

An Evaluation of Prevention of the Mother-to-Child Transmission Program in Murewa District, 2021

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Abstract

Background: Prevention of mother-to-child transmission (PMTCT) program includes a cascade of services given to prevent mother-to-child transmission (MTCT) of HIV in-utero, during delivery and during breastfeeding. Zimbabwe has made tremendous progress in increasing coverage of PMTCT services and reducing MTCT rate. COVID-19 has negatively impacted HIV programs. Murewa was among the districts with the most COVID-19 cases. We evaluated the PMTCT program in Murewa District in the face of COVID-19 challenges. **Methods:** We assessed inputs, processes, outputs and outcomes of the PMTCT program using the logic model approach. We collected data using interviewer-administered questionnaire, records review, and a checklist to assess availability of inputs, processes carried out and outputs realized from the program. We randomly selected health workers and program recipients. We used Epi info 7 to compute frequencies, means and proportions. **Results:** Murewa District had 58 health workers in post against an establishment of 92. Seven out of 16 facilities reported having HIV test-kit stockout. Only 4/16 were conducting postnatal clinics. No PMTCT training were conducted. Only 1872/5693 (33%) of HIV consumables including HIV test kits and CD4 count reagents were procured. The reasons reported for low PMTCT coverage in Murewa were fear of contracting COVID-19 at health facilities 33/43 (77%), lack of bus fare 28/43 (65%) and unavailability of medical consumables 26/43 (60%). **Conclusion:** The PMTCT program in Murewa District failed to meet targets for inputs, processes, and outputs worsened by

the impact of the COVID-19 pandemic. The reasons for low PMTCT coverage in Murewa District were reported to be due to fear of contracting COVID-19, unavailability of medical consumables and COVID-19 travelling restrictions. We recommended development of guidelines on provision of PMTCT services amid the COVID-19 pandemic. We gave health education to program recipients on the importance to access PMTCT services even amid public health emergencies like COVID-19.

Keywords

COVID-19, PMTCT Program, Murewa District

1. Introduction

Preventions of mother-to-child transmission (PMTCT) programs offer a range of services for women of reproductive age living with HIV to maintain their health and prevent the transmission of HIV from the mother to the infant in-utero, during delivery and during breastfeeding [1]. PMTCT services should therefore be offered from before conception [2]. Some of the key services in PMTCT are to facilitate access to regular attendance to antenatal care, HIV testing during pregnancy, provision of ART to woman during pregnancy and to the mother and her new-born baby during the breastfeeding period, safe delivery, safe infant feeding practices, other post-natal healthcare services, home-based and community based PMTCT counselling and outreaches [1] [2] [3].

Mother-to-child transmission (MTCT) of HIV is the most common route of infection in paediatric HIV acquisition, contributing to more than 90% of the infections [4]. Achievements in PMTCT of HIV in some countries have provided hope for ending the HIV epidemic in children across the world with countries like Cuba, Thailand and Malaysia having reached the elimination thresholds for MTCT of HIV and syphilis [5]. However, HIV MTCT rates are still well above the Joint United Nations Program on AIDS (UNAIDS) elimination target of less than 5% in most sub-Saharan African countries. Zimbabwe has made tremendous progress in increasing coverage of PMTCT services from 0 at its inception in 1999 to 87.2% in 2020 and reducing MTCT from 35.9% in 2001 to 8.7% in 2020 [6] [7]. Innovative strategies are therefore required to scale up and optimise PMTCT services to achieve the elimination of mother-to-child transmission of HIV and end paediatric HIV by 2030.

The COVID-19 pandemic has impacted global health service delivery, including provision of HIV services by causing serious disruptions to health systems with large numbers of hospitalizations and shortages of protective equipment. Countries are therefore balancing the need to minimize interactions with health facilities to reduce the risk of COVID-19 transmission, while delivering uninterrupted essential HIV prevention, testing and treatment services [8]. Measures to prevent and control COVID-19 that have been put in place include

social distancing such as limiting large gatherings, measures to isolate symptomatic individuals and their contacts, and large-scale lockdowns of populations. Stay-at-home orders that limit mobility in a bid to prevent COVID-19 transmission affects vulnerable populations who may be increasingly deterred from accessing health care services.

