The effects of antiretroviral stockout on primary health care nurses in the Ethekwini and Ilembe districts, KwaZulu-Natal

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Abstract

**Background:** Nurses face challenges of antiretroviral therapy (ART) stock out when rolling out, leading to drug resistance, poor compliance and decreased viral suppression. Poor viral suppression leads to higher morbidity and mortality rates, hence a need to strengthen supply chain principles in order to achieve equal distribution of resources amongst clinics. Nurses also need to have relevant guidelines available to prevent treatment failure. The study aimed to describe the effects of ART stockouts on primary health care nurses rolling out ART in clinics in KwaZulu Natal.

**Methods:** The study followed a qualitative approach, using a descriptive design. Two primary healthcare clinics in Ilembe and Ethekwini districts were selected for the study. The population comprised of 8 purposively selected participants. In-depth interviews and focus groups were conducted to describe the experiences of primary health care nurses rolling out antiretroviral therapy regarding stockout and how it was managed. Data collection and analysis followed Yates, Partridge and Bruce steps. Ethics and trustworthiness were maintained.

**Results:** The singular theme of inconsistent availability of treatment emerged, as well as sub-themes of means used to manage treatment stockout and supply change management issues.

**Conclusions:** An adequate supply of ART through an efficient supply chain management strategy, ongoing training in primary health care and nurse-initiated management of antiretroviral therapy and the availability of treatment guidelines should be enforced.

**Keywords**

antiretroviral therapy, primary health care, supply chain management
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Introduction
Stockouts are defined as the non-availability of a required medicine for at least a day at a storage or delivery point.\(^1\) Stock shortages cause nurses to either dispense a lower amount than what was prescribed or temporarily change antiretroviral (ARV) regimen.\(^2\) Suboptimal coordination between government donors and lack of human resources have been seen as causes for stock-outs.\(^3\) Pathways for sharing information between different levels in the Department of Health (DOH) about medical supply levels are not well-defined, especially when the tender contract ends and the new one commences.\(^4\) Sub-district pharmacists must be vested with such information, so as to prepare enough stock to cover the transition period, thus avoiding stock-out.

Weaknesses in ARV supply chains and poor coordinated services frequently contribute to stockout.\(^5\) Due to this issue, nurses are to give a reduced supply of medication to patients, resulting in short return dates, and overburdened workloads as patients return more frequently to clinics to collect treatment that was initially insufficient. In these cases, clients leave the health facility with either an insufficient supply or no medication at all.\(^6\) Despite this practice of decanting medication so that a patient does not leave the facility without it, there is no legislation governing such practices.

Due to ART stockout, sometimes primary health care nurses opt to issue an alternate drug as per the treatment guidelines, that is only where there is a possibility of fatal allergies. This is the predicament that is facing the nurses, and they wonder if their professional bodies are going to support such initiatives or not, hence, the researcher conducted this study which aimed to describe the effects of ART stockout on primary health care (PHC) nurses in the Ethekwini and Ilembe districts.

Methods
Study design and setting
A qualitative research design with a specific focus on a descriptive design using the constructivist paradigm to describe the effects of ART stockout on primary health nurses initiating ART was used in this study. It focused on the qualitative aspects of their lived experience as they rollout ART and the challenges they face.\(^7\)

The study was conducted for almost 6 weeks from 23\(^{rd}\) August 2021 to 30\(^{th}\) September 2021 in clinics in the Ethekwini and Ilembe District, respectively. Ilembe District is situated on the east coast of KwaZulu-Natal Province; it is the smallest of the province’s districts and includes four health sub-districts, namely Mandeni, KwaDukuza, Maphumulo and Ndwedwe. The Ethekwini district is the economic centre of the Province, and consists of features of an industrialized society, a high disease burden, a large number of informal settlements and highly mobile populations. To ensure that no bias influenced the results, tape recordings and field notes were utilised and those were kept for further auditing.

Study population: inclusion and exclusion criteria
The inclusion criteria were primary health nurses initiating ART working in ARV clinics with a minimum of 2 years of experience. The exclusion criteria were primary health nurses initiating ARVS, that did not have 2 years of experience working in ARV clinics.

Sampling, sample size and data collection tools
Non-probability purposive sampling was used to recruit participants for individual interviews and two focus group discussions (FGD). Individual in-depth interviews from a clinic in each district were conducted. The researcher wanted to recruit as many participants as possible, but not all met the inclusion criteria, hence managed to get 8. All 8 participants did the individual interviews and 7 participants were eligible for the FGD. The interview allowed the participants to express their experiences in detail. Probing was used to encourage participants to elaborate and provide a detailed exploration on their experiences working in primary healthcare clinics. Two open-ended questions were used to guide the interview, which included the following: What are the reasons for ART stock outs? and How is it managed?

Follow-up questions in the form of probes and prompts were asked based on the participant’s response to the questions.

The focus group interview allowed the participants to share their thoughts with each other, producing new ideas and reflecting a range of views before answering.\(^7\) Because of coronavirus disease 2019 (COVID-19) outbreak, social distancing and its protocols were maintained throughout the focus group discussion.

