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Knowledge, attitudes, and practices regarding HIV among university students: A comparative cross-sectional study of residents vs. off-campus students.

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Abstract

Background
HIV remains a major public health concern among young adults, particularly within higher education settings. University students' living arrangements, whether residing on-campus or off-campus, can significantly influence their knowledge, attitudes, and practices (KAP) related to HIV prevention and care. This study aimed to compare HIV-related KAP between students living in university residences and those residing off-campus.

Method
A cross-sectional study was conducted at a South African university between October 2021 and January 2022. Using stratified random sampling, 400 undergraduate students were selected, comprising 200 on-campus and 200 off-campus residents. Data were collected using a structured, pre-validated KAP questionnaire covering HIV knowledge, attitudes, sexual behaviours, and access to services. Quantitative data were analysed using descriptive statistics, chi-square tests, and logistic regression.

Results
Participants had a mean age of 21.4 years (SD = 2.1); 52% were female and 48% male. On-campus students demonstrated significantly higher HIV knowledge scores (mean 78%) compared to off-campus students (mean 63%) ($p < 0.01$). Positive attitudes toward HIV prevention were reported by 85% of on-campus students, compared to 68% of off-campus students ($p < 0.05$). Risky sexual behaviours, including inconsistent condom use and multiple sexual partners, were more prevalent among off-campus students (42%) than those on campus (25%) ($p < 0.01$). Engagement with campus-based HIV education programs was notably lower among off-campus students (34%) versus on-campus students (76%) ($p < 0.001$).

Conclusion
Living arrangements significantly influence HIV-related KAP among university students, with off-campus students at greater risk due to lower knowledge levels and limited program engagement.

Recommendation
Targeted HIV outreach for off-campus students, coupled with partnerships with community health organizations, is essential to ensure equitable access to prevention and care.

Keywords: *HIV prevention, University students, Knowledge, Attitudes,Practices, On-campus students, Off-campus students, Residence status, Sexual health education, South Africa, Higher education, HIV risk behaviours*
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Background

Human Immunodeficiency Virus (HIV) continues to pose a major public health challenge in South Africa, particularly among young adults aged 18 to 24, a demographic that includes many university students. Higher education institutions play a critical role in HIV prevention through the provision of education, testing, and support services. However, access to these services often differs based on students' living arrangements. Students residing in on-campus residences typically have greater exposure to university health programs, peer support structures, and prevention campaigns. In contrast, students living off-campus often face barriers to participation in institutional health initiatives, experience social isolation, and encounter environments that may increase their exposure to risky sexual behaviours. The influence of residence status on students' HIV-related knowledge, attitudes, and practices (KAP) remains under-researched in South African higher education settings. Addressing this knowledge gap is essential for developing effective, inclusive HIV prevention strategies that reach all segments of the student population.

Research Objectives

The main objective of this study is to compare the HIV-related knowledge, attitudes, and practices between university students living on campus and those living off-campus. The specific objectives are:

- To assess the level of HIV knowledge among on-campus versus off-campus students.
- To compare attitudes toward HIV prevention across the two groups.
- To examine the prevalence of risky sexual behaviours between on-campus and off-campus students.
- To evaluate engagement with HIV education programs among students with different residence statuses.

Methodology

Study design

This study employed a comparative cross-sectional design to assess and compare HIV-related knowledge, attitudes, and practices (KAP) among on-campus and off-campus university students. A cross-sectional approach was appropriate for providing a snapshot of differences between these two groups at a single point in time.

Study setting

The study was conducted at Mansosuthu University of Technology, a large urban university in South Africa, between October 2021 and January 2022. The university enrolls a diverse student body, with a significant proportion living in official on-campus residences and a substantial number living off-campus in surrounding urban and peri-urban areas. The university offers various HIV education programs, which are primarily based on campus.

Participants

Eligible participants included full-time undergraduate students aged 18 years and older, enrolled in any academic discipline during the study period. Both on-campus and off-campus students were eligible. Postgraduate students and part-time students were excluded from the study. Participants were selected using a stratified random sampling technique to ensure proportional representation from both on-campus and off-campus groups. Recruitment was conducted via email invitations, posters in university facilities, and social media platforms affiliated with the university.

