Strategies to improve the implementation of nurse-initiated management of antiretroviral therapy (NIMART) training: a systematic review

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Research article

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Abstract

Background Nurse-Initiated Management of Antiretroviral Therapy (NIMART) training was introduced with the purpose of improving the knowledge, skills and competence of nurses in providing comprehensive quality care to people living with HIV (PLWH) and facilitating World Health Organisation task-shifting where nurses initiate antiretroviral therapy (ART) rather than doctors to meet the increasing demand of ART drugs. The aim of this review was to identify evidence of training strategies that can improve the implementation and deals with challenges that hinder quality. Methods A measurement tool to assess systematic reviews methodological systematic review tool was used to critically assess selected studies. Studies were sought using multiple databases including CINAHL (EBSCO), Google Scholar, ProQuest, academic journals, SA publications, electronic resources and OAISTER published from January 2012 to February 2017. The initial review of studies yielded 535 results excluding duplications. The screening of full-text articles was conducted, and 33 articles met the eligibility criteria and were included for quality assessment. The rest were excluded. The quality assessment research instrument was used to analyse and synthesise selected full-text articles (n=33). Results The studies indicate that NIMART or HIV training is used interchangeably and has the potential to empower nurses with knowledge and skills. It also has a positive impact on increasing ART uptake; however, nurses still lack confidence and competence to provide comprehensive quality patient-centred care. Studies suggest that a shift from the traditional didactics of lectures or slide presentation methods during training to the use of interactive training strategies that stimulate critical thinking in making decisions about HIV care, followed by mentoring and continuous professional development. Conclusion and recommendation This study reveals that the use of effective training techniques during NIMART training has a positive impact on the learning outcomes, implementation and performance of HIV programmes. The health care system should focus on dealing with barriers that negatively influence NIMART implementation. Given the lack of a framework or model related to NIMART or HIV training, the study recommends the development of a conceptual framework to strengthens the implementation of NIMART training.

Background

This researcher analysed the process of conducting a systematic literature review in studies done in South Africa and globally, from January 2012 to February 2017, on Nurse-Initiated Management of Antiretroviral Therapy (NIMART) or Human Immunodeficiency Virus (HIV) training. The two are used interchangeably in most literature. NIMART training was introduced in response to World Health Organisation (WHO) recommendations of task shifting to tackle the shortage of skilled health care workers, where nurses initiate ART rather than doctors with the aim of achieving the goal of universal access to comprehensive prevention programmes, treatment, quality care and support globally [1]. However, the implementation of NIMART after training and quality is of serious concern in the North West districts. There is a need to increase access to ART to meet the demand according to the South African guidelines and the current universal test and treat (UTT) policy introduced in September 2016 to achieve the 90-90-90 strategy and eventually better health for all people living with HIV (PLWH).

Problem Statement

The Regional Training Centres (RTC) were established to improve the skills of health care workers in order to respond effectively to HIV and AIDS care. The clinical mentorship programme had been introduced to strengthen the knowledge, skills, competencies and confidence of health care workers after training. In addition, guidelines were developed and reviewed according to research findings as well as in-service training was conducted to promote proper NIMART implementation. However, gaps still exist. This was observed during the quarterly and annual monitoring and review of HIV programmes using ART indicators which included HIV/tuberculosis (TB) co-infected, antenatal (ANC) pregnant women, new adults and children initiated on ART and a total number of patients remaining on ART, viral load completion and suppression rate. The general performance of these indicators is fluctuating, and no significant impact is observed despite the increasing number of nurses trained and certified competent. Therefore, this prompted the researcher to conduct a systematic investigation of literature to obtain a better understanding of the problem. Preferred Reporting Items for Systematic and meta–Analyses (PRISMA) was followed to ensure justification for further research and to address several conceptual and practical advances in science. The flow diagram summarised in Figure 1 of the systematic review phases was used [2].

Aim of the study

The purpose of this study was to review the literature to obtain a broader perspective of strategies that can be adopted for training and identifying challenges that hinder implementation and ways to deal with such factors. The objective of the study was to review and analyse primary studies that would provide an in-depth understanding of the facilitation strategies that can be used to strengthen NIMART training and to improve quality in the implementation and management of HIV programmes.

The following review questions were used:

- What is the impact of NIMART/HIV training on HIV management?
- What are the training strategies used in NIMART /HIV training?
- What are the factors affecting or influencing the implementation of HIV programmes?

Implementation is a process of moving an idea from concept to reality (dictionary)., Implementation is also defined as the process needed to bring new practices into widespread use [3]. Therefore, in this study, implementation refers to the process of acquiring knowledge and skills obtained from NIMART training to increase access to antiretroviral drugs (ARVs) and to provide quality comprehensive care through evidence-based practice.

NIMART training had been defined in accordance to the National Department of Health, it was nurses who initiated and managed antiretroviral therapy training in order to increase access to ART [4]. This is an organised process or activity of teaching nurses about nurse-initiated and management of ART by imparting knowledge about the HIV and AIDS, Sexual transmitted infections (STI) and Tuberculosis (TB) (HAST) programme, the provision of clinical mentorship to improve practical skills, confidence and competence in the delivery of comprehensive quality care, treatment and support within primary health care (PHC) level.

Contribution of the study to NIMART training

This study contributes to a broader understanding of training strategies that can be used by the RTC, facilitators and curriculum developers to improve the knowledge, skills, competency and confidence of nurses to provide comprehensive and quality care to PLWH, including being aware of challenges influencing implementation in the health care system. This will also provide a basis for improvement in training and implementation of NIMART, through the findings and recommendations made by researchers. The study also provides guidance to policymakers and district health care system management teams on ways to deal with challenges affecting the implementation and quality of HIV programmes.

