EFFECTIVENESS OF MONITORING MECHANISMS IN REDUCING IMMUNIZATION DROPOUTS AMONG INFANTS IN HEALTH FACILITIES OF MARIDI COUNTY, SOUTH SUDAN

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DECLARATION AND APPROVAL

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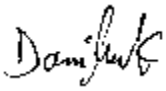
This thesis is my original work and has not been presented for a degree in any other university or any other award.

Signature: 

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ABSTRACT

Introduction: Immunization is one of the most efficient and successful health interventions for reducing child morbidity and mortality. Although global performance of immunization in 2019 was 86%, the coverage reduced to 84%. Despite the efforts employed to improve the immunization coverage, remained below 85%. Dropout rates continue to be an obstacle towards high vaccination coverage.

Objectives: The study aimed to ascertain the effectiveness of monitoring mechanisms in reducing immunization dropouts among infants in the health facilities. The study targeted vaccinators in the health facilities of Maridi county. A prospective cohort study design with stratified random sampling technique was used for sampling eligible participants. A semi-structured interview guide and observation checklist were used to collect quantitative and qualitative data from respondents. Data was analyzed using descriptive statistics, bivariable, multivariable regression analyses was used to determine association between variables and chi square test to answer the research questions and hypotheses.

Results: The results showed that 21% of health facilities did not have monitoring charts, 28.6% had more than 10% dropout rate and only 50% had desired dropout rate of less than 10%. 57% of the health facilities checked their monitoring chart at least 3 times in a quarter. 64% of health facilities had BHWs attached in their catchment area. The study observed a drop in the number of health facilities with high dropout by 9.6%. Lack of efforts from health workers to identify and link defaulters, lack of monitoring charts, absence of BHWs in some health facilities, no referrals from BHWs were associated with high dropout rates.

Conclusion: The study concluded and recommended that monitoring mechanisms in health facilities were effective in reducing the rates of infant dropping out of the immunization program hence health workers should use monitoring tools. Scale up boma health initiative to health facilities without boma health workers.

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ABBREVIATIONS AND ACRONYMS

BCG	Bacillus Calmette-Guilin
BHI	Boma Health Initiative
BHW	Boma Health Worker
CHW	Community Health Worker
DPT	Diphtheria, Pertussis, Tetanus
EPI	Expanded Programme on Immunization
HFMP	Health Facility Microplanning document
MCV	Measles Conjugate Vaccine
OPV	Oral Polio Vaccine
RI	Routine Immunization
PENTAVALENT	Vaccine combination of Diphtheria, Pertussis, Tetanus, Hepatitis B & Hemophiles influenza type-b

DEFINITION OF TERMS

Boma: This refers to the lowest administrative area of the local government of South Sudan, that reports to the payam level.

Boma health workers: Refers to the lowest health personnel cardre that is present at the village and boma level who provide health education and referrals in the community and link them to the health care units or center.

Community Mobilizers: Refers to persons in the community responsible to awareness and mobilization activities in the community usually assigned by the chief of the village or boma.

Defaulters: Refers to any infants from 0-11 months who for any reason missed their scheduled vaccinations appointments.

Dropout rate: Refers to the proportion of the infants who missed their immunization schedule over the total number of infants who started their immunization schedule usually called by the 1st dose of pentavalent and 3rd dose of pentavalent. It is expressed in percentage, total number of (penta-1-penta3)/penta-1 * 100

Fully immunized: Refers to an infant who has completed the vaccination as per the schedule and has reached upto measles vaccine.

Immunization: Refers to the process of both getting the vaccine and becoming immune to the disease following vaccination.

Indicators: Refers to the pentavalent-1 and pentavalent-3 which are used to measure the performance of immunization at the health facilities.

Infant: Refers to an eligible child for vaccination whose age ranges between 0-11 months.

Monitoring: Refers to a continuous process of collecting and analyzing information about a programme and comparing actual against planned results in order to judge how well the intervention is being implemented.

Monitoring mechanism Is a system that tracks the implementation and progress of a set of rules or goals.

Not immunized: Refers to a child who has not received any of the vaccines according to the vaccination schedule of South Sudan.

Pentavalent: Vaccine consist of diphtheria, pertussis, tetanus, haemophiles influenza type-b and hepatitis type b combined into one vaccine. Usually given at 6wks, 10wks, and 14wks as per routine immunization schedule in South Sudan.

Tickler File: Refers to a defaulter tracing system that uses reminder cards placed in pockets arranged by month with the purpose to identify infants who did not come for their vaccination appointments and remind the health worker to contact the parents or guardian of the infant.

Vaccination: Is the administration of a vaccine to help the immune system develop immunity from a disease.

CHAPTER 1: INTRODUCTION

1.1 Background of the Study

Immunization is one of the most efficient and successful health interventions for the reduction of child morbidity and mortality. To increase accessibility of immunization services while lowering the dropout rates are two key elements of necessity. Change in the overall coverage remains suboptimal as health systems strive towards access to immunization services (Zewdie et al., 2016). The World Health Organization (WHO) established the Expanded Programme on Immunization (EPI) in 1974 to ensure universal access to routinely recommended childhood immunizations (Aregawi et al., 2017).

As immunization is an important component of primary health care services, according Scharf et al. (2021) "Immunizations have proven to be an important tool for public health and for reducing the impact of vaccine preventable diseases. To realize the maximum benefits of immunizations, a coordinated effort between public policy, health care providers and health systems is required to increase vaccination coverage and to ensure high-quality data are available to inform clinical and public health interventions"

In 2021, according to WHO, "18.2 million infants did not receive an initial dose of DTP vaccine globally, pointing to a lack of access to immunization and other health services, and an additional 6.8 million are partially vaccinated. Of the 25 million, more than 60% of these children live in 10 countries: Angola, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Myanmar, Nigeria, Pakistan, and the Philippines. Monitoring data at subnational levels is critical to helping countries prioritize and tailor vaccination

strategies and operational plans to address immunization gaps and reach every person with life-saving vaccines" (Immunization Coverage, n.d.)

There has been reduction in the number of infants vaccinated globally. Specifically, uptake of 3rd dose of pentavalent, as per the immunization agenda 2030, expected to be reached is 90%. However, in 2019 the global performance was 86%. There was reduction in 2020 and 2021 with the coverage of 84% and 82% respectively (Immunization Agenda 2030, 2022). The 3rd goal of global immunization framework about ensuring the quality of vaccination delivery to achieve high and equitable coverage focus on priority areas of increased and sustained demand for vaccines, requires use of information about vaccination.

To attain high immunization coverage, monitoring of immunization services is key towards achieving immunization coverage. Monitoring mechanisms are established to monitor the effective implementation of a specific system's rules. This could include the use of tools and strategies to gauge immunization activities at the health facilities. The mechanisms used to monitor immunization services includes but not limited to: monitoring charts, immunization registers and defaulter tracing systems. Each play a key role to effectively monitor immunization services.

Boma health initiative, a community-based initiative that focuses on delivering basic health services such as health education, preventive services and basic treatment of pneumonia, diarrhea and malaria at the village level, providing referrals to the next level of health service delivery and areas with no access to health care units and centers. It is the first point of contact for health services at the village level. "The BHI is also designed to standardize the package of community health services, strengthen linkages between communities and

primary health facilities, and improve community ownership and governance of health services. It is intended to replace and harmonize the delivery of fragmented community health services which are currently supported by non-governmental organizations (NGOs) with funding from different donors."

Immunization Agenda 2030 (2030) emphasized on the use of data by the health workers, as a core principle, to guide decision making in immunization services, which would lead to improvement in immunization coverage. This also greatly helps to identify and reach people who are due for their vaccination and achieve fully vaccinated status in timely manner.

It is therefore important that health facilities keep track of their vaccination records and use them to ensure high coverage is attained. Although numerous factors could account for the reduction in the immunization coverage, monitoring defaulters and the trend of the dropouts are among the interventions that are lagging in many health facilities with poor documentation of the defaulters and lack of follow up actions.

South Sudan has been battling with underperformance and low coverage of the DPT-1 at 58% and DPT-3 at 50% in 2019. However, the country has experienced improvement in subsequent years and as of 2022, the coverage was at 97.6% for DPT-1 and 84.4% for DPT-3. As much as there has been improvement, the dropout rate of 13.2% still accounts for poor utilization coverage. Measles antigen performance in 2019 was 42% and 65.61% in 2022. Improvement of about 23.61% was experienced in the 3 years, however, it is below the set target of minimum performance of 85% (WHO, 2022).

Health facilities in Maridi County have been supported by the Health Pooled Fund program, to extend service delivery to areas with government owned health facilities in collaboration with the program. However, due to cuts in budget; some health facilities were dropped the Health Pooled Fund program and were handed over to the government. The support was mainly incentives for the health facility staff and medicines.

According to PAH (Immunization Toolkit, n.d.), "Monitoring and reporting of immunization-related data is a key element of the EPI. The analysis of immunization indicators has been essential to monitor the progress of the EPI, as well as to identify areas that require more work in order to achieve the selected goals." Monitoring tools that have been used in South Sudan included: Immunization register, immunization cards, defaulter tracing system, tally sheets and monitoring chart.

Maridi county of Western Equatoria State, has also been experiencing fluctuation in the performance of the vaccines, with 67% uptake of DPT-1/Pentavalent-1 and 63% of DPT-3 or Pentavalent-3 in 2019, which improved to 90% of DPT-1 and 82% of DPT3 in 2022. As much as measles antigen in 2019 was at 64%, it had improved in 2020 to 78%, which did not sustain this improvement and dropped to 74% in 2021 and to 55% in 2022. Despite the efforts employed to improve the coverage, it is still below the set target of minimum performance of 85%.

Table 1: Extracted DHIS-2 Data for Maridi County

	Year	**2019**	**2020**	**2021**	**2022**
Maridi County	Estimated under 1 year	5145	5304	5463	4911
	Pentavalent 1 Vaccinated	3449	4825	6368	4397
	Coverage	**67%**	**91%**	**117%**	**90%**
	Pentavalent 3 vaccinated	3237	4808	6074	4003
	Coverage	**63%**	**91%**	**111%**	**82%**
	Measles 1st dose vaccinated	3318	4150	4066	2695
	Coverage	**64%**	**78%**	**74%**	**55%**

Source: DHIS-2, www.southsudanhis.org

Regardless of the effort to improve the immunization coverage in South Sudan, and particularly in Maridi county through different strategies, dropout rates remain an obstacle to achieving and sustaining high vaccine coverage.

1.2 Statement of the Problem

Monitoring charts in the health facility are the monitoring tools used for tracking immunization performance on monthly basis. Although, health workers plot the indicators for gauging immunization performance on the monitoring chart monthly, without analyzing the dropout rate of infants per their catchment area would contribute to infants not completing immunization schedule. Having a coverage of more than 95% for 1st dose of pentavalent vaccine indicates good accessibility while a coverage of 85% and above for 3rd dose of pentavalent vaccine indicates good utilization and measures the coverage of pentavalent vaccine among infants in a county or community. The use of routine immunization monitoring charts at the health facility level has been very low leading to inability to identify gaps in performance which could have contributed to the increase in dropout rates attributed to the pentavalent vaccine (Tchoualeu et al., 2021).

Presence of dropouts in the immunization system indicate lack of immunization monitoring at the health facilities that could have triggered follow up of infants who did not complete their vaccination schedule as per the South Sudan guidelines. Dropout rates measuring the rate at which infants do not complete their immunization schedule for numerous reasons, without analyzing the monitoring chart at the health facility, dropout rate would continue to rise and thus indicate lack of effectiveness in immunization monitoring at the health facility.

South Sudan introduced a community component known as Boma Health Initiative (BHI) in 2017 to reinforce the health system at the lowest administrative area in South Sudan through an integrated package of health promotion and disease prevention activities. This cadre of health workers supports basic treatment and referral from the communities to the health facilities in terms of consultations, health education, vaccination, nutrition screening, and provide referral for cases above their capacity to the nearest health facility. Part of their mandate is to support tracing immunization defaulters and collaborate with the facility health workers and vaccinators on outreach services (Chantler et al., 2018). Not all the health facilities in Maridi county have BHWs who would have supported defaulter tracing activities in the communities and refer infants to complete their vaccination. Two out of five payams of Maridi county have active boma health workers who still have immunization defaulters and the reduced turn up for infants' vaccination is attributed to failure of the community health workers including the boma health workers to refer the infants from the community to the health centers. Thus, monitoring immunization without referrals of defaulters for the vaccination further proved lack of effective monitoring of immunization services at the health facilities.

Defaulter tracing system is an essential tool for monitoring immunization uptakes and also gauge the missed appointments at the health facilities. Lack of defaulter tracing system in the health facilities contributed to increased dropout rate of infants from the vaccination program. Furthermore, the introduction of tickler file as a dropout monitoring mechanism in South Sudan through the Health Pooled Fund (HPF) and its implementing partners across the country enabled health workers and vaccinators to coordinate with community structures to identify and refer infants for vaccination in order to close the gap of defaulters, reduce dropouts and improve immunization coverage. However, the use of the defaulter cards in the tickler file remained low in an effort to trace the defaulters and reduce the dropout rates.