To try and adapt to the COVID-19 preventative measures and still offer HIV services, the government released guidance for the provision of services as follows: scale up of HIV self-testing, individuals already on pre-exposure prophylaxis (PrEP) should be given 3 months prescription and side effects assessment done over social platforms; and ART clients should be given 3 - 6 months prescription. Many of these adaptations have not adequately accounted for the needs of pregnant and breastfeeding women, infants, children and adolescents [8] [9]. Little data are available on the impact of the COVID-19 epidemic on established healthcare systems designed to respond to the HIV epidemic.

COVID-19 has negatively impacted on HIV programs. Murewa was one of the districts in the province with the most active COVID-19 cases [10]. There was a decline in the percentage of HIV-positive pregnant women receiving ART from 90.8% to 87.2% in 2020 against a target of 95% required to achieve eMTCT. Mashonaland East Province had a low percentage of HIV positive pregnant mothers receiving ART of 83.4% whilst Murewa was amongst the worst performing districts with 72% of HIV positive pregnant mothers receiving ART. We evaluated the PMTCT program in Murewa District in the face of COVID-19 challenges to come up with strategies that tailor interventions to remain resilient to secure the gains of PMTCT program achieved to date and eliminate MTCT of HIV.

2. Methods

2.1. Study Design

We conducted a descriptive cross-sectional study design using Centre for Disease Control logic model for program evaluation for the period January 2020 to August 2021. This was used to assess the inputs which were availed for the program, the processes carried out, the outputs realized and the outcomes against the district's set targets. We conducted a process evaluation using the Logical Framework Approach (Table 1).

2.2. Study Setting

The study was conducted in Murewa Town and its district in Mashonaland East Province in Zimbabwe. Murewa District has 29 health facilities with 28 of the facilities offering PMTCT services. Mashonaland East has an HIV prevalence rate of 14%. Murewa District has a high HIV prevalence of 19% mainly in women and children against the national average of 13% [7] [11]. It was one of the first districts to be heavily affected by COVID-19.

Table 1. Logic model for evaluating the PMTCT program in Murewa District, 2021.

Inputs	Processes	Outputs	Outcome	Impact
Human resources	Planning	Number of meetings held	Increased ANC coverage to $\geq 95\%$.	Reduction of MTCT rate of HIV to $\geq 5\%$
ART drugs	Health workers training	Number of health workers trained	Increased coverage of pregnant women, new mothers and their partners who know their status to $\geq 95\%$.	$\geq 2\%$ among non-breastfeeding women.
HIV test kits	Community mobilisation and sensitization	Number of pregnant women, new mothers and their partners given health education	Increased coverage of pregnant mothers on ART to $\geq 95\%$.	Reduction of new paediatric HIV infection cases to 250 of less per 100,000 live births.
Communication	Health Education to pregnant women, new mothers and their partners	Number of clients accessing ANC services	Increased coverage of pregnant mothers with HIV viral suppression to $\geq 95\%$.	
Vehicles and transport	ANC services (counselling, testing, initiating eligible clients on ART)	Number of HIV positive women initiated on ART		
Stationary	Infant feeding counselling and support	Number of male partners tested for HIV		
Funding	Distribution of IEC material	Number of mothers and infants retained in care throughout breastfeeding		
Breastmilk substitutes		Number of mothers with viral suppression		
IEC material (leaflets, posters or flipcharts)				

*Logic framework created from literature review.

2.3. Study Population

The study population were health care workers involved in managing HIV positive maternity clients in Murewa District. Women participating in the PMTCT program were also interviewed. Key informants who were interviewed in this study are, the District Medical Officer (DMO), the District Nursing Officer (DNO), Health Information Officers, District HIV Coordinator, District Pharmacist and Laboratory Scientist.

2.4. Sample Size

2.4.1. The Sample Size for Health Care Workers

The sample size was calculated using Dobson formula: $n = z_a^2 \times p(1-p)/\delta^2$, where $Z_a = 1.96$. Assuming that 97.2% of the health workers knew the ART protocols for PMTCT from a study by Abade *et al.* in Nairobi in 2016 [12], a confidence interval (CI) of 95%, a delta of 5% and a non-response rate of 10%, a minimum sample size of 45 health workers were calculated.

