Research Article

SCISET
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Research Chronicle in Health Sciences

2023
Vol. 9 No. 1: 102

Sustainable Healthcare Systems: Balancing Quality, Accessibility, and Resource Utilization

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Received: March 11, 2023; **Accepted:** March 26, 2023; **Published:** April 05, 2023

Citation: Ellaissi Y, et al. Sustainable Healthcare Systems: Balancing Quality, Accessibility, and Resource Utilization. Research Chronicle in Health Sciences, 2023, Vol. 9 No. 1: 102

Abstract

Introduction: Lesotho continues to experience a severe HIV epidemic, ranking second globally in HIV prevalence after Swaziland. Older adults face unique challenges in HIV prevention, including limited awareness about HIV/AIDS, social stigma, and discrimination, which often result in delayed testing, late diagnosis, and hesitancy in seeking healthcare. This study represents the first effort in rural Lesotho to evaluate the understanding of HIV transmission, preventive measures, and treatment among elderly individuals living with HIV/AIDS.

Methods: The study targeted elderly patients aged 50 years and above receiving care at four rural clinics in the Maseru district. A random selection of medical records of HIV-positive patients from each clinic was performed. Baseline knowledge assessments were conducted, followed by structured interviews both before and after a targeted educational intervention using the same validated tool.

Results: Initially, 269 participants were interviewed. Females comprised 65.8% of the cohort, and 71.4% had only completed primary education. A composite score encompassing knowledge of HIV transmission and treatment was computed, with scores ≥75% classified as "adequate knowledge." At baseline, only 34.2% of participants demonstrated adequate knowledge. Females showed higher knowledge levels than males (OR=1.9, 95% CI: 1.1–3.5; P=0.022), and those with secondary or higher education performed better than participants with lower education levels (OR=2.8, 95% CI: 1.1–7.8; P=0.021). Multivariate logistic regression controlling for age, gender, and education confirmed these associations. Notably, 36.8% of participants reported engaging in unprotected sexual activity. Following the intervention, 183 participants were re-interviewed. The greatest knowledge gains were observed among participants with no formal education (OR=6.5, 95% CI: 1.5–59.3; P=0.005), males (OR=4.4, 95% CI: 1.6–14.9; P=0.001), and those aged 65 and older (OR=6.5, 95% CI: 1.5–59.3; P=0.005).

Conclusion: Elderly individuals living with HIV/AIDS in rural Lesotho exhibit substantial gaps in knowledge regarding HIV transmission, prevention, and treatment. Targeted interventions that consider educational disparities and improve healthcare access are urgently needed. Post-intervention results indicate that structured educational programs can significantly enhance knowledge, particularly among those initially less informed.

KEYWORDS: Older adults; HIV education; HIV prevention; Antiretroviral therapy; Cultural influences; Knowledge enhancement.

INTRODUCTION

Lesotho remains one of the country's most severely affected by HIV, with the second-highest prevalence globally after Swaziland. The nation has a population of approximately 1.9 million, of which an estimated 23.6% (over 289,841 individuals) are living with HIV/AIDS [1]. About 61% of eligible patients are currently receiving antiretroviral therapy (ART) [2]. Since the first reported HIV cases in 1986, a substantial number of patients have aged above 50 years. However, there is a notable lack of data on HIV prevalence and treatment among individuals over 49 years old, resulting in gaps in healthcare planning, monitoring of disease progression, and management of comorbidities for this group. Consequently, elderly patients often experience fragmented care, with their unique medical and social needs insufficiently addressed. In rural Lesotho, the country's mountainous terrain imposes additional challenges, as some older patients travel over five hours on foot to reach clinics.

Older adults face multiple barriers to HIV prevention, including limited knowledge of transmission and treatment, stigma, and discrimination, which often delay testing, diagnosis, and engagement with healthcare services [3–8]. Prevention initiatives frequently exclude older adults, and societal assumptions often depict HIV/AIDS as a condition affecting only younger individuals engaged in "risky behavior." This misconception leads both health programs and the elderly themselves to neglect education and preventive strategies. While some older adults acquired HIV earlier in life and aged with the infection, others were infected later, highlighting the diverse needs within this population.

Contrary to common societal beliefs, older adults remain sexually active. Sexuality is influenced by neurological, vascular, and endocrine systems and is shaped by social, cultural, and religious norms. Aging, health status, and prior experiences further modify sexual behavior, while interpersonal dynamics and partner characteristics also play a critical role [9–12]. Physiological changes, such as vaginal dryness in women and erectile dysfunction in men, can affect sexual function, yet sexual activity remains a meaningful component of life for many older adults, some of whom engage in casual relationships [13]. Despite this, discussions about sexual health with healthcare providers are limited, and condom use is often viewed as inconvenient or undesirable [13].

