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Age and Marital Status as Correlates of Cervical Cancer Screening Representation Among HIV-Positive Women in Aba, Nigeria: A Retrospective Cross-Sectional Study

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Research Article

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Abstract

Background

Cervical cancer is a leading cause of preventable morbidity among women living with HIV (WLHIV) in sub-Saharan Africa, yet screening uptake varies substantially across demographic subgroups. Little is known about how marital status and age jointly shape screening representation among WLHIV in Southeast Nigeria, where popular assumptions that marriage protects against HIV-related risk persist despite limited supporting evidence.

Methods

A retrospective cross-sectional analysis was conducted using hospital records of 200 WLHIV screened for cervical cancer via visual inspection with acetic acid (VIA) at a teaching hospital in Aba, Abia State, Nigeria, between February and October 2024. Age and marital status were cross-tabulated. Because expected cell counts were too small for standard chi-square analysis, a Freeman-Halton exact test (Monte Carlo estimation, 200 000 replications) was used to test the association between age group and marital status, with Cramér's V calculated as a measure of effect size.

Results

Married women accounted for 191 of 200 women screened (95.5%), compared with 9 single women (4.5%). Single women's presence in the cohort was confined almost entirely to women under 30, comprising over half of the 20–24 age band (6 of 11, 54.5%) but 3.8% or less of every age band from 30 years upward, while married women's representation remained consistently high (95.0–100.0%) across all age bands. The association between age group and marital status was statistically significant (Freeman-Halton exact $p = 3.5 \times 10^{-5}$), with a moderate-to-large effect size (Cramér's $V \approx 0.37$). All 200 screening results were negative, indicating no outcome variance within this cohort.

Conclusions

The marked underrepresentation of single women, particularly those under 30, in this screened HIV-positive cohort more plausibly reflects differential access to and encouragement toward screening than differential underlying risk. Existing Nigerian evidence indicates marriage does not confer the protective effect commonly assumed. Communication interventions, particularly radio-based sensitisation given the study setting's established radio infrastructure, should specifically target young, unmarried women, who currently appear least likely to access screening services.

Background

Cervical cancer remains the second most common cancer and the leading cause of cancer death among women in sub-Saharan Africa, with incidence rising across most population-based registries in the region over the past two decades [1]. Nigeria carries a disproportionate share of this burden, with particularly poor outcomes among women living with HIV (WLHIV), who face elevated risk of cervical dysplasia and malignancy due to HIV-related immunosuppression [2]. Visual inspection with acetic acid (VIA) is an increasingly used, low-cost method for cervical cancer screening in low-resource settings, yet screening uptake across Nigeria remains persistently low, and the demographic profile of who accesses screening is not well characterised in HIV-positive populations specifically.

A retrospective review of hospital screening records at a teaching hospital in Aba, Abia State, undertaken as part of a broader investigation into communication-related drivers of screening behaviour among WLHIV, revealed a striking pattern: of 200 women screened between February and October 2024, 191 (95.5%) were married and only 9 (4.5%) were single. This pattern raises two related questions addressed in this study: first, whether this disparity reflects age distribution alone, since marriage prevalence rises with age; and second, what the pattern implies for who is, and is not, accessing cervical cancer screening in this setting.

Evidence from Nigerian settings consistently identifies marital status as a correlate of cervical cancer screening uptake, although findings are not uniform across contexts. In a cross-sectional study of rural women in North Central Nigeria, married women were 3.5 times more likely, and divorced or separated women roughly six times more likely, to have undergone screening than single women [2]. A community-based study in Ilorin, North Central Nigeria similarly identified marital status, alongside attitude and awareness, as a significant determinant of screening uptake using chi-square and logistic regression analysis [3]. Comparable associations were found among university undergraduates in South-East Nigeria, where screening uptake was significantly higher among married respondents despite single women comprising the large majority of the sample [4]. This relationship is not universal, however; a study among tertiary health students in northeastern Nigeria found no significant association between marital status and screening awareness or willingness [5], suggesting the relationship is context-dependent and underscoring the value of locally grounded studies such as the present one.