Methods

Search Strategy

The methodological quality of the systematic review process was critically assessed using the eleven components of the AMSTAR tool or checklist [5]. The following components were assessed by indicating yes, no, can't answer or not applicable: the design used, the removal of duplicates and data extraction, the performance of a comprehensive literature search, indication of studies that met inclusion and exclusion criteria and the reason, providing the list of included and excluded studies, providing a table with characteristics of included studies, the use of a quality scoring tool to assess studies and be documented, appropriate use of rigour and scientific quality in analysing and formulating conclusions, the use of appropriate tests, reduction of bias and disclosure of conflict of interest (refer to Annexure A).

Information sources and search

A manual search using selected terms was conducted with the help of an experienced librarian and researcher to ensure that the studies were critically analysed. The search terms were divided into three words and later combined. Different databases were searched, including CINAHL (EBCO), scholar Google, ProQuest, academic journals, SA publications, electronic resources and OAISTER. The nominated search terms are shown in Table 1 and databases in Table 2. Both qualitative, quantitative and mixed studies were reviewed for meta-analysis. The search strategy was documented, saved and stored online.

Inclusion and exclusion criteria

Literature with the following topics, published between Jan 2012 and Feb 2017 was included: NIMART OR HIV training, HIV management, factors influencing performance and the impact of NIMART OR HIV training.

The following types of papers were excluded: informal literature surveys with no defined research question or search, data extraction and data analysis process and papers not subjected to peer reviews. When a paper had been published in more than one journal, the most complete version of the study was used.

Primary study selection

After conducting the search, primary or original full-text studies were selected using the PICOS review protocol or criteria. These studies were assessed based on participants, phenomena of interest, context and type of studies as indicated in Table 3. The list of rejected studies was compiled indicating reasons for rejection,

checked, discussed and agreed upon with an independent researcher. Most of the studies excluded were abstracts, magazines and newspaper articles.

Quality assessment

The quality of the original studies chosen for the review was critically screened using the Quality Assessment Research Instrument (QUARI), developed by the Joanna Briggs Institute (JBI) in 2014, as indicated in Table 4. The QUARI has ten evaluation criteria, which include author, name, year, country, and purpose of the study, participants, design, data collection, data analysis and key findings [6]. Studies that had scored 5 or fewer points were excluded from the review to ensure quality.

Data extracted and synthesis

Full-text studies were extracted (n=33) and considered for systematic review and analysis. Five were excluded, however, they were used in reference. Data from each paper was checked by another researcher. Microsoft Excel was used to capture, sort and arrange papers in alphabetical order according to the first authors and duplicates were removed (See Figure 1). The studies indicated on Table 4 was reviewed to answer the research questions and to identify interesting trends. Thematic analysis was used to synthesise data. Data were coded, categorised and themes were developed.

Results

The studies selected for analysis were conducted in South Africa, USA, Australia, Kenya, Uganda, Nigeria and Central African countries. Most of the studies were from the rural PHC of South Africa (45%), followed by USA (30.3 %%), Australia (3%) and other African countries (15%). The studies used different methods which included quantitative (n=13), qualitative (n=14) and mixed methods (n=6). A total number of 33 studies were reviewed. Participants among the reviewed studies varied from 15 to 386 and they were mainly nurses, midwives, students, managers in health care, clinical documents, patients and nursing educators. Studies focused on the impact of NIMART or HIV training strategies (n=15), factors influencing NIMART or HIV implementation and management (n=13) as well as those that focused on both training and implementation (n=5). The following themes were developed:

The Impact of NIMART/HIV training strategies on the implementation of HIV programmes

Studies have confirmed that the strategy of nurses initiating ART rather than doctors has a positive impact on increasing ART uptake, although there are still challenges in NIMART training and implementation which affect the performance of HIV programmes as indicated in Table 5. NIMART training can have both positive and negative impacts depending on the strategies used during training [7, 8, 9, 10]. Studies have revealed that nurses feel that NIMART training has empowered them with knowledge and skills to manage PLWH, however, there are still factors that influence implementation, competency and confidence to provide comprehensive quality care. This study's findings show that the use of ineffective, passive, traditional didactics methods of lecturing or slides presentation has no impact on learning and results in inadequate NIMART training. The use of multiple, interactive techniques that stimulate critical thinking to make sound decisions in care is recommended. These strategies include problem-based, reflective and case-based

learning, seminar, clinical simulation, group discussions, practice and feedback. It increases knowledge and confidence in caring for PLWH.

Some studies have indicated that, in service, onsite or facility-based clinical training, continuous professional development, creating a pool of trainers and mentoring have a potential to improve the knowledge, competency and performance of indicators [11, 12, 13, 14, 15, 16]. Pre-service training in the institutions of higher learning is necessary to prepare nurses to care for HIV patients immediately when they enter the health care system [17]. Additional training on Primary care 101 also has the potential of improving the quality of clinical records and the integration of the management of chronic diseases in the PHC clinics. This includes NCD and ART patients [18]. NIMART training includes paediatric HIV and TB /HIV co-infection management, adverse drug reaction, switching therapy and dealing with defaulters. However, nurses still call the hotline to request assistance in dealing with such cases or refer them to doctors. Very few nurses are competent to initiate ART to children and TB/HIV and some still need more practice and mentoring [19, 20, 21]. Another gap identified in NIMART is the lack of training in data management, data elements definition, ART, HTS, TB and other registers. This results in over- or under-reporting [22]. Consequently, inter-professional education, practice, ethics and professionalism are not emphasised in the clinical years of training and need sensitisation including enhancement of mentorship and the use of innovative training strategies [23].

