Women’s decision-making capacity and HIV testing in sub-Saharan Africa: A multi-country analysis of Demographic and Health Surveys

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Abstract

Introduction
Global commitment to stop HIV and ensure access to HIV treatment call for women empowering as these efforts play a major role in mother to child transmission. We explored the association between women decision-making capacity and HIV testing in sub-Saharan Africa (SSA).

Materials and methods
We used data from current Demographic and Health Surveys (DHS) conducted between January 1, 2010 and December 31, 2016 in 30 countries within SSA. At the descriptive level, we calculated the prevalence of women who had undergone HIV testing and decision-making capacity in each of the countries as well as prevalence of HIV testing across their socio-demographic characteristics. We used Binary Logistic Regression to explore the likelihood of HIV testing by decision-making capacity and socio-demographic characteristics at 5% margin of error. The results were presented as Crude Odds Ratios (CORs) and Adjusted Odds Ratios (AORs).

Results
We found that overall, 10.0% of women had decision-making with Nigeria (4.5%) and Zimbabwe (21.3%) recording the least and the highest respectively. In terms of HIV testing, the prevalence of HIV testing in the 30 SSA countries was 64.4%, with Guinea (12.8%) having the least. The highest occurred in Lesotho (99%) and Rwanda (99%). Women who had capacity to make decisions had higher likelihood of HIV testing [AOR=1.04, CI=1.02–1.09]. Women from Rwanda had the highest likelihood of HIV testing [AOR=53.92, CI=41.31–70.37] with women from Guinea having the least likelihood [AOR=0.10, CI=0.08–0.11]. Other determinants to HIV testing were level of education, wealth status, believing that a healthy-looking person can have HIV, watching television
almost every day, age and place of residence.

**Conclusion**

SSA countries intending to improve HIV testing need to incorporate women decision-making capacity strategies in terms of education and counselling into the available policies. This is essential because our study indicates that as women are able to make decisions in their households, the possibility for them to test for their HIV status increases.

**Introduction**

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) constitute one of the world’s most serious public health problems [1]. Worldwide, an estimated 1.8 million newly infected HIV cases were recorded in 2017 [1]. This was made up of 180,000 children predominantly living in sub-Saharan Africa (SSA) who were infected by their HIV-positive mothers during pregnancy, childbirth or breastfeeding [2]. HIV testing among women is a challenge in SSA, especially among married women aged [3, 4]. Some of the challenges identified in some studies include but not limited to HIV-related stigma from health professionals, HIV status disclosure dilemma, unintended pregnancy, intimate partner violence, HIV and environmental structural barriers, distress and fear related to maternal and child health [3, 5]. The few studies on this subject target individual women who access health services in specific countries [6]. However, it is important to have a wider coverage of women in a broader context in order to empower them with positive attitudes to go for HIV testing.

Global commitment to stopping new HIV infections and ensuring access to treatment call for empowering women as they play a major role in mother-to-child-transmission [1, 7]. Women’s decision-making capacity is imperative for ensuring HIV testing and addressing the pandemic [8], especially in sub-Saharan Africa (SSA). The importance of women
decision-making capacity in the area of HIV testing has been highlighted to build women’s confidence to prevent HIV infection, especially mother to child infection [9]. Women’s access to HIV testing depends substantially on the level to which they have been empowered to make decisions [10]. It is believed that a woman who is empowered either culturally, politically or professionally, has the confidence to decide on HIV testing, as she does not depend on her husband or partner to make decision to test for HIV or not [11]. Specific women’s characteristics such as age, education, wealth, employment, residence, parity, participation in household decision-making and justification for sexual violence have been found to influence HIV testing [8, 12]. In SSA, literature on women decision-making capacity and HIV testing are limited to specific countries such as Tanzania [8], Ethiopia [13] and South Africa [14] and mostly among women who are accessing health care services at health facilities [15, 16]. This suggests the paucity of studies on women’s decision-making and HIV testing in SSA. It is therefore imperative for a study in a broader context covering the entire SSA in order to empower and imbue women with a positive attitude for HIV testing. In light of the foregoing, we examined women decision-making capacity and HIV testing in SSA. Findings from such as multi-country study will provide evidence on the need and how to strengthen existing strategies to improve HIV testing and counselling by tackling women decision-making capacity.

