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DETERMINANTS OF DATA QUALITY IN THE HIV AND AIDS PROGRAMME IN MUTASA DISTRICT

BY

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Abstract

The Ministry of Health and Child Care introduced a new monthly reporting tool for the HIV and AIDS programme in July 2021. The introduction of the new reporting tool caused an increase in the reporting errors that were registered at the District Health Information Office in Mutasa District. An analytic cross-sectional study was conducted in Mutasa District. Health care workers were interviewed to investigate the determinants of data quality in Mutasa District. A data quality assessment tool was used to conduct record reviews using the registers in the HIV and AIDS programme to determine the quality of the data. Data for the determinants of data quality was analysed using SPSS and Microsoft excel was used to analyse data from the data quality assessment tool .39 health care workers from 15 health facilities in Mutasa District participated in the study and 69.2 % of the participants were females and 30.8% were males. 74.4% were nurses .20.5% were Primary Care Counsellors and 5.15 % were data entry clerks. There was an association between the years of service of the health care workers and their level of knowledge with r=0.555 and p=0.002. Out of the 39 participants 10.3% had worked for the Ministry of Health for less than two years ,15.4 % two to five years and 64.1% for more than 10 years. 69.2% of the participants were trained in the reporting of HIV and AIDS data and 30.8% were not trained and 22.2 % of the trained participants attended a workshop ,70.4% were trained on the job and 7.4% attended a workshop and were also trained on the job. There was a strong association between attending a workshop and the participants' level of knowledge with r=0.753; p=0.001. There was also a strong association between being trained on the job and the level of knowledge of the health care workers, r=0.598; p=0.011. The reporting tools were reported as not being user friendly by 61.0 % of the participants for the PMTCT Monthly Return Form and for the ZHI quasi by 88.0% of the participants. The major areas that were highlighted on the areas that needed improvement were the numerous indicators on the reporting tools. The weaknesses identified on the quasi were the duplication of indicators on the PMTCT monthly return form and having too many age bands. Poor completeness was observed in the documentation of the OI/ART patient care booklets with an average of 51.0% completeness across all the 15 facilities. The average completeness of the HIV testing services registers and the ART registers were both 86.0% and the ANC booking register had the highest completeness of 93.0%. Underreporting was noted on reporting the number of sexual partners or biological children of HIV positive clients who were tested for HIV with a verification factor of 85.0% which showed major data issues. Minor data issues were noticed for the total number for HIV and the total number of people initiated on ART with verification factors of 103.0% and 102.0% respectively.

Keywords: HIV and AIDS, Data quality, Reporting

Declaration page

I declare that this dissertation proposal is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it be submitted to another university for the award of a degree

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List of acronyms

HIV: Human Immunodeficiency Virus

AIDS: Acquired Immunodeficiency Syndrome

MRF: Monthly Return Form

DHIS2: District Health Information System 2

PMTCT: Prevention of Mother to Child Transmission

ART: Antiretroviral Treatment

PEPFAR: Presidential Emergency Plan for AIDS Relief

ZHI: Zimbabwe Health Interventions

RHIS: Routine Health Information System

EMR: Electronic Medical Record

PRISM: Performance of Routine Information System Management

DMO: District Medical Officer

AUREC: Africa University Research Ethics Committee

DQA: Data Quality Assessment

Definition of key terms

Data quality: The condition of data based on accuracy, validity, timeliness, completeness , reliability and consistency

Data accuracy: Indicates whether the data is free from errors

Data completeness: Comprehensiveness of the data

Data timeliness: The availability of data when needed

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CHAPTER 1: INTRODUCTION

1.1 Introduction

HIV and AIDS is one of the major conditions of public health concern across the globe. In 2020 there was 30% decline in the number of new HIV infections from 2020. UNAIDS updated targets for 2025 and the targets aims for 95% of people living with HIV to know their status ,95% of people living with HIV who know their status should be on HIV treatment and 95% of people on treatment should be virally suppressed. HIV testing is very crucial in HIV prevention, HIV Care and Treatment and the support services(Gesicho et al., 2021).

In Sub-Saharan Africa Zimbabwe has the sixth highest HIV prevalence and in 2020 there were 1.3 million people aged between 15-64 living with HIV. The country made progress in achieving the first HIV/AIDS 90-90-90 UNAIDS targets by 2020 as 86.8 people with HIV were diagnosed and 97 % of those people were on ART and 90.3 % of those on ART were virally suppressed(Musuka & Dzinamarira, 2021).

There is a strong affiliation between the HIV and AIDS programmes and the health care system in Zimbabwe. The challenges that are being faced in the health system of Zimbabwe such as constraints in human resources and financial resources necessitated the need for the health care system to evolve and accommodate the need of integrating the complex HIV and AIDS programmes (Chevo & Bhatasara, 2012). The success of the HIV and AIDS programme is mainly because of the concerted efforts of different players in the response, such as the US's President's Emergency Plan for AIDS relief (PEPFAR) and the Global fund. PEPFAR funding has led to the improvement of HIV care and treatment of people living with HIV and because of this funding a lot of people now have access to antiretroviral therapy. PEPFAR has worked in many affected countries since 2003 and it has enabled universal access to antiretroviral therapy and this had led in the decrease of HIV related mortalities (El-Sadr et al., 2012).

A lot of data has been collected in low and middle-income countries to monitor HIV programmes over the past decades. Numerous data collection requirements have been introduced by the donors and the ministries of health to monitor the investments that have been made towards HIV/AIDS response. Indicators in the HIV/AIDS program evolve from time to time in response to the many changes that occur in the prevention, diagnosis, and treatment of HIV(Gesicho & Babic, 2021). Reporting and compiling HIV and AIDS data is a very crucial component in the Monitoring and Evaluation field as it aids in monitoring the trend of HIV prevention and treatment and it contributes to the epidemic control. Reporting HIV data that is complete, accurate and timely by service providers is key in checking the trends of HIV which are important in the eradication. (Gesicho et al., 2021).

Health Information Systems that are weak cause challenges in reaching the Millennium Development Goals as the performance of health systems cannot be assessed with data that is not complete, inaccurate, and not reported on time (Mutale et al., 2013). Information that is sound and reliable is used for making decisions, this information is important for the development of policies, research, health education financing and service delivery (World Health Organization, 2010).

1.2 Background to the study

In Zimbabwe, ministry of health and other implementing partners such as the Presidential Emergency Plan for AIDS Relief (PEPFAR) need the health facilities to report several indicators to support the monitoring and evaluation of the HIV response program. The expansion of the HIV program has led to the development of Health Management Information Systems (HMIS) to enable the collection and management of accurate data across the different administrative levels, from the site level to the national level. The District Health Information System (DHIS2) was introduced in over 70 countries to ensure the availability of indicator data within health care (Gesicho & Babic, 2021).

Information systems in poor resource settings are mostly paper based and data collection and collation is done manually. At the clinics there are plenty of paper registers and tally sheets that are used for primary data collection and aggregating data that is forwarded to the district level. Training is usually not provided for all the staff at the clinics that are involved in data collection and usually they do not have skills for checking data quality and this leads to poor appreciation of the importance of the data they are collecting in managing the HIV response (Nicol et al., 2016).

Indicators for HIV/AIDS programme tracking, monitoring and evaluation change for many important reasons. Multiple stakeholders, develop new and better data collection registers and forms, resulting in more indicators being added than subtracted. PEPFAR alone has over 500 indicators for HIV programmes, many of which are supposed to be collected monthly for every health facility. Reporting is usually seen as something that is imposed by the stakeholders and the value of data in service delivery is usually not seen(Gloyd et al., 2016).

Accurate and reliable information is very crucial in public health as it is important in the improvement of health service delivery and programs. Countries report their progress towards the United Nations Millennium Development Goals, and this has caused the need for good quality data to be greater. Studies which have been done in developing countries have documented problems with data quality. The systems which are used in developing countries to report data are usually the only sources of data that are available for the monitoring and evaluation of programs. Errors in HIV/AIDS data have a negative effect on the efforts that are being made to reach the UN 95-95-95 targets(Mphatswe et al., 2012).

Modern health reporting systems in Zimbabwe started in 2010 with the introduction of the District Health Information System 1 (DHIS), which was later developed into the DHIS2 that is currently in use. HIV/AIDS data is collected from the facility registers using the PMTCT monthly progress return forms as well as the T5 forms at facility level and the tools are used to report to the district level. The data from the PMTCT monthly progress return forms are then entered in DHIS2 by the District health information officers. A new updated PMTCT monthly progress return form was introduced in 2021 and Mutasa district started using this updated monthly progress return form in July 2021. The statistics are submitted to the district health information office by the 7th of every month and entry in the DHIS2 is supposed to be completed by the 15th.

The PMTCT monthly progress return form is not the only form that is submitted by the facilities at the end of every month, there are other important reports submitted at the same time, these include statistics for other surveillance systems such as the OPD and nutrition as well as the village health worker reports. The supporting partner for HIV Care and Treatment in Mutasa District, Zimbabwe Health Interventions (ZHI), has an additional reporting tool called the quasi form which is used by the facilities to report indicators required by PEPFAR but are not on the PMTCT monthly return form.

The implementing partner in Mutasa District also enters the PMTCT monthly return form and the quasi form in their DHIS2. The DHIO and the Strategic Information department for ZHI conduct data triangulation meetings and compare the data which is in the MOHCC DHIS2 and the data in the ZHI DHIS 2 data base at the end of every reporting period. Quarterly Data quality assessments are also done with the DHIO and the Strategic Information and Evaluation Officers. At the end of every quarter the ZHI strategic information officers enter data from the PMTCT monthly return forms into DATIM which is data base which was developed by PEPFAR for monitoring of HIV and AIDS programs in all PEPFAR supported sites. The quasi forms are updated on a regular basis to meet the demands of the donor as new indicators are always being introduced due the new developments that are being made in the HIV and AIDS programme.

There were some indicators that were reported on the ZHI quasi form that were not on the PMTCT monthly return form that were later incorporated into the new PMTCT monthly return form. However not all indicators were in cooperated as many indicators are still being reported using the quasi form.

1.3 Problem statement

Reporting HIV and AIDS numbers has been a challenge in Mutasa District and the challenge was further exacerbated by the introduction of the new PMTCT monthly progress return form in July 2021. Following the introduction of the new progress report form, an increase in the errors was registered and this was inevitable considering new indicators were introduced without proper training of clinic staff. The figures that were reported on the aggregate PMTCT monthly progress return form did not always tally with the actual figures and documented in the source registers. These discrepancies are usually discovered during the routine data quality assessments that are conducted to improve the validity and reliability of the reported figures. Errors are also noticed at the District Health Information office as the data will be cleaned before entry into the DHIS2 system and in some cases the numerators will be larger than the denominator for the indicators. The total number on ART is an indicator that uses calculations and when calculations were redone at the District Health Information Office variances are noted. In most cases, the differences in the reported numbers compared to the numbers in the source documents the verification factor when data quality assessments are conducted is usually below or above the recommended range of 95% to 104%.

1.4 Objectives of the study

1.4.1 Study aim

To determine the factors associated with the HIV and AIDS data quality and come up with strategies to improve the quality of data

1.4.2 Broad objective

Identify the determinants of HIV and AIDS data quality in Mutasa District

1.4.3 Specific Objectives

1. Determine behavioural factors that affect data quality in the HIV and AIDS programme in Mutasa District
2. Identify organisational factors that affect data quality in the HIV and AIDS programme in Mutasa District
3. Explore technical factors that affect data quality in the HIV and AIDS programme in Mutasa District
4. To assess the data quality of the HIV and AIDS programme in Mutasa District

1.5 Research questions

1.What are the behavioral factors that affect data quality in Mutasa District?

2.What are the organizational challenges that affect data quality in Mutasa District?

3.What are the technical issues that affect data quality in Mutasa District?

4.What are the data quality issues?

1.6 Significance of the study

Identifying the determinants of HIV and AIDS data quality contributes to strengthening the Monitoring and Evaluation system through the identification of weaknesses and coming up with strategies to improve them. Studies on HIV and AIDS data quality issues have not been conducted in Mutasa District. Different versions of reporting tools have been introduced but there has not been any evaluation of the challenges that are faced with the reporting tools. The study also shed more light on how to improve data quality in health care as reporting errors are not only common in HIV and AIDS data but in other programs as well. The study also helps in exploring Monitoring and Evaluation tool design issues that result in reporting errors.

1.7 Delimitation of the study

The study was confined to HIV and AIDS data quality issues in Mutasa District and due to funding constraints, data collection was done by the researcher alone.

1.8 Limitations of the study

The is no literature review from Zimbabwe for data quality issues and recall bias might have affected the responses of the study participants.

This Chapter has explored the background to the research area and specified the problem that has required the research to be done. Appropriate objectives and research questions were formulated and aligned to the research problem. The chapter emphasized the significance of the study and provided the boundary or scope of the research. Key assumptions were explained, and the research model for the study was described.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter will explore literature related to the area of this study. The chapter with a conceptual framework that is used to assess the performance of Routine Health Information Systems. The study will then drill down into the factors associated with data quality which are in the conceptual framework. Lastly the chapter will explore studies which were done on accuracy and completeness of data.