Factors influencing the implementation of NIMART/ HIV training

Studies have revealed different factors, classified as patient, human resource (HR), environmental and structural/health system factors as indicated in Table 5. Nurses who have been trained on NIMART/HIV are reported to have gained knowledge and skills but face the burden of being overworked by high volumes of patients demanding ART. This results in exhaustion and dissatisfaction. High staff turnover leading to a shortage of skilled nurses and unverified data by OPM in the facilities affect the performance of indicators [11, 12, 13, 22, 24].

The patients' factor also adds pressure to the implementation and management of ART. Studies have indicated that poor adherence to ART or TB treatment is associated with poor outcomes. Patients still have challenges regarding modification of lifestyle, e.g. the use of alcohol and it undermines adherence, leads to risky behaviour, alters the immune system and the physiological and effective functioning of drugs. Poor adherence was also evident with a high rate of loss to follow up especially patients who were on pre-ART care or wellness and need tracing and link to care [25, 26].

Some studies have revealed that the health care system or structural factors have negatively impacted NIMART implementation, especially in sub-Saharan Africa, including South Africa. This includes poor integration of services, lack of support, lack of supervision, long waiting hours, inadequate financial resources, equipment and drugs stock-outs, supply chain system, overcrowding, staff attitudes, monitoring and evaluation programmes and poor organisation of work schedules and processes (see Table 6) [13, 27, 28, 29, 30]. There are only three sub-Saharan countries are implementing ART according to WHO guidelines of treatment for all to achieve the 90-90-90 targets, including the universal test and treat policy [31]. Decentralisation of NIMART services increases ART uptake in PHC and rural clinics although it also increases workload [14, 31]. NIMART is widely practised and authorised in policy but not reinforced in regulations, e.g.

SANC, pre-service education [32]. a review of ART guidelines has resulted in early ART initiation and has public health benefits in reducing HIV incidences, morbidity and mortality [33]. However, facility-based in-service training before implementation and mentoring should be prioritised and provided compulsorily.

Environmental factors such as stigma, discrimination and staff attitudes impact negatively on NIMART /HIV implementation and management and contribute to poor adherence to treatment. Studies also support that poor infrastructure, a lack of space and overcrowding expose both clients and staff to cross-infection and affect HIV and TB management. Inadequate security poses a risk to staff, drugs and equipment. Poor clinical leadership role models, support and supervision by unit managers in developing student nurses also exist [34, 35].

Discussion

Studies have indicated that NIMART training has positively increased ART initiations by nurses, however, there are still challenges to improve training and in dealing with factors hindering quality implementation. Most studies have confirmed that the implementation of WHO recommendations of task-shifting on nurse-led ART programme in PHC have yielded a positive impact [9, 29]. Hence, South Africa has the largest ART programme worldwide with about 3.4 million people [36]. Nurses have been reported to have gained knowledge and skills through NIMART training, but gaps still exist regarding competence, confidence and attitude necessary to sustain patients on lifelong ART and to ensure adherence to achieve viral load (VL) suppression. This has a negative impact in reducing new HIV and TB infections, drug resistance and death. Findings from this review suggest numerous barriers that have a negative impact on training and recommends various effective strategies to improve, as indicated in Table 5. The review has illustrated consistently that there are several factors that continue to impact NIMART implementation and hinder the performance of HIV and ART indicators. These include patient social, physical and psychological factors, environmental, structural or health care systems and human capital factors, as indicated in Table 6. Future studies need to consider identifying and finding ways to deal with barriers and should further develop a conceptual framework that will help to improve NIMART training and implementation as there was no framework in the literature reviewed.

Practical implications

Based on the findings and recommendations of the studies analysed**,** integration of theory and practice can be practically achieved by means of interactive critical thinking and training strategies. On the other hand, nurses would improve their decision-making skills and render quality HIV care to PLWH, thus improving the performance of the programme.

Limitations of the studies

The study only focused on full text, reviewed and published studies. Other studies were excluded as they did not comply with the approaches, even though it has valuable information. No conceptual framework or model related to NIMART/HIV training was identified.

Conclusions

Although task-shifting and NIMART training have helped to increase ART uptake, more should be done to provide quality care to PLWH and to strengthen adherence, to reduce loss to follow up and to keep them virally suppressed. Again, measures to improve continuity of HIV care should include the use of interactive training strategies that stimulate critical thinking in decision making about HIV care. Dealing with factors that hinder implementation is of great importance and the development of a comprehensive integrated framework is necessary to guide NIMART training and implementation.

The study has revealed recommendations that can be used to improve the quality of training using strategies that stimulate critical thinking and integrate theory with practice. It is also recommended the introduction of NIMART as a pre-service training to nursing students, providing continuous in-service training on the current development and dealing with barriers affecting the implementation of HIV programmes in the PHC facilities to achieve better outcomes.

Abbreviations

AIDS- Acquired Immune Deficiency Syndrome

ANC- Antenatal Care; ART- Antiretroviral Therapy;

ARV- Antiretroviral;

CPD- Continuous Professional Development;

HAST- HIV and AIDS, STDs and Tuberculosis;

HIV- Human Immunodeficiency Virus;

HTS- HIV counselling and testing services;

LTFU- Loss to Follow up;

NCD- Non-communicable disease;

NIMART- Nurse-Initiated Management of Antiretroviral Therapy;

NRF- National Research Foundation;

PHC- Primary Health Care;

PRISMA- Preferred reporting items for systematic and meta-analyses;

QA- Quality Assurance;

QI- Quality Improvement;

QUARI- Quality Assessment Research Instrument;

TB- Tuberculosis;

UTT- Universal Test and Treat;

VL- Viral Load;

WHO- World Health Organization

Declarations

Ethics and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data material

Not applicable

Competing interest

There is no financial or personal relationship that may have inappropriately influenced us in writing this article.

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Author's contribution

S.H.M and L.M conceptualised, designed the study, data collection through literature search independently, analysed and wrote the manuscript, edited and approved manuscript for the final submission.

