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The Influence of Individual Factors on HIV Testing Rates Among Men in Northern Tanzania

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Abstract

HIV testing plays a crucial role in care and management, serving as the first step for individuals to learn their HIV status and potentially begin antiretroviral therapy. This study examines trends and challenges related to HIV testing and individual factors like education, marital status, and occupation to enhance testing rates and control the HIV epidemic. A cross-sectional study evaluated HIV testing services (HTS) usage among men in Dodoma Urban, Ikungi District, and Babati Urban, collecting data through structured questionnaires from 378 men randomly selected at health facilities. SPSS was used to analyze the data to get descriptive and inferential findings. Results indicated significant improvements in HIV testing following the introduction of male-friendly health services, with annual testing for men standing at 77%. Younger men (under 35) had a higher testing rate of 58%, compared to 42% for those aged 35 and older (Chi- sq = 162.542, P = 0.000). Education level was crucial; 91.2% of men with secondary education or higher were tested, compared to 75.6% of those with primary education and 51.3% with no education. Married men had an 82.4% testing rate, while unmarried men tested at 78.5%. Occupation also influenced behavior; 84.7% of self-employed and 80.5% of employed men got tested, compared to 58.6% of unemployed men. The findings underscore the need for targeted outreach in HIV testing. The approach should consider education, marital

status, and occupation being essential for promoting early detection and better healthcare outcomes.

Keywords: HIV testing, education, marital status, occupation, Individual factors

1. Introduction

According to UNAIDS (2019), an estimated 37.9 million people worldwide were living with HIV in 2018, with about 68% of them residing in sub-Saharan Africa. In Tanzania, according to TACAIDS (2016–2017) annual incidence of HIV infection among adults aged 15 years and older was 0.24% (95% confidence interval [CI]: 0.15%–0.33%), which corresponds to 24 new HIV infections for every 10,000 persons in a year, and to approximately 72,000 new cases of HIV infection among adults aged 15 years and older in the country every year. The overall prevalence of VLS among adults, aged 15 years and older, living with HIV was 51.9%:57.2% among women and 41.5% among men.

HIV prevalence among adults aged 15years and older was 4.9%:6.3% among females and 3.4% among males. This corresponds to approximately 1.4 million PLHIV in Tanzania. Prevalence varied across the 31 regions, ranging from 0.0% in Southern Unguja and Northern Pemba, to 11.3% in Iringa, and 11.4% in Njombe. HIV prevalence among adults aged 15–49 years was 4.7%. Among HIV-positive males aged 15years and older, over half of those residing in urban (53.0%) and rural (55.8%) areas were not aware of their HIV-positive status based on self-report.

HIV testing plays a crucial role in care and management, serving as the first step for individuals to learn their HIV status and potentially begin antiretroviral therapy (ART). However, a recent UNAIDS report indicates that many men and boys in sub-Saharan Africa remain unaware of their HIV status, unlike women. In Tanzania, the Tanzania HIV Indicator Survey (2016–2017) found that only 45% of men living with HIV were aware of their status (UNAIDS, 2019). This limited uptake of HIV testing among men can lead to delayed diagnosis and a higher risk of transmitting the virus to sexual partners and family members. Additionally, men who do not know their HIV status face a greater risk of dying from AIDS-related illnesses. The low utilization of HIV testing services among men presents a significant barrier to achieving the first goal of the UNAIDS 95-95-95 targets, which aim for 95% of all people living with HIV to know their status by 2030 (UNAIDS, 2019).

Over the past decade, Tanzania has made significant progress in expanding HIV testing services through home-based testing, community outreach programs, and provider-initiated testing. Several strategies have been introduced to encourage men to get tested, including partner testing, where male partners of pregnant women are invited to undergo HIV testing when their partners attend antenatal care (ANC) services. Despite these efforts, men continue to have lower testing rates than women. To address this gap, the Tanzanian government launched a national test-and-treat campaign in June 2018, specifically targeting men for HIV counselling, testing, and treatment. As part of this initiative, a male engagement catch-up plan was introduced, focusing on non-biomedical strategies to accelerate HIV testing among adult men and adolescent boys (Ministry of Health, Community Development, Gender, Elderly, and Children, 2018). Supporting these efforts, the USAID Boresha Afya program for the Central and Northern zones introduced the “Male Friendly Health Services” initiative in 2018. Implemented across six regions viz. Arusha, Dodoma, Kilimanjaro, Manyara, Singida, and Tabora, the initiative aim was to improve the HIV testing rates among men by enhancing health

facility services and creating a more supportive environment for healthcare delivery. This study is going to assess the individual factors that are associated with HIV testing among men in Tanzania.

