ORIGINAL PAPER

Conceptual framework to strengthen NIMART implementation in mobile health clinics in eThekwini Municipality, KwaZulu-Natal Province, South Africa

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Abstract

Introduction: Human immunodeficiency virus (HIV) care within HIV hyperendemic eThekwini municipality remains a public health challenge. Non-availability of any formal framework to support HIV care delivery within the mobile health clinics (MHCs) needed attention. Aim of the study was to develop a conceptual framework to strengthen and improve the utilization and delivery of HIV care within the MHCs of eThekwini municipality. The study was conducted in eThekwini District of KwaZulu Natal Province.

Material and methods: An explanatory descriptive simultaneous QUAL+quant+qual multimethod study design was employed on 13 MHCs nurses, 137 MHCs and 12 MHCs managers, preceded by a systematic literature review on HIV care delivery in MHCs and Donabedian's model and Dickoff's theory was adapted for development of the framework following data analysis for individual studies employing descriptive statistics and Atlas.TI respectively.

Results: The researchers performed meta-inference and interpreted the qualitative findings from two studies and descriptive results from the quantitative study. Following findings obtained from the systematic review. Multiple themes emerged from the review, operations, and managers suggestive that gross lack of standardized HIV care exists in the MHCs, with multiple challenges spreading across operations and management. While infrastructural challenges exist. Various suggestions also emerged from the study and formed bases for construction of the conceptual framework.

Conclusions: The developed NIMART strengthening framework for MHCs addresses current contextual challenges addressing stakeholders, context, dynamics, procedures, and outcomes concerning HIV care in MHCs in line with the universal HIV care and support framework.

HIV AIDS Rev 2026; 25, 2: 151-164
DOI: https://doi.org/10.5114/hivar/183135

Key words: NIMART, HIV care, conceptual framework, mobile health clinics, mobile health clinic managers.

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Article history:
Received: 28.11.2023
Revised: 24.01.2024
Accepted: 26.01.2024
Available online: 10.06.2026

International Journal of HIV-Related Problems
HIV & AIDS Review

Introduction

According to the Statistics South Africa, about 8.45 million people in country in mid-year 2022 were reported living with human immunodeficiency virus (HIV), constituting almost 14% (13.9%) of the entire population [1]. Females of reproductive age (15-49 years old) carry the highest burden of the epidemic [2], accounting for 64% of all HIV-infected individuals [3]. This makes South Africa the leading country in the world, with the greatest number of people living with HIV (PLWH) [4]. Although antiretroviral therapy (ART) was introduced for dual-purpose of preventing and managing the disease, research indicates that new infections remain at high-rate [4]. Remarkably, to date, South Africa has the highest number of ART programs in the world [5], and nurses are the main drivers of decentralized ART programs in various communities via primary healthcare clinics (PHCs), which deliver 90% of antiretroviral treatment [6]. Nevertheless, research reveals that more people still need to be included into ART programs [7], as not every HIV-infected person has access to ART.

Mobile health clinics (MHCs) are strategically located, as they are used as an extension of primary healthcare clinics [8] to offer similar services as in PHCs. Primarily driven by the country's clinical and public health priority issues according to burden of diseases, the HIV-tuberculosis (TB) syndemic tops the list of communicable diseases in South Africa [9]. Therefore, it could be said that the MHCs contribute to universal ART coverage by increasing its access, and providing necessary HIV care and support to PLWH at the community level.

HIV care and support are described as the key of non-ART clinical services, treatment of HIV-related infections, and non-clinical services, which in combination with ART contribute to reduction of morbidity and AIDS-related mortality among PLWH [10]. Benefits of HIV care and support include immediate facilitation of access to treatment upon individual's HIV diagnosis, support adherence to treatment in order to attain viral suppression among PLWH, improvement of prevention and management of HIV-related infections, and enhancement of coping with challenges of living with HIV [10]. Evidence has emerged confirming that there is no difference between HIV care provided by nurses and that provided by doctors. More favorable outcomes on adherence and retainment to care were noted in the nurses' arm of a study [11].

HIV care in a MHC setting is no different to that of PHC in terms of treatment delivery, since nurses are responsible for its provision, apart from the absence of a medical doctor's support. Also, nurses are the only human resource for health cadres available, and are responsible for all activities within that context. Their ability to deliver competent HIV care and support services is achieved through nurse-initiated management of antiretroviral therapy (NIMART) training, even though only 23% of the 92% of nurses working in mobile clinics who had undergone NIMART training are certified [12]. However, a lack of standardization of HIV care across all the MHCs in eThekwini was observed [13], revealing different approaches in providing HIV care services. This is a cause for concern, because whatever type of care is provided impacts the patient and HIV treatment-related outcome. Therefore, a structured framework that will guide HIV care delivered in MHCs is essential and urgent. Such a framework should also include recommendations for involvement of mobile clinics managers, as those in charge of managing the MHCs in the eThekwini District have limited power and cannot exercise supervision of HIV-related services and other activities. Moreover, majority (92%) of the managers were not located in MHCs, holding additional managerial roles beyond mobile clinics [13] that greatly impacted monitoring and evaluation of the services. The framework should further ensure the integration of a multidisciplinary HIV care model, given its outlined benefits in the literature [14], particularly within the district and province with the highest numbers of adult PLWH [4, 15] and pregnant woman population [2].

In the absence of a structure guiding HIV care in MHCs, this study aimed to develop and describe a conceptual framework (CF) to strengthen NIMART implementation in the MHCs of eThekwini Municipality, KwaZulu-Natal Province. A systematic review highlighted multiple gaps, including fragmented HIV care and support services that are provided in MHCs, meaning that selected HIV care services only are available [8]. In addition, neglecting to address core activities, such as initiating newly diagnosed HIV-positive patients on treatment and linking them to care, monitoring of viral suppression and immunosuppression while screening for TB, and offering prophylaxis of co-trimoxazole due to extensive HIV-TB co-infection in South Africa, were demonstrated [16]. Therefore, the developed CF will address the major challenges associated with HIV care provided in the MHCs of eThekwini Municipality, KwaZulu-Natal, which will also promote standardization of HIV care across all mobile clinics. The objective of this paper was to discuss the development of CF for strengthening HIV care implementation in the MHC setting.

HIV care and NIMART in this paper were used interchangeably. The provided HIV services in MHCs should include as follows: 1) linkage to care for immediate initiation of ART for newly HIV-diagnosed individuals, with clinical and laboratory monitoring, including viral load; 2) TB screening; 3) co-trimoxazole prophylaxis; 4) optimization of retention in care and adherence to ART, as per the United States President's Emergency Plan for AIDS Relief (PEPFAR) 'universal' HIV care and support framework recommendations [8, 17].

