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Safeguarding strategies and current HIV treatment in the UK

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Abstract

Objectives: This study aims to illuminate contemporary strategies and treatment approaches employed in the United Kingdom (UK) to safeguard against Human Immunodeficiency Virus (HIV) transmission and enhance the well-being of those grappling with Acquired Immune Deficiency Syndrome (AIDS). The review contributes to a comprehensive understanding of the nation's ongoing efforts in managing the impact of HIV on public health.

Material and Methods: Research, reports, guidelines, and official websites from 2005 to 2024 were searched from the Pubmed database and Bournemouth University's database. English resources were searched using keywords related to HIV risk measures, pre-exposure prophylaxis (PrEP), post-exposure prophylaxis (PEP), and anti-retroviral therapy (ART).

Results: HIV prevention efforts in the UK emphasize education, widespread testing, and targeted interventions. Strategies include promoting safe sex practices, regular testing, and condom use. HIV testing, PrEP, PEP and ART play crucial roles in prevention and treatment, with initiatives focusing on high-risk populations such as men who have sex with men (MSM) and transgender individuals. Challenges include regional variations, financial constraints, and social stigma.

Conclusions: A holistic and adaptable approach is essential in HIV prevention and treatment in the UK. Education, widespread testing, and tailored interventions for diverse populations are key components. Challenges such as financial constraints and social stigma require sustained efforts and global collaboration. Advancements in PrEP, PEP, and ART offer promising avenues for mitigating the impact of HIV, emphasizing the importance of accessibility and adherence.

Keywords: AIDS; HIV; Pre-exposure prophylaxis; Post-exposure prophylaxis

1. Introduction

Human Immunodeficiency Virus (HIV), a member of the Retroviridae family with a single-stranded RNA structure, is known for inducing Acquired Immune Deficiency Syndrome (AIDS) by compromising the immune system. The HIV virus, which is transmitted through certain body fluids such as semen, vaginal fluids, breast milk and blood from an infected individual, does this by attacking CD4 cells, known as the body's immune system cells. Apart from instigating severe infections through immune suppression, HIV is implicated in cardiovascular and bone diseases, as well as liver and kidney dysfunction [1]. Despite reported success in HIV-related interventions diminishing disease-related morbidity and mortality [2], the UK Health Security Agency's report underscores AIDS as an enduring public health concern [3]. Due to the delayed manifestation of symptoms, addressing the complexity of the disease becomes challenging. Swift diagnosis post-HIV infection is crucial, as it facilitates early initiation of anti-retroviral therapy (ART), ensuring effective viral suppression and significantly reducing sexual transmission [4]. Recent advancements in HIV

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testing, treatment, and prevention, as highlighted by the World Health Organization (WHO), advocate immediate ART initiation for all individuals diagnosed with HIV, regardless of CD4 cell count [5]. WHO also endorses pre-exposure prophylaxis (PrEP) for those at high risk of HIV, underscoring the pivotal role of HIV testing. In the UK, accurate, rapid, and widespread screening for HIV becomes imperative for initiating ART, forming the backdrop for this study. This investigation aims to illuminate the contemporary strategies and treatment approaches employed in the UK to safeguard against HIV transmission and enhance the well-being of those grappling with AIDS, contributing to a comprehensive understanding of the nation's ongoing efforts in managing the impact of HIV on public health.

2. Material and Methods

In order to see past perspectives, research, reports, guidelines and official websites between 2005 and 2024 were searched from the Pubmed database and the database allowed by Bournemouth University to its members. English resources were searched with the keywords "AIDS", "HIV", "Pre-Exposure Prophylaxis" and "Post-Exposure Prophylaxis". In order to be up to date, 35 studies from the last 10 years were found to be relevant to the criteria of the subject and were included in the study. Non-full text data and unofficial sources were excluded from the study. In this article, HIV transmission prevention efforts and treatment approaches in England were investigated.

3. HIV Risk Reduction Measures

Comprehending and addressing the transmission of HIV poses a complex challenge that demands a thorough and adaptable approach. Several studies emphasize the vital role of education in combating HIV, drawing parallels with lessons learned from the Covid-19 pandemic [6,7,8]. The National Institute for Health and Care Excellence (NICE) recognizes the significance of sex education in HIV prevention, highlighting safe sex practices, regular testing, and proper condom use [9]. However, the current guidelines lack specificity on implementing these measures, necessitating a more detailed approach that integrates protected sexual intercourse across various media outlets, social platforms, and educational institutions to effectively combat HIV transmission in the UK [10].