2.2 Conceptual Framework

The PRISM Conceptual Framework

The PRISM framework supports the strengthening of a Routine Health Information System using information and better data quality. It uses the assumption that improving the health system performance leads to an improved performance of the health system which then leads to an improved health status of the population. The framework has technical, behavioral, and organizational factors that affect the performance of a RHIS(Belay & Lippeveld, 2013)

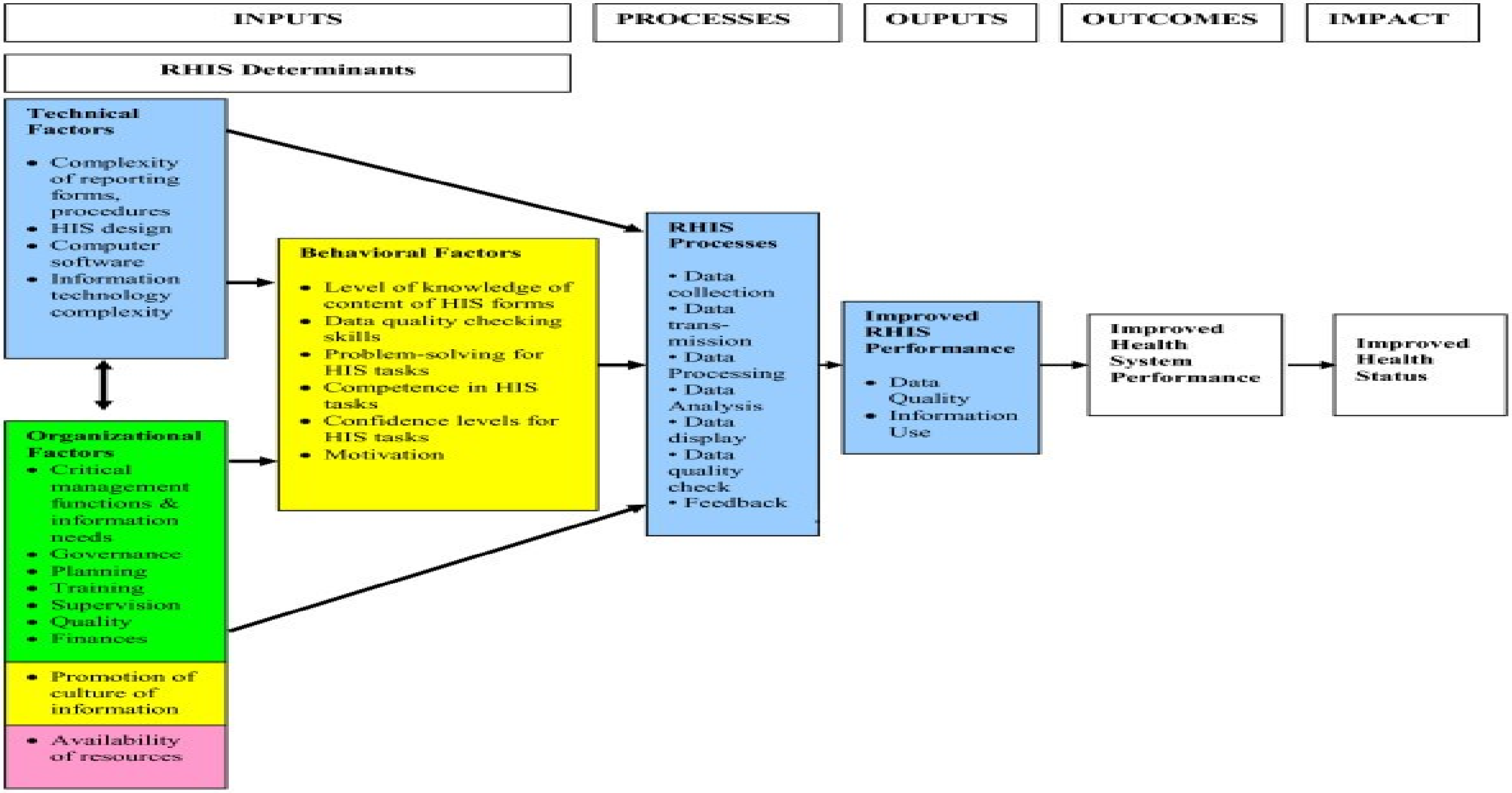

Figure 2.1 Conceptual framework

Adapted from (Belay & Lippeveld, 2013)

2.3 Relevance of conceptual framework to the study

The usage and effectiveness of health information systems in developing countries has always been a challenge. The Performance of Routine Health Information System Management (PRISM) was developed based on the weaknesses of the health information systems that had been documented for the development, strengthening and evaluation of health information systems. The framework identified determinants of the performance of a health information system as technical factors, behavioral factors, and organizational factors. These factors then affect the processes in the health information system such as the collection of data, the processing and the quality of data produced. The framework assumes that if the determinants and the processes are addressed quality data is produced and which improves data use and that will improve the quality of care. (Aqil et al., 2009)

2.4 Behavioral factors

The confidence, level of competence and motivation of the users of a health information system affects the performance of a health information system(Aqil et al., 2009) .The PRISM framework has level of knowledge of completing the reporting forms, skills for checking data quality and motivation as some of the behavioral factors that affect the system. In Ethiopia health care workers who were competent in the health information system were found to utilize the information more that health care workers that were not competent (Wude Id et al., 2020). Motivation and awareness of reporting performance was also observed to be a facilitator in improving reporting. Facilities that received feedback from the nurses in charge on their reporting were motivated to improve on their reporting. Receiving positive feedback was a positive motivator and those who noticed that their data was not being returned or questions were also motivated(Gesicho & Babic, 2021).

Behavioral determinants of a health information management system in Ethiopia and in that study. The confidence level for checking data quality for the study participants was 60%. However, the participants had more confidence in explaining their finding or trends after plotting their data on graphs and using their data for identification of gaps and areas of improvement(Negese Dufera et al., 2018).

Attitude of health care workers also affects their reporting practices as negative attitudes will affect the quality of data. Positive attitude favors the use of health information systems and negative attitude discourages the use. A study was conducted in Nigeria to assess the attitude of the health care workers towards data collection. Sixty one percent of the participants had no interest in filling the forms and 39% of them regarded the exercise of filling forms as time consuming and tiresome (Ekwueme et al., 2018).

2.5 Organizational factors

A study done in Kenya at different health facilities to identify barriers and facilitators to HIV indicator reporting showed that there is relationship between workload, teamwork, and capacity in reporting(Gesicho & Babic, 2021). Workload varies at different health facilities with the high-volume facilities having more workload than the low volume facilities. There are also other competing priorities that increase workload at health facilities and because of the Covid pandemic the same nurses who are involved in compilation of the HIV and AIDS data.

Training is a factor which affects the quality of data which is produced as it leads to health care workers acquiring knowledge in documentation and reporting. A study was conducted in Nigeria Kaduna State to assess whether training had any effect on the quality of data. The study was quasi experimental and eleven primary health care facilities were selected in the control and experimental group. No differences in reporting were noted in the control group and in the experimental group there were statistically significant changes in the completeness and timeliness of reporting (Nwankwo & Sambo, 2018). A similar study was conducted in Enegu State study and control health centers were selected and after training documentation in registers, timeliness in reporting and use of data improved significantly and no changes were noted in the control group (Osa-Eloka C E et al., 2009)

In study done in Tanzania 81% of the participants had never been trained on the health management information they were using and 65% of them could not define what the health information system was all about .and its importance. The participants from this study did not use the data they generated as it was of poor quality (Cheburet & Odhiambo-Otieno, 2016).Another study conducted in South Africa on the ART programme in Eastern Cape all nurses who were the focal persons for OI/ART reported to have never been trained on the proper way to fill in ART registers however these nurses attended a training which had a curriculum on the documentation and reporting of ART registers (Kaposhi et al., 2015).

Also, in the study done in Kenya having and Electronic Medical Record System was found to have a positive impact on the quality of data that was produced. However, some of the clinics that were found to have high quality data did not have EMR and some poor performing facilities had EMR systems(Gesicho & Babic, 2021). Another factor which contributed to late submission of data was that the deadlines for submission of data would sometimes fall under the weekend and this was an issue of concern by most of the facilities. The location of the facilities also contributed to late submission of data especially during the rainy season for clinics that are in hard-to-reach areas.(Gesicho & Babic, 2021).

A study done in Benin showed that there was no association between receiving incentives and the quality of data and the quality of data at facilities which received support and those that did not receive support (Ahanhanzo et al., 2014). Another study was conducted in Benin to evaluate the effects of Results Based Financing on the timeliness and quality of maternal and child health data. There was an improvement in the timeliness and completeness of data at the facilities that received results-based financing compared to the control group. However, there was no improvement in the quality of data as overreporting was noticed in the facilities that were receiving funding and there was underreporting in the control group (Salami et al., 2016).

Another barrier which was also identified was the complexity of reports, staff rotations and mentorship. Problems were noted when similar reports were being submitted to the Ministry of Health and to the supporting partner at the facility. HIV Care and treatment were found to be very complex and required knowledge of the indicators for one to compile the data these indicators were found to have a lot of transcription calculation errors; misinterpretation of the indicators and the registers were also not being updated. The registers which are not updated lead to the delay of reports as they need to be updated first before compiling the statistics and parallel reporting whereby reports needed to be submitted to the Ministry of Health and to the supporting partners in the district. The health workers who were interviewed mentioned that correcting both sources of data was a challenge when data issues were noted(Gesicho & Babic, 2021). Mentorships and trainings on indicators which were done by the data officers were found to have a positive impact on reporting. In a study done in Nigeria on the factors that hinder the use of a health information system participants mentioned that provision of incentives could improve the use of data from a family planning health information system.(Afe et al., 2017).

A rapid needs assessment for the HIV/AIDS monitoring and evaluation system was conducted in Kenya and the findings were consistent with those of the study done by Giescho as the numerous tools which are provided by different implementing partners were found to increase the workload of the health care workers. Some of the findings were also that the health care workers had minimal understanding of the data, and this was caused by the fact that feedback on the data was not provided after submitting the data to the national level. Organizations that conduct data quality assessments also did not leave any form of written feedbacks and follow ups to ensure that the corrective actions are taken were also not being done (Mbondo et al., 2013).

Supportive supervision from the district health officers has been proved to be a great way of improving the performance of health centers. In Kenya 79% of respondents mentioned that they received support and supervision visits and there was a strong association between receiving support and supervision and data quality There was also a strong association between the frequency of support and supervision visits and the data quality (Cheburet & Odhiambo-Otieno, 2016).

A study was conducted in Botswana to investigate how the best support and supervision visits can be conducted. The results from this study showed that the health care workers did not appreciate when their bosses who conducted the support and supervision just gave directions to them without understanding their problems. The discussions done with the health care workers showed that they preferred having meetings with the district health managers and discussing what works instead of the managers deciding for them. The district health managers also faced transport challenges as they could not visit all facilities because of lack of transport and lack of support from the National Ministry of Health(Nkomazana et al., 2016).

A study done in South Africa showed that participants who had not been trained on data elements understood the data elements more than the participants that had been trained (Moloko, 2021). Supportive supervision was found to be another factor that affects data quality, and this was found in a study done in Southern Ethiopia. The participants in the study had been supervised in the last 2 quarters. In another study done in South Africa the results showed that the health care workers were motivated but they lacked sufficient knowledge and skills on the routine health information system. It was also noted that the health care managers had more knowledge of the system compared to other health care workers at the health facilities(Nicol et al., 2013) .

In a study which assessed if there were any data quality assurance measures that were in place at health facilities in Uganda after data compilation it was found that less than 25% of the facilities had the nurses in charge check the data quality before submission .The organizational factors that were identified in this study included the unavailability of reporting forms which led to improvisation in counter books (Kagoya & Kibuule, 2018).

Human resources is also another factor that affects data quality at health facilities .In Uganda 52% of health facilities had a cadre responsible for health information and facilities that did not have focal persons for data the nurses in charge were responsible for handling data .Some of the staff that filled the reporting tools had handwriting that were not easy to read and the reporting tools were also left blank due to laziness .At these facilities lack of cooperation was also a major cause of poor data quality as some of the staff members did not cooperate when clarity was needed by the people responsible for reporting .The staff at health facilities also felt that it was not their responsibility to be involved in the compilation of data and it was the responsibility of the nurses in charge (Kagoya & Kibuule, 2018).

The results from the study done in Uganda by Kagoya and Kibuule were like the findings from a study in South Africa at Mbingo Health Facility where the focal person for data was the administrative officer of the health facility. The data focal person also faced challenges in compilation of data as the handwritings in the registers were difficult to read. When the focal person asked the nurses who had written in the registers it was difficult for them to recall what they had written .and this led to the submission of incomplete data and late submission(Asah, 2021).

Another study was also done in South Africa in Eastern Cape by (Kaposhi et al., 2015)there one or two nurses that had been trained in HIV/AIDS treatment issues and they were the ones responsible for consulting the patients, documentation and reporting of the indicators. These nurses were not always in the department as some of them had been assigned to other departments because of shortage of staff so sometimes the HIV and AIDS department was left without a nurse with HIV and AID data management. In this study the non-governmental organizations that supported the clinics also caused confusion as there was no standardization in reporting as their reporting requirements were different from the requirements of the Ministry of Health.

In Malawi 36.7 % of the health care workers had been trained on PMTCT and 20% had attended a refresher training in the past 12 months. The health care workers who had attended trainings were supposed to conduct on job trainings with those who had not attended and cascade down the information from the trainings. However, those who had attended the training did not conduct trainings at the health facilities. The participants from this study also mentioned that new tools were introduced before they got a chance to learn the old ones (Kumwenda et al., 2017).

Many studies have shown that trained cadres have more confidence and more knowledge in health information systems. However, this was not the case in a study done in Malawi where no significant differences were noted between health care workers who were trained and those that were not trained. In this study cadres who were recently recruited had more knowledge than those who had attended a training for five days. People who had done on the job training for two and a half days performed better than those that had attended a five-day training (Chaulagai et al., 2005).

After the identification of data quality challenges at Mbingo Health Care facility an intervention was put in place to address the challenges. The intervention was led by the data focal person, the nurse in charge for the facility and 6 other facility staff members. This intervention led to the health facility winning an award in data management and use. To improve data quality at the facility data validation meetings were conducted and during these meetings data reported was compared to data in the source registers the meeting were also used as an opportunity to mentor the staff on the documentation in the registers. The data review meetings were changed from monthly to daily meetings and this assisted in reducing the amount of time which was spent in data compilation at the end of the month and challenges with data were addressed daily(Asah, 2021).

To improve the health information system in Botswana efforts were made to do task shifting to improve the monitoring and evaluation system. Recent graduates who had no experience in health care and reporting were recruited and trained on the monitoring and evaluation system. After 3 years there was a great improvement in data quality and the workload for the health care workers had decreased as they now focused in consulting the patients only (Mpofu et al., 2014)

Before data is submitted to the next level it is supposed to be verified at the facility level. In the evaluation of an ART programme in South Africa the statistics were supposed to be verified by the nurse manager or another nurse at the facility. However, this was not the case as the nurse in charge did not verify the data comparing with what was in the registers they just signed and submitted the data.(Kaposhi et al., 2015).In Northern Nigeria 20% of the managers at the health centers checked their statistics before submission although 48% of them had regarded the data that was submitted as accurate (Adindu & Babatunde, 2006).

