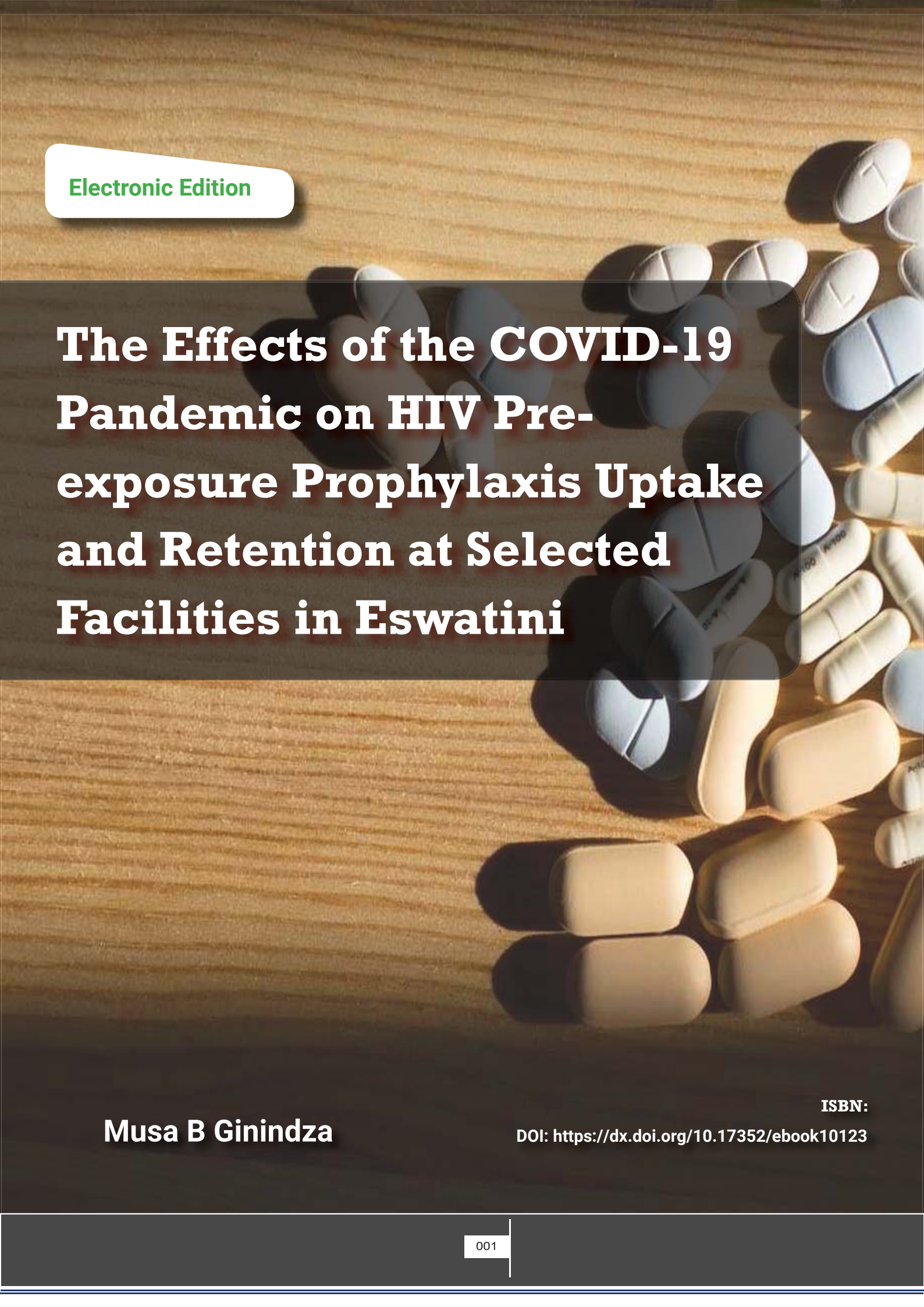

Electronic Edition

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The Effects of the COVID-19 Pandemic on HIV Pre-exposure Prophylaxis Uptake and Retention at Selected Facilities in Eswatini

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Abstract

Background: Oral pre-exposure prophylaxis (PrEP) is the use of antiretroviral medication to reduce HIV acquisition in HIV-negative individuals. In Eswatini, PrEP was introduced in 2017, and the uptake is increasing, despite stigma and COVID-19 challenges.

Aim: This study aimed to compare the uptake and retention of PrEP during and after the COVID-19 pandemic.

Setting and method: An analytical cross-sectional study design was used. Purposive sampling was used to select five facilities in the Manzini region. The chosen facilities are sites where PrEP was piloted and scaled up before, during, and after the COVID-19 pandemic. The study population was clients accessing HIV testing services in the selected facilities, and data was obtained from the HIV testing register, PrEP register, and the Client Management Information System (CMIS). Clients testing negative and eligible for PrEP, and those initiated on PrEP were followed for retention. PrEP uptake, and retention were assessed during COVID-19 (March 2020 – March 2021) and post-COVID-19 (April 2021 - April 2022).

Results: Among the 5,286 clients studied, 45% (*n* = 2,380) initiated PrEP during COVID-19, and 55% (*n* = 2,906) post-COVID-19. Facility 3 recorded the highest initiation rate (*n* = 844) during the pandemic, while Facility 5 recorded the lowest (*n* = 7). Retention rates were notably lower among younger clients aged 15–29 years. Females initially showed higher retention odds (OR: 1.50), but this was insignificant after adjusting for confounders. Clients initiated post-COVID-19 exhibited higher odds of retention (OR: 2.96).

Conclusion: COVID-19 impacted PrEP uptake in Eswatini, highlighting the need for more adaptable healthcare delivery systems. To address demographic fluctuations in the population and guarantee ongoing HIV prevention, Targeted campaigns and tailored interventions are crucial.

The study emphasizes the importance of responsive healthcare systems in safeguarding community health during public health crises.

Contribution: This study underscores the need for tailored interventions and responsive healthcare to maintain continuous HIV prevention amid public health challenges.

Keywords

COVID-19; Uptake; Retention; Initiation; Pre-exposure prophylaxis; Pandemic; Prevention; Exposure; Infection; Primary care; HIV; Eswatini; Retention; Pandemic

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Acronyms and Abbreviations

AHF: AIDS Healthcare Foundation; ART: Antiretroviral Therapy; CDC: Centre for Disease Control; CMIS: Client Management Information Services; HIV: Human Immuno-Deficiency Virus; HTS: HIV Testing Services; PEP: post-exposure Prophylaxis; PHU: Public Health Unit; PrEP: Pre-Exposure Prophylaxis; RFMH: Raleigh Fitkin Memorial Hospital; UNAIDS: United Nations Program on HIV/AIDS; VMMC: Voluntary Medical Male Circumcision; WHO: World Health Organization

CHAPTER 1

1. Introduction

This chapter provides a broad view of Pre-Exposure Prophylaxis (PrEP), including the guidance by the World Health Organization (WHO), and the rollout of PrEP in Eswatini. The research problem, objectives of the study, and the study scope are also outlined in this chapter.

1.1. Study background

Oral PrEP is the use of antiretroviral medication by individuals who are HIV-negative to reduce the risk of acquiring HIV [1,2]. The World Health Organization recommends that people at high risk of contracting HIV be offered antiretroviral oral-based medication, as an additional option, as part of comprehensive HIV prevention [2]. According to van Schalkwyk, et al. 2024 [3], as of the end of 2022, 39.0 million (uncertainty bounds: 33.1 million–45.7 million) people were living with HIV. This number has increased slightly in recent years, a trend attributed to prolonged life expectancy because of effective treatment and ongoing new HIV infections. Fifty-three percent of those living with HIV are women and girls. Sixty-five percent of people living with HIV (PLHIV) reside in sub-Saharan Africa; however, only half of the new HIV infections were in sub-Saharan Africa, reflecting greater progress at reducing new infections in this region compared with other parts of the world. There were 1.3 million (1.0 million - 1.7 million) new HIV infections in 2022. Although the number of new infections is declining, the pace is insufficient to meet the targets set by the United Nations Political Declaration on HIV/AIDS, which aims for fewer than 350,000 new infections by 2030 [3]. New HIV infections are still rising in 2 UNAIDS regions, Eastern Europe and Central Asia, and Middle East and North Africa, predominantly among men.

One of the most alarming statistics is that there were 630,000 (480,000–880,000) AIDS-related deaths in 2022, despite the availability of ART [3]. Sixty percent of all AIDS-related deaths were in sub-Saharan Africa, and 44% were among women and girls (compared with 53% of all PLHIV). Women are more likely to be on treatment than men, and men tend to acquire HIV at older ages than women, placing them at an elevated risk of rapid disease progression and increased mortality.

Compared to 2010, HIV incidence at the global level has declined by 16%, whereas estimates of AIDS-related deaths have dropped by 33%; the latter largely attributable to treatment scale-up [4]. The global HIV pandemic continues to burden the world with new infections exceeding the projected 500,000 per annum, despite a decrease in HIV incidence. The UNAIDS 2019 report shows that gains in reducing HIV deaths and curtailing new infections in Eastern and Southern Africa were driving global progress around 2018 [4]. Globally, various prevention interventions to reduce and stop the spread of HIV have been implemented, with oral pre-exposure prophylaxis (PrEP) being one of the interventions [1].

Comprehensive HIV prevention efforts are required to achieve HIV epidemic control. Oral PrEP is an effective HIV prevention tool [5]. Pre-exposure prophylaxis programs have been slow to scale up in some countries due to policy and accessibility barriers. In 2016, the PrEP Watch reported that only nine countries had initiated approximately 100,000 persons on PrEP; four were in Africa: Ethiopia, Senegal, South Africa, and Zimbabwe [5]. According to Kerzner, et al. [5], the total number of people enrolled on PrEP fell short of the UNAIDS goal of three million persons on PrEP by 2020.

In Eswatini, oral PrEP was introduced in 2017, mainly targeted at populations at a higher risk of HIV acquisition [6]. Pre-exposure prophylaxis was introduced as part of the healthcare services provided for family planning, antenatal care, outpatients, and HIV testing sites [7]. In 2017 there were 415 new users; in 2018, there were 1 278 new users; in 2019, there were 5 786 new users; in 2020, there were 13 278 new users; and in 2021, there were 7 809 new users [6]. Since the program's inception, uptake has been well despite the stigma surrounding oral PrEP, including concerns that other people might think one is HIV positive and taking antiretroviral treatment [8].

Oral PrEP is highly effective in preventing HIV infection if used as directed. The roll-out of PrEP is expanding worldwide, including across sub-Saharan Africa [9]. In generalized epidemic settings, strategies are needed to identify and engage individuals who might benefit from HIV prevention services, including PrEP [10]. Pre-exposure-prophylaxis has been heralded for its potential to put people at risk of contracting HIV in control of preventing HIV infection. Some significant strides made in HIV epidemic control, such as the scale-up of antiretroviral therapy, were threatened by the novel coronavirus disease-19 (COVID-19) [11] pandemic which is caused by severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) [5].