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References

1. World Health Organization. Joint United Nations Program on HIV/AIDS. HIV/AIDS programme. Strengthening health services to fight HIV/AIDS. Guidance on provider-initiated HIV testing and counselling in health facilities. Geneva, Switzerland: WHO. 2007 Mar.
2. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Annals of internal medicine. 2009 Aug 18;151(4):264-9.
3. Tout K, Metz A, Bartley L. Considering statewide professional development systems. Applying implementation science in early childhood programs and systems. 2013:243-68.
4. Department of Health. Clinical mentorship manual for integrated services.
5. Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, Porter AC, Tugwell P, Moher D, Bouter LM. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. BMC medical research methodology. 2007 Dec;7(1):10..
6. Munn Z, Moola S, Riitano D, Lisy K. The development of a critical appraisal tool for use in systematic reviews addressing questions of prevalence. International journal of health policy and management. 2014 Aug;3(3):123.
7. Bluestone J, Johnson P, Fullerton J, Carr C, Alderman J, BonTempo J. Effective in-service training design and delivery: evidence from an integrative literature review. Human resources for health. 2013 Dec 1;11(1):51.
8. Chew D, Jaworsky D, Thorne J, Ho M, Andany N, Morin C, Hoffman N, Henshaw C, Rourke SB, Fisher M, Rachlis A. Development, implementation, and evaluation of a student-initiated undergraduate medical education elective in HIV care. Medical teacher. 2012 May 1;34(5):398-403.
9. Iwu EN, Holzemer WL. Task shifting of HIV management from doctors to nurses in Africa: clinical outcomes and evidence on nurse self-efficacy and job satisfaction. AIDS care. 2014 Jan 2;26(1):42-52.
10. Ousman K, Polomano RC, Seloilwe E, Odero T, Tarimo E, Mashalla YJ, Voss JG, O'Malley G, Chapman SA, Gachuno O, Manabe Y. Interprofessional fellowship training for emerging global health leaders in Africa to improve HIV prevention and care: the Afya Bora Consortium. Journal of the Association of Nurses in AIDS Care. 2016 May 1;27(3):331-43.
11. Davies NE, Homfray M, Venables EC. Nurse and manager perceptions of nurse initiated and managed antiretroviral therapy (NIMART) implementation in South Africa: a qualitative study. BMJ open. 2013 Nov 1;3(11):e003840.
12. Mack N, Wong C, McKenna K, Lemons A, Odhiambo J, Agot K. Human resource challenges to integrating HIV pre-exposure prophylaxis (PrEP) into the public health system in Kenya: a qualitative study. African journal of reproductive health. 2015;19(1):54-62.
13. Mbonye MK, Burnett SM, Naikoba S, Ronald A, Colebunders R, Van Geertruyden JP, Weaver MR. Effectiveness of educational outreach in infectious diseases management: a cluster randomized trial in Uganda. BMC public health. 2016 Dec;16(1):714.
14. Nyasulu JC, Muchiri E, Mazwi S, Ratshefola M. NIMART rollout to primary healthcare facilities increases access to antiretrovirals in Johannesburg: An interrupted time series analysis. South African Medical Journal. 2013;103(4):232-6.

15. Oladele EA, Khamofu H, Asala S, Saleh M, Ralph-Opara U, Nwosisi C, Anyaike C, Gana C, Adedokun O, Dirks R, Adebayo O. Playing the catch-up game: accelerating the scale-up of prevention of mother-to-child transmission of HIV (PMTCT) services to eliminate new pediatric HIV infection in Nigeria. PloS one. 2017;12(1).
16. Owens A, Moroney T. Shifting the load: Improving bioscience performance in undergraduate nurses through student focused learning. Collegian. 2017 Feb 1;24(1):37-43.
17. Kurth AE, Jacob S, Squires AP, Sliney A, Davis S, Stalls S, Portillo CJ. Investing in nurses is a prerequisite for ensuring universal health coverage. Journal of the Association of Nurses in AIDS Care. 2016 May 1;27(3):344-54.
18. Mahomed OH, Naidoo S, Asmall S, Taylor M. Improving the quality of nurse clinical documentation for chronic patients at primary care clinics: A multifaceted intervention. Curationis. 2015;38(1):1-2.
19. Smith J, Odera DN, Chege D, Muigai EN, Patnaik P, Michaels-Strasser S, Howard AA, Yu-Shears J, Dohrn J. Identifying the gaps: An assessment of nurses' training, competency, and practice in HIV care and treatment in Kenya. Journal of the Association of Nurses in AIDS Care. 2016 May 1;27(3):322-30.
20. Swart AM, Chisholm BS, Cohen K, Workman LJ, Cameron D, Blockman M. Analysis of queries from nurses to the South African National HIV & TB Health Care Worker Hotline. Southern African Journal of HIV Medicine. 2013;14(4):179-82.
21. Kufa T, Hippner P, Charalambous S, Kielmann K, Vassall A, Churchyard GJ, Grant AD, Fielding KL. A cluster randomised trial to evaluate the effect of optimising TB/HIV integration on patient level outcomes: The “merge” trial protocol. Contemporary clinical trials. 2014 Nov 1;39(2):280-7.
22. Kaposhi BM, Mqoqi N, Schopflocher D. Evaluation of antiretroviral treatment programme monitoring in Eastern Cape, South Africa. Health policy and planning. 2015 Jun 1;30(5):547-54.
23. Byakika-Kibwika, P., Kutesa, A., Baingana, R., Muhumuza, C., Kitutu, F.E., Mwesigwa, C., Chalo, R.N. and Sewankambo, N.K., 2015. A situation analysis of inter-professional education and practice for ethics and professionalism training at Makerere University College of Health Sciences. *BMC research notes*, *8*(1), p.598.
24. Spies LA, Gray J, Opollo J, Mbalinda S. HIV and nurses: a focus group on task shifting in Uganda. Journal of the Association of Nurses in AIDS Care. 2016 May 1;27(3):312-21.
25. Knight M, Van Zyl RL, Sanne I, Bassett J, Van Rie A. Impact of combination antiretroviral therapy initiation on adherence to antituberculosis treatment. Southern African journal of HIV medicine. 2015;16(1):1-6.
26. Kompala T, Moll AP, Mtungwa N, Brooks RP, Friedland GH, Shenoi SV. Impact of nurse-delivered community-based CD4 services on facilitating pre-ART care in rural South Africa. BMC health services research. 2016 Dec;16(1):374.
27. Mathibe MD, Hendricks SJ, Bergh AM. Clinician perceptions and patient experiences of antiretroviral treatment integration in primary health care clinics, Tshwane, South Africa. curationis. 2015;38(1):1-1.
28. Uwimana J, Jackson D, Hausler H, Zarowsky C. Health system barriers to implementation of collaborative TB and HIV activities including prevention of mother to child transmission in South Africa. Tropical Medicine & International Health. 2012 May;17(5):658-65.