Health care workers use different tools to document as they consult patients. In Vhembe District the increase in workload of the nurses led to poor documentation and reporting. The nurses in this district were facing challenges with the numerous documents that needed to be filled. Documents were found with information that was incomplete and inaccurate and the recommendations from this study were to increase the number of nurses (Shihundla et al., 2016).

A study was conducted in Zimbabwe to assess the quality of data and its completeness before and after conducting a data quality assessment for a VMMC programme .After DQAs had been conducted there was an improvement at the four sites that were selected in the completeness of data .Giving feedback to those who were providing VMMC services and were responsible for the documentation was shown to lead to sustainable improvements in the quality of VMMC data (Xiao et al., 2017).

Another study was conducted to assess the impact of data quality assessments in five African countries. Data quality assessments were done in The Democratic Republic of Congo, Nile, Malawi, Nigeria, and Niger in 2014 and a second round of DQAs was conducted in 2016. The recommendations from the first DQAs conducted included conducting trainings for the health care workers, deduplication of reporting forms the second round of DQAs after the recommendations showed that the health care workers now had more confidence in using the reporting forms as they had been trained and supervision systems had been well established(Yourkavitch et al., 2019) .

Three DQAs were conducted in Kenya at 17 health facilities and data collected form the maternity registers was reviewed to identify the gaps in documentation. The data in the registers was also compared with the data that was reported in the Ministry of Health forms. After conducting the DQAs trainings were conducted targeting the areas that had been identified to need strengthening. Renovations were also done in the storage spaces for the documents. The results from this study showed an improvement over time in the documentation of the maternity registers and the concordance of data in the registers and what was reported in the Ministry of Health forms also improved significantly(Wanyoro et al., 2020).

Capacity building and mentorship is essential in the improvement of data quality In Ethiopia an evaluation of the outcomes from capacity building and mentorship was done the data quality in the intervention facilities showed significant change compared to the control group(Alemu et al., 2021) . The Ministry of health in Malawi conducted a DQA in 2016 to detect system level factors affecting data quality that needed improvement. 60% of the health facilities had received a support and supervision visit in the previous 6 months. Having a recent supervision visit was found to be associated with better data quality. The facilities that used data to track their performance also had better data quality. The presence of a cadre responsible for statistics had no association with the data quality(O'hagan et al., 2017)

2.6 Technical factors

A study conducted by Moloko showed that the challenges that were faced which were related to technical factors were the tool being considered as not user friendly and the participants indicated that the tool contained too many indicators and the font in the data collection tool was too small .The participants also stated that the tool was congested because it contained some data elements that were not relevant to their facilities(Moloko, 2021). These findings were consistent with the findings of the study done in Kenya were the health care workers complained that they did not understand data collection tools and the tools were too complex and ambiguous and they had not been trained (Abera et al., 2016).

In another study to identify factors associated with data quality in a system which uses manual methods in Benin the major reasons for poor data were the tools that were used for data collection. The health workers indicated that the tools had many sections that needed to be completed and the cells for inputting the figures were very small. The data which was also required in these forms was also not relevant to some of the sites and they spent a lot of time reporting zeros(Ahanhanzo et al., 2014). Similarly in Ethiopia facilities which had friendly reporting tools were two times more likely to report quality data(Teklegiorgis et al., 2016). In contrast another study which was done in Ethiopia discovered that the registers and data collection tools which were used for data collection were regarded as very comprehensive and user friendly (Negese Dufera et al., 2018)

Having a standard set of indicators is one of the factors that also affect the quality of data that is produced. In a study done in Ethiopia facilities that had a standard set of indicators were more likely to use information from the routine health information system compared to the facilities without (Wude Id et al., 2020). In a study conducted in Kenya 39.5 % of the participants indicated that they had standard operating procedures for the collection of data but they went on to mention that these standard operating procedures lacked clear guidelines on checking if the data which was being produced was of good quality(Cheburet & Odhiambo-Otieno, 2016).

2.7 Data quality

Data quality is defined as the extent to which data meets the requirements of a user. In health care poor quality of data affects patient care, it also affects reproduction of the results from research and the value of data for use in public health surveillance also decreases(Ehsani-Moghaddam et al., 2021). Literature discusses many dimensions of data quality such as consistency, security, timeliness accuracy, completeness, relevance, meaningfulness, and consistency. The most important data dimensions of data quality in routine health information systems which have been most discussed are data accuracy, data completeness, timeliness, and consistency.

Data completeness data is considered complete if all the relevant columns of a reporting tool which are supposed to have data are filled and no column is left empty or blank (Deepa & Gopinath, 2016).Completeness of data can also be measured by the number of columns that are filled compared to the given set of instructions for completing a reporting tool. Data timeliness is the submission of reports on the actual date or before the date they are required at the district health information office (Deepa & Gopinath, 2016). Data accuracy is defined as a measure of reported values against what is in the source documents. Data accuracy is measured using a verification factor and a verification factor is calculated by dividing the figures from the recounts by the reported values and multiplying by 100. A verification factor which is above 100% indicates overreporting and a verification factor less than 100% is an indication of underreporting (Bosch-Capblanch et al., 2009)

In Nkangala District in South Africa data was for the PMTCT indicators data completeness was at 11%. Data was missing from the source documents as well as the summary sheets that were used for reporting. The data from this study was also inaccurate as the values that were in DHIS and the values in the registers had a variance which was greater than 10%(Mlambo et al., 2014). In another study conducted in South Africa the data accuracy for PMTCT data was found to be at 51%. Variances were noted between the source registers and the reported figures, the variances were mainly because of errors during tallying from the registers and transferring the data from the tally sheets to the reporting forms. The variances were attributed to in competencies of the health information personnel (Nicol et al., 2016b).

In Tanzania data quality was assessed at the primary health care facilities and at district level. At the health facilities there was overreporting of data and this problem was mainly found in the hospitals. The overreporting at the health facilities was more than 50% and some of the variances noted were close to 3-fold. This difference between the registers and the recounts from registers was like the differences between the figures in the registers and the figures in DHIS2.The differences between the DHIS2 and the reports at the facility showed that some of the indicators were slightly corrected at district level but not corrected at facility level (Rumisha, Lyimo, Tungu, et al., 2020).

A study was done in Ethiopia to assess the quality of data from a health information system. The results from this study showed that completeness of data at health facilities was 78%, the timeliness of data was 70% and the accuracy was 48%(Kebede et al., 2020). The poor data quality was as result of lack of training and lack of motivation of the health care workers.

In Malawi health care workers believed that the poor data quality was because of use of the paper-based system which was time consuming and tiresome. Lack of feedback on the reports submitted asl also another cause of concern for the health care workers. (Kumwenda et al., 2017).

A study was conducted in Solomon Islands to evaluate the malaria health information system. In this study the completeness of data for all indicators was 28% and the major cause for the incomplete data was workload. The nurses also believed that having a computerized system could improve the quality of data instead of using the paper-based system. Supervisory visits were also not being conducted regularly because of lack of funding (Wangdi et al., 2020).

In the study done in Solomon Islands data which did not reach the Provincial office on time was delayed by a period of between two weeks and a month. The major causes for the delays were the physical reporting forms that needed to be transported and this was difficult in facilities that were in remote areas and faced challenges with transport. Workload was also a contributing factor, and this was exacerbated by the numerous indicators that needed to be reported (Wangdi et al., 2020).These results were different from those of a study which was done in Uganda in Kabalore District were all reports were submitted on time during the period that was being assessed,90 % of the respondents were aware of the reporting deadlines. In this study 65% of the health center had data that was consistent 25% of the facilities had overreported and 4% had underreported (Nsubugaid et al., 2018).

Health center managers in northern Nigeria mentioned that the causes of delays in submission of reports were transport, poor road networks and they also did not receive the reporting forms on time(Adindu & Babatunde, 2006) .Wrong coding in registers, empty columns and wrongly filled columns were some of the data quality issues that were observed in a study which was done in Tanzania. There was overreporting of indicators as high variances were observed in the registers compared to what was reported on the forms which were submitted at the district health information office. The indicators that had the highest number of variances were those indicators which had huge number of clients and had many variables that were included in reporting(Rumisha, Lyimo, Mremi, et al., 2020) .

Health care workers have quite several registers that they need to complete as they attend to patients. A study which was done in 5 African countries revealed that the average number of registers which are filled by health care workers ranges from 16 to 48 registers the average was 34. The mean amount of time which was spent recording in the registers was about a third of the total time for consultation. In the five countries the number of reporting tools was ranging from 19 to 52 the average being 35 reporting forms. The number of estimated hours required to complete monthly reporting forms was nine hours (Siyam et al., 2021).

The quality of data was assessed at clinic offering Antiretroviral therapy in Malawi and there was a difference in data quality between facilities that had clerks responsible for record keeping and those without. Sites which had been providing ART services for longer periods had better quality as they also received quarterly mentorship visits. There was also a difference in the data quality of hospitals and the data quality of rural health centers(Makombe et al., 2008) .

Having indicator guides is one of the factors that affect data quality as indicator definitions are not always available. In Malawi definitions of data elements were available nationwide but the use of the guides was not consistent. The main challenges that were noted were the use of wrong codes and entry of wrong fields. In this study it was also observed that facilities did not recheck their data after compilation(Chaulagai et al., 2005).

In South Africa HIV prevention is recorded in four registers and HIV treatment data is recorded in six reporting forms. A total of 201 data elements was being reported and of these 201 indicators some of them were duplicated as they were reported on two different reporting forms. However not all forms were being utilized due to lack of training. The facilities had also designed their own tools as the tools they had been given did not allow them to record some indicators which were also important. The use of this improvised tools was noticed to continue even for the sites that had received the standardized tools(Kawonga et al., 2012).

This chapter has explored literature on the determinants of data quality and factors that affect the quality of data. Examples of some of the determinants of data quality in African countries and in other outside Africa were explored and these determinants were mostly training factors, support, and supervision.

CHAPTER 3: METHODOLOGY

3.1 Introduction

Research methodology is the pathway taken by the researcher in conducting their study (Sileyew, 2019).The chapter details how the study was conducted and includes the steps that were performed to select the study participants, the study methodology, the resources that were used to conduct the study, and how the data was analyzed.

3.2 Research design

An analytic cross-sectional study was conducted. A cross sectional study is an observational type of a study in which the research participants are selected based on the inclusion and exclusion criteria of the study being conducted. These studies are relatively cheaper to conduct and take less time. These studies have also been found to be useful in health planning and Monitoring and Evaluation (Setia, 2016) . Given the nature of the problem, as well as time and financial resource limitations to conduct the study, a cross-sectional study design was the most appropriate design. The study used a mixed method approach as both qualitative and quantitative data was collected. A mixed method design is a study in which a researcher uses both quantitative and qualitative methods to collect data (Schoonenboom & Johnson, 2017).The quantitative part of the study answered the research questions on the data quality of the district, and the types of data quality issues in the district and the qualitative investigated the factors that are associated with the data quality.

3.3 Population and sampling

The study was conducted in Mutasa district which is one of the seven districts in Manicaland province. The district has an estimated population of 177 122 according to the 2021 ZIMSTAT projection. The study population was the health workers in Mutasa district providing HIV and AIDS services, that is the nurses, primary care counsellors, data entry clerks, health information officers in Mutasa district. The study also reviewed patient records in the OI department that is the HIV testing services registers, the ART registers, ANC booking registers and the OI/ART patient care booklets.

3.3.1. Sample size for health facilities

Using Dobson`s formula:

$$n = \frac{Z^2_{\alpha/2} Np(1-p)}{d^2(N-1) + Z^2_{\alpha/2} p(1-p)^2}$$

Where N=46, p=0.11%, delta=0.10, where p is the proportion of health facilities that had stock-outs of recording and reporting tools following a data quality assessment in Gauteng South Africa, 2015. The calculated sample size was 22 health facilities.

3.3.2 Sample size for health workers

Using Dobson`s formula: $n=Z^2_\alpha \times p(1-p)/delta^2$, where $Z_\alpha=1.96$, p=0.86 (where p=0.86 is the data completeness in a study in Ethiopia), delta 0.10, confidence interval 95%, non-response rate of 5%. A sample size of 51 health workers was calculated.

3.3.3 Sampling procedure for health facilities

The three hospitals in the district were purposively sampled into the study. A total of 19 clinics were randomly selected from the 43 clinics in the district using the RAND function in Microsoft Excel.

3.3.4 Sampling procedure for health workers

Table 3.1 Sampling procedure for health workers

Health Worker Category	Number working in the HIV and AIDS programme	Sampling procedure	Proportion of population sampled
Nurses	87	38 nurses were randomly selected.	43.7%
Primary Care Counsellors	21	9 PCCs were randomly selected	43.0%
Data Entry Clerks	8	4 DECs were randomly selected	50.0%

3.3.4 Inclusion and Exclusion Criteria

Inclusion: All health workers providing HIV and AIDS services, and participating in HIV and AIDS recording, and reporting activities.

Exclusion: Health workers not directly involved in the compilation of HIV and AIDS monthly statistics

3.4 Data collection instruments

3.4.1 Questionnaire for health workers

A structured interviewer-administered questionnaire was used to collect data from the health workers. The questionnaire was used to capture data on the socio-demographic characteristics of the health workers, their knowledge, attitudes, practices on data quality, and reasons for the data quality issues.

3.4.2 Record review

A data quality assessment tool was used to identify and classify the data quality issues. The tool was used to capture data from the HIV and AIDS registers, and the reporting compare the data.

3.5 Pretesting of instruments

Data collection tools were pretested at one health facility in the district that was not part of the selected study sites. This was done to assess the validity of the tools, the time required to administer the study tools, the willingness of respondents to answer questions, and amendments were made where necessary before data collection started.

3.6 Data collection procedure

3.6.1 Health workers

Face-to-face interviews were conducted using the structured questionnaire. The data collection was done in private and at the most convenient place for the study participants. All COVID-19 prevention protocols were adhered to during the data collection exercise.

