



# The health inequity and socioeconomic inequality faced by adolescent girls and women on the move living with or at high risk of HIV infection, during the COVID-19 pandemic in Nigeria

Erik Lamontagne <sup>1,2</sup>, Hasiya Yunusa Nyako,<sup>3</sup> Amaka Enemo,<sup>4</sup> Aaron Sunday,<sup>5</sup> Amira Muhammad,<sup>6</sup> Rilwan Mohammed Abdullah,<sup>7</sup> Henry Okiwu,<sup>8</sup> Veronica Undelikwo,<sup>9</sup> Pamela Ogbozor,<sup>10</sup> Oluwaranmilowo Amusan,<sup>11</sup> Oluwatoyin Alaba,<sup>11</sup> Gabriel Undelikwo,<sup>12</sup> Koubagnine Takpa,<sup>12</sup> Greg Ashefor,<sup>13</sup> Matthew Kavanagh,<sup>14,15</sup> Moréniké Oluwátóyìn Foláyan <sup>16</sup>

**To cite:** Lamontagne E, Nyako HY, Enemo A, *et al.* The health inequity and socioeconomic inequality faced by adolescent girls and women on the move living with or at high risk of HIV infection, during the COVID-19 pandemic in Nigeria. *BMJ Glob Health* 2023;**8**:e012116. doi:10.1136/bmjgh-2023-012116

**Handling editor** Seye Abimbola

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/bmjgh-2023-012116>).

Received 7 March 2023  
Accepted 9 September 2023



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

For numbered affiliations see end of article.

## Correspondence to

Dr Erik Lamontagne;  
lamontagne@unaids.org

## ABSTRACT

**Background** We assessed if women and girls on the move living with or at high risk of HIV faced increased health inequity and socioeconomic inequalities during the COVID-19 pandemic compared with other vulnerable women and girls.

**Methods** We used data collected through a survey conducted in Nigeria between June and October 2021. Women and girls living with or at risk of HIV were recruited voluntarily, using a combination of venue-based and snowball sampling. We performed multivariable logistic regression models per mobility and HIV status to determine associations between health inequity, socioeconomic inequalities and macrosocial characteristics.

**Findings** There were 3442 participants, of which 700 were on the move. We found no statistical difference between HIV-negative women and girls on the move and those not on the move. On the opposite, we found substantial differences in health inequity and socioeconomic inequalities between women and girls on the move living with HIV and those not on the move living with HIV. There are very strong associations between being a woman or girl on the move living with HIV and facing economic precarity (aOR 6.08, 95% CI 1.94 to 19.03), food insecurity (aOR 5.96, 95% CI 2.16 to 16.50) and experiencing more gender-based violence since COVID-19 started (aOR 5.61, 95% CI 3.01 to 10.47).

**Interpretation** Being a woman or girl on the move and living with HIV compound increased health and socioeconomic vulnerabilities. The COVID-19 crisis seems to have exacerbated inequalities and gender-based violence. These findings call for more feminist interventions to protect women on the move living with HIV during health crises.

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Most existing studies considered the HIV status of migrants in Europe, but there is limited knowledge on the health inequity and socioeconomic inequality faced by women and girls on the move living with or at high risk of HIV in sub-Saharan Africa.

## WHAT THIS STUDY ADDS

⇒ This study provides new information about the health inequity and socioeconomic inequality faced by women and girls on the move living with or at high risk of HIV in Nigeria, one of Africa's countries with the biggest burden of migrants, internally displaced people, returning migrants and asylum-seekers.

⇒ The study confirmed that the COVID-19 pandemic had caused economic precarity, food insecurity and increased risk for gender-based violence for women and girls on the move living with HIV in Nigeria. A piece of new information was the observed high level of resilience of women and girls on the move living with HIV compared with other African women living with HIV but not on the move.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The findings of this study call for two urgent interventions in conflict zones and migration routes in ways that can enhance programmes designed to address the preparedness of people on the move for future pandemics. First, there is a need for more feminist and bold interventions to protect women on the move living with HIV. Second, for further studies of women and girls on the move living with HIV in Nigeria to learn how to translate lessons on resilience for humanitarian programmes.

## INTRODUCTION

Women and girls living with or at high risk of HIV infection face numerous obstacles that hinder their access to equitable health services and increase their risk of experiencing social disparities. These challenges include difficulties accessing comprehensive sexual and reproductive health (SRH) education. It results in insufficient knowledge about HIV prevention, transmission and treatment options.<sup>1</sup> It also leads to gender inequality and discrimination, which limit young women's access to resources, opportunities and decision-making power.<sup>2–3</sup> Societal norms and cultural expectations disadvantage young women, impacting their education, employment prospects and economic empowerment.<sup>4</sup> Barriers related to stigma, discrimination and the intersection of HIV and gender bias impede young women's access to education and employment opportunities.<sup>5</sup> Economic dependence on partners, family members or caregivers compromises autonomy and restricts decision-making regarding healthcare, including accessing appropriate treatment, preventive measures and support services.<sup>6</sup> Limited access to social support networks negatively affects mental health and well-being.<sup>7</sup> Insufficient support hampers their ability to navigate healthcare systems and obtain necessary services.<sup>8</sup> In addition, challenges in accessing comprehensive SRH services, including contraception and antenatal care, further exacerbate existing health disparities.<sup>9</sup> They also have heightened vulnerability to sexual exploitation, abuse and violence.<sup>10</sup>

Women and girls on the move include migrants, refugees, asylum-seekers, returning migrants and internally displaced people (IDP).<sup>11–14</sup> Many have limited or no access to social protection systems,<sup>15</sup> they deal with racialism and experience xenophobia leading to stigmatisation and discrimination,<sup>16</sup> and are at higher risks of gender-based violence, abuse and exploitation.<sup>17</sup> These experiences were heightened during the COVID-19 pandemic. They faced an increased risk of COVID-19 infection,<sup>18</sup> and the loss of employment and wages resulting from COVID-19 was more precarious in the absence of social protection systems and poor access to the COVID-19 special measures in the countries of residence.<sup>19</sup> They also face higher risks of gender-based violence, abuse and exploitation during the COVID-19 pandemic.<sup>20</sup> Finally, the closure of borders and other movement restrictions to curb the spread of COVID-19 may have impacted the human rights of many people on the move<sup>14</sup> and forced them to rely on alternative and unsafe migratory routes.<sup>21</sup>

Although there is limited information regarding people on the move in low-income and middle-income countries like Nigeria, the available evidence suggests that states' response to their needs has been inadequate.<sup>22</sup> As of June 2023, Nigeria was home to large population groups in vulnerable situations, including 98 645 refugees and asylum-seekers and 3.58 million internally displaced persons who had been forced to leave their homes.<sup>23</sup> The country has also provided refuge to individuals fleeing

violence in Cameroon.<sup>24</sup> It also accounts for more than 1.7 million unsettled returning migrants, that is, former Nigerian migrants and refugees in other countries, who return to their home country. Many are women returning from unsuccessful attempts to cross the Mediterranean from Libya. Returnees often come back destitute and may be economically worse off than before they left.<sup>25</sup>

This study aimed to assess if women and girls on the move were facing increased health and socioeconomic inequalities than other vulnerable women and girls in Nigeria since the COVID-19 pandemic started. The study focuses on those living with or at high risk of HIV infection.