Material and methods

A two-phase, explanatory-descriptive, simultaneous, study was conducted using QUAL+quant+qual multimethod study design [18], which was preceded by a systematic review. Findings from all phases of the study influenced the development of a CF. MHCs, operated by local health municipality and the Provincial Health Department, were included in the study to describe and evaluate HIV care

delivery, such as exploring factors influencing HIV care implementation from operational and managerial perspectives, as conducted in various studies.

A CF was pre-assumed based on the findings of QUAL+quant+qual multimethod study design [19]. Dickoff, James, and Wiedenbach's [19] practice-oriented theory and Donabedian's structure, process, and outcomes (SPO) model [20] were used concurrently to classify and categorize the characteristics, activities, and functions of NIMART HIV care implementation within MHCs. SPO model was primarily involved during empirical phases of three studies, while the theory informed overall elements of conceptual framework, which was influenced by all phases of the study. In order to determine the ideal framework, both the theory and model were employed because of their existing reciprocal relationship, which formed a base for the development of CF, by examining distinctive characteristic activities as well as functions outlined and described through the process of abstraction, starting from the concrete level of experience to the higher level of abstraction [20].

Furthermore, criteria for selecting the most appropriate characteristics describing the phenomena were used, which were thoroughly and mutually exclusive, as recommended in the literature [21]. Relationship between the typical characteristics, activities, and functions of NIMART implementation of HIV program was described. Table 1 summarizes the activities undertaken in each phase of the study, organized by stage, while further refinement was performed to eliminate overlapping activities.

A purposive sampling of professional nurses working in the MHCs from various sub-districts of the eThekwini Municipality was done, and a total of 13 nurses participated in the study. Operational factors influencing NIMART (HIV care) were explored and described within mobile clinic context from nurses perspectives who were responsible for all procedures in that setting. Semi-structured, in-depth individual online interviews were conducted with these selected 13 MHC nurses who provide HIV care, following obtaining their consent. Since the study was performed during the COVID-19 pandemic restricting face-to-face interviews, researchers had to employ this socially distant method when collecting data [22].

A total population sampling (TPS) of all MHCs within the eThekwini district was conducted. According to the literature, when the number of cases investigated is relatively small, the total population should be considered [23]. Also, it is advisable to include all the subjects in an evaluation study, especially if the total population is less than 200 [24]. Therefore, one hundred thirty-seven mobile clinic points were included for descriptive evaluation of all MHCs, to outline and depict NIMART services within the eThekwini District of KwaZulu-Natal. Additionally, due to lack of homogeneity within MHCs, the researchers aimed to include all MHCs. Descriptive research is an exploration and description of phenomena in real-life situations; it provides accurate accounts of the characteristics of particular individuals, situations, or groups [25].

Finally, MHCs managers were purposely selected to participate in a qualitative, exploratory, and descriptive inquiry to explore the managerial factors influencing NIMART implementation. Twelve MHC managers from various subdistricts within the eThekwini Municipality, supervising MHCs belonging to provincial and local governments in the district, were enrolled. A qualitative, exploratory, descriptive (QED) design was used to examine and describe operational and managerial factors influencing the implementation of NIMART services in MHCs of eThekwini Municipality. QED research approach helped the researchers gain insight into the real-world context, with participants experiences, accounting for what was working and what was not [26]. Moreover, it enabled the researcher to obtain a detailed account of the phenomenon of concern and to capture meaningful characteristics of real-life events [26]. Significantly, QED study design is suitable when the problem is unknown or too complex to be captured by other methods (e.g.,

Table 1. Research designs and methods before developing the conceptual framework [8]

Stage	Design	Population	Sampling	Sample size	Context
Phase 1	Systematic literature review	All full-text articles	Multimodal	25	Global
Phase 2	Explorative design	Nurses working in the MHCs	Non-probability purposive sampling	13	eThekwini municipality of KwaZulu Natal
Phase 3	Descriptive programme evaluation	MHC points	Total sampling technique	137	eThekwini municipality of KwaZulu Natal
Phase 4	Explorative design	Mobile health clinic managers	Non-probability purposive sampling	12	eThekwini municipality of KwaZulu Natal
Phase 5	Dickoff *et al.*'s (1968) practice orientated theory and Donabedian's (1996) structure, process, and outcomes (SPO) model	MHCs, MHC nurses, MHC managers	Purposive and total sampling technique	13 nurses, 137 MHCs, 12 MHC managers	eThekwini Municipality of KwaZulu Natal

questionnaire surveys) [26]. In this study, since evidences on HIV care provision within MHCs from either nurses' or managers' perspectives were not available, QED model was believed to be a highly pragmatic approach, enabling answering concrete and practical 'what' questions, such as those addressed in this study [26].

Prior to empirical research being embarked upon, a systematic review of cross-sectional descriptive studies, randomized clustered trials, and mixed-methods research conducted between 2011 and 2020, was included and evaluated using CAPS [8]. SPICE conceptual framework tool was used to define the review question being, "What universal HIV care and support services are available at MHCs?". A total of 25 global studies met inclusion criteria and were encompassed in the review.

Ethical consideration

The study received approval from a local university's Ethics and Research Committee (approval number: NWU 00934-19-A1), while permission was granted by the Local Provincial Department of Health (ref no: KZ_202002_017) and Local Health Authority (ref no: 30/1/1/6/3/). Voluntary, written consent was obtained from all participants, who were informed of their rights to withdraw from the study at any time. Data collected were recorded after permissions were granted, and kept under lock and key. Privacy, anonymity, and confidentiality were maintained throughout all procedures in accordance with ethical conduct.

Reliability of the study findings was enhanced through a multimethod design, participants' validation, and safe storage of all tape-recorded data and notes for future references. The researchers also spent time with participants until data saturation was achieved; at this point, no new information was obtained from datasets, allowing data to be examined and amplified.

Results

As outlined in Table 1, the combination of results from the first four phases of the study informed the development of a conceptual framework to strengthen HIV care provision by nurses in MHCs. Twenty-five studies providing HIV care in remote settings demonstrated that inconsistencies in HIV care within MHCs resulted in various themes, as presented in Table 2. Three themes and eleven sub-themes emerged from the qualitative study of nurses responsible for operational activities within MHCs. Table 3 depicts all the themes and sub-themes, which nurses reported towards implementing HIV care in MHCs.

The morphology of eThekwini District's MHCs is depicted in Figure 1, outlining the current status of operating authorities, travel modalities, times, and distances to MHC points, terrain, basic municipal services, and the availability of MHC services per month.

