

Knowledge of nurse educators working in higher education regarding the “Undetectable = Untransmissible” concept in HIV care: A scoping review

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ABSTRACT

Introduction

The *Undetectable = Untransmissible* (U=U) concept, which emphasises sustained HIV viral suppression through effective antiretroviral therapy, has gained global acceptance. However, awareness and understanding of U=U among nurse educators, particularly within academic healthcare institutions, remain limited. This study aims to assess nurse educators’ understanding of HIV, specifically in relation to the U=U concept, within academic healthcare settings.

Purpose

This scoping review aimed to evaluate the current knowledge of nurse educators working in higher education regarding the U=U concept in HIV care.

Methods

A comprehensive literature search was conducted using English-language keywords across multiple databases, including PubMed, Scopus, Web of Science, EBSCOhost, and ProQuest. The search focused on publications published between January 2010 and April 2025. The review followed the Arksey and O’Malley framework and adhered to PRISMA-ScR guidelines.

Results

A total of 38 articles were identified as potentially eligible for inclusion. However, 30 were excluded after full-text screening for reasons such as incorrect topic, setting, outcome, population, or publication year. Consequently, eight articles met the inclusion criteria. Four major themes emerged: curriculum development and implementation; knowledge and beliefs about U=U; communication barriers; and strategies for improvement.

Conclusion

Academic healthcare institutions should empower nurse educators with structured training programmes on HIV-related topics, enabling them to educate students effectively and help reduce new infections and stigma. This review highlights barriers to implementation and identifies effective strategies for enhancing U=U education in nursing, bridging the gap between policy and practical application.

INTRODUCTION

Knowledge about human immunodeficiency virus (HIV) has advanced significantly in healthcare and research, particularly with the ground-breaking *Undetectable = Untransmissible* (U=U) concept. There is a need to

summarise nursing educators’ understanding of U=U within higher education institutions. Nurse educators play a pivotal role in shaping HIV care; however, many lack updated knowledge of this critical gap that undermines global HIV prevention efforts.

Scientific consensus confirms that people living with HIV who are on antiretroviral therapy (ART) and have achieved viral suppression cannot transmit HIV sexually (Grace et al., 2022; Torres et al., 2020). Beyond its clinical implications, the U=U concept serves as a transformative public health message that reduces stigma and encourages treatment adherence (Gardenier et al., 2019; Wells et al., 2024).

Social scientists also agree that normalising HIV literacy can reshape societal perceptions of stigma and empower healthcare providers, including nurse educators, to spearhead this change. Initiatives such as the THANE Project in Tanzania (Kohi et al., 2010) highlight growing efforts to equip nurse educators with updated HIV knowledge. Nevertheless, systemic gaps persist, leaving many educators unprepared to teach the subject effectively in the classroom.

It is widely accepted that ART can suppress the virus to undetectable levels, thereby eliminating the risk of sexual transmission (Ngure et al., 2020). This scientific consensus, supported by clinical trials, has significantly transformed HIV prevention and care (Grace et al., 2022; Wells et al., 2024). However, nurse educators in institutions of higher learning often lack this knowledge because they are frequently excluded from national training programmes, despite their crucial role in training future healthcare professionals.

Integrating HIV care literacy into the nursing curriculum is essential for effectively transferring HIV prevention knowledge to nursing students and other healthcare practitioners, ultimately improving healthcare delivery. This concept aligns with the findings of Wagner et al. (2025), who emphasised the importance of embedding HIV care literacy in nursing curricula to ensure that students and healthcare professionals are well informed about HIV prevention. Their study found that students from all health disciplines demonstrated significant increases in HIV prevention and care knowledge, as well as in their intent to provide care for individuals at high risk of HIV.

Nursing statutory bodies should therefore advocate for the inclusion of HIV education in nursing curricula and establish standardised competency frameworks for HIV literacy tailored to educators in higher education institutions. This review seeks to assess the knowledge of

nurse educators in higher education regarding the U=U concept in HIV care, as limited reviews currently exist on this subject.