Numerous studies have documented significant changes in the usage of healthcare services during the COVID-19 pandemic because of measures such as lockdowns and stay-at-home orders implemented to curb the spread of the virus [12]. These COVID-19 restrictions negatively impacted healthcare services provision, particularly in areas severely affected by the pandemic. A WHO survey reported that disruption to healthcare services was greatest among lower-income countries [13]. Many people could not access treatment and vaccinations that they desperately needed, such as cancer treatments that extended their lives [14]. Furthermore, literature highlighted that reducing essential maternal and child health

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interventions may cause more than a million additional child deaths [11]. Roberton, et al. [11] also stated that although there were disruptions in healthcare service provision, COVID-19 restrictions positively introduced and strengthened other healthcare services, such as telemedicine. Concurrently, the pandemic may also have resulted in some people being spared unnecessary or inappropriate care, which has the potential to cause harm [13]. This study aimed to describe the effects of COVID-19 on PrEP uptake and retention in selected health facilities in Eswatini.

1.2. Problem statement

The COVID-19 pandemic created tremendous challenges and threats to human life and health systems globally Barazzoni, et al. 2020. Without definitive and curative measures for COVID-19, the pandemic's infection prevention, control, and management heavily relied on public health preventative measures. These included lockdown and social distancing to prevent disease transmission Anderson, et al. 2020. At the end of March 2020, more than one hundred countries were in either partial or full lockdown to mitigate the spread of the COVID-19 infection [15], thus compelling millions of people to remain housebound. The lockdown measures severely affected economic activities, population health, health care delivery, and health services utilization, particularly in resource-poor countries like sub-Saharan Africa [16].

As in other settings, the COVID-19 pandemic disrupted healthcare services, including prevention and treatment services in Eswatini. The effect that COVID-19 had on the uptake (initiation) and retention (remaining on treatment) of oral PrEP in Eswatini is not known. Evidence to describe the effects of COVID-19 on PrEP uptake and retention by comparing the rates during and after the COVID-19 pandemic is much needed. Such evidence will provide primary data that could potentially be used as a reference source for future HIV programming implementation activities to ensure the sustainability and retention on PrEP, especially during public health crises.

1.3. Research aim and objectives

The study aimed to describe the effects of COVID-19 on PrEP uptake and retention during and after the COVID-19 pandemic in selected public sector facilities in Eswatini. The objectives of this study were:

To compare enrolment rates for oral PrEP in clients for the period during (March 2020 – February 2021) and after (March 2021 – March 2022) the COVID-19 pandemic in selected facilities in Eswatini.

To compare the retention rates among PrEP clients in the period during (March 2020 – February 2021) and after (March 2021 – March 2022) the COVID-19 pandemic in selected facilities in Eswatini.

To assess any associations between the COVID-19 pandemic and PrEP uptake in the selected public sector facilities in Eswatini.

1.4. Structure of the thesis

A general background to the study, the research problem, the setting, and the aim and objectives have been provided in this introduction. Chapter 2 presents the literature review and Chapter 3 discusses the research design and methodology selected to address the research problem and objectives. In Chapter 4, the manuscript that has been submitted to the African Journal of Primary Health Care & Family Medicine from this thesis is provided. In Chapter 5, these results are interpreted and discussed to provide a clear picture of the research findings. Finally, the conclusions and recommendations, together with recommendations for future research, conclude this research study in Chapter 6.

CHAPTER 2

Literature review

2. Introduction

This chapter presents literature concerning the HIV situation in Eswatini, the rollout of PrEP as a preventive intervention from a global perspective and narrowing down to PrEP implementation in Eswatini. The chapter will also discuss the history of COVID-19 in the country, and the utilization of health services during the pandemic. The literature review was conducted using databases such as PubMed, ScienceDirect, and Google Scholar. A narrative literature review method was used to identify literature relevant to this study. The relevant literature was identified using the keywords "pre-exposure prophylaxis", "COVID-19", "services uptake", "retention", and "adherence".

2.1. HIV and AIDS in Eswatini

The Eswatini Population HIV Incidence Assessment (PHIA) conducted in 2021 stated that Eswatini has an HIV prevalence of 24.8% among adults 15 years and older, with a prevalence of 30.4% among women overall [17], and 35.4% among pregnant women aged 15 - 49 years [18]. This is much higher than the prevalence among similarly aged men of 18.7%. The annual HIV incidence rate among adults 15 - 49 years is 0.77% (0.20% among males and 1.45% among females) [17]. With the high HIV prevalence and incidence rates, pregnant and post-natal women (PPW) in Eswatini are at substantial risk of HIV infection [19]. Women who get infected with HIV during pregnancy or breastfeeding risk transmitting HIV to their infants [19]. In 2019, the Eswatini Ministry of Health scaled up the provision of PrEP as part of combination HIV prevention, with a particular focus on HIV-negative PPW, adolescent girls and young women (AGYW) aged 16 - 24 years, men aged 30–34 years, HIV-negative partners in sero-discordant sexual relationships, clients with sexually transmitted infections (STIs), and key populations (sex workers, men who have sex with men and transgender clients) [19]. In Eswatini, clients are eligible for PrEP if at substantial risk after an assessment; age is 16 years and above; HIV test is negative on the day of PrEP initiation; there is no presence of symptoms indicating acute HIV infection (AHI) in combination with an exposure for HIV in the previous 14 days; willing to attended PrEP visits until 28

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days after risk period; no contraindication to TDF + lamivudine (3TC); and bodyweight is 30 kilograms (kg) and above. PPW women are considered to be at substantial risk for HIV infection and are offered PrEP upon testing HIV-negative and having no contraindications for PrEP.

The issue of mother-to-child transmission of HIV remains a significant public health concern in Eswatini. A study found a mother-to-child transmission rate of 2.2%, which is higher than rates reported in neighboring South Africa [20]. The implementation of the Option B+ program, which provides lifelong ART to all HIV-positive pregnant women, has been a pivotal strategy in reducing transmission rates. However, many women face emotional and psychological barriers that complicate their acceptance of their HIV status and the initiation of ART [21,22].

Community-based interventions have shown promise in improving HIV testing rates and antiretroviral treatment (ART) initiation. For instance, the Love Test campaign has been instrumental in raising awareness and encouraging testing among married individuals, who tend to have higher awareness of their HIV status due to partner support [23]. Additionally, innovative approaches such as peer-delivered linkage case management have resulted in high rates of same-day ART initiation, contrasting sharply with traditional referral services that often see delays in care [24,25].

Despite these advancements, the challenge of HIV-related stigma persists, particularly among vulnerable populations such as young men and women. Young men often exhibit negative attitudes toward HIV testing and treatment, which can impede their engagement in care [26]. Addressing these social complexities through targeted educational campaigns and community support initiatives is essential for improving health outcomes in Eswatini.

While Eswatini has made significant strides in addressing the HIV epidemic, persistent barriers related to testing, treatment adherence, and stigma continue to undermine these efforts. A comprehensive approach that includes community engagement, targeted interventions, and ongoing support for individuals living with HIV is crucial for achieving long-term health improvements and reducing the incidence of HIV in the country.

2.2. Pre-exposure prophylaxis and its options

In September 2015, the World Health Organization (WHO) launched evidence-based guidelines by recommending that any person at substantial HIV risk should be offered oral pre-exposure prophylaxis (PrEP) containing tenofovir disoproxil fumarate (TDF) as an additional prevention choice [1]. Since 2017, PrEP medications have been listed in WHO's Essential Medicines List, including TDF/emtricitabine (FTC) and TDF/lamivudine (3TC). Hodges-Mameletzis, et al. [1] further mentioned that a descriptive policy review and analysis of countries adopting WHO's 2015 recommendation on oral PrEP was conducted. As of June 2018, we identified 35 countries that had some type of policy on oral PrEP, and an additional five countries where a specific policy on PrEP is currently pending. A total of 19 high-income countries (HICs) and 21 low- and middle-income countries (LMICs) have adopted or have a pending policy. Most countries that have adopted or pending PrEP are in the European (42.9%) or African (30.0%) region [1].

2.2.1. Global perspective of pre-exposure prophylaxis: Pre-exposure prophylaxis constitutes a cornerstone of global HIV prevention strategies, particularly in regions with high prevalence rates. The World Health Organization (WHO) and various health authorities have endorsed PrEP as an effective method for reducing the risk of HIV transmission among at-risk populations, including men who have sex with men (MSM), sex workers, and serodiscordant couples [27,28]. The introduction of PrEP has been particularly transformative for women, especially those of childbearing age, as it provides a means of protection that does not rely on partner cooperation, thus empowering women to take control of their sexual health [29,30].

Globally, the uptake of PrEP has been influenced by various factors, including awareness, accessibility, and stigma. Studies show that greater knowledge about PrEP significantly correlates with higher uptake; better-informed individuals are more likely to use it [31,32]. However, the stigma surrounding HIV and its prevention methods remains a significant barrier. For instance, in Nigeria, stigma has been identified as a major impediment to the uptake of oral PrEP among adolescents [33]. Efforts to mitigate stigma through community engagement and education are essential for increasing PrEP utilization [33,34].

In terms of safety, extensive research has demonstrated that PrEP is safe for use among various populations, including pregnant and breastfeeding women. The American College of Obstetricians and Gynecologists has acknowledged the reassuring safety profile of tenofovir/emtricitabine during pregnancy, recommending its use while emphasizing the importance of monitoring for HIV seroconversion during lactation [27,35]. This is particularly crucial as many women in high-prevalence areas may face an increased risk of HIV acquisition during pregnancy and postpartum periods [29,36].

The implementation of PrEP has also been supported by substantial global funding, yet there remains a disparity in resource allocation. For example, a study highlighted that only a small fraction of Global Fund investments in HIV prevention have been directed towards key populations, such as MSM and transgender individuals, despite their high vulnerability to HIV [37]. This underfunding of targeted prevention strategies can hinder the overall effectiveness of PrEP programs in reducing HIV incidence in these populations [38,39].

Moreover, the integration of PrEP into existing healthcare frameworks has shown promise in enhancing its uptake. For instance, incorporating PrEP services into family planning clinics has been identified as a feasible strategy to reach women at risk [28]. Additionally, the use of technology, such as online navigation tools for PrEP access, has emerged as a potential method to improve awareness and facilitate uptake among individuals at high risk [40].

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While PrEP represents a significant advancement in HIV prevention, its global implementation faces challenges related to stigma, accessibility, and resource allocation. Addressing these barriers through targeted education, community engagement, and integration into existing health services is essential for maximizing the impact of PrEP in reducing HIV transmission worldwide.