1.3 Purpose of the Study

The study aimed to ascertain the effectiveness of monitoring mechanisms in reducing immunization dropouts in the health facilities that could improve completion of the immunization schedule as per the guidelines of the Republic of South Sudan. Monitoring immunization at the health facility level is essential for ensuring vaccines reach the right people at the right time—and that no one is left behind Furthermore, the study aimed to assess the contribution of the boma health initiative, that operates at the community, to improve linking vaccine defaulters to health facilities in Maridi county. The study assessed the use of defaulter tracing systems as important mechanisms for improving performance of immunization activities in the health facility.

1.4 Research Objective

To determine the effectiveness of immunization monitoring mechanisms in reducing immunization dropouts among infants in health facilities of Maridi County in South Sudan.

1.4.1 Specific Objectives

1. To analyze the use of immunization monitoring chart to track immunization performance
2. To assess whether the BHI contributes to reduced immunization dropout rates
3. To assess the use of the defaulter tracing system for infants to complete their vaccination schedule.

1.5 Research Hypothesis

H_a: The immunization monitoring mechanisms are effective in reducing immunization dropouts in health facilities of Maridi County

H_a: Health facilities use immunization monitoring chart to track immunization performance

H_a: Involvement of the BHI contributes to reduced immunization dropout rates

H_a: Defaulter tracing system contributes to infants' completion of vaccination schedule.

1.6 Research Questions

1. Does the use of immunization monitoring chart help to track immunization performance?
2. How does the involvement of Boma health Initiative contribute to improved defaulter tracing?

3. Do health facilities use defaulter tracing system to ensure infants complete their vaccination schedule?

1.7 Justification of the Study

Maridi county has been among the top three counties leading in immunization performance in Western Equatoria State, despite the challenges of immunization defaulters that have been affecting the county performance from reaching its targets. The study intends to determine the use of immunization monitoring mechanism as a strategy to improve the county's performance of 3rd dose of pentavalent, according to 2022 data, which is 82% and the quite low measles vaccine coverage at 55% to the minimum target of 85% through the proper use of immunization monitoring mechanisms. It is evident that prompt actions and collaborative approach of monitoring at the health facility and tracing in the communities could yield improvement in ensuring that infants complete their vaccination schedule as per the national guidelines for immunization. Nevertheless, attaining low dropout rates in the immunization programme of Maridi county would communicate the success of the immunization programme in achieving its minimum target and ensure infants are immunized against the vaccine-preventable diseases, hence increasing the herd immunity of the communities of Maridi county.

1.8 Significance of the Study

The study is among the rare studies conducted in the area of Monitoring in Immunization and aimed to contribute to the body of knowledge the effectiveness of immunization monitoring at the health facility. Although, other studies focused mostly on the caregivers, the reasons for dropouts in the communities, factors associated and contributing to

incomplete immunization status; this study is important as it highlights that health facility vaccinators and health workers could identify gaps that led to dropout at the health facility promptly which plays a key role in reducing dropout rate in the Expanded Programme on Immunization (EPI) through a continuous monitoring of immunization data and use of routine immunization monitoring charts.

The study pointed out the contribution of BHI in enhancing immunization performance and improved defaulter referrals that would ensure infants complete their vaccination schedule before reaching one year. Regular and proper use of defaulter tracing systems in the health facility could reduce the dropout rates.

1.9 Scope / Limitations

The study targeted health workers in the health facilities who provided immunization services in the month of October to December 2023. It further involved the boma health workers in the community and cover concepts related to defaulters in immunization programme.

Among the limitations, the researcher was an officer in a programme that oversees the health facilities which could affect the response of the participants leading to biased views and responses from the participants. To mitigate the possibility of bias, research assistants with no link to the health facilities were recruited to conduct data collection for the study.

1.10 Assumptions of the Study

The functional health facilities in Maridi County provided vaccination services as stipulated in the basic packages of health and nutrition services guidelines and policies of the Republic of South Sudan. Boma health workers in communities served by the health facilities provided services including defaulter tracing, vaccination awareness and behavior change communication activities to promote completion of vaccination for infants. The health workers in the health facilities maintained good record keeping of the infants vaccinated in immunization register and used vaccination data to inform decision

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter entails literature reviewed on immunization monitoring mechanisms and how its presence in a health facility is vital for reducing dropout rate thus achieving high immunization coverage in the community.

2.2 Review of Related Literature

2.2.1 Use of Immunization Monitoring Chart to Track Immunization Performance

As South Sudan adopted the vaccination schedule from the WHO, there are key indicators emphasized by the government and donors supporting EPI. Among the indicators being tracked using the monitoring chart for immunization, 1st dose of pentavalent which indicates access to immunization service. The 3rd dose of pentavalent indicates coverage of immunization, and a fully immunized infant should have received measles vaccine. Monitoring and tracking infants at the village level is a responsibility of health workers, by using a set of indicators (USAID, 2016).

The maternal and child survival program guideline suggests that targets for each indictor should be established at the county and facility levels. On monthly basis, health workers should collect information to determine whether the activities are on track using these indicators and compare these data against targets within their catchment area (USAID, 2016). It is important to increase and maintain the immunization level to the intended target.

The Immunization Coverage Monitoring Chart is a very simple yet effective tool that has been in use for decades. This tool is used for managing immunization program in the

worldwide. Data in this tool is plotted and gives a visual representation that enables immunization program managers to set and evaluate monthly goals on a timely fashion, provide basis for comparing performance and coverage over different time periods, monitoring each vaccine and dose, and reflect the situation accurately. (Smith, 2011)

Most of the health facilities in South Sudan use Immunization Coverage Monitoring Chart as the basic tool for gauging the immunization activities in their catchment area. The chart plots two antigens of interest, that's 1st dose of pentavalent as the prime indicator for access to immunization services and the 3rd dose of pentavalent as the indicator for continuation of vaccination services and also it measures the coverage of pentavalent antigen widely.

Immunization defaulters affect the coverage performance for specific health facility, and mechanisms to monitor the vaccination services are important to spot areas of weakness and strength as early as possible. Coverage evaluations are done periodically after 3 months or 6 months, where sharing of challenges and solutions are proposed. Through a continuous process of monitoring the performance using a simplified tool gives quick feedback and necessitates quick action to avoid and reduce immunization defaulters.

Through immunization monitoring approach, a study affirmed that it would help, support and reduce missed opportunities hence improving defaulter tracing (Malual et al., 2018). Missed opportunities is one of the factors that affects immunization activities, a mother might bring her child to continue the vaccination schedule and would find unavailable services simply because the vaccinators and health workers did not project and quantify through the immunization data and monitoring the average consumption of vaccines required for the whole month.

According to Tchoualeu et al. (2021), routine immunization monitoring chart was used to review progress toward meeting vaccination coverage targets in health facilities in Nigeria. Knowledge about plotting the graph and inserting the right targets could yield better and accurate performance. Use of immunization data for decision making would improve immunization coverage as it reduces the defaulters in the program. Active analysis and utilizing routine immunization data together with investing in community health strengthening systems improve immunization coverage (Shikuku et al., 2019).

2.2.2 Involvement of Boma Health Initiative in Improving Defaulter Tracing

The launch of Boma Health Initiative (BHI) as a national scale community health programme by the South Sudan MOH in 2017, aimed to strengthen the health system in South Sudan and efficiently deliver an integrated package of health promotion and disease prevention activities at the Boma level. Increased access to quality health promotion, disease prevention and selective curative services were among other objectives of BHI through community engagement and trained community health workers (Lajul & Morton, 2022).

The boma health workers are expected to give health education and counselling that promote immunization, nutrition, hygiene, safe motherhood, family planning, and also prevent and treat illnesses (e.g., malaria, pneumonia, diarrhoea, etc.). The Boma health workers are also expected to perform community engagement and mobilization for health seeking behaviors and identify community-based means of transport for child health referrals (Samuel, 2021).

Evidence indicates that “the main reasons for defaulting from the immunization programme are poor counseling of mothers, unsupportive provider-client relationships,

poor immunization service arrangements, and lack of systems for tracking defaulters" (Zewdie et al., 2016). It is therefore recommended in this study, that "efforts to reduce defaulter rates from the immunization programme need to focus on improving counseling of mothers and strengthening the health systems, especially with regards to service arrangements and tracking of defaulters". It is important that participation of the boma health initiative in improving defaulter tracing could yield better results and improve immunization services in the county.

The involvement of Boma health workers in South Sudan has shown tremendous change and drop in the number of infants not been referred after being identified as defaulters in the immunization program. Between 2018 and 2020, the BHI program cumulatively identified 57,055 under 1-year infants who defaulted and 40,552 were linked to the nearest catchment health facility to receive and complete their vaccination appointments.

Table 2: Extracted data showing the trend of defaulters identified and referred by Boma health workers in South Sudan between 2018 to 2020

Year	Defaulters identified	Defaulters referred after being identified	Defaulters not referred in percentage
2018	1,280	242	81.0%
2019	10,430	6,550	37.2%
2020	45,345	33,760	25.5%

Source: www.southsudanhis.org

Based on the above table, it is clear that boma health initiative has significantly contributed to the reduction of defaulters between 2018 at 81% who have not been referred to 25.5% in 2020, and the trend is expected to close and ensure that all the infants that have been

identified as defaulters are 100% referred and received their vaccination as per the South Sudan vaccination schedule.

Effective referrals from the community for missed appointment of the immunization services were due to strengthened linkages between communities and health centers (Samuel, 2021). It is clear from the above trend of the immunization defaulters and referred statistics that the boma health initiative has contributed about 71% of infants who were reported as defaulters and they were linked and referred to complete their immunization.

According to Ames et al. (2017), health workers and vaccination clinics were important sources of information. As Angadi et al. (2013) reasoned out that infants with no fully immunized status was associated with lack of information. This shows that lack of information still exist as much as more effort has been placed in the social media, radio, television, communication through the community leaders and other mechanisms to reach mothers and guardians. Social mobilization through door-to-door visits and public announcements during religious services were found to be important and accepted ways of communicating information (Ames et al., 2017).

Through the boma health workers, it is evident that their contribution towards achieving the target of capturing and linking those infants who missed their vaccination is a crucial role that the boma health workers play. However, this would work well when there is adequate number of the workforce in the community and coverage of all the villages to ensure no child is left behind. Parents regard information about childhood vaccination as important, but that health services need to be organized in ways that prioritize and facilitate communication, particularly about routine vaccination (Ames et al., 2017).

The boma health workers should be able to counsel the mothers on the appropriate time for the infant to start vaccination and how many visits is expected until the child completes their immunization. Children with no immunization remain vulnerable to vaccine-preventable diseases, in addition to poverty, conflict, and lack of basic health services (Sato, 2023). Utilization and knowledge of mothers about when a child should begin, and finish vaccination are determinants to complete immunization coverage. Thus, strengthening local innovations to raise awareness of the community on the importance of immunization is paramount (Etana & Deressa, 2012).

A research finding revealed that mother's education and household wealth level are weakly associated with reduction in the number of dropout children (Sato, 2023). Other studies suggested that awareness creation, behavior change on vaccination and enhancing utilization of maternal health service including delivery service, should be stressed as part of maternal education on immunization (Yadita & Ayehubizu, 2021). Therefore, it is important that the boma health workers should also target the male partners in order to share the responsibility of ensuring that the infant has completed their vaccination schedule on time as health education as well as access to health facilities can significantly improve immunization (Jil, 2022).

2.2.3 Use of the Defaulter Tracing System for Infants to Complete their Vaccination Schedule

One of the basic immunization tools in the health facility is an infant immunization register. This register is an important tool for both keeping vaccination records of the infants and also acts as a monitoring tool to identify infants who have missed their doses at the appropriate time as recommended by the immunization schedule. Proper utilization of this

register helps to follow up all infants in the community and the catchment population of the health facility. According to Scharf et al. (2021), “The key output of an Immunization Information System is high-quality data for use in targeting and monitoring immunization program activities and providing clinical decision support at the point of care.”

A study affirmed that high dropout rates in the health facility associated with immunization activities and routine immunization registers that were not updated routinely, and defaulter tracing that was rarely conducted (Chantler et al., 2018). Immunization registers that were not updated implied lack of follow up, increase in missed opportunities to vaccinate a child or negligence of the health worker in providing immunization services. As much as, other challenges encountered with establishing immunization include a lack of defaulter tracing systems in most healthcare facilities providing childhood immunizations were also observed in other research (Nyaku et al., 2017). Thus, a facility that do not update their immunization register and without immunization defaulter tracing systems is likely to have high dropout rates.

A recently introduced dropout tracking system in health facilities supported by HPF known as tickler file, uses defaulter tracing cards to track the immunization timelines of infants per month and their date of subsequent visits till the infant completes vaccination schedule. The cards are filled during the first visit of the infant to the health facility or outreach center where vaccination service is offered. Then the health worker places the card according to the month of next visit to remind the vaccinator about the infants expected to be vaccinated in the specific month of the year (Zewdie et al., 2016).