## METHODS

### Participants and study design

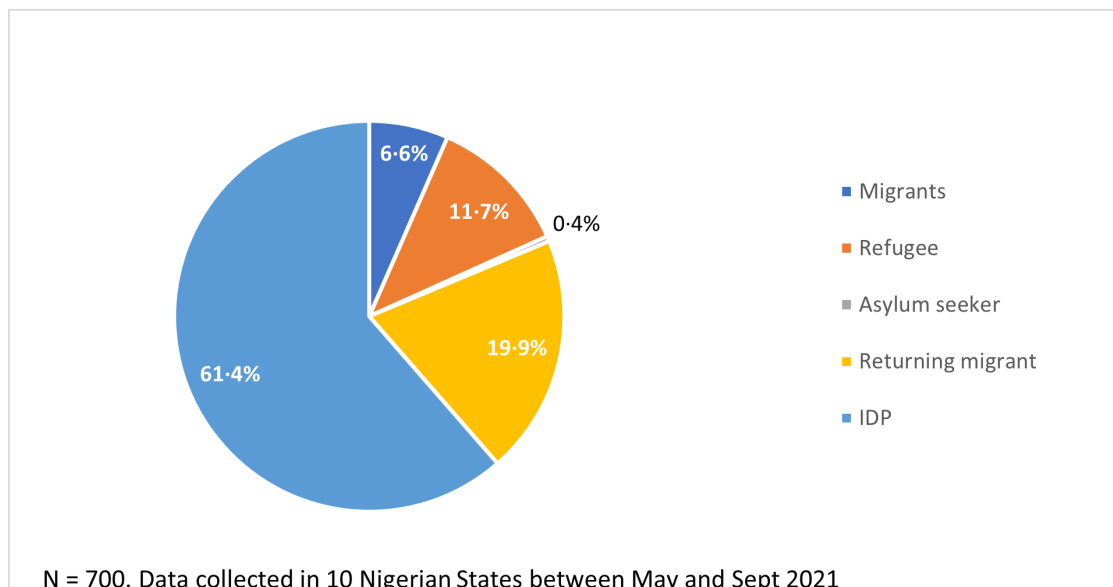
As mentioned in the Global AIDS strategy 2021–2026: End inequalities end AIDS,<sup>26</sup> adolescent girls and young women in sub-Saharan Africa are among the priority population groups. Women and girls account for 59% of new infections in sub-Saharan Africa. Globally, AIDS remains one of the leading causes of death for women aged 15–49. Women and girls who belong to key populations, that is, women and girls living with HIV, as well as those who inject drugs, those engaging in sex work, those living with disability, and those on the move who experience high risks of acquiring HIV and are less likely to access services.

The current research focuses on women and girls on the move. The participants' data come from a cross-sectional survey on adolescent girls and women living with or at high risk of HIV. The survey was conducted in collaboration with community-based organisations in Nigeria between June and October 2021, corresponding to the period between the second and third waves of COVID-19 in the country. The survey determined the social, economic and health impact of COVID-19 on vulnerable girls and women living with HIV in Nigeria.

The survey covered the country's six geopolitical zones, with participants recruited from Adamawa, Akwa-Ibom, Anambra, Benue, Enugu, Gombe, Kaduna, Lagos, Nassarawa and Niger States. Women and girls living with or at risk of HIV were recruited voluntarily using a combination of venue-based and snowball sampling. Survey participants included women living with disability, those who engaged in sex work or transactional sex, who used psychoactive substances, or who were on the move (migrants, refugees, asylum-seekers, IDPs, and returning migrants). More details of the survey's methodology are provided in online supplemental file 1 and other studies.<sup>27–29</sup>

### Exposure measures

In this study, we considered the health and socioeconomic impact of the COVID-19 pandemic on women and girls on the move in Nigeria based on their self-declared HIV status. We created a dichotomic variable for people on



**Figure 1** Adolescent girls and women on the move, per category.

the move, including migrants, refugees, asylum-seekers, IDPs and returning migrants.

As described in [figure 1](#), we first explored the socio-demographic characteristics of women and girls on the move depending on their HIV status. In a second step, We considered three outcomes, corresponding to three dimensions of inequality, described in the next section and performed inferential statistical analysis on those women and girls on the move living with HIV and compared their situation to other vulnerable women and girls living with HIV but who are not on the move. Readers may also refer to the conceptual framework in online supplemental material S2.

### Outcome measures

We identified key markers to measure health inequities, socioeconomic inequalities and macrosocial categories associated with HIV vulnerability. The selection of each independent variable followed three broad steps: we started with a literature review to identify the potential measures and corresponding variables that could proxy the situation or the behaviours associated with the research question. Following this step, we assembled a long list of measures that we tested for their association with being a woman on the move living with HIV (the exposure or dependent variables). We then checked for collinearity and endogeneity before ending with a short list of relevant measures. Finally, we limited the number of measures to what was strictly necessary, applying the principle of parsimony<sup>30–32</sup> not to overfit the model. We provided a complete description of the measures and variables below in online supplement S1 and S2.

### Health inequity

Health inequity was measured with four measures, two related to access to health services: namely ‘access

to HIV service’ and ‘access to sexual and reproductive health services’.<sup>33</sup> The two other measures were related to mental health and wellness: ‘the severity of symptoms of anxiety and depression’ measured using the Patient Health Questionnaire-4 (PHQ-4).<sup>34 35</sup> The fourth measure was the ‘HIV Stigma Score’, using the validated 12-item short version of the Berger HIV stigma scale.<sup>36–39</sup> We assessed the reliability of both the PHQ-4 and the HIV stigma score. They presented a Cronbach’s alpha coefficient<sup>40</sup> of 0.88 and 0.92, respectively. These two measures have thus a very good internal consistency and are considered reliable.<sup>41</sup>

### Socioeconomic inequality

Socioeconomic inequality was assessed with three measures, namely the McArthur scale of ‘subjective social standing’,<sup>42</sup> the ‘current main source of income’ as a proxy measure for economic precarity. The third measure, ‘food insecurity’, corresponded to situations where participants had to eat less or skip meals because there was not enough money for food since the COVID-19 crisis began.<sup>43</sup> Participants also informed their main current sources of income and the changes in their income since the COVID-19 crisis started.

### Macrosocial markers of vulnerability

Macrosocial markers of vulnerability considered three measures. The first relates to ‘being a survivor of gender-based violence’. It was measured using the participants’ experience of gender-based violence during the COVID-19 pandemic. The other two measures are ‘engaging in sex work’ and ‘engaging in transactional sex’. We adjusted the model to account for the interactions between the latter two measures, acknowledging that they are not mutually exclusive.

## Statistical methods

We first performed a bivariate analysis to study the associations between the independent variables and people on the move per self-declared HIV status. We used Pearson's  $\chi^2$  test of association (see results as [table 1](#) and online supplemental S3) and Cramér's V test. We subsequently developed the inferential statistical analysis with a logistic regression model per HIV status. We focused on HIV-positive women and girls on the move compared with other vulnerable women and girls living with HIV but not on the move. See [figure 1](#).