Elderly patients living with HIV are particularly vulnerable. Reduced hormonal function increases susceptibility to infection, and changes in life circumstances, such as widowhood, can expose previously monogamous individuals to new HIV risks [14]. Older adults frequently present late for HIV testing, limiting the benefits of early treatment, and they are rarely targeted by prevention programs [3,14]. Healthcare professionals often hesitate to inquire about sexual behavior in this population, further reducing opportunities for prevention and early intervention [14]. Moreover, older HIV-positive patients experience psychological challenges, including emotional distress and suicidal thoughts, underscoring the need for targeted psychosocial interventions [4,5,13]. Disclosure of HIV status is also lower among older adults compared to younger populations, affecting family, social, and healthcare interactions [5].

The complex interplay of aging, comorbidities, physiological decline, and financial vulnerability exacerbates the health challenges faced by elderly individuals living with HIV/AIDS [6,12]. These factors highlight the importance of coordinated planning across healthcare, social services, and support programs to adequately meet the needs of older patients. This study is the first in Lesotho to investigate knowledge, risk perception, and treatment-related understanding among elderly patients living with HIV in rural settings.

MATERIALS AND METHODS

A baseline assessment was carried out in Lesotho between March and June 2015 to evaluate whether elderly individuals living with HIV/AIDS received support related to nutrition, psychosocial needs, financial assistance, environmental factors, and healthcare. The primary goal of this baseline study was to evaluate the participants' knowledge regarding HIV/AIDS risk factors and treatment.

The study population consisted of elderly HIV/AIDS patients aged 50 years and above, receiving care within the catchment areas of four rural clinics in the Maseru district: Matsieng, Marakabei, Matukeng, and St. Leonard. Interviews were conducted at patients' homes with the assistance of community healthcare workers.

Sample Size

Based on the assumption that approximately 50% of the elderly HIV/AIDS population would demonstrate adequate or inadequate social and health support, a sample size of 384 patients was calculated to achieve a 5% precision at a 95% confidence interval (CI). Ultimately, 269 patients participated, resulting in a 70% response rate (Table 1). Matsieng and Matukeng clinics had the lowest participation rates (57% and 43%, respectively), mainly due to patients relocating or being absent from the addresses listed in clinic records. In contrast, Semonkong and Marakabei clinics achieved response rates of 95% and 87%, respectively.

Table 1: Distribution of Baseline Survey Participants by Clinic Catchment Area.

Clinic Catchment Area	Sample Size (n)	Response Rate (%)	Female (%)	Primary Education (%)
Matsieng	70	57	64.3	70
Marakabei	80	87	67.5	72
Matukeng	50	43	66	70
St. Leonard	69	95	66	73
Total	269	70	65.8	71.4

Data collectors underwent a one-week training program. The

survey instrument was pretested with data collectors and a pilot study was conducted with eight patients (two from each clinic) to refine the questionnaire prior to full deployment.

Data Analysis

Survey data were entered into Microsoft Excel® and verified for accuracy. Statistical analyses were conducted using Stata. Participants' knowledge of HIV/AIDS risk factors and treatment was assessed through seven questions [8]. Correct responses were scored as 1, while incorrect or "unknown" responses were scored as 0. A composite score was calculated across all questions, with scores ≥75% classified as indicating 'adequate knowledge' [7]. Odds ratios (OR) were calculated to examine associations between baseline and end-line data, with statistical significance defined as a p-value <0.05 and 95% confidence intervals not including 1. Focus group discussions were also conducted, recorded with participants' consent, transcribed, and analyzed to identify key themes. For this study, the discussions focused on abstinence, fidelity, and condom use.

Ethical Considerations

All participants provided written informed consent, ensuring anonymity throughout the study. Participation was voluntary, and individuals were free to withdraw at any time. Enumerators were trained to appropriately refer participants for support if issues arose. Ethical approval was obtained from the National University of Lesotho Institutional Review Board and the National Ethics Committee under the Ministry of Health. Additional permissions were received from the Christian Health Association of Lesotho and St. James Hospital Mantsonyane.

Intervention

The intervention aimed to enhance knowledge about HIV transmission, antiretroviral therapy (ART), and related information among patients and community members.

Mode of Education and Training: The intervention, conducted from July to October 2015, utilized focus group discussions to educate elderly patients across all four clinics. Community health workers assisted by providing reminders for ART adherence. Chiefs and other community members were included in public awareness sessions to reinforce accurate information and support elderly patients. Facilitators employed probing questions to encourage discussion, enabling participants to arrive at correct answers themselves. Sufficient time was allocated for in-depth discussion, with didactic sessions held during public gatherings where feasible. Additionally, University Sechabeng radio programs broadcasted HIV education to reach a wider audience.