Bias

Efforts were made to minimize potential sources of bias. A validated and anonymous self-administered questionnaire was used to reduce interviewer bias and social desirability bias. Stratified random sampling ensured balanced representation of both groups. To further minimize response bias, students were assured that participation was voluntary, and responses would remain confidential and would not influence academic standing.

Study size

A total sample size of 400 students was determined to achieve sufficient power for comparative analysis (200 on-campus students and 200 off-campus students). The sample size was calculated using G*Power software, targeting a medium effect size (d = 0.5), an alpha level of 0.05, and a power of 0.80, based on previous studies of HIV KAP in similar university populations.

Statistical analysis

Data were analysed using SPSS version [XX]. Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to summarize participant characteristics and key variables. Group comparisons

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were conducted using chi-square tests for categorical variables and independent t-tests for continuous variables. Logistic regression models were used to examine the association between residence status and risky sexual behaviours, adjusting for potential confounders such as age and gender. Missing data were checked for randomness and handled using listwise deletion, as missing values constituted less than 5% of total data points.

Ethical consideration

Ethical approval for this study was granted by the Mangosuthu University of Technology Ethics Committee on 11 February 2022. All participants provided informed consent electronically before completing the questionnaire. The study complied with ethical principles regarding human research, including confidentiality, voluntary participation, and the right to withdraw at any point without penalty.

Results

Figure 1 analysis revealed a notable difference in HIV knowledge between on-campus and off-campus students. On-campus students demonstrated a higher mean knowledge score of 78%, compared to 63% among their off-campus peers. This suggests that residence within university housing may facilitate greater access to accurate HIV-related information, possibly through proximity to campus-based health services, workshops, and peer education programs. In contrast, students living off-campus appear to be at a disadvantage regarding exposure to such resources, contributing to their lower knowledge levels. This gap underscores the need for more inclusive outreach strategies targeting non-resident students.