The staff availability profile in MHCs is detailed in Figure 2, showing the categories, training levels, and the number of members available to provide HIV care and support. Figure 3 further demonstrates the support staff involved in MHC's activities.

Various methods of MHC services delivery within the district are demonstrated in Figure 4.

Specific HIV care-related activities are presented in Table 4, providing better understanding of the nature of HIV services available throughout the District.

Themes that emerged from the manager-focused qualitative investigation are shown in Table 5. The managers' perspectives are valuable views, as they hold a span of control on the actions taken place within MHCs.

Meta-inference and interpretation of the quantitative and qualitative results were conducted to supplement the quantitative findings, yielding the following conclusions.

Multiple factors affecting the realization of successful HIV care provision within MHCs

MHCs revealed that multifaceted factors were consistent with healthcare operational and system failures, contributing significantly to inadequate services offered to those who need HIV care. These services are not comprehensive, but rather fragmented or selective in nature, whereas only a certain aspect of HIV care is executed. The rest of the services

Table 2. Themes about HIV care in the MHCs found in the literature [8]

Theme 1: Fragmented or selected universal HIV care and support services available at Mobile Health Clinics
Theme 2: Lack of local support for HIV care and support services from ministries of health
Theme 3: Success relies on multiple stakeholders' engagement: 3.1. Involvement of local leadership 3.2. Partnership with existing healthcare institutions 3.3. Training and mentorship
Theme 4: Excellent platform to reach marginalized population and expanding healthcare access
Theme 5: Possible multi-health programme delivery
Theme 6: Implementation of critical viable point-of-care services
Theme 7: Follow-up care leads to successful health outcomes for patients attending MHCs

Table 3. Themes and subthemes emerged from nurses exploring the operational factors influencing NIMART implementation in MHCs [8]

Themes	Sub-themes
1. Patient-related factors	1.1. Patients defaulting treatment
	1.2. Lack of privacy for the patients
2. Nurse-related factors	2.1. Unavailability of phones to make official calls
3. Organizational factors	3.1. MHCs are stressful and demotivating
	3.2. Nurses feel unsafe at MHCs
	3.3. Lack of support from management
	3.4. Lack of budget
	3.5. Unavailability of computers
	3.6. Shortage of medical equipment
	3.7. Shortage of nursing personnel
	3.8. Absence of data capturers

needed should be sourced elsewhere, such as in a fixed clinic or hospital. Table 4 and Figures 1 and 4 outline the types of services and the profiles of MHCs. This becomes a significant disadvantage for PLWH, as they need additional time, money, and effort to receive appropriate care. Such factors vary from one MHC to another, and include privacy, information technology, staffing, transportation, communication, collaboration with relevant stakeholders, essential municipal services, and medical equipment.

Lack of privacy

Dignified care is rooted in ethical principles and human rights, with privacy at its core. However, a significant lack of privacy is prevalent due to the nature and setting of MHCs. Nurses in the operational study reported that patients were often reluctant to be seen spending extended time with the nurse during consultations, as longer consultation times were frequently interpreted by other patients as an indication of HIV-positive status. Patients also expressed concern that conversations during consultations could be overheard by others waiting nearby, raising fears around the confidentiality of sensitive health information. Also, nurses themselves reported a lack of privacy as a barrier to HIV care, as they have to rush the service and no proper time is given for adequate counseling because of patients' disruption. At times, not even screens are available to provide a certain level of privacy, according to a manager. This makes the environment unfavorable for professional care provision. Therefore, the proposed framework that underpins all the identified privacy issues is ideal for ensuring acceptable structures built in the communities (referred to as 'health posts'), in which MHCs are offered. Alternatively, properly developed mobile clinic vehicles with consulting rooms, etc., should be provided. If that is not possible, settings either at the creche, hall, or someone's house, should have separate rooms instead of an open space. Figure 4 depicts settings of different MHCs. Being in a progressive country classified as upper-middle class, authority and ministry of health can comfortably address privacy issues by providing appropriate structures, enabling to comply with what is protected by the South African Constitution Act 108 of 1996.

Staffing

It is impossible to provide any health services without skilled and trained staff, despite the fact that MHCs where the study was conducted had at least 50% of the nurses trained in NIMART, making them effective in delivering HIV care. However, most clinics had only two professional nurses, meaning only one competent in HIV care and provision. That is not enough, especially in the country known as the HIV global epicenter, notwithstanding that the KZN Province is also a hyperendemic area. The recommended ideal team to be present in a MHC consists of at least three nurses, a current manager, a data capturer, and a lay counselor. Figures 2 and 3 explicitly outline the current staff complement and its distribution across the MHCs.

Information system

Real-time data gathering and capturing are imperative for healthcare programs, and even more so for MHCs. Currently, there is no data-capture system, but paper system, which relies on nurses filling it in at the end of the day. These information become part of the fixed facility, to which MHC is attached. This is not an accurate picture of how mobile clinics perform regarding HIV care indicators. Therefore, a standalone functional data-gathering structure should be placed in MHCs with data-dedicated personnel. Information-gathering devices need to be provided, such as tablets with software applications that can operate without power. This has proven to be possible, as during the population census, officers could walk around with gadgets that help to input information without any connectivity requirements.

Table 4. HIV care services within the MHCs of eThekwini Municipality [8]

Items	Attributes	Frequency (%)
Does this Mobile health clinic offer any HIV care and support services?	Yes	123 (89.8)
	No	14 (10.2)
List the category/s of staff that offer HIV care and support services in this mobile health clinic.	PN, HIV counsellor	4 (2.9)
	PN,	3 (2.2)
	PN, EN	119 (86.8)
	PN, EN, counsellors	11 (8.1)
Is there a linkage to the care of HIV-infected persons available in this Mobile Health Clinic?	Yes	125 (91.2)
	No	12 (8.8)
Are HIV care and support services offered to adults only?	Yes	133 (97.1)
	No	4 (2.9)
Are HIV care and support services offered to children only?	Yes	5 (3.6)
	No	132 (96.4)
Is HIV Counselling and Testing (HCT) offered at this Mobile Health Clinic?	Yes	137 (100.00)
Does this mobile clinic have antiretroviral therapy (ART) available for HIV?	Yes	130 (94.9)
	No	7 (5.1)
Is ART available for prevention purposes?	Yes	9 (6.6)
	No	128 (93.4)
Is ART available for treatment purposes?	Yes	130 (94.9)
	No	7 (5.1)
Does this Mobile Health Clinic initiate patients on ART (HAART)?	Yes	130 (94.9)
	No	7 (5.1)
Does this Mobile Health Clinic retain patients on HAART?	Yes	69 (50.4)
	No	68 (49.6)
Does this Mobile Health Clinic receive down referral patients for ART?	Yes	50 (36.5)
	No	87 (63.5)
Does this Mobile Health Clinic perform clinical monitoring of HIV-diagnosed persons?	Yes	88 (64.2)
	No	49 (35.8)
Does this Mobile Health Clinic do laboratory monitoring for HIV-diagnosed persons?	Yes	41 (29.9)
	No	96 (70.1)
Is equipment for collecting blood and samples available at this MHC?	Yes	55 (40.1)
	No	82 (59.9)
Does this Mobile Health Clinic do CD4 counts?	Yes	47 (34.3)
	No	90 (65.7)
Does this Mobile Health Clinic do HIV viral load?	Yes	28 (20.4)
	No	109 (79.6)
Is there a clear referral pathway available at the Mobile Health Clinic for HIV-infected persons?	Yes	123 (89.8)
	No	14 (10.2)
Does this Mobile Health Clinic offer tuberculosis screening?	Yes	137 (100.0)
Does this mobile clinic offer cotrimoxazole prophylaxis?	Yes	124 (90.5)
	No	13 (9.5)