Every end of the month, the vaccinator or health worker generates the list of those who missed their vaccination appointments using the defaulter tracing cards of the infants who

missed their appointments and submitted to the boma health workers or community mobilizers to locate and refer the infant for vaccination. Besides this method, in areas with cellphone communication, the vaccinators use their phone to communicate to the mothers whose infants missed their appointments, and the infants are brought timely for the vaccination service (Mokaya et al., 2017). Elsewhere, SMS system for reminder were used to inform the parents about the vaccination visits, and concluded that SMS text reminders led to a significant increase in the number of return visits for child vaccinations,

Meanwhile, a well-articulated and defined system for tracking defaulters maybe in place, the knowledge of the vaccinators is paramount to monitor the trend of missed opportunities and lack of adherence to the vaccination schedule for infants and look for a solution to enable the mothers to adhere to the appointments.

Effective routine immunization depends on a microplanning that requires accurate estimation of the population and location maps that shows the location of health facilities and villages of the target populations (Ali et al., 2020). An effective micro plan intent to reach all targeted and eligible populations as per recommended vaccination schedule. World Health Organization, the United Nations Children's Fund, and other partner organizations such as GAVI, the Vaccine Alliance in 2002, developed the Reaching Every District (RED) guide to improve immunization program performance and reduce inequities in countries with low immunization coverage.

The RED strategy encourages districts and health facilities to make micro plans to identify local problems and find corrective solutions, using their own data. "The effectiveness and efficiency of RED micro plans largely depend on detailed knowledge of the local situation; accurate population estimates; and maps showing the location of health facilities, villages,

and other points of interest". The microplanning approach helps the district with determining the resources needed, including vaccine requirements, human resource allocation, service delivery strategies, and supervision (Ali et al., 2020).

Through Reach Every Child (REC) strategy, health facility microplanning is drawn in order to estimate the population eligible for vaccination in the catchment area of the health facility. Percentage of under 1 year who should be able to receive vaccine before they turn one year is estimated and that forms the vaccination target for the health facility, which is also computed to realize the number to be vaccinated per month or per quarter to help in monitoring of the indicators. Hard-to-reach populations require multiple REC strategies to reach every child with immunization. These strategies require Health facilities to actively analyze and use routine immunization data and invest in community health strengthening systems to identify hard-to-reach areas to be targeted with outreaches to improve routine immunization coverage (Shikuku et al., 2019).

REC microplanning has "well-defined catchment areas and realistic local solutions for operational, economic, political and social barriers to immunization" (Ali et al., 2020). The microplanning "describes the demographics of the health facility catchment area by listing villages in the catchment area, total population per village and the target populations (children under 1 year, children under 5 years, pregnant women). It includes a sketch of the health facility catchment area with all routine immunization points (both static and outreaches) and geographical features such as rivers, swamps and mountains".

Additionally, "the microplanning includes documentation on performance monitoring and dropout rate monitoring charts that are updated monthly. the microplanning captures mapping of immunization service points, both static and outreaches, showing how villages

in the catchment area are served. The microplanning also has a section on social mapping that specify stakeholders and partners in village and lastly it has the plans and budget needed for implementation of the microplanning" (Ali et al., 2020).

Mafigiri et al. (2021) suggested that, in order to achieve quality improvement, "the microplanning process should be revised. Health workers' misunderstanding and limited knowledge about the microplanning process, especially at peripheral health facilities, coupled with the complex, bulky nature of the microplanning tool, reduces the effectiveness of microplanning in improving routine immunization". This indicates that a health facility should be able to revise the microplanning tool regularly to enable its proper use since the vaccinators and health workers handling vaccination activities in the health facility could be overwhelmed by the workload. Nevertheless, on-job-training has been one of the strategies to support the workers improve their understanding on monitoring their immunization activities and also their coverage by using the routine immunization data and comparing it to the target intended to be achieved.

It is therefore important for every health facility to have a micro plan to ensure that routine immunization services are provided to the community of the catchment area timely and proper forecast of the stocks required for every vaccination session whether static or outreach.

2.3 Theoretical Framework

Global framework for immunization monitoring and surveillance (GFIMS), is one of the frameworks that highlighted timely, reliable and actionable data for immunization program. It provides the evidence-based decision-making, tracks progress towards global

goal and helps control vaccine-preventable diseases. In 2005, WHO and UNICEF published the Global Immunization Vision and Strategy 2006–2015 (GIVS), which defines the strategies and goals that will maximize the impact of immunization. One of the key components of achieving the GIVS goals is the need for strong systems for disease surveillance and programme monitoring (Dabbagh et al., 2007). The framework was developed by WHO and partners to strengthen immunization system globally. The framework's foundation includes health system integration, theory of change and continuous learning. The framework focuses on two key strategic areas: disease surveillance and program monitoring which entails tracking immunization coverage, dropout rates, session performance and vaccine stock levels (Dabbagh et al., 2007).

Routine vaccination coverage rates are generally used to describe the proportion of the targeted population that has been vaccinated. This information is valuable at every level of the programme; it provides a rough estimate of the proportion of the population that remains susceptible to the disease targeted by the vaccine. Further analysis of coverage data allows the programme to develop plans for reaching those who have been missed or who have initiated, but not completed, a vaccination series (i.e. dropouts). It is not only geographical barriers, but also social, economic, cultural and ethnic barriers and service delivery gaps that can prevent vaccination. In planning human and other resources within the programme, coverage should be considered as a proxy for staff work-load. At the health facility level, coverage data may be a powerful motivator to health workers and a valuable tool in feedback to communities (Dabbagh et al., 2007).

At district level, coverage can be used to target outreach and fixed facility immunization sessions; immunization coverage assessments can identify programme weaknesses that

need to be addressed. Monitoring vaccination coverage is a critical component of monitoring programme performance. It should be a key function of surveillance staff, together with improving the quality and use of data at peripheral levels and synergy with other programme monitoring. In using service statistics to estimate coverage, it is essential to have reliable and consistent estimates of the catchment populations, based on population census projections (Dabbagh et al., 2007).

Coverage monitoring should be done regularly, at least once a month – all countries to monitor coverage and vaccination indicators (e.g. drop-out rates) at national and local levels to monitor programme performance and direct corrective action as necessary.

Strengthen the use of data through regular training and supportive supervision to ensure that health staff have the ability to monitor and interpret basic trends at every level where data are collected, collated or analysed.

Countries to maintain standardized tools (e.g. tally sheets and registers) to record and transmit programmatic data, data items and reporting frequencies in each country; put systems in place to transmit data from one level to the next.

The framework's monitoring dimensions incudes: inputs which are vaccine supply and cold chain infrastructure, processes: training session, outreach activities; output: doses administered, and session held; outcome: coverage rates, dropout rate; impact disease incidents and mortality reduction.

Application of the framework in relation to the study:

The cornerstone of programme monitoring is by measuring vaccination coverage and dropout levels falls within the service-delivery component. Immunization monitoring is a

key aspect of a successful immunization program. It's worth noting that inputs such as vaccine supply is key in reducing dropout at the health facility as without vaccine the community would not complete their vaccination schedule. The tools used in the health facilities are WHO standards that were printed and handed to the health facility for use.

Outreach activities are important to reach out infants who have started their vaccination journey and could not able to return for numerous reasons such as distance to the health facility among other reasons that contribute to their dropouts. Output such as doses administered, and session held are important to measure the coverage rate and dropout as the outcome of the immunization program. Monitoring immunization is essential to improve coverage rate and reduce dropout rates in the health facility.

In immunization programme monitoring, data on the process and outcome of the intervention itself is collected and analysed to provide valuable quantitative and qualitative information on programme performance. In most countries, monitoring of the overall health system includes immunization programme monitoring, often as part of a larger compilation of data from the service delivery level. These data generally include the demographics of people attending the health facilities, the services offered to them, the procedures followed, and the medicines/vaccines provided. In some countries, other child-health interventions are recorded simultaneously with the vaccination tallies; this provides valuable information. The monitoring data are generally compiled and transmitted to higher levels once a week or once a month.

2.4 Conceptual Framework

Immunization monitoring mechanisms involves set of tools that are used to produce reports to gauge the performance of immunization in a health facility. The tools include the immunization register where information about the infant vaccinated are registered, monitoring chart displays the indicators used for gauging the performance based on the monthly report generated from the immunization registers, Health facility microplanning document gives estimate of the population to be vaccinated over a specific period of time. BHI plays a crucial role of community sensitization about immunization services, and trace immunization dropouts and refer them to complete their vaccination schedule and mobilize the children for vaccination.

Thus, the conceptual framework depicts the interaction of independent variables to achieve reduced immunization dropout rates in the health facilities.

Dependent variable:

Immunization dropout rate this measures the dropout rate of the infants at the health facility level. The dropout rate is classified by low dropout rate which is below 10% and high dropout rate above 10% of the cumulative dropout rate of the health facility.

Independent variables:

Monitoring chart, this is a tool that is used at the health facility to track progress of the immunization indicators, mainly 1st and 3rd dose of pentavalent. It is required to in order to calculate the dropout rate. The information is recorded monthly by the health workers.

Boma Health Initiative, this is a community component in the catchment area of the health facility that impacts the immunization dropout rate. Boma health workers track and trace those infants who missed their appointments and refer them to complete vaccination. Effort of the Boma health workers is essential in monitoring immunization activities in the community thus impacting the dropout rate of the health facility at large.

Defaulter tracing system, this is a system known as dropout tracing system that uses reminder cards to plot dates for immunization sessions of infants and arranged by month of next visit. Presence of this system provides feedback to the health workers on the number of infants expected to visit and come for their vaccination. Knowing the number of infants who did not visit that month impact the immunization dropout rate hence health workers strive to identify the infants to avoid them missing their vaccination schedule.

All the independent variables play a key role in immunization dropout rate, thus immunization dropout rate depends on these variables.

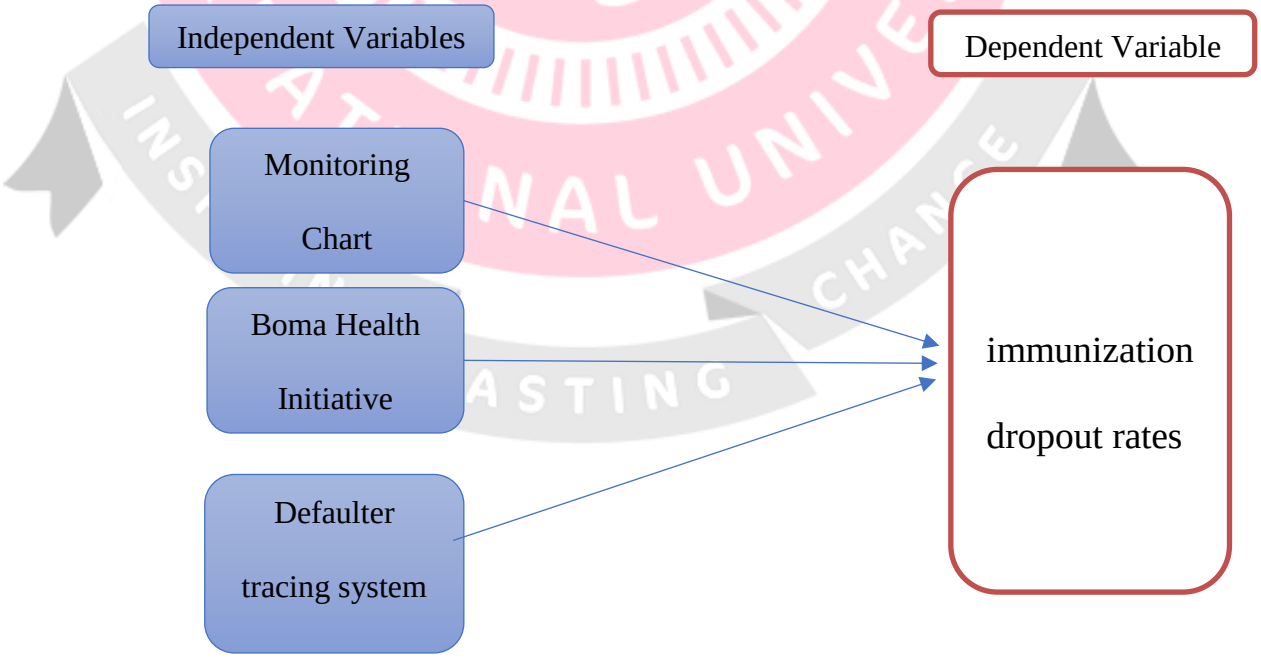


Figure 1: Conceptual framework

2.5 Identification of Knowledge Gap

It is evident that immunization monitoring tools are used in EPI to support the use of data to improve vaccination coverage. As these tools exist for quite period of time, proficiency and usage of these tools to reduce immunization dropouts have been challenging due to number of factors as seen through the literature reviews. Therefore, assessing the use of these tools would help to improve performance and identify any problem of access and utilization in communities with high numbers of unimmunized children undesired dropouts in the immunization programme (WHO, 2020).

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter presents research design, study location, target population, sampling methodology, data collection procedures, and ethical considerations for the study.

3.2 Research Design

The study used a cross-sectional study design, with extended data collection duration of three months in order to answer the research questions. Health facilities that have boma health initiative activities and those that do not have these activities were selected to determine the effectiveness of immunization monitoring mechanisms to reduce immunization dropouts.

The study intended to observe and compare involvement of Boma health initiative in the health facilities that boma health workers were attached to the health facility and determine its impact on the immunization dropout rates.

