceiving the pandemic as secondary to their major health burden. This is consistent with a previous study [63], where chronic condition patients showed risk fatigue during pandemic.

Tackling these gaps requires debunking myths via trusted channels and framing risks across HIV care frameworks.

The study further found that accessing information on COVID-19 from healthcare workers was positively associated with perception. This should not be surprising in view of the respondents' perception of healthcare workers as trusted sources of information. Television and family/friends were however, negatively associated with perception. A study in China [64] equally found that exposure to television and internet news was not correlated with risk perception. One plausible reason for this could be that Nigerian television channels failed to show pictures of people with COVID-19 in the hospitals and quarantine centres. This contributed to public scepticism about COVID-19 in Nigeria.

There was relatively high adherence to certain safety measures such as using hand sanitizers and vaccines, but less consistent use of face masks when outdoors, regular hand washing with soap and observing physical distancing. Inconsistency in the adoption of safety protocols even among PLWHA is equally reported in other studies [27,29-31]. This attitude might be informed by the fact many people found some safety practices such as wearing face mask inconvenient, and some are engaged in businesses that make physical distancing difficult.

Consistent with related studies [65,66], urban dwellers demonstrated higher adherence measures compared to rural residents, probably due to greater exposure to enforcement and health campaigns. Likewise, women's adherence exceeded that of men. This is consistent with several global trends [27,38-40]. These patterns indicate systemic (e.g., healthcare access) and socio-cultural (e.g., gender caregiving roles) factors might affect adherence more than HIV-specific vulnerabilities.

Furthermore, the HBM helps to elucidate the research findings by connecting perceptions to behaviour. Regardless of the high level of knowledge, PLWHA demonstrated low perceived susceptibility to COVID-19 and encountered barriers such as discomfort with face masks, discouraging adherence. Cues from healthcare workers defined risk perception compared to mass media. This indicates that the quality of communication has more consequences than the amount of information in influencing health behaviours among vulnerable groups [47,48].

Overall, the current research contributes to health communication research by underscoring the dual dependence of PLWHA on healthcare workers for trust and social media for accessible information, which necessitate integrated messaging. It equally unravels message fatigue, wherein high knowledge coincides with low-risk perception, indicating possible information overload in lengthened crises. Furthermore, it reveals the constrained impact of cues to action, highlighting the significance of spatial factors in communication strategies within resource-constrained areas.

4.1. Study Limitation

This study's results are limited by its focus on Enugu State, which can affect generalizability to other Nigerian regions or global contexts with unique healthcare infrastructure and norms. As an example, urban-rural disparities in Enugu (e.g., clinic access) may not showcase patterns in states with higher HIV prevalence or weaker health systems. Future studies could conduct similar research from multi-states or national samples to corroborate or invalidate the current findings. Nevertheless, the study provides in-depth insights into the process through which marginalized groups use health information in times of crises, with implications for comparable resource-limited settings.

5. Conclusions

This study illuminates the critical role of healthcare workers and social media/Internet as primary sources of COVID-19 information for PLWHA in Enugu State, Nigeria, emphasizing the need for health communication strategies to leverage these channels effectively. The study highlights that while PLWHA had high exposure to COVID-19 information, mainly from healthcare workers and social media, critical gaps existed in personal risk perception and adherence to preventive measures. Despite identifying the severity of the disease, respondents underestimated their vulnerability as immunocompromised folks. Education, occupation, residence and specific information sources significantly impacted outcomes. This underscores the significance of designing health communication strategies to the peculiar needs of the population of study. Specifically, incorporating pandemic communication into HIV care programmes, leveraging trusted sources and tackling systemic barriers (e.g., rural disparities, gendered behaviours) to close the knowledge-behaviour gap among PLWHA in the population.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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