We controlled for confounders, conducted postestimation tests, including likelihood ratio  $\chi^2$ , and controlled for the hypothesis of a null value for the independent variables for each model. In addition, we performed additional analyses of variance, margins, collinearity and goodness-of-fit. Finally, we controlled for specification errors and tested whether or not the interactions between potentially related variables such as living in precarity and food insecurity. We similarly controlled for interaction between sex work and transactional sex. We considered statistical significance at a p value < 0.05 and reported the strength of association and effect size CIs accordingly.<sup>44</sup> All statistical analyses were performed using STATA V.16. More details are provided in online supplement S1.

## Ethical approval

Ethics approval for the study, including a waiver for parental consent for adolescents 15–17 years old, was obtained from the Institute of Public Health, Obafemi Awolowo University Health Research Committee (IPH/OAU/12/1692), which was the ethics committee of record. Additional approval for the study was obtained from the ethics committee in Lagos (LS/C.350/S.1/215), Anambra (MH/AWK/M/321/363), Adamawa (ADHEC07/06/2021), Akwa-Ibom (MH/PRS/99/Vol.V/994), Benue (MOH/STA/208/VOL.1/183) and Kaduna (MOD/ADM/774/VOL.1/1008) States. Written informed consent was obtained for all study participants. No data with identifiers were collected from the respondents. All study methods were carried out in accordance with the National health research ethics code governing research conduct in Nigeria.<sup>45</sup>

## Role of the funding source

The funder of this study had no role in study design, data collection, analysis and interpretation. All authors had full access to the data in the study.

## Patient and public involvement statement

Civil society organisations (CSOs), community-based organisations (CBOs) and representatives of women and girls living with HIV, transgender people, female sex workers, women on the move, and women who use drugs were involved in all steps of the survey and the current study. The partnering CBO reviewed and suggested revisions to the study protocol, made the decisions on the states for the data collection, conducted community entry

programmes and supported the participants' recruitment process using the venue-based sampling technique. The CSOs and CBOs performed a pilot test among participants to assess the burden and time required for the survey. They also consider the vocabulary and the adequacy of translations in different dialects. The Jami Al Hakeem Foundation, a CBO working with migrants and refugees in Nigeria, identified the community entry leads for migrants and refugees.

The CSOs and CBOs also actively participated in the preparation, the submission of the current study and are coauthors. Preliminary results of the survey were disseminated among the national and local CSOs and CBOs. Data and ad hoc analysis were made available to communities for their programming and advocacy purposes.

## RESULTS

### Descriptive statistics

#### Sociodemographic characteristics

[Table 1](#) presents the sociodemographic characteristics of adolescent girls and women on the move per HIV status. The sociodemographic characteristics of the 3442 participants included in this study, per HIV and mobility status, are presented in online supplement S3. Of the 700 women and girls on the move, most (53.6% were aged 25–44). Almost a sixth (16.3%) did not know or refused to disclose their HIV status. Nearly half (46.5%) of adolescent girls and young women were unaware of their HIV status. The majority (62.4%) of the women and girls on the move had no education or only completed the primary degree. Additionally, the sociodemographic characteristics of the complete sample, that is, women and girls on the move and those not on the move, per HIV status, are presented in online supplement S4.

HIV-positive women and girls on the move reported fewer moderate to severe symptoms of anxiety and depression (30.2%) compared with their HIV-negative peers (43.3%) but higher and compared with other vulnerable women living with HIV but not on the move (39.9%, see online supplement S3).

Regarding socioeconomic inequality, the majority (61.0%) of women and girls on the move were unaware of special COVID-19 support measures compared with those not on the move (43.6%). When considering only women and girls on the move, the lack of information on these measures was lower among those living with HIV (48.8%) than their HIV-negative peers (70.2%). Consequently, a minority (14.9%) of women and girls on the move were either receiving or waiting to receive the COVID-19 social support measures compared with other vulnerable women living with HIV but not on the move (25.2%, see online supplement S3). Among women and girls on the move, those living with HIV were more likely to receive or wait to receive the COVID-19 social support measures (21.0%) than their HIV-negative peers (10.0%).

**Table 1** Sociodemographic characteristics of women and girls on the move by self-reported HIV status

		Total		HIV-	HIV+	Don't know
		N = (700)		N = (252)	N = (334)	N = (114)
		(n)	(%)	(%)	(%)	(%)
Age groups		Pearson $\chi^2$ (4) = 31.1479 Pr $\leq$ 0.001, Cramér's V=0.1492				
	Adolescent girls and young women (15–24 years)	194	27.7	23.0	24.9	46.5
	Adults (25–44 years)	375	53.6	59.9	56.3	31.6
	Older adults (45+ years)	131	18.7	17.1	18.9	21.9
Education (highest degree completed)		Pearson $\chi^2$ (4) = 12.5913 Pr = 0.013, Cramér's V=0.0949				
	From none to primary education	437	62.4	59.5	61.1	72.8
	Secondary education	213	30.4	29.8	32.6	25.4
	Post-secondary or university degree	49	7.0	10.3	6.3	1.8
	Missing	1	0.1	0.4	0.0	0.0
Geopolitical zones		Pearson $\chi^2$ (10) = 322.3023 Pr $\leq$ 0.001, Cramér's V=0.4802				
<b>1</b>	North Central	206	29.4	6.7	54.2	7.0
<b>2</b>	North East	118	16.9	30.2	2.1	30.7
<b>3</b>	North West	27	3.9	4.0	2.7	7.0
<b>4</b>	South East	178	25.4	24.2	24.9	29.8
<b>5</b>	South South	97	13.9	28.6	0.6	20.2
<b>6</b>	South West	73	10.4	6.3	15.6	4.4
	Missing	1	0.1	0.0	0.0	0.9
Health inequity						
Psychological distress (sympt. anxiety and depression)		Pearson $\chi^2$ (2) = 6.2421 Pr = 0.044, Cramér's V=0.0981				
	None to mild symptoms	400	57.1	54.0	57.2	64.0
	Moderate to severe symptoms	249	35.6	43.3	30.2	34.2
	Missing	51	7.3	2.8	12.6	1.8
Disrupted access to health services						
HIV services		Pearson $\chi^2$ (2) = 109.0852 Pr $\leq$ 0.001, Cramér's V=0.4106				
	No	472	67.4	81.3	50.0	87.7
	Yes	175	25.0	11.1	42.5	4.4
	Missing	53	7.6	7.5	7.5	7.9
Sexual and reproductive health services		Pearson $\chi^2$ (2) = 15.2330 Pr $\leq$ 0.001, Cramér's V=0.153				
	No	555	79.3	85.3	74.3	80.7
	Yes	89	12.7	7.1	17.7	10.5
	Missing	56	8.0	7.5	8.1	8.8
Economic inequalities						
Access to COVID-19 support measures		Pearson $\chi^2$ (12) = 102.4880 Pr = 0.000, Cramér's V=0.2721				
	I did not know there was a special relief measure for me	427	61.0	70.2	48.8	76.3
	These measures are not applicable to me	32	4.6	7.5	0.6	9.6
	I have been denied access	110	15.7	7.9	25.4	4.4
	I can access these support measures if I want, but I don't	10	1.4	1.6	1.8	0.0
	Yes, I applied, and I am waiting for the support measure	43	6.1	6.0	7.2	3.5
	Yes, I applied, and I received these support measures	61	8.7	4.0	13.8	4.4
	I cannot or do not wish to answer this question	9	1.3	1.6	1.5	0.0
	Missing	8	1.1	1.2	0.9	1.8
Subjective social standing		Pearson $\chi^2$ (4) = 23.5919 Pr $\leq$ 0.001, Cramér's V=0.1298				