2.4.2. The Sample Size for Women Receiving PMTCT Services

The sample size was calculated using the same Dobson formula above:

Assuming that 94.2% of antenatal mothers are aware that HIV infection can coexist with pregnancy from a study by Igwegbe *et al.* in Nigeria (2005) [13], a confidence interval (CI) of 95%, a delta of 5% and a non-response rate of 10%, a minimum sample size of 83 PMTCT recipients calculated.

2.5. Sampling

2.5.1. Sampling of Health Care Workers

The RAND and RANK function in Microsoft Excel was used to select 15 clinics from the 26 clinics in the district. Nurses from the 15 selected clinics in the district were randomly selected by creating a list of their names in Microsoft Excel then used the RAND and RANK function to randomly select participants. Simple random sampling was done to select two nurses at each clinic. At Murewa Hospital we randomly select 14 health care workers from those involved in the PMTCT program. Key informants were purposively recruited into the study.

2.5.2. Sampling of Pregnant and Lactating Women Receiving PMTCT Services

Sampling was done per facility proportionately to its size. Of the calculated sample size (83) for pregnant or lactating women receiving PMTCT services, 13 were randomly selected from the hospital and five from each of the 15 clinics that were visited.

2.6. Data Collection Tools and Techniques

We used a pre-tested interviewer-administered questionnaire designed by authors to collect data from health workers to assess for possible ways of improving services in this new COVID-19 environment, and the PMTCT program processes. Facility-based exit interviews for the pregnant and lactating women were conducted. Data from the women was collected using an interview guide gathering information on their views on the PMTCT program. Data from key informants was collected using a key informant interview guide to get in-depth information about the PMTCT program, possible interventions to improve service delivery in this new COVID-19 era as well as to validate responses from the study participants. The authors collected the data both by audio record and writing manually, transcribed the data and assessed objectively using records where possible. ART registers were reviewed for information on the processes and outputs of the program. A checklist was used to check inputs that were injected into the PMTCT program.

2.7. Plan for Analysis and Quality Control

Epi info 7.2.4.0 software was utilized to capture as well as analyze the data. Means, frequencies, and proportions were generated using the same statistical software. The data was cleaned before analysis for errors that may have occurred in the collection or during data entry. Missing or incorrectly entered information was verified using the corresponding hard copy questionnaires and information was corrected accordingly. The changes and corrections made were documented. Descriptive statistics were used to describe the study population. An in-depth assessment of the PMTCT program processes was done using the SWOT analysis (strengths, weakness, opportunities, and threats). We collected qualitative data from key informants by both audio record and writing responses

manually. We transcribed the data and assessed objectively using records were possible then used Epi info to group the qualitative data and generate frequencies from themes.

2.8. Dissemination of Results

Feedback was given to the District Health Team for Murewa District and Provincial Health Executive for Mashonaland East Province.

2.9. Permission and Ethical Considerations

The Mashonaland East Provincial Health Directorate Ethics Committee reviewed and approved the study. Permission to carry out the study was obtained from Murewa District Medical Officer, Mashonaland East Provincial Medical Director and the Health Studies Office.

A detailed explanation of the study was given to the participants for informed decision making to participate in the study. Written consent was obtained from the participants. For anonymity, the data collecting tools did not have the participant's names. We used unique identifiers to maintain anonymity. Participants were informed that participation was voluntary, and they could withdraw from the study at any time during the study. During data collection, privacy was observed. Since data collection was conducted during the COVID-19 pandemic era, social distancing, hand hygiene and the wearing of a face mask covering the nose and mouth were maintained.

3. Results

3.1. Demographic Characteristics of Health Workers

We interviewed 43 health workers against a minimum calculated sample size of 45 giving a response rate of 95%. Most health workers were females 32 (74.4%). Primary care nurse constituted 18 (37.2%) of the study respondents. The median age in years for participants was 38 ($Q_1 = 29.8$; $Q_3 = 47.2$) and the median years in service was 11 ($Q_1 = 9.5$; $Q_3 = 18$) (Table 2).

Table 2. Demographic characteristics of health workers involved in the PMTCT program in Murewa District 2021.