Materials And Methods

We made use of pooled data from current Demographic and Health Surveys (DHS) conducted from January 1, 2010 and December 31, 2016 in 30 countries in SSA (see Figure 1). DHS is a nationwide survey collected every five-year period across low and middle-income countries. DHS focused on maternal and child health by interviewing women of reproductive age (15 – 49 years) and men between 15 and 64 years. DHS surveys followed the same standard procedures – sampling, questionnaire development, data collection,
cleaning, coding and analysis which allow for cross-country comparison. The survey employed a stratified two stage sampling technique. The initial stage involves the selection of points or clusters (enumeration areas [EAs]) followed by a systematic sampling of households listed in each cluster or EA. For this study, the women file of the DHS data was used. All the participants were women in their reproductive age (15 – 49), who were usual members of the selected households and/or visitors who slept in the household on the night before the survey. In this study, only women who had information on all the variables of interest were included (N = 194,275).

**Definition of variables**

**Outcome variable**

The outcome variable was HIV testing. It was derived from the question “have you ever tested for HIV?” and the response was coded as “1=Yes and 0=No”.

**Explanatory variables**

Fourteen explanatory variables were considered in our study including the key explanatory variable (women decision-making capacity). Following a previous study [17], women decision-making capacity was derived from three questions “decision on personal health care”, “decision on large household purchase” and “decision on visits to family or relatives”. These response categories were recoded as “not alone = 0” and “alone = 1”. An index was created with all the “yes” and “no” answers with scores ranging from 0 to 3. The score 0 and 1 were labelled as “low capacity” and 2 and 3 were labelled as “high capacity”. A dummy variable was generated with ‘0’ score being women who were less capable and ‘1’ if women were more capable.

Besides, 13 additional variables were included in the study. These are: country, age, educational level, marital status, religion, wealth status, place of residence, parity, occupation, exposure to mass media (radio, television and newspaper) and whether
healthy-looking person can have HIV or not. Apart from country of origin which was predetermined based on the geographical scope of the study, the selection of the rest of the variables were based on their association with HIV testing and counselling [6, 7, 8, 18, 19, 20, 21, 22]. Marriage was recoded into ‘never married (0)’, ‘married (1)’, ‘cohabiting (2)’, ‘widowed (3)’ and ‘divorced (4)’. Occupation was captured as ‘not working (0)’, ‘managerial (1)’, ‘clerical (2)’, ‘sales (3)’, ‘agricultural (4)’, ‘household (5)’, ‘services (6)’ and ‘manual (7)’. We recoded parity (birth order) as ‘one birth (1)’, ‘two births (2)’, ‘three births (3)’, and four or more births (4)’. Lastly, religion was recoded as ‘Christianity (1)’, ‘Islam (2)’, ‘Traditionalist (3)’, and ‘No religion (4)

Statistical analysis
The data was analysed with STATA version 14.2 for Mac OS. The analysis was done in three steps. The first step was the computation of the prevalence of HIV testing in SSA (see Figure 1). The second step was a bivariate analysis by which we calculated the prevalence and proportions of HIV testing across the socio-demographic characteristics with their significance levels (see Table 1). Afterwards, two stepwise logistic regression models were built in order to assess the predictors of HIV testing among women in SSA. Model I looked at a bivariate analysis between the key independent variable, women decision making capacity and HIV testing. Model II controlled for the effect of country and all the socio-demographic variables to build a multivariable logistic regression model (see Table 2). All frequency distributions were weighted while the survey command (svy) in STATA was used to adjust for the complex sampling structure of the data in the regression analyses. Multicollinearity was checked and there was no evidence of multicollinearity among the variables (Mean VIF=1.37). All results of the logistic regression analyses were presented as Crude Odds Ratios (CORs) and Adjusted Odds Ratios (AORs) at 95% confidence intervals (CIs).
Results

Prevalence of HIV testing among women in SSA

Figure 1 shows the prevalence of HIV testing in entity and in each of the 30 SSA countries. Overall, the prevalence of HIV testing was 64.4%. We found that the prevalence of HIV testing ranged from 12.8% in Guinea to 99% in Lesotho and Rwanda.