3.3 Study Location

The study was conducted in Maridi County of the Western Equatoria State in South Sudan. The county located 86 miles from the headquarter for the state and 185 miles away from Capital city of South Sudan. The county has 5 payams with 81 bomas.

3.4 Target Population / Study Population

The study targeted health workers and vaccinators in the health facilities of Maridi county. There were 21 functional health facilities in Maridi County, 13 supported by non-governmental organizations (8 supported by Health Pooled Fund, 5 supported by World

Vision) and 8 supported by the government; with 160 boma health workers concentrated in two out of five payams of Maridi county and 40 vaccinators spread across the 5 payams. The study included only vaccinators handling vaccination programme at the health facilities that have been providing vaccination services and excluded health facilities that were not providing vaccination services 3 months prior to the study period. Boma health workers provided mobilization for immunization as part of their mandate and their contribution could impact dropout rates in the community. Selection of Payams without BHWs was to compare dropout rates given that BHWs contribute to identifying the defaulters and referring them for vaccination.

Table 3: Payams with boma health initiative activities

Payam	No. Health Facility	No. Vaccinators
Kozi Payam	3	6
Town Payam	3	7
Total	6	13

Table 4: Payams with no boma health initiative activities

Payam	No. Health Facility	No. Vaccinators
Ngamunde Payam	2	2
Mambe Payam	5	9
Landili	1	2
Total	8	13

3.5 Sampling: Sample Size Determination, Sampling Procedures

A stratified random sampling method was used to draw participants and the health facilities from the two strata. Using EPI info for calculating the samples needed for the study, at 95% confidence level, 14 health facilities were selected. In the 14 health facilities, a total of 26 vaccinators were divided proportionately into 2 categories. 13 vaccinators from health facilities with BHI and 13 vaccinators from health facilities with no BHI. A coin was toasted to select a vaccinator from each eligible health facility (each facility generally has two vaccinators).

Inclusion criteria: Health facilities were selected based on their functionality and provision of immunization services at the health facility. Each health facility had two vaccinators who relatively performed same task, thus one vaccinator per health facility was included and assessed using the semi-structured interview and the vaccinator was selected based on toasted coin that determined which vaccinator was to be interviewed.

Exclusion criteria: Health facilities that did not provide immunization service were excluded from sampling. Vaccinator who the coin did not select was excluded from the semi-structured interview.

3.6 Data: Instruments, Procedures, Entry, Cleaning, Analysis, Presentation

A semi-structured interview guide and an observation checklist were used to collect data from the respondents. Data was collected on the first month using the semi-structured interview guide while observation checklist was used in the two months hence data was collected on monthly basis for the duration of the study. The data from the research instrument was cleaned, coded, and entered into Excel sheet on monthly basis for analysis

as well as tracking the study and into SPSS after the study duration for further analysis. Descriptive statistics such as frequencies and percentages were used to describe the respondents' demographic statistics, marital status, educational level and years of experience in expanded programme on immunization. Whereas bivariable analysis was used to determine relationships between the independent variables and the dependent variable. This statistical test was used to determine whether relationship between Immunization registers, health facility microplanning and monitoring chart were associated with reduced immunization dropout rate. Chi square test was used to compare the dropout rates of health facilities that were exposed to and those not exposed to boma health initiative, immunization monitoring chart and linking defaulters for vaccination. This examined whether the presence of BHWs in health facilities was either attributed to having low dropout rates (less than 10%) or high dropout rates (more than 10%). Multivariable regression analysis was used to determine association between the variables to answer the research questions and hypotheses.

Data was collected once every end of the month. Interview was conducted at the first month with the respondents. In the second month, an observation checklist was used to track the changes in the dropout rate of the health facility in both strata. In the third month, observation checklist was used to track changes in the dropout rate of the health facility and concluded data collection process for the study.

The unit of analysis in this study was the health facility. Immunization dropout rates aggregated by health facility. Health workers contribution in the study determined their interaction that contributed to the health facility's immunization dropout rate. Health workers were responsible for providing immunization services at the health facility, using

reporting tools to record information of the immunization sessions what would contribute to determining the dropout rate at the end of the month. Health workers were responsible for using the defaulter tracing system to identify defaulters that were to be linked for vaccination hence impacting the dropout rate of the health facility. Their responses were solely representation of the health facility.

Collected data included demographic information of the respondent, dropout rates, number of infants vaccinated with first dose of pentavalent and third dose of pentavalent, and number of infants vaccinated with measles vaccines aggregated by gender. The immunization dropout rates in the health facilities that were exposed and those not exposed to boma health initiative were compared. Boma health initiative was used to compare its impact on the immunization dropout rates. Although the BHI is not a monitoring mechanism, it is a community component that impact health activities in the community and their mandate in supporting immunization activities in the community to which health facility has been assigned.

The data was presented in form of tables, graphs and charts to illustrate the findings of the research. The research findings shall be disseminated in form of article publication, and a radio talk show to the communities where the study was conducted. Printed hard copies of the research findings shall be disseminated to Maridi county health department, state ministry of health and the national Ministry of Health.

3.7 Ethical Issues / Ethical Considerations

The study obtained ethical approval from the AMIU ESRC, South Sudan Research Ethics Committee, approval from the state ministry of health in Western Equatoria State and from Maridi County Health Department that oversees the health facilities where the research was conducted.

The researcher provided informed consent to the participants informing them about the purpose of the research and assured them of the confidentiality measures that will be undertaken to safeguard respondent data. All the research data were kept safely by the researcher for future reference.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter discusses the findings and the results of the study that was conducted from October 2023 to December 2023. 14 interviews were conducted, and 42 observation checklists were filled during the study period to answer the research questions. The findings are arranged according to the objectives of the research.

4.2 Demographic Information

All 14 health facilities that were selected for the study were reached during the study. Out of the 14 health facilities, (12, 86%) were supported by non-governmental organizations while (2, 14%) were supported by the Government. Majority of the respondents (11, 79%) were male with (13, 93%) of them married, (10, 71%) reached secondary level of education, and (4, 29%) attained primary level of education.

Table 5: Health facility support

Who Support Health facility	Frequency	Percentage
NGO	12	85.7
Government	2	14.3
Total	14	100.0

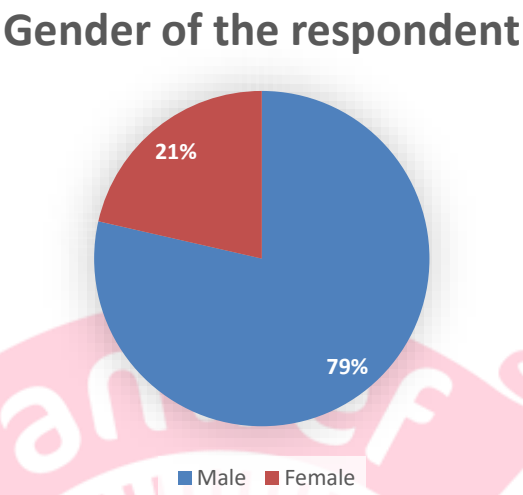


Figure 2: Gender of the respondents

Table 6: Marital Status of the respondents

Marital Status of respondent	Percentage
Single	7.1%
Married	92.9%

Table 7: Educational level of the respondent

Level of Education	Percentage
Primary	28.6%
Secondary	71.4%
Total	100.0%

Majority of the respondents (10, 71%) reached secondary level of education whereas few of the respondents attained primary level of education. When compared by gender, majority (11, 79%) of the male respondents reached secondary level of education while

female respondent completed their primary level. Educational level, with confidence interval (Mean difference: 1.71, 95% CI:1.44 – 1.98) is significant factor for using immunization tools.

4.3 Use Immunization Monitoring Chart to Track Immunization Performance

Eleven out of fourteen (11, 78.6%) health facilities had monitoring chart for displaying the immunization performance of the health facility, with 71% of the health facilities having their monitoring charts updated with the previous month data. The monitoring charts were filled by the health facilities correctly.

Table 8: Health facility with monitoring chart

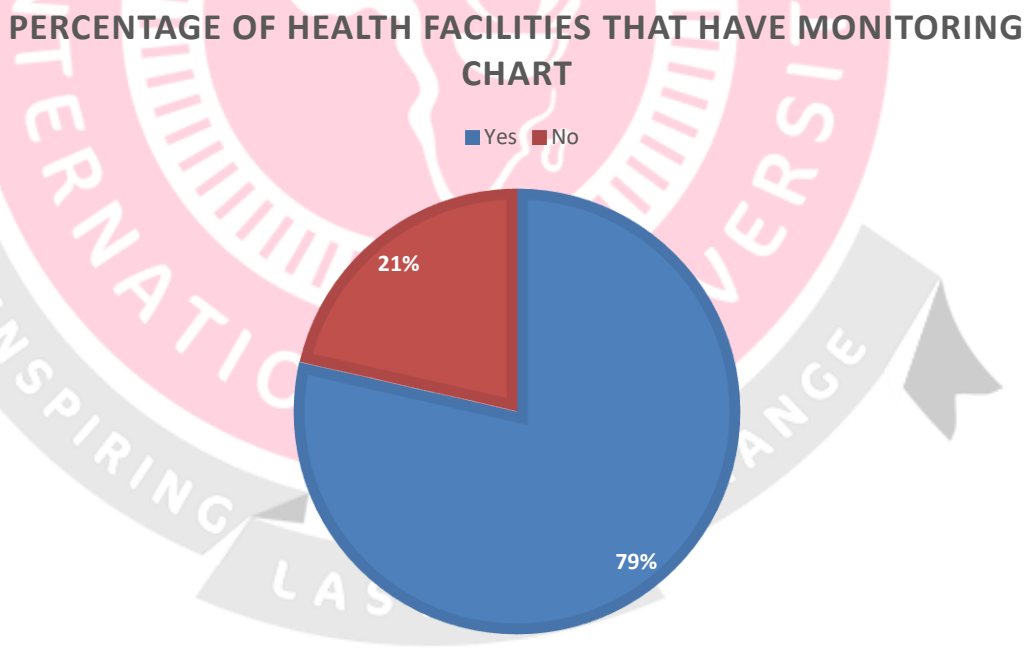


Figure 3: Facilities with monitoring chart

Seven out of fourteen respondents (7, 50%) affirmed that they used immunization registers to identify immunization defaulters (dropouts), (4, 29%) used tickler files, (2, 14%) used

defaulter tracing cards while (1, 7%) used monitoring chart to realize their defaulters. Eleven out of the fourteen (11, 79%) health facilities have immunization monitoring chart with (10, 71%) of the monitoring charts updated with the data prior to the month of the study. Use of monitoring tools to identify immunization defaulters was statistically significant (Mean difference: 1.78, 95% CI: 1.22 – 2.35) in reducing defaulters in the health facilities.

Table 9: Monitoring tool used to identify immunization defaulters

Monitoring Tools used to identify defaulters	Percentage
Immunization registers	50%
Tickler file	28.6%
Defaulter tracing Cards	14.3%
Monitoring Charts	7.1%

The use of monitoring tools was associated with the health facility microplanning document been updated, with a 54% coefficient of association and p-value 0.04, indicated the more the microplanning documents been updated the more likely monitoring tools were used to identity immunization defaulters. As much as monitoring chart is a performance tool, it should be used to display the performance and gauge the success of immunization rather than identifying the immunization defaulters.

The observation data indicated that most of the health facility filled the immunization registers correctly regardless of the dropout rate. This is a very important aspect of the data

management as incorrect data filling would result into misclassification of the dropouts and also immunization visits. Accurate data capturing into the immunization register enhanced completeness of the data tools.

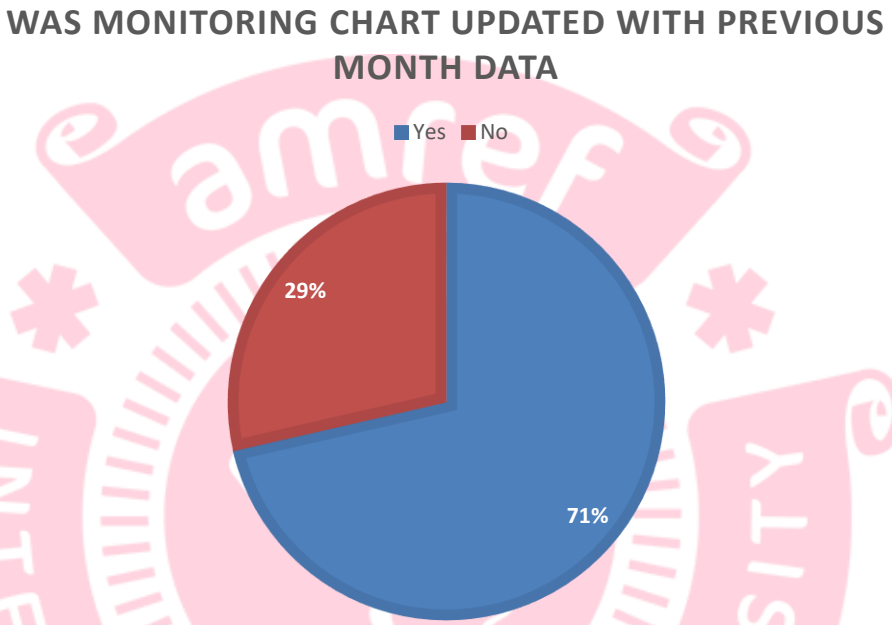


Figure 4: Status of monitoring chart update with previous month's data

Table 10: No. of Performance Check in a Quarter

No. of Performance Check in a Quarter	Percentage
None	7.1%
Three times in a quarter	57.1%
Two times in a quarter	14.3%
Once in a quarter	21.4%

Ten of the fourteen (10, 71.4%) health facilities had their monitoring chart updated while 4 health facilities did not update their monitoring chart, majority of the health facility

Eleven out of the fourteen of the respondents (11, 79%) confirmed that they used monitoring chart for plotting the performance of the 1st and 3rd dose of Pentavalent, (13, 93%) recorded child's information in the immunization register, child health card and dropout/defaulter tracing cards at the start of the vaccination session. (8, 57%) of the respondents check their monitoring chart three (3) times in a quarter while (2, 14%) checked twice and (3, 21%) checked once. Health facilities that checked their monitoring chart three times in a quarter implied monthly checking of the performance. Updated monitoring chart showed significant inverse association with the dropout rate of the health facility with 72.5% correlation coefficient and p-value of 0.003, which implied the more a health facility updated their monitoring chart the less likely would the health facility have increased dropout rate, thus indicating improved performance.