Data collection process
After obtaining permission from the relevant departments, the researcher engaged in the process of getting the relevant details for all participants that met the eligibility criteria and communicated the information and received consent from them, maintaining COVID-19 infection control protocols. The information sheet was in English only, as English is the language used by nurses in KwaZulu Natal. There was no need for an interpreter. Those nurses that had given consent to
participate in the study, communicated with the researcher face-to-face, maintaining social distancing. Observations were
done by the researcher twice at each clinic, for approximately 4 hours per day. This was done so that she could observe the
behaviors of the participants and collect data by using field notes. Firstly, the researcher posed as a volunteer working in
the clinic and carried out observations in their natural setting to avoid a Hawthorne effect. All data collection methods
including these observations, were approved by the ethics committee (see end of manuscript for full details), and consent
was obtained from the chief executive officer (CEOs/PHC) managers of the relevant institutions before any data was

collected.

Secondly, the researcher revealed her identity and observations and field notes were done in person as this enabled her to
gain a picture on how the participants interacted with patients rolling out antiretroviral therapy.

The researcher holds a master's degree in nursing, working in a PHC clinic with 8 years of experience. She also did
research modules in ethics, in possession of a training and resources in research ethics evaluation (TRREE) certificate.
The first encounter was with gatekeeper permission. Participants were only aware of the aim of the study, through the
information sheet. The interviews took place in a quiet consultation room in each clinic and were audio recorded. The
discussion began informally with the researcher greeting the participants and laying out the instructions for the interview
process. The interview sessions for each participant lasted between 30-45 minutes. Each interview continued to the point
where the participant could not provide any new information. Data saturation was reached after the 6th participant,
however, two more interviews were held for validation purposes.

Data management and analysis
Data was transcribed verbatim using data analysis stages for the phenomenographic studies as described by Yates,
Partridge and Bruce. These stages were used to uncover variation in how the phenomenon under study was perceived.
Data analysis was done with thematic analysis which led to the emergence of themes and subthemes. All transcribed and
translated data were transferred to the qualitative data analysis software package NVIVO 12.

Trustworthiness and rigor were maintained throughout the study using the criteria of Lincoln and Guba. The focus group
discussions allowed the participants to share their thoughts with each another, producing new ideas and reflecting on a
range of views before responding to posed questions.

To ensure credibility, the researcher personally collected, transcribed, and analyzed data to ensure prolonged engage-
ment. The researcher carried out member checking through probing and paraphrasing participants’ responses during the
interview process to ensure that the information captured was a true reflection of what the participants were saying. Confir-
mability was ensured with the use of audio recordings and field notes that were utilized and kept for further
auditing.

The researcher transcribed the audio recordings verbatim. Dependability was achieved, as the researcher used an
interview guide, based on the study objectives and research questions to ask the participants more or less similar
questions. To ensure transferability, the researcher provided in-depth descriptions of information concerning the
participants, their settings and the context.

Data analysis format
Data was analyzed in stages using Yates, Partridge and Bruce’s format shown in Table 1.

<table>
<thead>
<tr>
<th>Stages involved</th>
<th>Procedure to ensure data analysis</th>
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<tbody>
<tr>
<td>Stage one</td>
<td>During this stage, the researcher read each transcript a few times to establish what was significant about what the participant said.</td>
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<tr>
<td>Stage two</td>
<td>This stage involved viewing and engaging in self-questioning in terms of how the phenomenon was understood by the researcher, the perception used to explain it and its similarities with other phenomena.</td>
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<tr>
<td>Stage three</td>
<td>Contrasting groups of similar data and writing a category of description for each.</td>
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<tr>
<td>Stage four</td>
<td>Verifying a portion of the data by engaging an independent coder to establish inter-coder reliability.</td>
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</tbody>
</table>
Once the above stages were complete, the researcher developed themes of each transcript. The themes of individual transcripts were then compared for similarities and variation which led to the compilation of the theme and subthemes.

**Results**

The participants that were selected for the study were trained in PHC with experience in nurse initiated management of antiretroviral therapy (NIMART). Their experience working in PHC clinics ranged from 2 and 13 years. Those that did not meet the eligibility criteria were excluded from the study. Four of the nurses from the clinic in the Ethekwini district were not trained in primary health care. Two of the nurses from the clinic in the Ilembe district did not have the minimum of 2 years experience to be part of the study. The theme that emerged was the inconsistent availability of treatment which merged with supply chain management issues and means to manage treatment stockout.

**Inconsistent availability of treatment**

Participants expressed their concerns that there was a shortage of treatment, and they could not function efficiently to meet patient’s needs. By not having sufficient medication, the participants extended their scope of practice, by decanting medication into bottles and supplying to patients. Participants stated that they were unsure about the correct stock levels at the clinic. Instead of patients receiving a full 3month supply of medication, they were issued with only a month supply.

**Supply chain management issues**

The participants stated that during certain months, the department was showing over supply of medication and they were baffled with the reasons leading to this stock levels. They expressed concern over the functioning of the procurement system as they sometimes experienced over or under supply of ART, hence the concern is ART stockout.