Socio-demographic Characteristics and Prevalence of HIV Testing

Table 1 summarises the prevalence of HIV testing across the included socio-demographic characteristics. The highest prevalence of HIV testing was among women with higher education (94.5%) and the lowest prevalence was among those who did not know that a healthy-looking person can have HIV (34.5%). All the socio-demographic characteristics showed a statistically significant relationship with HIV testing (see Table 1).

Table 1: Socio-demographic characteristics and prevalence of HIV testing

| Variables                  | Weighted | Weighted | HIV testing |
|----------------------------|----------|----------|-------------|
| Age (P<0.001)              |          |          |             |
| 15-19                      | 14,163   | 7.3      | 61.1        | 39.0 |
| 20-24                      | 43,631   | 22.5     | 66.6        | 33.4 |
| 25-29                      | 50,011   | 25.7     | 66.2        | 33.9 |
| 30-34                      | 39,920   | 20.6     | 65.9        | 34.1 |
| 35-39                      | 28,011   | 14.4     | 62.6        | 37.4 |
| 40-44                      | 13,954   | 7.2      | 58.6        | 41.4 |
| 45-49                      | 4,584    | 2.4      | 52.1        | 47.9 |
| Education (P<0.001)        |          |          |             |
| No formal education        | 72,066   | 37.1     | 43.1        | 56.9 |
| Primary                    | 66,144   | 34.1     | 74.3        | 25.7 |
| Secondary                  | 49,306   | 25.4     | 79.4        | 20.6 |
| Higher                     | 6,759    | 3.5      | 94.5        | 5.5 |
| Marital status (P<0.001)   |          |          |             |
| Status         | Count  | Percent | Married | Percent | Divorced | Percent |
|---------------|--------|---------|---------|---------|----------|---------|
| Never married | 14,101 | 7.3     | 78.1    | 21.9    |          |         |
| Married       | 13,290 | 68.4    | 60.3    | 39.7    |          |         |
| Cohabitation  | 32,554 | 16.8    | 70.4    | 29.6    |          |         |
| Widowed       | 2,842  | 1.5     | 69.1    | 31.0    |          |         |
| Divorced      | 11,876 | 6.1     | 75.4    | 24.6    |          |         |

| Religion (P<0.001) | Christianity | Islam | No religion | Other |
|---------------------|--------------|-------|-------------|-------|
| Count               | 120,688      | 62,652| 4,087       | 6,848 |
| Percent             | 62.1         | 32.3  | 2.1         | 3.5   |
| Married             | 76.5         | 44.7  | 51.9        | 43.5  |
| Divorced            | 23.5         | 55.3  | 48.1        | 56.5  |

| Wealth status (P<0.001) | Poorest | Poorer | Middle | Richer | Richest |
|-------------------------|---------|--------|--------|--------|---------|
| Count                   | 39,799  | 40,159 | 39,061 | 38,769 | 36,487  |
| Percent                 | 20.5    | 20.7   | 20.1   | 20.0   | 18.8    |
| Married                 | 50.9    | 57.0   | 63.9   | 72.2   | 84.5    |
| Divorced                | 49.1    | 43.0   | 36.1   | 27.8   | 15.5    |

| Occupation (P<0.001) | Not working | Managerial | Clerical | Sales | Agriculture | Services | Manual |
|----------------------|-------------|------------|----------|-------|-------------|----------|--------|
| Count                | 60,025      | 6,578      | 1,191    | 38,148| 64,696      | 10,001   | 13,636 |
| Percent              | 30.9        | 3.4        | 0.6      | 19.6  | 33.3        | 5.2      | 7.0    |
| Married              | 62.9        | 89.7       | 91.9     | 60.4  | 61.9        | 71.3     | 75.8   |
| Divorced             | 37.1        | 10.3       | 8.1      | 39.7  | 38.1        | 28.8     | 24.2   |

| Place of Residence (P<0.001) | Urban | Rural |
|-------------------------------|-------|-------|
| Count                        | 67,303| 126,972|
| Percent                      | 34.6  | 65.4  |
| Married                      | 76.9  | 58.2  |
| Divorced                     | 23.1  | 41.8  |

| Parity (P<0.001) | 1 | 2 |
|-------------------|---|---|
| Count             | 42,093| 37,548|
| Percent           | 21.7 | 19.3 |
| Married           | 71.2 | 70.2 |
| Divorced          | 28.8 | 29.8 |
| 3   | 30,764 | 15.8 | 67.4 | 32.6 |
|-----|--------|------|------|------|
| 4+  | 83,870 | 43.2 | 57.6 | 42.4 |

