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HIV status awareness and associated factors among domestic workers in Kigali, Rwanda

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Received: 27 October 2024 / Accepted: 21 March 2025
Published online: 31 March 2025
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Abstract

Background Domestic workers are at risk of sexual violence at their workplace, and recent studies have demonstrated that they have irregular working hours and limited time off, making it difficult to access health care services. Poor access to health services has been linked to poor HIV testing. In this study, we aimed to determine the proportion of domestic workers who are aware of their HIV status in Rwanda and the associated factors related to their unawareness.

Methods This cross-sectional study design involved 884 domestic workers in Kigali. We employed questions regarding awareness of HIV status adopted from previously published literature. Descriptive statistics was conducted to determine the proportion of domestic workers who are unaware of HIV status, and logistic regression was performed to identify the associated factors related to their unawareness.

Result The mean age was 21.3 (Standard Deviation of 3.5), and the findings revealed that 29.43% of domestic workers were unaware of their HIV status. Factors associated with unawareness of HIV status were age below 18 (adjusted odds ratio [aOR] = 3.34; 95% confidence interval [CI]: 1.55–7.19, *p* value = 0.002), male-gender (aOR = 2.00, 95% CI: 1.40–2.86, *p* value ≤0.001), low level of education (aOR = 1.77, 95% CI: 1.26–2.49, *p* value ≤0.001), previous history of having unprotected sexual intercourse (aOR = 1.81; 95% CI: 1.19–2.73, *p* value = 0.005), those who had ever had sex (aOR = 0.59; 95% CI: 0.39–0.89, *p* value = 0.012), and drug dependence (aOR = 0.68, 95% CI: 0.48–0.96, *p* value = 0.032).

Conclusion One in three domestic workers is unaware of their HIV status, yet the majority are sexually active. To achieve the 2030 goal of eradicating HIV infection, programs should innovate ways to target this vulnerable group specifically.

Keywords Domestic workers · Drug dependency · HIV awareness · Primary prevention · Rwanda · Sexual behaviors

1 Introduction

Domestic workers, often called housekeepers or maids, play a crucial role in households worldwide, performing tasks such as cleaning, cooking, and caring for children and elderly people [1]. This study uses the term "domestic workers" to define the earlier categories. Despite their essential contributions, domestic workers, with whom the majority are females, are among the most marginalized groups, facing numerous barriers to accessing healthcare services, including HIV testing and treatment [2, 3]. They often work under challenging conditions, experiencing sexual violence and abuse,

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lack of health insurance, low wages, and restrictions imposed by their employers [1–5]. Additionally, domestic workers frequently lack knowledge about HIV and their sexual health, which increases their vulnerability to HIV infection [6].

The global HIV epidemic remains a significant public health challenge, with approximately 39.9 million people living with HIV in 2023 [7, 8]. Of these, 38.6 million were adults (above 15 years old), and 1.4 million were children (below 15 years old) [8, 9]. Women and girls constituted 53% of the total HIV-positive population [9]. Among all people with HIV worldwide, 86% knew their HIV status in 2023, highlighting the importance of awareness in managing and preventing the spread of the virus [8, 10]. The United Nations Joint Program on HIV/AIDS (UNAIDS) has set targets known as the 95–95–95 goals, aiming to ensure that 95% of people living with HIV know their status, 95% of those who know their status are receiving treatment, and 95% of those on treatment have a suppressed viral load by 2030 [8, 10]. These targets further strengthen the importance of knowing one's HIV status. Rwanda surpassed these targets but has not yet attained 100%, calling for innovative ways to cover the last mile [11].

Rwanda is among the five countries in East and Southern Africa celebrated to have attained the overall UNAIDS 95–95–95 targets for HIV testing, treatment, and viral load suppression ahead of 2025 [12], with a national prevalence of HIV in the general population at 3% [13] in the last 10 years. However, the same survey indicates that the prevalence is also geographically disproportionate, with a higher rate in the City of Kigali at 4.3%, Additionally, the prevalence of HIV remains high among key populations with a prevalence that ranges between 24–51% across studies among female sex workers [14, 15] and 4.8–6.9% among men who have sex with other men [16, 17]. There is also concern about the high number of new infections among adolescent girls and young women aged 15–24 at 22% [18]. In relation, there are also ongoing efforts by partners to understand the underlying factors behind teenage pregnancies.