3.6.2 Record review

The HIV and AIDS registers, and the monthly reporting forms were reviewed. The recording and reporting tools were reviewed for the period October to December 2021. Data in the registers for the selected indicators was compared with the data reported in the monthly return forms for the same period to assess concordance. The following indicators were used:

- Total number of people tested for HIV.
- Number of contacts tested for HIV at the facility.
- Total number of people who were initiated on ART

3.7 Data Analysis

3.7.1 Data from the questionnaire

Data will be analyzed using SPSS. The statistical software was be used to generate, frequencies, proportions, and prevalence odds ratios. Statistical significance was set at a p-value <0.05, and all calculations were at a 95% confidence interval

3.7.2 Record review

Completeness was analyzed by randomly selecting 30 patients recorded in the registers (HIV testing, and the ART register), and completeness will be calculated by diving the number of patients with all the required information captured in the register divided by 30. The completeness was reported as a proportion, by multiply the product by 100. Data concordance was analyzed by calculating the verification factor, using the formula: (recounts from the register/reported in monthly reporting form) x 100. When the verification factor is ≥95% to ≤105, this was reported as no data issues, a verification factor of 90% to <95% or >105% to ≤110% will be reported as minor data quality issues, and a verification factor of <90% or >110% will be classified as major data quality issues.

3.8 Ethical considerations

Permission to conduct the study was sought from the, the District Medical Officer (DMO) Mutasa District, and the Africa University department of health sciences. Ethical clearance was sought from AUREC.

Written informed consent was obtained from each study participant before recruitment into the study. The researcher read out the details of the consent form to the potential participant. The participant should know the aim of the study. The researcher should obtain consent after the participant understood the study procedures.

CHAPTER 4: DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1 Introduction

The previous chapter focused on the methodology used for data collection and analysis. This chapter focuses on findings and the interpretation of results to address the research objectives. Analysis of quantitative data collected from the questionnaire administered to customers was facilitated by statistical package SPSS version 23, The chapter will present response rate, demographic analysis and findings on the behavioural factors resulting that affect data quality, organisational challenges affect data quality, technical issues that affect data quality and the data quality.

4.2 Data presentation and analysis

4.2.1 Response Rate

The researcher administered questionnaires to 51 health workers in Mutasa District, 39 were successfully completed.

A response rate of 76% was obtained

$$\therefore \textit{Response Rate} = \frac{39}{51} = 76.0\,\%$$

According to (Lawrence Neuman, 2014), the standard acceptable response rate of self-administered questionnaires is 60.0% and basing on this criterion, the established response rate of 76.7% was therefore adequate and appropriate for the study,

4.2.2 Demographics

The researcher investigated demographics information of respondents to unearth salient relationships that may be present in the data. The investigated demographics were gender, Age, Level of education, occupation, and period of working. The results were provided in the following sections below.

4.2.2.1 Age

The researcher investigated the age of the respondents. Figure 4.1 below shows the results (**N=39**)

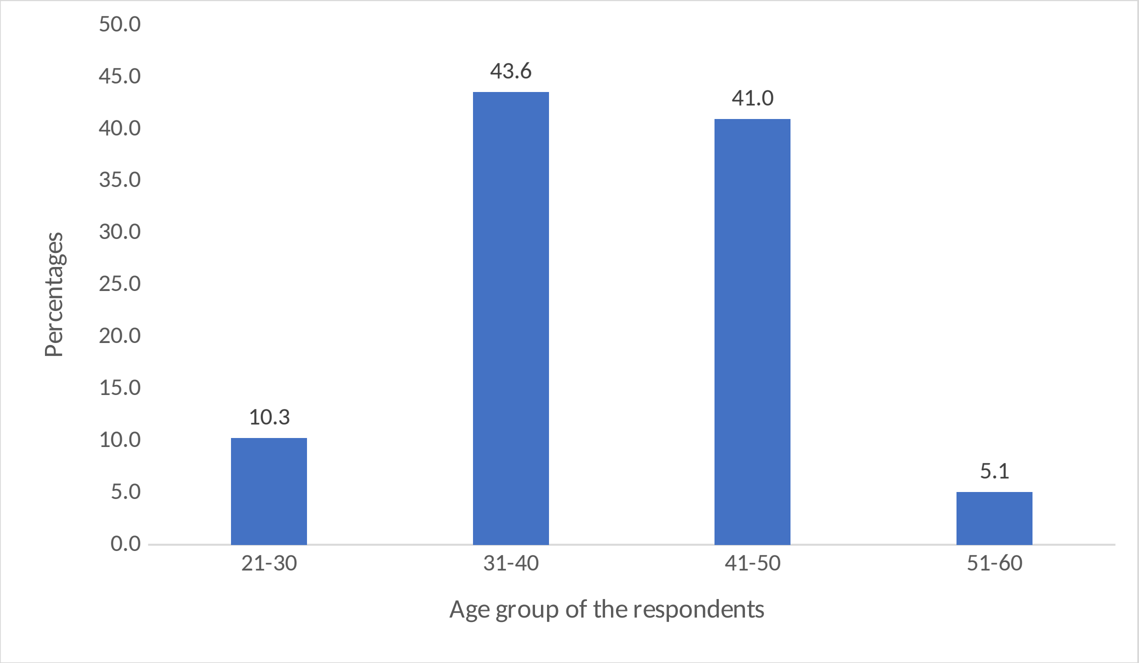

Figure 4.1 Age of the respondents

Figure 4.1 shows that 10.3% have 21-30 years, 43.6% have 31-40 years, 41.0% have 41-50 years while 5.1 have 51-60 year. A significant percentage fall under 31-40 and 41-50 years of age

4.2.2.2 Gender

Figure 4.2 below shows the gender of the respondents. (N=39)

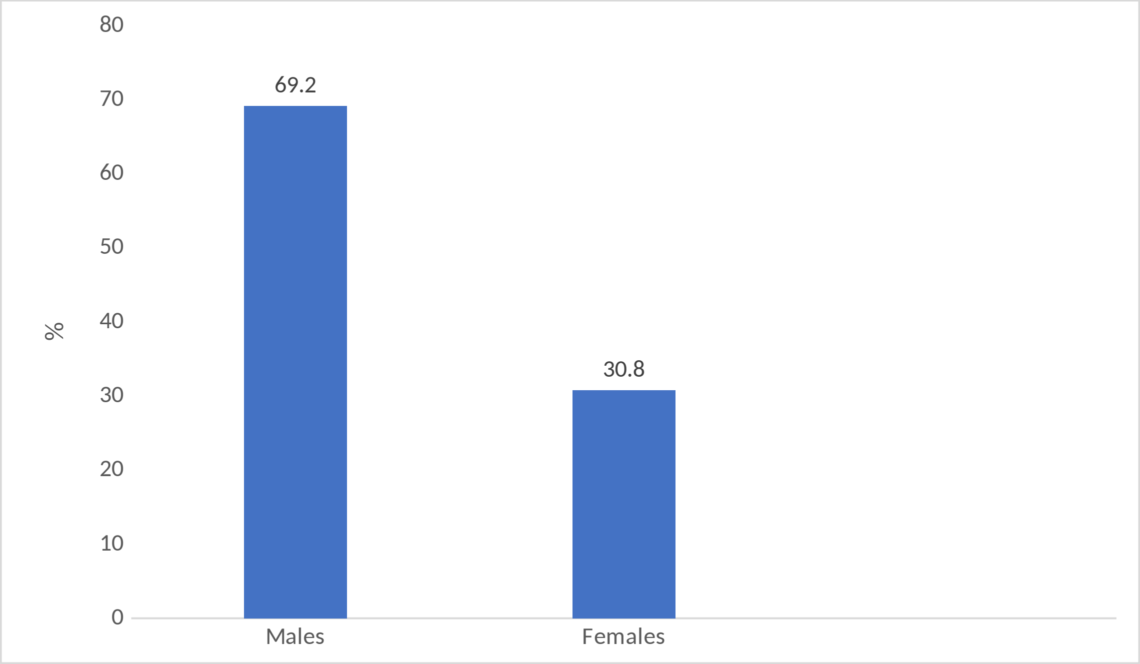

Figure 4.2: Sex of the respondents

The results showed that 69.2% were female while 30.8% were male. Most of the respondents were female. This can be caused by the complement of nurses which has more women than men.

4.2.2.3 Occupation

The research sought to investigate the occupation of the health workers who participated in the study.

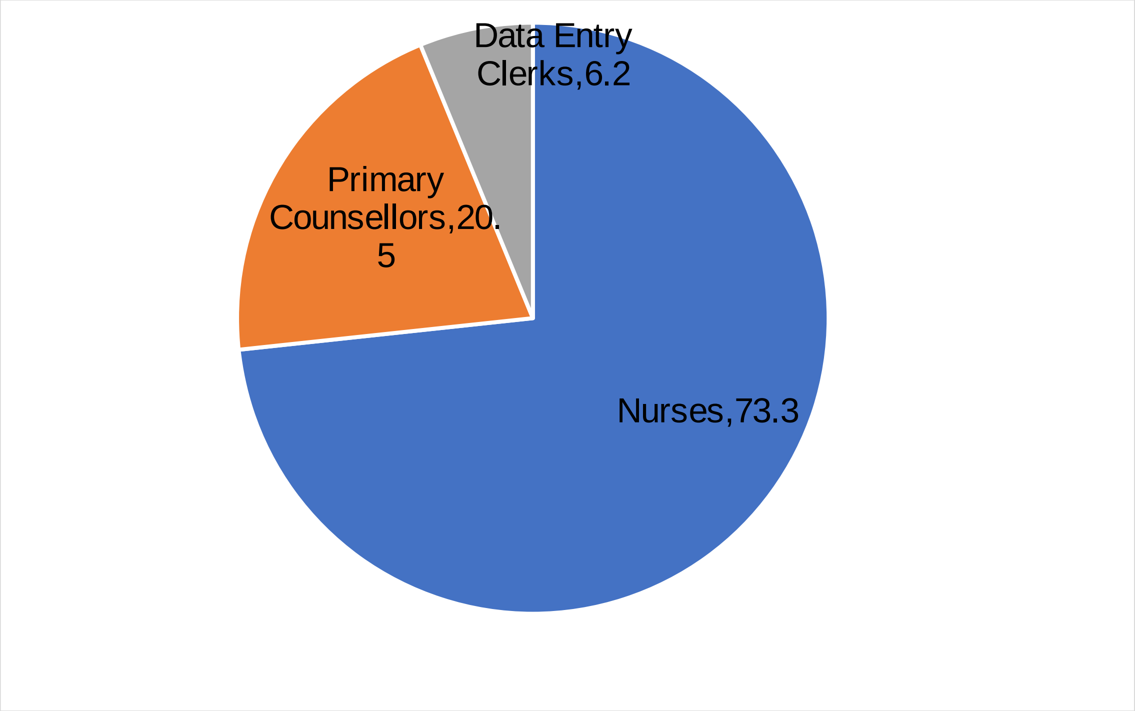

Figure 4.3 Occupation of the respondents

The results showed that 73.3% were Nurses, 20.5% were primary care counsellors while 6.2 % were data entry clerks.

4.2.2.3 Level of education

Level of education is very important to identify the level of knowledge an understanding the respondents have on the subject under study. Figure 4.4 shows the results

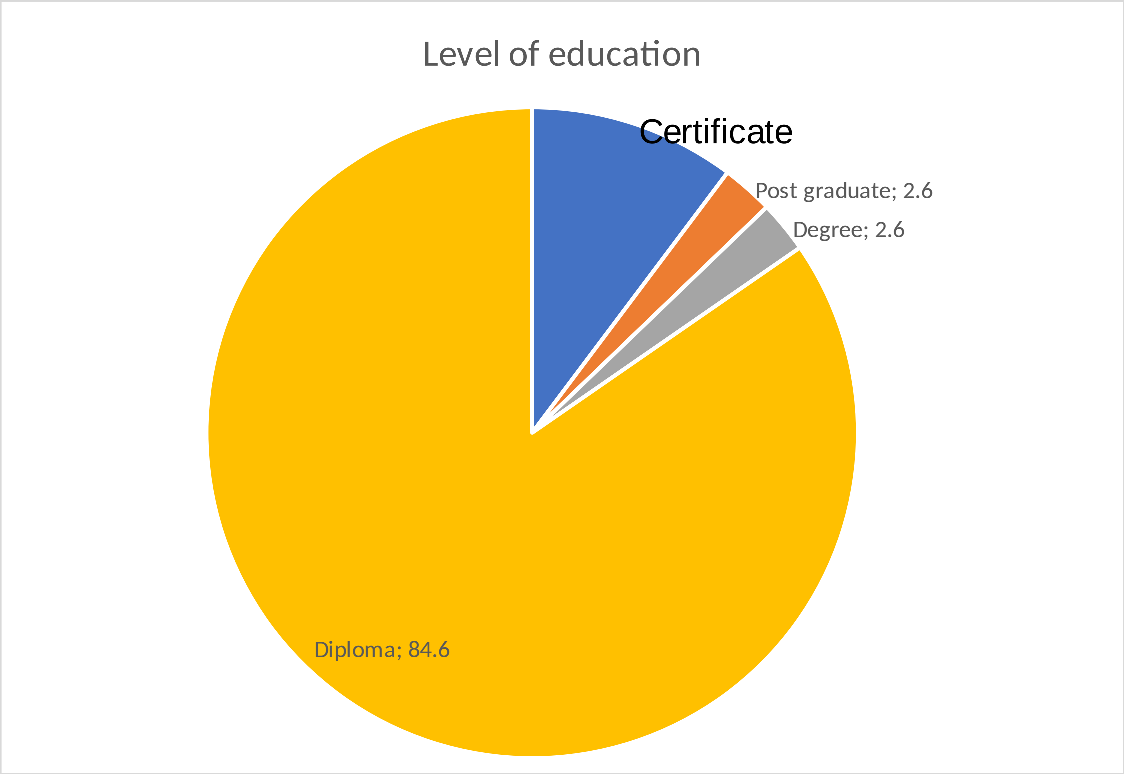

Figure 4.4 Level of education of the respondents

The results indicates that 84.6% have Diplomas, 10.2% have certificates, 2.6% have degrees while 2.6% have postgraduate qualifications.