Main Topics Covered: The intervention focused on HIV transmission, preventive measures (abstinence, fidelity, and condom use), and HIV treatment.

End-Line Survey Methodology

Study Design: A quasi-experimental pre-post survey design was used to assess changes in patients' knowledge of HIV risk factors and treatment following the intervention. Sampling strategy, ethical considerations, and survey tools mirrored those of the baseline survey.

Data Collection: End-line data were collected from the same catchment areas as the baseline study (Matsieng, Marakabei, Matukeng, and St. Leonard). A total of 183 patients participated in the end-line survey (Table 2).

Table 2: Distribution of End-line Survey Participants by Clinic Catchment Area.

Clinic Catchment Area	Sample Size (n)	Female (%)	Secondary or Higher Education (%)
Matsieng	56	66	21
Marakabei	54	63	25
Matukeng	30	67	20
St. Leonard	43	65	23
Total	183	65.6	22

Data Analysis: End-line responses were entered into Excel® and exported to Stata for statistical analysis [8]. Patient records were matched with baseline data using unique identification codes. Knowledge was assessed using the same seven-question instrument, with scores ≥75% indicating 'adequate knowledge' [7]. Odds ratios were calculated to determine associations, and McNemar's test was applied to evaluate statistically significant differences between baseline and end-line results. A p-value <0.05 and 95% confidence intervals not including 1 were considered statistically significant [14].

RESULTS

Baseline Findings

A total of 269 elderly patients living with HIV/AIDS participated in the baseline survey. The majority were female (65.8%) and had completed only primary-level education (71.4%). A composite knowledge score was calculated from seven questions regarding HIV transmission and treatment. Participants scoring ≥75% were classified as having 'adequate knowledge' [15]. Only 34.2% of participants met this threshold.

Adequate knowledge was significantly associated with gender and educational level. Females were more knowledgeable than males (OR=1.9, 95% CI: 1.1–3.5; P=0.022), and participants with secondary or higher education were more knowledgeable than those with lower education levels (OR=2.8, 95% CI: 1.1–7.8; P=0.021). After adjusting for age, gender, and education in a multivariate logistic regression, the associations remained similar to the unadjusted odds ratios. Additionally, over one-third of participants (36.8%) reported engaging in unprotected sexual activity.

Knowledge about HIV Transmission and Treatment

During baseline focus group discussions, participants' misconceptions about HIV transmission were corrected. HIV treatment principles, including adherence to antiretroviral therapy (ART), were also explained. Table 3 summarizes participants' responses regarding HIV knowledge.

Knowledge Question	Correct Responses Baseline (%)	Correct Responses End-line (%)
Can ARVs make a person healthier?	91.8	92.3
What happens if ARVs are stopped?	92.9	93.1
Can HIV be transmitted through unprotected sex?	60.2	85.3
Can HIV be transmitted through sharing sharp objects?	55.0	81.4
Can HIV be transmitted from mother to child?	58.4	80.3
Is condom use effective in preventing HIV?	62.1	84.7
Can faithful monogamous relationships reduce HIV risk?	59.0	82.0

Table 3: Knowledge Assessment on HIV Transmission and ARV Treatment (Baseline vs. End-line).

Attitudes and Practices

Focus group discussions were stratified by gender and marital status to encourage open communication. Men were separated from women, and married women were separated from single women, allowing participants to freely express their experiences and opinions.

Attitudes toward prevention: Abstinence was largely viewed as unrealistic by both men and women due to social and personal factors. Fidelity was uncommon, with married participants citing spousal infidelity as a reason for non-adherence to monogamy, while single participants reported dating married partners due to family and property concerns.

Attitudes toward condom use: Both men and women expressed reluctance to use condoms. Men cited women's desire for children, while women believed condoms could cause kidney problems for men. Some participants reported unconventional uses of condoms, such as using them for topical applications on knees. Overall, participants were unwilling to assume personal responsibility for HIV prevention. Tables 4, 5 summarize the responses on attitudes and practices for males, single women, and married women, respectively.

