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Addressing the Stigma and Size of Antiretroviral (ARV) Tablets: A Call for Innovation

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ABSTRACT

Purpose: This study investigates how antiretroviral (ARV) tablet size affects medication adherence, particularly in individuals with dysphagia, pediatric populations, and the elderly. It highlights the role of tablet size in influencing adherence and its broader impact on virological control, drug resistance, and HIV-related morbidity.

Research Method: This research employed a constructivist paradigm, conducting a scoping literature review to explore existing studies. Systematic inclusion and exclusion criteria were applied to select relevant sources. Thematic analysis identified key patterns and refined central themes to ensure analytical consistency regarding ARV tablet size and associated adherence barriers.

Results and Discussion: The review reveals that smaller tablets, particularly in dolutegravir-based regimens, significantly enhance adherence by reducing the physical difficulty of swallowing. However, the visibility of medication continues to contribute to stigma, potentially undermining adherence. Emerging innovations, such as mini-tablets, nanotechnology, and long-acting injectables, show promise; however, their cost and limited availability hinder widespread adoption in low-resource settings.

Implications: The findings suggest a need for patient-centred ARV formulations that reduce stigma and improve access. Policymakers and pharmaceutical stakeholders are encouraged to develop smaller, affordable ARV options to support better adherence and long-term treatment success.

Keywords: adherence; tablet size; hiv treatment; antiretroviral therapy; medication burden; stigma; drug formulation; long-acting injectables.

Introduction

Antiretroviral therapy (ART) has significantly transformed HIV from a fatal disease to a manageable chronic condition, with substantial reductions in morbidity and mortality rates (Oguntibeju, 2012; Rodés, Cadiñanos, Esteban-Cantos et al., 2022). Despite these advancements, medication-related barriers persist, particularly regarding pill burden and the size of ARV tablets (Salleh, Richardson, Kerr et al., 2018). Although not widely discussed in the literature, the large size of some ARV tablets can make swallowing difficult, potentially discouraging adherence and increasing the risk of suboptimal treatment outcomes and drug resistance. This study explores the multifaceted impact of ARV tablet size on adherence and stigma, emphasising the urgent need for pharmaceutical innovation. Specifically, the research objectives are: (1) to examine how ARV tablet size influences adherence among individuals on

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ART, (2) to assess the relationship between tablet size and HIV-related stigma, and (3) to explore potential pharmaceutical innovations that could improve treatment adherence.

The challenge of large ARV tablet size is particularly significant for individuals with swallowing difficulties, including children, older adults, and those with medical conditions that impair their ability to ingest large pills (Cohen, Seedat & Sawasawa, 2023; Hummler, Stillhart, Meilicke et al., 2023). Hummler et al., (2023) found that although most participants could swallow various tablet sizes, they recommended using smaller, elongated tablets to enhance long-term adherence. This finding is particularly relevant for ART, where large, identifiable pills may pose challenges for adherence, especially among individuals with swallowing difficulties or those experiencing pill fatigue. Beyond physical challenges, the visibility of large ARV tablets exacerbates the stigma associated with HIV treatment. Stigma remains a critical barrier to ART adherence, as fear of disclosure often leads to patients skipping doses or avoiding medication altogether (Perger, Davtyan, Foster et al., 2025). The study by Mitzel, Vanable, and Carey (2018) demonstrated that HIV-related stigma adversely affects treatment adherence, with its impact mediated by concerns about disclosing HIV status and the presence of depressive symptoms, which in turn influence medication adherence and clinic attendance. The identifiable size of pills was found to play a role in treatment adherence, as larger or more distinguishable pills may increase the likelihood of stigma-related concerns, further affecting treatment adherence.

The noticeable size of large ARV tablets can unintentionally reveal an individual's HIV status, leading to increased social discrimination and psychological distress. This challenge is further intensified by perceived stigma, which, as Madiba and Josiah (2019) noted, affects the timing and location of medication intake, clinic visits for ART refills, and the willingness to disclose one's HIV status. Their research underscores the importance of encouraging adolescents to be open about their HIV status with friends, as the fear of unintended disclosure often heightens perceived stigma, creating additional obstacles to treatment adherence and emotional well-being. Addressing these challenges requires a patient-centred approach, prioritising discreet and manageable drug formulations.

Pharmaceutical advancements offer promising avenues for reducing the size of antiretroviral (ARV) tablets while maintaining efficacy (Tseng, Seet, & Phillips, 2015). Emerging technologies, such as nanotechnology, mini-tablets, and alternative drug delivery systems —including dispersible formulations and long-acting injectables —could enhance treatment adherence and improve patient quality of life (Slama, Porcher, Linard et al., 2023). However, the slow pace of reformulation and lack of funding for research and development in this area limit the availability of these innovations, underscoring the need for industry-wide efforts to expedite their development. This study presents a novel approach to understanding how ARV tablet size influences adherence by examining the interplay between physical medication characteristics, patient adherence behaviors, and stigma, ultimately advocating for pharmaceutical innovations that prioritize patient-centered care.