29. Uebel K, Guise A, Georgeu D, Colvin C, Lewin S. Integrating HIV care into nurse-led primary health care services in South Africa: a synthesis of three linked qualitative studies. BMC Health Services Research. 2013 Dec;13(1):171.
30. Gupta S, Granich R. When will sub-Saharan Africa adopt HIV treatment for all?. Southern African journal of HIV medicine. 2016;17(1):1-6.
31. Omole OB, Semenya MA. Treatment outcomes in a rural HIV clinic in South Africa: Implications for health care. Southern African journal of HIV medicine. 2016;17(1).
32. Zuber A, McCarthy CF, Verani AR, Msidi E, Johnson C. A survey of nurse-initiated and-managed antiretroviral therapy (NIMART) in practice, education, policy, and regulation in east, central, and southern Africa. Journal of the Association of Nurses in AIDS Care. 2014 Nov 1;25(6):520-31.
33. Meintjes G, Black J, Conradie F, Dlamini S, Maartens G, Manzini TC, Mathe M, Moorhouse M, Moosa Y, Nash J, Orrell C. Southern African HIV Clinicians Society adult antiretroviral therapy guidelines: Update on when to initiate antiretroviral therapy. Southern African journal of HIV medicine. 2015;16(1):1-4.
34. Ndubuka NO, Lim HJ, van der Wal DM, Ehlers VJ. Erratum: Health-related quality of life of antiretroviral treatment defaulters in Botswana. Southern African journal of HIV medicine. 2016;17(1).
35. Walker R, Cooke M, Henderson A, Creedy DK. Characteristics of leadership that influence clinical learning: a narrative review. Nurse Education Today. 2011 Nov 1;31(8):743-56.
36. Simelela NP, Venter WD. A brief history of South Africa's response to AIDS. SAMJ: South African Medical Journal. 2014 Mar;104(3):249-51.

Tables

Table 1: Search terms or keywords

Search keywords	Group
NIMART or HIV training and HIV management	*1*
Impact of NIMART or HIV training	2
Training and HIV programme performance	3
Combination	4
Total	4

Source: author's own work

Table 2: databases and search results identifying the original studies

Databases	Number of original studies
CINAHL (EBSCO)	320
Science direct	56
Expanded Academic ASAP	2
Pro Quest	60
OAISTER	6
Business insight	3
SPORT Discuss	6
SA publications service	37
Cochrane	1
Psych Articles	18
Hein Online	34
SocINDEX	27
No data base	10
SciELO	1
Total	575

Source: Author's own work

**After duplications removed*

Table 3: Inclusion criteria according to the PICOS review protocol

Inclusion criteria	Description
Participants	Nurses, students and midwives trained on NIMART or HIV management, patients, documents, literature
Phenomena of interest	Impact of NIMART training on HIV management
Context	The clinical environment in the PHC level initiating ART
Types of studies	Original qualitative and quantitative studies, peer-reviewed and published during 2012-2017

Source: Author's own work

Table 4: Extracted data from original studies with quality assessments scores

Author and year	Country	Purpose	Participants	Methodology (data collection & analysis)	Key findings	QA	comments
Azia et al, 2016	South Africa	Describe challenges faced by patients on ART with regard to adherence to treatment	18 non adherence patients on ART	Descriptive qualitative study, purpose sampling , semi structured interview, manual thematic analysis	Inadequate follow-ups , lack of confidentiality Stigma, unemployment, lack of transport, insufficient ,disability grants were identified as major barriers to adherence	9	Strong Included
Byakika-kibwika et al, 2015	Uganda	Situational analysis of inter professional education and practice for ethics and professionalism training to guide development of a relevant training curriculum of ethics and professionalism	236 under graduate students, 32 teaching health professionals	Mixed methods designs, Cross sectional study, questionnaires and FGDs and key informant interviews Descriptive	Inter-professional education ,practice ,ethics and professionalism are not emphasize in the clinical years and need sensitization and enhancement of mentorship and innovative training strategies	8	Strong Included
Bekker et al, 2016	South Africa	To provide guideline on the use of PrEP (Tenofovir TDF/ emitricitabine FTC)to users and health care workers	17000 people from Uganda, Kenya, Botswana	10 random controlled trial on TDF based PrEp reporting HIV outcomes	Reduction of HIV requisition risk by 51% on women and men Development of PrEp guidelines for southern Africa	7	included in references
Bluestone et al, 2013	USA	To identify effective training approaches for health worker continuing professional education (CPE)	37 full text studies reviewed .32 randomized controlled trials	Programme evaluation , randomized control trial	Evidence suggest that the use of multiple techniques that allow interaction and enables participants to process and apply information and	7	Strong Included