METHODS

This review adopted Arksey and O'Malley's (2005) methodological framework for conducting an advanced scoping review. Additionally, the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews* (PRISMA-ScR) chart and checklist were employed to screen and report the results (see Figure 1). A research librarian from the University's Faculty of Health Sciences was consulted to assist with the search strategy.

The search covered relevant English-language publications from January 2010 to April 2025 and included five databases: PubMed, Scopus, Web of Science, EBSCOhost, and ProQuest (see Table 1). Relevant literature was identified using a combination of keywords and Boolean operators. The Joanna Briggs Institute (JBI) guideline was employed in formulating the research question, which was based on the Population, Concept, and Context (PCC) framework (Aromataris, 2024; Hadie, 2024).

Reviewers screened all titles and abstracts against the inclusion and exclusion criteria. Publications without an abstract were excluded. The methodological framework by Arksey and O'Malley (2005), later refined by Levac et al. (2010), was applied. This framework comprises five stages:

1. Identifying the research questions;
2. Identifying relevant studies;
3. Selecting studies;
4. Charting the data; and
5. Collating, summarising, and reporting the results.

Stage 1: Identifying the Research Question

The review aimed to explore the knowledge of nurse educators working in higher education concerning U=U in HIV care. Guided by the JBI framework, the review sought *What is known about the U=U concept in HIV care among nurse educators working in higher education institutions?*

Stage 2: Identifying Relevant Studies

A detailed search strategy was developed using primary keywords and their synonyms across five databases: ProQuest, Scopus, Web of Science, EBSCOhost, and

PubMed (see [Table 1](#)). Reviewers used Boolean phrases to identify studies that met the inclusion criteria.

Stage 3: Selecting Studies

The JBI framework was used to establish eligibility criteria for reviewing relevant global studies, focusing on titles and abstracts (see [Table 2](#)). Full texts of eligible articles were uploaded into EndNote software and then imported into Covidence for further screening (see [Figure 1](#)).

The search covered a 15-year period (January 2010 – April 2025). Inclusion and exclusion criteria were developed using the PCC framework (see [Table 2](#)).

Inclusion criteria:

- Registered nurse educators working in higher education institutions, including those facilitating learning in clinical skills laboratories or clinical settings.

Exclusion criteria:

- Nurses who are not registered as nurse educators and other health professionals not practising within institutions of higher learning, clinical skills laboratories, or clinical settings.

Table 1:
Search Strategy and Databases Searched

Databases	Search Strategy	Number of Articles Retrieved
ProQuest	("Knowledge" OR "awareness" OR "understanding" OR "perceptions" OR "apprehension" OR "recognition" OR "familiarity" OR "mindfulness" OR "responsiveness" OR "cognisance" OR "realisation" OR "expertise") AND ("nurse educators" OR "registered nurse educators" OR "clinical coordinators" OR "nurse facilitators" OR "clinical instructors" OR "healthcare professionals" OR "healthcare providers" OR "clinical preceptors" OR "nurse tutors" OR "nursing lecturers" OR "nursing professors") AND ("academic health institutions" OR "nursing colleges" OR "institutions of higher learning" OR "nursing universities" OR "nursing training colleges" OR "schools of nursing") AND ("undetectable equals transmissible" OR "U=U" OR "undetectable equals untransmissible")	n = 96
Scopus	Same as above	n = 8
Web of Science	Same as above	n = 7
EBSCOhost	Same as above	n = 3
PubMed	Same as above	n = 2
Total		n = 116

Note. The search strategy used Boolean operators (AND, OR) and truncations () to identify relevant literature published between January 2010 and April 2025.*

Table 2:
Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Population	Nurse educators; registered nurse educators; clinical facilitators; clinical instructors; clinical preceptors; nurse tutors; nurse facilitators; nursing lecturers; healthcare professionals; healthcare providers	Registered nurses; professional nurses; medical doctors; allied healthcare professionals
Concept	Knowledge of the “Undetectable = Untransmissible (U=U)” concept in HIV care	Sources not related to U=U in HIV care
Context	Academic health institutions; faculties of health sciences; nursing colleges	Non-academic health institutions; non-institutions of higher learning
Publication Status	Peer-reviewed journal articles	Grey literature
Period Range	Publications between January 2010 and April 2025	Publications before January 2010 or after April 2025