HIV can be diagnosed with a simple blood test that detects antibodies to the virus. Rapid HIV tests are also available, providing results in as little as 20 minutes. It's recommended that individuals at higher risk for HIV get tested regularly. Brown et al. argue that HIV testing and condom use are crucial steps in preventing the disease [11]. While the focus of health practitioners and policymakers is commendable, a more comprehensive approach to prevention, including pre-exposure prophylaxis, anti-retroviral therapy, and thorough blood transfusion controls, should be considered. Researchers advocate for extensive HIV screening in at-risk populations, emphasizing swift access to and compliance with anti-retroviral treatment [12,13]. However, it is essential to extend the screening approach to the entire population to avoid potential gaps in prevention efforts. Regional variations in testing rates, as highlighted by Rodger et al., reveal disparities in high-risk populations, particularly among those with lower education levels [14]. Gabriel et al. shed light on HIV testing among transgender individuals, stressing the need for widespread community-based screening to address the varied prevalence of the disease in society.

Despite the reported increase in HIV testing among men who have sex with men (MSM), testing levels among heterosexual men and women lag, possibly due to women being less likely offered testing or refusing the test [15]. Aghaizu et al. highlight the rising rate of undiagnosed HIV infections in London, primarily linked to unprotected anal intercourse among MSM [16]. This underscores the importance of a combined approach involving both behavioural and biological interventions to reduce transmission risks not only in London but throughout the UK.

Transcending demographics, HIV prevention efforts should concentrate on vulnerable groups, including the LGBTQ+ community, where civil society leaders and influencers play a pivotal role in raising awareness. Ragonnet-Cronin et al. point out the difficulty in characterizing British heterosexual men not disclosing homosexual behavior through traditional epidemiological approaches [17]. Tailoring awareness campaigns to eliminate discrimination and stigmatization, as demonstrated by Witzel et al., can encourage testing and research participation among transgender individuals [18].

The literature consistently advocates for increased awareness as a linchpin of HIV prevention. Advertising strategies, as highlighted by Knight et al., have proven effective in raising self-HIV testing awareness [19]. Additionally, involving patients in decision-making processes, as emphasized by Robinson and Lorenc, enhances the overall effectiveness of sexual, reproductive, and HIV services [20]. The challenge lies in implementing these strategies, requiring clear directives in guidelines regarding responsible parties, execution methods, and evaluation feedback.

While the UK has made strides in reducing HIV transmission, challenges persist, particularly in areas outside London where the number of people living with undiagnosed HIV is disproportionately high [21]. Financial constraints may hinder government support for HIV prevention and awareness programs, requiring a nuanced approach to allocate resources effectively. Calculating the lifetime cost of HIV per person, as highlighted by Ong et al. emphasizes the necessity of balancing treatment costs and prevention efforts, especially with the potential cost reduction associated with generic drugs [22].

Age-related disparities in HIV testing, as identified by Bell et al., underscore the need for tailored prevention strategies [23]. Overcoming barriers related to healthcare accessibility, insurance coverage, and insufficient healthcare workers, as indicated by Witzel and Ong, requires a concerted effort to prioritize prevention and address systemic issues [18,22]. The complex interplay of social stigma in healthcare settings, as explored by Namuleme, necessitates a commitment to non-discriminatory treatment and patient-focused healthcare practices [24]. In the context of mother-to-baby transmission, the National Institute for Health and Care Excellence (NICE) primarily recommends caesarean section without providing detailed information about breastfeeding and postnatal care [25]. There is a need for more extensive research focusing on newborn babies and mothers, recognizing their role as the next generation of the UK.

In conclusion, a holistic and adaptable approach is indispensable in the prevention of HIV in the UK. Education, widespread testing, and tailored interventions for diverse populations are key components. Overcoming challenges such as financial constraints, age-related disparities, and social stigma requires sustained efforts, global collaboration, and an unwavering commitment to prioritizing HIV prevention alongside treatment.