Variable	Frequency (n = 43)	Percentage (%)
Sex		
Male	11	25.6
Female	32	74.4
Designation		
Medical Doctor	3	7
Registered General Nurses	8	18.6
Registered Midwife	14	32.6
Primary Care Nurses	18	37.2
Age in years	Median age: 38 $Q_1 = 29.8$ $Q_3 = 47.2$	
Years in service	Median: 11 $Q_1 = 9.5$ $Q_3 = 18$	

3.2. Demographic Characteristics of Women Receiving Services through the PMTCT Program in Murewa District

We interviewed 80 PMTCT program recipients against a minimum sample size of 87, giving a response rate of 92%. Most of the respondents were pregnant women 59 (73.8%). The median age of the program recipients was 25 ($Q_1 = 17.8$ $Q_3 = 38.2$) and median parity was 2 ($Q_1 = 1$ $Q_3 = 5$).

3.3. Inputs for the PMTCT Program in Murewa District

Murewa District had 58 health workers in post against an establishment of 92. Out of the 16 facilities recruited into the study, 14 did not have stockouts of ART medicines.

“Since the COVID-19 pandemic, I have never run out of my ART medicine, however, twice I was given a two-week supply of ART medicine because the nurse said they had low stock and wanted to make sure that everyone gets medicine until they have received the next batch of ART medicine” (PMTCT program recipient).

Only 10/16 had ART registers. The other facilities were improvising with notebooks. All facilities had received tablets for the roll-out of the electronic Health Record (eHR). Seven facilities reported having experienced HIV test-kit stockouts and none of the facilities had received reagents for CD4 count testing.

“When I booked for my pregnancy, I was told to come back after two weeks for an HIV test as there were no HIV test kits available at the health facility. After two weeks I tested HIV positive and had to go and have a CD4 count at a private laboratory as it was not being done at the health facility. I had blood drawn for viral load testing at delivery and today at my 6 weeks postnatal visit I am still waiting for my results” (PMTCT program recipient).

Facilities that had functional cell phones were 11/16 although all facilities reported receiving limited airtime. The district has 3 ambulances out of the expected 6 and fuel was readily available for the functional vehicles (Table 3).

3.4. Processes Performed for the PMTCT Program, Murewa District, 2020

All health facilities were using the WHO PMTCT guidelines for management of the pregnant and lactating mothers. Some of the guiding principles of these guidelines are to provide a strategic approach to the prevention of HIV infection in infants and children through delivery of integrated PMTCT interventions within maternal and child health services. During the study period, all the facilities offered health education to their clients though it was now being done individually compared to the pre-COVID-19 when mothers were educated in groups. Fourteen out of the 16 facilities were conducting ANC clinics whilst only four were conducting postnatal clinics. Of the 4 expected support and supervision visits, only 1 was conducted and no PMTCT trainings were conducted during this year (Table 4).

Table 3. Availability of inputs for the PMTCT program in Murewa District, 2020.

Item	Target	Achieved
Human Resources	92	58
ART medicines	16	14
ART registers	16	10
HIV test kits	16	9
CD4 count reagents	16	0
Maternal HIV guidelines	16	6
Cellphone	16	11
Biological safety cabinet	16	4
Ambulance	6	3

Table 4. Processes performed for the PMTCT program, Murewa District, 2020.

Process	Target	Achieved
Facilities using the WHO PMTCT guidelines	16	16
Health education	16	16
Antenatal clinics conducted	16	14
DBS done	16	6
Postnatal clinics conducted	16	4
Couples provided with HIV counselling and testing	16	16
Support and supervision visits conducted	4	1
PMTCT trainings conducted	1	0

3.5. Outputs in the PMTCT Program in Murewa District, 2020

More than half of the primary care nurses 34/60 (56.7%) had midwifery skills and only 5/16 facilities had at least one PMTCT trained nurse. Only 1872/5693 (32.9%) of HIV consumables including HIV test kits and CD4 count reagents were procured. ART medicines received were 5400/5431 (99.4%) (Table 5).

3.6. Outcomes of the PMTCT Program

The PMTCT coverage in the district in 2020 was 72% and the elimination of mother to child transmission (eMTCT) rate was 12.3.

3.7. Reasons for the Low PMTCT Program Coverage in Murewa District, 2020 (n = 43)

The major reasons reported by participants for the low PMTCT coverage in Murewa District were fear of contracting COVID-19 at health facilities 33 (77%), lack of bus fare 28 (65%) and unavailability of consistent medical consumables 26 (60%).