Search Results

As shown in [Figure 1](#), the PRISMA-ScR flowchart illustrates the literature search process. A total of 116 studies were retrieved from the databases. Fourteen duplicates were removed, leaving 102 unique articles. Of these, 64 were excluded after title and abstract screening. The remaining 38 articles underwent full-text screening, after which 30 were excluded for reasons such as irrelevant topics, settings, outcomes, populations, or publication years. Ultimately, eight studies met the inclusion criteria.

Stage 4: Charting the Data

Data extraction ([Table 4](#)) included the following variables: author names, publication year, study title, design, setting, population, limitations, and findings. Two reviewers independently extracted data from the eight included studies, then compared and discussed their results.

The PRISMA diagram ([Figure 1](#)) illustrates data appraisal, which employed the *Mixed Methods Appraisal Tool (MMAT)* version 2018 ([Hong et al., 2018](#)). The MMAT assesses quality across five methodological categories: qualitative studies, randomised controlled trials, non-randomised studies, quantitative descriptive studies, and mixed methods studies. Only medium-quality (50%–86%) and high-quality (100%) studies were included for data abstraction and synthesis.

The final analysis comprised eight articles from Canada and Kenya (n = 1), Ireland (n = 1), Tanzania (n = 1), Canada, Italy, the USA, and the Africa region (n = 1), Denmark, Finland, and Sweden (n = 1), and one global study encompassing Africa (Zambia, South Africa, Kenya, and Uganda), Europe, Australia, North America, and the USA (n = 1).

From these eight studies, four major themes and corresponding subthemes were identified (see [Table 5](#)).

Stage 5: Collating, Summarising, and Reporting Results
At this stage, the findings were collated and summarised to assess the knowledge of nurse educators working in higher education regarding the U=U concept in HIV care. The results of this scoping review were categorised into key themes that addressed the central research question. (See [Figure 1](#) for the PRISMA-ScR flow diagram of identified and eligible studies.)

Figure 1:
PRISMA-ScR Flow diagram of the identified eligible studies via online databases