4.2.2.4 Period of working for the Ministry of Health and Child Care

The experience of health workers is determined by the time they have stayed at workplace. The period of working in the Ministry of Health and Child Care is shown in the figure below. (N=39)

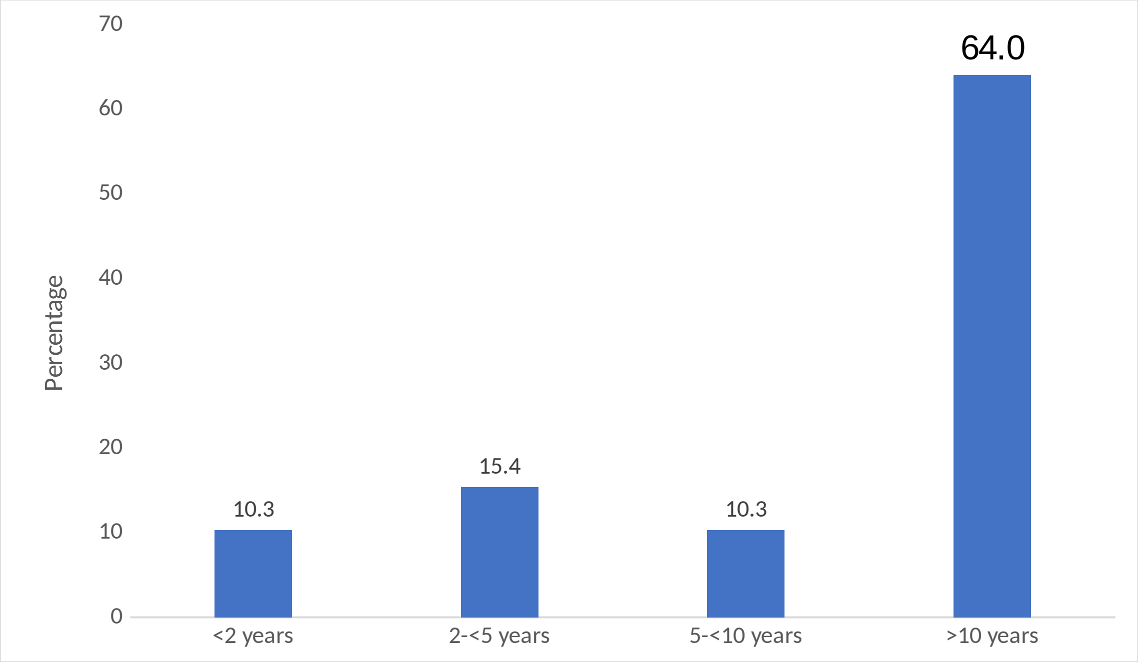

Figure 4.5 Period working in the Ministry of Health and Child Care.

About 10.3% have worked for less than 2 years, 15.4% have worked for 5 to 10 years while 64.0% have above 10 years. Most of the respondents are long serving have more experience in ensuring HIV data quality.

4.3 Determinants of data quality

This section provides the interpretation of findings on the factors associated with data quality in the HIV and AIDS programme in Mutasa district.

4.3.1 Behavioural determinants

Respondents were asked if they felt it was their responsibility to participate in data management at the workplace. Figure 4.6 shows the results.

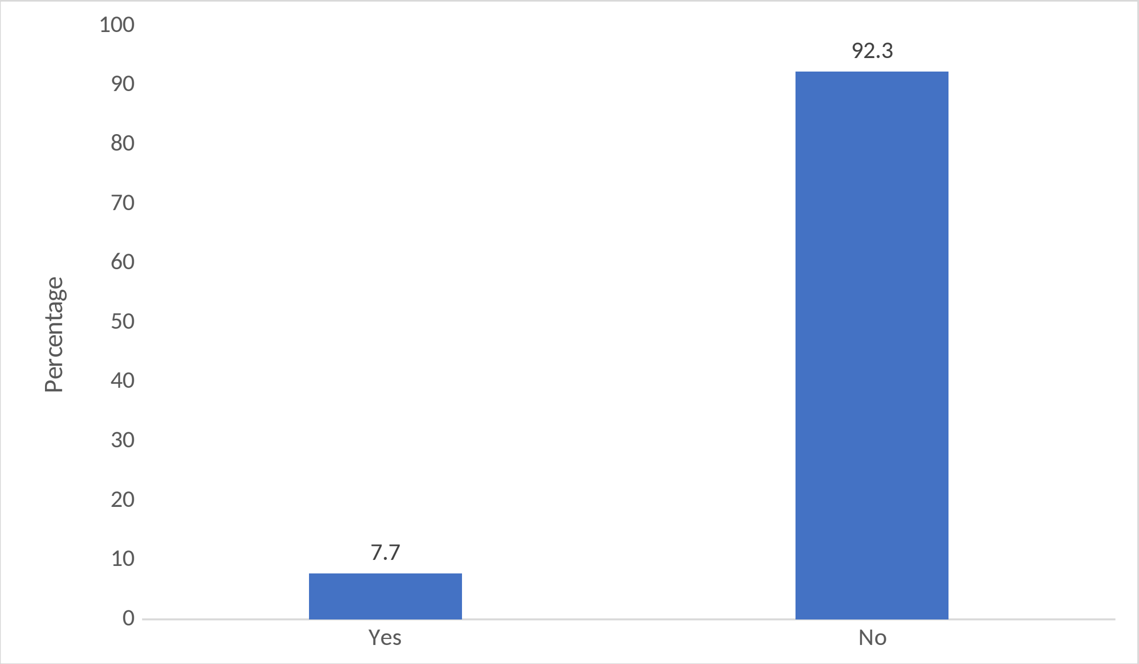

Figure 4.6: Feels it is their responsibility to participate in data management

About 92.3% felt that it is their responsibility while 7.7 felt it's not their responsibility. Those who disagreed were further asked to indicate a reason for their attitude. Table below shows the results.

Table 4. 1: Reason for not feeling responsible

Reasons for not feeling responsible	Frequency(n)	Percentage (%)
I was not trained	2	100.0
I have other important priorities	0	0.0
High patient workload	0	0.0
It is for managers	0	0.0
Other specify	0	0.0

The results indicate that all respondents who felt that it is not their responsibility to manage data were not trained. The results means that lack of training contributes to negative attitude over data management.

4.3.1.2 Knowledge

The respondents were asked about the number of registers used to compile total number of clients on ART.

Table 4.2; Registers to calculate total number of clients on ART

Responses	Frequency(n)	Percentage (%)
1 register correct	16	41.0
Both registers correct	23	59.0
Other, specify	0	0.0
Don’t know	0	0.0

The results showed that participants have knowledge of the registers that are used to calculate the total number of people on ART .41.0% of the participants managed to get 1 register correct and 59.0% got both registers correct.

Facilities conduct data consolidation meetings after compiling their data and they receive a $10 lunch allowance for these meetings from the implementing partner ZHI.

Table 4.3: Data quality issues to look out for

Data qualities	Frequency	Percentage
Data completeness	39	100.0
Data accuracy	39	100.0
Data consistency	39	100.0
Other specify	0	0.0
Don’t know	0	0.0

The results showed that respondents have knowledge of what is expected during data consolidation meetings as indicated by all of respondents indicating that they will be looking for data accuracy and data consistency. Data accuracy and data consistency are important to ensure quality data.

4.3.2.2 Time committed to data management

Respondents were asked to indicate the time they commit to data management. Results are indicated in figure 4.7

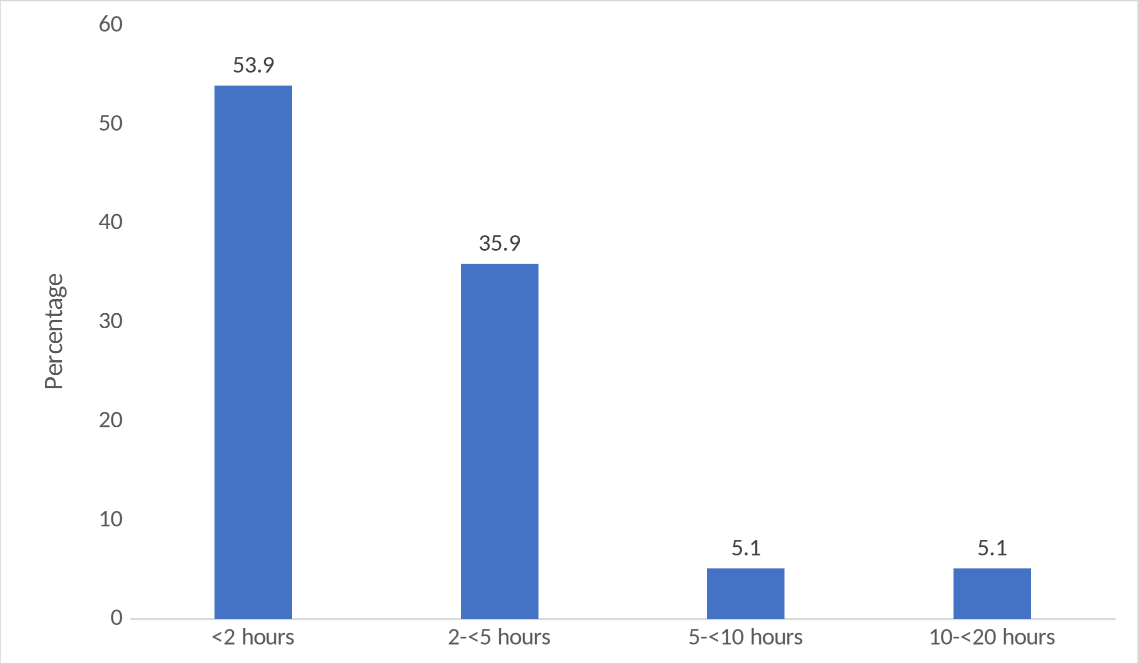

Figure 4.7 Time committed on data management on a 40h /week

The results shows that 53.9% commit less than 2hours, 35.9% commit 2-5 hours, 5.1% commit 5-10 hrs. while 5.1 commit 10 to 20hours. Most of the respondents committed less than 2 hours on data management. This implies that there is little time committed on data management by health workers.

4.4.3 Organizational factors that affect data quality

This section provides the analysis and interpretation for the first objective of the study which sought to identify organizational factors that affect data quality

4.4.3.1 Training for data reporting

Respondents were asked if they ever received training in data reporting. Results are shown in the table below.

Table 4.4: Training in data reporting

Training in data reporting	Frequency	Percent
No	12	30.8
Yes	27	69.2
Total	39	100.0

The results shows that 30.8% disagreed that they were trained while 69.2% were trained. This shows that most of the health workers were trained on how they do data reporting. The respondents were further asked those who agreed that they were trained to indicate how they received their training. Table 4.5 below shows how the participants were trained

Table 4.5 Method of training

Method of training	Frequency	Percent
Attended a workshop	6	22.2
Both	1	3.7
Trained on the job	19	70.4
Total	27	100.0

The results showed that 22.7% attended workshops, 3.7% were trained on the job and attended workshops while the majority 70.4% were trained on the job. The results showed that most of the health workers did their training for data recording on the job.

4.4.3.2 Period in management of HIV and AIDS data

N=39

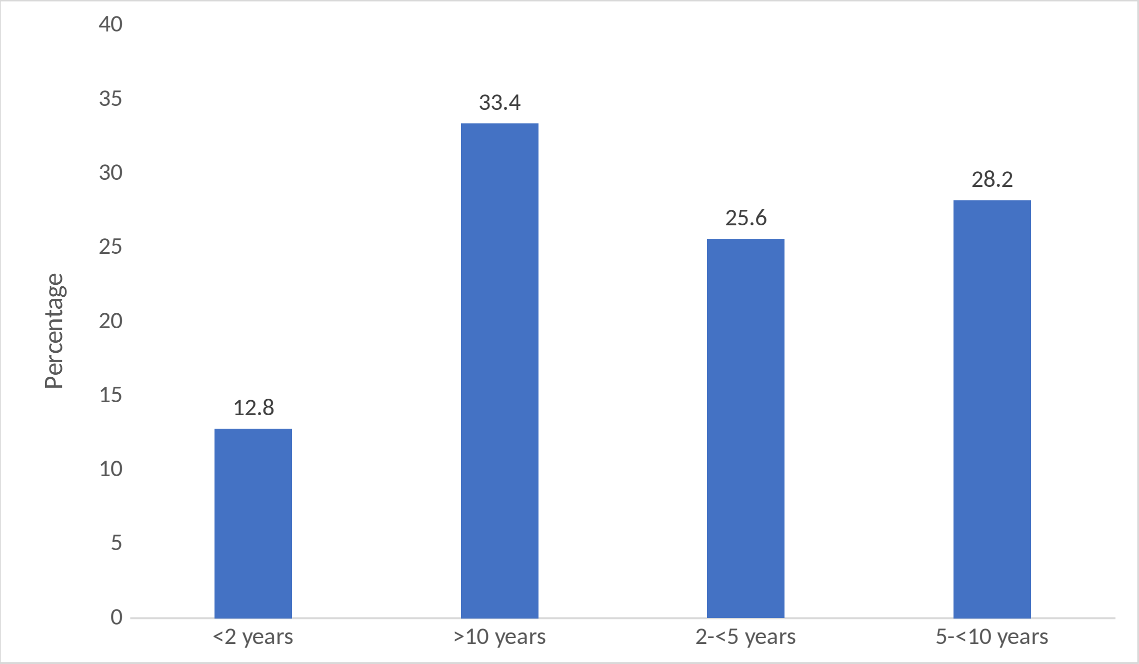

Figure 4.8: Period in HIV and AIDS Data Management

The results showed that 12.8% have less than 2 years, 33.4% have more than 10 Years, 25.6% have 2-5 years while 28.2 have 5-10 years. The results shows that the health workers have different experiences in HIV and AIDS data management.

4.4.3.3 Mentorship support visits

The researcher investigated if there were some mentorship site supports towards data management. Figure below shows the results.