Youth domestic workers in the City of Kigali are particularly vulnerable due to their socio-economic conditions and limited access to healthcare [19]. Despite the high risks they face, there is limited research on HIV status awareness among this group. Knowing one's HIV status is essential for accessing treatment, preventing transmission, and improving health outcomes. However, domestic workers, of which the majority are youth, often face significant barriers to HIV testing and treatment, including lack of health insurance, low wages, and restrictive working conditions [2, 3]. They are also frequently excluded from protections offered by labor laws, which further limit their access to healthcare services [20]. Understanding the level of awareness of HIV status among young domestic workers in Kigali and the associated factors is crucial for developing targeted interventions that can mitigate these risks.

The primary objective of this study was to assess the level of awareness of HIV status among domestic workers in Kigali. Additionally, the study sought to identify factors associated with unawareness of HIV status, such as socio-demographic characteristics, sexual behavior, and access to healthcare services. The findings of this study could have significant public health implications, guiding policies and interventions aimed at increasing awareness of HIV status and reducing the transmission of HIV among youth domestic workers in Kigali.

2 Methods

2.1 Study design and setting

This cross-sectional study was conducted in the City of Kigali, the capital of Rwanda. The City of Kigali is located between 29°43′0″ E and 29°440″ E longitude and 2°35′0″ S and 2°37′0″ S latitude [21]. The city is divided into three districts: Kicukiro, Gasabo, and Nyarugenge, with a combined population of approximately 1,288,000, representing 9.03% of Rwanda's total population [21]. Each district is further subdivided into sectors, cells, and villages. Specifically, there are 35 sectors, 161 cells, and 1155 villages [21]. Each sector has a health center that provides accessible healthcare services to its residents. For each village, community health workers (CHWs) are responsible for the residents.

2.2 Study population, sampling, and enrolment procedure

The study population comprised domestic workers in the City of Kigali. Eligible participants were domestic workers with at least 3 months of work experience. Convenience sampling was employed to select participants. CHWs approached domestic workers in their localities and invited them to participate in the study. They were contacted in person, given study details, and then asked those who agreed to participate in the study to attend the nearest health center for consenting and enrollment.

2.3 Study measures and tools

Data was collected using a pretested questionnaire translated into Kinyarwanda, the local language. The questionnaire was pretested in a pilot study involving 30 domestic workers outside the City of Kigali. Feedback from the pilot study was used to refine the questionnaire, ensuring clarity and cultural relevance.

The questionnaire captured various socio-demographic information, including age, sex (female or male), marital status (single, married, divorced, or widowed), level of education, number of children, and years of experience working as a domestic worker. Additionally, it gathered information on the history of sexual activities: unprotected sexual intercourse, ever had sex, age at first sexual intercourse, sexual intercourse at the workplace with coworkers or employers, and severity of substance use was assessed using the 10-item Drug Abuse Screening Test (DAST-10).

The Drug Abuse Screening Test (DAST) is a 10-item, face-valid, self-report measure of problematic substance use. It is utilized for clinical screening and treatment evaluation research [22]. Responses to the DAST are binary (yes/no), each valued at one point, yielding a total score ranging from 0 to 10. A cutoff score of 6 generally indicates a drug abuse or dependence problem. The tool has been validated in various settings, including those similar to Kigali [23, 24].

The outcome variable, HIV status awareness, was evaluated by asking individuals if they were aware of their status.

2.4 Data analysis

The data from Excel was exported into STATA version 17 for formal analysis. Categorical variables were summarized using frequencies and proportions, while age, a parametric continuous variable, was summarized using mean and standard deviation. We used Chi-square analysis to determine population differences between those aware of their HIV status and those unaware. Bivariate and multivariate binary logistic regression analyses were performed to identify variables associated with HIV unawareness and to control for confounding variables.

Before inclusion in the final adjusted model, collinearity was tested using the variance inflation factor (VIF). Only variables with a VIF of less than two were retained to ensure no multicollinearity issues. All factors included in the bivariate regression analysis were included in the multivariate model. The final model's fitness was assessed using the Hosmer–Lemeshow goodness-of-fit test. For a p value above 0.05, the model was fitting.

The significance level for all statistical tests was set at a 95% confidence interval (CI), with a p value of less than 0.05 considered statistically significant.