Literature Review and Hypothesis Development

The impact of antiretroviral (ARV) tablet size on medication adherence has been extensively documented, particularly in vulnerable populations such as individuals with dysphagia, paediatric patients, and the elderly (Cohen et al., 2023). Several studies suggest that large tablets contribute to lower adherence rates, a critical issue given that poor adherence is a well-established predictor of virological failure, drug resistance, and increased HIV-related morbidity (Nachega, Hislop, Nguyen, et al., 2009; SeyedAlinaghi, Afsahi, Moradi et al., 2023). The umbrella review by SeyedAhmad SeyedAlinaghi

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et al., (2023) provides a comprehensive analysis of adherence-related factors, underscoring the interplay between medication adherence, baseline and therapeutic CD4 levels, co-infections, and the clinical stage of HIV in determining treatment success. This study builds on these findings by focusing on how medication burden, including pill size, impacts adherence behaviour among diverse patient populations. Prior research highlights that medication burden significantly influences adherence behaviour, with simplified regimens leading to better treatment outcomes (Jaiswal, Francis, Singer et al., 2020; Okoli, Castellanos, Allan, et al., 2020). While previous studies, such as Walmsley et al. (2013) and Feinberg et al., (2014), as cited in Günthard et al. (2012), demonstrated that dolutegravir exhibited superior efficacy compared to efavirenz and ritonavir-boosted darunavir in clinical trials, this study investigates explicitly the role of pill size in adherence. Dolutegravir's once-daily dosing and co-formulation with abacavir/lamivudine provide an advantage in reducing medication burden. However, whether these characteristics translate into improved adherence among different patient groups remains a key focus of this research.

The role of stigma as a barrier to adherence is another key theme explored in the literature. While physical medication characteristics, such as pill size, are often highlighted as barriers to adherence, stigma remains a pervasive issue influencing treatment continuation. Madiba and Josiah (2019) demonstrated that the physical appearance of ARVs can lead to involuntary disclosure, discouraging adherence. Similarly, Okoli, Castellanos, Allan et al. (2020) emphasised that addressing the physical, emotional, and psychosocial challenges faced by people living with HIV (PLHIV) is critical for improving adherence and health outcomes. This study builds on their findings by exploring whether innovations in ARV formulations, such as smaller pill sizes and long-acting injectables, mitigate stigma-related adherence challenges. Despite the assumption that smaller pill sizes would enhance adherence, findings remain inconclusive. Cohen, Seedat, and Sawasawa (2023) conducted a study in South Africa and found that while individuals with HIV/AIDS reported difficulties swallowing large pills, pill size itself did not directly impact adherence. This suggests that other factors, such as treatment fatigue, stigma, and regimen complexity, may play a more significant role in influencing outcomes. This research extends this discussion by examining how patient perceptions of medication burden, beyond physical pill size, influence adherence patterns.

Innovations in pharmaceutical formulations present promising solutions to the challenges of adherence. Advances in nanotechnology and mini-tablet formulations have demonstrated the potential to reduce pill size while maintaining drug efficacy (Tseng, Seet & Phillips, 2015). Additionally, long-acting injectable ART, such as that explored by Thornhill & Orkin (2021) and Slama, Porcher, Linard et al. (2023), offers an alternative to daily oral regimens, potentially improving adherence. However, these advancements have limitations, including high costs and limited accessibility, particularly in low-resource settings (Cresswell & Lamorde, 2022). This study examines the feasibility of such innovations in real-world settings and their alignment with patient needs and healthcare system constraints. By integrating insights from prior research, this study aims to provide a nuanced understanding of how medication burden, stigma, and pharmaceutical innovations influence adherence. Unlike previous studies focusing on pharmacological efficacy or general adherence trends, this research bridges the gap by explicitly analysing the interrelationship between pill characteristics, patient adherence behaviour, and broader systemic factors. The findings will contribute to the development of patient-centred ART strategies that address both individual and structural barriers to adherence.

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Theoretical framework

This study is grounded in the Health Belief Model (HBM), a theoretical framework that explains health-related behaviours by examining individuals' perceptions of susceptibility, severity, benefits, and barriers to action (Rosenstock, 1974). The model has long been foundational in designing interventions to increase awareness of health challenges, enhance individuals' perceptions of personal risk, and motivate actions to mitigate or eliminate those risks. In its later iterations, the HBM also emphasises the importance of fostering self-efficacy and empowering individuals to undertake necessary health behaviour changes (Green, Murphy, Gryboski, et al., 2020). Focusing on these key components — perception of risk, barriers, benefits, and self-efficacy —this model provides a comprehensive approach to understanding and influencing health behavior, especially in interventions targeting chronic health issues, such as HIV treatment adherence. In the context of ARV tablet size, perceived barriers, such as difficulty swallowing and fear of stigma, may deter adherence despite the known benefits of treatment. The model also highlights the role of self-efficacy and cues to action in promoting adherence (Champion & Skinner, 2008). The following section outlines the research methods to achieve the study's objectives.