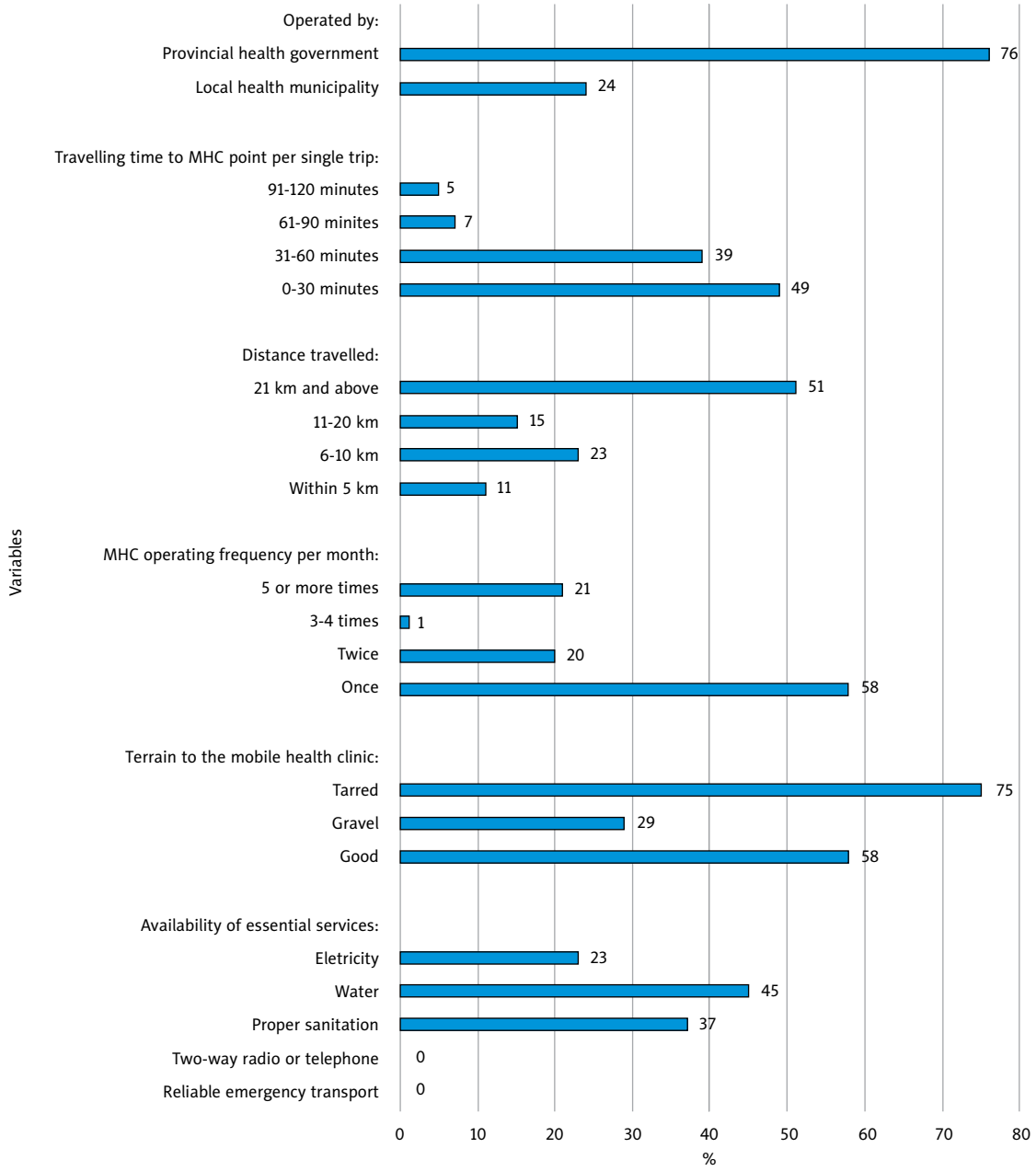


Figure 1. eThekwini municipality MHCs profiles [8]

Medical equipment and tools

A great outcry was noted and reported - basic essential equipment needed to deliver HIV care is not available in MHCs. Even if skilled personnel is available but no enabling tools, it becomes impossible to provide the services effectively. Therefore, lockable filing cabinets and equipment for HIV screening and monitoring should be made readily available (over and above the availability of treatment) for all patients, including children and prophylaxis. Currently, certain MHCs are not offering ART for children and some even for adults, including those who want it for prevention purposes.

Transportation services

Transport arrangements should be made for blood specimens from MHCs to laboratory services, as most mobile clinics reported having great difficulty collecting blood specimens from PLWH, because they could not send them to laboratory. It is suggested that courier services, for example, can be organized, so that daily specimens can be collected. Patient's viral loads, amongst other tests, are critical to be monitored as part of the HIV management continuum. If that is not possible, other monitoring methods, such as point-of-care rapid tests, can be used as alternatives.