2.2.2. Pre-exposure prophylaxis in Eswatini: The introduction of PrEP (in clinical trials) in Eswatini in 2016 aimed to reduce the incidence of HIV, especially among vulnerable populations, including women of childbearing age, men who have sex with men, and sex workers. Despite its potential, PrEP uptake in Eswatini has faced challenges including stigma, limited awareness, and structural barriers.

Research indicates that community-based approaches significantly enhance the accessibility of PrEP. For instance, the LINKAGES project in Eswatini successfully implemented a community-based PrEP initiation program that involved self-testing and the use of community ambassadors to promote PrEP refills among key populations [41]. This model highlights the importance of integrating PrEP services within community health frameworks to improve uptake and adherence.

A study focusing on pregnant and post-natal women in Eswatini revealed that while there is a recognized need for PrEP, knowledge and attitudes towards its use remain critical factors influencing uptake. The survey conducted among HIV-negative pregnant women indicated that many were unaware of PrEP or held misconceptions about its safety and efficacy [42]. This aligns with findings from other regions, such as Ethiopia and Zimbabwe, where increased knowledge about PrEP was associated with higher utilization rates [31].

Moreover, qualitative research has shown that men in Eswatini often experience barriers related to masculinity norms and fear of stigma when seeking PrEP services [43]. A mixed-methods study highlighted those men expressed discomfort with clinic visits and a fear of being perceived as vulnerable [44]. Addressing these gender-specific barriers is essential for increasing PrEP uptake among men, who are often overlooked in HIV prevention strategies.

The role of healthcare providers in facilitating PrEP access cannot be understated. A study examining healthcare worker adaptations to PrEP delivery in Eswatini emphasized the need for training and support for providers to effectively communicate the benefits of PrEP and to address patient concerns [45].

Innovative approaches, such as the use of long-acting injectable PrEP formulations, are being explored to improve adherence and reduce the burden of daily pill-taking [46]. These alternatives may particularly appeal to populations that struggle with adherence to daily oral PrEP, such as young women and those with complex social circumstances.

While PrEP presents a promising tool for HIV prevention in Eswatini, its successful implementation requires a multifaceted approach that includes community engagement, education, gender-sensitive strategies, and support for healthcare providers. Continued research and adaptation of services to meet the needs of diverse populations will be crucial in overcoming the barriers to PrEP uptake and ensuring its effectiveness in reducing HIV transmission.

2.3. Adherence to PrEP and HIV prevention

Adherence to PrEP is a critical factor in the prevention of HIV transmission, particularly among high-risk populations such as men who have sex with men (MSM) and serodiscordant couples. The effectiveness of PrEP is contingent upon consistent and correct usage, as suboptimal adherence can significantly diminish its protective benefits against HIV infection [47,48]. Research indicates that good adherence is essential for individual health outcomes and broader public health goals, as it contributes to reducing HIV transmission rates within communities [48,49].

Several studies have identified various barriers to adherence, including the stigma associated with PrEP use, which can lead to the concealment of medication and ultimately affect adherence levels [48,50]. Stigma can manifest in different forms, such as fear of judgment from peers or concerns about being perceived as engaging in high-risk behaviors [51]. This stigma is particularly pronounced among young MSM, who may face additional pressures that complicate their adherence to PrEP [51]. Furthermore, the presence of side effects from PrEP medications, such as nausea or headaches, has been shown to negatively impact adherence, as individuals may discontinue use to avoid these unpleasant experiences [49,52].

Interventions aimed at improving adherence have been explored extensively. Counselling that includes education about the importance of adherence, coping strategies for side effects, and the involvement of partners in the PrEP process have been shown to enhance adherence rates [49,53]. Additionally, the use of technology, such as mobile health interventions and telemedicine, has emerged as a promising approach to support adherence, particularly among younger populations [54,55]. These interventions can provide reminders, facilitate communication with healthcare providers, and offer tailored support to address individual barriers to adherence [55].

Moreover, qualitative studies have highlighted the role of social support in promoting adherence to PrEP. Relationships with partners and social networks can serve as motivational factors for individuals to maintain their medication regimen [56]. In serodiscordant couples, for example, the desire to protect one's partner from HIV infection can be a powerful motivator for adherence [56]. This underscores the importance of integrating social support mechanisms into PrEP adherence strategies.

Although highly effective for HIV prevention, the success of pre-exposure prophylaxis (PrEP) heavily depends on user adherence. Addressing the multifaceted barriers to adherence, including stigma, side effects, and lack of social support, is crucial for optimizing PrEP's effectiveness. Future research and interventions should continue to focus on these areas to enhance adherence rates among at-risk populations.

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2.4. Factors influencing medication adherence

Adherence to medication, particularly in the context of Pre-Exposure Prophylaxis (PrEP) for HIV prevention, is influenced by a multitude of factors that can be categorized into individual, social, and systemic determinants. In Eswatini, where the HIV prevalence is notably high, understanding these factors is crucial for improving PrEP uptake and adherence among at-risk populations.

2.4.1. Patient-related/individual factors: Personal beliefs and knowledge about PrEP significantly influence adherence. For instance, misconceptions about the safety and effectiveness of PrEP can deter individuals from consistent use. Research indicates that fear of reduced condom use due to reliance on PrEP is a common concern among potential users, which can lead to lower adherence rates [57]. Additionally, socioeconomic burdens such as poverty and competing life challenges can impede an individual's ability to maintain a daily medication regimen, particularly among adolescents and young adults [58]. Furthermore, the presence of side effects has been documented as a significant barrier to adherence, as individuals may discontinue use due to discomfort or health concerns [52].

2.4.2. Social factors: Social dynamics, including stigma and peer support, play a critical role in medication adherence. In Eswatini, the stigma associated with HIV and PrEP can discourage individuals from seeking or continuing treatment [59]. Qualitative studies have shown that community perceptions and the attitudes of healthcare providers can either facilitate or hinder adherence. For example, supportive social networks and positive reinforcement from peers can enhance adherence, while negative societal messages can create barriers [60].

2.4.3. Health care system factors: The healthcare system's structure and functionality significantly impact medication adherence. In Eswatini, issues such as stockouts of essential medicines, inadequate training for healthcare professionals, and poor adherence to treatment guidelines have been identified as systemic barriers that affect prescribing practices and patient adherence [61]. The logistical challenges associated with accessing healthcare services, including transportation costs and clinic hours that conflict with work schedules, further complicate adherence efforts [62]. Additionally, the integration of HIV and Non-Communicable Disease (NCD) medication delivery has shown promise in improving adherence by providing comprehensive care [63].

Targeted interventions are necessary to address these multidimensional barriers to medication adherence. Strategies such as providing financial incentives for adherence, enhancing community education about PrEP, and utilizing mobile health (mHealth) technologies to remind users to take their medication have been explored as effective means to improve adherence rates [58,64]. Furthermore, the introduction of long-acting injectable formulations of PrEP may offer a viable alternative for individuals struggling with daily pill-taking, thereby potentially increasing adherence [46].

All the above-mentioned factors that influence adherence to medication can be further worsened by the emergence of pandemics like the COVID-19. The speed and havoc that COVID-19 imposed to the world was so tragic that it brought a new life to everyone.

2.5. History of COVID-19 in Eswatini

Despite the great strides made in HIV prevention using oral PrEP, the COVID-19 pandemic posed some challenges. The COVID-19 pandemic presented a complex interplay of public health responses, societal impacts, and healthcare challenges in Eswatini. The first confirmed case of COVID-19 was reported on March 13, 2020, marking the beginning of a significant public health crisis in the country. The government swiftly implemented various measures to curb the spread of the virus, including lockdowns, travel restrictions, and public health campaigns aimed at educating the population about the virus and preventive measures Brooke, et al. [65].

In the early stages of the pandemic, Eswatini faced challenges typical of many countries, such as limited testing capacity and healthcare resources. The Ministry of Health focused on contact tracing and isolation of confirmed cases, which was crucial given the initial low number of cases [66]. However, as the pandemic progressed, the healthcare system became strained, particularly as resources were diverted from routine health services to COVID-19 response efforts.

2.6. Utilization of health services during the COVID-19 Pandemic

The COVID-19 pandemic has had a profound impact on health service utilization globally, and Eswatini is no exception. The pandemic not only strained healthcare resources but also altered the dynamics of how health services were accessed and delivered. Below are findings from various studies to highlight the key factors influencing health service utilization during the COVID-19 period in Eswatini.

2.6.1. Disruption of routine health services: One of the most significant impacts of the COVID-19 pandemic was the disruption of routine health services. In Eswatini, as in many other countries, resources were reallocated to manage the pandemic, leading to a decline in the availability of essential health services. For instance, Masina, et al. noted that routine healthcare services, including Tuberculosis (TB) care, were deprioritized, resulting in a decrease in case notifications and treatment adherence [67]. This trend was echoed in other regions where similar reallocations occurred, leading to a significant drop in service utilization for non-COVID-related health issues [68].

2.6.2. Fear and misinformation: The fear of contracting COVID-19 in healthcare settings significantly deterred individuals from seeking medical care. Many people avoided hospitals and clinics due to concerns about exposure to the virus, which was particularly pronounced during the early stages of the pandemic Hung, et al. 2020. This phenomenon was not unique to Eswatini; studies from other countries have

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documented similar trends, where fear of infection led to decreased utilization of essential services, including maternal and child health services [69].

2.6.3. Telehealth and innovative service delivery: In response to the challenges posed by the pandemic, there was a notable shift towards telehealth and other innovative service delivery models. For instance, healthcare providers in Eswatini began utilizing telemedicine to maintain continuity of care for patients with chronic conditions, including TB [67]. This adaptation was crucial in ensuring that patients continued to receive necessary treatments while minimizing the risk of COVID-19 transmission. The effectiveness of telehealth services during the pandemic has been documented, highlighting their potential to improve care access during crises Schulz, et al. 2020.

2.6.4. Impact on specific health services: Certain health services experienced more pronounced declines than others. For example, sexual and reproductive health services saw significant reductions in utilization, with many women reporting difficulties in accessing contraceptive services during the pandemic [70]. This decline was attributed to clinic closures, reduced outreach services, and the prioritization of COVID-19 response efforts over routine health services Williams, et al. 2023. The implications of these disruptions were particularly concerning for vulnerable populations, including adolescents and women, who faced increased risks of unintended pregnancies and other health complications Meherali, et al. 2021.

2.6.5. Community engagement and support: Community engagement played a critical role in mitigating the impacts of the pandemic on health service utilization. Initiatives that involved community health workers and local organizations helped to raise awareness about the importance of continuing to seek healthcare services despite the pandemic. Such community-based approaches were critical in addressing stigma and misinformation surrounding COVID-19 and ensuring healthcare access Williams, et al. 2023; Hasan, et al. 2021.