Research Method

Research Paradigm and Methodology

This study adopted a constructivist research paradigm, emphasizing the co-construction of knowledge through the synthesis and interpretation of existing literature (Naeem, Ozuem, Howell, & Ranfagni, 2023). As Arksey and O'Malley (2005) outlined, a scoping literature review methodology was employed to map the extent of research on the topic, highlighting key themes, gaps, and findings. This approach included both quantitative and qualitative studies, allowing for a comprehensive examination of the effects of ARV tablet size, adherence challenges, and stigma on treatment outcomes.

Data Collection Procedure

The data collection process followed a systematic approach to identify relevant studies from academic sources. This involved conducting comprehensive research while applying consistent inclusion and exclusion criteria to ensure the selection of studies directly related to the research focus (Arksey & O'Malley, 2005; Naeem et al., 2023).

Data Analysis Techniques

The collected data were analysed using thematic analysis, a qualitative research technique that identifies, analyses, and interprets recurring patterns and themes within qualitative data (Naeem et al., 2023). Thematic analysis was employed for data analysis, either manually or using qualitative data analysis software such as NVivo. This process included familiarising with the data, coding key themes, developing overarching themes, and refining them to ensure the consistency and reliability of the findings.

Replication of the Research

To replicate this research, future researchers should adopt a constructivist research paradigm and utilise a scoping literature review methodology to explore similar research questions in health-related fields (Arksey & O'Malley, 2005; Naeem et al., 2023)

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Results and Discussion

Analysis Result

The Impact of Large ARV Tablets on Adherence

Medication adherence is critical for viral suppression and reducing transmission rates. Studies indicate that pill size significantly influences patient willingness to take medication consistently (Tseng, Seet & Phillips, 2015). Large ARV tablets present a significant challenge for individuals with dysphagia, pediatric patients, and the elderly, who may struggle with swallowing difficulties (Cohen et al., 2023; Hummler, Stillhart, Meilicke, et al., 2023). When patients find it physically uncomfortable to ingest medication, they are more likely to skip doses, leading to suboptimal drug levels in the bloodstream. This inconsistency in adherence can result in the development of drug-resistant HIV strains, reducing the effectiveness of treatment and increasing the risk of treatment failure (SeyedAlinaghi et al., 2023). Furthermore, adherence issues due to pill size contribute to the overall burden of care, requiring healthcare providers to implement additional interventions to ensure compliance. Beyond physical characteristics such as the pill size, the psychological burden of taking large ARV tablets can discourage adherence.

Many individuals experience a phenomenon known as 'pill fatigue,' where the constant reminder of their HIV status through daily medication intake leads to mental exhaustion and treatment avoidance (Jaiswal, Francis, Singer et al., 2020; Okoli, Castellanos, Allan, et al., 2020). Jaiswal et al. (2020) identified treatment fatigue as a significant challenge for low-income people living with HIV, with participants employing strategies such as reminder programs and "pill holidays" to manage this fatigue. This highlights the importance of tailored support and further research to address treatment fatigue as a distinct issue affecting adherence. In this context, smaller and more discreet ARV formulations can alleviate the stress of taking large, noticeable tablets in social settings, ultimately improving adherence rates. Ensuring the availability of these more palatable formulations is crucial for enhancing adherence and ensuring the success of HIV treatment programs.

Stigma and Psychological Barriers

The stigma surrounding HIV remains a significant barrier to treatment adherence, and the physical characteristics of medication can inadvertently contribute to this issue (Sweeney, Mitzel & Vanable, 2015). Large ARV tablets are often distinctive in shape, colour, and size, making them easily recognisable and increasing the risk of involuntary disclosure. The graph illustrates different types of antiretroviral drugs used in HIV treatment, with a focus on the colour and size of the tablets, which may relate to the stigma associated with HIV and taking ARVs. The visibility of large, distinguishable pills can increase the risk of disclosure in social settings, potentially affecting individuals' willingness to adhere to their treatment. Many individuals living with HIV face discrimination in their personal and professional lives, and the fear of being identified as HIV-positive due to their medication can lead to non-adherence (Martinez, Harper, Carleton et al., 2012). This is particularly concerning in regions where HIV stigma remains deeply entrenched, discouraging individuals from consistently taking their prescribed ART (Sweeney, Mitzel & Vanable, 2015; Perger, Davtyan, Foster et al., 2025). Moreover, the psychological burden of taking large ARV tablets can lead to increased stress, anxiety, and depression, which further negatively impact adherence (Mellins, Havens, McDonnell, et al., 2009; Luthuli & John-Langba, 2024). Patients may experience isolation, shame, and reluctance to engage in social activities due to the