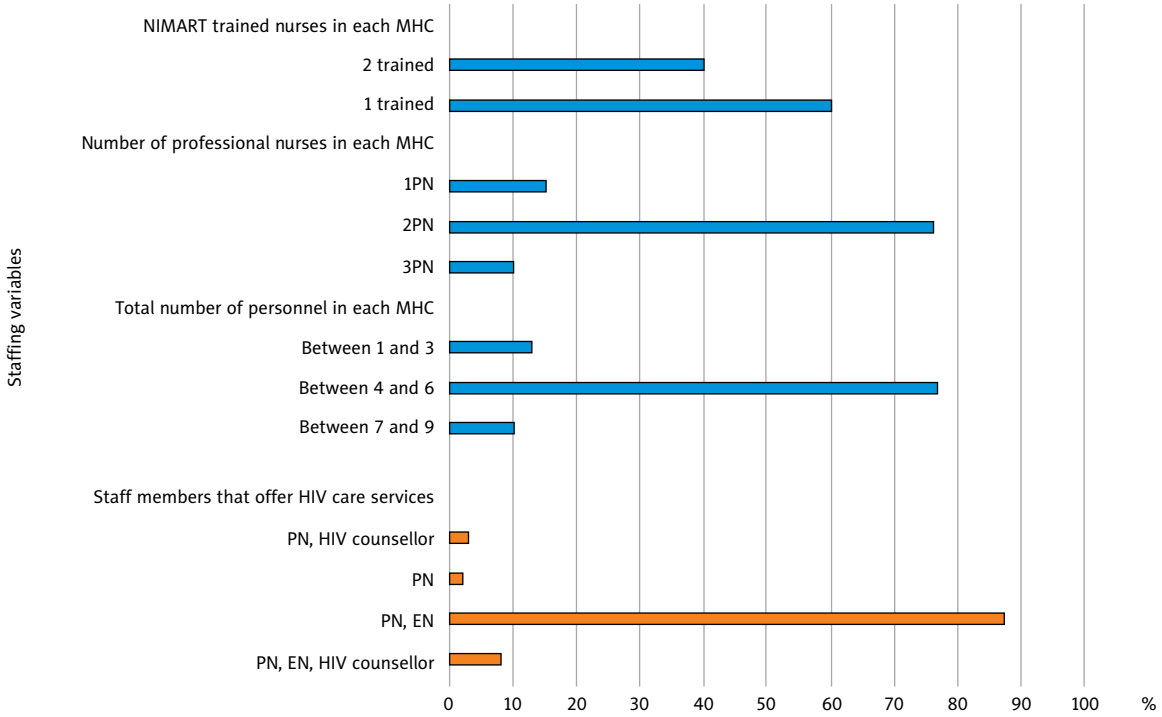
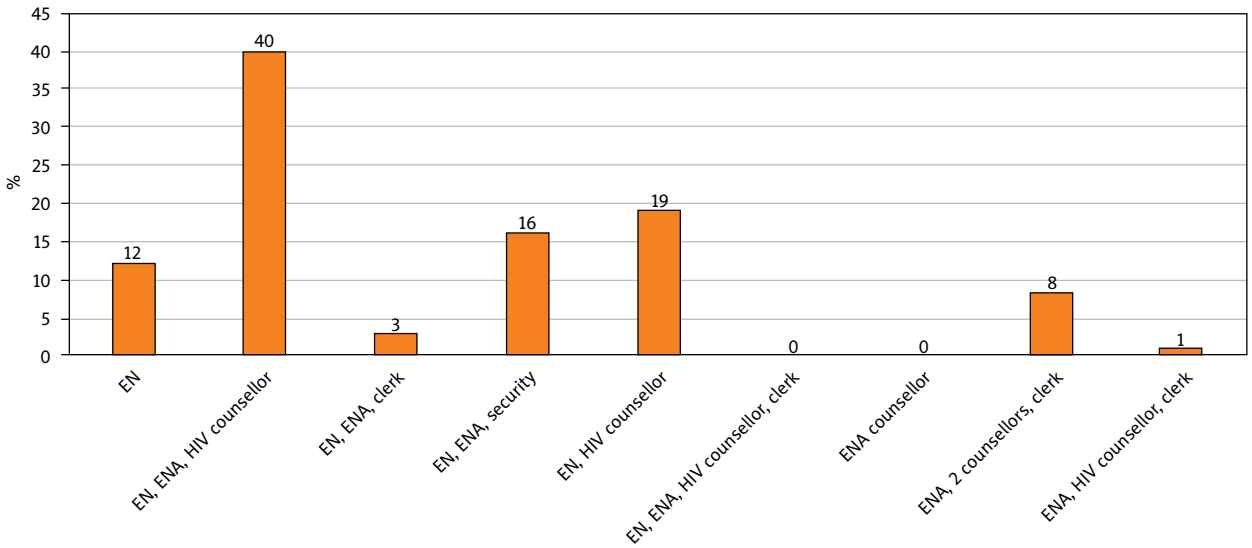


Figure 2. Available staff complement in MHCs of eThekwini district [8]



EN – enrolled nurse, ENA – enrolled nursing auxillary

Figure 3. Composition of support staff in the MHCs [8]

Communication systems

No official communication processes were available in MHCs. The staff had to rely on personal devices, and were not reimbursed for calls to the fixed facility or laboratory for inquiries. Therefore, for follow-up care, an effective two-way communication system must be accessible to engage all stakeholders, including PLWH.

Basic municipality services

Water, electricity, and sanitation are essential services, which must be in place to ensure the physical comfort and safety of PLWH and staff. Most MHCs lack access to these elements, which severely hampers the provision of care. The current status of the MHCs is shown in Figure 1. Critical issues in nursing practice, such as infection

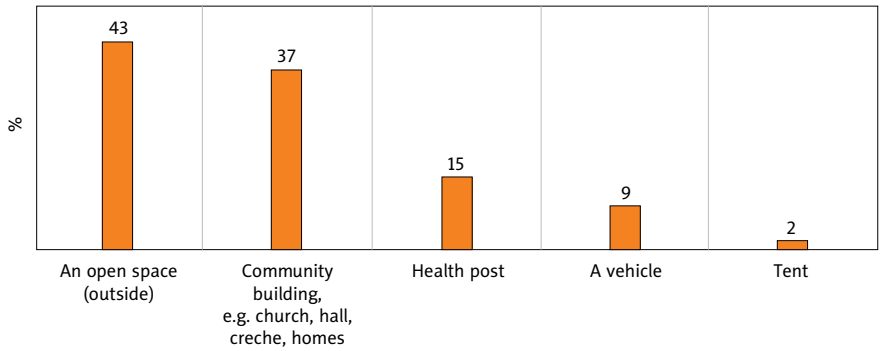


Figure 4. Description of MHCs services delivered throughout eThekwini District [8]

Table 5. Themes and subthemes that emerged when exploring the managerial factors which influence NIMART implementation in MHCs of eThekwini District [8]