“I was afraid of going to the health facility even to collect my ART medicines for fear of contracting COVID-19. I had to wait for about 5 hours to have my

routine checkup and collect my ART medicines because only one nurse was attending to us. The risk of contracting COVID-19 was therefore higher as people tended to gather in those long waiting hours. Sometimes I thought it's safer to be home than to go for the antenatal care visit" (PMTCT program recipient).

Only 10 (23%) cited that use of traditional herbs was still a reason for low PMTCT coverage in Murewa District. Key informants highlighted that attention and resources had been diverted to fighting the COVID-19 pandemic as the major reason for the low PMTCT coverage in Murewa District. Other reasons for the low PMTCT coverage were unavailability of public transport coupled with a hike in the scarce transport charges since the beginning of the COVID-19 pandemic and lack of skilled and trained cadres on PMTCT due to brain drainage (Table 6).

"It was difficult to attend antenatal care during the COVID-19 lockdown as we needed travelling pass letters to produce at police roadblocks. Because I was heavily pregnant on the last visit the officers were more understanding. It was however difficult to find public transport as most commuters had been banned from carrying passengers and when you find the transport, the fares had doubled or tripled therefore I only manage to attend only 2 antenatal care visits as I could not afford to attend more times" (PMTCT program recipient).

Table 5. Outputs in the PMTCT program in Murewa District, 2020.

Outputs	Target	Achieved	Achieved %
Up skilled primary care nurses	60	34	56.7
Facilities with ≥ 1 PMTCT trained staff	16	5	31.3
Couples tested and counselled for HIV	2544	987	38.8
Mothers initiated on ART	1327	1076	81.1
ART medicines received	5431	5400	99.4
Children diagnosed of HIV	211	186	88.2
HIV laboratory consumables procured (HIV test kits, CD4 count reagents)	5693	1872	32.9

Table 6. Reasons given by healthcare workers for the low PMTCT program coverage in Murewa District, 2020.

Reasons for low PMTCT coverage	Frequency n = 43	Frequency %
Fear of contracting COVID-19 at health facilities	33	76.7
Lack of bus fare	28	65.1
Unavailability of consistent medical consumables	26	60.5
COVID-19 travelling restrictions	21	48.8
Religious beliefs	21	48.8
Lack of trust in public health facilities	19	44.2
Use of traditional herbs	10	23.3

4. Discussion

Zimbabwe has made remarkable progress increasing coverage of PMTCT services from 0 at its inception in 1999 to 87.2% in 2020 and reducing MTCT from 35.9% in 2001 to 8.7% in 2020 [6]. Murewa District was among the first districts in Zimbabwe to be hardly hit by the COVID-19 pandemic [10]. Previous studies show that the COVID-19 pandemic has significantly affected global economies and disrupted healthcare systems across the world. We conducted a process outcome evaluation, using the logical framework approach in 16 health facilities in Murewa District for the period January 2020 to August 2021 in the face of COVID-19 challenges.

Our major findings were that PMTCT coverage in Murewa District decreased with the advent of the COVID-19 pandemic and its preventative measure of travel restrictions and banning of gatherings. Coupled with difficulties in passing COVID-19 check points during lockdowns, clients were also afraid of travelling due to increased probability of contracting COVID-19 which resulted in low attendance to the antenatal and postnatal clinics. Lockdown measures instituted to flatten the curve were a setback in the delivery of PMTCT health services in Murewa district. This was however contrary to Mutyambizi *et al.*, 2021 in South Africa who did not find any lockdown effects on PMTCT health services. The authors recommended that there be strategies to encourage positive health-seeking behaviour among the population amidst COVID-19 [14].

To date, few studies have analysed the impact of COVID-19 and the associated lockdown measures on PMTCT. A study by Pattinson *et al.* found a 30% increase in maternal deaths among PMTCT recipients in South Africa during the country's first COVID-19 wave, compared with a similar period in 2019. The authors suspect that lack of transport human resources and beds at facilities were among the leading causes of death [15]. However, Siedner *et al.* found no evidence of drops in visits for perinatal care. A South African pre-exposure prophylaxis (PrEP) cohort study of pregnant and postpartum women in care found that during the nationwide lockdown, missed PrEP visits in the first month increased by 34%. Modelling studies indicate that a 6-month disruption in ART would result in mother-to-child transmission of HIV doubling over 4 years in sub-Saharan Africa [9].