A plausible mechanism linking marriage to screening uptake is spousal influence over women's healthcare decisions. A mixed-methods study of married men in rural South-East Nigeria found that most husbands expected to be consulted, and expected their consent to be sought, before their wives underwent cervical cancer screening, reflecting prevailing patriarchal norms around women's healthcare decision-making; the study's authors recommended that awareness campaigns actively engage husbands to promote screening uptake among their wives [6]. For married women, a husband's awareness or encouragement may function as a facilitating pathway into screening; for single women, this pathway is largely absent.

Because the present study's cohort is drawn entirely from WLHIV, general-population screening literature must be read alongside evidence specific to this group. A systematic review and meta-analysis of 21

studies across Sub-Saharan Africa, encompassing over 20 000 HIV-positive women, found overall screening uptake among WLHIV to be approximately 30%, with barriers including poor knowledge, low perceived risk, fear of results, cost, and poor partner attitudes toward screening, alongside a barrier distinct to this population: the perceived burden of a potential cervical cancer diagnosis layered onto an existing HIV diagnosis [7]. This is broadly consistent with programmatic data from a multi-state Nigerian cervical cancer prevention programme, in which WLHIV comprised a distinct screened subgroup with markedly higher VIA and HPV positivity than the general screened population, underscoring both their elevated clinical risk and the importance of characterising their screening access patterns specifically [8]. This 'double burden' concern may weigh more heavily on single WLHIV, who may lack a partner with whom to share it.

A further consideration is the popular assumption that marriage reduces HIV risk. Nigerian evidence complicates this assumption considerably. An ethnographic study of modern marriage in southeastern Nigeria found that married women's greatest HIV exposure typically arises through their own husbands, since men more often acquire HIV outside marriage through extramarital activity and subsequently transmit it within the marital relationship, a dynamic linked to persistent gender inequality that constrains married women's ability to negotiate protection [9]. This is consistent with multi-country evidence that community-level gender inequity is associated with married men's likelihood of engaging in risky extramarital sex, with direct implications for wives' HIV exposure [10]. National survey data further complicate a simple protective narrative: analysis of the 2012 Nigerian population-based HIV/AIDS and reproductive health survey found HIV prevalence of 3.4% among both currently married and never-married women, but 5.9% among formerly married (divorced, separated, or widowed) women [11].

Taken together, this literature establishes marital status as a recurring, though inconsistent, correlate of cervical cancer screening uptake in Nigeria, with spousal gatekeeping offering a plausible mechanism, and establishes that the marriage-HIV protection narrative is not well supported by Nigerian data. What remains unexamined is how age and marital status jointly shape screening representation among WLHIV in a Southeast Nigerian, faith- and community-embedded setting such as Aba. This study addresses that gap, and situates its recommendations within an established communication-for-social-change framework in which community dialogue, rather than one-way information delivery, is understood to drive sustained health behaviour change [12].

Methods

Study design and setting

This was a retrospective, records-based cross-sectional study conducted at Rhema University Teaching Hospital (RUTH) in Aba, Abia State, Nigeria, a facility situated at the intersection of a university, teaching hospital, and faith-based ministry, serving a broader HIV-positive patient population beyond the study cohort.

Study population and sampling

The study population comprised all women living with HIV who underwent cervical cancer screening via VIA at the facility during the period February to October 2024, totalling 200 women. This represented all patients screened during the study window, rather than a subsample, drawn from a larger pool of HIV-positive patients registered with the facility.

Data source and variables

Data were extracted from anonymised hospital medical records using a structured data extraction form developed by the first author (FT) for this study (Additional file 1). Variables relevant to this analysis were age (grouped in five-year bands from 15–19 through 45+) and marital status (married vs. single). VIA screening outcome, antiretroviral treatment regimen (tenofovir/lamivudine/dolutegravir, TDL), and communication exposure (clinical counselling) were also recorded but showed no variance across the cohort, and are reported descriptively rather than analysed inferentially.

Statistical analysis

Age and marital status were cross-tabulated using the full seven-band age classification, then collapsed into three bands (under 30, 30–39, 40+) to reduce sparseness. Because expected cell counts in the marital status subgroup (n = 9 single women) remained below the conventional threshold of 5 required for valid chi-square analysis, even after collapsing age bands, a standard Pearson chi-square test was considered unreliable as a primary statistic. A Freeman-Halton exact test [13], the generalisation of Fisher's exact test for tables larger than 2 × 2, was computed via Monte Carlo simulation (200 000 replications) to assess the association between age group and marital status. Effect size was quantified using Cramér's V [14]. A Pearson chi-square test on the same collapsed table is reported as a secondary, sensitivity statistic. All analyses were conducted in Python using the SciPy statistical library.