Themes	Sub-themes
1. Challenges in implementing NIMART services in MHCs	1.1. Shortage of staff
	1.2. Shortage of medical equipment for NIMART services
	1.3. Challenges related to infrastructure in MHCs
	1.4. Lack of budget for NIMART services
2. Positive factors influencing the implementation of NIMART services in MHCs	2.1. Nurses are trained on NIMART
	2.2. Continuous meetings
3. Suggestions to strengthen the implementation of NIMART services	3.1. Proper planning
	3.2. More nurses should be trained on NIMART
	3.3. Employment of more nursing personnel
	3.4. Collaboration with relevant stakeholders
	3.5. Proper infrastructure for NIMART services
	3.6. A need for more allowances

control, are severely compromised in the absence of water. Without water, it is not possible for a healthcare worker to maintain basic hand hygiene during procedures involving HIV-positive patients. Furthermore, the lack of proper sanitation services poses an occupational hazard and contributes to overall safety issues in MHCs. Portable water tanks can be installed at various MHC points, or arrangements can be made with a relevant water and sanitation department to deliver water on the days when MHCs are operational. This is also the case for mobile toilets, which need to be provided for both staff and patients. Alternative sources of energy can be sorted, so that power is generated; used generators could even be applied. All these activities call for intentionality in the management of MHCs.

Safety of the environment

Environment, in which HIV provision is being delivered, is not conducive to physical, occupational, and psychological well-being, as outlined by the findings of the 3 phases of the study. Therefore, care must be taken to ensure the environment fosters safety at all levels. Addressing the challenges mentioned above will promote a favorable environment. An allowance, for example, could promote psychological well-being and motivation, while providing security would promote physical safety. Partial provision of HIV care is prominent in MHCs, leading to difficulty in monitoring and evaluating the services.

Many factors were identified as the leading causes in selective provision of HIV care services in mobile clinics, and the above-mentioned challenges in affecting the realization of appropriate HIV care directly contribute to the lack of comprehensive HIV care services (Table 5). Furthermore, factors directly linked to the nurses, MHC management, support, and mentorship, critically impact the complexity of HIV care delivery. The nurses' skills must be at an acceptable level achieved in NIMART training, which will ensure their competency. However, despite the training, they need to be motivated, confident, and recognized, as the majority of nurses working in MHCs currently report low motivation due to their workplace conditions and lack of tools. Also, as being the only persons

trained in the NIMART course, the nurses need to bear all the HIV-related burden, as there is no one else to discuss the patients' issues with. This also reduces the nurses' confidence, especially regarding HIV pediatric management, so above 97% of all MHCs offer only adult HIV care. This shows that the MHCs target certain populations, and not all HIV community members' needs are being met.

Additionally, due to the lack of continuity of care identified in MHCs, some patients are only offered screening services, after which are referred to a fixed facility. Even though good linkage was reported, it is still unclear whether the patient was received at the referred facility. Therefore, partnering with other healthcare workers outside a MHC would improve services; e.g., community health workers can conduct community patient follow-up and provide support. Meanwhile, having a roving doctor available to discuss complex cases would provide support for nurses, while also re-affirming their confidence. Utilization of support partner services is important, because on the days a MHC is not operational, there is at least continuity of care as well as involving district HIV trainers and coordinators to be part of MHC's HIV management team; as currently, HIV care in MHCs is being provided in silos. As suggested, at least 3 nurses should constitute the team per clinic, as this will ensure peer support, facilitate collective decision-making in terms of patient care, and boost the nurses' confidence. Managers of MHCs play an important role as supervisors of the MHC system. Their presence and effective leadership would determine the kind of service MHCs render under their guidance. It was discouraging to learn that the MHCs managers were not fully present in their roles, as 92% of them held other operative responsibilities, which took precedence over their MHC duties; hence, the nurses felt neglected and demotivated due to the absence of the managers. Therefore, it is highly recommended that managers should be dedicated solely to MHCs and all their activities. Contextual, innovative leadership ideas are encouraged. Also, the nurses require ongoing formal and informal mentorship to provide comprehensive HIV care services.

Guiding principles for effective HIV care implementation in MHCs are unevenly in place

Notably, there is no careful planning, monitoring, or implementation of HIV services within MHCs. Table 6 outlines some themes directly linked to this inefficiency. This refers to core guiding principles and procedures that steer the HIV services, such as the clinic's budget. Instead, all the activities and supplies utilized in MHCs must be outsourced from a fixed facility. At times, MHCs would just get the leftovers or nothing. This is an area of concern because it appears that MHCs are of no priority to government authority. A sole budget for MHCs should be allocated, so that all HIV-related services can be planned accordingly. That would enable the effective implementation, monitoring, and evaluation of specific HIV programmatic goals, such as the 95-95-95 UNAIDS targets, global and national HIV-related policies, NIMART training, and universal coverage. Currently, these are loosely implemented, and not by all MHCs. Therefore, standardization of all HIV-related strategies needs to be executed and followed up, to ensure that the same services are provided across all MHCs. This will allow to monitor the program by looking at the targets and simpler evaluation. Figure 1 depicts the conceptual framework developed by the researchers, adapted from the Donabedian model and Dickoff [19, 20].

The conceptual framework outline

The researchers developed the conceptual framework after data collection and analysis. A conceptual framework can be a useful tool to scaffold research and, therefore assist a researcher in developing meaning of subsequent findings [27]. The framework served as the basis for improving HIV care implementation withing MHCs, informed by literature, MHCs' status conditions, nurses, and managers responsible for operating the clinics.

This study's conceptual framework for NIMART strengthening in MHCs was constructed according to three essential elements of a situation-producing conceptual framework, as proposed by Dickoff, James, and Wiedenbach [19], i.e., goal-content activity prescription to attain the desired outcome and a survey list to identify the gap between the intended activity and prescriptions for the activity. Therefore, the ideas of Dickoff, James, and Wiedenbach [19] guided the formulation of a new conceptual framework, depicted in Figure 5. The survey list of Dickoff, James, and Wiedenbach [19] includes the context, agent, recipient, dynamics, procedure of the activity, and terminus. The researchers had to answer the following questions: "Who is the agent?", "Who is the recipient?", "What is the procedure?", "What are the dynamics?", "What is the context?", and "What is the outcome?". In the MHC context, the framework aimed to identify major concepts, which could be reflected in the implemented HIV care program, intended to strengthen the NIMART implementation within the MHCs in the eThekwini District of KwaZulu-Natal Province. These ideas were utilized to develop the conceptual framework for HIV care practice, strengthening MHCs provision by supplying guidelines on what needs to be prepared for effective HIV delivery through the NIMART program. The researchers' mind map symbolized an interaction between the agent and recipients to inform the contextualization within a specific framework and procedure. The context determined the procedure to be followed while acknowledging the dynamics, reinforcing both the interaction and facilitation of the re-integration process to accomplish specific goals or outcomes.