In conclusion, the COVID-19 pandemic significantly altered health service utilization in Eswatini, leading to disruptions in routine healthcare, increased reliance on telehealth, and challenges in accessing specific health services. Addressing these issues requires a multifaceted approach that includes strengthening healthcare systems, enhancing community engagement, and ensuring that essential health services remain accessible during public health emergencies.

2.7. Retention in PrEP care during COVID-19

Many researchers acknowledge that there is a dearth of knowledge about factors affecting PrEP retention during the COVID-19 pandemic and these further warrant conducting studies in the subject matter. A qualitative study conducted in Nepal on the impact of COVID-19 on health services utilization indicated that people suffered immensely during the lockdown period [15]. The researcher mentions that the decline was exacerbated by the unavailability of health services for several months including general health services.

In Kenya, South Africa and Uganda, PrEP retention during the COVID-19 pandemic occurred due to t enabling factors such as management and policy, service delivery, communication, and outreach [5]. According to the authors, management and policy included virtual staff training, records management and tracking, and PrEP commodity tracking. Service delivery included decentralization of services, integrating PrEP with other services and multi-month dispensing of PrEP. Furthermore, communication and outreach included PrEP awareness campaigns, COVID-19 PrEP information, education and communication materials and virtual engagement. Some countries devised strategies to cope during the COVID-19 pandemic to ensure PrEP uptake and their efforts culminated in a peak in PrEP uptake during the pandemic compared to the pre-pandemic period. In Kenya, PrEP uptake increased by 52.2%; in Uganda by 142.6%; and in South Africa by 201.6% [5]. In Kibera, Kenya, factors explored regarding PrEP retention included gender, age, education level, employment status, marital status, and religion. Noteworthy is that none of them were associated with PrEP retention during statistical analysis, hence the indication for this study.

CHAPTER 3

3. Research methodology

3.1.Introduction

This chapter outlines and discusses the methods, processes, and procedures followed in conducting this study. The study was quantitative and analytical in nature and made use of secondary data to answer the research questions on clients accessing PrEP services in the selected facilities. The research design, Sampling processes, data collection tools, and data analysis are outlined in this chapter. Research ethics guiding the study are also discussed.

3.2.Study setting and population

This study was conducted in public sector facilities located in the Manzini region, the most populous region in Eswatini. Eswatini is a low-middle-income country situated in Southern Africa. It is a landlocked country with South Africa and Mozambique as its neighboring countries. The country has a population of about 1.1 million inhabitants, and it is divided into four administrative regions: Hhohho, Manzini, Shiselweni, and Lubombo (Centers for Disease Control and Prevention [CDC], 2019). The Manzini region has an estimated population of about 355,945 people (Centers for Disease Control and Prevention [CDC], 2019). Manzini is the country's industrial hub, attracting youth from other regions for employment and educational opportunities.

Five facilities (study sites) in the Manzini region were purposively sampled and these were: Raleigh Fitkin Memorial Service (RFMH) - the second largest hospital in Eswatini, King Sobhuza II Public Health Unit (KSII), AIDS Health Foundation (AHF) Lamvelase, AHF Matsapha, and Luyengo Clinic. The

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selected facilities are in the Manzini region, the most populous region in Eswatini. The characteristics of the selected facilities are described in Table 1.

3.3. Participants

The study population were clients accessing HIV testing services in the selected facilities. Clients testing negative and eligible for PrEP and those initiated from March 2020 (during COVID-19) to February 2021 (when there were COVID-19 restrictions from 27 March 2020 to 27 August 2020) were included in the study. Data on initiation and retention in treatment was extracted from HIV testing register, PrEP register, and the electronic system (CMIS). For purposes of comparing the effects of COVID-19 on PrEP uptake, March 2021 to March 2022 was considered as the period after COVID-19.

The Eswatini Population HIV Incidence Assessment (PHIA) conducted in 2021 stated that Eswatini has an HIV prevalence of 24.8% among adults 15 years and older, with a prevalence of 30.4% among women overall [17], and 35.4% among pregnant women aged 15 - 49 years [18]. The HIV and AIDS pandemic continues to be Eswatini's biggest threat to public health and sustainable human development. The country has been trying interventions to lower the prevalence of HIV by implementing different strategies, including using antiretroviral therapy [11] as prevention for HIV-positive individuals and PrEP for people testing negative [71].

3.3.1. Inclusion criteria:

Records that were included in the study were for:

- Clients tested negative for HIV in the selected facilities during the period during COVID-19 (March 2020 – February 2021) and after COVID-19 (March 2021 – March 2022).
- Clients registered as those belonging to the selected facilities, i.e., not visiting the facilities to refill PrEP.
- Clients 16 years and above or a mature minor that tested negative on the day of PrEP initiation, as stated in chapter two of the Eswatini HIV Management guidelines. The Clinical Implementation Guide for PrEP provision in Eswatini (2020) defines a mature minor as an individual under 16 years but sexually active who is given PrEP (PrEP Implementation Guide, 2020).

Table 1: Facility characteristics.

Name of facility	Characteristics of facility
King Sobhuza II PHU	A public health facility located in a densely populated township next to a regional referral hospital
AHF Manzini	An ART facility in the Manzini town city centre
Luyengo Clinic	A clinic located in a highly populated area next to a university
AHF Matsapha	A public health facility located in the industrial hub of the country. This facility has flexi-hours and is male friendly.
RFM Hospital	A referral hospital located at the centre of the region.

- Clients with no contraindications to Tenofovir Disoproxil Fumarate (TDF) + Lamivudine (3TC).
- Clients without signs of Acute HIV Infection (AHI) and willing to attend scheduled PrEP visits.
- Clients who weigh more than 30 kg and with a creatinine clearance level of more than 60 ml/min.

3.3.2. Exclusion criteria:

Records for clients meeting the following criteria were excluded from the study:

- Clients less than 16 years of age, as the Eswatini HIV Management guidelines, state that 16 years is the consenting age for PrEP unless the person is a mature minor (PrEP Implementation Guide, 2020).
- Clients visiting the selected facilities to refill PrEP.
- Clients transferred in from other facilities.

3.4. Study design

An analytical cross-sectional study design with a quantitative approach was performed to ascertain PrEP uptake and retention during and after COVID-19. In this study, measurements for PrEP uptake or enrollment, and retention were taken during the COVID-19 period (March 2020 – March 2021) and after COVID-19 (April 2021 -April 2022). In this study, the researchers sought to ascertain the PrEP uptake and retention rate (dependent variables) during and after COVID-19, thus making COVID-19 the exposure or independent variable. For this study routinely collected program data was extracted from the electronic medical records (the client management information system (CMIS) and registers in the selected facilities. The five facilities were selected for the study because they have a high volume of patients and hence a higher number of clients on Anti-Retroviral Therapy [11] and PrEP.

The study population comprised clients who had accessed HIV testing services in the selected facilities. Inclusion criteria for the study encompassed clients who had tested negative for HIV and initiated PrEP between March 2020 and March 2021 during COVID-19, and between April 2021 and April 2022 post-COVID-19. Clients were included if they were 16 years and above or mature minors under 16 who were sexually active and had been prescribed PrEP in accordance with the Eswatini Integrated HIV Management guidelines (2022) [72]. The guideline also indicates that PrEP should be given to clients who do not have contraindications to Tenofovir Disoproxil Fumarate (TDF) + Lamivudine (3TC), exhibited no signs of Acute HIV Infection (AHI), and demonstrate a willingness to adhere to scheduled PrEP visits. Additionally, clients should have had a body weight exceeding 30kg and a creatinine clearance level surpassing 60 ml/min [72].

3.5. Sampling

The study included all clients in the PrEP cascade in the selected facilities in Eswatini. The PrEP cascade includes:

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- Number of individuals who received HIV testing services and received a negative test result (HTS_TST_NEG). Data source will be the HIV Testing Services register.
- **PrEP_Screen:** Number of individuals who have been screened, identified at substantial risk, and are thought to be potentially eligible for Prep. Data source-HTS register, CMIS.
- **Prep offered:** number of individuals who are at substantial risk, are thought to be potentially eligible for PrEP and are offered during the reporting period. Data source: HTS register, CMIS.
- **PrEP accepted:** number of individuals who accepted PrEP during the reporting period. Data source-HTS register and CMIS.
- **PrEP NEW:** number of individuals who were newly enrolled on PrEP to prevent HIV infection in the reporting period. Data source is the PrEP register, CMIS.
- **PrEP CURR:** number of individuals, inclusive of those newly enrolled, who received oral antiretroviral PrEP during the reporting period.
- **PrEP Sero-converts:** number of individuals who have seroconverted to HIV positive while on PrEP during the reporting period.

This sample is representative, as PrEP roll-out has been suboptimal in the small country of Eswatini with a population of approximately 1.1 million. The average PrEP initiations in a month at the selected sites range between 25 to 30 initiations. All the clients accessing PrEP services were sampled for the study. This represents a convenient sampling method as participants with files meeting the inclusion criteria in the selected facilities were sampled.

The study was conducted utilizing a retrospective folder review. A prevalence was set at 50% to calculate the sample size. Based on this prevalence a total sample size of 400 folders was sufficient for data collection (see formula below).

Formula to calculate sample size.

$n = (p(1-p)\ z^2)/d^2$

n = sample size

p = prevalence

d = desired precision

z = 1.96 (95% level of confidence)

$n = (0.5(1 - 0.5)\ [1.96]^2) / [0.05]^2$

n = 385

n = 400

3.6. Data collection process

A data collection tool, as shown in Annexure A, was used to extract data from the paper-based PrEP register and the client information management electronic systems (CMIS). The data collection tool was piloted at Chakaza Clinic. Data from the two sources (registers and CMIS) was then entered into a Microsoft Excel© spreadsheet and cleaned by checking for missing values, abnormal entries, consistency, and accuracy.

Study numbers were used as identifiers, and data collected was captured solely by the principal investigator, Musa Ginindza (MG), who is the sole person guarding the filled questionnaires. The data dictionary was securely stored for a minimum of five years. Supervisors will have access to identified datasets.

To maintain the confidentiality of information collected from client files, study numbers were used, and all personal identifiers were removed ensuring the safe and secure locked storage of the data for a minimum of 5 years. Electronic data was password protected.

3.7. Validity and reliability of data

To maintain results valid and reliable, all data entries were double-checked and verified on two worksheets and compared. Formulas were double-checked to ensure accuracy in calculations. Pilot testing was conducted on the data collection tool at Chakaza Clinic.

The validity of a survey is the degree to which it measures what it claims to measure. The validity of a survey can be maintained in the evaluation and testing phase. Validity is ensured by checking if the principles of construction have been respected. These include validating the questions if they fulfil the aim of the research, the chronological order of the questions, the simplicity of the questions and ordering Deniz and Alsaffar, 2013. Expert reviews by key leaders in the prevention programs were done to validate the questionnaire. The questionnaire was presented to the PrEP core team where it was investigated.

