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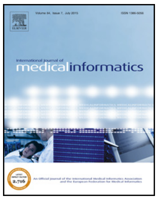

Assessing the quality of routine data for the prevention of mother-to-child transmission of HIV: An analytical observational study in two health districts with high HIV prevalence in South Africa

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ABSTRACT

Background: The prevention of mother-to-child transmission of HIV (PMTCT) is a key maternal and child-health intervention in the context of the HIV/AIDS pandemic in South Africa. Accordingly, the PMTCT programmes have been incorporated in the routine District Health Management Information System (DHMIS) which collects monthly facility-based data to support the management of public-health services. To date, there has been no comprehensive evaluation of the PMTCT information system.
Objectives: This study seeks to evaluate the quality of output indicators for monitoring PMTCT interventions in two health districts with high HIV prevalence.
Methods: An analytical observational study was undertaken based on the Performance of Routine Information System Management (PRISM) framework and tools, including an assessment of the routine PMTCT data for quality in terms of accuracy and completeness. Data were collected from 57 public health facilities for six pre-defined PMTCT data elements by comparing the source registers with the routine monthly report (RMR), and the RMR with the DMHIS for January and April 2012. This was supplemented by the analysis of the monthly data reported routinely in the DMHIS for the period 2009–2012. Descriptive statistics, analysis of variance (ANOVA) and Bland Altman analysis were conducted using STATA® Version 13.
Results: Although completeness was relatively high at 91% (95% CI: 78–100%) at facility level and 96% (95% CI: 92–100%) at district level, the study revealed considerable data quality concerns for the PMTCT information with an average accuracy between the register and RMR of 51% (95% CI: 44–58%) and between the RMR and DHMIS database of 84% (95% CI: 78–91%). We observed differences in the data accuracy by organisational authority. The poor quality of the data was attributed partly to insufficient competencies of health information personnel.
Conclusions: The study suggests that the primary point of departure for accurate data transfer is during the collation process. Institutional capacity to improve data quality at the facility level and ensure core competencies for routine health information system (RHIS)-related tasks are needed. Further exploration of the possible factors that may influence data accuracy, such as supervision, RHIS processes, training and leadership are needed. In particular understanding is needed about how individual actions can bring about changes in institutional routines.

1. Introduction

Since its emergence in the early 1980s, there has been substantial progress towards alleviating the HIV epidemic. In Sub-Saharan Africa, there was a decline of more than 25% new infections in 22 countries between 2001 and 2009 [1]. Despite this decline, South Africa remains the country with the highest HIV prevalence in the world. Health facility estimates from 2013 show antenatal HIV prevalence to be 27.3% [2] putting a high proportion of unborn babies at risk of being infected [3]. Perinatal transmission of HIV can be averted by identifying women infected with the virus and providing the mother-infant pair with a prescribed regimen of antiretroviral therapy before and after delivery. A prevention of mother-to-child transmission of HIV (PMTCT) programme has been available nationally in South Africa since 2002 [4], and is

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a component of the 2007–2011 HIV and AIDS National Strategic Plans (NSP) [5].

More than a decade after the implementation of the PMTCT programmes, data for 2012 show that 98% of women attending public-sector antenatal clinics had an HIV test [6], indicating some progress in the coverage of PMTCT interventions. However, only 88.3% of HIV-exposed children received an early HIV test [7]; 75% of HIV-positive antenatal clients and 54% of identified HIV-exposed babies under 18 months were initiated on Highly Active Antiretroviral Therapy (HAART) [6]. A recent survey evaluating the PMTCT programme concludes that despite universal coverage of infant HIV-testing services in primary health-care facilities, not all infants who are at risk of HIV benefit from the programme [8]. Although there has been an increase in the uptake of HAART, the introduction of the B+ option (the latest World Health Organization treatment regimen for managing PMTCT) requires that all HIV-infected pregnant women be put on HAART for life [9]. There is also a need for a more comprehensive health information system to monitor drug toxicities, prescription adherence and drug resistance. Given that the PMTCT programme is implemented across several health-care platforms, the supporting information system needs to provide linkages across these platforms. While it would be ideal to use a cohort register based at a single facility, currently PMTCT information is conveyed between different care providers by means of stamps on the patient-held 'Road-to-Health Card'[10]. This makes data transfer between facilities offering the continuum of care difficult, creating opportunities for incomplete, duplicate and unreliable data.