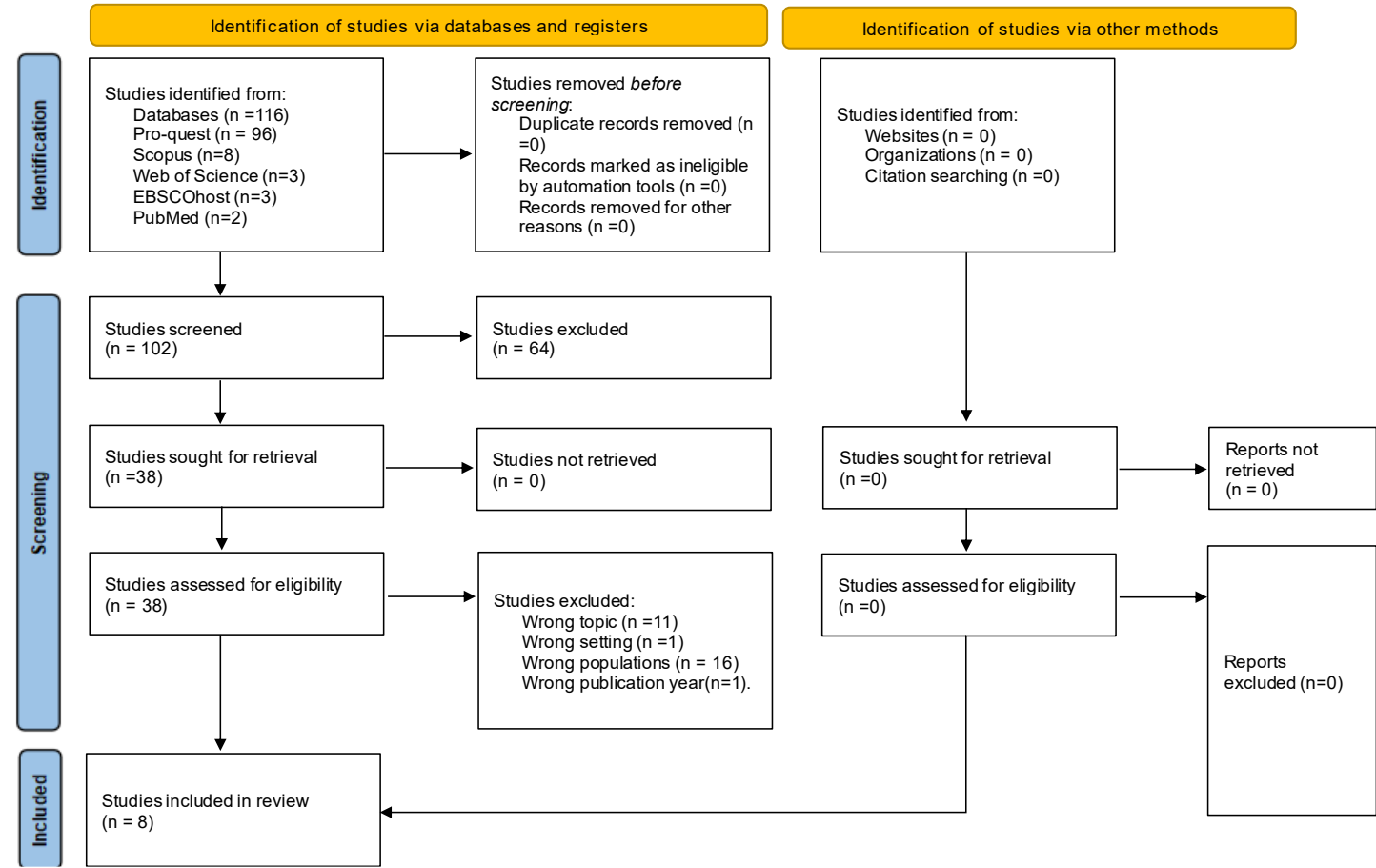


Table 3:
Quality Appraisal of Included Studies Using the Mixed Methods Appraisal Tool (MMAT_v2018)

First Author and Year	S1	S2	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	Score	Ranking
Kohi et al. (2010)	1	1											1	1	1	1	1						1	1	1	1	1	100%	High quality
Mythili et al. (2015)	1	0						1	1	1	1	1																86%	Medium quality
Vaughan & Költő (2024)	1	1											1	1	1	1	1						1	1	1	1	1	100%	High quality
Grace et al. (2022)	1	1	1	1	1	1	1	1																				100%	High quality
Phillips et al. (2018)	1	1											1	1	1	1	1						1	1	1	1	1	100%	High quality

First Author and Year	S1	S2	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	Score	Ranking
Moseholm et al. (2024)	1	1											1	1	1	1	1						1	1	1	1	1	100%	High quality
Bor et al. (2021)	1	1											1	1	1	1	1						1	1	1	1	1	100%	High quality
Ngure et al. (2020)	1	1	1	1	1	1	1	1																				100%	High quality