Healthy-looking person can have HIV (P<0.001)

|       |        |      |      |      |
|-------|--------|------|------|------|
| No    | 33,209 | 17.1 | 49.7 | 50.3 |
| Yes   | 149,786| 77.1 | 70.2 | 29.8 |
| Don't Know | 11,280 | 5.8  | 34.5 | 65.5 |

Frequency of Reading newspaper (P<0.001)

|                  |        |      |      |      |
|------------------|--------|------|------|------|
| Not at all       | 161,288| 83.0 | 60.1 | 39.9 |
| Less than once a week | 17,522 | 9.0  | 86.8 | 13.2 |
| At least once a week | 14,033 | 7.2  | 87.1 | 12.9 |
| Almost every day | 1,432   | 0.7  | 90.4 | 9.6  |

Frequency of Listening radio (P<0.001)

|                   |        |      |      |      |
|-------------------|--------|------|------|------|
| Not at all        | 77,455 | 39.9 | 56.4 | 43.6 |
| Less than once a week | 38,126 | 19.6 | 64.2 | 35.8 |
| At least once a week | 70,893 | 36.5 | 71.7 | 28.4 |
| Almost every day  | 7,801   | 4.0  | 83.0 | 17.0 |

Frequency of Watching television (P<0.001)

|                  |        |      |      |      |
|------------------|--------|------|------|------|
| Not at all       | 117,380| 60.4 | 59.2 | 40.8 |
| Less than once a week | 22,768 | 11.7 | 66.4 | 33.6 |
| At least once a week | 41,425 | 21.3 | 72.8 | 27.2 |
| Almost every day | 12,702  | 6.5  | 87.8 | 12.2 |

**Influence of women decision-making capacity and socio-demographic characteristics on HIV Testing in SSA**

Table 2 shows results on the influence of women decision-making capacity and socio-demographic factors on HIV testing in SSA. The results indicate that women who had high capacity to take decisions, were more likely to test for HIV compared to those who had no capacity [AOR=1.04, CI=1.02–1.09] (see Model II). As shown in Model II, the highest odds of HIV testing were recorded among women of Rwanda [AOR=53.92, CI=41.31-70.37],
while women of Guinea had the lowest odds of testing for HIV [AOR=0.10, CI=0.10-0.12] as compared with Angola. Women 30-34 years had the highest odds of testing for HIV [AOR=1.32, CI=1.23-1.41] whilst those aged 45-49 had the lowest odds [AOR=0.89, CI=0.80-0.99]. Women with higher educational level had the highest odds of HIV testing while those cohabiting were more likely to test for HIV [AOR=1.08, CI=1.02-1.15]. Muslim women had the lowest odds of testing for HIV [AOR=0.66, CI=0.64-0.68] compared with Christian women.