Correlations

			Dropout Rate of the health facility classified	Is the monitoring chart updated with previous month data
Spearman's rho	Dropout Rate of the health facility classified	Correlation Coefficient	1.000	-.725**
		Sig. (2-tailed)	.	.003
		N	14	14
	Is the monitoring chart updated with previous month data	Correlation Coefficient	-.725**	1.000
		Sig. (2-tailed)	.003	.
		N	14	14

**. Correlation is significant at the 0.01 level (2-tailed).

Majority (13, 95%) of the health facilities whose dropout rate was less than 10% plotted the monitoring chart correctly with exception of few whose monitoring chart were not plotted correctly. All the health facilities whose dropout rate was more than 10% plotted the monitoring chart correctly. However, this would indicate other factors that could have contributed to having high dropout which the study did not assess as it wasn't in the scope of the study.

Health facilities whose monitoring chart were plotted correctly, Majority (12, 90%) had an effort to identify defaulters and trace them. Whereas two health facilities whose monitoring chart weren't plotted correctly, had effort to identify defaulter and trace them. This indicated use of other tools to identify defaulters in the health facilities other than monitoring chart. Few of the health facilities whose monitoring charts weren't plotted correctly had their immunization registers not correctly filled which could explain reason as to why some did not correctly plot their monitoring chart.

Those whose monitoring chart were correctly plotted every end of the month of the study about (10, 75%) of them had desired dropout rate while (4, 25%) had more than 10% dropout rate. While those whose monitoring charts were not correctly filled all of them had less than 10% dropout rate when verified at the end of the study. Updating monitoring chart is significantly important to monitor dropout rates of the health facility (Mean difference: 1.28, 95% CI: 1.02 – 1.56). Health facilities whose dropout rate were above 10% while they had updated monitoring chart could be attributed to missing community linkage activities, no follow up of defaulters and no BHWs presence in their catchment area.

Updating the monitoring chart had shown an association with who supported the health facility. With a correlation coefficient of 64.5% and p-value of 0.001, this indicated that the more the health facility received a support, which could be in terms of mentorship from the government of the NGOs, the likelihood of updating the monitoring chart increased by 64%. Although there was no association between who supported the health facility and its effect on the dropout rate of the immunization, mentorship program aimed at supporting the health facility to improve their knowledge contributed to updating the monitoring charts.

was the monitoring chart plotted correctly? In relation to Dropout Rate

Dropout rate		Frequency	Percentage
No Monitoring chart	no	10	100.0
Less than 10%	yes	23	95.8
	no	1	4.2
More than 10%	yes	8	100.0

The observational data indicates 95.8% of the 8 health facilities had less than 10% dropout rate after the three months of follow up. This indicated progress from the initial assessment, attributed to consistent use of the monitoring tools at the health facilities which yield less dropout rates

4.4 Involvement of the BHI Contributes to Reduced Immunization Dropout Rates

Sixty four percent (9, 64%) of the respondents affirmed that they have boma health workers attached to their facilities while (5, 36%) had community mobilizers who were volunteers assigned by their community. Eighty six percent (12, 86%) of the health workers and vaccinators affirmed that they received referrals from the BHWs and community mobilizers with (9, 64%) infants who dropped out of their immunization schedule while (2, 14%) of the respondents did not receive referrals for immunization indicating gaps in referral activities.

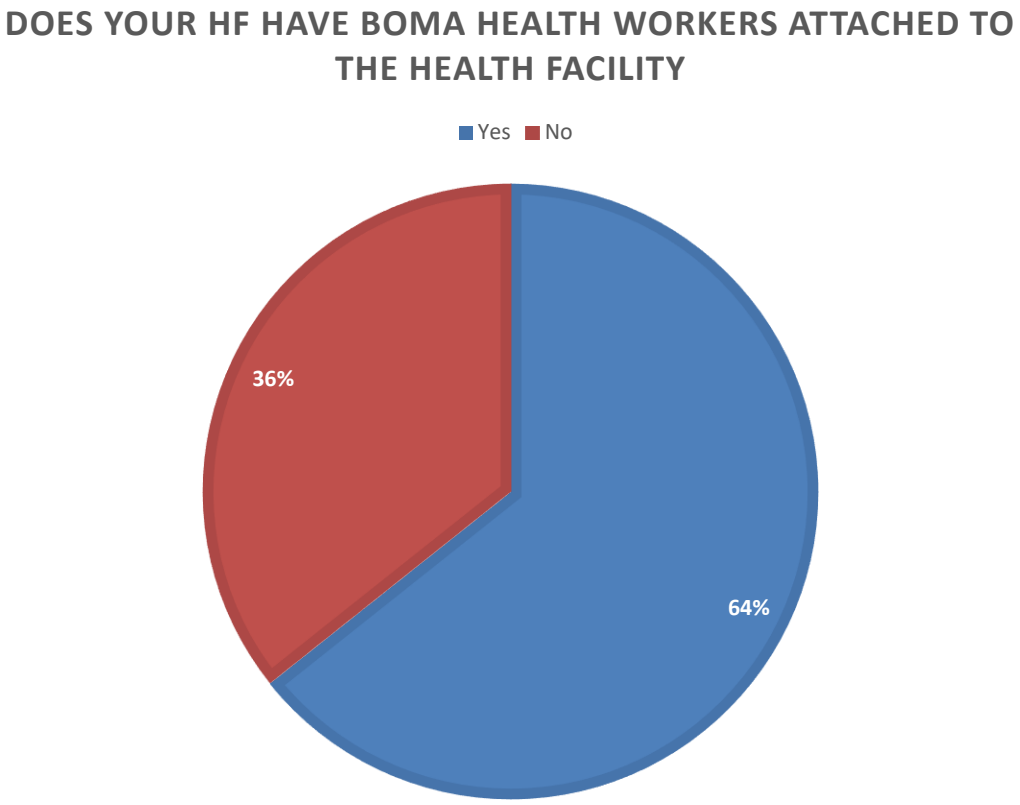


Figure 5: Boma health workers attached to the health facility

Did you receive referral for immunization from the boma health workers

Health workers received referrals	Frequency	Percentage
yes	12	85.7
No	2	14.3
Total	14	100.0

The type of referrals is important to address the dropouts, out of the two types of referrals, defaulters and zero-dose referrals, heath facilities with less than 10% dropout rate had 86% of the received referrals were defaulters, whereas health facilities with more than 10% dropout rate had 50% defaulters, 25% zero-dose and 25% no referrals.

As many as (13, 93%) of the respondents affirmed that their BHWs provided counseling for the mothers to ensure that their infants completed their immunization schedule before 1 year, (5, 36%) of the referrals were zero-dose infants and majority (9, 64%) were dropouts. It is statistically significant (Mean difference: 1.64, 95% CI: 1.36 – 1.93) that defaulters should be referred for vaccination in order to reduce the number of dropouts in the community hence promoting completion of vaccination schedule.

Type of immunization referral does you receive from the boma health workers in relation to dropout rate

Dropout Rate		Frequency	Percentage
No Monitoring Chart	defaulters' referral	1	33.3
	Zero-dose referral	1	33.3
	Both	1	33.3
	Total	3	100.0
Less than 10%	defaulters' referral	6	85.7
	Both	1	14.3
	Total	7	100.0
More than 10%	defaulters' referral	2	50.0
	Zero-dose referral	1	25.0
	No referrals	1	25.0
	Total	4	100.0

It is evident that having a desirable dropout rate (less than 10%) is linked with more referral of defaulters by BHWs to the health facilities (Mean difference:1.64, 95% CI: 1.36 – 1.93). Lack of referrals and zero-dose referrals, as much as defaulter's referral rate do not exceed 50%, could be attributed to having undesired dropout rate (more than 10%) indicates presence of defaulters in the communities served by the health facilities and infants who did not finish their vaccination schedule. Therefore, the type of referrals by the BHWs is statistically significant (Mean difference: 1.85, 95% CI: 1.05 – 2.67) in reducing dropout rates of the health facility.

Presence of BHWs in relation to Dropout rate

Dropout rate		Frequency	Percent
No Monitoring chart	No BHWs	4	40.0
	BHW Exist	6	60.0
	Total	10	100.0
Less than 10%	No BHWs	2	8.3
	BHW Exist	22	91.7
	Total	24	100.0
More than 10%	No BHWs	5	62.5
	BHW Exist	3	37.5
	Total	8	100.0

Presence of BHWs in the health facilities is a key factor in improving immunization uptake and reducing defaulters in the immunization program. Health facilities with desired dropout rate (less than 10%) had more than eighty percent (11, 80%) presence of BHWs

with few who did not have BHWs. While few health facilities whose dropout rates were more than 10% had BHWs, majority more than sixty percent (2 out of 3, 60%) did not have BHWs. Thus, involvement of BHWs in reducing immunization defaulters is paramount to achieve desired less than 10% dropout rates.

Similarly, health facilities who had an effort to link the identified defaulters and trace them, majority (11, 79%) were those who had BHWs attached to their facilities. While twenty-one percent (3, 21%) who did not have BHWs showed concern to identify the defaulters and trace them using other means such as local authorities in the community and religious leaders. On the other hand, health workers who did not show an effort to identify defaulters and trace them, majority (80%) did not have BHWs attached to their facilities and twenty percent (20%) had BHWs attached to their facilities.

Effort to identify defaulters in relation to dropout rate of the health facility		Frequency	Percent
No Monitoring chart	yes	9	90%
	no	1	10%
Less than 10%	yes	24	100.0
More than 10%	yes	4	50.0
	no	4	50.0

All the health facilities with desirable (less than 10%) dropout rate had put effort to identify the defaulters and trace them in order to complete their vaccination schedule while facilities with more than 10% dropout rates had fifty percent (50%) effort to identify the defaulters

and trace them. Having effort by the health workers is equally important to attain reduced dropout rate. Presence of BHWs attached to the health facilities should facilitate referrals of the defaulters after the health worker had identified and hand over a list of defaulters who should be found in the community and referred to complete their vaccination schedule. The health workers felt motivated to support the tracing the defaulters as BHWs supported them in ensuring that they find the infants. It is evident that number of BHWs attached to health facility is significantly important (Mean difference: 2.35, 95% CI: 2.07 – 2.64) in referring and linking infants from the community for vaccination.

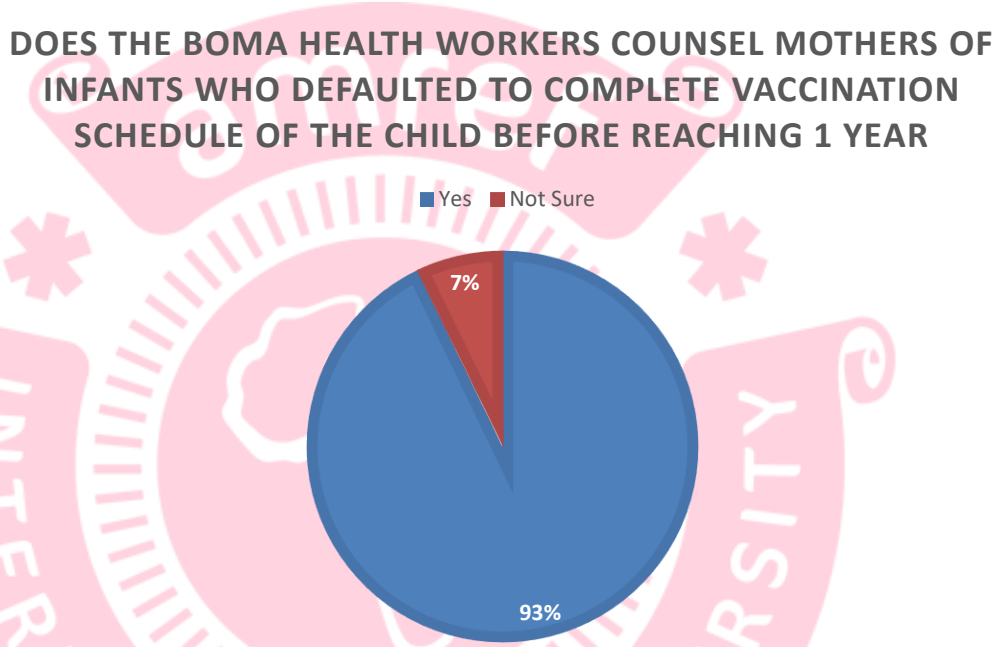
Correlations

			was there an effort by HCW to link the identified defaulters and trace them	Dropout rate
Spearman's rho	was there an effort by HCW to link the identified defaulters and trace them	Correlation Coefficient	1.000	.354*
		Sig. (2-tailed)	.	.021
		N	42	42
	Dropout rate	Correlation Coefficient	.354*	1.000
		Sig. (2-tailed)	.021	.
		N	42	42

*. Correlation is significant at the 0.05 level (2-tailed).