3.8. Data analysis

Data were analysed using STATA (version 18). Socio-demographic characteristics of clients on PrEP were summarized using descriptive statistics, with means and standard deviations reported for normally distributed numerical variables such as age. Multinomial logistic regression was employed to determine factors associated with PrEP initiation during and after COVID-19 and to determine factors associated with PrEP retention. Assumptions for multinomial logistic regression were checked, including linearity of logits and independence of irrelevant alternatives using the Hausman-McFadden test, and multicollinearity using Variance Inflation Factor (VIF). Univariable analysis was initially conducted, including all variables with a p - value below 0.05, followed by a manual backward elimination stepwise procedure to exclude variables with p - values exceeding 0.05. Crude and adjusted odds ratios, 95% confidence intervals, and p-values were calculated for each independent variable. The indicators in Table 2 show how the variables were calculated.

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3.8.1. Dependent variable measurement: In measuring uptake: after testing negative and eligible for PrEP according to the screening tool, how many clients are initiated on PrEP? This was a binary variable where those who take PrEP will be coded 1 [10]. And those who refuse PrEP will be coded 2 (Two).

In measuring retention: this was measured according to the retention indicator as shown in Table 2. Retention was measured through pill count. Clients were given a stock of ARVs and a scheduled return date that falls some days before the pills finish. When the client comes back with more, or fewer pills, it means there are retention issues. The clients who are found to be retained in the two stages (3 and 6 months) will be at high retention, those who are retained at one measurement stage and not on the other will be at moderate retention. Those who are not retained at either time point will be coded as poorly retention. The coding of retention is shown in Table 3.

3.9. Ethics considerations

The investigator ensured that the study was conducted in full conformity with the current revision of the Declaration of Helsinki or with the International Conference for Harmonization Good Clinical Practice (ICH-GCP) regulations and guidelines, whichever affords greater protection to the subject. Ethics approval to conduct the research was obtained from the Biomedical Research Ethics Committee (BMREC) (BMREC Number BM22/10/2) of the University of the Western Cape (UWC) (Annexure B). Additionally, approval was granted by the National Health Research Review Board (NHRRB) under the Ministry of Health in Eswatini (Annexure C). Permission to access client files in the selected facilities was sought from the Acting Director of Health Services in the Ministry of Health and matrons/senior medical officers in charge of the selected facilities. In conducting this study, the Protection of Personal Information Act was adhered to (Protection of Personal Information, Act 4 of 2013, 2013).

Table 2: Indicators to be measured to understand the impact of COVID-19 on PrEP uptake.

Uptake indicator		
Indicator	**How to calculate**	**Data source**
% of those eligible who initiated PrEP	Numerator: Number of those who initiated PrEP	HTS register, CMIS and PrEP register
	Denominator: Number of clients who were offered PrEP	
Retention indicator		
% of clients returning for 3 months follow-up visit	Numerator: # of clients attending 3-month visit (within 7 days of scheduled visit)	PrEP Register, CMIS
	Denominator: # of clients initiated on PrEP (initiated at least 88 days prior)	
% of clients returning for 6-month follow-up visit	Numerator: # of clients attending 6-month visit or 3rd visit that includes Month 6, within 7 days of the scheduled visit	PrEP register, CMIS
	Denominator: # of clients initiated on PrEP (initiated at least 178 days prior)	

Table 3: Coding of clients' retention to PrEP.

Retention measurement		
Retention in all stages	High retention	2
Retained at one stage	Moderate retention	1
Not retained at all stages	Poor retention	0

3.10. Permission

Permission to access the data for this study was sought through the office of the Director of Health Services Clinical in the Ministry of Health in Eswatini, Dr SV Magagula. A request letter (Annexure D) was written to the facilities (study sites).

3.11. Informed consent

Informed consent was not required, as the study did not involve human subjects as participants or respondents [73].

3.12. Confidentiality

Client information remained confidential throughout data analysis, with no possible linkage to individual identities. Data collection forms were kept in a locked location at the Eswatini National AIDS Programme, and electronically stored data was password protected.

3.13. Anticipated risks and precautions

No risks were anticipated or encountered during this research, as the study utilized only existing data and there will be no human subject interviews.

CHAPTER 4

Results (manuscript)

In this chapter, the researcher presents the results of the study in the form of a manuscript that has been accepted for publication in the African Journal of Primary Health Care and Family Medicine. Below is the manuscript as received by the journal:

Ginindza M, Coetzee R, Ginindza-Ncube N. The effects of the COVID-19 pandemic on HIV Pe-exposure prophylaxis uptake and retention in selected facilities in Eswatini. Journal: African Journal of Primary Health Care & Family Medicine (Ref. No.: 4685).

Reference citations from the publication are listed at the end of the manuscript, numbered in order of appearance.

Contributions

The candidate, Musa Ginindza was the primary contributing author of the study. Renier Coetzee and Nondumiso Ncube, the candidate's supervisors are the corresponding authors. Contributions to the paper are published as follows: "Musa designed the study, designed data collection, monitored data collection for the whole study, collected data, wrote the statistical analysis plan, cleaned, and analyzed the data, and drafted and revised the paper. He is the guarantor of the study. Professor Renier and Dr Nondumiso provided guidance on the study and revised the paper. MB designed data collection tools, collected data and revised the paper. RC facilitated the collaborative project between the University of the Western Cape and the African Journal of Primary Health Care, provided guidance on the study, and revised the paper." All co-authors provided feedback and approved the final version of the publication.

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The Effects of the COVID-19 Pandemic on HIV Pre-exposure Prophylaxis Uptake and Retention at Selected Facilities in Eswatini

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Abstract

Background: Oral pre-exposure prophylaxis (PrEP) uses antiretroviral medication to reduce HIV risk in HIV-negative individuals. Despite its effectiveness, global uptake faces policy and accessibility challenges. In Eswatini, PrEP introduction in 2017 showed promise despite stigma and COVID-19-related disruptions.

Aim: This study compared PrEP uptake and retention during and after COVID-19.

Setting and methods: An analytical cross-sectional study was conducted among clients accessing HIV testing services in selected Eswatini facilities. Data from the HIV testing register, PrEP register, and Client Management Information System (CMIS) were analysed. Uptake and retention were measured during COVID-19 (March 2020–March 2021) and post-COVID-19 (April 2021–April 2022).

Results: Of 5286 clients, 45% (n = 2380) initiated PrEP during COVID-19, while 55% (n = 2906) initiated post-COVID-19 period. Facility 3 (Raleigh Fitkin Memorial Hospital) had the highest initiations during COVID-19 (844), while Facility 5 had the lowest (7). Retention rates were lower among clients aged 15–29 years. Females initially demonstrated higher odds of retention (OR: 1.50), though this association became statistically insignificant after adjusting for confounders. Clients initiated post-COVID-19 had higher retention odds (OR: 2.96).

Conclusion: COVID-19 impacted PrEP uptake in Eswatini, emphasising the need for flexible healthcare delivery. Targeted campaigns and tailored interventions are crucial for sustaining HIV prevention efforts and addressing demographic shifts.

This study highlights the importance of responsive healthcare systems and tailored approaches to maintaining HIV prevention during public health crises.

Keywords

Primary care; HIV; Pre-exposure prophylaxis; COVID-19; Eswatini; retention; Pandemic; Public health; Prevention

Introduction

Oral pre-exposure prophylaxis (PrEP) is the use of antiretroviral medication by individuals who are human immunodeficiency virus (HIV)-negative to reduce the risk of acquiring HIV [1,2]. The World Health Organization (WHO) [3] recommends that people at high risk of contracting HIV be offered antiretroviral medication, as an additional option, as part of comprehensive HIV prevention [2]. The 2019 UNAIDS Global AIDS Update reported that, globally, there were an estimated 37.9 million (32.7 - 44.0 million) people living with HIV, with 1.7 million (1.4 - 2.3 million) new infections and 770 000 (570 000 to 1.1 million) acquired immunodeficiency syndrome (AIDS)-related deaths in 2018 [4]. Compared to 2010, HIV incidence at the global level has declined by 16%, whereas estimates of AIDS-related deaths have dropped by 33%; the latter is largely attributable to treatment scale-up [5]. Despite declining HIV incidence, the global HIV pandemic continues to burden the world, with new infections exceeding the projected 500,000 annually [5]. The 2019 UNAIDS report showed that gains in reducing HIV deaths and curtailing new infections in Eastern and Southern Africa were driving global progress around 2018 [5].

Comprehensive HIV prevention efforts are required to achieve HIV epidemic control. Globally, various prevention interventions to reduce and stop the spread of HIV have been implemented, with oral PrEP being one of the interventions [1]. Pre-exposure prophylaxis, defined as the use of antiretroviral medication to prevent HIV acquisition among at-risk persons, is an effective HIV prevention method [6]. Pre-exposure prophylaxis programmes have slowly scaled up in some countries because of policy and accessibility barriers. In 2016, PrEP Watch reported that only nine countries had initiated approximately 100 000 persons on PrEP; four were in Africa: Ethiopia, Senegal, South Africa, and Zimbabwe [6]. Thus, the total number of people who have been enrolled on PrEP has fallen short of the UNAIDS goal of three million persons on PrEP by 2020 [6].

In Eswatini, oral PrEP was introduced in 2017, mainly targeted at populations at a higher risk of HIV acquisition [7]. Pre-exposure prophylaxis was introduced as part of the healthcare services provided for family planning, antenatal care, outpatients, and HIV testing sites [8]. In Eswatini, 28 575 people were enrolled in PrEP in 2021 [7]. In 2017, there were 415 new users. This number increased to 1278 new users in 2018, and 7809 new users in 2021 [7]. Since the programme's inception, uptake of oral PrEP has been substantial despite the associated stigma, such as concerns that others might assume users are HIV-positive and undergoing antiretroviral treatment [9].

Oral PrEP is highly effective in preventing HIV infection if used as directed. The roll-out of PrEP is expanding worldwide, including across sub-Saharan Africa [10]. In generalised epidemic settings, strategies are needed to identify and engage individuals who might benefit from HIV prevention services, including PrEP [11]. Pre-exposure-prophylaxis has been heralded for its potential to put people at risk of contracting HIV in control of preventing HIV infection. Significant strides made in HIV epidemic control, such as the scale-up of antiretroviral therapy, were threatened by the coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) [12].

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Numerous studies have documented significant changes in the usage of healthcare services during the COVID-19 pandemic because of measures such as lockdowns and stay-at-home orders implemented to curb the spread of the virus [13]. These COVID-19 restrictions negatively impacted healthcare service provision, particularly in areas severely affected by the pandemic.