Results

Demographic profile

The cohort's age distribution skewed toward older women: 15–19 years (n = 1, 0.5%), 20–24 years (n = 11, 5.5%), 25–29 years (n = 20, 10.0%), 30–34 years (n = 26, 13.0%), 35–39 years (n = 49, 24.5%), 40–44 years (n = 39, 19.5%), and 45 years and above (n = 54, 27.0%). Overall, 191 women (95.5%) were married and 9 (4.5%) were single.

Age and marital status cross-tabulation

Table 1 presents the full cross-tabulation of age group by marital status.

Table 1
Age group by marital status among 200 HIV-positive women screened for cervical cancer, Aba, Nigeria, 2024

Age group	Married n (%)	Single n (%)	Total n
15–19	1 (100.0)	0 (0.0)	1
20–24	5 (45.5)	6 (54.5)	11
25–29	19 (95.0)	1 (5.0)	20
30–34	25 (96.2)	1 (3.8)	26
35–39	49 (100.0)	0 (0.0)	49
40–44	38 (97.4)	1 (2.6)	39
45+	54 (100.0)	0 (0.0)	54
Total	**191 (95.5)**	**9 (4.5)**	**200**

Percentages are row percentages (married and single women as a proportion of each age group's total).

In the 20–24 age band, single women made up more than half of those screened (6 of 11, 54.5%), the only age band in which married women did not overwhelmingly predominate. From age 30 onward, single women accounted for 3.8% or less of every band (0% in three of the four bands from 30 upward), while married women's representation remained consistently high (95.0–100.0%) across the entire age range. Of the 9 single women in the cohort overall, 7 (77.8%) were under 30.

Statistical association between age and marital status

For analysis, age was collapsed into three bands (Table 2).

Table 2
Age band (collapsed) by marital status among 200 HIV-positive women screened for cervical cancer, Aba, Nigeria, 2024

Age band	Married n	Single n	Total n
Under 30	25	7	32
30–39	74	1	75
40+	92	1	93
Total	**191**	**9**	**200**

Age collapsed into three bands to reduce sparse cell counts for statistical testing (see Methods).

A Pearson chi-square test on this collapsed table yielded $\chi^2 = 26.77$, df = 2, $p \approx 1.5 \times 10^{-6}$; however, three of six expected cell counts remained below 5 (range 1.44–4.19), violating the assumptions underlying this test. The Freeman-Halton exact test, computed via Monte Carlo simulation, confirmed a statistically significant association between age group and marital status ($p = 3.5 \times 10^{-5}$). The effect size was moderate to large (Cramér's V ≈ 0.37), indicating that single women's presence in the screened cohort is confined almost entirely to the youngest age band, while married women's high representation holds consistently across the entire age range.

Clinical outcome

All 200 women returned negative VIA results. The study cohort's clinical screening outcome therefore shows no variance, and this analysis cannot speak to differential cervical cancer risk by age or marital status, only to differential representation among those accessing screening.

Discussion

This study found that women screened for cervical cancer within an HIV-positive cohort in Aba, Nigeria were overwhelmingly married, and that this pattern was not simply an artefact of age: single women's presence in the cohort was confined almost entirely to women under 30, while married women's high representation held consistently from the youngest to the oldest age band. This finding is broadly consistent with prior Nigerian evidence linking marital status to screening uptake [2, 4], and offers a plausible extension: the marriage-screening association in this setting appears strongest, and most consistent, from the early thirties onward, whereas at younger ages, where national marriage prevalence is lower, spousal encouragement or consent [6] may not yet be the dominant pathway into screening for many women.

It is important to state clearly what this study can and cannot conclude. Because all 200 screening results were negative, this analysis identifies a disparity in who accessed screening, not a disparity in underlying cervical cancer risk. It would be a misreading of these findings to conclude that single women are at lower risk; rather, the data suggest they are less likely to be screened at all, which should be read as a call for improved outreach, not reduced concern.