The effort from the health workers showed association with the dropout rate, this indicated that the more the health worker put effort to identify the defaulters the more likely would

it impact the dropout rate by 35%. Although the association coefficient is weak, it highlighted the impact of health workers contribution to support the boma health workers in the community to trace the defaulters and ensure that the infants complete their vaccination within the timeframe.



Majority of the health facilities (13, 93%) reported that their boma health workers provide counseling to mothers of infants who defaulted in the community to complete their infant's immunization schedule. The counseling included taking the child for vaccination timely and importance of the vaccination service at the health facility. Although counseling has shown no association with the dropout rate, it remained a core function of the boma health workers that supported the defaulter tracing in the community.

4.5 Defaulter Tracing System Can Be Used to Ensure Infants Complete Their Vaccination Schedule

Ninety three percent (13, 93%) of the respondents confirmed that their facilities have defaulter tracing system, with eighty-six percent (12, 86%) who filled the dropout cards, thirty-six percent (5, 36%) knew the overall importance of using tickler file as a defaulter tracing system while twenty-one percent (3, 21%) only knew that it is used to track the next visit of the infant, and others think that it is simple and effective to identify defaulters. Ninety three percent (13, 93%) of the respondents understood that stockouts of vaccines in the health facility increase the number of defaulters and dropouts which in turn reduce the vaccination coverage.

Table 11: Table showing HF have defaulter tracing system

Health Facility with Defaulter tracing system	Percentage
Yes	92.9
No	7.1

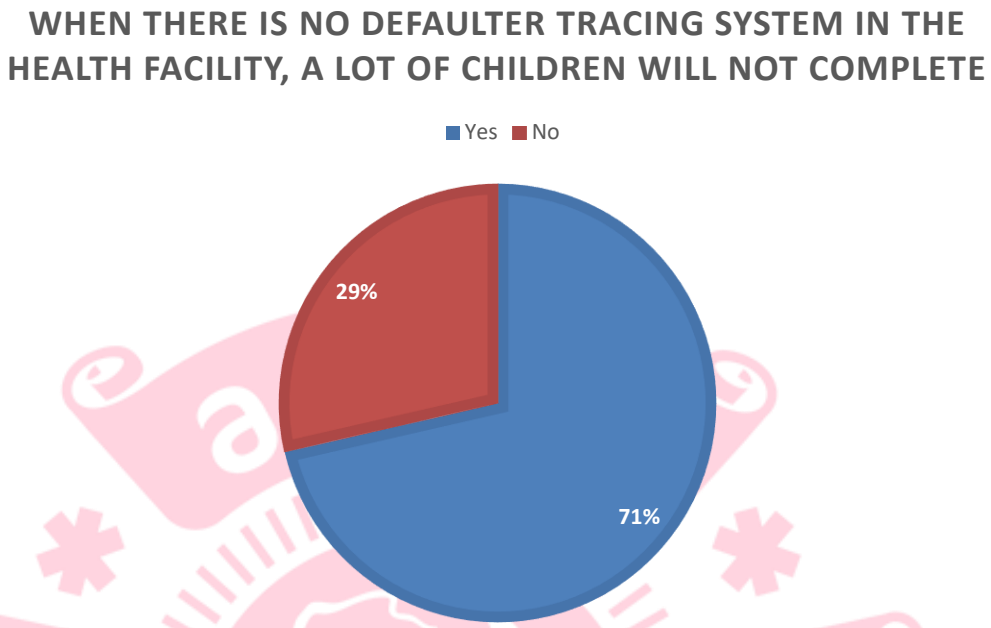
Majority of the respondents (6, 43%) confirmed that they collect information about the dropout from the tickler file on weekly basis while thirty-six percent (5, 36%) collect on monthly basis, few collect daily (2, 14%). Knowing the importance of the tickler files determines its frequent utilization (Mean difference: 2.78, 95% CI: 1.82 – 3.75). Health workers and vaccinators timing differ as to when they should collect information about the

defaulters from the tickler file. This also impacted their effort to link defaulters to complete their vaccination.

Table 12: Frequency of collecting defaulters' information from the tickler file

Frequency of collecting defaulters' information	Percentage
None	7.1%
Daily	14.3%
Weekly	42.9%
Monthly	35.7%

Eighty six percent (12, 86%) of the respondents believed that defaulter tracing system could help reduce infants who did not come for their immunization visits, and seventy-one percent (10, 71%) affirmed that when there's no defaulter tracing system infants would not complete their vaccination schedule.



A positive association between having defaulter tracing system and a health facility having children with incomplete immunization, suggested that when a health facility have defaulter tracing system, the more like that a lot of infants would complete their vaccination as per immunization schedule by 64%, with p-value of 0.01. the association is greater when the defaulter tracing has been used correctly with the reminder cards in the health facility. This elaborates the need for the health workers to use the defaulter tracing system effectively in order to realize the infants who missed their vaccination appointments.

The use of the defaulter tracing system is in health facilities with boma health workers proved significant progress in reducing dropout rate as the identified defaulters linked to complete their vaccination services at the health facilities. Mothers listen to the boma health workers as they provide counseling and education at the community level thus improving and impacting the use of the defaulter tracing system.

Ninety three percent (13, 93%) of the respondents confirmed that their health facilities have health facility microplanning document, and they know how to use the document, with eighty six percent (12, 86%) saying the document was updated in less than one year. Updating of the microplanning document is vital towards accurate calculation of the expected infants to be vaccinated and also the denominator for calculating the performance of the health facility.

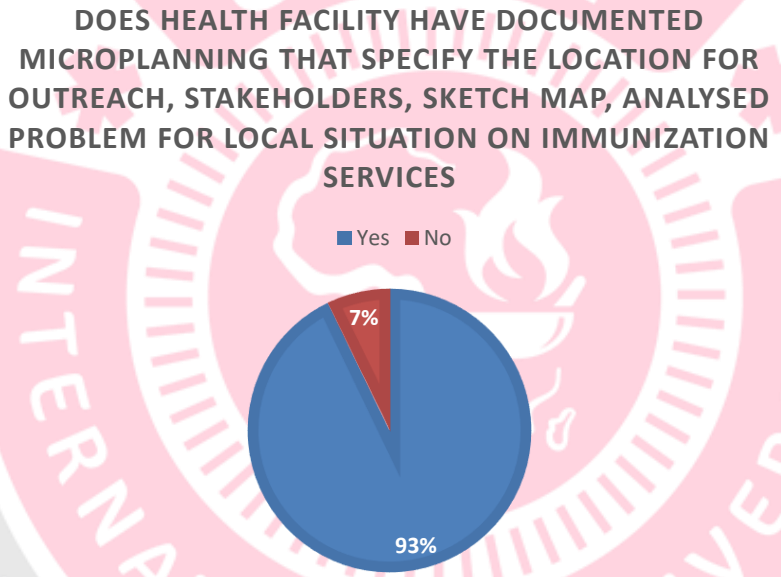


Table 13: When was the last time the health facility microplanning was updated or done?

When was the last time the health facility microplanning was updated or done?	Percentage
Less than a year	85.7%
1 year ago,	7.1%
2-3 years ago,	7.1%

A health facility without defaulter tracing system is more likely to have increased dropout rate than one with defaulter tracing system (Mean difference: 1.28, 95% CI: 1.02 – 1.56). Knowing the importance of having a working health facility microplanning document contribute to utilization of the document to support immunization services and reduce dropout rate in the health facility. About fifteen percent (2 out of 13, 15%) of health facilities who had health facility microplanning document did not agree that defaulter tracing system is important to reduce the number of infants who did not come on time for vaccination. This indicated knowledge gap of the vaccinators on the importance and perhaps the use of defaulter tracing system. A positive association between who supported the health facility and the use of microplanning document suggested that the more health facility has been supported, the more likely they would able to use the document by 68%, p-value <0.01. An updated microplanning document that indicated the villages and analyzed their coverage shown an association with utilization of the microplanning document. The document not only identity the areas but also locate where BHWs were located to understand the gaps in the community, vaccine stocks required to vaccine the projected infants in the community.

4.6 Regression analysis of the variables

Table 14: Regression analysis model summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.943[a]	.890	.795	5.889	.890	9.415	6	7	.005	1.608

a. Predictors: (Constant), Do you know how to use the health facility microlanning document to help reduce defaulters?, Does the HF have defaulter tracing system, Gender of the respondent, Dropout Rate of the health facility classified, Educational level of the respondent, Is the monitoring chart updated with previous month data

b. Dependent Variable: Dropout rate of the health facility as it stands

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1958.964	6	326.494	9.415	.005[b]
	Residual	242.750	7	34.679		
	Total	2201.714	13			

a. Dependent Variable: Dropout rate of the health facility as it stands

b. Predictors: (Constant), Do you know how to use the health facility microlanning document to help reduce defaulters?, Does the HF have defaulter tracing system, Gender of the respondent, Dropout Rate of the health facility classified, Educational level of the respondent, Is the monitoring chart updated with previous month data

This model significantly predicts approximately 80% of the association between the dependent variable and the independent variables. Factors such as use of health facility microplanning document, having defaulter tracing system, gender, classifying dropout rate of the health facility, educational level and updated monitoring chart are predictors of dropout rate.

Table 15: Regression analysis coefficients table of the predictors

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	-61.500	17.000		-3.618	.009	-101.698	-21.302
	Does the HF have defaulter tracing system	-40.000	10.200	-.821	-3.922	.006	-64.119	-15.881
	Is the monitoring chart updated with previous month data	39.750	8.833	1.432	4.500	.003	18.863	60.637
	Do you know how to use the health facility microlanning document to help reduce defaulters?	-27.250	11.147	-.560	-2.445	.044	-53.609	-.891
	Gender of the respondent	22.000	6.800	.720	3.235	.014	5.921	38.079
	Educational level of the respondent	27.250	8.500	.982	3.206	.015	7.151	47.349
	Dropout Rate of the health facility classified	15.750	4.498	.884	3.502	.010	5.115	26.385

a. Dependent Variable: Dropout rate of the health facility as it stands

CHAPTER 5: DISCUSSIONS

5.1 Use of Immunization Monitoring Chart to Track Immunization Performance

Monitoring mechanisms in health facilities had shown effectiveness in reducing dropout rates. These significant changes in the dropout rates were attributed to the use of various monitoring mechanisms in health facilities of Maridi county. Thus, immunization monitoring mechanisms had shown effectiveness in reducing immunization dropouts among infants.

Despite seventy-one percent (71%) of the health facilities had reported updating their monitoring chart monthly, few health workers used it for tracking dropout rates and instead immunization registers were used to track immunization defaulters. With seventy-nine percent (79%) of the health facilities having immunization monitoring chart, only seventy-one percent (71%) updated their monitoring charts indicating lack of adequate monitoring charts in all the health facilities hence provision of monitoring chart in the health facilities is crucial to improve their performance and reduce dropout rates

A strong association between having monitoring chart and updating the chart indicated that having a monitoring chart in a health facility increases the likelihood of updating the monitoring chart. As a weak strength of association existed between updating the monitoring chart and who supported the health facilities, the finding suggested that the more health facility gets a support, could be through mentorship and other required support towards updating the monitoring chart, the more likely that the monitoring chart in the health facility would be updated.

An inverse association between dropout rate and having monitoring chart indicated that the more health facilities have monitoring charts, the lesser they would have dropouts. And the association is even stronger when the monitoring charts are updated. The study finding agreed with (Chantler et al., 2018) that highlighted the high dropout rates in the health facility was associated with immunization activities and routine immunization registers that were not updated routinely, and defaulter tracing that was rarely conducted. Thus, updating immunization registers remained a key towards reducing defaulters in the immunization program.

The desirable immunization coverage is that with less defaulters and reaches more infants targeted for immunization in the community. The frequency of checking defaulters using performance monitoring chart is associated with infants been referred by boma health workers. A sixty-two percent (62%) strength of association indicated that the more the health workers check the performance monitoring chart the more likely that the BHWs would get information on the defaulters and leads to referral of infants. The findings concur with Shikuku et al. (2019) that active analysis and utilizing routine immunization data together with investing in community health strengthening systems improve immunization coverage. Greater data use can result in better quality data and ultimately contribute to better immunization programme performance by better identifying and targeting those who are eligible for vaccination.