Table 4:
Summary of Included Studies

Author & Year	Title of the Study	Study Design	Setting	Population	Limitations	Key Findings
Kohi et al. (2010)	<i>The Tanzania HIV/AIDS Nursing Education (THANE) Preservice Curriculum</i>	Mixed methods	Tanzania	Nurse educators	Lack of student supervision; difficulty integrating the THANE curriculum into existing nursing curricula	The THANE curriculum equips Tanzanian nurse educators with essential knowledge and skills to train future nurses in HIV prevention, treatment, and care. This initiative has contributed to improved quality of care for patients, families, and communities affected by HIV in Tanzania.
Mythili et al. (2015)	<i>Effect of U=U Concept Mapping in Improving Nursing Students' Knowledge and Attitudes Related to Care of HIV/AIDS Patients</i>	Quantitative	Canada and Kenya	Healthcare professionals and undergraduate nursing students	Small sample size (n = 73) limits generalisability to other students or professionals	Findings did not identify specific barriers to U=U understanding. The study focused on general teaching methods rather than direct assessment of U=U knowledge.
Vaughan & Költő (2024)	<i>Drivers and Facilitators of HIV-Related Stigma in Healthcare Settings in Ireland</i>	Mixed methods	Ireland	Healthcare practitioners	Conducted with a small national sample, limiting generalisability	76.9% of participants agreed or strongly agreed with the U=U statement, indicating relatively high knowledge levels among healthcare practitioners.
Grace et al. (2022)	<i>Challenges to Communicating the Undetectable = Untransmissible (U=U) HIV Prevention Message: Healthcare Provider Perspectives</i>	Qualitative	Canada	Healthcare practitioners	Limited generalisability beyond healthcare providers closely engaged in HIV or sexual health services	Although most healthcare providers understood U=U, they faced challenges communicating the message due to concerns about the notion of “zero risk.”
Phillips et al. (2018)	<i>Teaching HIV-Specific Content for Pre-Licensure Nursing and Health Professions Students</i>	Mixed methods	Canada, Italy, USA, and Africa	Healthcare providers in higher education	Sampling limitations affected generalisability	Findings revealed a lack of focus on historical, cultural, policy, and legal contexts of HIV/AIDS. The study emphasised the need for long-term, scalable interventions to address knowledge gaps and stigma among healthcare providers and students.
Moseholm et al. (2024)	<i>Infant Feeding Knowledge Among Women Living with HIV and Their Interaction with Healthcare Providers in a High-Income Setting: A Longitudinal Mixed Methods Study</i>	Mixed methods	Denmark, Finland, and Sweden	Healthcare providers	Limited to pregnant women in the third trimester	Healthcare providers caring for women living with HIV must maintain current knowledge on HIV transmission risks during breastfeeding and engage in shared decision-making.
Bor et al. (2021)	<i>Changing Knowledge and Attitudes Towards HIV Treatment-as-Prevention and Undetectable = Untransmissible</i>	Mixed methods	Global (Africa, North America, Europe, Australia)	Healthcare practitioners	Limited relevant studies due to narrow search and publication criteria	Findings revealed inconsistent beliefs about U=U. Some participants believed it required consistent condom use, reflecting a lack of confidence in U=U as a prevention strategy.
Ngure et al. (2020)	<i>“I Just Believe There Is a Risk”: Understanding of Undetectable = Untransmissible (U=U) Among Health Providers and HIV-Negative Partners in Serodiscordant Relationships in Kenya</i>	Qualitative	Kenya	Healthcare providers (clinical officers, nurse counsellors)	Conducted within a specific PrEP project; limited inclusion of HIV-positive partners	Findings showed limited in-depth knowledge and conviction about U=U. The study recommended strategies that account for local social and clinical contexts to enhance understanding.

RESULTS

A total of eight (n = 8) studies met the inclusion criteria for this scoping review (see [Table 4](#)). Five studies employed mixed-methods designs, conducted in diverse regions

including Tanzania; Ireland; Canada, Italy, and the broader African region; the United States; and Denmark, Finland, and Sweden. The African representation included South

Africa, Zambia, Kenya, and Uganda, alongside North America, Europe, and Australia.

Two studies used qualitative designs (Kenya and Canada), and one study applied a quantitative design (Canada).

This review identified **four major themes and corresponding subthemes** summarised in **Table 5**.

Table 5:
Themes and Subthemes

Themes	Subthemes
1. Curriculum Development and Implementation	1.1. Integration challenges of U=U content in the nursing curriculum
	1.2. Effectiveness of HIV care training programmes
2. Knowledge and Beliefs about U=U	2.1. Unreliable beliefs and misconceptions
	2.2. Gaps between theoretical and practical U=U knowledge
3. Communication Barriers	3.1. Persistent HIV-related stigma
	3.2. Behavioural and cultural factors
4. Strategies for Improvement	4.1. Strengthening nursing training programmes
	4.2. Enhancing policy and advocacy guidelines

The key themes and sub-themes identified above emerged through a comprehensive search, screening, and synthesis process across the selected studies.