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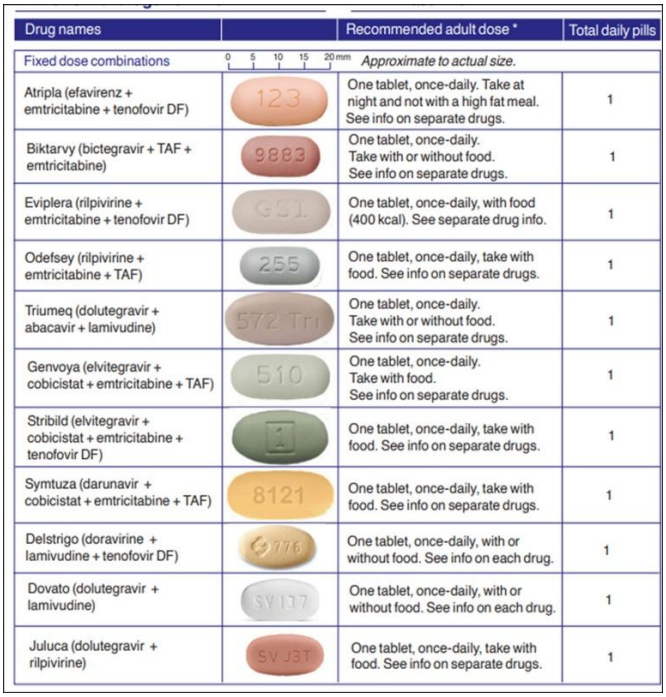
constant reminder of their condition. Still, research suggests that mental health interventions addressing stigma-related stress can enhance medication adherence and overall well-being among people living with HIV (Earnshaw & Chaudoir, 2009). Addressing the issue of pill size and colour, therefore, not only facilitates physical adherence but also helps mitigate the psychological barriers associated with HIV treatment, improving patient quality of life and long-term treatment outcomes (Tseng, Seet & Phillips, 2015).



Drug names		Recommended adult dose *	Total daily pills
Fixed dose combinations	0 5 10 15 20 mm *Approximate to actual size.*		
Atripla (efavirenz + emtricitabine + tenofovir DF)	123	One tablet, once-daily. Take at night and not with a high fat meal. See info on separate drugs.	1
Biktarvy (bictegravir + TAF + emtricitabine)	9883	One tablet, once-daily. Take with or without food. See info on separate drugs.	1
Eviplera (rilpivirine + emtricitabine + tenofovir DF)	GS1	One tablet, once-daily, with food (400 kcal). See separate drug info.	1
Odefsey (rilpivirine + emtricitabine + TAF)	255	One tablet, once-daily, take with food. See info on separate drugs.	1
Triumeq (dolutegravir + abacavir + lamivudine)	572 Tri	One tablet, once-daily. Take with or without food. See info on separate drugs.	1
Genvoya (elvitegravir + cobicistat + emtricitabine + TAF)	510	One tablet, once-daily. Take with food. See info on separate drugs.	1
Stribild (elvitegravir + cobicistat + emtricitabine + tenofovir DF)		One tablet, once-daily, take with food. See info on separate drugs.	1
Symtuza (darunavir + cobicistat + emtricitabine + TAF)	8121	One tablet, once-daily, take with food. See info on separate drugs.	1
Delstrigo (doravirine + lamivudine + tenofovir DF)	776	One tablet, once-daily, with or without food. See info on each drug.	1
Dovato (dolutegravir + lamivudine)	SV 137	One tablet, once-daily, with or without food. See info on each drug.	1
Juluca (dolutegravir + rilpivirine)	SV J3T	One tablet, once-daily, take with food. See info on separate drugs.	1

Figure 1. Sample Criteria (N = 256)
Source: Adapted from Home Guides. (2024)