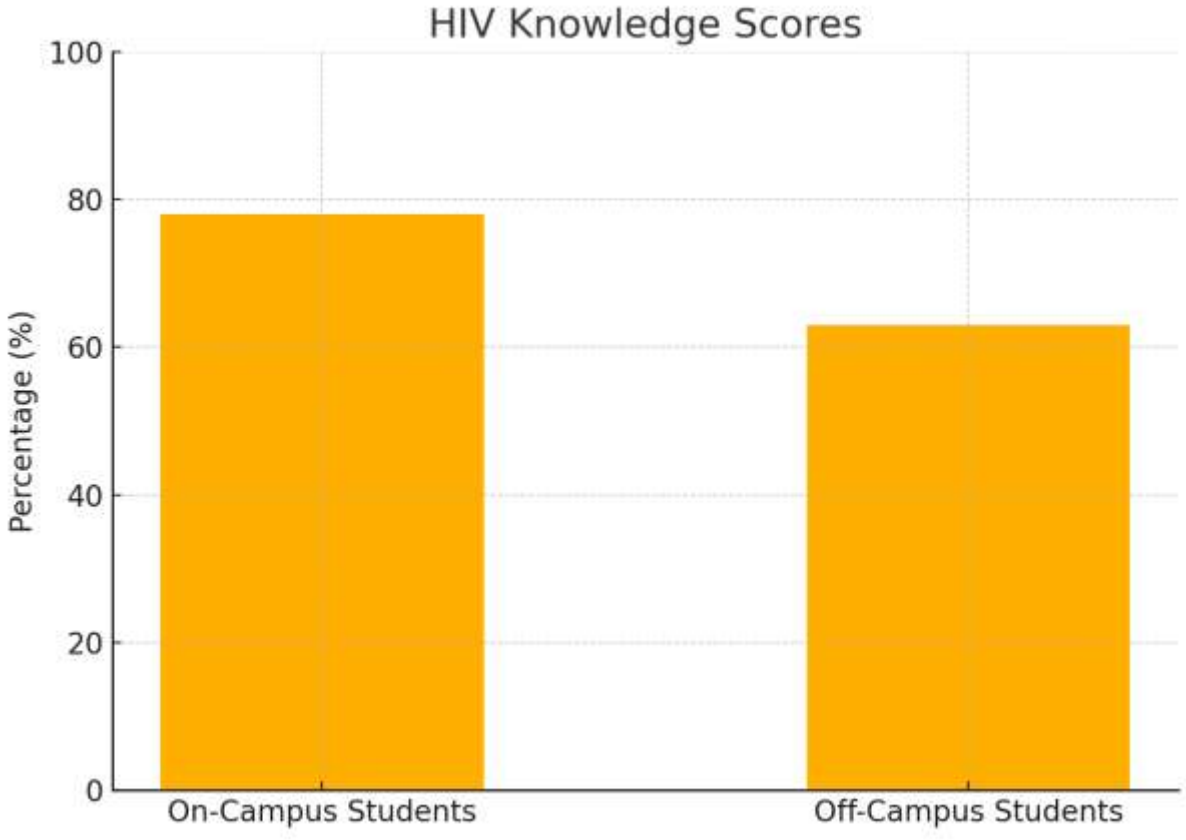

Figure 1: The graph represents the HIV knowledge scores between on and off-campus students

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Figure 2 shows attitudinal differences regarding HIV prevention were also evident between the two groups. 85% of on-campus students exhibited positive attitudes toward engaging in preventive behaviours such as condom use and HIV testing, whereas only 68% of off-campus students reported similar attitudes. These findings highlight the influence of institutional environment and social norms fostered within university residences that likely reinforce health-positive behaviours. Conversely, off-campus students may experience fewer structured opportunities to build and reinforce such attitudes, increasing their vulnerability to risky sexual practices.

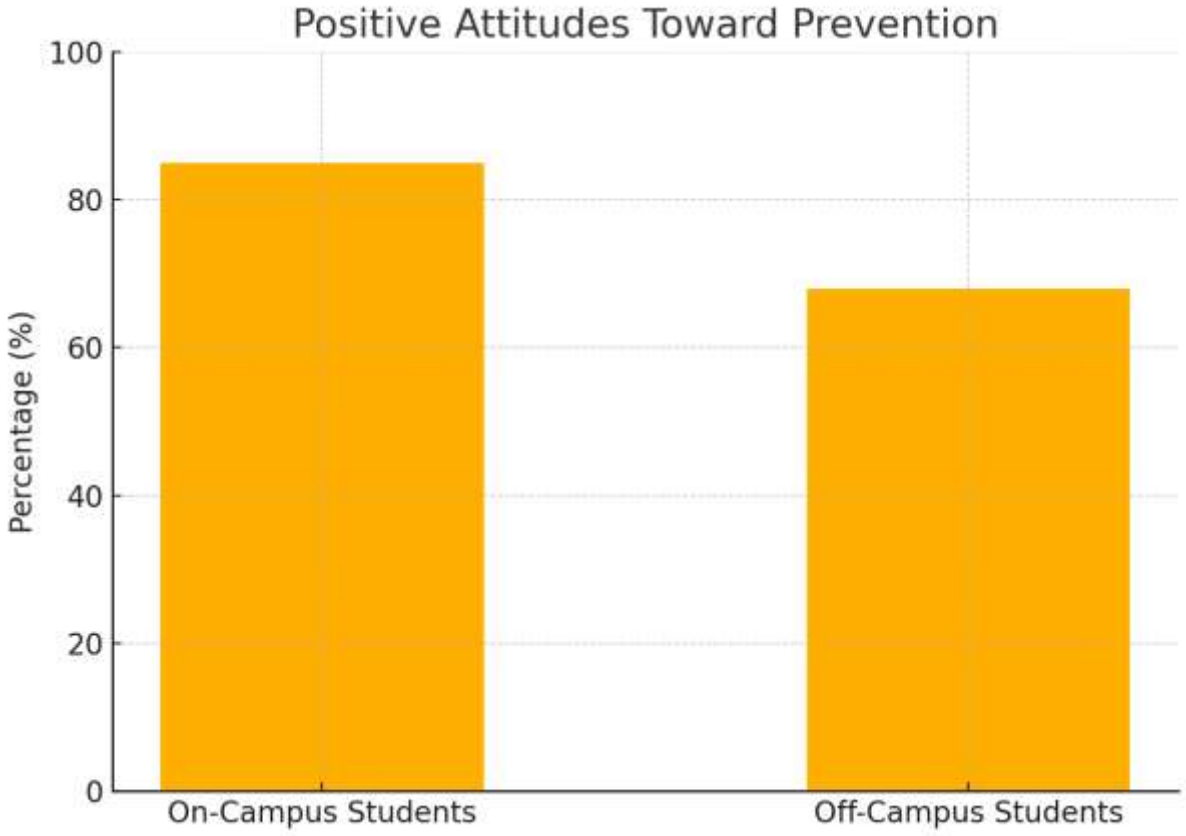

Figure 2: The graph represents the positive attitudes towards prevention towards on and off-campus students