Continued

Table 1 Continued

	Total		HIV–	HIV+	Don't know
	N = (700)		N = (252)	N = (334)	N = (114)
	(n)	(%)	(%)	(%)	(%)
Lower tercile	402	57.4	47.2	62.6	64.9
Middle tercile	182	26.0	33.3	20.1	27.2
Higher tercile	116	16.6	19.4	17.4	7.9
Missing	–	–	–	–	–
Skip meals because not enough money	Pearson $\chi^2$ (2) = 8.7438 Pr = 0.013, Cramér's V=0.1131				
No	126	18.0	21.0	13.8	23.7
Yes	557	79.6	73.8	85.0	76.3
Missing	17	2.4	5.2	1.2	0.0
Current main source of income	Pearson $\chi^2$ (12) = 47.3186 Pr $\leq$ 0.001, Cramér's V=0.1842				
No income/survival mode	177	25.4	20.2	24.8	38.6
Transactional sex	91	13.1	8.3	17.8	9.6
Social transfer, incl. pension	6	0.9	0.4	1.5	0.0
Remittances or charity	56	8.0	5.2	9.1	11.4
Agriculture	157	22.5	25.0	21.1	21.1
Self-employed, petty trade	193	27.7	38.1	23.3	17.5
Paid work	17	2.4	2.8	2.4	1.8
Missing	3	0.4	–	0.9	–
Macrosocial markers of vulnerability					
Survivor of gender-based violence	Pearson $\chi^2$ (6) = 24.6323 Pr $\leq$ 0.001, Cramér's V=0.1355				
I am not experiencing any violence	452	64.6	74.6	56.3	66.7
Less violence than before COVID-19	30	4.3	4.4	4.8	2.6
Same level of violence as before COVID-19	108	15.4	9.9	20.4	13.2
More violence than before COVID-19	81	11.6	7.5	14.1	13.2
Missing	29	4.1	3.6	4.5	4.4
Engaged in transactional sex	Pearson $\chi^2$ (2) = 11.9471 Pr = 0.003, Cramér's V=0.1350				
No	479	68.4	74.6	61.4	75.4
Yes	177	25.3	21.8	30.5	17.5
Missing	44	6.3	3.6	8.1	7.0
Engaged in sex work	Pearson $\chi^2$ (2) = 6.6533 Pr = 0.036, Cramér's V=0.1006				
No	515	73.6	76.6	70.4	76.3
Yes	142	20.3	19.0	24.0	12.3
Missing	43	6.1	4.4	5.7	11.4

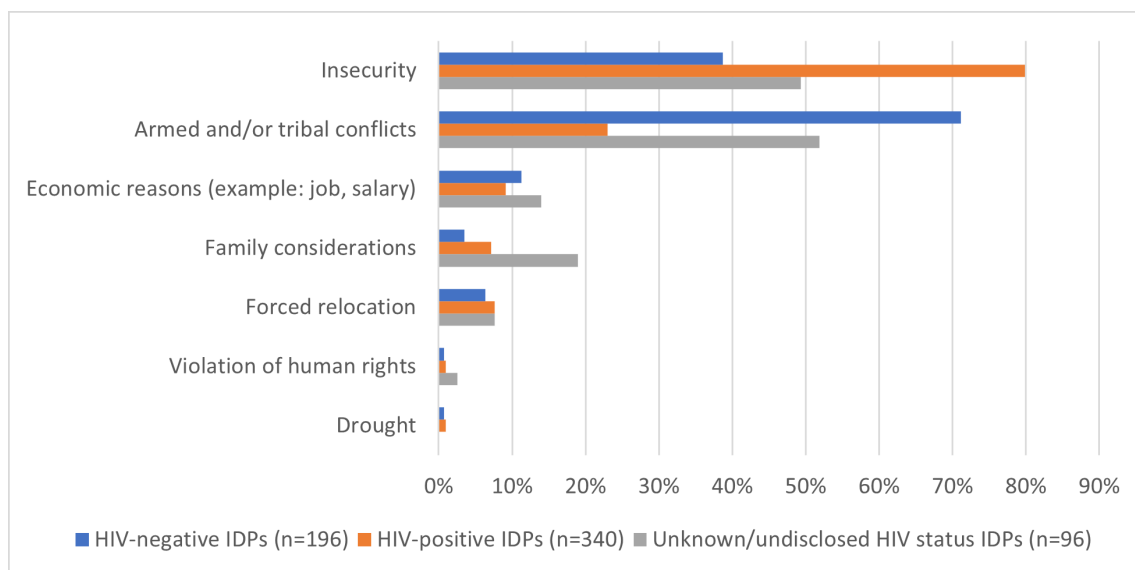
Note: Pearson  $\chi^2$  values represent the associations between the independent variables and people on the move per self-declared HIV status. The number between brackets defines the degree of freedom. Cramér's V test values measure the association between two nominal variables.

HIV-positive women and girls on the move reported fewer moderate to severe symptoms of anxiety and depression (30.2%) compared with their HIV-negative peers (43.3%) but higher and compared with other vulnerable women living with HIV but not on the move (39.9%, see online supplement S3).

More than three-quarters (79.6%) of the participants on the move had to skip meals or reduce portions of their meals because there was not enough money since the COVID-19 pandemic started. This percentage rose to 85.0% among those living with HIV. A quarter (24.6%) of women on the move living with HIV have no income

compared with women living with HIV but not on the move (17.2%, see online supplement S4).

In terms of macrosocial markers of HIV vulnerability, a third (31.3%) of women and girls on the move reported gender-based violence. This percentage rose to 39.2% among those living with HIV and is substantially higher



**Figure 2** Focus on internally displaced women and girls: most mentioned reasons, per HIV status.

than the proportion of women and girls living with HIV but not on the move who experienced gender-based violence (25.5%, see online supplement S4). The proportions of women and girls on the move who engaged in transactional sex (25.3%) or in sex work (20.3%) were lower than the 48.1% and 43.1% of women and girls not on the move who engaged in transactional sex in sex work respectively (see also online supplement S4).

There was heterogeneity in the profile of the 700 consenting women and girls on the move aged >15. As presented in figure 2, 61.4% of the women and girls on the move were internally displaced, and 19.9% were returning migrants. Also, 11.7% of the sample were refugees, and 6.6% were migrants.

We looked more closely at IDPs and returning migrants. The reasons for their move vary by their HIV serostatus. As presented in figure 2, most IDPs moved because of insecurity (61%), including armed or tribal conflicts (44%). The reasons for movement varied by HIV status.

Table 2 shows that the current source of income differed for different subpopulations of women and girls on the move. The table shows that more than a quarter (25.3%)

of women and girls on the move have no current source of income or are in survival mode (eg, recycling and selling in slums, begging). Self-employment provided the main source of income for more than a quarter (27.6%) of women and girls on the move. It represented the main source for almost half of the refugees (48.8%). Agriculture was the main source for more than a fifth of women and girls on the move (22.4%), particularly among the IDP women and girls (30.0%). Finally, we found that transactional sex was the main source of income for 13% of women and girls on the move, essentially among migrants, with 63% of them, followed by returning migrant women for whom transactional sex is the main source of income for a sixth of them (15.8%).