The results of developing the conceptual framework as the basis of MHCs' HIV care provision program, include the activities suggested in a survey list by Dickoff, James, and Wiedenbach [19], namely agent, recipient, context, dynamics, procedures, and terminus.

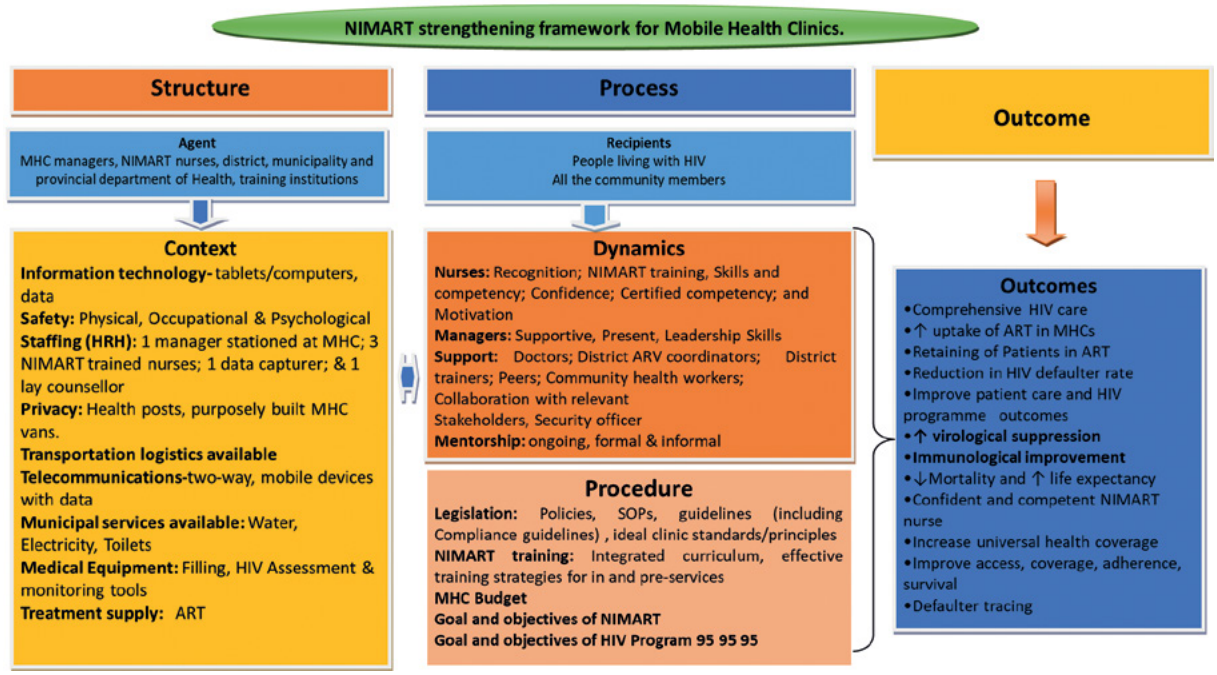


Figure 5. NIMART strengthening framework for MHCs adapted from Dickoff and Donabedien

Agent

According to Dickoff, James, and Wiedenbach [19], an agent is a propelling force that moves the practice towards a goal, and is either a person who does the actual work, or a thing that produces an effect and takes an active part. The agent should possess certain characteristics and play an important role in facilitating effective HIV care delivery in MHC. MHC nurses and managers should possess such characteristics. The nurses need the competency to provide HIV care through the NIMART training, must be motivated while ongoing clinical support, having confidence, and good managerial skills that facilitate competent and acceptable care.

Recipient

The recipients are those on the receiving end of an activity [19]. In this study, the recipients of the conceptual framework are people living with HIV as well as all the community members served by the MHCs. This is critical in ensuring universal health coverage for HIV treatment and care.

Context

Dickoff, James, and Wiedenbach [19] described a framework as the environment or context, where activities occur. A context may also be understood as an environment, a setting, or a set of circumstances. The environmental context is the total of an event, situation, or experience [28]. An environmental setting may be internal (body, mind, and spirit), comprising the inner self, and/or external (physical and social) setting [29]. It is important to ensure that the location as well as structure of the place where learning takes place, accommodates women who have dumped babies and/ or committed infanticide. According to George [28], the environmental context encompasses all conditions and circumstances. The context for the current CF were MHCs. For a fully functional MHC that offers effective HIV care services, the following factors need to be accommodated:

1. An information technology structure with data-capture system to record all HIV information into the DIS and Tier.net. Even portable devices can be sufficient for this function, as long as they are programed adequately.
2. Safety of the environment is critical, covering all spheres, such as physical, occupational, and psychological. A study by Ngcobo *et al.* [8] reported cases where nurses have been the victims of crime and had their personal belongings hijacked and removed from them, in addition to the confiscation of medication carried in MHCs' vehicles. Mobile clinics should ensure the safety of physical environment, including shelter. Occupational safety is imperative, such as guaranteeing infection control and prevention measures. Psychological well-being also needs to be addressed, as working conditions in MHCs differ from those in traditional health facilities.
3. Personnel plays a crucial role in any healthcare delivery setting, including MHC. Thus, for adequate and effective HIV care delivery, at least the following staff recommendations should be implemented in each MHC setting:
    - One fully dedicated MHC manager, with continuous effective leadership, support, and mentorship while monitoring and evaluating HIV care program, will

yield favorable outcomes for both the program and staff members. Findings from Elgalib *et al.* [14] study on the nurses and managers revealed that MHCs managers hardly visit their clinics, and are overwhelmed with managerial duties in facilities other than MHCs.

- Three NIMART-trained nurses to manage patients' load at the same time, where sufficient time can be dedicated to HIV services while the other nurses can deal with non-HIV-related patients' needs. At the same time, they can all form a support system for each other. The study found that in most mobile clinics, only one nurse was trained in NIMART. As a result, the nurse has no one to discuss the patient' issues with, which leads to demotivation and lack of confidence; hence, all the nurses in this study reported that they do not provide pediatric HIV care.
- One lay HIV counsellor can assist in counselling the patients pre- and post-HIV diagnosis, offering ongoing and adherence counselling. This will ease demand for the nurse, who will be able to focus on more clinically advanced aspects of HIV patients' management.
- One data-capturer should be part of the team to ensure that accurate HIV statistics are documented in order to monitor program indicators accurately, of which currently there is significant lack of these.