Figure 3 comparing engagement in risky sexual behaviours, off-campus students demonstrated a higher prevalence (42%) of inconsistent condom use, multiple partners, and transactional sex compared to their on-campus counterparts (25%). The disparity may be linked to environmental factors: off-campus living often lacks the structured oversight and peer accountability found in residence halls and may expose students to riskier social circles or financial pressures. These findings align with existing literature indicating that students in less supervised settings may face greater exposure to high-risk situations for HIV transmission.

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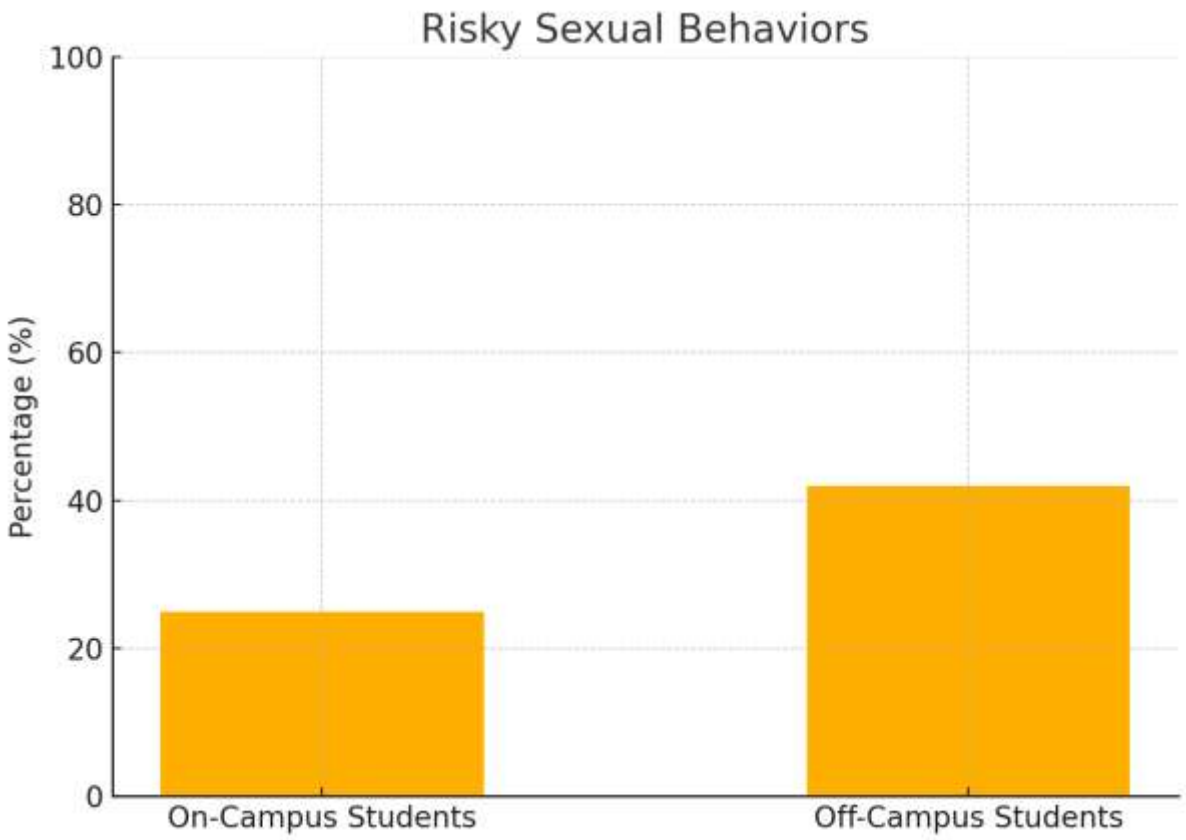

Figure 3: The graph shows the prevalence of risky sexual behaviours among On-Campus and Off-Campus Students.