The lockdown strategies that were implemented globally to curb the spread of COVID-19 affected the supply chain of many medical sundries including HIV test kits and CD4 count reagents. The economic impact of COVID-19 pandemic indicates a possible shortfall in the availability and a rise in the cost of medical sundries. Factors noted to be responsible for the low availability of ART medicines, HIV test kits and CD4 count reagents across borders were inadequate human resources in manufacturing facilities due to physical distancing and lockdown; curtailing of sea and air transport dents the manufacture and distribution of raw materials and other products such as packaging materials pharmaceutical companies needs to manufacture these commodities. Other factors

included increased overhead and transport costs and active pharmaceutical ingredients coupled with fluctuation and weakened national currency caused by envisaged economic shock apparently pushed up the cost of some antiretroviral regimens. Our findings were similar to findings by Dada *et al* in 2020 who found that the limited and reduced income due to COVID-19 shock at the level of the client, led to loss of follow-up and despite ARVs being free in third world countries like Nigeria for instance, clients still need to pay money for registration, laboratory and transportation amongst others and so they will tend to default due to unavailability of this cost [15].

Another major challenge that has affected the PMTCT program is lack of skilled human resources. The economic challenges being currently faced by Zimbabwe has resulted in brain drainage of skilled personnel as they seek for greener pastures abroad. Healthcare workers were not spared from COVID-19 but were rather at more risk as they are frontline workers towards the fight of this disease. In Murewa district, healthcare workers constituted a significant chunk of the total COVID-19 caseload [16]. Agarwal *et al.*, 2020 noted that to keep our health workers safe from COVID, there is a need for systematic vigilant contact tracing and rational testing along with other infection prevention and control measures. Contact tracing has the potential to be a game-changer public health intervention which will help in winning the battle against COVID. This may be because it helps in ensuring the safety of the in-service health workers and upkeeps availability of adequate workforce for health-care service delivery [16].

Our study highlights the importance of resilient healthcare systems and continued access to care, even in the context of a public health emergency. There is an urgent need for the investigation and use of alternative innovative service delivery options such as differentiated service delivery options, to ensure that future pandemics do not interrupt service delivery to the same extent.

We focused our study on the effect of COVID-19 on the low PMTCT rates in Murewa District, so our results may not be generalisable to other rural areas that experienced different COVID-19 infection rates. Secondly, the data capturing at the sites by healthcare workers were subject to human errors because of the manual capturing process and may have been subject to other inaccuracies such as missing or invalid data. These may have been exacerbated during the COVID-19 pandemic, with sickness and high workplace stress experienced.

In conclusion the PMTCT program in Murewa District failed to meet targets for inputs, processes, and outputs mostly because of the impact of the COVID-19 pandemic. The reasons for low PMTCT coverage in the district were due to fear of contracting COVID-19 at health facilities, lack of bus fare, unavailability of consistent medical consumables and COVID-19 travelling restrictions. We recommended development of guidelines on provision of PMTCT services amid the COVID-19 pandemic, ensuring a consistent supply of hospital medicines and consumables and conducting more mobile clinics and outreaches. We distributed maternal HIV guidelines to the 10 facilities that had no guidelines and gave health education to program recipients on the need to access PMTCT ser-

vices even amid COVID-19.

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Authors' Contributions

HK: conception, design, acquisition, analysis and interpretation of data and drafting the manuscript. BM: conception, design, acquisition, analysis and interpretation of data and drafting the manuscript. AC: conception, design, acquisition, analysis, interpretation and reviewing of several manuscript drafts for important intellectual content. TJ: conception, design, acquisition, analysis and interpretation of data and reviewing manuscript draft for important intellectual content. NTG: conception, design, acquisition, analysis and interpretation of data and reviewing manuscript draft for important intellectual content. MT: conception, design, acquisition, analysis and interpretation of data and reviewing manuscript draft for important intellectual content. The authors read and approved the final manuscript.

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Availability of Data and Materials

The data sets generated and analysed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Ethics approval for the study was obtained from Mashonaland East Provincial medical directorate, Murewa DHE, and the Health Studies Office. Written informed consent was obtained from the study participants before the interviews, and the interviews conducted in private. Confidentiality was maintained throughout the study by not recording the participants' names on the questionnaires.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] (2015) Prevention of Mother-to-Child Transmission (PMTCT) of HIV.