4. Privacy was the greatest outcry, which was cited by both the nurses and managers as compromising the quality of HIV care provision in the MHCs. The patients reported that they do not want to spend more time with the nurses, because the community members in the clinic assume that the more time spent with the nurse automatically means that they are HIV-infected. Therefore, stigma is perpetuated due to a lack of privacy. At the same time, the nurses and providers felt that the lack of proper consulting rooms, even in the cars or tents where they offer services, resulted in compromised care. Thus, either the construction of health posts in the communities where the mobile clinics are stationed, or proper mobile clinic vehicles with adequate consulting rooms, should be made available. Currently, in certain MHCs, ordinary vehicles are being used as mobile vans, while other services are just offered in an open space. Indeed, human rights and dignity need to be restored or maintained for people receiving services from mobile clinics.
5. Transportation infrastructure and logistics: Based on this study, it was evident that critical HIV monitoring laboratory tests were not being done due to non-availability of logistics with regards to specimens reaching the laboratory. This calls for innovative leadership and motivation to develop a system for samples to reach the laboratory promptly.
6. Telecommunication is crucial because healthcare delivery systems cannot function without means of communication, and without internal and external environments. MHCs are no exception. For instance, if the nurse needs to phone other stakeholders regarding patient care, this is currently not possible, unless they use their personal devices.
7. Collaboration among services with other stakeholders ensures continuity of care and patient monitoring on days when MHC is not operating.
8. The availability of municipal services hampers the comfort and smooth delivery of services. Water, electricity, and toilets (even portable) must be available, so that both patients and nurses can benefit.
9. Medical equipment required for rendering basic HIV care needs to be in place, including filling of HIV tools for monitoring of HIV prognosis, e.g., blood specimen tubes, laboratory forms, etc. The constant supply of ART is the core of successful delivery of HIV care, since the universal testing and treatment guidelines have been adopted in the country.

All the above constitute a favorable environment that will facilitate HIV services delivery, assuring efficient provision of HIV care.

Dynamics

Dickoff, James, and Wiedenbach [20] described dynamics as the internal energy or power sources or motivating factors, which enable an individual to become successful. The authors also explained that dynamics explore physical, biological, psychological, or chemical power sources of agents and recipients [19]. In the study, several dynamics were identified among the nurses and managers. Recognition of nurses working in a MHC is perceived important, but the study found that the nurses felt their work was not significant, which led to demotivation. Moreover, HIV care cannot be effectively delivered unless the nurses are adequately trained and certified in NIMART, equipping them with the necessary skills and competencies needed for HIV care. With the essential support from peers and managers, their confidence in supplying appropriate care can be boosted. Managers' presence and visibility within MHCs would provide the needed courage, guidance, and mentorship, helping nurses feel less alone, as shown by the study findings. Furthermore, any healthcare delivery service does not have a means on its own, but has referral pathways and support from other partners. This should be applied to MHCs, with doctors, district ARV coordinators, and regional trainers attached to mobile clinics, so that appropriate support can be given to nurses, ensuring that current practices are largely provided to MHCs. Since such a structure does not exist presently, this setup will ensure that formal and non-formal ongoing mentorship does take place, resulting in services provided to the best of their ability.

Procedure

A procedure comprises the protocols and devices that enable an agent to attain a set of goals [19]. Procedures are guiding rules, protocols, or techniques to be followed during activities [19]. Several procedures must be implemented for

effective HIV care delivery in MHCs, such as legislation, policies, SOPs, guidelines, and ideal clinic standards. NIMART training is an integrated curriculum and effective training strategy for in-services. An MHC budget should include its cost, so that activities can be achieved, such as the goals and objectives of NIMART and the 95-95-95 HIV program, with compliance guidelines, Ideal Clinic (IC) project, and Universal Health Coverage (UHC) goals.

Terminus/outcome

Terminus refers to the last stage, the end, or the finishing point [19]. The terminus is the desired outcome that an agent seeks through the procedures. The following are some of the desired outcomes, which would be achieved through strengthening HIV care in MHCs, using the constructed conceptual framework. For full comprehension of the list, please refer to Figure 1.

- Comprehensive HIV package provision.
- Increased uptake of ART in MHCs.
- Retention of patients under ART (people living with HIV retained in care).
- Reduction in HIV defaulter rate.
- Improved patient care and HIV program outcomes.
- Decreased mortality and increased life expectancy.
- Confident and competent NIMART nurses.
- Increase of universal health coverage.

Evaluation of conceptual framework

The conceptual framework was evaluated to assess its feasibility in practice. Five criteria for model evaluation, as stipulated by Chinn and Kramer [30], were adopted, i.e., clarity, simplicity, generality, accessibility, and importance of the model. The evaluation form was sent to six experts in the field, including two MHC managers, two PHC nurses, who also rotate in the MHCs, and two senior nurse university academics, who are well-versed in HIV care and primary health settings. Four of them responded, including two MHC managers, one clinical nurse, and one academic. All five areas of the tool received favorable responses, and the reviewers provided valuable comments.

Limitations of the study

This study was limited to one district only in KwaZulu-Natal Province. The focus was on MHC facilities in a semi-urban area, and the status of MHCs in other districts is unknown and may differ. However, the findings are significant for the MHC settings, since across South African rural and poor communities, mobile clinics provide healthcare for HIV-infected individuals.

Conclusions

The above study findings demonstrate that HIV care within mobile clinics is embodied with multiple challenges mentioned above, including infrastructure, operation, and management. The solutions to all identified challenges are addressed by the developed framework, which will not only serve to improve the clinical health outcomes of PLWH, but will also address critical issues relating to the conditions under which these services are provided. Also, with concerns requiring management addressed, it will provide structure, mentorship, and support for the staff dealing with daily procedures in MHCs. Furthermore, the conceptual framework will contribute significantly towards the realization of universal health coverage for those who need HIV care the most.

The implantation of the framework will not require resources or skills that are not already available within the setting. Instead, it will just intentionally apply what is already available, but with a strengthened approach, supporting structures being ensured and key HIV outcomes addressed to effectively deliver HIV care. Therefore, the development of the conceptual framework will strengthen existing NIMART activities by improving operations, environmental infrastructure, and management of MHCs. The adoption of the framework will ensure that the minimum prescribed HIV care and support packages are offered by all MHCs as guided by PEPFAR's universal HIV care and support framework. Standardization of HIV care across all MHCs will be achieved through the adoption of this framework.

Disclosures

1. Institutional review board statement: The study received approval from a local university's Ethics and Research Committee (approval number: NWU 00934-19-A1), while permission was granted by the Local Provincial Department of Health (ref no: KZ_202002_017) and Local Health Authority (ref no: 30/1/1/6/3/).
2. Assistance with the article: None.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

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