The Need for Pharmaceutical Innovation

Advancements in pharmaceutical technology present opportunities to develop smaller, more palatable ARV formulations that improve adherence and patient outcomes. One promising approach is the development of mini-tablets and nanotechnology-based formulations, which reduce pill size without compromising drug efficacy (Tseng, Seet & Phillips, 2015). Nanotechnology optimises drug absorption and bioavailability, ensuring that smaller doses achieve the same therapeutic effects as larger tablets (Thornhill & Orkin, 2021). Research also suggests that mini-tablets offer better swallowing comfort and ease of administration, particularly for pediatric and geriatric patients who struggle with standard-sized ARV tablets (Hayakawa, Uchida & Namiki, 2015; Priyanka, Kumar, Teotia & Teotia, 2018; Hejduk & Lulek, 2022). The study by Priyanka et al. (2018) emphasizes the potential of mini tablets, measuring 3.0 mm or smaller, as a groundbreaking solution to enhance patient compliance, especially for pediatric and geriatric populations. These mini tablets address key challenges, such as difficulty swallowing and delayed onset of action, while enhancing drug bioavailability and providing flexible dosing options through controlled-release mechanisms. In line with this, Hejduk & Lulek (2022) support the advantages of minitablets in personalised therapy, highlighting their suitability for paediatric and geriatric patients. However, they also note that challenges persist in the packaging, dispensing, and safe

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administration of mini tablets, suggesting that further innovations are necessary to optimize their use fully.

Table 1 categorises various innovative drug delivery systems that address adherence barriers, explicitly targeting individuals experiencing difficulties with traditional ARV tablets. The findings highlight that pill size significantly impacts adherence, as larger tablets pose challenges for individuals with swallowing difficulties, such as paediatric and geriatric patients. Additionally, the visibility of ARV medication contributes to stigma, leading to non-adherence due to the fear of involuntary disclosure.

Table 1. Innovative Drug Delivery Systems for Enhancing HIV Patient Adherence

Innovation	Description	Target Population	Benefits	Challenges
Mini tablets	Small tablets for easier swallowing and flexible dosing.	Pediatric, geriatric, and HIV patients with swallowing issues	Improved adherence, reduced stigma, and better bioavailability.	Packaging, dispensing, and administration challenges.
Nanotechnology formulations	Uses nanotechnology for optimised drug absorption in smaller doses.	HIV patients need reduced pill sizes	Smaller pills with maintained efficacy reduce pill burden.	High production costs and limited availability.
Chewable tablets	Tablets that can be chewed for easier consumption.	Pediatric, elderly, and HIV patients	Easier to swallow, reduces stigma, and is more palatable.	Stability and dosing flexibility.
Dissolvable oral strips	Thin strips that dissolve in the mouth.	HIV patients with swallowing issues, children	Convenient, portable, reduces stigma, no need for water.	Taste, stability, and formulation limitations.
Oral jellies	Jelly formulations in unit pouches for easy swallowing.	Pediatric, elderly, and HIV patients	Travel-friendly, improves adherence, and reduces stigma.	Stability concerns, limited drug types.
Long-acting injectables	Injectables for monthly or bi-monthly dosing.	HIV patients need long-term treatment	Reduces daily pill burden, minimises stigma, enhances adherence	Accessibility, affordability, and administration issues.

Alternative drug delivery systems also offer promising solutions for overcoming adherence challenges related to pill size. Chewable tablets and dissolvable oral strips provide user-friendly alternatives to traditional antiretroviral medications (ARVs), particularly for individuals who experience difficulty swallowing (Rodríguez-Pombo, Awad, Basit et al., 2023). While Shailesh & Vaishali (2020). depicts those Oral jellies in a dosage form, packed in unit pouches, which are both travel-friendly and user-friendly for self-administration, and therefore can lead to better patient compliance. Additionally,

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long-acting injectable ARVs, which allow for monthly or bi-monthly dosing, have gained traction as an innovative adherence strategy (Thornhill & Orkin, 2021). These injectables eliminate the need for daily oral medication, reducing pill burden and minimising stigma-related adherence barriers (Mate, Engler, Lessard & Lebouché, 2023; Slama, Porcher, Linard et al., 2023). However, while these innovations hold significant potential, their accessibility and affordability remain key concerns, particularly in low- and middle-income countries where HIV prevalence is highest. The table (Table 1) outlines various innovative drug delivery systems aimed at improving adherence among HIV patients, particularly those facing stigma or difficulty with traditional pills. Mini-tablets, nanotechnology-based formulations, chewable tablets, oral jellies, and long-acting injectables offer more convenient and less stigmatizing alternatives. These options enhance swallowing comfort, reduce pill burden, and improve patient compliance. However, challenges such as packaging, affordability, and accessibility persist, especially in low-resource settings.