4. Treatment

4.1. Pre-Exposure Prophylaxis

Although there is no complete cure for HIV, the replication of the virus can be slowed down with pre- and post-exposure and antiretroviral therapy options [26]. PrEP represents a pivotal tool in curbing HIV transmission by impeding the virus's entry and replication within the body, contingent upon consistent adherence for optimal efficacy [26]. Recommended particularly for individuals in high-risk groups, such as those engaging in condomless sex within specific networks or with HIV-positive partners, PrEP offers accessible protection through NHS sexual health clinics [26,27]. While it doesn't guard against other sexually transmitted infections (STIs), its initial side effects usually diminish over time [27]. Daily PrEP usage is common, although some opt for on-demand intake for specific sexual encounters, ensuring maximum protection within a week of consistent use or shortly before and after anal sex. Tenofovir disoproxil and emtricitabine, commonly known as Truvada or its generic form, are frequently prescribed for PrEP, with Descovy, which contains tenofovir alafenamide and emtricitabine, known as "TAF PrEP, as another approved option [26]. Despite the FDA's approval of long-acting injectable PrEP, it remains unavailable in the UK, along with PrEP vaginal rings [26]. The PARTNER study affirmed that individuals adhering to effective treatment and maintaining an undetectable viral load cannot transmit HIV, corroborated by the PARTNER 2 study's findings of no transmissions in nearly 800 homosexual couples over 77,000 instances of condomless sex [28,29]. However, the Partners PrEP study highlighted a lingering transmission risk during the initial six months of treatment, attributed to the gradual decline of the HIV-positive partner's viral load [30]. Furthermore, large-scale investigations like IMPACT and the PROUD trial underscore PrEP's effectiveness, reporting significant reductions in HIV infections among users compared to non-users [31,32].

4.2. Post-Exposure Prophylaxis

In contrast, while there exists no cure for HIV, highly effective treatments are available, enabling individuals with the virus to lead a healthy and prolonged life. In instances where individuals suspect HIV exposure, post-exposure prophylaxis (PEP) medication serves as a crucial preventive measure, necessitating initiation within 72 hours of potential exposure, particularly following higher risk scenarios such as known positive sexual partners [27]. The current drug regimen for PEP consists of a sole pill containing tenofovir disoproxil/emtricitabine, commonly referred to as Truvada, accompanied by two tablets of raltegravir. This regimen involves daily intake of HIV medication for a month, albeit possibly entailing side effects. Accessing PEP is typically available at sexual health clinics, genitourinary medicine (GUM) clinics, or hospital accident and emergency (A&E) departments [26]. Moreover, for individuals already diagnosed with HIV, facilitating PEP for their sexual partners can be achieved through their HIV clinic. Subsequent to a positive HIV diagnosis, individuals undergo regular blood tests to monitor infection progression before treatment initiation, encompassing the HIV viral load test and CD4 lymphocyte cell count [27].

4.3. Anti-retroviral Therapy

The treatment approach involving ART is geared towards impeding viral replication, facilitating immune system restoration, and preventing further deterioration. While some HIV therapies are available in fixed-dose combinations, others may necessitate multiple daily pills. Monitoring treatment effectiveness through regular viral load assessments typically results in most individuals achieving an undetectable viral load within half a year of treatment commencement [26]. Nevertheless, as seen in Table 1, it's imperative to remain mindful of potential interactions between HIV medications and other drugs, including nasal sprays, herbal remedies, and recreational substances [33]. This emphasis on treatment initiation regardless of CD4 count is rooted in the insights garnered from the START study, which highlighted a markedly heightened risk of AIDS-related conditions such as cancers among individuals deferring treatment until their CD4 count reached 350. Conversely, interruptions in HIV treatment have been associated with an increased likelihood of illness, contrasting with the benefits of consistent therapy adherence elucidated by the SMART trial [34,35].

Table 1 Anti-retroviral drugs

Generic name	Trade name	Standard adult dose	Food requirements
Single-tablet regimens			
Bictegravir/ emtricitabine/tenofovir alafenamide	Biktarvy	One tablet once a day	Take with or without food
Darunavir/cobicistat/ emtricitabine/tenofovir alafenamide	Symtuza	One tablet once a day	Take with food
Dolutegravir/abacavir/lamivudine	Triumeq	One tablet once a day	Take with or without food
Dolutegravir/lamivudine	Dovato	One tablet once a day	Take with or without food
Dolutegravir/rilpivirine	Juluca	One tablet once a day	Take with a meal
Doravirine/lamivudine/tenofovir disoproxil	Delstrigo	One tablet once a day	Take with or without food
Elvitegravir/cobicistat/ emtricitabine/tenofovir alafenamide	Genvoya	One tablet once a day	Take with food
Elvitegravir/cobicistat/ emtricitabine/tenofovir disoproxil	Stribild	One tablet once a day	Take with food
Rilpivirine/ emtricitabine/tenofovir alafenamide	Odefsey	One tablet once a day	Take with food
Rilpivirine/ emtricitabine/tenofovir disoproxil	Eviplera	One tablet once a day	Take with food
Nucleoside/nucleotide reverse transcriptase inhibitors (NRTIs)			
Emtricitabine	Emtriva	200 mg once a day	Take with or without food
Lamivudine	-	150 mg twice a day or 300 mg once a day	Take with or without food
Tenofovir disoproxil	-	245 mg once a day	Take with food
NRTI fixed-dose combinations			
Abacavir/lamivudine	-	One tablet once a day	Take with or without food
Emtricitabine/tenofovir alafenamid	Descovy	One tablet once a day	Take with or without food