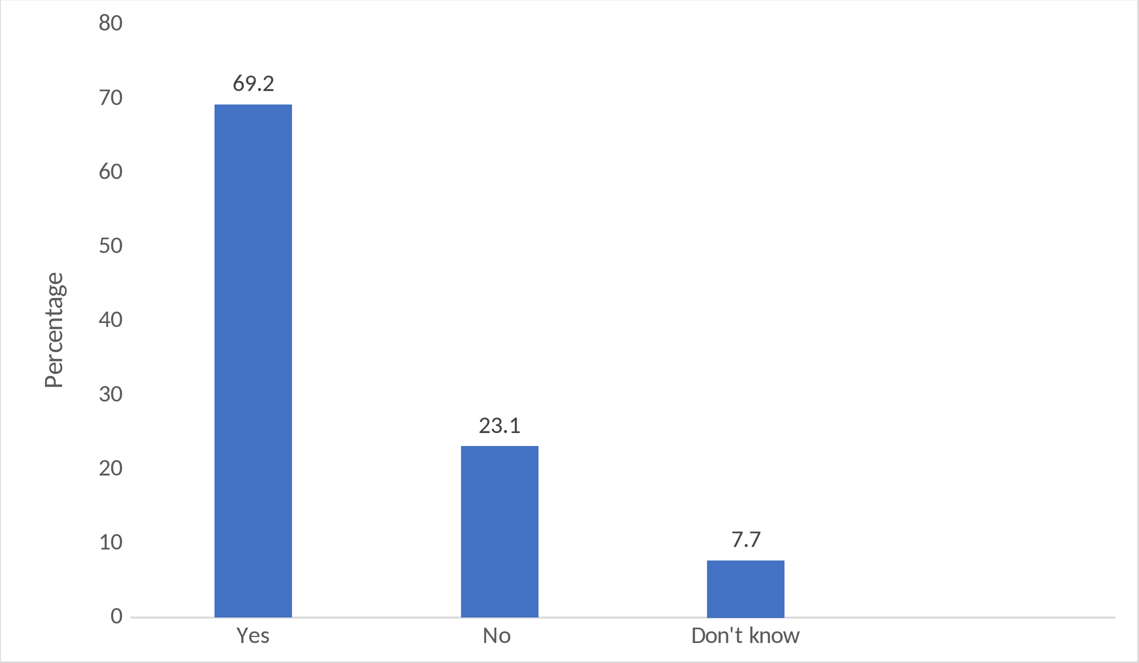

Figure 4.9: Mentorship support

The results showed that 69.2% of the respondent agreed that they had mentorship programmes, 23.1 had no mentorship programmes while 7.7 did not know.

4.4.3.4 Frequency of mentorship support visits

The researcher further asked on the frequency of mentorship visits. Figure below show the results

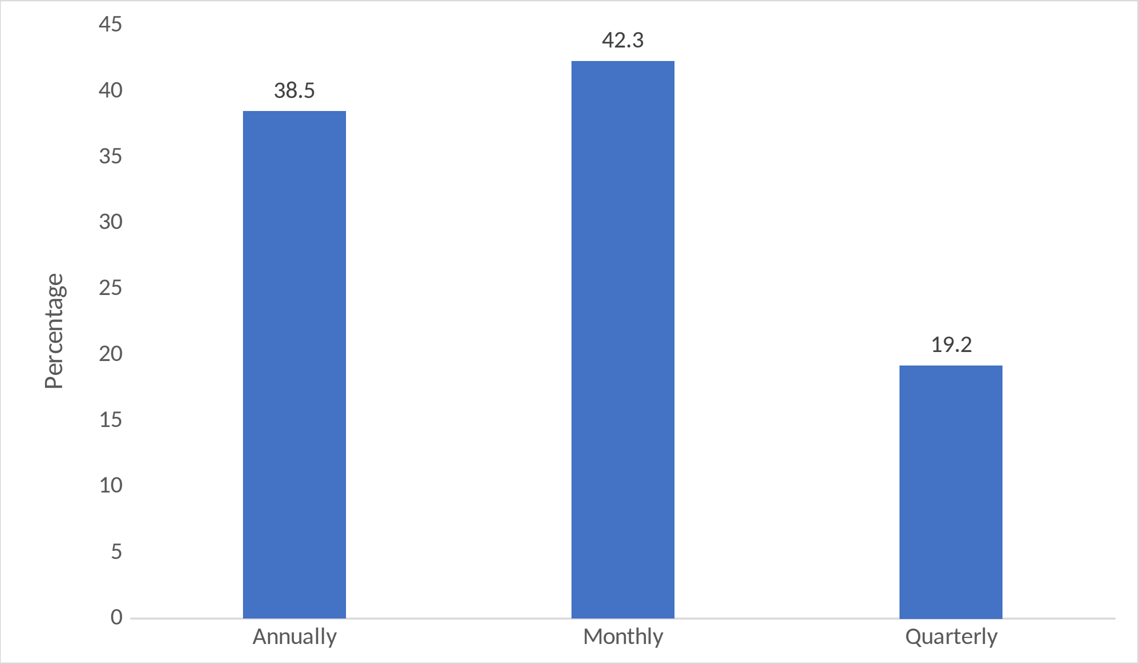

Figure 4.10: Frequency of mentorship visits

The results shows that 38.5% had mentorship programmes annually,42.3% had them monthly, 19.2% had them quarterly**.**

4.4.3.5 Standard Operating Procedures

The respondents were asked if they had Standard Operating Procedures for collection of data and the figure below shows the responses

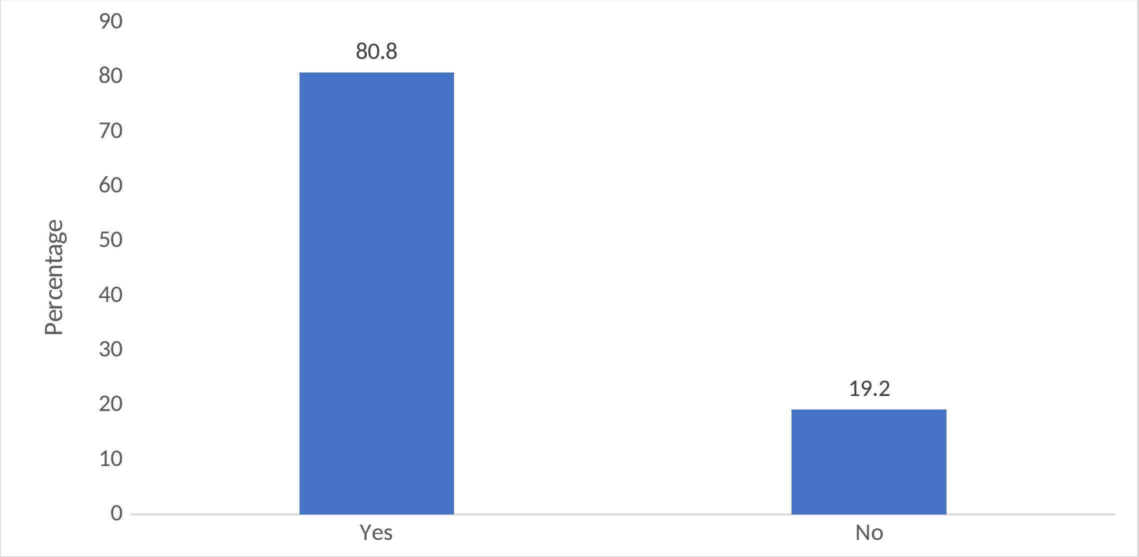

Figure 4.11: Standard operation procedure

The results shows that 19.2% have no Standard Operation Procedures for the HIV/AIDS indicators. About 80.8% have Standard Operating Procedures for the HIV/AIDS indicators.

4.6 Technical issues that affect data quality

The researcher investigated the technical issues on the data collection tools that affect data quality and the results are shown in the figures below.

Figure below shows respondent’s views on the MOHCC PMTCT monthly return form.

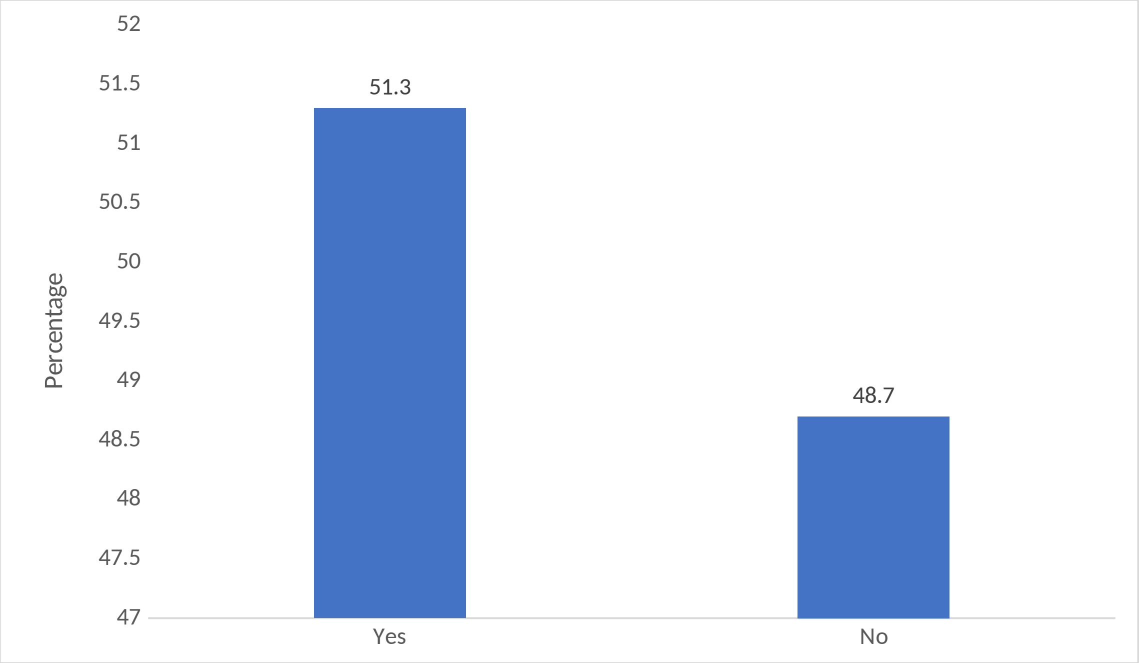

Figure 4.12: Understanding of indicators on the PMTCT MRF

Figure 4.12 shows that 51.3% said that it is not easy to understand while 48.7% said its easy. The majority felt that it is not easy to understand. The lack of understanding HIV indicators means that the health workers have challenges of reporting the indicators which leads to poor data quality management.

The researcher went on to investigate if the respondents understood the indicators on the ZHI quasi form and the figure below shows the results.

(N=39)

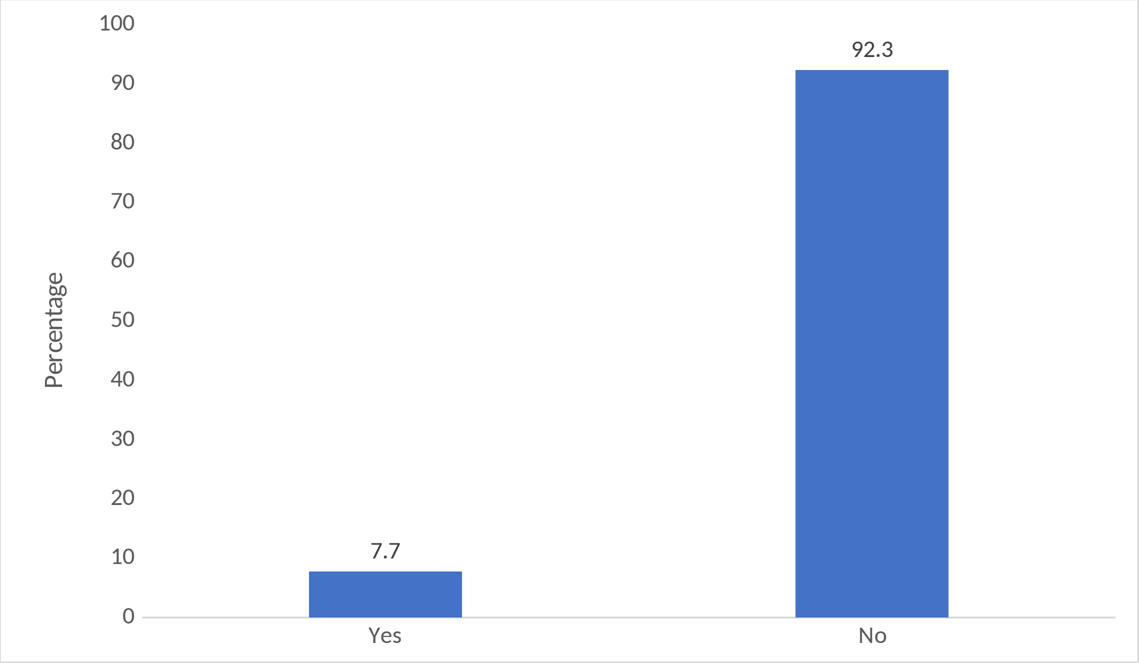

Figure 4.13 Understanding of quasi form indicators

The researcher went on to investigate if the PMTCT Monthly Return Form was friendly and the figure below shows the results.

N=39

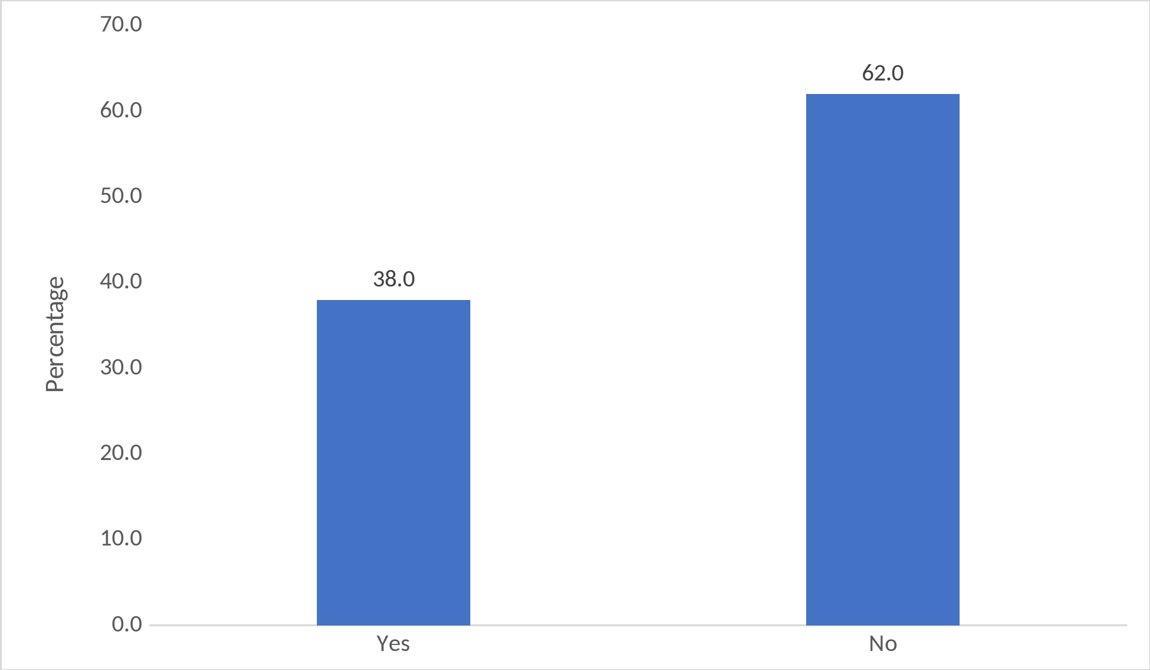

Figure 4.14 User friendliness of the PMTCT MRF

The reasearcher investigated areas that need improvement on the PMTCT monthly return forms and the figure below shows the responses.