Immunization defaulters affect the coverage performance for specific health facility, and mechanisms to monitor the vaccination services are important to spot areas of weakness and strength as early as possible. Coverage evaluations are done periodically after 3 months or 6 months, where sharing of challenges and solutions are proposed. Through a continuous

process of monitoring the performance using a simplified tool gives quick feedback and necessitates quick action to avoid and reduce immunization defaulters.

While updated Health Facility Micro-Planning (HFMP) document was positively associated with updating performance monitoring chart, a sixty-four percent (64%) strength of association indicated that regular update of HFMP document would lead to frequent update of the performance monitoring chart as the two are immunization feedback mechanisms at the health facility. Strengthening health workers' skills and knowledge on the use of data would ultimately improve immunization program when underused data triangulation from the feedback mechanisms have not been considered

Tchoualeu et al. (2021) findings concur with the study and conclude that routine immunization monitoring chart was used to review progress toward meeting vaccination coverage targets in health facilities. As monitoring charts are regularly updated it would lead to reduced dropout rate and better immunization performance. According to Adamu (2023), "The potential advantage of monitoring implementation outcomes in immunisation is that it can enable a more logical and concrete understanding of areas of implementation success or failure that influence programme performance" (Adamu et al., 2024).

According to Prakash et al. (2025), "… immunization coverage and dropouts emphasize the need to identify area-specific patterns and reasons for low immunization coverage and to develop interventions to address them. Robust support systems for community health workers and comprehensive record-keeping are pivotal to improve immunization coverage and to reduce the burden of vaccine-preventable diseases". Health workers should be able to properly use the monitoring tools such as registers and monitoring charts which are vital

in ensuring improvement is achieved in immunization thus reducing dropouts in the community.

It is important that resources are allocated to support monitoring of immunization at the local level towards achieving vaccination for all and reaching every child. Presence of effective monitoring mechanism as intended to improve the vaccination services through the use of data would support decision making at the peripheral health facilities.

Immunization policy in South Sudan incorporated and adopted the monitoring charts in all health facility to track the progress and performance of the immunization services. The findings are important to enforce the use of the monitoring charts at the health facilities whose health workers are reluctant to use the monitoring chart for immunization performance.

5.2 Involvement of the BHI Contributes to Reduced Immunization Dropout Rates

The number of BHWs attached to a health facility is important in following up mothers of infants who dropped out, a positive association indicated that greater number of BHWs attached to health facility could result to more follow ups hence reducing defaulters in the immunization program. A positive association between stockout of vaccine and receiving immunization referrals, with correlation coefficient of 67.5% and p-value < 0.01 indicated that the more the health facility have stockout of vaccine the more likely the rate of immunization referrals would increase. Thus, availability of vaccine, in order words, reduces dropout rate and ensuring completion.

As much as stockout of vaccines increases dropouts in the immunization program, an association with telephone follow up, suggest that the more health facility experience stock

out of vaccines this could necessitates more follow up of mothers to reduce dropouts. Thus, increased referrals of infants who did not receive vaccination timely, by BHWs, has been associated with the number of BHWs in the community. As much as the number of boma health workers attached to the health facility could be important in reducing dropout rate. (Mean difference: 2.36, p-value <0.01 and 95% CI 2.07 – 2.64) clearly indicated the importance in the number of BHWs. Although no association existed between the number of boma health workers and its effect on the dropout rate, the more BHWs attached to a specific health facility, the more likely they would be engaged into tracing the defaulters.

An inverse association between zero-dose referral and follow up of defaulters in location with cellular connection suggest that the more zero-dose infants being referred by BHWs the less likely would the BHWs follow the defaulters. Thus, reducing dropouts would need more concentration of the BHWs to refer defaulters as much as infants who did not receive any vaccine should also be referred to reduce zero-dose infants in the community.

Nevertheless, BHWs coordinate mobilization activities in the communities they service as part of their mandate to support immunization activities in their communities. The more BHWs coordinated mobilization for outreach activities, the more the outreaches would be done together with the presence of BHWs. Although a weak strength of association with statistical significance exists, it is important to note that the vaccinators sometimes conduct the activities without the presence of the BHWs when the mobilization has already been coordinated by the BHWs in the designated area for outreach activities. A study conducted in southern Ethiopia suggested that "Incomplete immunization was higher compared to the national target (Tayu et al., 2024). It is necessary to strengthen the program by enhancing the number of outreach sites considering the size of the target group." Although the study

focused on the target group for immunization, the boma health workers concentrated on the infants who defaulted and did not complete their immunization schedule as per South Sudan guidelines.

Findings for a study conducted in Northern Ethiopia agreed that households not visited by health extension workers at least monthly (AOR = 2.68,95%CI:1.30–5.51); poor participation in women's developmental groups (AOR = 3.3,95%CI 1.54–7.08); no postnatal care follow-up (AOR = 5.2,95%CI:2.36–11.46); and poor knowledge of child immunization (AOR = 3.3,95%CI:1.87–7.43) were predictors of defaulting from completion of child immunization (Aregawi et al., 2017). Therefore, presence of the Boma health workers in the community played significant role in tracing the dropout infants to complete their vaccination schedule.

Effort of the health workers to identify the defaulters and being tracked by the BHWs is key to reduce dropout. A relationship existed between health workers' effort to identify defaulters, link them for immunization service and reduced dropout rate. This indicated the more health workers put effort to identify the defaulters to be linked for immunization service, it reduces the dropout rate by 66%. The finding agreed with Samuel (2021), that effective referrals from the community for missed immunization services were due to strengthened linkages between communities and health centers. The responsibility of health centers is to identify who did not complete their vaccination in the community whereas the community spot the infants and refer them for vaccination hence reducing the number of dropouts in the community.

A study conducted in Ethiopia, concluded that "to reduce the rate of defaulters, health providers should motivate and counsel mothers to attend postnatal care. Health extension

workers should visit households at least once per month and strengthen mothers' participation in the women's development groups." Zawadie et al. (2016) further explained that "the main reasons for defaulting from the immunization program are poor counseling of mothers, unsupportive provider-client relationships, poor immunization service arrangements, and lack of systems for tracking defaulters. Efforts to reduce defaulter rates from the immunization program need to focus on improving counseling of mothers and strengthening the health systems, especially with regards to service arrangements and tracking of defaulters". A study in Nigeria agreed with the findings to educate the community about the immunization and dropout found out that Dropout rate was 22.66% for sample sizes under 500 and 18.01% for sample sizes beyond 500. In Sub-Saharan Africa, the prevalence of vaccination dropout was high. Community education about vaccinations importance should be prioritized (Gebeyehu et al., 2022).

The study observed that lack of efforts from health workers to identify and link defaulters, lack of updated monitoring charts and incorrectly filled immunization registers, absence of BHWs in the health facilities, no referrals from BHWs and lack of support from concerned organizations and government were attributed to high dropout rates in some of the health facilities of Maridi County.

Thus, according to Prakash et al. (2025), "Mobilization strategies that integrate robust data management within immunization programs are vital to ensure that children receive all recommended vaccinations and to maximize the protective benefits of vaccine programs". The effort of the health workers when combined with the mobilization and tracing of the BHWs could ensure that all the children received their vaccination which impacts the dropout rate.

Expanding boma health initiative to all health facilities to reach infants in the communities with defaulters and increase health education on importance of immunization thus reducing dropouts in the community

5.3 Defaulter Tracing System Can Be Used to Ensure Infants Complete Their Vaccination Schedule

Presence of defaulter tracing system in a health facility was associated with who supported the health facility. The finding suggested that the more a health facility was supported, the more the facility would have a defaulter tracing system that would be functional. A functional defaulter tracing system updated the information of the infant on the reminder cards which supported the health workers to identify infants who might have missed their appointments for vaccination. As much as having defaulter tracing system played an important role in the health facility's performance, it helped reduce rates of defaulters in the immunization program.

Having correctly filled defaulter cards or reminder cards, to remind the health workers about the dropouts, the more likely infants who did not come for their subsequent doses would be identified and this would lead to reduced dropouts. This significantly indicated using a defaulter tracing system is important in reducing the defaulters. As the system simplified the activity and effort of tracking the infants, it also contributed to timely generation of list of defaulters that the BHWs would use to identify the infants in the community. Effort of the health workers to identify the defaulters showed association and impact on dropout rate by 36.5% with p-value of 0.01, indicating the need for health workers to embrace defaulters' identification to coordinate with BHWs.

A study finds agreed that poor defaulter tracking systems were associated with high dropouts. Health system factors that contributed to the problem were poorly arranged and coordinated immunization services, vaccine and supplies stock outs, and lack of viable defaulter tracking systems in the health facilities. The main reasons for defaulting from the immunization program are poor counseling of mothers, unsupportive provider-client relationships, poor immunization service arrangements, and lack of systems for tracking defaulters. Efforts to reduce defaulter rates from the immunization program need to focus on improving counseling of mothers and strengthening the health systems, especially with regards to service arrangements and tracking of defaulters (Zawadie et al., 2016).

The findings concur with Kayembe-Ntumba et al. (2022), a study conducted in Kenya stated that lack of a reminder system on days before the scheduled vaccination, were perceived to be associated with high immunization dropout rates. As much as, other challenges encountered with establishing immunization include a lack of defaulter tracing systems in most healthcare facilities providing childhood immunizations were also observed in other research (Nyaku et al., 2017). Thus, a facility without immunization defaulter tracing systems is likely to have high dropout rates. Although other studies advocated for prioritizing targeted interventions and programs to strengthen interpersonal communication between immunization service providers and users during vaccination in health facilities and to implement an SMS reminder system on days before the scheduled vaccination, the study did not interrogate the use of SMS reminder system as part of tracing defaulters in the immunization program.

A positive association between the last time Health Facility Microplanning document was updated, the health worker's ability to use the document and with performance monitoring

chart. These indicate the more frequent the HFMP document could be updated, the more likely the health workers and vaccinator would be able to use the document. The study concurs with Ali et al. (2020) that effective routine immunization depends on a microplanning that requires accurate estimation of the population and location maps that shows the location of health facilities and villages of the target populations (Ali et al., 2020). Frequent update of HFMP usually within a timeframe of a year, would be more applicable to understand the population dynamics and immunization needs, and how many infants expected to be vaccinated in order to prioritize resource allocation.

An effective micro plan intent to reach all targeted and eligible populations as per recommended vaccination schedule. World Health Organization, the United Nations Children's Fund, and other partner organizations such as GAVI, the Vaccine Alliance in 2002, developed the Reaching Every District (RED) guide to improve immunization program performance and reduce inequities in countries with low immunization coverage. Likewise, the health workers would regularly update the performance monitoring chart since they are related feedback mechanism at the health facility. However, the study did not interrogate the ability of health worker to develop the microplan document, since the microplanning process has been usually guided and supported by the county health department. Thus, ability to use the document is an essential element for the health workers at the health facilities.

Although Mafigiri et al. (2021) findings showed that lack of updated microplan in the health facility was attributed to lack of knowledge, some health facilities with no updated microplans had high immunization coverage and concluded that health workers' misunderstanding and limited knowledge about the microplanning process, especially at

peripheral health facilities, coupled with the complex, bulky nature of the microplanning tool, reduces the effectiveness of microplanning in improving routine immunization. On the contrary, updating HFMP document was supported by the county health department and updated copies of the HFMP document were handed to the health facility for implementation, thus eliminating the risk that health workers would update the document by themselves.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Immunization Monitoring mechanisms in health facilities of Maridi County were effective in reducing dropout rates. Although monitoring charts were updated regularly to track immunization performance, vaccinators rely on immunization registers for identifying dropouts thus, monitoring charts and defaulter tracing system were less commonly used. Gaps of no monitoring chart in other health facilities were attributed to poor performance in monitoring of immunization services.

Boma health initiative contributed significantly to reduce immunization dropout rates in health facilities with operational BHWs. Nevertheless, higher number of BHWs attached to health facility contribute effectively towards reduced dropout rate. Few health facilities with BHWs who did not attain improved immunization coverage and reduced dropout rates were attributed to poor efforts of health workers to identify defaulters and link them with BHWs for follow up. Thus, it is necessary for the health workers to coordinate and complement efforts to identify the infants who have dropout of the immunization schedule and trace them to complete their vaccination schedule. Boma health initiative has proven its success ensuring infants who did not complete their immunization were followed up.

Without defaulter tracing system in the health facilities, increase in dropouts would lead to poor performance, most of the health facilities had defaulter tracing systems. Although no uniform timeline for collecting information about the defaulters exist between the health facilities. Efforts of health workers to identify defaulters and link them for immunization was significant in reducing dropout rates. Thus, knowing the importance of the defaulter

tracing system increases its frequent use in the health facilities. Most of the health facilities had updated Health facility microplanning document and were able to use it for supporting immunization service delivery. The microplanning document though not directly a monitoring tool, supported to ensure that vaccine quantities for the health facility were sufficient. Lack of vaccine supply in the health facility was identified to be one of the causes infants' dropouts of their vaccination schedule.

Therefore, addressing lack of monitoring charts in some of the health facilities, improving efforts of health workers to identify and link defaulters for follow up, increasing presence of BHWs in health facilities without BHWs, in addition to already existing strategies would further reduce dropout rates hence achieving improved immunization coverage in Maridi County.