This distinction matters most in relation to the popular belief that marriage protects women from HIV. Nigerian evidence directly challenges this assumption: married women's HIV exposure has been shown to arise predominantly through their own husbands, with men frequently acquiring HIV through extramarital activity and transmitting it within marriage [9], a pattern linked to community-level gender inequity in multiple African countries [10]. National data show that current marriage confers no HIV-prevalence advantage over never having married [11]. The implication for this study's findings is important: the fact that married women dominate this screened cohort should not be read as evidence that marriage is protective, or that single women are a lower priority for outreach. If anything, the opposite may be true: single women in this setting may be under-screened despite carrying comparable

risk, simply because they lack the spousal pathway into care that appears to draw married women into screening programmes.

From a health communication perspective, this reframes the core problem: it is not that married women are over-served, but that single women, and particularly single women under 30, appear to be systematically missing from the screening population. Radio remains a dominant and trusted source of health information across Nigeria, reaching a large majority of the population and functioning as an established vehicle for behaviour-change messaging, including in interactive formats that allow direct audience engagement [15]. Given the study setting's documented radio infrastructure and established role in community health messaging, this is a mechanism-appropriate gap for social and behaviour change communication (SBCC) intervention, consistent with models in which sustained behaviour change is driven by community dialogue rather than one-way messaging alone [12]. Radio messaging explicitly targeting single women, public communication correcting the marriage-protection assumption, community and faith-based outreach providing alternative encouragement pathways, and SMS-based screening reminders extended to unmarried patients are all plausible, low-cost interventions warranting evaluation in this setting.

This study has several limitations. It draws on records from a single facility, limiting generalisability. The small size of the single-women subgroup (n = 9), while statistically significant via exact testing, limits the precision of subgroup estimates and warrants replication with a larger sample. Because all VIA results were negative, the study cannot assess whether marital status or age is associated with actual cervical cancer risk or HPV positivity, only with screening representation. The retrospective, records-based design means the study cannot capture individual-level reasons for single women's underrepresentation (e.g., awareness, fear, stigma, logistical barriers); these are inferred from the broader literature rather than directly measured. Finally, marital status was recorded as a binary (married/single) category in hospital records, which does not distinguish divorced, separated, or widowed women, a subgroup that national data suggest may carry distinct and elevated HIV risk [11] and that future studies in this setting should disaggregate.

Conclusions

Among 200 HIV-positive women screened for cervical cancer at a teaching hospital in Aba, Nigeria, married women were markedly overrepresented, and single women's presence in the screened cohort was confined almost entirely to women under 30, while married women's high representation held steady across every older age band. This pattern most plausibly reflects differential access to and encouragement toward screening, not differential underlying risk, and is consistent with a broader Nigerian evidence base showing that marriage does not confer the HIV or cervical cancer protection popularly attributed to it. Closing this screening gap for single women, particularly younger single women, through targeted radio-based and community health communication represents a clear and actionable opportunity in this setting, and future prospective, multi-facility research disaggregating marital status subgroups is recommended to build on these findings.

Abbreviations

RUTH
Rhema University Teaching Hospital
SBCC
Social and Behaviour Change Communication
TDL
Tenofovir/Lamivudine/Dolutegravir
VIA
Visual Inspection with Acetic Acid
WLHIV
Women Living with HIV.

Declarations

Ethics approval and consent to participate

This study was not submitted to a research ethics committee or institutional review board. It was a retrospective analysis of anonymised routine clinical records, abstracted onto data extraction forms numbered 1 to 200 that contain no patient names or other direct identifiers. Access to the records was authorised by the Chief Medical Director of Rhema University Teaching Hospital (RUTH), who minuted approval on the corresponding author's written request to the Hospital Records Unit. Individual informed consent to participate was not obtained, because the data were retrospective and anonymised and no patient was contacted. The study was conducted in accordance with the Declaration of Helsinki.

Clinical trial number

not applicable.

Consent for publication

Not applicable. This manuscript does not contain any individual person's data, images, or case details.

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

FT conceived and designed the study, obtained permission to access the records, and collected and analysed the data. AN-U contributed to the conceptual framing of the study. FT drafted the manuscript, and AN-U critically revised it for important intellectual content. Both authors read and approved the final manuscript.

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Data Availability

The data analysed in this study were extracted from routine hospital records onto anonymised data extraction forms numbered 1 to 200, containing no patient names or other direct identifiers. The anonymised dataset is available from the corresponding author on reasonable request.

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