2. Literature Review

HIV testing is a crucial element in the global fight against HIV/AIDS, serving as the primary entry point to HIV care and management (WHO, 2021). Increasing HIV testing uptake is vital to achieving the first goal of the Joint United Nations Program on HIV/AIDS (UNAIDS), which aims for 95% of people living with HIV to be aware of their status (UNAIDS, 2021).

Despite the widespread availability of stand-alone voluntary counselling and testing centers, as well as provider-initiated counselling and testing services in health facilities across sub-Saharan Africa, the percentage of men who test for HIV and know their status remains low (UNAIDS, 2019). In contrast, the uptake of HIV counselling and testing among women has significantly increased since 2004. In twenty three (23) out of twenty nine (29) sub-Saharan African countries, more women than men report having ever been tested for HIV. This disparity is partly due to the introduction of provider-initiated HIV testing and counselling during antenatal care visits (UNAIDS, 2019). Achieving the goal of zero new HIV infections requires increased HIV testing uptake, as it is a critical gateway to HIV prevention, treatment, and care services (WHO, 2017).

To expand HIV testing services, data show that between 2007 and 2008, the number of health facilities offering HIV testing increased by 50% in 37 sub-Saharan African countries (UNAIDS, 2010). However, despite improved access to testing, recent demographic data indicate that the median national HIV testing uptake among men in sub-Saharan Africa remains low at just 17.2% (UNAIDS, 2019). In Tanzania, various strategies have been introduced to expand HIV testing services, including community interventions, voluntary counselling and testing (VCT), provider-initiated counselling and testing (PICT), and index testing. Despite these efforts, HIV testing rates among men remain suboptimal, leaving a significant number unaware of their HIV status. According to the Tanzania HIV Impact Survey 2022–2023, 21.6% of men living with HIV were unaware of their status (Tanzania HIV Impact Survey 2022–2023 - Zanzibar-OCGS).

Numerous studies at global, regional, and local levels have highlighted the low utilization of HIV testing services among men. For example, a study in rural Tanzania found that 54% of men reported having been tested for HIV. However, certain strategies, such as the development of male-friendly clinics, have shown promising results in improving men's health-seeking behaviour, particularly for HIV services, in countries like Malawi. While Tanzania has implemented similar male-friendly health services, the extent to which men utilize these services for HIV testing remains uncertain (Abdallah Mkopi et al., 2023).

2.1 Conceptual Framework

The conceptual framework outlined in the Fig.1 illustrates how individual factors can influence HIV testing rates among men. It hypothesizes six key independent variables; age, education level, marital status, occupation, socioeconomic status, and health-seeking behaviour that may

impact HIV testing.

This framework suggests that personal characteristics play a significant role in a man's likelihood of getting tested for HIV. For instance, age can shape testing behaviour, with younger men possibly being more open to testing due to greater awareness, while older men may experience stigma or hesitation. Education level also influences knowledge and attitudes toward HIV testing; those with higher education are more likely to understand the benefits of early diagnosis and take proactive steps toward testing.

Marital status is another important factor, as married men may feel encouraged to test due to family responsibilities, whereas unmarried men might avoid testing due to fear or stigma surrounding HIV results. Additionally, occupation and socioeconomic status matter, as financial stability can determine access to healthcare services, including HIV testing. Men with stable jobs may have better access to healthcare facilities, whereas unemployed individuals may face challenges related to affordability or accessibility.

Health-seeking behaviour is also a crucial element, man who actively engage in routine health check-ups are generally more likely to undergo HIV testing. Understanding these factors provides valuable insight into the barriers and motivators affecting HIV testing uptake. This framework serves as a useful guide for designing targeted interventions that can encourage more men to get tested and ultimately improve public health outcomes.

