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Prevention of mother-to-child transmission (PMTCT) implementation in rural community health centres in Mpumalanga province, South Africa

Karl Peltzer^{1,2,3,*}, Guillermo Prado^{4,5}, Viviana Horigian⁵, Stephen Weiss⁶, Ryan Cook⁶, Sibusiso Sifunda¹, and Deborah Jones⁶

¹HIV/AIDS/STIs and TB (HAST) Research Programme, Human Sciences Research Council, Pretoria, South Africa ²Department of Research and Innovation, University of Limpopo, Turfloop, South Africa ³ASEAN Institute for Health Development, Mahidol University, Salaya, Thailand ⁴Center for Prevention Implementation Methodology (CePIM) for Drug Abuse and Sexual Risk Behavior, University of Miami, Miami, USA ⁵Florida Node Alliance of the National Drug Abuse Treatment Clinical Trials Network, University of Miami, Miami, USA ⁶Department of Psychiatry and Behavioral Sciences, University of Miami Miller School of Medicine, Miami, USA

Abstract

This study explores organisational and individual provider influences on prevention of mother-to-child transmission (PMTCT) implementation at 12 community health centres (CHCs) in a rural South African setting. Clinic staff members ($N = 103$; females = 86%, nurse managers = 9.7%, nurses = 54.4%, lay health workers = 35.9%) were surveyed on PMTCT implementation acceptability and skills. The data were analysed using descriptive statistics comparing PMTCT protocol implementation achievements and clinic-level PMTCT indicators. Results indicate that staff were very positive about the frequency at which each element of the PMTCT protocol was achieved. Several areas where gaps in conformity to the PMTCT protocol were identified including delivery at the clinic, HIV retesting, provision of anti-retroviral treatment (ART) and six-week polymerase chain reaction (PCR) testing. It was unclear what organisational or individual characteristics contributed to this variation. Overall, providers' perception of barriers to care and human resource capacity were unrelated to performance and fidelity of protocol implementation.

Keywords

organisational factors; barriers; adaptation; PMTCT implementation; South Africa

Introduction

The evidence base for the use of ARVs to prevent mother-to-child transmission (PMTCT) to enhance infant and maternal health is extensive. However, the evidence on the optimal

*Corresponding author karl.pel@mahidol.ac.th.

implementation of the PMTCT programme in South Africa is scarce (Rispel, Peltzer, Phaswana-Mafuya, Metcalf, & Treger, 2009; Barker, Barron, Bhardway, & Pillay, 2015). For instance, about one third of HIV-infected pregnant women in rural antenatal care at community health centres (CHCs) did not access available PMTCT services in 2010 (Department of Health, 2011), suggesting possible PMTCT implementation gaps are yet to be explored.

Understanding barriers to implementation and successful adaptation of scientifically proven interventions in the local context can increase the potential to achieve the goal of elimination of mother-to-child HIV transmission. Implementation science ‘aims to investigate and address major bottlenecks that impede effective implementation and to test new approaches to identifying, understanding, and overcoming barriers to the adoption, adaptation, integration, scale-up, and sustainability of evidence-based interventions’ (Sturke et al., 2014, p. S163). This study investigates organisational and individual provider influences on PMTCT implementation.

The model of implementation for evidence-based practices (EBPs) in the public service sector proposed by Aarons, Hurlburt and Horwitz (2011) outlines a four-phase process of implementation: Exploration (awareness of the need for an improved approach), Adoption/Preparation (preparation for or adoption of an EBP), Active Implementation (scale up of EBP), and Sustainment (maintenance of EBP). The model addresses factors associated with implementation at each phase of both the outer context (e.g. political, policy, funding, networks) and inner context (e.g. organisational climate, individual adopter characteristics). Though PMTCT is the standard of care in Mpumalanga province, it is unclear how organisational and individual provider staff characteristics affect service delivery and adoption in clinics. For instance, organisational ‘absorptive capacity’ of clinics’ human resources (higher number of nurses and doctors), PMTCT training, larger catchment area and utilisation were positively associated with effective PMTCT service delivery (Ogbolu et al., 2013; Gimbel et al., 2014).

Individual staff provider characteristics such as pre-existing PMTCT implementation protocol knowledge and skills leadership, and previous experience with innovations, might influence the fidelity with which it is translated into practice (Aarons, 2004; Aarons et al., 2011).

This study sought to address the following question: How are PMTCT implementation acceptability, coverage and fidelity at rural CHCs influenced by organisational and individual staff characteristics? Understanding barriers to implementation of proven interventions in the local context has the potential to enhance the PMTCT programme goals of eliminating mother-to-child HIV transmission.

Methods

Study setting

The current study was a supplemental study conducted in conjunction with an ongoing clinical trial, ‘Protect Your Family’, which aims to determine whether male partner

involvement plus a behavioural intervention will significantly reduce infant HIV incidence with community health centres ($n = 12$ CHCs) in rural communities with high rates of vertical transmission (13%) in Gert Sibande and Nkangala Districts in Mpumalanga province, South Africa. Mpumalanga had the second highest antenatal rates of HIV in the country (35.6%) (Department of Health, 2004).