Table 3 shows that more than half (52.0%) of women and girls on the move reported a reduction in their income, and 8.7% lost all their income during COVID-19. The situation is particularly acute among IDPs, the largest group on the move. Among them, 6 in 10 (61.2%) reported a reduction in their income, and 7.7% lost all their income. Refugees are the second most impacted subgroup of women and girls on the move, with more

**Table 2** Current main sources of income among vulnerable women and girls in Nigeria

Groups	Total (n=3442)	No income/survival mode (%)	Transactional sex (%)	Social transfers (%)	Remittances (%)	Agriculture (%)	Self-employment (%)	Paid work (%)
On the move	700	25.3	13.0	0.9	8.0	22.4	27.6	2.4
Migrants	46	8.7	63.0	–	–	4.3	17.4	6.5
Refugees	82	28.0	3.7	1.2	7.3	9.8	48.8	1.2
Asylum seekers	3	–	100.0	–	–	–	–	–
Returning migrants	139	32.4	15.8	0.7	3.6	12.9	30.2	4.3
IDPs	430	24.4	7.9	0.9	10.5	30.0	24.0	1.6
NOT on the move	2637	17.1	15.5	1.4	11.0	8.3	39.5	5.2
Did not know	105	36.2	2.9	1.9	8.6	6.7	32.4	8.6

Pearson  $\chi^2$  (36) = 390.8708 Pr ≤ 0.000, Cramér's V=0.1387.  
IDP, internally displaced people.

**Table 3** Change in incomes among vulnerable women and girls in Nigeria

Groups	Total (n=3442)	Lost all their income (%)	Reduced by more than half (%)	Reduced by about half (%)	Reduced by less than half (%)	No change (%)	Increased (%)	Missing (%)
On the move	700	8.7	24.4	18.0	9.4	33.6	3.4	2.4
Migrants	46	2.2	8.7	13.0	2.2	50.0	23.9	–
Refugees	82	22.0	22.0	12.2	8.5	31.7	2.4	1.2
Asylum seekers	3	–	–	–	–	100	–	–
Returning migrants	139	6.5	18.0	12.2	8.6	47.5	5.0	2.2
IDPs	430	7.7	28.8	21.6	10.7	27.2	0.9	3.0
NOT on the move	2637	7.1	26.2	15.7	12.8	30.6	4.7	3.0
Did not know	105	10.5	29.5	2.9	10.5	37.1	6.7	2.9

Pearson  $\chi^2$  (30) = 145.7046 Pr  $\leq$  0.000, Cramér's V=0.0934.  
IDP, internally displaced people.

than 4 in 10 (42.7%) reporting a reduction in their income and more than a fifth (22.0%) having lost all their income since the COVID-19 crisis started. Finally, a third (33.6%) of women and girls on the move reported no change in their income, essentially because most of those reporting no change (64.4%) had no prior income (see online supplement S5).

Table 4 shows that more than a quarter (27%) of women and girls on the move reported disrupted access to HIV services when needed during COVID-19. This percentage is lower than among other vulnerable women not on the move (43.9%). Similarly, women and girls on the move reported lower disruption in their access to SRH services when needed during COVID-19 (13.8%) compared with other vulnerable but not on the move (32.1%). Migrant women living with HIV reported higher disruption in their access to HIV activities (45.5%) and SRH services (38.6%) compared with vulnerable women and girls not on the move. Returning migrants and IDPs reported lower rates of disruption. Returning migrants reported more symptoms of anxiety and depression than the reference category.

**Inferential statistics on the socioeconomic determinants of inequality.**

Our preliminary analysis of socioeconomic determinants of inequality showed that, on the first hand, there are no differences among women and girls on the move who were HIV-negative, HIV-positive, and who did not know their HIV status, as shown in online supplement S6. On the other hand, we found substantial differences in the determinants of inequality when comparing women and girls on the move who were HIV-positive and women and girls not on the move who were HIV-positive. These differences are presented in table 5. Each adjusted OR (aOR) reflects the probability of meeting a said outcome measure (first column of table 5) for the women and girls on the move that of those not on the move, adjusting for the other outcome measures.

In terms of health inequity, table 5 shows that women and girls on the move and living with HIV have lower odds of reporting disrupted access to HIV services (aOR 0.54, 95% CI 0.36 to 0.82), disruption of access to SRH services (aOR 0.55, 95% CI 0.34 to 0.90), reporting

**Table 4** Disrupted access to HIV and SRH services when it was needed during the COVID-19

	Disrupted access to HIV services N = (2571)	Disrupted access to SRH services N = (2552)	Symptoms of anxiety and depression N = (20407)
	X <sup>2</sup> (6) 71.5390 Pr $\leq$ 0.001 Cramér's V=0.1468	X <sup>2</sup> (6) 103.3465 Pr $\leq$ 0.001 Cramér's V=0.1771	X <sup>2</sup> (6) 15.5767 Pr=0.016 Cramér's V=0.0703
Women and girls NOT on the move (n=2637)	43.9%	32.1%	41.9%
Women and girls on the move (n=700)	27.0%	13.8%	38.4%
Migrants (n=46)	45.5%	38.6%	23.8%
Refugees (n=82)	19.5%	9.8%	25.9%
Asylum-seekers (n=3)	0.0%	33.3%	0.0%
Returning migrants (n=139)	30.7%	19.3%	45.0%
Internally displaced people (n=430)	25.7%	10.2%	40.6%
Missing or did not know (n=195)	44.6%	31.0%	45.3%

SRH, sexual and reproductive health.



**Table 5** Logistic regression of different markers of inequality among women and girls on the move and living with HIV when compared with women and girls not on the move living with HIV

HIV-positive women and girls on the move	aOR	P value	95% CI	
Age groups				
Adolescent girls and young women (15–24)	0.64	0.047	0.41	0.99
Adults (25–44)	Base			
Older adults (45+)	1.22	0.485	0.70	2.15
Education level				
From none to primary education	2.76	0.000	1.85	4.12
Secondary education	Base			
Post secondary or university degree	0.55	0.070	0.28	1.05
Health inequity				
Disrupted access to HIV services	0.54	0.003	0.36	0.82
Disrupted access to SRH services	0.55	0.017	0.34	0.90
Symptoms of anxiety and depression	0.91	0.002	0.86	0.96
HIV stigma index	0.94	0.000	0.91	0.97
Socioeconomic inequality				
Subjective social standing status				
Lower tercile	2.16	0.001	1.36	3.43
Middle tercile	Base			
Higher tercile	1.36	0.309	0.75	2.48
Economic precarity	6.08	0.002	1.94	19.03
Skip meals	5.96	0.001	2.16	16.50
Macrosocial categories of vulnerability				
Survivor of gender-based violence				
I am not experiencing any violence	Base			
Less violence than before COVID-19	1.77	0.142	0.83	3.81
The same level of violence as before COVID-19	4.93	0.000	2.79	8.71
More violence than before COVID-19	5.61	0.000	3.01	10.47
Engaged in sex work	0.44	0.022	0.21	0.89
Engaged in transactional sex	0.85	0.632	0.44	1.64
Interaction eco precarity # skipmeals	0.18	0.005	0.05	0.60
Interaction sex work # transactional sex	Empty			
Constant	0.45	0.291	0.10	1.97
N	946			
Log-likelihood	–361.76			
LR $\chi^2$ (18)	285.59			
prob> $\chi^2$	0.000			

SRH, sexual and reproductive health.

symptoms of anxiety and depression (aOR 0.91, 95% CI 0.86 to 0.96) and lower odds of reporting high HIV stigma index (aOR 0.94, 95% CI 0.91 to 0.97) compared with HIV-positive women and girls not on the move. In other terms, there are weak associations<sup>44</sup> between the four measures of health inequity for women and girls on the move and living with HIV compared with the association of health inequity among women and girls living with HIV but not on the move.