					this includes : case base learning , clinical simulation, practice and feedback, didactics that involve passive instructions such as reading or lecture has little or no impact on learning outcomes		
Chew et al, 2012	USA	*Development, implementation and evaluation of a student – initiated undergraduate medical education elective in HIV care to increase knowledge among students and prepare them to serve the affected population*	18 second year students	Programme development, description and evaluation Self-assessment of HIV knowledge prior and after Preclerkship HIV elective. Using different teaching strategies: lecturers, small group discussions, clinical observations, community placements, reading assignment, HIV counselling and testing workshop, liker scale	Increase knowledge and confidence in serving the PLWH	8	Strong Included
Colombini et al 2014	USA	Review evidence on the factors influencing maternal and infant drug adherence to preventing MTCT drug regimens at delivery in Sub Saharan Africa	14 studies on adherence published Jan 2003-september 2011	Quantitative research designs	Studies reveal the following as factors influencing adherence Quality and timing HCT, late distribution of NVP socio demographic factors	8	Strong Included
Crowley and Stelleberg, 2015	South Africa	To evaluate the adequacy of pharmaceutical services for the	20 PHC Facilities in KZN 12 provincial and 6 local	Quantitative descriptive study Data collection instrument developed in line	Insufficient storage space, inadequate security, poor a stock outs of	8	Strong Included

		provision of ART in PHC clinics.	government clinics	with WHO M & E ART tool Structured observation Microsoft excel No parametric test	essential drugs, PN performed task of managing drugs supply, prescribing and dispensing medication as there is no pharmacy or pharmacy assistant This add strains to PNs		
Davies et al, 2013	South Africa	Explore nurses, facility and programme managers perceptions of NIMART implementation	25 nurses and 18 managers	Qualitative , FGD interviews, purposive sampling	Nurses and managers felt empowered by this role despite challenges of shortage of HR , inadequate training, clinical mentoring and health systems issues	8	Strong Included
Duncombe et al, 2015	USA	Development of HIV care patient centred framework that will get more people on ART before they became ill	30 full text studies	Systematic literature review	Literature and examples of models and evidence of impact was used to develop a Framework for delivering HIV care and treatment: people centred. Cost effective and acknowledge of best practices	6	Included
Iwu et al, 2014	USA	Evaluate the impact/ outcome of task shifting in nurses initiating ART	34 literature reviewed	Systematic review on Full text task shifting publications, in depth review	Literature support that nurses in Africa can provide quality HIV care with excellent outcomes through acquisition of knowledge , skills and mentoring	7	Strong Included

Kaposhi et al, 2014	USA	Evaluation of ART programme monitoring for evidence based decision making	34 facilities providing ART by nurses in rural sub districts	Qualitative study, purposive sampling Semi structured interviews , data quality audits SPSS version 19 used to analyse data	Over reporting of data due to lack of training on ART registers , data elements definition during NIMART, Data verification not done by OPM, ,staffing levels, shortage of NIMART trained nurses,	6	Strong Included
Knight et al , 2015	SA	Determine the impact of combination ART initiation on adherence to TB Rx to reduce reluctance among health care workers to start combination ART in TB patients	50 TB/HIV patients with CD4 count 50-350 cells/mm. Sept 2011 –Oct 2012	Prospective observational cohort study, self-report , pill count, electronic medication event monitoring system before and after ART initiation Questionnaire , medical files review analyses	Decreased adherence to treatment in patients with TB /HIV infection and associated with poor outcomes, development of resistance and requires adherence support	8	Strong Included
Kompala et al; 2016	USA	To determine impact of community based CD4, Testing services on facilitating Pre art	160 HIV positive adults, 18 PHC facilities	Retrospective study , comparing before & after the presence of , questionnaire phlebotomy nurse Tracing of patients, referred to local facility for initiation based on eligibility criteria, Chi Square test	7213 access screening services, reduced loss of pre ART care and facilitate timely access to ART. availability of CD4 phlebotomy may reduce loss	8	included
Kufa et al, 2014	USA	To evaluate the effect of an intervention to optimize TB/HIV service integration on mortality, morbidity and retention in care among newly diagnosed HIV and TB positive patients	18 PHC clinics	18 Randomized trial, intervention and control group, , ANOVA statistical analyses		6	Strong Included
Mack et al,	Kenya	Identify HR	16 public health	Qualitative study	Increased work	8	Strong

2015		challenges to integrating HIV PrEP in to public health system in Kenya	stakeholders	Semi structured Interviews	load, insufficient , HIV care and treatment most overburden staff, training for existing and new staff , create pool of trainers, facility based trainings, continuous education and training and mentorship Poor infrastructure : space, furniture, lab equipment's, storage , discrimination and stigma		Included
Mahomed et al, 2015	South Africa	Establishment of structural clinical record as guide for chronic disease management to improve the quality of clinical records at PHC	30 PHC ICDM initiating clinics ,6 months study 20 PHC clinics 10 intervention sites and 10 control sites stratified random sampling	Quasi comparison experimental study clinical document review. pre (PC 101 on-site training) and post intervention, HIV patients on ART and NCDs 19 records per single lot structured data collection tool piloted	PC 101 has the potential for improving the quality of clinical records for patients with chronic disease in PHC clinics	9	Strong Included
Makhado and Davhana-Maselesele, 2016	South Africa	To determine knowledge, insight and uptake of occupational post exposure prophylaxis amongst nurses caring for PLWH	233 nurses (ENA, EN, PN	Quantitative Cross sectional descriptive design, stratified sampling, parametric and non-parametric statistics, Questionnaire, SPSS21	Nurses are highly exposed to HIV but still lack knowledge on PEP , not sure if the service is available in their facilities and did not receive PEP and to be address in policy , guidelines and programmes	9	Strong Included
Maphutego et al, 2015	South Africa		ENs=1/PNs=33/ Drs=1	Exploratory descriptive	Inadequate training on	7	Strong Included