Discussion

This study reveals that the large size of ARV tablets significantly affects treatment adherence, particularly among patients with dysphagia, children, and the elderly. Difficulty swallowing leads to missed doses and inconsistent drug levels, which can trigger HIV resistance and treatment failure. Psychological burdens also play a significant role, such as pill fatigue or mental exhaustion from daily medication that reminds individuals of their HIV status, particularly among low-income individuals. Strategies such as reminder programs and pill holidays often address this. Stigma is another significant barrier, as the physical characteristics of medications, such as size and color, can inadvertently reveal HIV status in social settings, reducing motivation to take medication in public. Pharmaceutical innovations, such as mini-tablets, oral strips, chewable tablets, and long-acting injections, offer promising solutions. Mini-tablets and oral strips are easier to swallow, reduce stigma, and offer dose flexibility, while long-acting injections reduce the need for daily consumption. However, challenges such as packaging, distribution, and cost remain barriers in developing countries with high HIV prevalence. This study supports previous literature, including the findings of Tseng et al. (2015), Cohen et al. (2023), and Jaiswal et al. (2020), on the impact of pill size, treatment burden, and psychological fatigue on adherence. Unlike Mellins et al. (2009), which emphasize stigma as the primary barrier, this study highlights that stigma and physical factors of the tablet are equally important. Thus, pharmaceutical innovation is an important strategy for improving adherence and treatment outcomes for HIV. However, production costs, access, and packaging need further investigation. This study suggests patient-centered approaches and public campaigns to reduce stigma and increase awareness of treatment innovations. Further research should explore the relationship between pharmaceutical innovation, adherence behavior, and psychosocial factors to develop comprehensive strategies for improving long-term treatment outcomes.

The findings of this study confirm that the success of HIV therapy is not only determined by the availability of drugs, but also greatly influenced by the physical and psychological aspects of the drug formulation itself. Large tablet size is a significant barrier to patient adherence, particularly in vulnerable groups such as children, the elderly, and people with dysphagia. Additionally, the presence of "pill fatigue" and social stigma exacerbate these challenges. Innovations such as mini-tablets, oral strips, and long-acting injections offer new hope, but their implementation is still hindered by economic and

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distribution factors, particularly in developing countries. Therefore, a comprehensive understanding of patient needs and supportive policies is key to improving the long-term effectiveness of HIV treatment.

Conclusion

This study highlights the significant role of ARV tablet size in medication adherence, reaffirming previous research findings. Large tablet sizes have been identified as a barrier to adherence, particularly among paediatric and elderly populations, due to swallowing difficulties. Furthermore, stigma associated with visible pill intake exacerbates non-adherence, leading to adverse treatment outcomes. Pharmaceutical innovations such as mini-tablets, nanotechnology-based formulations, chewable tablets, oral jellies, dissolvable oral strips, and long-acting injectables present promising alternatives that enhance adherence by reducing pill burden and improving drug bioavailability. However, challenges related to cost, accessibility, and packaging persist, particularly in resource-limited settings.

This research contributes to scientific and practical discourse by emphasising the need for pharmaceutical innovation in ARV treatment. From a scientific perspective, advancements in drug delivery mechanisms, mainly through nanotechnology and personalised therapy, offer groundbreaking improvements in treatment efficacy and patient compliance. In practice, this study underscores the need for policies that foster the development and equitable distribution of innovative antiretroviral (ARV) formulations. The integration of these alternatives into treatment programs can enhance adherence, reduce stigma, and ultimately improve health outcomes for individuals living with HIV. This research informs stakeholders, including pharmaceutical companies, healthcare providers, and policymakers, on strategic approaches to addressing adherence challenges by bridging scientific advancements with healthcare policy.

The reliance on self-reported adherence data introduces the potential for recall and social desirability biases, which may affect the accuracy of findings. Additionally, while this research primarily focuses on tablet size and stigma-related adherence barriers, other influential factors, such as socioeconomic status, healthcare access, and mental health, warrant further exploration. Another constraint is the limited generalizability to individuals using alternative ARV formulations, such as long-acting injectables. Future research should examine the intersection of pharmaceutical innovation, adherence behaviours, and psychosocial factors to develop holistic strategies for improving ART outcomes, particularly in resource-constrained environments.

References

Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. International Journal of Social Research Methodology, 8(1), 19-32. https://doi.org/10.1080/1364557032000119616

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.

Champion, V. L., & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), Health behavior and health education: Theory, research, and practice (4th ed., pp. 189-193). Jossey-Bass.

Clotet, B., Feinberg, J., van Lunzen, J., et al. (2014). ING114915 Study Team. Once-daily dolutegravir vs darunavir plus ritonavir in antiretroviral-naive adults with HIV-1 infection (FLAMINGO): 48-week results from the randomised open-label phase 3b study. The Lancet, 383(9936), 2222–2231. https://doi.org/10.1016/S0140-6736(14)60084-2

Cohen, A., Seedat, J., & Sawasawa, C. (2023). Dysphagia and pill swallowing in HIV/AIDS in South Africa: Results of a scoping review. The South African Journal of Communication Disorders, 70(1), 955. https://doi.org/10.4102/sajcd.v70i1.955

OPEN ACCESS
e-ISSN: 2985-9808

Cresswell, F. V., & Lamorde, M. (2022). Implementation of long-acting antiretroviral therapy in low-income and middle-income countries. Current Opinion in HIV & AIDS, 17(3), 127-134. https://doi.org/10.1097/COH.0000000000000732

Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.