Regarding socioeconomic inequality, table 5 shows that HIV-positive women and girls on the move had more

than twice higher odds (aOR 2.16, 95% CI 1.36 to 3.43) of being among the lower tercile in terms of subjective social standing; more than six-time higher odds of facing economic precarity (aOR 6.08, 95% CI 1.94 to 19.03) and almost six-time higher odds of having to skip meals because there was not enough money since the COVID-19 pandemic started (aOR 5.96, 95% CI 2.16 to 16.50) when compared with vulnerable women living with HIV but not among the people on the move. In other terms, there are medium to very large associations between the three measures of socioeconomic inequality for women and

girls on the move and living with HIV compared with the association of health inequity among women and girls living with HIV but not on the move.

In terms of macrosocial categories of HIV vulnerability, table 5 shows that women and girls on the move and living with HIV had almost five times higher odds (aOR 4.93, 95% CI 2.79 to 8.71) of facing gender-based violence and more than five and half times higher odds (aOR 5.61, 95% CI 3.01 to 10.47) of facing more gender-based violence since the COVID-19 crisis started compared with those vulnerable HIV-positive women not on the move. They also had lower odds (aOR 0.44, 95% CI 0.21 to 0.89) of engaging in sex work when compared with HIV-positive women not on the move. We found no statistical difference between the two groups regarding transactional sex, even after controlling for interactions between transactional sex and sex work. In other words, there are very large associations between being a woman or girl on the move living with HIV and gender-based violence compared with those women and girls living with HIV but not on the move.

## DISCUSSION

This study aimed to assess whether HIV-positive women and girls who are on the move experience greater health inequities and socioeconomic inequalities than other vulnerable women and girls living with HIV in Nigeria during the COVID-19 pandemic. To our knowledge, this study is the first attempt to examine the syndemics of HIV and COVID-19 among women and girls on the move, explicitly focusing on socioeconomic inequality and health disparities within an African country. The study yielded five key findings that can inform targeted and effective interventions for this highly vulnerable group of women and girls living with HIV.

First, there were no disparities in health inequities and socioeconomic inequalities between HIV-negative vulnerable women on the move and not on the move. However, we found important differences between women and girls living with HIV who were on the move and those not on the move. This suggests that the combination of being on the move and living with HIV exacerbates individual vulnerabilities, and the COVID-19 pandemic may have further intensified existing inequalities.

Second, women and girls on the move and living with HIV seem less likely to have experienced health inequity compared with women living with HIV but not on the move. There were, however, disparities in access to HIV services between the categories of women on the move living with HIV: migrant women and girls reported higher health inequities than IDPs and returning migrants. Our findings may reflect the positive effect of the specific assistance provided to IDPs to minimise the impact of the lockdown and other COVID-19 public health preventive measures.<sup>46 47</sup> We postulate that women and girls on the move and living with HIV were less likely to face disrupted access to health services because they

had learnt to navigate challenges associated with poor health service access before the COVID-19 pandemic.<sup>48</sup>

Third, HIV-positive women and girls on the move were more likely to belong to the lowest tercile in social standing. They were exposed to additional socioeconomic shock during the COVID-19 crisis, being more likely to skip meals because they were cash-strapped and to rely on sources of income that put them in economic precarity, such as being in survival mode (eg, recycling and selling in slums, or begging), depending on assistance from charitable or CSOs, engaging in transactional sex, relying on remittances or not having any source of income. In addition, very few of them reported access to social transfers, including food transfers. These findings corroborate previous findings<sup>49 50</sup> on socioeconomic inequalities experienced by IDPs in Nigeria and alert to the intersection of gender, socioeconomic and HIV-related inequalities exacerbated by future health crises such as COVID-19.

Fourth, the study highlighted the high risk of gender-based violence faced by women and girls on the move living with HIV since COVID-19 started. Our findings provide additional evidence on the increased level of gender-based violence faced by women and girls on the move,<sup>51</sup> by HIV-positive women in sub-Saharan Africa,<sup>52</sup> as well as the increment of gender-based violence during the COVID-19 pandemic.<sup>53</sup> The exceptionally high risk for gender-based violence faced by women and girls on the move during this pandemic cannot all be explained by theories that frame patriarchal structures of power as the root cause of gender-based violence.<sup>4 54</sup> The observed disproportional impact of gender-based violence among people on the move living with HIV when compared with peers not living with HIV needs further analysis. These findings call for a better gender-based violence surveillance system and urgent feminist interventions<sup>55</sup> that promote women's safety, health, positive lifestyles, personal strength, competence and resilience. It underlines the need for targeted interventions to prevent and protect the survivors of gender-based violence, with particular attention to vulnerable women and girls.

Lastly, the study found that symptoms of anxiety and depression and HIV self-stigma were high among all HIV-positive women and girls. Nonetheless, women and girls on the move and living with HIV reported fewer symptoms of mental distress and a lower HIV-stigma score than their HIV-positive peers not on the move. These findings are interesting and open the way for more studies to explore what appears as a strong resilience capacity of people on the move and how the involvement of HIV-positive people on the move in HIV programmes and activities could contribute to reinforcing and strengthening the resilience of other vulnerable communities.

One of the study's strengths is the large sample size that allowed for robust subgroup analysis. Nevertheless, the findings should be considered in the context of several limitations. First, the recruitment strategies combined non-probabilistic sampling methods with a risk for selection

biases.<sup>56 57</sup> However, these methods are reputed to be appropriate for recruiting hard-to-reach and stigmatised population groups.<sup>58 59</sup> To reduce the risk of selection bias, CBOs and CSOs involved in the design and implementation of this study helped reach out to vulnerable adolescent girls and women with diverse profiles to participate in the study. Second, we used self-reported measures, such as self-reported HIV status, which may increase the risk for overestimation or underestimation. We used validated instruments and performed the appropriate tests to minimise this risk. Finally, the prevailing COVID-19 control measures at the time of the survey led to several restrictions which may have impacted the recruitment of participants. The geopolitical and insecurity situation in Adamawa State, as well as the interreligious tensions, kidnapping and killings by unknown gunmen in Akwa-Ibom, Benue and Lagos States, required additional security measures. The survey security protocol and the close involvement of local organisations and specialised organisations working hand in hand with the data collectors enabled the team to securely address these challenges and recruit people on the move in most geopolitical zones.

## CONCLUSIONS

This study showed that being on the move and living with HIV compounded increased socioeconomic inequalities and gender-based violence for adolescent girls and women. The COVID-19 crisis appeared to have exacerbated these inequalities, leading to further economic precarity and food insecurity. These findings raise concerns over the pandemic's medium-term to long-term impact on women and girls on the move and call for two urgent interventions in conflict zones and migration routes: First, the need for more feminist and bold interventions to protect HIV-positive women on the move. Second, to actively involve HIV-positive women and girls on the move in HIV and humanitarian programmes to benefit from their impressive resilience. These findings can enhance programmes' design to address people's needs and preparedness for future pandemics.