Participants

The participants were clinic staff from 12 CHCs in two health districts (Gert Sibande and Nkangala), including clinic leadership, nursing and healthcare staff providing PMTCT/ *President's Emergency Plan for AIDS Relief* (PEPFAR) services ($n = 10$ per clinic). The clinic staff members comprised 10 (deputy) operational managers/sisters in charge, 56 nurses, and 37 counsellors (lay counsellors, PMTCT counsellors, and Mother 2 Mother counsellors). Staff members were mostly female (86%, $n = 89$) and were 38 ± 9 years of age, on average. Just over half had achieved a diploma (55%, $n = 57$) and reported a median monthly income of 7 862 South African Rand (intra-quartile range = 10 700). Staff members from 12 clinics were surveyed with a varying number from each clinic; the fewest staff members surveyed within a clinic was 4, and the most 11, with an average of 9.

Measures

A demographic questionnaire was administered to all CHC staff members to obtain age, gender, education level, income, and job title. Data were gathered on clinic organisational PMTCT fidelity and coverage, and individual provider personnel acceptability and skills. These measures are briefly described next:

Clinic organisational factor—*Barriers to the uptake of the PMTCT* protocol was assessed using an adaptation by Funk, Champagne, Wiese and Tornquist (1991) of the Barriers to Research Practice Scale. The scale consists of 28 items, e.g. 'Staff do not see the value of research on the prevention of HIV infection or transmission for clinical practice.' Response options included, '1 = To no extent' to '4 = To a great extent' and '0 = no opinion' (sample alpha = 0.92). The scale assesses how features of the clinic setting, healthcare providers and health innovation act as barriers. The scale yields four factors, characteristics of the adopter (eight items), characteristics of the organisation (eight items), characteristics of the innovation (six items), and characteristics of the communication (six items), as well as a full scale score.

Readiness for organisational change was measured using the Readiness for Organisational Change scale (Holt, Achilles, Armenakis, Field, & Harris, 2007), consisting of 44 items, e.g. 'PEPFAR/HIV prevention programmes are clearly needed.' Item response options range from '1 = strongly disagree' to '7 = strongly agree' (sample alpha = 0.93). The scale consists of four factors, appropriateness (ten items), management support (six items), change efficacy (six items) and personally beneficial (three items), and a full scale score.

Clinic burden was assessed using a survey of 16-items (Vamos et al., 2014), assessing staff turnover, clinic space, client descriptors, time and available funding. Item response options range from '1 = always' to '5 = never'. Elements were examined individually.

Clinic-level data were collected on 14 elements of the PMTCT protocol in order to provide a more objective measure of how successfully those elements of the protocol were implemented in the CHCs: Monthly PMTCT indicator data for HIV retesting rate, rates of ART immediately following diagnosis, et cetera.

Individual personnel characteristics—CHC staff completed a 23-item questionnaire regarding the PMTCT protocol, providing their perceptions on how often each element of the protocol was achieved in their clinic on a scale from 0 ('This activity does not apply to my clinic or never happens at my clinic') to 4 ('This activity is completed every time at my clinic'). Elements were examined individually as well as summed to create a total PMTCT protocol score.

Procedure

Prior to the onset of study procedures, ethical approval was obtained from the Institutional Review Board and Research Ethics Committees associated with the grantee institutions and the South African Health Department, Mpumalanga province. All participants were English speaking and assessments and consenting were conducted in English. All participant assessments were completed using an audio computer-assisted survey instrument (ACASI) that was administered using headphones, such that questions were read to the participant, in order to reduce the influence of literacy and potential social desirability bias and to enhance privacy and confidentiality.

Data analysis

Descriptive statistics (e.g. mean, standard deviation, frequency) were used to characterise the sample of CHC staff participants, and implementation scales were compared between job categories using ANOVAs. Staff perceptions of achievement of the PMTCT protocol were summarised using means and standard deviations, and CHC-level indicators were described using minimums, maximums, medians and intra-quartile ranges (IQRs). All analyses were conducted using R v.3.2.1 at a two-tailed level of significance of $p < 0.05$.

Results

Clinic staff were asked to report how successfully the different elements of the PMTCT protocol were implemented in their clinic (there was no difference in perceptions by job title). Generally, staff were very positive about the frequency with which each element of the PMTCT protocol was achieved, as the mean of only two out of 23 indicators was below 3 ('Often') and most were close to 4 ('Every time') (See Table 1).

Areas where gaps in conformity to the PMTCT protocol were most prevalent included delivery at the clinic (clinic-level median proportion = 49%), HIV retesting (81%), provision of ART to newly-diagnosed women or those becoming eligible for ART following entry to antenatal care (ANC) (clinic median of 89%), and six-week polymerase chain reaction (PCR) testing (median = 90%). For all of these indicators, staff reported that these activities happened 'often' to 'every time'. Conversely, elements of the protocol that were consistently achieved included provision of ART to infants (100% in all 12 study clinics).