Demographics	Adequate Knowledge n (%)	Odds Ratio (OR)	95% CI
Clinic: Matsieng	46 (82.1)	4.0	2.2 – 7.2
Clinic: Marakabei	40 (74.1)	3.2	1.8 – 6.1
Clinic: Matukeng	10 (33.3)	2.0	0.6 – 7.4
Clinic: St. Leonard	33 (76.7)	3.5	1.9 – 6.7
Age 50–54	48 (75.0)	4.1	2.1 – 7.9
Age 55–64	30 (62.5)	2.5	1.2 – 5.3
Age ≥65	11 (61.1)	2.4	1.1 – 5.0
Male	34 (70.8)	4.4	1.6 – 14.9
Female	55 (68.8)	Reference	–
Secondary/Higher Education	36 (79.0)	2.8	1.1 – 7.8
Primary/No Education	53 (64.6)	Reference	–

Table 4: Composite Knowledge Score (Adequate Knowledge ≥75%) by Demographics (End-line).

End-Line Survey and Comparison with Baseline

The percentage of correct responses to the seven HIV knowledge questions (Figure 1). After the intervention, there was a notable increase in correct responses compared to baseline. However, two questions related to ART adherence ("Can taking ARVs as prescribed make a person healthier?" and "What happens if ARVs are stopped and restarted?") showed no significant change, as participants already had high baseline knowledge (91.8% and 92.9%, respectively) [16].

The proportion of participants with 'adequate knowledge' based on the composite score. Among the 183 participants in the end-line survey, there was a 31.2% increase in adequate knowledge compared to baseline (OR=4; 95% CI: 2.4–7.0).

Behavior / Practice	Male (%)	Single Female (%)	Married Female (%)
Sexually active	82	75	69
Unprotected sex	38	35	37
Abstinence practiced	12	15	17
Faithful to one partner	28	21	32
Condom use	19	24	27
Knowledge of ARV benefits	85	87	90

Table 5: Sexual Behavior and Prevention Practice among Elderly Patients (Baseline).

Knowledge improvements by subgroup

Clinic site: All clinics except Matukeng demonstrated significant improvement in knowledge. Matukeng showed a non-significant increase of 16.7% (OR=2; 95% CI: 0.6–7.4), while Matsieng had the highest post-intervention adequate knowledge rate at 82.1%.

Age group: Participants aged 50–54 years showed the highest increase in adequate knowledge (75%).

Gender: Male participants had a higher proportion of adequate knowledge after intervention (70.8%).

Education: Participants with secondary or higher education showed the greatest improvement (79%), confirming education as a strong predictor of HIV knowledge.