### Author affiliations

- <sup>1</sup>Joint United Nations Programme on HIV/AIDS, Johannesburg, South Africa
- <sup>2</sup>Aix-Marseille Université, Marseille, France
- <sup>3</sup>Jami Al Hakeem Foundation Jimeta-Yola, Jimeta-Yola, Nigeria
- <sup>4</sup>Nigeria Sex Workers Association, Kubwa, Nigeria
- <sup>5</sup>African Network of Adolescent and Young Persons Development, Barnawa, Nigeria
- <sup>6</sup>Northern Nigerian Transgender Initiative, Abuja, Nigeria
- <sup>7</sup>National Association of Persons with Physical Disability, Abuja, Nigeria
- <sup>8</sup>YouthRise, Abuja, Nigeria
- <sup>9</sup>Department of Sociology, University of Calabar, Calabar, Nigeria
- <sup>10</sup>Department of Psychology, Enugu State University of Science and Technology, Enugu, Nigeria
- <sup>11</sup>Obafemi Awolowo University, Ile-Ife, Nigeria
- <sup>12</sup>Joint United Nations Programme on HIV/AIDS, Abuja, Nigeria
- <sup>13</sup>National Agency for the Control of AIDS, Abuja, Nigeria
- <sup>14</sup>Joint United Nations Programme on HIV/AIDS, Geneva, Switzerland
- <sup>15</sup>Georgetown University, Washington, Washington DC, USA
- <sup>16</sup>Child Dental Health, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria

**Twitter** Erik Lamontagne @lamontagne\_erik

**Acknowledgements** We thank all study participants who contributed to generating new knowledge on the situation of adolescent girls and women on the

move in Nigeria. We are grateful for the support and expertise provided by Winnie Byanyima, Quarraisha Abdool-Karim, Mary Mahy and Peter Godfrey-Faussett.

**Contributors** EL and MOF conceptualised the study and drafted the manuscript. EL developed the econometric models and conducted the data analysis. MOF, EL, HYN, AE, AS, AM, RMA, HO, VU, PO, OA, and OAA contributed to the study design and the data collection. All authors contributed to the reviewing and editing of subsequent versions of the manuscript for critical intellectual content. All authors read and approved the final version of the manuscript. EL act as the guarantor of this study.

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

**Patient consent for publication** Consent obtained directly from patient(s)

**Ethics approval** This study involves human participants and was approved by Ethics approval for the study, including a waiver for parental consent for adolescents 15-17 years old, was obtained from the Institute of Public Health, Obafemi Awolowo University Health Research Committee (IPH/OAU/12/1692) and the ethics committee in Lagos (LS/C.350/S.1/215), Anambra (MH/AWK/M/321/363), Adamawa (ADHEC07/06/2021), Akwa-Ibom (MH/PRS/99/Vol.V/994), Benue (MOH/STA/208/VOL.1/183) and Kaduna (MOD/ADM/774/VOL.1/1008) States. Written informed consent was obtained for all study participants. No identifier data were collected from respondents. All study methods were carried out in accordance with the National Health Research Ethics Code governing research conduct in Nigeria. Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available upon reasonable request. The data supporting the findings will be available from the corresponding author upon request following a 6-month embargo from the publication date. Requests will be examined and considered on a case-by-case basis.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

### ORCID iDs

Erik Lamontagne <http://orcid.org/0000-0002-6394-0070>  
Morènikè Oluwátóyin Foláyan <http://orcid.org/0000-0002-9008-7730>

## REFERENCES

- 1 Zarei E, Khabiri R, Tajvar M, *et al*. Knowledge of and attitudes toward HIV/AIDS among Iranian women. *Epidemiol Health* 2018;40:e2018037.
- 2 Mahajan AP, Sayles JN, Patel VA, *et al*. Stigma in the HIV/AIDS epidemic: a review of the literature and recommendations for the way forward. *AIDS*. *AIDS* 2008;22 Suppl 2(Suppl 2):S67-79.
- 3 Varni SE, Miller CT, Solomon SE. Sexual behavior as a function of stigma and coping with stigma among people with HIV/AIDS in rural New England. *AIDS Behav* 2012;16:2330-9.
- 4 Nintunze N, Bigirimana S. *Analysis of cultural barriers to women's economic empowerment in Burundi*. 2021.
- 5 Rice WS, Logie CH, Napoles TM, *et al*. Perceptions of Intersectional stigma among diverse women living with HIV in the United States. *Social Science & Medicine* 2018;208:9-17.
- 6 Kruk ME, Gage AD, Arsenault C, *et al*. High-quality health systems in the sustainable development goals era: time for a revolution. *Lancet Glob Health* 2018;6:e1196-252.