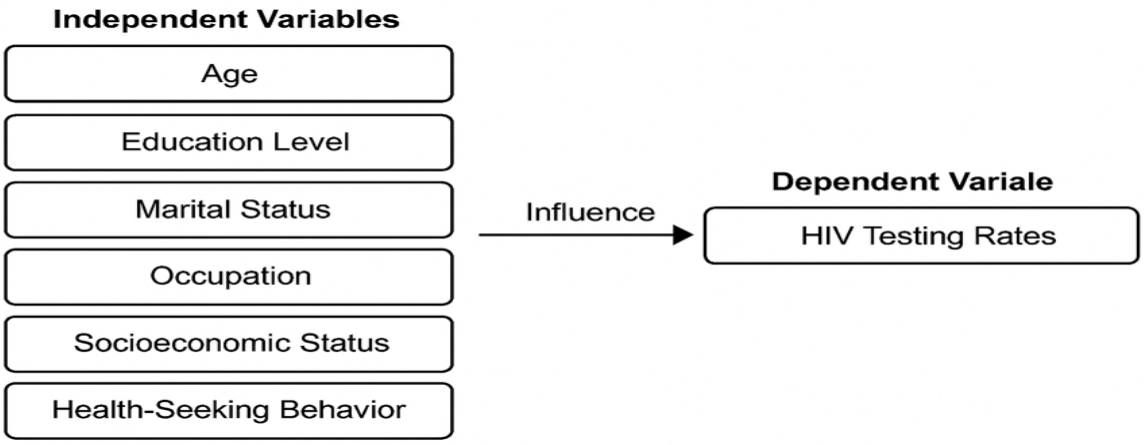

Figure 1. Conceptual Framework on the Influence of Individual factors on HIV testing rates among men

3. Methodology

The study utilized a cross-sectional mixed-method approach, incorporating both quantitative and qualitative data collection strategies. The research was carried out in the catchment areas of Dodoma Urban, Ikungi District in Singida, and Babati Urban. For the quantitative aspect, data were collected through structured questionnaires administered to a sample of 378 men. Participants were selected using simple random sampling from a list compiled at chosen health

facilities. Quantitative data analysis was conducted using SPSS version 23, generating descriptive statistics such as frequencies and percentages, along with inferential analyses to explore relationships between participants individual factors and HIV testing rates.

4. Findings and Discussion

4.1 Social-Demographic Characteristics

Social demographic factors play a crucial role in understanding HIV testing behaviours, as they influence individuals' perceptions, access to healthcare, and willingness to engage with HIV testing services, making them key determinants in shaping HIV testing rates among men.

4.1.1 The Ccurrent Utilization Rate of HIV Testing Services Among Men

Participants were asked if they had tested for HIV within one year of project implementation. The results in Table 1 show that, the majority of the participants, 287 (76%), were tested for HIV. This finding indicates that most men in the study area are aware of HIV testing services and have accessed testing during the project implementation period. The result aligns with global and regional findings on HIV testing uptake among men. A study by Shapiro et al. (2021) in sub-Saharan Africa found that digital health interventions and male-targeted HIV awareness campaigns significantly increased HIV testing among men aged 18–34. Similarly, a systematic review by Musheke et al. (2021), highlighted that younger men were more likely to test due to targeted outreach strategies, including peer-led programs and mobile testing services.

Despite these improvements, the literature also highlights persistent challenges in engaging men in HIV testing. Studies in Tanzania (Moyo et al., 2022) and Uganda (Wanyenze et al., 2020) have shown that older men (aged 35 and above) are less likely to seek HIV testing due to cultural beliefs, fear of stigma, and misconceptions about their personal risk. This underscores the need for continued male-friendly services, community engagement, and targeted interventions to improve HIV testing rates among men, particularly older age groups.

UNAIDS (2021) emphasize that increasing male participation in HIV testing is critical to achieving the 95-95-95 targets. The expansion of male-friendly health services, such as those introduced in Tanzania through the USAID Boresha Afya initiative, has demonstrated promising results in narrowing gender disparities in HIV testing (Kalichman et al., 2021).

Table 1. Proportion of males who tested for HIV within one year of project implementation.

S/N	Response	No. of Respondents	Percentage (%)
1.	Yes	287	76%
2.	No	91	24%
	Total	378	100%

4.1.2 Age

Age is a critical factor influencing HIV testing uptake among men. All younger individuals

(100%) between 18–24 years and 25–34 years tested for HIV (Table 2). Studies have consistently shown that younger men (below 35 years) are more likely to test for HIV compared to older men. This trend is often associated with increased exposure to HIV awareness campaigns, peer influence, and male-friendly health services designed to attract younger populations (Maheswaran et al., 2021).

Table 2. Association between Age and HIV testing

HIV Testing		Tested for HIV (%)			P-Value	Chi-Square
		18–24	25–34	35+		
Tested for HIV	Yes	91(100)	126(100)	70(43.5)	0.000	161.542
	No	00(00)	00(00)	91(56.5)		
	Total	91(100)	126(100)	161(100)		

Younger men tend to exhibit higher HIV testing rates due to targeted interventions such as peer-led HIV awareness programs and social media campaigns. A study by Shapiro et al. (2021) in Sub-Saharan Africa found that digital health interventions significantly improved HIV testing uptake among men aged 18–34. Additionally, younger men often have fewer concerns about stigma and confidentiality, making them more likely to utilize male-friendly HIV testing services (Adeagbo et al., 2022). In contrast, older men (aged 35 and above) are less likely to test for HIV, often due to long standing cultural beliefs, fear of a positive result, and lower perceived risk of infection (Hlongwa et al., 2022). A study conducted in Uganda by Wanyenze et al. (2020) found that older men were significantly less likely to seek HIV testing unless prompted by a health crisis or illness.