3 Results

3.1 Participant characteristics

Out of 884 participants, 853 completed the questionnaire on awareness of HIV status and were included in the analysis. The average age of the participants was 21.3 ± 3.5 years, with the majority being female 627(73.51%). Most participants, 818(95.9%), were single and had not progressed beyond primary education. Nearly a quarter (24.91%) reported a history of nonconsensual sex. Approximately 25.24% ($n = 133$) had engaged in sexual activity at their workplace, and over 628(73.62%) had unprotected sex. For details, see Table 1.

3.2 Proportion of HIV status awareness

A total of 602 (70.57%) of the domestic workers were aware of the HIV status. Among these, 19 (2.23%) were HIV positive (see Fig. 1). The remaining 29.43% did not know their HIV status; 95% confidence interval [CI] = (26.37–32.48%).

3.3 Distribution of awareness of HIV status across the studied variables

The prevalence of HIV unawareness among housemaids was 29.43% ($n = 251$), with a 95% confidence interval (CI) of 26.37–32.48%. Statistical differences were observed in the prevalence of HIV awareness across genders, with female participants significantly more aware of their HIV status than male participants (79.40% vs. 20.60%, $\chi^2 = 36.52$, p value = 0.001). A statistical difference was also noted between marital statuses, as a higher proportion of single domestic workers reported being unaware of their HIV status ($\chi^2 = 7.81$, p value = 0.020). Additionally, there was a statistically significant

Table 1 Distribution of HIV Status awareness across the various domestic workers' sociodemographic characteristics and sexual history

Variables	All participants *n* (%)	HIV status awareness		t/x^2 (*p* value)
		Aware 602 (70.57%)	Unaware 251 (29.43%)	
Age group				
Below 18	103 (12.08%)	46 (7.64%)	57 (22.71%)	54.11 (<0.001)
Young adults (18–24)	618 (72.45%)	439 (72.92%)	179 (71.31%)	
Adults (25–64)	132 (15.47%)	116 (19.27%)	14 (5.58%)	
Gender				
Female	627 (73.51%)	478 (79.40%)	149 (59.36%)	36.52 (<0.001)
Male	226 (26.49%)	124 (20.60%)	102 (40.64%)	
Marital status				
Single	818 (95.90%)	570 (94.68%)	248 (98.80%)	7.81 (0.020)
Divorced/widow	17 (1.99%)	15 (2.49%)	2 (0.80%)	
Married	18 (2.11%)	17 (2.82%)	1 (0.40%)	
Education level				
None & primary	508 (59.55%)	338 (56.15%)	170 (67.73%)	9.87 (0.002)
Secondary& tertiary	345 (40.45%)	264(43.85%)	81(32.27%)	
Number of children				
No children	610 (72.10%)	380(63.33%)	230 (93.50%)	78.91 (<0.001)
One child	190 (22.46%)	177 (29.50%)	13 (5.28%)	
Two or more children	46 (5.44%)	43 (7.17%)	3 (1.22%)	
Have you ever had sex				
No	324 (37.98%)	189 (31.40%)	135 (53.78%)	37.69 (<0.001)
Yes	529 (62.02%)	413 (68.60%)	116 (46.22%)	
Was your first sexual experience at your workplace				
No	394 (74.76%)	309 (75.00%)	85 (73.91%)	0.056 (0.812)
Yes	133 (25.24%)	103 (25.00%)	30 (26.09%)	
Unprotected sexual intercourse				
Never	225 (26.38%)	136 (22.59%)	89 (35.46%)	15.10 (<0.001)
Once/more	628 (73.62%)	466 (77.41%)	162 (64.54%)	
Drug abuse (DAST)				
No problems reported	481 (56.39%)	323 (53.65%)	158 (62.95%)	6.22 (0.013)
Low, moderate to severe levels of drug abuse	372 (43.61%)	279 (46.35%)	93 (37.05%)	