- 7 Waldron EM, Burnett-Zeigler I, Wee V, *et al.* Mental health in women living with HIV: the unique and unmet needs. *J Int Assoc Provid AIDS Care* 2021;20:2325958220985665.
- 8 Krishnan S, Dunbar MS, Minnis AM, *et al.* Poverty, gender inequities, and women's risk of human immunodeficiency virus/AIDS. *Ann N Y Acad Sci* 2008;1136:101–10.
- 9 Ndlazi BE, Masango T. The sexual and reproductive health needs of young people living with HIV in Gauteng, South Africa. *South Afr J HIV Med* 2022;23:1377.
- 10 Murray LK, Haworth A, Semrau K, *et al.* Violence and abuse among HIV-infected women and their children in Zambia: a qualitative study. *J Nerv Ment Dis* 2006;194:610–5.
- 11 United Nations Statistics Division. *Recommendations on Statistics of International Migration, Revision 1*. 1998.
- 12 Meyer A. *People on the move: Handbook of selected terms and concepts: Hague Process on Refugees and Migration*. 2008.
- 13 International Organization for Migration. *International migration law - glossary on migration*. Geneva, CH 2019.
- 14 Guterres A. *Refugees, IDPs and Migrants and COVID-19: Policy Brief*. New York, USA: United Nations, 2020.
- 15 UNDESA. Division for inclusive social development. social protection systems and measures for all? International migrants are left far behind. *Social Development Brief* 2018.
- 16 Maple N, Walker R, Vearey J. COVID-19 and people on the move in Africa: the impact of state responses to the pandemic on migrants, refugees, asylum-seekers and internally displaced people. 2021.
- 17 International Organisation for Migration. What makes migrants vulnerable to gender-based violence? 2023. Available: <https://rosanjosie.iom.int/en/blogs/what-makes-migrants-vulnerable-gender-based-violence>
- 18 Hayward SE, Deal A, Cheng C, *et al.* Clinical outcomes and risk factors for COVID-19 among migrant populations in high-income countries: a systematic review. *J Migr Health* 2021;3:100041.
- 19 Bojorquez-Chapela I, Strathdee SA, Garfein RS, *et al.* The impact of the COVID-19 pandemic among migrants in shelters in Tijuana, Baja California, Mexico. *BMJ Glob Health* 2022;7:e007202.
- 20 Mittal S, Singh T. Gender-based violence during COVID-19 pandemic: a mini-review. *Front Glob Womens Health* 2020;1:4.
- 21 Maple N, Walker R, Vearey J. COVID-19 and migration governance in Africa. *Occasional Paper* 2021.
- 22 Walker R, Vearey J. "Let's manage the stressor today" exploring the mental health response to forced migrants in Johannesburg, South Africa. *IJMHS* 2023;19:1–15.
- 23 Operational data portal. 2023. Available: <https://data.unhcr.org/en/country/nga>
- 24 UNHCR. Nigeria portal. 2021. Available: <https://www.unhcr.org/nigeria.html>
- 25 Sydney C. *Nigeria: returning migrants at risk of new displacement or secondary migration*. IDMC, 2021.
- 26 UNAIDS. *End inequalities*. End AIDS. Global AIDS strategy 2021–2026; 2021. Geneva, Switzerland
- 27 Folayan MO, Arije O, Enemo A, *et al.* Associations between COVID-19 vaccine hesitancy and the experience of violence among women and girls living with and at risk of HIV in Nigeria. *Afr J AIDS Res* 2022;21:306–16.
- 28 Lamontagne E, Folayan MO, Arije O, *et al.* The effects of COVID-19 on food insecurity, financial vulnerability and housing insecurity among women and girls living with or at risk of HIV in Nigeria. *Afr J AIDS Res* 2022;21:297–305.
- 29 Folayan MO, Arije O, Enemo A, *et al.* Factors associated with poor access to HIV and sexual and reproductive health services in Nigeria for women and girls living with HIV during the COVID-19 pandemic. *Afr J AIDS Res* 2022;21:171–82.
- 30 Seasholtz MB, Kowalski B. The parsimony principle applied to multivariate calibration. *Analytica Chimica Acta* 1993;277:165–77.
- 31 Popper KR. *The Logic of Scientific Discovery*. New York: Science Editions, Inc, 1961.
- 32 Simon HA. Science seeks parsimony, not simplicity: searching for pattern in phenomena. simplicity, inference and modelling: keeping it sophisticatedly simple. 2001:32–72.
- 33 United Nations Population Fund. *Surveys and assessments on young people and COVID-19: Technical brief*. New York, USA, 2020.
- 34 Kroenke K, Spitzer RL, Williams JBW, *et al.* An ultra-brief screening scale for anxiety and depression: the PHQ-4. *Psychosomatics* 2009;50:613–21.
- 35 Workneh F, Wang D, Millogo O, *et al.* Knowledge and practice related to COVID-19 and mental health among adults in sub-Saharan Africa. *Am J Trop Med Hyg* 2021;105:351–62.
- 36 Berger BE, Ferrans CE, Lashley FR. Measuring stigma in people with HIV: Psychometric assessment of the HIV stigma scale. *Res Nurs Health* 2001;24:518–29.
- 37 Reinius M, Wettergren L, Wiklander M, *et al.* Development of a 12-item short version of the HIV stigma scale. *Health Qual Life Outcomes* 2017;15:115.
- 38 Luz PM, Torres TS, Almeida-Brasil CC, *et al.* Translation and validation of the short HIV stigma scale in Brazilian Portuguese. *Health Qual Life Outcomes* 2020;18:322.
- 39 Lamontagne E, Howell S, Yakusik A, *et al.* The global Internet survey on happiness, health and well-being among sexual and gender minority: design and methods [under review]. 2022.
- 40 Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951;16:297–334.
- 41 Tavakol M, Dennick R. Making sense of Cronbach's alpha. *Int J Med Educ* 2011;2:53–5.
- 42 Adler NE, Epel ES, Castellazzo G, *et al.* Relationship of subjective and objective social status with psychological and physiological functioning: preliminary data in healthy, white women. *Health Psychol* 2000;19:586–92.
- 43 Santos G-M, Ackerman B, Rao A, *et al.* Economic, mental health, HIV prevention and HIV treatment impacts of COVID-19 and the COVID-19 response on a global sample of cisgender gay men and other men who have sex with men. *AIDS Behav* 2021;25:311–21.
- 44 Rosenthal JA. Qualitative descriptors of strength of association and effect size. *Journal of Social Service Research* 1996;21:37–59.
- 45 Federal Ministry of Health. Guidelines for young persons' participation in research and access to sexual and reproductive health services in Nigeria. 2014. Available: [https://www.popcouncil.org/uploads/pdfs/2014HIV\\_YoungPersonsSRH-Nigeria.pdf](https://www.popcouncil.org/uploads/pdfs/2014HIV_YoungPersonsSRH-Nigeria.pdf)
- 46 Dirlikov E, Jahun I, Odafe SF, *et al.* Rapid scale-up of an antiretroviral therapy program before and during the COVID-19 pandemic—nine States. *MMWR Morb Mortal Wkly Rep* 2019;70:421–6.
- 47 Boyd AT, Jahun I, Dirlikov E, *et al.* Expanding access to HIV services during the COVID-19 pandemic—Nigeria, 2020. *AIDS Res Ther* 2021;18:62.
- 48 El Mouhib M, Muttoni A. Health care for people on the move: how can data help actors addressing health needs and access challenges? Geneva, CH: Internal Office for Migrations; 2023. Available: <https://medium.com/@UNmigration/healthcare-for-people-on-the-move-how-can-data-help-actors-addressing-healthcare-needs-and-access-67a76b4b13c7>
- 49 Okon EO. Poverty in Nigeria: a social protection framework for the most vulnerable groups of internally displaced persons. *Aijssr* 2018;2:66–80.
- 50 Okeke-Ihejirika P, Oriola TB, Salami B, *et al.* Beyond poverty fixation: interrogating the experiences of internally displaced persons in Nigeria. *Third World Quarterly* 2020;41:1476–97.
- 51 Amodu OD, Richter MS, Salami BO. A Scoping review of the health of conflict-induced internally displaced women in Africa. *Int J Environ Res Public Health* 2020;17:1280.
- 52 Tenkorang EY, Asamoah-Boaheng M, Owusu AY. Intimate partner violence (IPV) against HIV-positive women in sub-Saharan Africa: a mixed-method systematic review and meta-analysis. *Trauma, Violence, & Abuse* 2021;22:1104–28.
- 53 Phillimore J, Pertek S, Akyuz S, *et al.* We are forgotten": forced migration, sexual and gender-based violence, and Coronavirus disease-2019. *Violence Against Women* 2022;28:2204–30.
- 54 McPhail BA, Busch NB, Kulkarni S, *et al.* An integrative feminist model: the evolving feminist perspective on intimate partner violence. *Violence Against Women* 2007;13:817–41.
- 55 Worell J. Feminist interventions: accountability beyond symptom reduction. *Psychology of Women Quarterly* 2001;25:335–43.
- 56 Prah P, Hickson F, Bonell C, *et al.* Men who have sex with men in great Britain: comparing methods and estimates from probability and convenience sample surveys. *Sex Transm Infect* 2016;92:455–63.
- 57 Drabble LA, Trocki KF, Korcha RA, *et al.* Comparing substance use and mental health outcomes among sexual minority and heterosexual women in probability and non-probability samples. *Drug Alcohol Depend* 2018;185:285–92.
- 58 Ayhan CHB, Bilgin H, Uluman OT, *et al.* A systematic review of the discrimination against sexual and gender minority in health care settings. *Int J Health Serv* 2020;50:44–61.
- 59 Tyldum G. Surveying migrant populations with respondent-driven sampling. experiences from surveys of East-West migration in Europe. *International Journal of Social Research Methodology* 2021;24:341–53.