**Table 2: Logistic regression analysis on women decision-making capacity and HIV testing in SSA.**

| Variables                        | Sample Size n= 194,275 | Model I Crude Odds Ratio (95%CI) | Model II Adjusted Odds Ratio |
|----------------------------------|------------------------|----------------------------------|------------------------------|
| Women decision-making capacity   |                        |                                  |                              |
| Low capacity                     | 175,002                | Ref                              | Ref                          |
| High capacity                    | 19,273                 | 1.50***[1.46-1.55]               | 1.04* [1.02-1.15]            |
| Country                          |                        |                                  |                              |
| Angola                           | 6,710                  | Ref                              |                              |
| Burkina Faso                     | 10,270                 | 0.52***[0.48-0.55]               |                              |
| Benin                            | 8,027                  | 0.61***[0.56-0.68]               |                              |
| Burundi                          | 8,700                  | 18.36***[1.0-16.1]               |                              |
| Congo DR                         | 10,196                 | 0.11***[0.08-0.14]               |                              |
| Congo                            | 5,763                  | 0.27***[0.23-0.32]               |                              |
| Côte d’Ivoire                    | 4,733                  | 0.728***[0.66-0.79]              |                              |
| Cameroon                         | 3,373                  | 1.10[1.00-1.20]                  | 1.19***[1.16-1.23]           |
| Ethiopia                         | 6,994                  | 1.19***[1.16-1.23]               |                              |
| Gabon                            | 3,610                  | 1.37***[1.32-1.43]               |                              |
| Ghana                            | 4,019                  | 1.16**[1.09-1.24]                |                              |
| Gambia                           | 5,067                  | 1.80***[1.66-1.94]               | 1.50***[1.36-1.66]           |
| Guinea                           | 4,643                  | 0.10***[0.08-0.12]               |                              |
| Kenya                            | 6,793                  | 14.50***[1.23-1.69]              |                              |
| Comoros                          | 1,830                  | 0.17***[0.14-0.21]               |                              |
| Liberia                          | 4,605                  | 1.43***[1.37-1.49]               |                              |
| Country       | N  | OR   |
|---------------|----|------|
| Lesotho       | 1,121 | 33.41***[1] |
| Mali          | 5,567 | 0.198***[0] |
| Malawi        | 13,307 | 29.87***[2] |
| Mozambique    | 3,795 | 3.32***[2.1] |
| Nigeria       | 18,281 | 0.33***[0.1] |
| Namibia       | 3,735 | 12.38***[1] |
| Rwanda        | 6,020 | 53.92***[4] |
| Sierra Leone  | 7,981 | 3.87***[3.1] |
| Senegal       | 7,302 | 0.52***[0.4] |
| Chad          | 2,916 | 0.25***[0.1] |
| Togo          | 4,631 | 1.14**[1.0] |
| Uganda        | 10,170 | 16.64***[1] |
| Zambia        | 9,158 | 9.43***[8.4] |
| Zimbabwe      | 4,958 | 7.198***[6] |
| Age           |     |      |
| 15-19         |     | Ref  |
| 20-24         |     | 1.16***[1.0] |
| 25-29         |     | 1.31***[1.1] |
| 30-34         |     | 1.32***[1.0] |
| 35-39         |     | 1.25***[1.0] |
| 40-44         |     | 1.09* [1.0] |
| 45-49         |     | 0.89* [0.8] |
| Education     |     |      |
| No formal education |     | Ref  |
| Primary       |     | 1.49***[1.0] |
| Secondary     |     | 2.21***[2.0] |
| Higher        |     | 5.24***[4.0] |
| Marital status|     |      |
| Never married |     | Ref  |
| Married       |     | 1.01 [0.95] |
| Cohabitation  |     | 1.08* [1.0] |
| Widowed       |     | 1.06 [0.93] |
| Divorced      |     | 1.06 [0.98] |
| Religion      |     |      |
| Christianity  |     | Ref  |
| Islam         |     | 0.66***[0.1] |
| No religion   |     | 0.72***[0.1] |
|                | Odds Ratio | 95% CI |
|----------------|------------|--------|
| **Wealth status** |            |        |
| Poorest        |            |        |
| Poorer         | 1.28***    | [1.1]  |
| Middle         | 1.52***    | [1.4]  |
| Richer         | 1.95***    | [1.8]  |
| Richest        | 3.07***    | [2.8]  |
| **Occupation** |            |        |
| Not working    |            |        |
| Managerial     | 1.30***    | [1.1]  |
| Clerical       | 1.47**     | [1.1]  |
| Sales          | 1.16***    | [1.1]  |
| Agriculture    | 0.93***    | [0.9]  |
| Services       | 1.16***    | [1.1]  |
| Manual         | 1.16***    | [1.1]  |
| **Residence**  |            |        |
| Urban          |            |        |
| Rural          | 0.65***    | [0.6]  |
| **Parity**     |            |        |
| 1              |            |        |
| 2              | 1.03       | [0.98] |
| 3              | 1.01       | [0.96] |
| 4+             | 0.91***    | [0.9]  |
| **Healthy-looking person can have HIV** | | |
| No             |            |        |
| Yes            | 1.48***    | [1.4]  |
| Don't Know     | 0.72***    | [0.7]  |
| **Newspaper**  |            |        |
| Not at all     |            |        |
| Less than once a week | 1.35*** | [1.3] |
| At least once a week | 1.34*** | [1.3] |
| Almost every day | 1.17     | [0.93] |
| **Radio**      |            |        |
| Not at all     |            |        |
| **Healthy-looking person can have HIV** | | |
The results further indicated that richest women were more likely to test for HIV compared to poorest women [AOR=3.07, CI=2.89-3.26]. Women who were Clerics had the highest odds of HIV testing [AOR=1.47, CI=1.13-1.90] while those who were into Agriculture, had the lowest odds of HIV testing [AOR=0.93, CI=0.90-0.96]. Women from the rural areas were less likely to test for HIV compared to those from the urban areas [AOR=0.65, CI=0.63-0.68]. Women with parity 4 and above were less likely to test for HIV compared to those with parity 1 [AOR=0.91, CI=0.87-0.96]. Women who knew that a healthy-looking person can have HIV were more likely to test for HIV compared to those who did not know [AOR=1.48, CI=1.43-1.53]. All women who had frequent encounter with television, radio and newspaper had higher odds of testing for HIV.