				qualitative Design. FGDs, questionnaires	NIMART, Poor integration of services and support , poor infrastructure and , long waiting hours , staff negative attitudes, poor organization of work schedules and processes		
Mbonye eta al, 2016	South Africa	Determine effectiveness of educational outreach in infectious disease management	36 health facilities , mid-level practitioners 9 clinical officers, RNs or midwives participated on 3 weeks training	Cluster Randomized intervention (training and Onsite support, CQI) -control study , pre and post changes , mixed design medical records review/ audit , secondary data analysis capture in EPI info version3.2, Ms Excel frequency	Improved management of cases and performance of indicators with combination of OSS and training however workload was not address	8	Strong Included
Ndubuka et al, 2016	South Africa	Not indicated	4 ART clinics,104 adult ART patients for 12 months who has stopped taking ARVs for 3 months	cross sectional quantitative and , explorative , questionnaires translated in local language, descriptive statistic	Inadequate social and environmental support structures, stigma, poor financial resources , physical living conditions and insecurity lead to poor adherence and defaulting ART	8	Strong Included
Nyasulu et al, 2013	South Africa	Impact of decentralization of NIMART rollout on the referral hospital by applying ten steps	17 PHC facilities	Quasi experimental design, interrupted time series analysis, Compare ART before -2009 and after 2010 From DHIS 2012Intervention: 5 days training, pre and post-test, mentoring	45 PNs trained & mentored Increased ART uptake by average of 9 monthly in PHC clinics. referral facilities initiations decreases by average of 18 monthly Inc. workload,	9	Strong Included

				Statistical analysis, auto correlation (Durbin-Watson statistic), excel	however capacity building , training, mentoring and integration was still lacking to ensure quality, partner driven , lacks DoH buy in		
Nyasulu et al, 2013	South Africa	Impact of decentralization of NIMART rollout on the referral hospital by applying ten steps	17 PHC facilities	Quasi experimental design, interrupted time series analysis, Compare ART before -2009 and after 2010 From DHIS 2012Intervention: 5 days training, pre and post-test, mentoring Statistical analysis, auto correlation (Durbin-Watson statistic), excel	45 PNs trained & mentored Increased ART uptake by average of 9 monthly in PHC clinics. referral facilities initiations decreases by average of 18 monthly Inc. workload, however capacity building , training, mentoring and integration was still lacking to ensure quality, partner driven , lacks DoH buy in	9	Strong Included
Oladele et al, 2017	Nigeria	Assessment to build to up evidence and provide baseline to Accelerate scaling up of PMTCT services in order to eliminate new paediatric HIV infections	Multiple stakeholders: health ministry, DG, project managers, AIDS coordinators, Dir. PHC , regulatory bodies4176 facilities with ANC services from 8 states(private and public)	Mixed methods 10 months project Qual-Opinions of health care workers , Key informant interviews Quant-Checklist /questionnaire ,descriptive statistics	Roll out model: onsite training of public, NGOs, traditional leaders and healers and private health care workers (7224). Followed by post training two days hands on support by Multi-disciplinary activation teams, deploy	9	Strong Included

					resources. Continued fortnight onsite mentoring teams Facility coverage ↑8-50%Access to HCT by pregnant woman 246%Access to ART 152%		
Omole et al, 2016	South Africa	To assess the treatment outcomes of an HIV clinic in rural areas	2CHC , 18 PHC clinic Adult patients initiated on ART 2007-2008	Retrospective cohort study 124 Medical files review systematic random sampling Data collection tool, pilot study , EPI info version 6, STATA version 9.0 descriptive analysis	Good treatment outcomes is achievable in rural HIV clinic in SA however VL sand adherence support for pregnant women should be enhanced to reduce MTCT	6	Strong Included
Ousman et al, 2016	USA	Recruit and train African partnering institutions to provide leadership training on HIV management, 5 year programme 2012-2017 sponsored by PEPFAR, HRSA, OAR from USA	100 inter health care professionals leaders form public, private and academic institutions (43 nurses, 56 physicians, PH 2, Pharmacists , 1) 86 from Africa (Botswana, Kenya, Uganda, Tanzania, Cameroon, countries and 14 USA	Programme development and evaluation Transformative and innovative leadership and HSS training conducted. Participant feedback and direct observation, journal entries, skills log books signed by attached mentor used to assess trainees Biannual survey of the impact of the programme through alumni Self-report , competency based assessment and E of ,indicators attach to each programme	Teaching and learning strategies have been introduced, modified and enhanced to strengthen the training experience e.g. more interactive learning , shift from didactic PowerPoint slides presentation to seminar , case based and reflective learning through sharing of work place experiences work, collaborative learning groups used to dissect, and analyse	8	Strong Included

					solutions to complex systems issues, challenges and barriers to health care Faculties assign HIV management modules to provide diverse perspective on the Basic and advance learning modules developed Serviced based learning to improve health care professionals and administrative personnel in improving healthcare systems and HIV care delivery Building capacity to African nursing and medical schools including international council of nurses		
Owens and Moroney, 2015	Australia	To determine which three different intervention would assist student performance in a nursing bioscience	182 high school students 44 underperforming students	Comparative study of performance and entry mark to the course Prior nursing bioscience learning , human body club and online self-learn smart on bioscience SPSS	Good high school science did improve student performance unlike prior learning workshop Student centred learning improved performance , however human body club was most effective	8	Strong Included