- <https://www.avert.org/professionals/hiv-programming/prevention/prevention-mother-child>
- [2] (2021) PMTCT Approach.
<https://www.wvi.org/health/pmtct-approach>
- [3] Chadambuka, A., Katirayi, L., Muchedzi, A., *et al.* (2017) Acceptability of Lifelong Treatment among HIV-Positive Pregnant and Breastfeeding Women (Option B+) in Selected Health Facilities in Zimbabwe: A Qualitative Study. *BMC Public Health*, **18**, Article No. 57. <https://doi.org/10.1186/s12889-017-4611-2>
- [4] (2021) An Evaluation of Zimbabwe's Prevention of Mother-to-Child Transmission (PMTCT) Programme to Reduce the Infant Mortality Rate: A Case Study of Chitungwiza. Afribary.
<https://afribary.com/works/an-evaluation-of-zimbabwe-s-prevention-of-mother-to-child-transmission-pmtct-programme-to-reduce-the-infant-mortality-rate-a-case-study-of-chitungwiza>
- [5] Musarandega, R., Robinson, J., Sen, P.D., *et al.* (2020) Using the Critical Path Method to Rollout and Optimise New PMTCT Guidelines to Eliminate Mother-to-Child Transmission of HIV in Zimbabwe: A Descriptive Analysis. *BMC Health Services Research*, **20**, Article No. 1042.
<https://doi.org/10.1186/s12913-020-05900-4>
- [6] (2021) PMTCT—CeSHHAR Zimbabwe.
<http://ceshhar.org/our-work/sexual-reproductive-health/pmtct/>
- [7] (2021) Global Aids Response Progress Report 2020 Gam Zimbabwe.
https://www.unaids.org/sites/default/files/country/documents/ZWE_2020_countryreport.pdf
- [8] Vrazo, A.C., Golin, R., Fernando, N.B., *et al.* (2020) Adapting HIV Services for Pregnant and Breastfeeding Women, Infants, Children, Adolescents and Families in Resource-Constrained Settings during the COVID-19 Pandemic. *Journal of the International AIDS Society*, **23**, e25622. <https://doi.org/10.1002/jia2.25622>
- [9] Stover, J., Chagoma, N., Taramusi, I., Teng, Y., Glaubius, R. and Mahiane, G. (2020) Estimation of the Potential Impact of COVID-19 Responses on the HIV Epidemic: Analysis Using the Goals Model. medRxiv [Preprint].
<https://doi.org/10.1101/2020.05.04.20090399>
- [10] (2021) COVID-19 Wreaks Havoc in Murewa, Marondera Farms. NewsDay, Zimbabwe.
<https://www.newsday.co.zw/2021/07/covid-19-wreaks-havoc-in-murewa-marondera-farms/>
- [11] (2021) Education & HIV Treatment for 100 Children-Murewa. GlobalGiving.
<https://www.globalgiving.org/projects/treatment-literacy-for-hiv-positive-children/>
- [12] Ulalo, A.R. (2016) Assessment of Knowledge of and Adherence to the Recommended Intrapartum Obstetric Guidelines for PMTCT of HIV by Health Workers at Mbagathi District Hospital, Nairobi. University of Nairobi, Kenya.
- [13] Igwegbe, A.O. and Ilika, A.L. (2005) Knowledge and Perceptions of HIV/AIDS and Mother to Child Transmission among Antenatal Mothers at Nnamdi Azikiwe University Teaching Hospital, Nnewi. *Nigerian Journal of Clinical Practice*, **8**, 97-101.
- [14] Mutyambizi, C., Dunlop, J., Maluleke, C., *et al.* (2021) Effect of COVID-19 on HIV, Tuberculosis, and Prevention of Mother-to-Child Transmission of HIV Indicators in Mopani District, South Africa. *The South African Medical Journal*, **111**, 1181-1189.
<https://doi.org/10.7196/SAMJ.2021.v111i12.15822>
- [15] Dada, D.A., Aku, E. and David, K.B. (2020) COVID-19 Pandemic and Antiretrovir-

als (ARV) Availability in Nigeria: Recommendations to Prevent Shortages. *The Pan African Medical Journal*, **35**, Article No.149.