Theme 1: Curriculum Development and Implementation

A thematic analysis was conducted to determine whether nursing curriculum development incorporates HIV care implementation. One study (n = 1; 13%) indicated that HIV care (excluding U = U) is integrated into nursing preservice curricula to improve the quality of care for patients, families, and communities affected by HIV in Tanzania (Kohi et al., 2010).

Current literature underscores the need for curriculum reform to meet societal needs, future challenges, and national aspirations, moving beyond traditional models (Catacutan et al., 2023). Curriculum development is a vital process that enables educators to design programmes that address specific educational needs (Primrose & Alexander, 2013). Nurse educators’ roles are evolving in response to shifts in healthcare delivery, the prioritisation of health equity, and the need to address diverse population needs in HIV care.

Sub-theme: Integration Challenges

Two studies (n = 2; 25%) reported that integrating U = U into nursing curricula remains limited, particularly in preservice nursing education (Phillips et al., 2018). A lack of knowledge among nurse educators and institutional resistance were also observed (Kohi et al., 2010). Despite research on frontline providers, there remains a paucity of studies on nurse educators’ U = U knowledge and teaching practices (Zuniga, 2024). Further investigation is needed to assess their confidence, curricular integration methods, and professional development needs.

Sub-theme: Effectiveness of HIV Care Nursing Training Programmes

Phillips et al. (2018) argued that limited emphasis on HIV-specific content in nursing and health professions training is due to insufficient research on HIV education for nursing students and educators. This aligns with Nanayakkara and Choi (2018), who found that healthcare professionals, especially clinical nurses, often hold negative attitudes, inadequate knowledge, and hesitation toward people living with HIV (PLHIV).

Theme 2: Knowledge and Beliefs About U = U

Vaughan and Költő (2024) found that 77% of healthcare professionals strongly agree with the U = U prevention strategy. However, despite scientific evidence, misconceptions persist; many still believe condom use is the only effective prevention method (Ngure et al., 2020). Moseholm et al. (2024) emphasised that healthcare providers caring for HIV-positive women should understand breastfeeding risks and engage in shared decision-making.

Sub-theme: Unreliable Beliefs and Misconceptions

Two studies (n = 2; 25%) indicated persistent misconceptions among health professionals, including nurse educators (Bor et al., 2021; Grace et al., 2022). Such doubts often stem from fears of reinfection and associations between U = U and promiscuity. The literature highlights the need for sustainable and scalable interventions addressing knowledge gaps, skill deficits, and stigma within healthcare education.

Sub-theme: Awareness and Trust Between Theory and Practice
Findings show inconsistencies in awareness levels among healthcare providers and nurse educators, with some

expressing limited confidence in U = U, focusing instead on viral suppression (Bor et al., 2021).

Theme 3: Communication Barriers

Misinterpretations of U = U information pose major communication barriers, as some practitioners fear promoting risk-taking behaviours. Three studies (n = 3; 38%) identified challenges in communicating U = U messages to patients, including concerns about liability if transmission occurs and stigma-related discomfort (Ngure et al., 2020; Vaughan & Költő, 2024; Grace et al., 2022). A South African study further revealed healthcare practitioners' reluctance to discuss U = U due to concerns about adherence and transmission (Onoya et al., 2023).

Sub-theme: Behavioural and Cultural Factors

Communication strategies should reflect local beliefs and practices. Ngure et al. (2020) suggested that adapting U = U education to Kenya's social and clinical environments could improve messaging effectiveness.

Sub-theme: Persistent HIV-Related Stigma

Stigma, defined as the devaluation of individuals based on perceived discredit (Turan et al., 2017), remains a key challenge. Two studies (n = 2; 25%) found that stigmatizing behaviours among nurse educators stem from inadequate U = U knowledge, especially in regions with limited HIV-focused training (Vaughan & Költő, 2025; Phillips et al., 2018). Enhancing U = U comprehension could help address both individual and structural stigma in healthcare systems and academia.