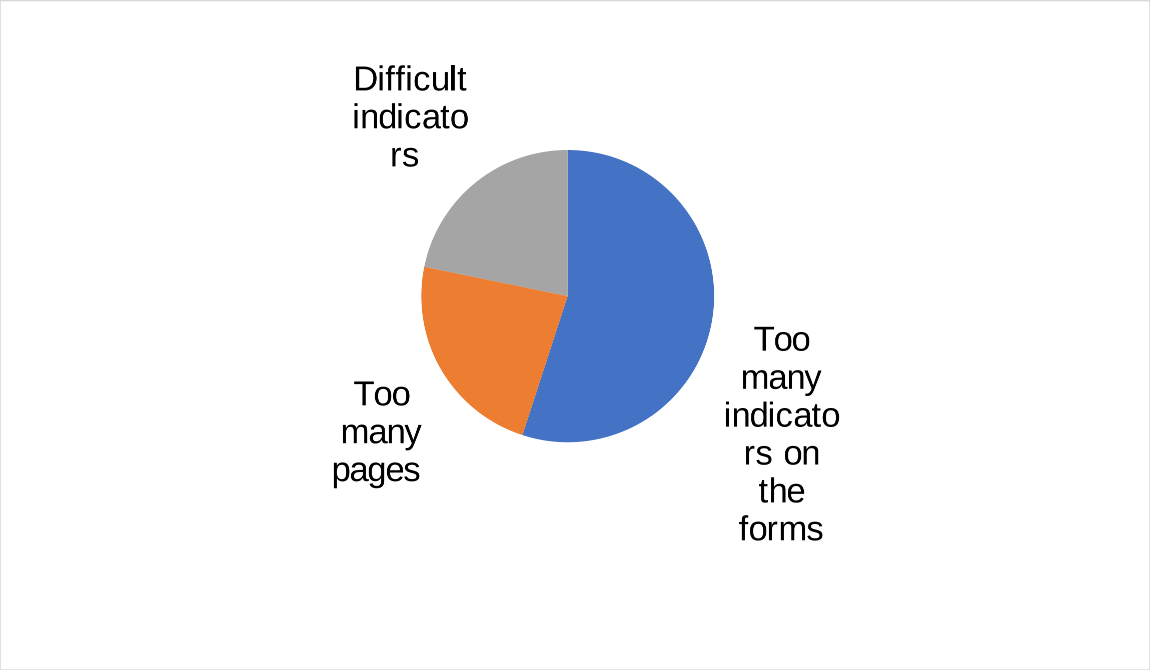

Figure 4.15 Issues on the PMTCT MRFs

The researcher also investigated whether the ZHI quasi form was perceived as friendly or not and the figure below shows the results.

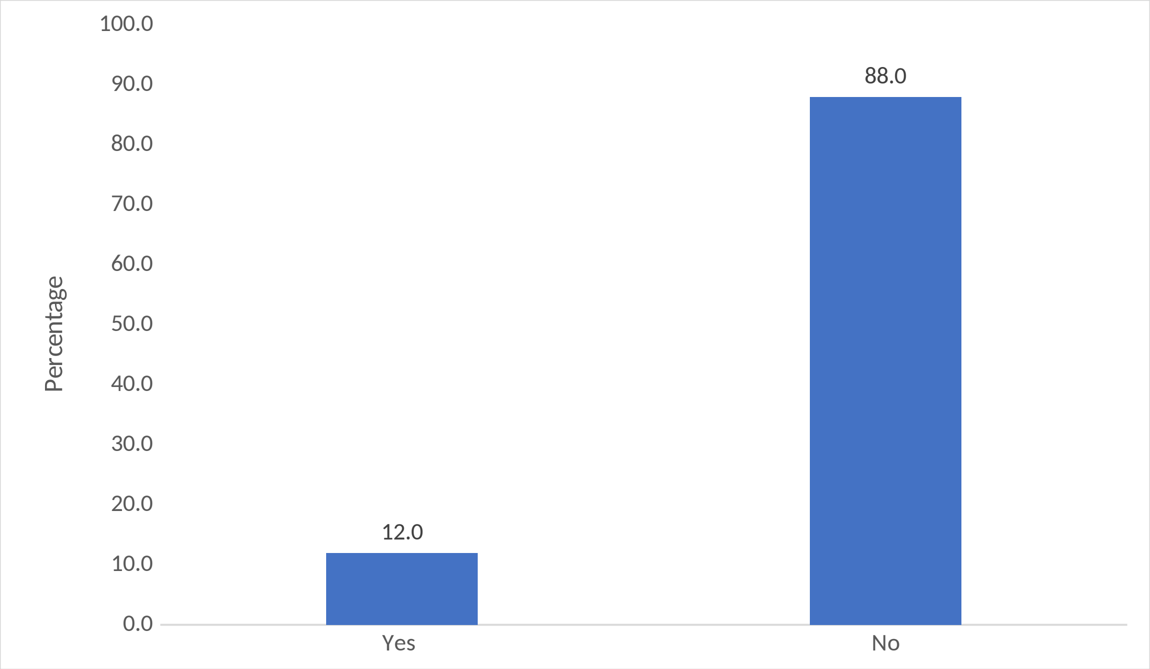

Figure 4.16: Friendliness of the ZHI quasi form

The respondents listed the major issues on the ZHI quasi form that caused it to be perceived as not user friendly as shown in the figure below.

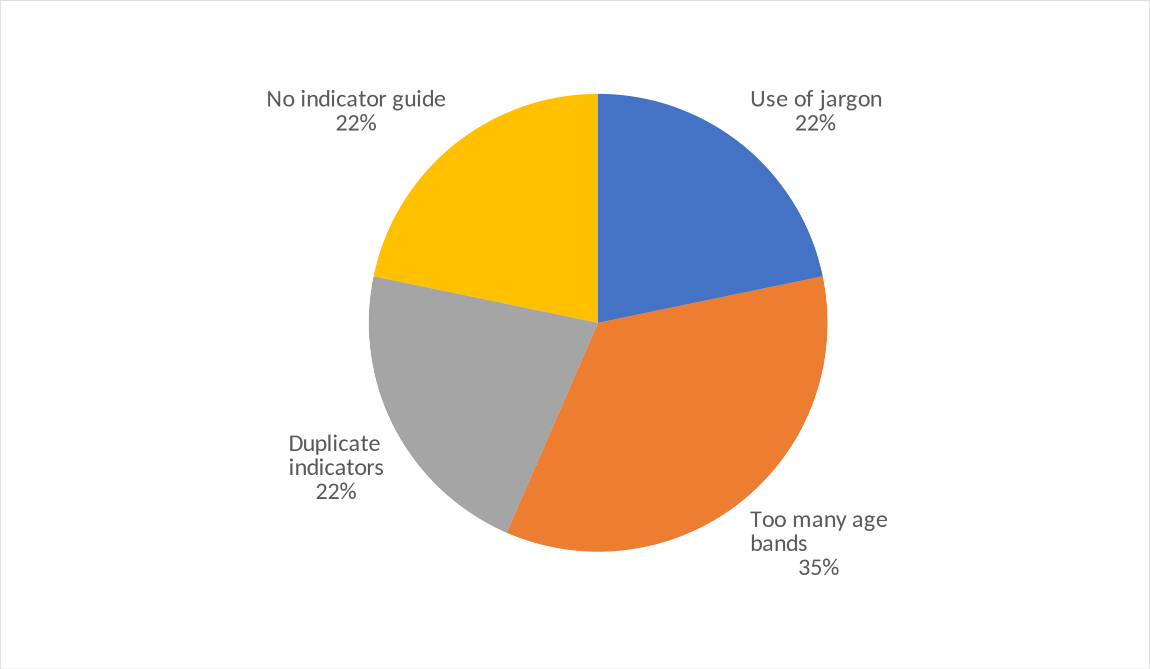

Figure 4.17 Issues on the quasi form

Following the responses of the respondents on the tools having too many indicators and duplication of indicators the researcher investigated the number of indicators on each tool and the number of indicators that were duplicated.

Table 4.6 Number of indicators reported

HIV indicators	Number of Indicators on PMTCT monthly Return Form	Number of Indicators on the quasi form	Number of indicators duplicated
HIV Testing	36	26	9
PMTCT indicators	41	6	0
HIV treatment	51	56	2
HIV and TB	13	13 and 15 quarterly indicators	0
Viral load	6	11 and 20 quarterly indicators	4
HIV prevention	7	19	3
HIV case-based surveillance	11	2	
HIV and cervical cancer	30	53	0
HIV and mental health		4	0
HIV and GBV		6	0

The reasons were asked of the reason that were causing poor data quality at their facilities and the table below shows the responses.

Table 4.7 Reasons for poor data quality

Reasons for the poor data quality	Frequency	% Response
High patient workload	27	69.2
Lack of frequent data quality assessment	6	15.4
Lack of mentorship	14	35.9
Lack of training	30	76.0
Too many reporting tools	7	76.9

The results shows that the reasons for poor data quality were high patient workload (69.2%) , lack of frequent data quality assessment (15.4%, Lack of Mentorship (35.9%) . Lack of training (76.0%) and too many reporting tools (76.9%)

Correlation analysis

Correlation analysis was done to investigate the factors that were associated with the knowledge of the health care workers. The table below shows the results from the correlation analysis.

Table 4.8 Correlation Analysis

			KNOWLEDGE	**TRAINING**	**W/S**	**Y/ SERV**	**ME**	**S/0**
SPEARMAN'S RHO	Knowledge	Correlation Coefficient	1.000					
		Sig. (2-tailed)	.					
CORRELATION IS SIGNIFICANT AT THE 0.01 LEVEL (2-TAILED).	Training	Correlation Coefficient	.598*	1.000				
		Sig. (2-tailed)	.011	.				
	W/S	Correlation Coefficient	.752**	.769**	1.000			
		Sig. (2-tailed)	.001	.000	.			
	Y/Serv	Correlation Coefficient	.555*	.629**	.591*	1.000		
		Sig. (2-tailed)	.021	.007	.012	.		
	Me	Correlation Coefficient	.517*	.108	.138	.199	1.000	
		Sig. (2-tailed)	.033	.681	.598	.443	.	
	S/O	Correlation	.541*	.197	.316	.493*	.719	1.00

	Coefficient					**	0
	Sig. (2-tailed)	.025	.449	.217	.044	.001	.

***. CORRELATION IS SIGNIFICANT AT THE 0.05 LEVEL (2-TAILED).**

The correlation analysis were used to test the association between variables (on job training, work -shops, years of service, mentorship, standard operation procedure) and knowledge of data management .

On the Job training

The results showed that there is a positive and strong relationship which is statistically significant between on-the-job training and knowledge of data management, **$r=0.598$,** $p<0.05$ ($p=0.011$).

Workshops

There is a positive and strong relationship which is statistically significant between workshops and knowledge of data management, **$r=0.753$,** $p<0.01$ ($p=0.001$).

Years of service

There is a positive and strong relationship which is statistically significant between years of service and knowledge of data management, **$r=0.555$** $p<0.05$ ($p=0.021$).

Mentorship

There is a strong relationship which is statistically significant between mentorship and knowledge, **$r=0.517$,** $p<0.05$ ($p=0.033$).

Standard operating procedures

There is a positive and strong relationship which is statistically significant between standard operation and knowledge, **$r=0.541$,** $p<0.05$ ($p=0.025$).

4.7 Data quality

Table 4.9 Data completeness

Facility	Completeness of HTS registers (%)	Completeness of ART register (%)	Completeness of ANC booking registers (%)	Completeness of new OI/ART patient care booklets (%)
Tsvingwe	60.0	80.0.	100.0	50.0
St Augustine's	100.0.	80.0.	100.0	60.0.
St Peter's	70.0	60.0	80.0	40.0
St Barbra's	100.0	100.0	100.0	30.0
Sachisuko	80.0	100.0.	90.0	20.0
Mupotedzi	80.0	60.0	100.0	60.0
Old Mutare	100.0	80.0	90.0	50.0
Zindi	80.0	100.0	100.0	60.0.
Hauna Clinic	100.0.	100.0	100.0	50.0
Honde mission	60.0	70.0	70.0	40.0
Bonda	80.0	70.0	100.0	90.0
Hauna hospital	100.0	100.0	100.0	80.0
Mutasa Clinic	100.0	100.0	100.0	70.0
Chinaka	70.0	70.0	70.0	20.0
Sahumani	90.0	100.0	90.0.	40.0
Average completeness	85.0	85.0	93.0	51.0

The results showed that the OI/ART patient care booklets were the least complete documents with an average completeness of 51.0.%. The HIV testing services register and the ART register both had an average of 85.0% completeness. The ANC booking register had the highest completeness of 93.0%.