Earnshaw, V. A., & Chaudoir, S. R. (2009). From conceptualising to measuring HIV stigma: A review of HIV stigma mechanism measures. AIDS and Behavior, 13(6), 1160. https://doi.org/10.1007/s10461-009-9593-3

Günthard, H. F., Saag, M. S., Benson, C. A., Eron, J. J., Gallant, J. E., Hoy, J. F., Mugavero, M. J., Sax, P. E., Thompson, M. A., Gandhi, R. T., Landovitz, R. J., Smith, D. M., Jacobsen, D. M., & Volberding, P. A. (2016). Antiretroviral drugs for treatment and prevention of HIV infection in adults: 2016 recommendations of the International Antiviral Society–USA Panel. JAMA, 316(2), 191. https://doi.org/10.1001/jama.2016.8900

Hayakawa, Y., Uchida, S., & Namiki, N. (2015). Evaluation of the ease of taking mini-tablets compared with other tablet formulations in healthy volunteers. European Journal of Pharmaceutical Sciences, 84, 1-6. https://doi.org/10.1016/j.ejps.2015.12.029

Hejduk, A., & Lulek, J. (2022). Dispensing of minitablets – Has the problem been resolved? International Journal of Pharmaceutics, 619, 121666. https://doi.org/10.1016/j.ijpharm.2022.121666

Home Guides. (2024). Introduction to ART: Antiretroviral drugs: Illustrated pill chart. Retriever from https://i-base.info/guides/starting/arvs

Hummler, H., Stillhart, C., Meilicke, L., Grimm, M., Krause, E., Mannaa, M., Gollasch, M., Weitschies, W., & Page, S. (2023). Impact of tablet size and shape on the swallowability in older adults. Pharmaceutics, 15(4), 1042. https://doi.org/10.3390/pharmaceutics15041042

Jaiswal, J., Francis, M., Singer, S., Dunlap, K., Cox, A., & Greene, R. (2020). "Worn out": Coping strategies for managing antiretroviral treatment fatigue among urban people of color living with HIV who were recently disengaged from outpatient HIV care. Journal of HIV/AIDS & Social Services, 19(2), 173. https://doi.org/10.1080/15381501.2020.1767749

Luthuli, M. Q., & John-Langba, J. (2024). Interaction of social support and depressive symptoms on antiretroviral therapy adherence among people living with HIV in South Africa. Health SA Gesondheid, 29(0), a2271. https://doi.org/10.4102/hsag.v29i0.2271

Madiba, S., & Josiah, U. (2019). Perceived stigma and fear of unintended disclosure are barriers in medication adherence in adolescents with perinatal HIV in Botswana: A qualitative study. BioMed Research International, 2019, 9623159. https://doi.org/10.1155/2019/9623159

Martinez, J., Harper, G., Carleton, R. A., Hosek, S., Bojan, K., Glum, G., Ellen, J., & Trials Network, A. M. (2012). The impact of stigma on medication adherence among HIV-positive adolescent and young adult females and the moderating effects of coping and satisfaction with health care. AIDS Patient Care and STDs, 26(2), 108. https://doi.org/10.1089/apc.2011.0178

Mate, K. K., Engler, K., Lessard, D., & Lebouché, B. (2023). Barriers to adherence to antiretroviral therapy: Identifying priority areas for people with HIV and healthcare professionals. International Journal of STD & AIDS, 34(10), 677. https://doi.org/10.1177/09564624231169329

Mellins, C. A., Havens, J. F., McDonnell, C., Lichtenstein, C., Uldall, K., Chesney, M., Santamaria, E. K., & Bell, J. (2009). Adherence to antiretroviral medications and medical care in HIV-infected adults diagnosed with mental and substance abuse disorders. AIDS Care, 21(2), 168. https://doi.org/10.1080/09540120802001705

Mitzel, L. D., Vanable, P. A., & Carey, M. P. (2018). HIV-related stigmatisation and medication adherence: Indirect effects of disclosure concerns and depression. Stigma and Health, 4(3), 282. https://doi.org/10.1037/sah0000144

Nachega, J. B., Hislop, M., Nguyen, H., Dowdy, D. W., Chaisson, R. E., Regensberg, L., Cotton, M., & Maartens, G. (2009). Antiretroviral therapy adherence, virologic and immunologic outcomes in adolescents compared with adults in Southern Africa. Journal of Acquired Immune Deficiency Syndromes (1999), 51(1), 65. https://doi.org/10.1097/QAI.0b013e318199072e

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Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. International Journal of Qualitative Methods. https://doi.org/10.1177_16094069231205789