*P2, Clinic A* “The pharmacist will tell us that during certain months, we are showing over stockage and the next month is under. We are not sure how the procurement system functions within the district because we had a lot of ARV stock outs, and it’s unexplainable”.

**Means used to manage available ART**

Participants mentioned that they have to decant medication into packets for issue to patients due to the limited stock. The issued medication would cover patients for a few days. Other participants stated that instead of giving a patient a full 3month supply of medication, they issued a month supply, as the stock was inadequate. This meant that patients incurred high financial costs due to travelling to the clinic more frequently. Patients were more prone to defaulting, drug resistance, non-compliance and higher morbidity and mortality rates.

*P4, Clinic A* “We had to open up these bottles and decant the tablets into packets and give the patients just to cover for a few days. So, you do what you have to”.

*P3, Clinic B* “We serve a number of ART patients on antiretrovirals and highly active antiretroviral therapy (HAART). Most of them are migrant workers that require more than one month’s supply. Instead of a 3month supply, we only issue a month’s supply because we don’t have enough”.

**Discussion**

**Inconsistent availability of ART**

Participants mentioned that they had to devise ways to assist patients, even if it meant that the tablets lasted for a short while. There is no legislation governing such practices. If a patient becomes resistant to ART in future, the health system will be liable for such atrocities. PHC nurses do not have documentation or guidelines to follow, in the event of medication stockouts. PHC nurses are extending their scope of practice to assist patients, but this is not ethical, in terms of the duties they should be carrying out. Health-care workers are using refill periods, borrowing medicine, or referring patients to other facilities using coping strategies to provide ART to patients when there are stockouts in their facilities.

The same sentiment is shared in a study conducted by. In ART facilities, ART dispensers were dispensing doses that ranged from 15 days to 3 months depending on the patient’s condition. Frequent stock-outs forced them to dispense medicines even for a single day.

Participants mentioned that they were unsure of how the procurement system worked as they had experienced many stockouts of ART at the clinic. PHC nurses should be educated by managers of clinics on how medication is procured and delivered to the clinic pharmacies. This will give the nurses an idea of how the supply chain system works. A 2015 study from Kinshasa found that stock-outs of HIV commodities were common especially due to supply chain problems, like late deliveries.
Participants stated that there were discrepancies in their stock levels as they were told by the pharmacists that there were over supplies of ART issued to their clinics, where in fact, there were actual shortages in ART. In a state conference on 3rd June 2019 in Johannesburg by the Stop Stockouts, it was mentioned that a supplier responsible for delivery, delivered over 1 million additional packs of second line ARVs, when only 128,000 packs were ordered by National Department of Health, and the extra packets are nowhere to be found and no one is accountable for them. This study had many strengths. Participants shared their lived experiences as they rolled out ART. The study was conducted in their natural environment at their own time and it was done in their language so there was no interpreter needed. Participants expressed how their challenges ought to be managed. We only collected data from 1 clinic in each of the 2 districts, which cannot represent the heterogeneity of all PHC nurse’s experiences of clinics in the other districts.

Conclusion
This study concludes that there is a need to strengthen the stock systems in health institutions in KwaZulu Natal. Having an adequate supply of ART, will enhance the smooth running of clinics and give PHC nurses the chance to work more efficiently, hence providing quality care to patients. It is recommended that the district pharmacists work together with the Department of health and the companies who are awarded tenders to supply the ART, so that the pharmacist will know when the present tender is ending and the new one commencing, so that she/he may prepare adequate supply to cover the transition period.

An adequate supply of ART through an efficient supply chain management strategy should be made available. Close tracking of stock should be implemented when it is delivered to an institution and entered into the system that will monitor its movement, so that each stock is accounted for in time, and shortages are managed. As the levels drop, the supply process of the next stock will be underway, and the cycle of events run smoothly. It is also recommended that there should be ongoing training in primary health care and NIMART, so that the nurses will be sure of the correct drug replacement in cases of shortages, thus avoiding drug reactions leading to medical emergencies in cases of incorrect drug dispensation. Updated standard operating procedures (SOPs) and the availability of treatment guidelines should be implemented, so, in the event of ART stockouts, PHC nurses will be aware of who to contact in cases of such, as well as their acceptable scope of practice, regarding dispensing and decanting of available drugs amongst the patients in the clinic.

Ethical statement
The ethical clearance was obtained on the 12th of August 2021 from the Biomedical Research ethics committee of UKZN (BREC00002821/2021). Permission was sought and obtained from the Provincial Research Ethics Committee. Consent was obtained from the chief executive officer (CEOs/PHC) managers of the relevant institutions before any data was collected. The names of the clinics were protected to ensure confidentiality. Written Informed consent was obtained from participants before the commencement of individual interviews and focus group interviews. The anonymity of the participants was ensured by assigning pseudo names and codes. Participation was voluntary and data safety was maintained throughout the study. All methods were performed in accordance with the relevant guidelines and regulations.

Data availability

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

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References


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