Recent reviews of the PMTCT programme [11,12] have highlighted challenges such as the lack of data to monitor progress across the PMTCT cascade, and the absence of an important indicator (the mother-to-child transmission rate at 18 months) to evaluate the current NSP [11]. Other challenges which hinder monitoring of policy changes include the poor alignment of the new PMTCT guideline with data-collection tools such as registers and tally sheets, and inadequate mentoring and supervisory support systems to facilitate the use of information at facility level [13].

In spite of the demands for quality data, routine health information systems (RHIS) in many resource-limited settings, including South Africa, continue to perform below expectations [12,14–19], and are often not used for their intended purpose of generating accurate and reliable data. Studies on the evaluation of RHIS performance primarily focus on technical and organisational issues or clinical processes [20–23] and generally fail to explain the determinants of RHIS successes or failures in different settings. A major challenge and probably the most important reason for poor data quality has to do with the nature of the routine health information systems in limited-resourced settings. Most of the health information systems in these settings are paper based, involving the manual collection and collation of data. At the facility level, there are multiple registers and tally sheets that need to be collated, summarised and sent to the sub-district level. Training is not adequately provided for clinic staff involved in the data collection processes [23–26], who often have very limited data quality checking skills and do not understand the importance of collecting data [27].

Other reasons for poor quality data include design/structural issues relating to inappropriate data collection tools and procedures [13,28], poor recording due to inadequate skills [13,24–27,29], inadequate resources [30] leading to poor capturing and reporting of data [24,25,31] errors in processing data [32], too many data elements [33], staff attrition [13,25,29], and lack of use of already generated data [24], which may hinder constructive feedback to data producers. Feedback is a crucial part of the supervisory process, and is critical for enhancing data quality, especially when audits are done [22,25,32].

Achieving health targets, such as the 90:90:90 strategic treatment targets to eliminate the AIDS epidemic [34], and the post-2015 era of the sustainable development goals (SDGs) [35], will require accurate and reliable data. Drawing on lessons learned from the health-related millennium development goals (MDGs) era, in terms of the limitations inherent in various surveys and databases for tracking progress on coverage of key indicators for the Countdown to 2015 initiative [36], a 5-Point call to action has been endorsed by the global health agencies to resolve issues related to measurement and accountability for health-related data and enable countries to monitor the implementation of strategies outlined in the roadmap for health measurement and accountability [37].

No study has been conducted in South Africa, including in the context of maternal and child health programmes that has investigated PMTCT data quality, factors associated with poor data quality, and barriers to adequate use of information for management purposes. By comparing the experiences in two health districts, using the Performance of Routine Information System Management (PRISM) diagnostic tool [38], this study seeks to evaluate the quality of the PMTCT routine health information system in terms of data accuracy, completeness and timeliness at both facility and district levels.

2. Methods

2.1. Study setting

Two health districts were selected, each incorporating one of the eighteen priority sub-districts identified by the South African National Department of Health (Khayelitsha/Eastern substructure (KESS), one of the four substructures in the Cape Metro Health District, Western Cape, and Dannhauser in the Amajuba District, KwaZulu-Natal) as the most deprived, with the highest HIV burden, the poorest health status, and poor access to health care and health service delivery. The study sites have similar HIV prevalence which is among the highest in the country, similar socio-economic status, and are poorly resourced, but have different RHIS and are managed by different organisational structures (referred to in this paper as Authorities). Amajuba District is managed by a single entity – the KwaZulu-Natal (KZN) Provincial Department of Health, whereas public health services in the KESS sub-district have dual management Authorities – the Western Cape Provincial Department of Health, also known as Cape Metro District Health Services (MDHS) and the City of Cape Town (CoCT).

In the case of the district health management information system (DHMIS) in this settings, the data are routinely collected at the facility level in paper format and captured monthly into an electronic format (Microsoft Excel) at the sub-district level, which is then imported into the DHMIS at the district level. Despite the fact that each individual health care staff member is expected to validate the data before submission for onward collation, there are a number of opportunities for transcribing errors (OTEs), particularly when these tasks are performed in unconducive environments. It is important to note that the quality of data produced at this level is of vital importance in the health information system processes. Even though the DHIS software is equipped with an inbuilt validation mechanism to verify data captured onto the system, this has not necessarily resulted in the generation of good quality data [22,33].

2.2. Study design

An analytical observational study was undertaken which included: an assessment of the routine PMTCT data for quality, consistency and variability; and observations in health facilities. Data were collected from 57 public health facilities selected in the two health districts.