4.1.3 Education

The present study shows that 91.2% of individuals with secondary education and above tested for HIV, followed by those with primary education (75.6%) and individuals with no formal education (51.3%). Higher levels of education are strongly associated with greater HIV testing uptake. Educated individuals are more exposed to health campaigns, digital health interventions, and peer discussions that promote HIV testing (Musheke et al., 2021), reinforcing findings from research in Kenya and Uganda, where higher education levels correlated with increased utilization of HIV services (Moyo et al., 2022). A study by Wambura et al. (2023) in Tanzania found that men with primary education were twice as likely to test for HIV compared to those with no education suggesting that even basic education plays a role in increasing health seeking behavior. A study in Malawi found that individuals with little to no education were less likely to seek voluntary counseling and testing services due to poor knowledge about HIV transmission and treatment, misconceptions about HIV, and fear of stigma (Nyamhanga et al., 2021; Mugisha et al., 2022).

Education is a significant determinant of health-seeking behaviors, including HIV testing uptake. The chi-square test ($\chi^2 = 55.321$, $p = 0.000$) in Table 3, indicates a statistically

significant association between education level and HIV testing. The results suggest that as education level increases, HIV testing uptake also increases. This could be due to the fact that educated individuals are more likely to understand the benefits of HIV testing (Health Literacy), Higher education promotes positive attitudes toward HIV testing and reduces fear of discrimination (reduced Stigma) and individuals with higher education levels have better access to HIV-related information through digital media, workplace programs, and peer discussions (access to information). Studies have consistently shown that individuals with higher education levels are more likely to seek HIV testing and other preventive healthcare services. Education improves health literacy, reduces stigma, and enhances awareness of available healthcare options (Kalichman et al., 2021).

Table 3. Association Between Education Level and HIV Testing

Education Level	**Tested for HIV**	**Yes, n (%)**	**No, n (%)**	**Total, n (%)**	**P-Value**	**Chi-Square**
No Formal Education	Yes	40 (51.3)	38 (48.7)	78 (100)	0.000	55.321
Primary Education	Yes	102 (75.6)	33 (24.4)	135 (100)		
Secondary+	Yes	145 (91.2)	14 (8.8)	159 (100)		
Total		287 (75.9)	91 (24.1)	378 (100)		

4.1.4 Marital Status

Marital status is an important factor influencing HIV testing uptake. The study shows that 82.4% of married individuals tested for HIV, making them the group with the highest testing rate, followed by 78.5% of single individuals who tested for HIV, suggesting relatively high uptake (Table 4). The lowest HIV testing rate was observed among divorced or widowed individuals, with only 55.6% undergoing testing. In general, 75% of respondents tested for HIV. This aligns with findings from Tanzania, where married individuals had higher testing rates due to spousal encouragement and antenatal care visits (Moyo et al., 2022). Spouses often influence each other to get tested, especially in settings where couple based HIV testing is promoted (Kalichman et al., 2021). For single participants, the high rates could be attributed to increased exposure to HIV awareness campaigns targeting youth and unmarried individuals. Similar findings were observed in a study in Malawi, where single men were more likely to participate in community-led HIV testing programs compared to their married counterparts (Nyamhanga et al., 2021). A study in Kenya found that widowed men were less likely to seek HIV testing due to the belief that they were no longer at risk after losing their spouse (Mugisha et al., 2022).

The chi-square test ($\chi^2 = 34.875$, $p = 0.000$) shows a statistically significant association between marital status and HIV testing uptake indicating that marital status significantly influences HIV testing uptake (Table 4). Several studies indicate that married individuals are more likely to get tested due to partner influence, antenatal care visits, and routine medical check-ups. Conversely, divorced or widowed individuals may have lower testing rates due to

stigma, emotional distress, or lack of access to healthcare (Musheke et al., 2021). A study in Uganda found that married men were more likely to seek HIV testing due to encouragement from their spouses, while single men engaged more in voluntary testing programs (Mugisha et al., 2022). On the other hand, widowed and divorced individuals often faced psychological barriers, leading to reduced HIV testing uptake (Wambura et al., 2023).