					as it provided additional support		
Relf et al, 2011	USA	Support HIV prevention , care and treatment through training and HSS in response to the epidemic	Educators, clinicians, policy regulatory and experts from sub Saharan Africa	Participatory action approach	The need for competency based education, orientation and continuing competency validation as part of license renewal which include knowledge (mental & cognitive abilities), skills (motor abilities) and attitudes (use of cognitive learning ,critical thinking and make appropriate decisions)These competencies should be used to redesign nursing and midwifery curriculum to provide a holistic perspective of HIV and AIDS nursing practice	6	Excluded because it was published before 2012
Shneider,et al, 2014	South Africa	Determine the impact of alcohol on HIV prevention and treatment	Literature with alcohol risk factors ,	Narrative review of relevant literature, AUDIT tool with ten questions to identify severity of the problem use in PHC	Heavy chronic alcohol consumption alters physiological and biological functioning of the body cell , risky sex , drug interaction and immune system and undermines adherence	6	Number of literature, sources and inclusion criteria was not indicated

					Nurses need training to provide guidance on the drug interaction and confront barriers		

Table 5: Thematic analysis of the NIMART/HIV training strategies

Theme1: Positive strategies impacting on NIMART/HIV training	Use of Interactive teaching strategies to stimulate critical thinking which includes problem-based, reflective, case studies and seminars.
	Use of competency-based education and training
	capacity building and training through pre-service
	Onsite training on PC 101 training improves recording and integration of non-communicable diseases (NCDs) with HIV
	Onsite continuous facility training on current development and gaps.
	Continuous professional development and onsite facility mentoring
Theme 2: Negative strategies impacting on NIMART/HIV training	Ineffective training methods which include the use of traditional didactics like lecture methods and slides presentation have no impact on learning and implementation.
	A lack of pre-service NIMART training in institutions of higher learning makes students lack skills to manage HIV.
	Inadequate clinical onsite mentoring, partner-driven only.
	Inadequate in-service training on current developments
	A lack of continuous professional development (CPD) to improve knowledge and skills.
	Inadequate and unskilled trainers
	Inadequate training period (5 days).
	Unintegrated training curriculum in pre- or service training and education
	Inadequate training on data management, elements definition, clinical registers or stationery.
	Inadequate training & implementation of PC 101.

Source: *Author's own work*

Table 6: Thematic analysis of factors influencing the implementation of NIMART/HIV training

Theme 3: Structural or healthcare System factors	Lack of regulation on NIMART
	Inadequate follow-ups and tracing
	Drugs stock-outs
	Long working hours
	Poor work schedules and processes
	Poor integration of services
	Stigma and discrimination
	Inadequate leadership role model
	Poor management support
	Poor clinical supervision
	Poor data management
Theme 4: Environmental factors	*Poor infrastructure Not enough space for clients*
	Overcrowding
	Not enough space for storing drugs
	Inadequate security Exposure to infection
Theme 5: Health care provider factors	Negative staff attitudes
	Staff overworked/ overburden
	Dissatisfaction
	Lack of confidence
	Shortage of skilled healthcare workers
	Nurses still performing work of pharmacists
	Poor data verification
	Inability to interpret lab results
	Poor competence
	High staff turnover
Theme 6: Patient factors	Poor lifestyle
	Poor Adherence
	Stigma and discrimination, lost to follow up (LTFU)
	Social, Psychological & physical factors

Source: author's own work

Figures

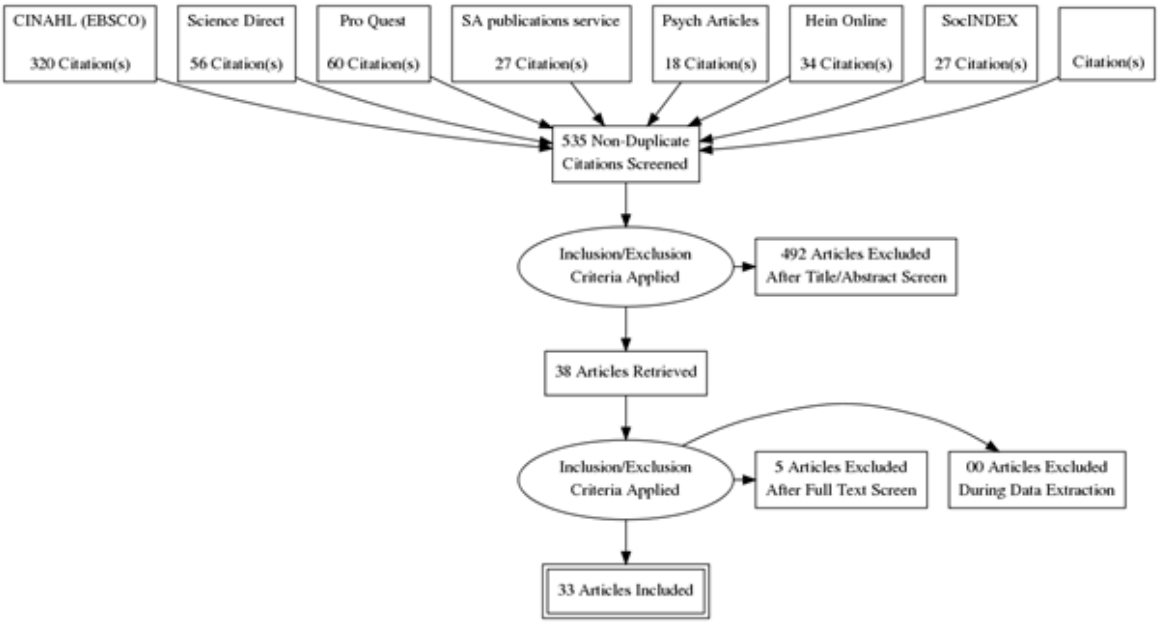

Figure 1

PRISMA flow diagram