Discussion

This study explored women decision-making capacity and HIV testing in SSA enlisting the most recent DHS of 30 countries. This study was imperative since HIV testing has been
noted as a challenge for some women in SSA [3] whilst some evidence suggest that
decision-making capacity plays a significant role in whether a woman will test for HIV or
not [11, 23]. We found that women who had high capacity to make decisions were more
likely to test for HIV. This may not necessarily imply that women who did not have the
capacity do not prioritise HIV testing, instead it may indicate their inability to translate
their thoughts into action. This finding reinforces evidence from Tanzania and Nigeria that
empowered women who are capable of making decisions have higher chances of HIV
testing [8, 21].
Our finding suggests that efforts to halt HIV and vertical transmission need to target
decision-making capacity of women in the household and community level. Additionally,
facility-based interventions such as supplying and subsidising the cost of antiretroviral
vaccines will be necessary. Active community engagement geared towards women
empowerment especially in the areas of decision-making, therefore, needs to be
prioritised. A recent systematic review indicated that encouragement from peers could
enhance ability of women to undergo HIV test [24] and this is a key community-level
strategy. We noticed that women from Rwanda had the highest likelihood of HIV testing
whilst women of Guinea had the least likelihood of testing. This is not surprising in light of
the upsurge in health sector reforms in Rwanda in the past few years [25]. Another factor
that might have accounted for the high likelihood of HIV testing may be Rwanda’s
continual efforts marked by 3.0% stabilised HIV prevalence among the general population
and 50% reduction in new HIV infection rate [26]. Rwanda is more probable to further
improve in HIV testing and reduction with the introduction of self-HIV-testing kit which can
be purchased over the counter [26]. There is the need to encourage women in Guinea to
utilise HTC.
The study revealed that HIV testing declines as women advance in age and parity. This is
consistent with earlier studies conducted in a number of SSA countries. For instance, one study from Namibia reported that likelihood of HIV testing generally declined as women advanced in age [19]. It is possible that women who are advanced in age and possibly with high parity will feel that they have limited exposure to HIV due to possible decline in sexual intercourse [27]. Such women may feel less motivated to test for HIV.

Our study showed that women with higher educational attainment stand a greater chance of testing for HIV. Education has been identified as a strong predictor for HIV testing [20, 28]. Through education, women are more probable to be exposed to the realities of HIV including the need to test for HIV as it is the first step towards its minimisation in any given population. In Ghana, Iddrisu and colleagues [22] made a similar observation and this implies that promoting female education could promote HIV testing.

Richest women were more likely to test for HIV. An earlier inquiry in Burkina Faso, Kenya, Malawi, and Uganda similarly unravelled that women with higher wealth standing are more likely to test for HIV [18, 29]. High wealth status is a form of empowerment and as a result it is not surprising that such women exercise their decision-making capacity in a way that can improve their health status, which is testing for HIV. This indicates that policies on Mother-To-Child-Transmission (MTCT) and plans to halt HIV need to consider measures that can enhance economic standing of women.