Figure 4 shows engagement with HIV education programs showed the starkest contrast between the two cohorts. 76% of on-campus students reported participating in campus-based HIV education initiatives, while only 34% of off-campus students had similar engagement. This suggests significant access and participation barriers faced by off-campus students, who may not be adequately informed of or able to attend on-campus sessions due to logistical or scheduling constraints. The limited participation further contributes to knowledge gaps and risky behaviours identified among this group, emphasizing the need for more flexible and accessible educational outreach beyond the university campus.

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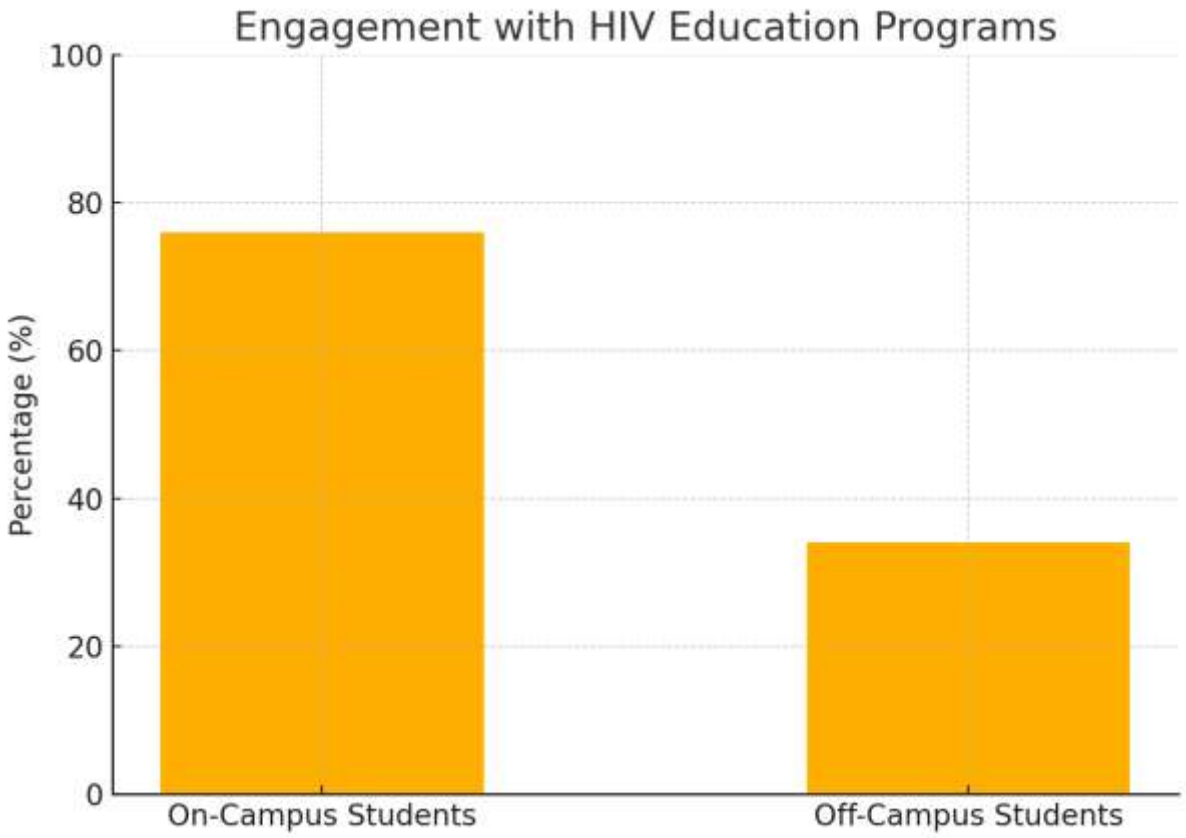

Figure 4: The graph represents Engagement with HIV Education Programs Among On-Campus and Off-Campus Students.

Discussion

This study explored how residence status, living on-campus versus off-campus, influences HIV-related knowledge, attitudes, and practices among university students. The results clearly show that students residing on campus demonstrated higher HIV knowledge, more positive attitudes toward prevention, lower engagement in risky sexual behaviours, and greater participation in HIV education programs compared to their off-campus peers. These findings align with several prior studies and offer important insights for institutional HIV prevention strategies. Firstly, the higher HIV knowledge scores observed among on-campus students are consistent with the work of Mbelle et al. (2019), who reported that university residence students in South Africa had better exposure to structured health education programs and peer-to-peer learning, which facilitated accurate knowledge dissemination. Off-campus students in the current study exhibited lower knowledge levels, likely due to reduced access to campus-based information platforms and fewer opportunities for engagement in organized health programs.