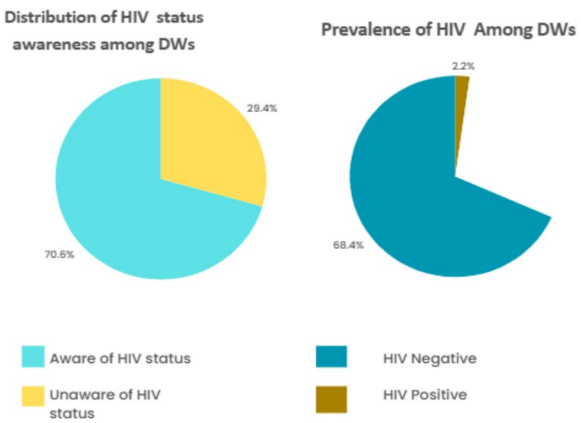

Fig. 1 Proportion of HIV and HIV awareness among domestic workers in Kigali, Rwanda

difference based on age; domestic workers aged 18–24 reported higher unawareness of their HIV status compared to those aged below 18 and those aged 25–64 years (71.31% vs. 22.71% vs. 5.58%, respectively; $\chi^2 = 54.11$, p value = 0.001). Furthermore, those without children reported being unaware of their HIV status at a statistically significantly higher proportion than those with one child or more (93.50% vs. 5.28% vs. 1.22%, respectively; $\chi^2 = 78.91$, p value = 0.001). Domestic workers with primary education as their highest level of education were significantly more unaware of their HIV status than those with secondary or tertiary education (67.73% vs. 32.27%, $\chi^2 = 9.87$, p value = 0.002). For further details, see Table 1.

3.4 Factors associated with unawareness of HIV status

Table 2 shows a bivariate and multivariate analysis of factors associated with unawareness of HIV status. Factors significant in bivariate analysis include being aged 18 years or under, being female, having the highest level of education below secondary school, being without children, having engaged in unprotected sexual intercourse, and using substances of abuse.

These significant variables at bivariate analysis were tested for collinearity before being included in the final multivariate model. Their VIFs were all below 2, and the mean VIF was 1.22.

In a multivariate analysis, several factors were significantly associated with unawareness of HIV status. Individuals under 18 years of age had the highest odds (Adjusted Odds Ratio [AOR] = 3.34, 95% Confidence Interval [CI]: 1.55–7.19; p value = 0.002), indicating they were over three times more likely to be unaware of their HIV status compared to older age groups. Those with no or primary education had significantly higher odds (AOR = 1.77, 95% CI: 1.26–2.49; p value

Table 2 Logistic regression analysis for factors associated with unawareness of HIV status

Variable	Bivariable analysis		Multivariable analysis	
	Crude odds ratio (95% confidence interval)	*p* value	Adjusted odds ratio (95%confidence interval)	*p* value
Age group				
Below 18 years	9.66 (4.98–18.76)	<0.001	3.34 (1.55–7.19)	**0.002**
Young adults (18–24 years)	3.19 (1.80–5.59)	<0.001	1.47 (0.77–2.80)	0.245
Adults (25-above)	Reference		Reference	
Gender				
Female	Reference		Reference	
Male	2.64 (1.91–3.63)	<0.001	2.00 (1.40–2.86)	**<0.001**
Marital status				
Single	4.64 (1.40–15.29)	0.118	1.20 (0.25–5.69)	0.816
Divorced/widow and married	Reference		Reference	
Education level				
None & primary	1.63 (1.20–2.23)	0.103	1.77 (1.26–2.49)	**0.001**
Secondary & above	Reference		Reference	
Number of children				
No children	8.68 (2.66–28.28)	0.938	3.38 (0.91–12.62)	0.070
One child	1.05 (0.28–3.85)	<0.001	0.929 (0.23–3.62)	0.910
Two or more children	Reference		Reference	
Have ever had sex				
Yes	0.393 (0.29–0.53)	<0.001	0.59 (0.39–0.89)	**0.012**
No	Reference		Reference	
Unprotected sexual intercourse				
Never	Reference		Reference	
Once/more	1.88 (1.36–2.59)	<0.001	1.81 (1.19–2.73)	**0.005**
Drug abuse (DAST)				
No problems reported	Reference		Reference	
With problems of drug abuse	0.68 (0.50–0.92)	0.013	0.68 (0.48–0.96)	**0.032**

Bold: p- value <0.05

<0.001) of being unaware of their HIV status compared to individuals with secondary education and above. Engaging in unprotected sexual intercourse was also a significant factor (AOR = 1.81, 95% CI: 1.19–2.73; *p* value = 0.005), suggesting nearly double the odds of unawareness. Females were twice as likely to be unaware of their HIV status compared to males (AOR = 2.00, 95% CI: 1.40–2.86; *p* value <0.001). Interestingly, drug abuse was inversely related to unawareness of HIV status (AOR = 0.68, 95% CI: 0.48–0.96; *p* value = 0.032), indicating lower odds of unawareness among those with drug abuse issues.