Oguntibeju, O. O. (2012). Quality of life of people living with HIV and AIDS and antiretroviral therapy. HIV/AIDS (Auckland, N.Z.), 4, 117–124. https://doi.org/10.2147/HIV.S32321

Okoli, C., Castellanos, E., Allan, B., Young, B., Brough, G., Muchenje, M., Eremin, A., Corbelli, G. M., McBritton, M., & Hardy, W. D. (2020). Physical, emotional, and psychosocial challenges associated with daily dosing of HIV medications and their impact on indicators of quality of life: Findings from the Positive Perspectives Study. AIDS and Behavior, 25(3), 961. https://doi.org/10.1007/s10461-020-03055-1

Perger, T., Davtyan, M., Foster, C., Evangeli, M., Berman, C., Kacanek, D., Puga, A. M., Sekidde, S., & Bhopal, S. (2025). Impact of HIV-related stigma on antiretroviral therapy adherence, engagement and retention in HIV care, and transition to adult HIV care in pediatric and young adult populations living with HIV: A literature review. AIDS and Behavior, 29(2), 497-516. https://doi.org/10.1007/s10461-024-04534-5

Priyanka, Kumar, K., Teotia, D., & Teotia, D. (2018). A comprehensive review on pharmaceutical mini tablets. Journal of Drug Delivery and Therapeutics, 8(6), 382-390. https://doi.org/10.22270/jddt.v8i6.2060

Rodés, B., Cadiñanos, J., Esteban-Cantos, A., Rodríguez-Centeno, J., & Arribas, J. R. (2022). Ageing with HIV: Challenges and biomarkers. EBioMedicine, 77, 103896. https://doi.org/10.1016/j.ebiom.2022.103896

Rodríguez-Pombo, L., Awad, A., Basit, A. W., Alvarez-Lorenzo, C., & Goyanes, A. (2022). Innovations in chewable formulations: The novelty and applications of 3D printing in drug product design. Pharmaceutics, 14(8), 1732. https://doi.org/10.3390/pharmaceutics14081732

Rosenstock, I. M. (1974). The Health Belief Model and Preventive Health Behavior. Health Education Monographs. https://doi.org/10.1177/109019817400200405

Salleh, N. M., Richardson, L., Kerr, T., Shoveller, J., Montaner, J., Kamarulzaman, A., & Milloy, J. (2018). A longitudinal analysis of daily pill burden and likelihood of optimal adherence to antiretroviral therapy among people living with HIV who use drugs. Journal of Addiction Medicine, 12(4), 308. https://doi.org/10.1097/ADM.0000000000000403

SeyedAlinaghi, S., Afsahi, A. M., Moradi, A., Parmoon, Z., Habibi, P., Mirzapour, P., Dashti, M., Ghasemzadeh, A., Karimi, E., Sanaati, F., Hamedi, Z., Molla, A., Mehraeen, E., & Dadras, O. (2023). Current ART, determinants for virologic failure and implications for HIV drug resistance: An umbrella review. AIDS Research and Therapy, 20, 74. https://doi.org/10.1186/s12981-023-00572-6

Shailesh, K., & Vaishali, L. (2020). Review on: Alternatives to large dosage forms for ease of swallowing. Journal of Drug Delivery Science and Technology, 57, 101712. https://doi.org/10.1016/j.jddst.2020.101712

Slama, L., Porcher, R., Linard, F., Chakvetadze, C., Cros, A., Carillon, S., Gallardo, L., Viard, P., & Molina, M. (2023). Injectable long-acting antiretroviral for HIV treatment and prevention: Perspectives of potential users. BMC Infectious Diseases, 23, 98. https://doi.org/10.1186/s12879-023-08071-9

Sweeney, S. M., Mitzel, L. D., & Vanable, P. A. (2015). Impact of HIV-related stigma on medication adherence among persons living with HIV. Current Opinion in Psychology, 5, 96-100. https://doi.org/10.1016/j.copsyc.2015.06.002

Thornhill, J., & Orkin, C. (2021). Long-acting injectable HIV therapies: The next frontier. Current Opinion in Infectious Diseases, 34(1), 8-15. https://doi.org/10.1097/QCO.0000000000000701

Tseng, A., Seet, J., & Phillips, E. J. (2015). The evolution of three decades of antiretroviral therapy: Challenges, triumphs, and the promise of the future. British Journal of Clinical Pharmacology, 79(2), 182. https://doi.org/10.1111/bcp.12403

Walmsley, S. L., Antela, A., Clumeck, N., et al. (2013). Dolutegravir plus abacavir-lamivudine for the treatment of HIV-1 infection. New England Journal of Medicine, 369(19), 1807–1818. https://doi.org/10.1056/NEJMoa1215541