Secondly, the more positive attitudes toward HIV prevention among on-campus students echo the findings of Mnguni and Simbayi (2020), who noted that social cohesion within student residences fosters peer reinforcement of health-positive attitudes. In contrast, off-campus students often interact in less structured environments, which may contribute to the comparatively lower prevalence of proactive attitudes observed in this group. Regarding risky sexual behaviors, the elevated rates among off-campus students in this study corroborate findings by Ndlovu and Moyo (2017), who demonstrated that students living outside institutional housing were more likely to engage in transactional sex or multiple-partner relationships due to factors such as financial pressures and the absence of residential supervision. These behaviours place off-campus students at greater

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risk of HIV infection, underscoring the need for tailored intervention strategies. Finally, participation in HIV education programs was significantly higher among on-campus students, an observation also supported by a multi-campus study conducted by Pillay et al. (2021), which found that proximity to campus health services strongly predicts student engagement in HIV-related programming. The limited participation of off-campus students suggests that logistical barriers, such as travel distance and class schedules, may restrict their ability to benefit from these services. Taken together, these findings highlight a critical gap in HIV prevention and education for off-campus students, one that has also been emphasized in global reviews of campus HIV programs (UNAIDS, 2020). Addressing this gap is essential for achieving comprehensive HIV risk reduction in university settings.

Generalizability

The findings from this study can inform HIV prevention efforts in higher education institutions facing similar structural challenges across South Africa and comparable global contexts. The lessons drawn apply to other urban universities with large off-campus student populations where unequal access to health services and education persists.

Conclusion

The findings clearly demonstrate that residence status strongly influences HIV-related knowledge, attitudes, and practices among university students. Off-campus students displayed lower knowledge levels, less positive attitudes, higher rates of risky sexual behaviours, and lower engagement in HIV education programs compared to their on-campus peers. These disparities indicate that current institutional HIV prevention efforts are not sufficiently reaching or supporting the off-campus student population.

Limitations

This study was limited by its cross-sectional design, which captured data at a single point in time. As a result, the study did not assess changes in knowledge, attitudes, or behaviours over time or after specific interventions. The self-reported nature of the questionnaire data introduced the potential for social desirability bias, particularly in sensitive questions related to sexual practices. The sample was drawn from one university, and while the results provide valuable insight, they do not reflect the experiences of students at all higher education institutions in South Africa. The comparison between on-campus and off-campus students was limited to full-time undergraduate students, excluding postgraduate or part-time learners who experience different levels of HIV knowledge and risk.

Recommendations

Universities must develop and implement targeted outreach programs specifically designed to engage off-campus students. Partnerships with community organizations and healthcare providers should be expanded to ensure that prevention services, testing, and education programs are equally accessible to all students, regardless of living arrangements. Flexible, decentralized approaches, such as online education, mobile health units, and peer outreach in local communities, should be prioritized to address existing gaps. University policies should ensure that HIV prevention is integrated into broader student support services, rather than being restricted to on-campus facilities.

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List of abbreviations

KAP - Knowledge, Attitudes, and Practices
HIV – Human Immune Virus

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Competing interests

The author has no relevant financial or non-financial interests to disclose.

Author contributions

I, the author, contributed to the study conception and design. Material preparation, data collection, and research were performed by Mbanjwa S.T. The first draft was written by Mbanjwa S.T.

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Data availability

The data supporting the findings of this study are available upon reasonable request from the corresponding author. Due to ethical considerations and confidentiality agreements, individual participant data cannot be publicly shared. However, anonymized and aggregated data may be provided for academic or research purposes upon institutional approval.

Conflict of interest

The authors declare no conflict of interest.

Biography

Dr. Sibonelo Thanda Mbanjwa is a dedicated lecturer in the Department of Nature Conservation at Mangosuthu University of Technology (MUT), South Africa. He holds a Ph.D. in Environmental Science and specializes in biodiversity conservation, sustainable development, and environmental education. Dr. Mbanjwa is deeply committed to community engagement, student mentorship, and the integration of indigenous knowledge systems into conservation practices. His work bridges academia and practical application, empowering students and communities through innovative teaching, research, and outreach initiatives.

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