<https://doi.org/10.11604/pamj.suppl.2020.35.2.25639>

- [16] Agarwal, N., Biswas, B. and Nair, R. (2020) Ensuring Safety and Availability of healthcare Workers in the Era of COVID-19: An Experience from the Eastern State of India. *Indian Journal of Medical Sciences*, **72**, 58-64.

https://doi.org/10.25259/IJMS_128_2020

Annexe: Questionnaire for Health Care Workers in Murehwa District, 2021

Questionnaire Number...

Section A: Demographic Characteristics of Health Care Workers.

1. What is your gender? (observe)
 - a) Male
 - b) Female
2. What is your age? (As at last birthday) -----
3. What is your designation?
 - a) Medical Doctor
 - a) Nurse
 - b) Laboratory Technician
 - c) Pharmacy Technician
 - d) Other, specify
4. For how long have you been working in the health services? (stated in years)

Section B: Possible interventions to improve PMTCT service provision in this COVID-19 era.

5. What are the possible reasons for a low PMTCT coverage in Murehwa District?
 - a) Low awareness of the PMTCT programme
 - b) Deep traditional beliefs
 - c) Increased stigma
 - d) Other (Specify)
6. What are the possible interventions to improve PMTCT service provision in this COVID-19 era in Murehwa District?
(Tick all that apply)
 - a) More mobile clinics
 - b) More outreaches
 - c) Group collection of medicines
 - d) Fewer more comprehensive ANC visits
 - e) Other (specify)

Section C: Processes Involved in the PMTCT programme

7. Have you received any training in PMTCT?
 - a) Yes
 - b) No
8. If yes to Q7, what kind of training did you get?
 - a) On job training
 - b) Workshop
9. When did you receive training?
 - a) Less than 6 months ago
 - b) 6 to 12 months ago
 - c) More than 12 months ago

10. What aspects of the PMTCT program where you trained in? (tick all that apply)

- a) HIV counselling and testing
- b) EMNOC
- c) ARV treatment
- d) Other (Specify)

11. Did you conduct any HIV testing in 2020? (Confirm with registers)

- a) Yes
- b) No

12. Were you initiating mothers and children on HIV treatment in 2020? (Confirm with registers)

- a) Yes
- b) No

13. Were you offering services to male partners in 2020?

- a) Yes
- b) No
- c) Sometimes

14. If yes to question above, how frequent did you offer services to male partners?

- a) Every ANC clinic
- b) Rarely
- c) Never

15. Have you attended any District Quarterly HIV review meetings in 2020? (confirm)

- a) Yes
- b) No

16. If no to Q 15, why not?

17. Where you trained in ART management?

- a) Yes
- b) No

18. If Yes to Q 17, when were you trained? -----

19. Who is responsible for the procurement of ART medicines?

- a) District Pharmacist
- b) Procurement
- c) Nurses Officer

20. Who is responsible for the distribution of ART medicines?

- a) District pharmacist
- b) Nat Pharm
- c) Private suppliers
- d) Other, specify

21. Did you order any ART medicines at this facility in 2020?

- a) Yes

b) No

22. If yes to Q 21, how often?

a) Monthly

b) Quarterly

c) Biannually

d) Other, specify

23. What was your order fill rate for HIV medicines in 2020? (calculate for ART medicines)

24. Did you have stock-outs of ART medicines?

a) Yes

b) No

25. Who is responsible for the procurement of laboratory consumables at this facility?

a) Laboratory scientists

b) Procurement

c) Nurses

26. Who is responsible for the distribution of laboratory consumables at this facility?

a) Laboratory scientist

b) Nat Pharm

c) Private suppliers

d) Nurse

e) Other, specify

27. Did you order any laboratory consumables at this facility in 2020?

a) Yes

b) No

28. If yes to Q 27, how often?

a) Monthly

b) Quarterly

c) Biannually

d) Other, specify

29. Where do you order your HIV laboratory consumables from?

a) National Pharmaceutical company (Nat Pharm)

b) Private suppliers

c) Other, specify

30. What was your HIV laboratory consumable order fill rate in 2020?

31. Did you experience any laboratory consumable stock out in 2020?

a) Yes

b) No

32. If yes to Q 30, why?

End of Questionnaire...