Women from the rural areas were less likely to test for HIV. Similarly, an earlier study has noted that women in rural settings have less likelihood of HIV testing in Bangladesh [30]. This is not a problem of the low and middle-income countries alone but also occur in some high-income countries. In the United States, Henderson et al. [31] noted that less women in rural settings had ever been tested for HIV compared to women in urban settings. The finding can be appreciated by reflecting on how health facilities, key human and other resources are skewed in favour of urban settings in most countries across SSA [32, 33].
Women who knew that a healthy-looking person can have HIV were more likely to test for HIV. Gaining consciousness about a health condition is the first step to inform the needed precaution as argued by the Health Belief Model [34, 35]. This finding is consistent with previous evidence from Burkina Faso and Cambodia that knowledge about HIV have greater implication on whether women will undergo the test or otherwise [20, 36]. HIV campaigns across SSA need to reorient women to appreciate that anybody could be HIV positive irrespective of physical appearance. The erroneous impression that healthy looking persons cannot have HIV possibly originated from the initial fear-based public health campaigns about HIV prevention where images of skulls, crossbones or scary pictures of women were used to portray and warn the public on the consequences of sexually transmitted infections including HIV [37]. The use of more humane images and advertisement strategies can help the public to appreciate that healthy-looking persons can have HIV and thereby increase chances of HIV testing.

Women with regular access to television, radio and newspaper had higher odds of testing for HIV. The positive resultant outcome of mass media on HIV testing has been noted in Uganda [38], Kenya [39] and South Africa [40]. Using mass media has been a principal approach for several behaviour communication change interventions [41, 42] implying that the health sector of SSA countries can utilise it effectively to encourage women to undergo HIV testing. Success rates of HIV testing within a given population could be tied to the use of media channels that are widely accessible to the target population. Adopting such approach could expose women to HIV testing campaigns and thereby contribute to the development of a positive perception and motivation to undergo the test. This may include the use of folk media (i.e. utilising narratives and stories through the local culture and indigenous social factors to deliver messages), which has proven positive in some countries across SSA [38].
Strengths And Limitations

This study offers a true account of women’s decision-making capacity and HIV testing emerging from most recent national surveys of 30 countries characterising SSA. The large sample and rigour of the methodological and analytical approaches are significant strengths of the study. However, the study is not devoid of limitations. The term “decision-making capacity” has different conceptualisations due to the use of different measurement indicators. This means that, its measurement by the DHS programme as used in this study differs from how it is conceptualised by other authors [17, 43]. Again, women were only asked if they had tested for HIV without any validation and as a result recall bias could occur. However, these do not outweigh the rigour of the study in light of the acknowledged strengths.

Conclusions And Policy Implications

The study has demonstrated that ensuring women decision-making capacity is a cornerstone for upscaling HIV testing among women in SSA. SSA countries that seek to improve HIV testing need to incorporate women decision-making strategies into the available policies because our study indicates that as more women are able to make decisions in their household, their chances of HIV testing increases. In addition to focusing on provision of care (i.e., providing HIV test kits, targeting household and community level structures), prioritising women decision-making capacities can contribute positively to HIV testing. Much of this effort is required in Guinea as women from that country had the least likelihood of HIV testing. Other category of women to target when developing measures to increase HIV testing are the poorest, women who have never married, women over 45 years, those not having formal education, agricultural workers, rural women, women having more than four births and women having limited contact with mass media.
(television, radio and newspaper). Various context specific mass media channels can therefore be used to reach the identified category of women depending on available resources.

Declarations

**Ethical Approval**

The DHS surveys obtain ethical clearance from the Ethics Committee of ORC Macro Inc. as well as Ethics Boards of partner organisations of the various countries such as the Ministries of Health. During each of the surveys, either written or verbal consent was provided by the women. Since the data was not collected by the authors of this paper, we sought permission from MEASURE DHS website and access to the data was provided after our intent for the request was assessed and approved on 27th January, 2019.

**Consent for publication**

All authors have read and approved final manuscript and agreed to be accountable for all aspects of the work.

**Competing interests**

The authors declare no competing interests in the conduct of this research.

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**Authors’ Contributions**

AS conceived the study. AS designed and performed the analysis. AS, FS, BL, BOA, JKO and FA designed first draft of the manuscript. AS, FS, BL, EB, JKO, BOA, EKA and FA revised the manuscript for intellectual content and gave consent for the version to be published.

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**Availability of data and materials**
The dataset is freely available at https://dhsprogram.com/data/available-datasets.cfm.

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