4 Discussion

In the study, it was found that 29.43% of domestic workers in Rwanda were unaware of their HIV status, presenting a significant gap in HIV awareness among this vulnerable group. In a country where HIV infection is a paramount public health concern, the high proportion of persons unaware of their HIV status represents a substantial number of people who are not seeking care and are at risk for their health and who are a potential source of new HIV infections.

4.1 Relationship between age and HIV status awareness

Lower rates of HIV awareness have been described among domestic workers below 18 years old compared to older individuals. This age disparity may be due to the likelihood that younger youths have had a shorter sexual experience and are less informed on sexual issues than older youth. This relationship may stem from the younger demographic's apprehension about learning about their HIV status. They fear knowing their HIV status and are more afraid of others discovering their HIV status than the elderly [25, 26]. This fear can be attributed to a lack of comprehensive sex education, limited access to confidential testing services, and the social stigma associated with HIV [27]. In contrast, older individuals may have more life experience and emotional resilience, enabling them to approach HIV testing with less fear and anticipated stigma [28]. Therefore, we recommend strengthening HIV awareness programs among youth to allow them to overcome the stigma attached to HIV and HIV testing.

4.2 Relationship between gender and HIV awareness

In Rwanda, men represent 2.2% of individuals living with HIV, yet they are nearly twice as likely as women to be unaware of their HIV status. This trend of low testing rates among men is observed in various regions with higher HIV prevalence [27–29]. The RAIHIS findings corroborate our results, showing approximately a 5% difference between male and female HIV status awareness [30]. This may stem from men's reduced health-seeking behaviors, which are owed to societal norms, stigma, and the perception that HIV testing is a threat to masculinity [29]. On the other hand, HIV testing and counseling initiatives have primarily benefited women, particularly those of childbearing age, through integrated maternal and child health services, such as regular antenatal care visits during pregnancy and immunization programs for their children, that emphasize the importance of HIV testing and early detection. Through these programs, women's insight into HIV is significantly improved, thus making them a more realistic assessment of their HIV risk. For instance, men and women who engage in higher-risk behaviors, such as having multiple sexual partners, appear to have varying levels of awareness regarding their HIV risk, with more men engaging in risky behaviors [31]. Men often report having a more significant number of sexual partners than women, which could heighten their concern about potential HIV infection, hence fearing to test [32, 33]. Therefore, as suggested by previous researchers, we recommend targeted interventions to increase their understanding of HIV risk and the importance of regular testing [34, 35].

4.3 Level of education and HIV status awareness

Education played a significant role in HIV awareness, with those with secondary education or higher education having a higher level of awareness of their HIV status. This finding is consistent with research conducted in Soweto, where sexually active men with lower levels of education showed a high correlation with not testing for HIV [25, 36]. Lower educational attainment can limit individuals' understanding of HIV transmission and the importance of testing, further contributing to the reluctance to seek testing services [37]. No wonder the odds of being unaware were almost double among those with lower than the secondary level of education. Therefore, we recommend the education system strengthen learning about HIV and other risky sexual behaviors earlier on so that in case those individuals discontinue school for any reason,

they have enough skills in their arsenal to understand the advantages of HIV testing. Also, we recommend that students continue their education and that the government continue to support the public health system to enable all individuals to achieve adequate knowledge about disease prevention, especially HIV.

4.4 Substance use and HIV status awareness

HIV risk is high among individuals who engage in the use of substances of addiction [38, 39]. In addition, their levels of HIV testing are reported to be low by various scholars, and they have a higher likelihood of not testing for their HIV status [38]. Contrary to these findings, the findings in the present study align with previous research [40–42], which highlights that individuals who engage in substance use have a higher likelihood of knowing their HIV status and testing. This observed relation may be related to the more frequent interactions individuals who use substances of addiction have with healthcare services through harm reduction programs or management of substance use complications [43, 44]. These programs typically include HIV testing and awareness as integral components, thereby increasing the likelihood of individuals knowing their HIV status. Additionally, individuals with drug dependence may be more vigilant about their health due to the inherent risks associated with drug use, prompting them to take preventive measures such as HIV testing to manage their health outcomes [43]. This result may be explained by the fact that people who engage in drug use are often exposed to sexual risk behaviors, and thus, they tend to test for their HIV status more frequently than those who do not use alcohol or drugs. This increased testing behavior is likely due to their higher engagement with harm reduction programs and healthcare services that emphasize regular HIV testing.