Theme 4: Strategies for Improvement

Four studies emphasised targeted training and education, while two highlighted policy and structural interventions. Clear, evidence-based education and consistent messaging could improve U = U awareness among nurse educators.

Sub-theme: Strengthening Nursing Training Programmes

Effective educational programmes enhance HIV care competence. Okoli et al. (2020) found that 66.5% of participants had discussed U = U with their providers. Nurse educators and policymakers should ensure curricula reflect current HIV research and prevention strategies (SANAC, 2025). The International Council of Nurses (ICN, 2021) also advocates integrating U = U knowledge and stigma-free care into nursing education globally.

Sub-theme: Strengthening Policies and Advocacy Guidelines

Policy and advocacy should create supportive legal and social environments for HIV care and promote academic engagement (Del Rio & Armstrong, 2018). These efforts must address stigma and sustain public recognition that the HIV epidemic persists.

DISCUSSION

This scoping review assessed nurse educators' knowledge of U = U in higher education and identified gaps in curriculum integration, misconceptions, communication barriers, and limited institutional support. Integrating U = U into nursing education offers opportunities for reform (Lightner et al., 2023), though curricular rigidity and slow revision cycles impede progress (Wagner et al., 2025). Misconceptions persist due to outdated HIV narratives and inadequate training (Phillips et al., 2018).

Partnerships with clinical institutions may enhance educators' practical understanding of U = U (Saifan et al., 2021). Policymakers should mandate U = U inclusion in curricula, aligning with WHO's Nurse Educator Core Competencies (Satoh et al., 2020). Approximately 30% of healthcare providers still misunderstand U = U, influenced by demographic and cultural factors (Campbell et al., 2024). Addressing these through curriculum reform, culture-sensitive communication, and professional development could improve practice and reduce stigma (Grace et al., 2022; Tadese et al., 2025).

Incorporating the African Ubuntu philosophy, centred on communal care and ethical responsibility, could further enhance culturally grounded HIV education (Meno et al., 2025; Ngubane & Makua, 2021). Ubuntu-based nursing education fosters compassion, inclusivity, and collaboration (Mulaudzi & Gundo, 2024). Integrating these values into curricula could enhance empathy and knowledge among nurse educators and students.

Implications for Policy, Practice, and Research

Policy Implications

Despite robust scientific backing, the U = U message remains underrepresented in health policies, slowing progress toward UNAIDS 95-95-95 targets (Zuniga, 2024). WHO (2023) emphasises integrating U = U into institutional guidelines and national health education frameworks. This review recommends embedding U = U and Ubuntu

principles into nursing curricula and public health campaigns.

Practice Implications

To meet UNAIDS' 2025 goals, 95% diagnosis, 95% treatment, and 95% viral suppression, U = U must move from policy to practice. Nursing education should focus on motivational interviewing, cultural humility, and effective communication (Grace et al., 2022).

Research Implications

Research on nurse educators' U = U knowledge remains scarce. Future studies should explore curriculum integration barriers, communication efficacy, and institutional factors limiting implementation (Zuniga, 2024).

CONCLUSION

This review revealed that many nurse educators lack adequate knowledge and confidence to communicate U = U effectively. Major barriers include concerns about "zero risk" messaging, stigma, and cultural misconceptions (Grace et al., 2022; Vaughan & Költő, 2025). Integrating HIV care into nursing curricula, together with Ubuntu values, could enhance educators' competence, compassion, and collaboration (Mulaudzi & Gundo, 2024; Wagner et al., 2025). Embedding these principles can transform HIV prevention, reduce stigma, and promote excellence in teaching and learning.

Limitations

Despite a rigorous search process with librarian support, the limited number of published studies on this topic constrains the generalisability of findings.

Recommendation

Further independent studies should investigate nurse educators' knowledge gaps regarding U = U in higher education to inform curriculum development and policy reforms.

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