A WHO survey reported that disruption to healthcare services was greatest among lower-income countries [14]. Many people could not access treatment and vaccinations that they desperately needed, such as cancer treatments that extended their lives [15]. Although there were disruptions in healthcare service provision, COVID-19 restrictions positively introduced and strengthened other healthcare services, such as telemedicine [12]. Concurrently, the pandemic may also have resulted in some people being spared unnecessary or inappropriate care, which has the potential to cause harm [14].

Eswatini has one of the highest HIV prevalence rates globally; 27% of adults are HIV-positive. The HIV and/or AIDS pandemic remains the country's most significant public health threat. To combat this, Eswatini has implemented various strategies, including antiretroviral therapy (ART) for HIV-positive individuals and PrEP for HIV-negative individuals [16,17]. This study aimed to describe the effects of COVID-19 on PrEP uptake and retention at selected health facilities in Eswatini.

Methods

This study was conducted in five selected public health facilities in Eswatini. Eswatini, a lower middle-income country in Southern Africa with a population of about 1.1 million, is landlocked by South Africa and Mozambique [2]. The country is divided into four regions: Hhohho, Manzini, Shiselweni, and Lubombo. Manzini, the industrial hub, is the most populous region with approximately 355 945 residents, and this region attracts youth from the other regions for employment and education. The selected facilities are in the Manzini region [18]. The facilities were selected through a non-probability sampling method in which a regional referral facility (facility 5) was chosen together with its baby clinics where PrEP was piloted and scaled up. Table 1 describes the characteristics of the selected facilities.

An analytical cross-sectional study design with a quantitative approach was utilised to ascertain PrEP uptake and retention during (March 2020–March 2021) and after (April 2021–April 2022) COVID-19. Pre-exposure prophylaxis uptake and retention were reviewed during these two time points. The dependent variable was PrEP uptake and retention rate, and COVID-19 was the exposure or independent variable. Routinely collected programme data on PrEP uptake and retention in care were extracted from the electronic medical records (the client management information system [CMIS]) and registers in the selected facilities. The five facilities were selected for the study because they have high patient volumes.

Table 1: Facility characteristics.

Name of facility	Characteristics of facility	Region
Facility 1	A public health facility located in a densely populated township next to a regional referral hospital	Manzini
Facility 2	An ART facility in the Manzini town city centre	Manzini
Facility 3	A clinic located in a highly populated area next to a university	Manzini
Facility 4	A public health facility located in the industrial hub of the country. This facility has flexi-hours and male friendly.	Manzini
Facility 5	A referral hospital located at the centre of the region.	Manzini

The study population included clients who accessed HIV testing services at these selected facilities. Participants who tested negative for HIV and started PrEP between March 2020 and March 2021 during COVID-19 and April 2021 and April 2022 after COVID-19 were included in the study. Eligible clients included individuals aged 16 years and older, as well as sexually active mature minors under 16, prescribed PrEP in accordance with the Eswatini Integrated HIV Management Guidelines [7]. Clients eligible for PrEP in Eswatini must have no contraindications to tenofovir disoproxil fumarate (TDF) plus lamivudine (3TC), no signs of acute HIV infection (AHI), be willing to adhere to PrEP visits, have a body weight over 30 kg, and a creatinine clearance above 60 mL/min [7]. In addition, Clients registered as belonging to the selected facilities, that is not visiting the facilities to refill PrEP are also eligible. However, clients excluded were those who were started on PrEP in other facilities and transferring in from other facilities.

Data analysis

Data was analyzed using STATA version 18. Socio-demographic characteristics of PrEP Clients were summarized using descriptive statistics, with means and standard deviations reported for normally distributed numerical variables such as age. Multinomial logistic regression was employed to determine factors associated with PrEP initiation during and after COVID-19 and also to determine factors associated with PrEP retention which was the main objective of the study. Assumptions for multinomial logistic regression were thoroughly checked, including linearity of logits, independence of irrelevant alternatives using the Hausman-McFadden test, and multicollinearity using Variance Inflation Factor (VIF). Univariable analysis was initially conducted, including all variables with a p-value below 0.25, followed by a manual backward elimination stepwise procedure to exclude variables with p-values exceeding 0.05. Crude and adjusted odds ratios, 95% confidence intervals, and p-values were calculated for each independent variable.

Ethical considerations

Ethical clearance to conduct this study was obtained from the University of the Western Cape Faculty of Community and Health Science Biomedical Ethics Research Committee (No. BM22/10/2).

Results

The result section outlines the sociodemographic factors of PrEP clients in Eswatini, followed by the comparison of factors associated with PrEP initiation during, and after the COVID-19 periods. Thereafter the factors associated with PrEP retention in Eswatini were also outlined.

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Socio-demographic factors of PrEP clients in Eswatini

A total of 5286 client records were analyzed. Out of the 5,286 individuals initiating PrEP, 45% (n = 2380) of clients were during COVID-19 while 55% (n = 2906) were after COVID-19. Facility 3 had the highest initiations (844) while Facility 5 had the least PrEP initiations (7) during the COVID-19 pandemic. However, post-COVID-19, Facility 1 had the highest PrEP initiations 1634, while Facility 5 had the least PrEP initiations (30).

Most of the clients who initiated PrEP during COVID-19 were aged between 30-39 years (59.0%; n = 850), while those aged between 15-19 years were the least (25.5%; n = 152). Among the clients who initiated PrEP after COVID, most were aged 20-24 years (71.5%, n = 959), while those aged 40 years and above were the least (26.3%; n = 191). More female (61.6%, n = 1634) than male clients were initiated on PrEP during COVID-19. After COVID-19, the proportion of females initiated on PrEP increased from 40.1% (n = 1634) to 59.9% (n = 2441). For males, 61.6% (n = 746) were initiated during COVID-19, with a decrease to 38.4% (n = 465) after COVID-19. Seventy-point seven percent (70.7%; n = 198) of high-risk males (30-34 years) were initiated during COVID-19 but this proportion reduced to 29.3% (n = 82) after COVID. First initiations were the most common, representing 1918 (88.2%) of initiations during COVID-19 and 2361 (95.6%) after COVID-19 (Table 2).

Factors associated with PrEP initiation during the COVID as compared to after COVID-19

Out of the 5,286 clients included in the study, 45% (n = 2,380) were initiated on PrEP during the COVID-19 period while 55% (n = 2906) were initiated after COVID-19. Compared to Facility 1, Facility 2 (aOR: 2.58, 95% CI: 2.09 to 3.18, p < 0.001) and Facility 3 (aOR: 1.95, 95% CI: 1.70 to 2.25, p < 0.001) had higher odds of initiating clients on PrEP during COVID-19. Individuals aged 25-29 (aOR: 1.55, 95% CI: 1.23 to 1.96, p < 0.001), 30-39 (aOR: 3.29, 95% CI: 2.61 to 4.13, p < 0.001), and 40 years and above (aOR: 6.36, 95% CI: 4.80 to 8.44, p < 0.001) had significantly higher odds of starting PrEP during COVID. Males had 2.40 times higher odds of initiating PrEP during COVID (OR: 2.40, 95% CI: 2.10 to 2.73, p < 0.001) compared to the females; however, the association was not significant after adjusting for potential confounders (Table 3).

Factors associated with retention on PrEP medication among clients in Eswatini

A total of 5,286 were included in the study, 61% (n = 3,241) were adhering to PrEP medication. Compared to Facility 2, Facility 1, Facility 3 and Facility 5 had higher odds patients who returned to PrEP treatment, Facility 1 (aOR: 1.92, 95% CI: 1.58 to 2.34, p < 0.001), Facility 3 (aOR: 2.02, 95% CI: 1.66 to 2.47, p < 0.001) and Facility 5 (aOR: 2.71, 95% CI: 1.18 to 6.23, p = 0.019). Compared to those aged 40 years and above, clients who are aged 15-19 years, 20-24 years, and 25-29 years, had lower odds of retention to PrEP medication. Regarding gender, females had higher odds of retention in PrEP medication (OR: 1.50, 95% CI: 1.32 to 1.71, p < 0.001) compared to males; however, the association was no longer statistically significant after adjusting for potential confounders.

Table 2: Demographic characteristics of the clients (N=5286).

Variables	PrEP INITIATION PERIOD		N (%)
	During COVID (n=2380: 45%)	After COVID (n=2906: 55%)	
Facility Name			
Facility 1	767 (31.9%)	1634 (68.1%)	2,401 (100%)
Facility 2	511 (63.6%)	292 (36.4%)	803 (100%)
Facility 3	844 (48.4%)	901 (51.6%)	1745(100%)
Facility 4	251 (86.7%)	49 (16.3%)	300 (100%)
Facility 5	7 (18.9%)	30 (81.1%)	37 (100%)
Total	2,380 (45.0%)	2,906 (55.0%)	5,286 (100.0%)
Age Group (years)			
15 – 19 years	152 (25.5%)	445 (75.5%)	597 (100%)
20 – 24 years	383 (28.5%)	959 (71.5%)	1342 (100%)
25 – 29 years	460 (39.0%)	720 (61.0%)	1180 (100%)
30 – 39 years	850 (59.9%)	591(41.0%)	1441 (100%)
40 years and above	535 (73.7%)	191(26.3%)	726 (100%)
Total	2,380 (45.0%)	2,906 (55.0%)	5,286 (100%)
Gender			
Female	1634 (40.1%)	2441 (59.9%)	4075(100%)
Male	746 (61.6%)	465 (38.4%)	1211 (100%)
Total	2,380 (45.0%)	2,906 (55.0%)	5,286 (100%)
Population type			
High-risk males (30-34 years)	198 (70.7%)	82 (29.3%)	280 (100%)
Adolescent girls and young women (16-24 years)	435 (26.0%)	1237 (74.0%)	1672 (100%)
Total	633 (32.4%)	1,319 (67.6%)	1,952 (100.0%)
Initiation type			
First Initiation	1918 (44.8%)	2361 (55.2%)	4279 (100%)
Restart less than 12 months	299 (79.3%)	78 (20.7%)	377 (100%)
Restart after 12 months	38 (79.2%)	10 (20.8%)	48 (100%)
Transfer In	125 (85.0%)	22 (15.0%)	147 (100%)
Total	2,380 (49.1%)	2,471 (50.9%)	4,851 (100.0%)

PrEP, pre-exposure prophylaxis; COVID-19, coronavirus disease 2019. †, (n = 2380: 45%); ‡, (n = 2380: 45%).

Patients who initiated PrEP after the COVID period had higher odds of retention in PrEP medication (aOR: 2.96, 95% CI: 2.58 to 3.39, p) compared to those that were initiated during the COVID period; even after adjusting for potential confounders the association remained statistically significant, clients who were initiated after COVID period had higher odds of adhering to PrEP medication (aOR: 2.96, 95% CI: 2.58 to 3.39, p < 0.001) compared to those that were initiated during COVID period (Table 4).

Discussion

In this study, we found that PrEP uptake was generally low during the COVID-19 period because there were many interruptions in people's movement because of travel restrictions.