Emtricitabine/tenofovir disoproxil	-	One tablet once a day	Best taken with food
Integrase inhibitors			
Dolutegravir	Tivicay	50 mg once a day or 50 mg twice a day	Take with or without food
Raltegravir	Isentress	400 mg twice a day or two 600 mg tablets once a day	Take with or without food
Non-nucleoside reverse transcriptase inhibitors (NNRTIs)			
Doravirine	Pifeltro	100 mg once a day	Take with or without food
Efavirenz	-	600 mg once a day	Take on an empty stomach
Rilpivirine	Edurant	25 mg once a day	Take with a meal
Protease inhibitors			
Atazanavir	-	300 mg with 100 mg ritonavir once a day	Take with food
Atazanavir/ cobicistat	Evotaz	One tablet once a day	Take with food
Darunavir	-	800 mg with 100 mg ritonavir once a day or 600 mg with 100 mg ritonavir twice a day	Take with food
Darunavir/ cobicistat	Rezolsta	One tablet once a da	Take with food
Lopinavir/ritonavir	-	Two tablets twice a day or four tablets once a day	Swallow whole. Take with or without food
Entry and CCR5 inhibitors			
Fostemsavir	Rukobia	One tablet twice day	Take with or without food
Maraviroc	Celsentri	600 mg twice a day with efavirenz or etravirine	Take with or without food
Long-acting injectable treatment			
Cabotegravir and rilpivirine	Vocabria Rekambys	Month 1: two tablets once a day. † Month 2: two injections on the same day. Month 3: two injections. Every 2 months after that: two injections	Take with or without food
Lenacapavir	Sunlenca	2 weeks of tablets ^{††} followed by two subcutaneous injections every 6 months	Take with or without food
Booster drugs			
Cobicistat	Tybost	One tablet once a day	Take with food
Ritonavir	-	To 'boost' other PIs 100 – 200 mg once or twice a day	Take with food

[†] One tablet containing 30 mg of cabotegravir and one tablet containing 25 mg of rilpivirine, taken for one month before injections begin. ; ^{††}Two 300 mg tablets on days 1 and 2, one 300 mg tablet on day 8, taken before injections begin

5. Conclusion

In conclusion, the intricate landscape of HIV prevention and treatment in the UK demands a multifaceted and adaptable approach. The outlined prevention strategies underscore the vital importance of education, widespread testing, and targeted interventions tailored to diverse populations. Despite significant progress, challenges persist, particularly in addressing regional variations, financial constraints, and social stigma. Overcoming these hurdles necessitates

sustained efforts, collaborative partnerships, and a steadfast commitment to prioritizing HIV prevention alongside treatment initiatives. Regarding treatment, advancements in PrEP, PEP, and ART offer promising avenues for mitigating the impact of HIV. PrEP has emerged as a pivotal tool in curbing transmission, though challenges such as accessibility and adherence remain. PEP serves as a crucial preventive measure following potential exposure, highlighting the importance of timely intervention. Meanwhile, ART aims to impede viral replication and restore immune function, emphasizing the significance of consistent therapy adherence and regular monitoring.

Moving forward, addressing disparities in access to care, improving healthcare infrastructure, and fostering a supportive environment free of stigma are paramount. Additionally, ongoing research and innovation are essential to enhance prevention methods, optimize treatment outcomes, and ultimately work towards an HIV-free future. By combining scientific advancements with comprehensive public health strategies, the UK can continue to make strides in combating HIV and improving the well-being of affected individuals and communities. Through collective action and unwavering dedication, we can strive towards a world where HIV is no longer a public health threat.

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