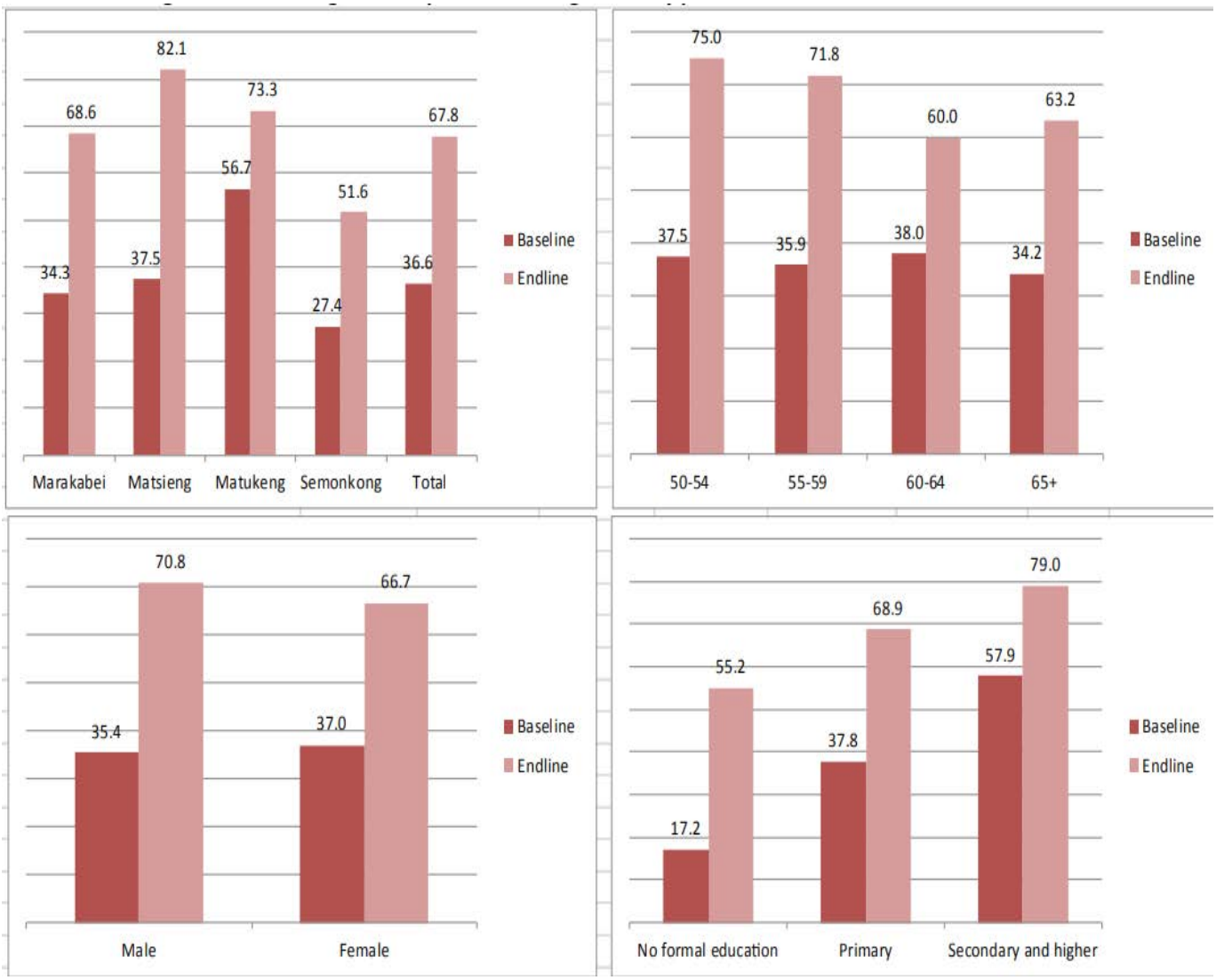

Figure 1: Adequate Knowledge Levels Among Elderly HIV/AIDS Patients in Lesotho.

These findings indicate that the educational intervention significantly enhanced knowledge about HIV transmission, prevention, and treatment among elderly patients, particularly in groups that initially had lower awareness.

DISCUSSION

Attitudes and Practices

Attitudes and practices regarding HIV prevention among elderly patients were measured using abstinence, faithfulness, and condom use. Both male and female participants expressed reluctance to practice abstinence, despite understanding the risks and consequences of unsafe sexual behavior. Similarly, participants were generally unwilling to remain faithful to a single partner. Married women noted that being unfaithful to their husbands was socially frowned upon, particularly in public settings such as gatherings and shebeens, though they sometimes discreetly facilitated condom use for their husbands. Single women reported that they requested condom use from partners but did not insist if refused, due to the potential loss of material or social benefits provided by those partners [17].

A key challenge identified was that sexual health and discussions about sex were rarely addressed within households, limiting open communication between spouses. Group discussions created a safe environment for participants to share experiences, reflect on sexual behaviors, and acknowledge the importance of behavior change. Participants recognized their potential role as role models for younger adults, particularly in influencing attitudes toward fidelity and safe sexual practices. Although educational interventions significantly increased participants' knowledge, attitudes and practices remained inconsistent. This highlights the need for further investigation into the socio-cultural factors, beliefs, and motivations that contribute to the persistence of risky sexual behaviors in this population.

Knowledge of HIV/AIDS and ARVs

At baseline, overall knowledge regarding HIV/AIDS transmission, prevention, and treatment was low among participants. Following the intervention, significant improvements were observed, particularly in understanding the impact of antiretroviral therapy (ART) on HIV progression, the inability of ART to completely eliminate the virus, and the continued necessity of condom use regardless of viral load status.

Despite these gains in knowledge, condom use remained limited due to deeply embedded attitudes, cultural beliefs, and myths surrounding condoms. Participants demonstrated awareness of HIV transmission routes and recognized the risk of reinfection from multiple partners, yet translating this knowledge into protective behavior proved challenging. These findings underscore that knowledge alone is insufficient to change behavior; targeted interventions must also address socio-cultural barriers, personal beliefs, and gender dynamics to promote sustained HIV prevention practices.

CONCLUSION

This study demonstrates that elderly patients in rural Lesotho initially had limited knowledge about HIV transmission and antiretroviral therapy (ART), but their understanding significantly improved following targeted interventions using focus group discussions. Elderly patients are well-positioned to adopt preventive measures and serve as role models, educating younger generations on abstinence, faithfulness, and consistent condom use.

Addressing cultural beliefs and practices through open dialogue is essential to understanding how these factors influence HIV risk and to identifying culturally appropriate strategies for prevention. Empowering communities to develop solutions embedded within their own cultural context can help reduce new HIV infections effectively. It is recommended that Lesotho continue community-based education programs on HIV prevention and ART, as informed communities are better able to make decisions that protect health. Additionally, elderly patients should be included in national health statistics and planning, ensuring that their unique needs are recognized and incorporated into health and social service programs.

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