During the COVID-19 period, we can see that most initiations were from the ages 30 – 39, which is the group with the highest prevalence in the country according to the Population-based HIV Impact Assessment (PHIA) project (2021) [18]. One of the reasons that might have caused this group to have a high number of initiations may be the fact that the group is sort of free from parental guidance.

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Table 3: Factors associated with the PrEP initiation period among the clients.

Variables	PrEP Initiation Period	Bivariate analysis		Multiple logistic	
	During COVID 2,380 (45%)	COR [95%CI]	P value	aOR (95%CI)	P value
Facility Name					
Facility 1	767 (32.0%)	Ref	-		
Facility 2	511 (63.4%)	3.73 [3.15-4.41]	<0.001	2.58(2.09-3.18)	<0.001
Facility 3	844 (48.4%)	2.00 [1.76-2.27]	<0.001	1.95 (1.70-2.25)	<0.001
Facility 4	251 (83.7%)	10.91 [7.94-15.00]	<0.001	-	
Facility 5	7 (18.9%)	0.50 [0.22-1.14]	0.098	-	
Age Category					
15 – 19 years	152 (25.5%)	Ref	-		
20 – 24 years	383 (28.5%)	1.17 [0.94-1.46]	0.162	-	
25 – 29 years	460 (39.0%)	1.87 [1.50-2.33]	<0.001	1.55 (1.23-1.96)	<0.001
30 – 39 years	850 (59.0%)	4.21 [3.41-5.20]	<0.001	3.29 (2.61-4.13)	<0.001
40 years and above	535 (73.7%)	8.20 [6.40-10.50]	<0.001	6.36 (4.80-8.44)	<0.001
Gender					
Female	1634 (40.1%)	Ref	-		
Male	746 (61.6%)	2.40 [2.10-2.73]	<0.001		
Population type					
Adolescent girls and young women (16-24 years)	435 (26.0%)	Ref	-		
High-risk males (30-34 years)	198 (70.7%)	6.87 [5.19-9.08]	<0.001		
Initiation type					
First Initiation	1918 (44.8%)	Ref	-		
Restart less than 12 months	299 (79.3%)	4.72 [3.65-6.10]	<0.001	2.68 (2.02-3.57)	<0.001
Restart after 12 months	38 (79.2%)	4.68 [2.32-9.41]	<0.001		
Transfer In	125 (85.0%)	6.99 [4.43-11.05]	<0.001	3.12 (1.92-5.08)	<0.001

PrEP, pre-exposure prophylaxis; COR, Crude Odds Ratio; aOR, adjusted Odds Ratio; Ref, reference group. †, During COVID-19: 2380 (45%).

Table 4: Factors associated with PrEP retention among Clients in Eswatini.

Variables	Retention Status	Bivariate		Multiple logistic	
	Retained in PrEP 3,241 (61.3%)	COR [95%CI]	P value	aOR (95%CI)	P value
Facility Name					
Facility 2	395 (49.2%)	Ref	-		
Facility 1	1,579 (65.8%)	1.98 [1.69-2.33]	<0.001	1.92 (1.58-2.34)	<0.001
Facility 3	1,104 (63.3%)	1.77 [1.50-2.11]	<0.001	2.02 (1.66-2.47)	<0.001
Facility 4	135 (45.0%)	0.85 [0.65-1.10]	0.215	1.04 (0.77-1.41)	0.791
Facility 5	28 (75.7%)	3.21 [1.50-6.90]	0.003	2.71 (1.18-6.23)	0.019
Age Category					
40 years and above	421 (58.0%)	Ref	-		
15 – 19 years	379 (63.5%)	1.26 [1.01-1.57]	0.042	0.59 (0.45-0.77)	<0.001
20 – 24 years	863 (64.3%)	1.31 [1.08-1.57]	0.005	0.64 (0.51-0.80)	<0.001
25 – 29 years	736 (62.4%)	1.20 [0.99-1.45]	0.057	0.71 (0.57-0.88)	0.002
30 – 39 years	842 (58.4%)	1.02 [0.85-1.22]	0.844		
Gender					
Male	651 (22.9%)	Ref	-		
Female	2,590 (77.1%)	1.50 [1.32-1.71]	<0.001		
COVID period					
During COVID	1,134 (47.7%)	Ref			
After COVID	2,107 (72.5%)	2.90 [2.58-3.25]	<0.001	2.96 (2.58-3.39)	<0.001
Population type					
High-risk males (30-34 years)	147 (52.5%)	Ref	-		
Adolescent girls and young women (16-24 years)	1,082 (64.7%)	1.66 [1.29-2.14]	<0.001		
Initiation type					
Transfer In	76 (51.7%)	Ref	-		
First Initiation	2,624 (61.3%)	1.48 [1.07-2.06]	0.019		
Restart less than 12 months	204 (54.1%)	1.10 [0.75-1.61]	0.619		
Restart after 12 months	28 (58.3%)	1.31 [0.68-2.53]	0.424		

PrEP, pre-exposure prophylaxis; COR, Crude Odds Ratio; aOR, adjusted Odds Ratio; Ref, Reference group. †, Retained in PrEP 3241 (61.3%).

The study also indicates that the highest number of initiations in the facilities was reported in Facility 3 with 32% of initiations. One may think that the facility is a bit rural and situated next to a university campus, surrounding farms, and huge factories. On the other hand, the high initiation in the rural areas shows the level of compliance with the travel restrictions as towns were guarded by the army and police.

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There was a change during the COVID-19 pandemic as there were high initiations in Facility 1 [16]. This facility is closer to town and is in a semi-urban place where low-income earners reside. It was also observed that there was a 15.3% increase in initiations among females, while a 13.3% decrease among males after COVID-19. With the results of this study, we can concur with what Hartnett, et al. [15] stated that major changes in the utilisation of healthcare services occurred during the COVID-19 period. They further mention that the lockdowns and stay-at-home orders were forcing low uptake of healthcare services. We also see a reduction in services uptake during the period in the study.

On the other hand, Kerzner, et al. [7] showed a significant increase in PrEP uptake [6]. The study reported that innovative actions such as PrEP campaigns, development, and distribution of COVID-19 PrEP information and virtual engagements resulted in increased uptake of PrEP services during the COVID-19 period in countries such as Kenya (52.2% increase), Uganda (142.2% increase) and South Africa (201.6% increase).6 This was because of concerted efforts of the government and implementing partners during the COVID-19 pandemic, which yielded tangible results. Kerzner's study indicates that although there was an increase in PrEP initiations (uptake), the countries experienced a decline in new PrEP users (first-time initiations), especially in countries such as the Dominican Republic (8.6%), Lesotho (5.2%), Thailand (11.3%), and Ukraine (14.4%) [6]. Such results show that the clients who were initiated in the COVID-19 period were re-initiations, people who have the information and used the prophylaxis before. Most countries supported by the US President's Emergency Plan for AIDS Relief (PEPFAR) adapted well during the COVID-19 pandemic in those in the continuity of HIV services provision; however, other countries lagged [17].

Limitations

Inadequate documentation of PrEP uptake and continuation before COVID-19 is a potential limitation. Pre-exposure prophylaxis rollout began in Eswatini in 2018 and COVID-19 started in 2019, during the service scaling-up phase. The low number of facilities offering PrEP at the pandemic's onset likely affected the numbers. During COVID-19, a significant increase in PrEP initiation among female clients was observed, which continued post-COVID-19 period. Factors contributing to this rise included scaling up PrEP to all HIV-negative pregnant women attending antenatal care (ANC) and improved marketing efforts.

Strengths

The employment of purposive sampling in this study allowed for selection of facilities that are most relevant for the study. The facilities were the ones where PrEP was piloted in the country and are also located in centrally in the country which is the industrial hub with the highest population compared to the other regions. Quantitative research has given evidence of the trends in which clients were initiating in PrEP and outlined the retention in the selected facilities. This study has outlines performances of facilities offering the service which will enable improvements.

Conclusion

This study concludes that COVID-19 significantly influenced the uptake and retention of PrEP services in Eswatini. The pandemic disrupted both the initiation and continuity of these services. The findings provide critical insights for PrEP programme planning and positioning in response to pandemics, underscoring the necessity for flexible and innovative healthcare delivery approaches, such as targeted campaigns, to mitigate service disruptions during public health crises. In addition, the study highlights the need for tailored interventions to address changing PrEP uptake patterns across different demographic groups and acknowledges the potential for re-initiations among previously exposed individuals. These results emphasise the importance of maintaining continuity in HIV prevention efforts amid broader public health challenges, showcasing the essential role of responsive healthcare systems in safeguarding community health and well-being.

The observed decrease in PrEP uptake among men post-COVID-19 suggests the need for expanding PrEP options. Other countries have implemented Event-Driven PrEP (ED PrEP), where men take PrEP only when anticipating exposure to HIV. Eswatini should consider investigating this option to enhance prevention, particularly among men. The study found that females had higher odds of adhering to PrEP medication (OR: 1.50, 95% CI: 1.32 - 1.71) compared to males. Enhancing and diversifying PrEP options for men could significantly improve HIV prevention in the country.

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors contribution

M.G. was responsible for conceptualisation, methodology, formal analysis, data collection, and writing of drafts. R.C. and N.N. were responsible for conceptualisation, methodology, resources, review of drafts, and administration.

Data availability

The authors confirm that the data supporting the findings of this study are available within the article.

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CHAPTER 5:

5. Discussion

5.1. Introduction

Comprehensive HIV prevention efforts are required to achieve HIV epidemic control, PrEP is an effective tool to be used before or for ongoing exposure among at-risk persons [5]. In the current study, low uptake of PrEP especially during COVID-19 was an indication of a high risk of HIV transmission in a country with such a high incidence of HIV. COVID-19 interrupted the uptake of services which was observed where a public health facility had higher numbers of initiations than big, high-volume facilities.

5.2. Discussion

The findings underscore the profound impact of the COVID-19 pandemic on healthcare service delivery, particularly in HIV prevention through PrEP. The disruptions caused by lockdowns and movement restrictions led to decreased healthcare access, which was reflected in the lower uptake rates during the pandemic.

The findings also highlight a significant drop in the utilization of services in the COVID-19 era as it was outlined in Adelekan study in 2021 [68]. Routine health care services were affected in the period as some services like TB, were deprioritized. Sigh, et al. attested that in Nepal health services utilization declined during the COVID-19 period. The researcher mentioned that the decline was exacerbated by health services unavailability for months. Repurposing staff to departments fighting to combat the spread of the virus left other services having reduced functionality. There were awareness campaigns, and screening of people in public and private places, which required a lot of health care workers. Sigh also mentioned that the fear caused by deaths and sickness caused by the disease contributed to people not accessing services in public hospitals. Similarly, that can be attributed to Eswatini, as indicated by the level of health services utilization during the pandemic.