Further, dividing CHCs into poor and good performers in terms of selected PMTCT indicators and a summative measure of five main PMTCT indicators did not show any significant differences regarding PMTCT implementation scales.

Discussion

This study investigated organisational and individual staff factors in relation to PMTCT implementation outcomes in a rural South African setting. PMTCT implementation varied between clinic sites. It is unclear what characteristics of organisations and/or individuals contributed to this variation.

Clinic organisation factors were found to be related to perceptions of barriers to PMTCT implementation. For instance, clinic staff reports of high levels of PMTCT protocol implementation differed from district PMTCT clinic level data, with the exception of agreement on high levels of ART provision to mothers and infants.

The findings suggest a lack of association between adequate human resources (lesser clinic patient burden) and effective PMTCT service delivery. The evaluation of the adequacy of human resources is a subjective measure; service providers may perceive themselves as being overburdened while continuing to provide adequate service. Many clinics stop providing services at midday, in order to have time to document clinic visits and complete administrative duties, suggesting resources may be more adequate than perceived by the staff. In addition, efforts to bundle the patient load in the morning hours and reluctance to utilise an appointment-based system may increase the perception of pressure when all clients arrive at 7am.

Similarly, self-reported barriers to uptake and willingness to implement PMTCT were not related to protocol performance as reported by the district, suggesting that clinic staff and managers' perceptions and attitudes of the protocol and their workplace did not impact their job performance. Performance reports may be more closely related to individual issues and attitudes than to perceived barriers; clinic staff, while being aware of barriers, may have developed strategies for overcoming or working around them, reducing the impact on protocol delivery. At the system level, there may also be barriers unique to clinics themselves, not recognised by staff on the ground.

PMTCT protocol gaps were mostly associated with failure to adhere to protocol or a lack of protocols for facilitating infant delivery at the CHC, ART initiation and PCR testing uptake. Frequent changes in PMTCT protocols, the complexity of the overall protocol and the lack of a written protocol available at the facility are likely contributors to gaps in care. The healthcare system should ensure adequate coverage of printed protocols and diagrams illustrating the correct implementation of protocol at all healthcare sites. Refresher training and feedback to site staff upon return from such training is essential for effective protocol implementation.

This study was designed to generate information on PMTCT implementation, but had several limitations, including the limited sample size of managerial staff and the sampling

was restricted to only twelve clinics. Finally, results relied on self-reporting, which may be prone to social desirability bias, such as reporting conformity to the PMTCT protocol.

In conclusion, strategies are needed to promote fidelity to the PMTCT protocol implementation in rural, low-resource community settings. Future implementation research should emphasise the objective measurement of performance as it relates to objective programme outcomes, as subjective measures may not closely relate to performance.

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Table 1

Clinic PMTCT organisation and clinic staff indicators

Staff perception of PMTCT protocol element	Mean (SD) *	Clinic-level PMTCT data	Clinic Min-Max or Median (IQR)
Total PMTCT protocol implementation scale score	84.9 (8.7)	N/A	
HIV testing for all pregnant women of unknown status	3.9 (0.5)	N/A	
Provision of ART immediately following diagnosis or entry to ANC	3.8 (0.7)	Rate of ART prescription immediately following diagnosis or entry to ANC	54%–100% 89% (14%)
HIV retesting at 32 weeks for women testing negative	3.9 (0.5)	Rate of HIV retesting at 32 weeks gestation	25%–100% 81% (33%)
Testing of women of unknown HIV status during labour	3.0 (1.4)	N/A	
HIV retesting every three months during breastfeeding	3.4 (1.1)	N/A	
HIV retesting one year postpartum	2.8 (1.4)	N/A	
Counselling on the importance of delivering the baby at the CHC	3.9 (0.4)	Rate of infant delivery at the CHC	25%–100% 57% (49%)
Provision of nevirapine (NVP) to newborns immediately following birth	3.9 (0.6)	Rate of nevirapine administration to infants at birth	100%
Supplying mothers with six weeks of NVP for their newborns	3.9 (0.5)	N/A	
Issuing all new mothers with 'Road to Health' booklets	3.8 (0.8)	N/A	
HIV PCR testing of infants at six weeks postpartum	3.8 (0.7)	Proportion of infants with six-week PCR test	78%–94% 90% (12%)
Rapid HIV testing of all infants at 18 months of age	3.8 (0.8)	Rate of infant 18 month rapid testing	47%–100% 100% (24%)
Retesting infants who are symptomatic	3.6 (0.7)	N/A	
Supplying ART to all HIV positive infants	3.8 (0.7)	N/A	
Treatment for TB, opportunistic infections	3.8 (0.6)	N/A	
Offering nutritional support to new mothers	3.5 (1.0)	N/A	

* Note: 0 = 'This activity does not apply to my clinic or never happens at my clinic'; 4 = 'This activity is completed every time at my clinic'