4.5 Sexual activities and HIV awareness

Our study found that having ever had sex was associated with HIV status awareness. Individuals who reported having had sex were more likely to be aware of their HIV status than those who did not. A Study by Pettifor et al. demonstrated that sexually active individuals are more likely to seek HIV testing due to perceived risk, which in turn increases their awareness of HIV Status [45]. This is consistent with our findings, as individuals who engage in sexual activity may be more conscious of the need for HIV testing and are, therefore, more likely to be aware of their status. However, a study by De Wet et al. found that in specific populations, particularly among adolescents, sexual activity did not always correlate with awareness of HIV status [46]. This may be due to factors such as limited access to sexual health education, stigma surrounding HIV testing, or a lack of perceived risk among younger or less experienced individuals.

Participants who reported not using protection or condoms were more likely to be unaware of their HIV status. This observation is consistent with existing literature, which suggests that individuals engaging in risky sexual behaviors often avoid HIV testing due to fear of receiving a positive result or confronting the potential consequences of their actions. For instance, Obermeyer et al. identified fear, stigma, and anxiety surrounding HIV diagnosis as substantial barriers to testing, particularly among those who engage in unprotected sex [47]. Similarly, De Walque et al. reported that regular condom users are more likely to get tested, reflecting their heightened awareness and concern for personal health [48]. This finding may be due to the fact that people who engage in unprotected sex often forget or refuse to acknowledge behaviors that put them at risk, and self-reported information on HIV testing and risky behaviors may not be accurate [49]. To address these issues, researchers recommend creating health education initiatives, increasing the user friendliness of HIV self-test kits, and setting up targeted distribution points [50].

5 Limitations and strengths

This study had some strengths and limitations. Regarding the strengths, this is the first study to explore HIV Status awareness among domestic workers in Rwanda. Secondly, a large sample size was employed to provide a strong basis for reliable statistical analysis. Regarding the limitations, this was a cross-sectional design, and it limits the ability to draw casual inferences. Secondary, HIV status was self-reported which may be biased by the social desirability. Lastly, the study did not explore sexual relationships at the workplace, particularly regarding consent, transactional sex, and power dynamics between workers and employers. These factors may have influenced the reporting of sexual interactions, which were not fully captured in the study. These limitations should be explored in future studies, including rural settings, longitudinal designs and more consideration of a broader range of factors.

6 Conclusion

In the current study, findings demonstrated low levels of awareness of HIV Status among domestic workers, which falls below the WHO recommended standards. Factors such as age, gender, education level, history of protected sex, and drug dependence were found to affect HIV awareness significantly. Limited access to healthcare and low healthcare-seeking behaviors, especially among young people, males, and those with low education levels, contribute to this gap. Tailored interventions, including community-based HIV testing and awareness programs, are needed to improve access to testing. Strategic expansion of HIV testing and counseling programs targeted testing of populations at higher risk of infection, like domestic workers, as well as provider-initiated testing and counseling, are strategies that should be employed to decrease the number of people who are unaware of their HIV status.

Acknowledgements The authors acknowledge the support of the Health Development Initiative in Rwanda. The participants and the dedicated research assistants.

Author contributions ET, AF, DL, RM: drafted the initial manuscript, subsequent revisions, data analysis, and visualization. AF, DL: Conceptualization, study coordination, data curation, revision of subsequent versions, and supervision. ET, FM, RM, AN, DK, PK: data collection and revision of subsequent versions. AK, LTG: conceptualization, revision of subsequent versions, and supervision. AGN, MMK: conceptualization, visualization, subsequent revisions, and supervision.

Funding The study did not receive any external funding.

Data availability The datasets will be made available to appropriate academic parties on request from the corresponding author.

Declarations

Ethics approval and consent to participate The study adhered to the principles outlined in the Declaration of Helsinki and received approval from the Rwanda National Ethics Committee (RNEC) under reference number 106/RNEC/2023. This cross-sectional study focused on domestic workers in Kigali, Rwanda. All participants provided informed consent before participating. To ensure confidentiality, research assistants guided participants to a comfortable, secluded area to record their responses. Participants provided written informed consent and completed a translated data collection questionnaire in Kinyarwanda, the local language.

Consent for publication Not applicable.

Competing interests The authors declare no competing interests.

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