Table 4.10 Data accuracy

Facility	Reported number of people tested f	people tested for in site registers	Verification factor number tested for HIV (%)	Reported number of people initiated on ART	people initiated on ART in site level registers	Verification factor for total number initiated on ART (%)	Reasons for variances	Reported number of contacts tested for HIV	Site level number of contacts tested for HIV	Verification factor (%)	Reasons for variances***
Tsvingwe	249	379	152.2	13	12	92.3	2	3	3	100.0	2
St Augustine's	274	274	100.0	11	12	109.1	2	3	3	100.0	-
St Peter's	101	97	96.0	3	2	66.7	2	0	0	-	1
St Barbra's	20	19	95.0	0	0	-	-	0	1	0	4
Sachisuko	86	54	62.7	0	0	-	-	0	1	0	3
Mupotedzi	57	50	87.7	2	3	150.0	1	1	1	100.0	2
Old Mutare	427	424	99.2	23	25	108.7	2	2	2	100.0	1
Zindi	289	289	100.0	3	3	100	-	2	1	200.0	-
Hauna Clinic	301	301	100.0.	8	8	100	-	2	2	100.0	-
Honde mission	32	20	62.5	0	0	-	-	0	0	-	3
Bonda	277	282	101.8	11	12	109.1	1	4	7	57.0	1
Hauna hospital	302	300	99.3	7	6	85.6	3	2	2	100.0	1
Mutasa Clinic	133	133	100.0	6	6	100.0	-	4	4	100.0	
Chinaka	50	48	97.5	0	0	-	-	0	0	-	3
Sahumani	30	29	103.0.	0	0	-	-	2	3	67.0	4
Average	2620	2696	102.9	87	89	102.3	-	19	30	157.9	-

Reasons for variances *1- calculation error, *2- misclassification of indicators and *3- poor documentation

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter focused on presentation, analysis, and interpretation of the empirical findings of the study. This chapter draws inferences and conclusions from the major findings that were discussed in the previous chapter. Conclusions will be discussed based on the study`s objectives which were set out in chapter one. The discussion on conclusions will be followed by recommendations whose primary focus is on improving key areas which were identified in the findings. Recommendation will also be presented as well as recommendation for further research

5.2 Summary

5.2.1 Behavioral determinants

The results from this study showed that 92.31 % of the participants believed that it was their responsibility to compile the monthly statistics and 7.76% believed that it was not their responsibility to compile statistics. These results show that the participants have positive attitudes towards compilation of statistics. The participants who did not feel it was their responsibility to compile statistics mentioned that they had not been trained. These results were different from those of a study which was conducted in Nigeria were 61% of the participants had no interest in filling the forms and 39% of them regarded the exercise of filling forms as time consuming and tiresome (Ekwueme et al., 2018).

The knowledge of the participants on the registers which are used when calculating the total number of people on ART.58.85 % of the participants knew both registers and 41.15 % managed to get one register correct. These results showed that the participants had good knowledge. However, they show that there is no sufficient knowledge regarding the use of the essential changes register.

5.2.3 Organizational factors

The results from this study showed that 69.2 % of the participants had been trained in the compilation of statistics and 30.8% had not been trained. Out of the participants that had been trained 22.2 % attended a workshop ,70.4% were trained on the job and 3.7% attended the workshop and were also trained on the job. There is a positive and strong relationship which is statistically significant between workshops and knowledge of data management**=0.753,** p<0.01 (p=0.001).A few selected cadres at the health facilities were selected to attend a workshop on the compilation of the PMTCT MRF and the quasi forms as well as the new registers that were introduced .These health care workers were then supposed to cascade down the knowledge gained from the trainings and conduct on the job trainings with other health care workers . These results were consistent with the findings from this study showed that there was a statistically significant relationship between on-the-job training and knowledge of data management with p=0. 011. The cadres that had on the job trainings with their nurses in charge or when data quality assessment visits were conducted had better understanding of indicators.

These results show that training increases knowledge in data management and they were consistent with the findings from the experimental studies done in Nigeria Kaduna and Enugu State were participants from the experimental group that had attended trainings showed more understanding of reporting requirements compared to the control group(Nwankwo & Sambo, 2018;

However, these findings were different from those of a study done in South Africa were participants who had not been trained showed more understanding of indicators compared to those that had been trained (Moloko, 2021).

There was also a strong relationship between being given site mentorship and knowledge of data management. 69.23 % of the participants had received mentorship support from the district officers ,23.08 had not received any mentorship support and 7.69% did not know if they had received mentorship support or not .Out of those who had received mentorship support 38.46% had received the support annually ,42.31% monthly and 19.23% quarterly .These findings were similar to those of a study conducted in Kenya were 79% of the participants had received mentorship support and there was an association between frequency of support visits and the quality of data (Cheburet & Odhiambo-Otieno, 2016).

5.2.4 Technical factors

The PMTCT monthly return form and the quasi form were considered as not user friendly. Only 39% of the participants mentioned that the PMTCT MRF was user friendly and only 12% for the quasi. These forms were reported to have too many indicators that were difficult to understand. The areas that needed to be improved on the quasi form there was an issues of too many age bands that are on the form .The issue of reporting forms having too many indicators that are not easy to understand was also a finding in the study conducted in South Africa to evaluate the performance of a RHIS (Moloko, 2021).Findings from a similar study conducted in Kenya also revealed that reporting forms were too complex (Abera et al., 2016) .There was also an issue of jargon on the quasi form and this form uses terminology which is in the indicator guide for PEPFAR reporting and the terminology is not understood by the MOHCC staff .

There was a positive and strong relationship which is statistically significant between having standard operating procedures for compiling statistics and knowledge, $r=0.541$, $p<0.05$ ($p=0.025$). In another study which was conducted the standard operating procedures

5.2.5 Data quality

The ANC booking register was the tool with the highest level of completeness with an average of 93% completeness. The ANC booking register is the tool that is used for RBF and is monitored constantly by different stakeholders. The completeness of the ANC booking register was very high in comparison to the completeness of ANC indicators from the study that was done in Nkangala District in South Africa data was for the PMTCT indicators data completeness was at 11%.(Mlambo et al., 2014).

The completeness of the new OI/ART patient care booklets was the lowest as transitioning to new booklets is currently in progress and information from the old booklets is being transferred into the new booklets .However the standard operating procedures for transitioning information into these new booklets is not being followed as many sections had incomplete information .The major causes of discrepancies between the reported data and the data in the sources documents were poor documentation which was usually noticed by the use of wrong codes especially in the HIV testing services register.

5.3 Conclusions

The Research made the following conclusions

The quality of data is affected by the knowledge and experience of health workers. The health workers do not give enough time to data quality management. The research concluded that there is high patient workload prohibiting data management. There is also lack of mentorship consistent mentorship as all facilities do not receive mentorship monthly. The health care workers that attended the workshop did not all cascade the trainings to their facilities as there are some cadres who have not been trained. The quality of data is also being affected by having numerous reporting tools which duplicate the indicators.

5.4 Recommendations

The researcher recommends collaborations between the MOHCC monitoring and evaluation department and the PEPFAR funded organizations in coming up with one standard data collection tool that caters for the reporting requirements of PEPFAR and the MOHCC.Onjob training is also required at the sites and there is need to ensure that health care workers that attend workshops cascade down the trainings at their facilities. There is need for mentorship visits to be done by the implementing partner together with the MOHCC District Health Executive monthly at all health facilities. Standard operating procedures for the collection of HIV and AIDS monthly statistics.

5.5 Limitations of the study

The study was conducted at only 15 sites in Mutasa District which are less than half of the 46 sites in the district. This is because of the vastness of the district and the mountainous terrain which made it difficult to reach more sites as there are also some sites which are hard to reach during the rainy season.

5.6 Future research

The current research focus on the behavioral, technical, and organizational determinants of data quality. There is need to conduct more studies that will focus on the processes that are done that influence the quality of data. Future research should not be limited to HIV and AIDS data quality only but also data from other programs.

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Appendices

Appendix 1: Research questionnaire

(Nurses, Data Entry Clerks, Primary Care Counselors)

Questionnaire number:		**[ ]**	
Section A: Socio-demographic factors			
Question number	Question	Response	Instruction
1	Date of interview		……/……/…….. DD/MM/YY
2	What is your age in years?		
3	Sex	[ ] Female [ ] Male	
4	What is your occupation?	[ ] Nurse [ ] Data Entry Clerk [ ] Primary Care Counselor	
5	What is your highest professional qualification?	[ ] Certificate [ ] Diploma [ ] Post-graduate diploma [ ] Degree [ ] Post graduate degree	
6	How long in years, have you been working for the Ministry of Health?	[ ] <2 years [ ] 2 - <5 years [ ] 5 - <10 years [ ] >10 years	

Section B: Involvement in HIV/AIDS data recording, and reporting			
7	Have you ever been trained in HIV/AIDS data management?	[ ] Yes [ ] No	
8	If yes, How were you trained?	[ ] Attended a workshop [ ] Trained on the job [ ] Both [ ] Other, specify …….	
9	Are you involved in the HIV/AIDS data management at your workplace?	[ ] Yes [ ] No	
10	If yes to question 9, How are you involved?	[ ] Source recording and reporting tools for the health facility [ ] Enter data in the registers [ ] Compile the monthly report forms [ ] Verify data [ ] Analyze data	
11	How long have you been involved in the HIV/AIDS data management?	[ ] <2 years [ ] 2 - <5 years [ ] 5 - <10 years [ ] >10 years	
SECTION C: Knowledge assessment			
12	Which registers do you use to calculate the total number of people on ART?	[ ] Essential changes register [ ] ART register [ ] Other, specify ………. [ ] Don't know	
13	When are monthly reports supposed to	[ ] 5th to 7th day of each month [ ] Other, specify …..	

	be submitted to the district level health information office?	[ ] Don't know	
14	When you conduct data consolidation meetings after compiling statistics, which data issues do you look out for?	[ ] Data completeness [ ] Data accuracy [ ] Data consistency [ ] Other, specify …… [ ] Don't know	
15	What are the benefits of having quality data?	[ ] More informed decision making [ ] Guides targeted interventions [ ] Quality patient care [ ] Helps to identify health problems timely [ ] Other, specify ………… [ ] Don't know	
Section D: Attitudes, and practices			
16	Do you feel it is your responsibility to participate in data management at your workplace?	[ ] Yes [ ] No	
17	If No to 16, why?	[ ] I was not trained [ ] I have other important priorities [ ] High patient workload [ ] It is for managers [ ] Other, specify	
18	Assuming a 40 hour week, how much time in hours on average do you thing you commit to data	[ ] <2 hours [ ] 2 – <5 hours [ ] 5 - <10 hours [ ] 10 - <20 hours [ ] >20 hours	

	management in a week?		
19	Are the HIV/AIDS indicators easy for you to understand?	[ ] Yes [ ] No	
Section E: Resources for data management and support			
20	Do you have adequate registers for the HIV/AIDS registers?	[ ] Yes [ ] No [ ] Don't know	
21	If no to 19, which ones are out of stock	[ ] HIV testing registers [ ] PMTCT registers [ ] ART registers [ ] Other, specify ……..	
22	How long has the register been out of stock?	[ ] <2 weeks [ ] 2 - <4 weeks [ ] 4 - <12 weeks [ ] >12 weeks	
23	Do you have adequate monthly reporting forms for the HIV/AIDS program?	[ ] Yes [ ] No [ ] Don't know	
24	If No to 22, for how long?	[ ] <2 weeks [ ] 2 - <4 weeks [ ] 4 - <12 weeks [ ] >12 weeks	
25	Do you receive mentorship support from the district which focuses on data quality?	[ ] Yes [ ] No [ ] Don't know	

26	If yes to 24, how frequently?	[ ] Monthly [ ] Quarterly [ ] Annually	
27	Does the district/province conduct data quality assessments at your health facility that includes HIV/AIDS services?	[ ] Yes [ ] No [ ] Don’t know	
28	If yes to 26, how frequently?	[ ] Monthly [ ] Quarterly [ ] Annually	
29	Do you have Standard Operation Procedures for the HIV/AIDS indicators?	[ ] Yes [ ] No	
Section F: Reasons for data quality issues			
30	In your opinion what could be the reasons for the poor data quality in the district for HIV/AIDS activities?	[ ] Lack of training [ ] Stock-outs of recording, and reporting tools [ ] High work-load [ ] Lack of mentorship support [ ] Other, specify ……… [ ] Don’t know	

Appendix 2: Data quality assessment tool

Name of health facility: …………………………………………

Date data quality assessment done: ……………………………………………..

Section A: Availability of recording, and reporting tools			
REGISTER/REPORTING FORM		AVAILABILITY (Yes/No)	
Monthly reporting forms			
HIV programs indicator guide			
HIV testing register			
ART register			
Section B: Data completeness assessment			
REGISTER		COMPLETENESS (%)	
HIV testing register			
ART register			
PMTCT register			
Section C: Data concordance assessment			
Indicator	Number in site level registers	Number in site level monthly report	Classification of the data quality issue
Total number of people tested for HIV			
Number of contacts tested for HIV at the facility			
Total number of people who were initiated on ART			

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Appendix 3: Informed consent for the questionnaire

My name is Elizabeth Musarurwa, a final year MPH student at Africa University. I am carrying out a study on a root cause of data quality issues in the HIV and AIDS program in Mutasa District. The purpose of the study is to identify the root causes of data quality issues in the District, and to come up with recommendations which will be useful in addressing the challenge. You were selected for the study as you are a health worker in Mutasa District. Should you decide to participate you will take about twenty-five minutes to answer questions asked by the interviewer. The researcher will address the sensitive questions in a respectable manner and maintain the information obtained confidential. The participant is also free to divulge the information voluntarily. It is essential to note that there are no material benefits attached to the study. All the information obtained would be kept confidential, no names or any other identification will appear on questionnaires. However coding of questionnaires will be done using serial numbers. Privacy will also be maintained. Participation in this study is on voluntary basis. Should the participant feel unable to participate, the action will not affect their relationship with the participant organization or any authority. If they chose to participate they are free to withdraw their consent and discontinue participation without penalty. Please feel free to ask any questions pertaining to the study. You may take as much time as necessary to make a decision. If you have decided to participate in this study kindly sign the form in the spaces provided below as an indication that you have read the information and have agreed to participate.

Name of Research Participant

Please print Date ……………………………………….

Signature of Research Participant or

Legally authorized representative

If you have any queries, questions, or concerns beyond those addressed by the researcher or anything to with the research, like your rights as a research participant. If you feel you have been treated unfairly and would like to talk to someone other than the researcher feel free to contact, the Africa University Research Ethics Committee on telephone. (020) 60075 or 60026 extension 1156 or email aurec@africa.edu.

Name of researcher----------------------------------

Appendix 4 Workplan

Activity	December 2021				January 2021				February 2022			
Week	1	2	3	4	1	2	3	4	1	2	3	4
Completion of the full protocol	■	■	■									
Data collection				■	■	■						
Data analysis						■	■					
Presentation of findings								■	■			
Report writing					■	■	■	■				
Dissemination of findings									■	■	■	■

Appendix 5 Budget

Item	Quantity	Unit Cost (USD)	Total Cost (USD)
Bond Paper	2	5	10.00
Toner	1	25	25.00
Pens	5	0.20	1.00
Pencils	5	0.10	0.50
Fuel	140litres	1.40	196.00
Total			232.50