The analysis revealed notable demographic changes between the two periods.

5.2.1. Demographic shifts: The demographic analysis indicates a shift in the profile of PrEP clients, with older age groups showing higher initiation rates during the pandemic. This could be attributed to the relative independence of this age group from parental guidance, allowing them to seek services despite restrictions. The travel restrictions instituted had an impact on the utilization of services, especially for young people.

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In this study, we found out that PrEP uptake was generally low during the COVID-19 period since there were many interruptions in people's movement due to travel restrictions. During the COVID-19 period, we can see that most initiations were from the ages 30 - 39 which is the group with the highest prevalence in the country, as reported by the PHIA (2021) and Nkambule, et al. [74]. One of the reasons that might have caused this group to have a high number of initiations may be the fact that the group is sort of free from parental guidance.

Following the analysis of demographic patterns, facility-level performance trends are considered below

5.2.2. Facility performance: The variation in initiation rates across facilities suggests that location and accessibility played crucial roles. Facilities closer to urban areas or those with flexible hours may have been better positioned to serve clients during the pandemic. The study also indicates that the highest number of initiations in the facilities was Luyengo Clinic with 32% of initiations. One may think that the facility is a bit rural and situated next to a university campus, surrounding farms, and huge factories. On the other hand, the high initiation in the rural areas shows the level of compliance with the travel restrictions as towns were guarded by the Army and Police. Main cities have referral hospitals and have limited access for clients coming to access health services during the period of the pandemic. The facilities in the semi-urban areas had to carry the burden of clients deterred from the entering the big facilities. This was evident in the number of PrEP initiations in the facilities in those areas.

There was a change during the COVID-19 pandemic as there were high initiations King Sobhuza II PHU [15]. This facility is closer to town and is in a semi-urban place where low-income earners reside. It was also noted that there was a 15.3% increase in initiations among females whilst a 13.3% decrease among males after COVID-19.

With the results of this study, we can concur with what Hartnett et al, 2020 stated that major changes in the utilization of healthcare services occurred during the COVID-19 period [14]. They further mention that the lockdowns and stay-at-home orders were forcing low uptake of healthcare services. We also see a reduction in services uptake during the period in the study.

On the other hand, Kerzner et al., 2022 showed a significant increase in PrEP uptake [5]. The study reported that innovative actions like PrEP campaigns, development, and distribution of Covid PrEP information and virtual engagements resulted in increased uptake of PrEP services during the COVID-19 period in countries like Kenya (52.2% increase), Uganda (142.2% increase) and South Africa (201.6% increase) [5]. This was because of concerted efforts of the government and implementing partners during the COVID-19 pandemic yielded tangible results. Kerzner's study indicates that though there was an increase in PrEP initiations (uptake), the countries experienced a decline in new PrEP users (first-time initiations). Especially in countries like the Dominican Republic (8.6%), Lesotho (5.2%), Thailand (11.3%), Ukraine (14.4%) [5]. Such results show that the clients who were initiated in the Covid period were re-initiations, people who have the information and used the prophylaxis before. Most countries supported by PEPFAR adapted well during the Covid-19 pandemic in those in continuity of HIV services provision, however, other countries lagged [75-98].

5.2.3. Post-COVID-19 period recovery: The significant increase in retention rates for clients initiated after the pandemic suggests a recovery phase where healthcare systems adapted to new norms. This points to the potential for innovative healthcare delivery models, such as telehealth and community-based services, to enhance access and adherence. Prevention services were made accessible in this period to clients at convenient places. The innovative models, including the differentiated service delivery models adopted in this period, enhanced the increase in uptake and retention in the service. Multi-month dispensing (3 months) was welcomed well by clients as evidenced in the post-COVID-19 period where it reduced the frequency of clinic visits.

CHAPTER 6

6. Conclusion and recommendations

6.1. Conclusion

This study concludes that COVID-19 significantly influenced the uptake and retention of PrEP services in Eswatini. The pandemic disrupted both the initiation and continuity of these services. The findings provide critical insights for PrEP program planning and positioning in response to pandemics, underscoring the necessity for flexible and innovative healthcare delivery approaches, such as targeted campaigns, to mitigate service disruptions during public health crises. Additionally, the study highlights the need for tailored interventions to address changing PrEP uptake patterns across different demographic groups and acknowledges the potential for re-initiations among previously exposed individuals. These results emphasize the importance of maintaining continuity in HIV prevention efforts amidst broader public health challenges, showcasing the essential role of responsive healthcare systems in safeguarding community health and well-being.

The lower retention rates among younger clients highlight a critical area for intervention. Tailored strategies are needed to engage this demographic, possibly through targeted outreach and education campaigns. As PrEP has been implemented, it is still not finding rhythm in terms of information about it getting to intended audiences. Outreach services to strategic areas with high numbers of Adolescent Girls and Young Women (AGYW) are present. The country could also use the data generated from Recency surveillance to map up areas with high new infections. Targeting such areas has a potential to combat HIV by initiating all clients at risk of contracting HIV on PrEP and those infected with the virus initiated on ART and thereby using ART as prevention.

The observed decrease in PrEP uptake among men post-COVID-19 suggests the need for expanding PrEP options. Other countries have implemented Event-Driven PrEP (ED PrEP),

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where men take PrEP only when anticipating exposure to HIV. Eswatini should consider investigating this option to enhance prevention, particularly among men. The study found that females had higher odds of adhering to PrEP medication (OR: 1.50, 95% CI: 1.32 to 1.71) compared to males. Enhancing and diversifying PrEP options for men could significantly improve HIV prevention in the country.

In conclusion, while the COVID-19 pandemic posed significant challenges to PrEP uptake and retention in Eswatini, the findings also highlight opportunities for strengthening HIV prevention strategies through responsive healthcare systems and targeted interventions. The study serves as a crucial reminder of the importance of maintaining continuity in HIV prevention efforts amidst broader public health challenges.

6.2. Limitations

Inadequate documentation of PrEP uptake and continuation before COVID-19 is a potential limitation. PrEP rollout began in Eswatini in 2018, and COVID-19 started in 2019, during the service scaling-up phase. The low number of facilities offering PrEP at the pandemic's onset likely affected the numbers. During COVID-19, a significant increase in PrEP initiation among female clients was observed, which continued post-COVID-19 period. Factors contributing to this rise included scaling up PrEP to all HIV-negative pregnant women attending ANC and improved marketing efforts.

In addition, the low numbers of PrEP clients during the COVID-19 period led to the use of purposive sampling which affects the generalization of results, which is one of the limitations of the study.

6.3. Recommendations

The country needs to be more vigilant and set up systems to ensure that there is no interruption in services given to the people. Even though Eswatini is nearing epidemic control, it is evident that there are still new infections among Adolescent Girls and Young Women (AGYW), and men, especially in ages 25 – 34. This indicates that preventive measures like PrEP should be demedicalized. Increased access to such interventions, making it available at the convenience of clients, especially in private Pharmacies could help a lot.

The findings of this study should inform the programming of HIV prevention, not just PrEP but the whole cascade of prevention commodities including post-exposure prophylaxis (PEP), Condoms, Voluntary Medical Male Circumcision (VMMC), etc. Additionally, biomedical interventions are also necessary to inform behavior change among the populations at risk of acquiring HIV. Having the above would result in increased uptake of the service and improve retention in the prevention packages.

The study emphasizes the need for adaptive and resilient healthcare strategies that can adapt to crises. Implementing targeted campaigns and diversifying PrEP options, such as Event-Driven PrEP for men, could improve uptake and retention, particularly in populations that have shown decreased engagement.

6.4. Recommendations for future research

Further recommended research relating to this study should include the assessment of:

Preferences of men, key populations, and AGYWs on the different options of PrEP in Eswatini.

The acceptability and feasibility of the use of the PrEP Dapivirine ring among women of childbearing age in Eswatini.

These studies will provide further information to improve the knowledge about PrEP rollout in the country and recommendations for improvement.

List of definitions

Retention in care: In a general sense, retention in care is defined as a patient's regular engagement with medical care at a healthcare facility after initial entry into HIV clinical care.

Antiretroviral therapy: Treatment of people infected with human immunodeficiency virus using anti-HIV drugs.

Pre-Exposure Prophylaxis: ARVs taken to prevent getting HIV.

Post Exposure Prophylaxis: ARV regimen taken within 72 hours (3 days) after a possible exposure to HIV to prevent HIV.

Pandemic: A widespread occurrence of an infectious disease over a whole country or the world at a particular time.

Lockdown: A state or period in which movement within or access to an area is restricted in the interests of public safety or health.

Social distancing: In public health, social distancing, also called physical distancing, is a set of non-pharmaceutical interventions or measures intended to prevent the spread of a contagious disease by maintaining a physical distance between people and reducing the number of times people come into close contact with each other.

HIV prevention: Several methods and interventions have proved highly effective in reducing the risk of, and protecting against, HIV infection, including male and female condoms, the use of antiretroviral medicines as pre-exposure prophylaxis (PrEP), voluntary male medical circumcision (VMMC), behavior change interventions to reduce acquisition of HIV.

Services uptake: The actual use of a service by the people for whom it is intended, e.g. people claiming benefits or assistance to which they are entitled.

HIV Incidence: The estimated number of new HIV infections during a specified period (such as a year), which is different from the number of people diagnosed with HIV during a given year.

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HIV prevalence: Percentage of people living with HIV. Prevalence measures the frequency of existing disease in a defined population at a specific time.

Outbreak: When more people get sick from a particular disease than what would normally be expected, it's called a disease outbreak. Disease outbreaks are caused by bacteria, viruses or other organisms such as parasites.

Substantial risk: A strong possibility, as contrasted with a remote or significant possibility, that a certain result may occur or that certain circumstances may exist.

Seroconversion: A general term for the time between exposure to a virus and when antibodies show up in your blood.

ART initiation: Immediate antiretroviral therapy means starting HIV treatment as soon as possible after the diagnosis of HIV infection, preferably on the first clinic visit (and even on the same day as the HIV diagnosis). This strategy also is known as "rapid ART," "same-day ART," and "treatment upon diagnosis."

Declaration

I declare that this thesis that I now submit for assessment on the program of study leading to the degree Master of Science in Public Health has not been submitted for the purpose of a degree at this or any other higher education institution. It is entirely my own work and has not been taken from the work of others save to the extent that such work has been cited and acknowledged within the text of this work.

I agree to deposit this thesis in the University of Western Cape's library and Healthcare-Learning's institutional repository and or allow these institutions to do so on my behalf, subject to South African and British Copyright Legislation and the University of Western Cape's conditions of use and acknowledgement.

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ANNEXURES

Annexure A: Data collection tool

Annexure B: Facility request letter

Annexure C: Research Approval letter (UWC)

Annexure D: Research Approval Certificate (Eswatini)

Annexure E: Manuscript pdf

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