Table 4. Association Between Marital Status and HIV Testing

Marital Status	**Tested for HIV**	**Yes, n (%)**	**No, n (%)**	**Total, n (%)**	**P-Value**	**Chi-Square**
Single	Yes	102 (78.5)	28 (21.5)	130 (100)	0.000	34.875
Married	Yes	140 (82.4)	30 (17.6)	170 (100)		
Divorced/Widowed	Yes	45 (55.6)	36 (44.4)	81 (100)		
Total		287 (75.9)	91 (24.1)	378 (100)		

4.1.5 Occupation

Employment status has been identified as a key factor influencing HIV testing uptake. Most of the self-employed individuals (84.7%) tested for HIV, followed by 80.5% who were employed and lastly, 58.6% who were unemployed (Table 5). The highest HIV testing rate for self-employed individuals could be due to their flexibility in seeking health services at convenient times, as opposed to employed individuals who may have work schedule restrictions. For employed individuals, a higher utilization of testing services could be associated with workplace health initiatives, mandatory medical check-ups, and employer-supported HIV awareness campaigns could explain this trend. The lower testing rate among unemployed individuals could be attributed to financial constraints, lack of awareness, and reduced exposure to workplace health programs. A study in Tanzania found that self-employed individuals who operated small businesses had higher awareness of HIV services, particularly those who interacted with customers and suppliers in urban centres where HIV awareness programs were more prevalent (Mugisha et al., 2022). Studies in South Africa have reported that men working in formal sectors are more likely to undergo regular medical screenings, including HIV testing, as part of occupational health programs (Kalichman et al., 2021). Similar findings were observed in Uganda, where unemployed individuals were less likely to access voluntary HIV testing services due to economic hardships (Moyo et al., 2022).

Table 5. Association Between Occupation and HIV Testing

Occupation	**Tested for HIV**	**Yes, n (%)**	**No, n (%)**	**Total, n (%)**	**P-Value**	**Chi-Square**
Unemployed	Yes	51 (58.6)	36 (41.4)	87 (100)	0.000	47.913
Employed	Yes	120 (80.5)	29 (19.5)	149 (100)		
Self-Employed	Yes	116 (84.7)	21 (15.3)	137 (100)		
Total		287 (75.9)	91 (24.1)	378 (100)		

The chi-square test ($\chi^2 = 47.913$, $p = 0.000$) indicates a statistically significant association between occupation and HIV testing uptake (table 5). This finding is supported by a study conducted in Kenya found that self-employed men were more likely to access HIV testing services, as they had flexible schedules compared to those in formal employment, who often cited work-related constraints as a barrier (Musheke et al., 2021). However, in some cases, self-employed individuals delayed seeking healthcare services due to the lack of health insurance benefits (Wambura et al., 2023). Studies suggest that employed individuals are more likely to get tested due to workplace health programs, access to medical insurance, and awareness through corporate wellness initiatives (Mugisha et al., 2021). Conversely, unemployed individuals often face financial barriers, limited healthcare access, and lower health-seeking behaviour, leading to reduced HIV testing rates (Nyamhanga et al., 2022).

5. Conclusion and Recommendation

5.1 Conclusion and Implications

This study demonstrates that individual characteristics namely age, education level, marital status, and occupation significantly influence the uptake of HIV testing services among men. Younger men are more likely to seek testing than older men, suggesting the need for age sensitive interventions that engage older populations who may be less proactive or face distinct barriers. Similarly, higher education levels are associated with greater awareness and participation in HIV testing, indicating that outreach efforts must be tailored to reach men with lower educational attainment through simplified and accessible messaging.

Marital status also plays a critical role, with married men showing a higher likelihood of testing than their unmarried peers. This highlights the potential effectiveness of incorporating HIV education into couple based or family centered health programs. Furthermore, employment status emerges as a key determinant, as employed men access testing more frequently than those who are unemployed possibly due to increased exposure to workplace health initiatives or better access to healthcare services.

5.2 Recommendations

To increase HIV testing uptake among men, it is essential to implement targeted interventions that consider individual factors, including age. Specifically, strategies tailored for older men, such as community-based peer education and home-based testing initiatives, can effectively address their reluctance and fear surrounding HIV testing. Additionally, strengthening HIV awareness and education programs is crucial, especially for individuals with lower levels of education, as this will enhance their understanding of the benefits of testing and help counter misinformation. Establishing stigma reduction programs through community-led discussions and media campaigns can foster a more supportive environment for unmarried men. Finally, promoting workplace-based HIV testing initiatives, along with economic empowerment programs that provide financial support or incentives for unemployed individuals, will improve access to HIV testing services.

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