6.2 Recommendations

The research recommended the following in order to enhance immunization monitoring mechanisms in the health facilities:

Policy makers to leverage on the defaulter tracing system in the health facilities and activate them to support the effort of the health workers in identifying infants who defaulted easily and improve tracking of the defaulters

The government and its partners to enforce the use of monitoring tools to track progress of immunization in the catchment areas of the health facilities.

The government and its partners to prioritize scaling the BHI to health facilities without BHWs is paramount to narrow the gap of defaulters in the community hence reducing immunization defaulters in the community.

6.3 Limitations and Recommendation for Future Studies

The study did not assess and interrogate the quality of immunization data in the immunization registers to justify the dropout rates. Most of the sources focused on the mother's perspective and factors associated with dropouts instead of health facility immunization monitoring. Health facilities who partially plotted monitoring charts were considered incorrectly filled, although their monthly data showed progress towards reduced dropout rates. Thus, future studies in related areas should consider assessing data quality of the immunization registers, specific timeline for collecting defaulters' information from defaulter tracing system that would be attributed to reduced dropout rate.

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APPENDICES

Appendix I: Interview Guide

Informed Consent:

Kindly, which language would you prefer?

___ English ___Juba Arabic ___ Muru ____Azande ___ Baka ___ Avokaya Other_____

Title of Study: Effectiveness of Monitoring Mechanisms in reducing immunization dropouts among infants in health facilities of Maridi County, South Sudan

Interviewer reads:

Greetings. My name is_____. I kindly invite you to participate in this study about effectiveness of monitoring mechanisms in reducing immunization dropouts among infants in health facilities of Maridi county, South Sudan. This study is led by Daniel Opinile Mark, Igga herein referred to as student at Amref International University and conducting the study with approval from the National Ministry of Health South Sudan and with support of Amref International University using experts and lecturers referred herein as research supervisors. Here in Maridi, the study is overseen by Amref Health Africa in South Sudan and Maridi County Health Department representing State and National ministries of Health in Western Equatoria State-Yambio

Purpose of study

The study would like to find out the effectiveness of immunization monitoring mechanisms in reducing dropouts that could improve completion of the immunization schedule as per the guidelines of the Republic of South Sudan. Furthermore, the study will assess the

contribution of the boma health initiative, that operates at the community, to improve linking vaccine defaulters to health facilities in Maridi county. The study will also find out familiarity of the health workers on monitoring tools and strategies for reduced immunization dropouts. The study will also findout the use of health facility microplanning strategy for performance of immunization activities in the health facility.

Study procedures

- In case you accepted to participate in this study, the answers you will provide will be confidential. This interview will ask questions about your educational level, gender and marital status. I will also ask about your knowledge and understanding about immunization related activities in your health facility. Time for the interview would last about 30 to 45 minutes.
- The information is collected on this tablet or on the paper will be stored in a secure manner, and the questions' answers will not be connected to you. I don't take your name. Instead, I assign you a number so once so as I finish in your area, no one will be able to identify you, your answers, or your contributions. The interview will be done in a secure place, free from other people.

Alternatives to taking part

You can decide not to take part in this study. "If you choose to take part in the study, you may change your mind at any time and stop taking part. If you decide not to take part, it will not affect your healthcare in any way. If you decide to leave the study, no more information will be collected from you. However, you will not be able to take back the information that has already been collected and shared".

Costs of being in the study

Apart from your time, there is no cost or compensation for being in the study.

Benefits

Your participation in this study will us to understand immunization monitoring activities in your health facility and community served by the health facility and how effective monitoring could reduce missed appointments and dropout rates. In addition, the study will help the county health department to provide mechanisms for improving defaulter tracing that will enable vaccinators and boma health workers in the health facilities will use to reduced defaulters in the Expanded Program on Immunization in Maridi County.

Risks

The risks of taking part in this study are minimal. You may feel uncomfortable about some of the questions we will ask, and you can refuse to answer any specific question.
While I am here talking to you in person, when I take your information, I don't record your name, your address, or any other information that can identify you. This means I am the only person who knows the answers to your questions. I am not allowed to tell anyone who you are or that you participated in the study.

Confidentiality and access to your health information

I will do everything I can to keep your answers confidential. The information I collect from you will be identified by a number, not by your name. Your name will not appear when I share study findings and study data. The results of this study will be released to the public without any identifiers, which will not require your consent. Your name and contact information will not be released outside of the study groups listed unless there is an issue of safety.

Some individuals and organizations protect your rights if you participate in a study. Because of this, they will be able to see the responses to your questions. However, they will not know your name:

- **S**taff members from the University or Ethics Committees overseeing the conduct of this study to ensure that I am protecting your rights as a person taking part in a study, including:
- Lecturers and research supervisors at Amref International University
- the National and Yambio State Ministry of Health and Maridi CHD
- Selected study staff and assistant researchers.

This study has received approval from the South Sudan Ministry of Health Research Ethics Review Board and the Institutional Review Board of Amref International University in Nairobi

Who should you contact if you have questions?

If you would like to have more information about the study, you may contact:
Mr. Daniel Opinile Mark, Igga
email: danielmarkigga@gmail.com
Phone: 0921825525
Dr. Kennedy Muni
Email: maring.muni@gmail.com
Phone: 0922 939 944
Dr. Nzomo Mwita
Email: nzomom@yahoo.com
Phone: +254721 440462
If you have issues related to injuries or other harms, or for questions about the process of agreeing to take part in this study, or for more information about your rights as someone taking part in this study, you may contact:
Cecilia Konga
Research Ethics Review Board
Ministerial Complex

P.O. Box 88

Juba, South Sudan

Phone: 0927 579 099

You may contact the person that leads the study at Amref International University as well.

Her name is Dr. Alice Lakati

email: Alice.Lakati@amref.org

phone: +254722840012

Do you want to ask me anything about the study?

- The survey questions I will be asking?
- The individual interview questionnaires?
- Key Informant interview questionnaires?
- Other

Consent Statement

By answering the question below, you confirm that any questions you had have been answered satisfactorily, and you have been offered a copy of this consent form.

Do you agree to do the interview? 'YES' means that you agree to do the individual interview. 'NO' means that you will NOT do the individual interview.

____Yes _____No

Individual Study number #: _____

Study staff ID number _____

Section A: Demographic characteristics of the respondent

1. What is the name of your health facility?

   _____

2. Supported by: NGO ☐ Government ☐
3. If supported by NGO, which one: _____
4. What is your gender? Male ☐ Female ☐
5. What is your marital Status? Single ☐ Married ☐ Widowed ☐ Divorced/separated ☐
6. What level of education have you completed? None ☐ primary ☐ ☐ Secondary Vocation/Technical ☐ University
7. Are you a member of this community? Yes ☐ No ☐
8. Do you receive mentorship and on-job-training? Yes ☐ No ☐
9. What is your title at work in the facility? Health worker BHW Vaccinator Other

Section B: Use of Immunization monitoring chart at the health facility

10. Which immunization monitoring tool do you most commonly used to identify immunization defaulters and dropouts in the health facility?

    Immunization registers ☐ Tickler file ☐ Defaulter tracing cards ☐

    Immunization monitoring chart ☐ Other ☐

11. Does your health facility have monitoring chart?

    Yes No

12. If yes in Q. 11, write down the cumulative vaccinated data for: Penta-1 = _____ Penta-3 =_____ and Dropout rate: _____

13. Is the monitoring chart updated with the previous month data?

Yes No

14. Why does health facility use immunization monitoring chart?

To plot the performance of penta-1 and penta-3

To determine defaulter rates in the immunization program

To know how many children came for vaccination last year

15. When an infant has come for vaccination session for the first time, which tools will you use to record the information?

Tally sheet

Child health card and defaulter tracing card

Immunization register, child health card and defaulter tracing card

16. How many times in a quarter do you check your immunization performance using monitoring chart?

Three times (3)

Two times (2)

Once a quarter

	Tick in one of the columns according to the statement	TRUE	FALSE	Don't Know
17.	Screening for immunization defaulters when the infant has been brought to the health facility is an important step to monitor vaccination appointments			
18.	Calculating coverage of immunization every month help to identify the gap in vaccination services and help to improve defaulter tracing			
19.	It is important for the health facility vaccinators to monitor the consumption of vaccines to help identify the problem about the antigens not performing well and schedule for community linkage activities			
20.	Stockout of vaccines and supplies in the health facility increase the number of defaulters in the health facility and reduce the coverage as well as performance of immunization programme			
21.	Missed opportunities of vaccination in the health facility cause vaccination gap when mothers go back home, infants are not brought for vaccination which increase defaulters in the community			
22.	Immunization monitoring give information every month to health vaccinators which support efforts to improve defaulter tracing in the community.			
23.	1st dose of Pentavalent is an important indicator to show the number of infants who are able to access vaccination services in the health facility or during outreach activities.			

Section C: Involvement of Boma Health Initiative to improve defaulter tracing

24. Does your facility have boma health workers or community mobilizers attached to the facility?

    Yes No

25. If yes to 21, how many boma health workers and/or community mobilizers does your facility have?

    More than 5 2 to 3 1 None

26. If yes to 21, does the boma health workers and community mobilizers refer infants for vaccination services?

    Yes No

27. Did you receive referral for immunization from the boma health workers or community mobilizers?

    Yes No

28. If yes to 24, what type of immunization referral do you receive from the boma health workers or community mobilizers?

    Defaulters' referral Zero-dose referral Don't know

29. Does the boma health workers or community mobilizers pass information on immunization in the community?

    Yes No Don't Know

30. Does the boma health workers counsel mothers of infants who defaulted to complete vaccination schedule of the child before reaching 1 year?

    Yes No

	Tick in one of the columns according to the statement	TRUE	FALSE	Don't Know
31.	Majority of the referral for immunization from the boma health workers or community mobilizers are zero dose referral that needed to be vaccinated for the first time.			
32.	Majority of the referral for immunization from the boma health workers or community mobilizers are defaulters, infants who did not complete their vaccination appointments or schedule at any stage of the antigens			
33.	Boma health workers or community mobilizers support in passing awareness about completing vaccination schedule in the communities			
34.	Boma health workers or community mobilizers support to gather all the children who have defaulted that was identified in the community for vaccination session during outreach to their area			
35.	Boma health workers or community mobilizers receive list from the vaccinators or health workers indicating children who have defaulted in their area so that they can look for these children and refer them for vaccination services.			

Section D: Defaulter tracing system and immunization activities

36. Does the health facility have defaulter tracing system?

Yes No

37. Does the health facility use defaulter tracing cards to record information of the infant during the vaccination sessions for follow up?

Yes No

38. Why is tickler file as a defaulter tracing system is very important in a health facility?

Check all that apply

To track next visits of infants by month

It is simple and effective to identify defaulters

Children miss their appointments

39. When do you collect information about defaulters from the tickler file?

Daily

Weekly

Monthly

40. Can the tickler file help the vaccinator or health worker to estimate the number of children who are to return back for vaccination in specific month?

Yes No Don't know

	Tick in one of the columns according to the statement	TRUE	FALSE	Don't Know
41.	Presence of tickler file is important in the health facility to ensure that defaulters are tracked and traced in the community and ensure that they receive their vaccination.			
42.	Defaulter tracing system is important in the health facility to reduce the number of infants who did not come on time for the vaccination.			
43.	In place with telephone network, monitoring the tickler file help to call mothers of the infant when they missed their appointment for vaccination quickly.			
44.	When there is not defaulter tracing system in the health facility, a lot of children will not complete their vaccine doses such as penta-3 or measles vaccine.			

45.	To ensure all children vaccinated with BCG or Penta-1 in the health facility complete their vaccination schedule, defaulter tracing card need to be filled for every child and placed into the tickler file for easy tracing.			

Section E: Health facility microplanning to reduce dropouts

46. Does your facility have estimated population for the catchment area of the health facility?

    Yes No

47. If yes in Q.43, what is the estimated population for your catchment area? _____

48. If yes in Q.44, what is the under one year target per month for your facility? _____

49. Does the health facility have documented microplanning that specify the location for outreach, stakeholders in the community, sketch map, and analyzed problem of the local situation on immunization services?

    Yes No

50. When was the last time the health facility microplanning was updated or done?

    Less than 1 year

    1 year ago

    More than 1 year ago

51. Do you know how to use the health facility microplanning document to help reduce defaulters?

    Yes No

52. Using health facility microplanning, the vaccinators and health workers can estimate right quantity of vaccine required for every month to reduce missed opportunities that results into defaulters

    True False Don't know

53. Health facility microplanning map location of the villages with its population for easy estimation of vaccine quantity required before outreach session

    True False Don't know

54. What challenge do you face in using the health facility microplanning to improve your immunization coverage?

_____

Appendix II: Observation Checklist

Section A: Immunization monitoring

1. Check immunization uptake and utilization using the monthly summary report (Record data for infants 0-11 months): Penta-1: _____ Penta-3: _____
2. Is the monitoring chart updated with the data from the monthly summary report? Yes No
3. Check dropout rate as it stands: Penta-1 Cumulative_____ Penta-3: Cumulative_____, Dropout rate: _____
4. Was the monitoring chart plotted correctly? Yes No

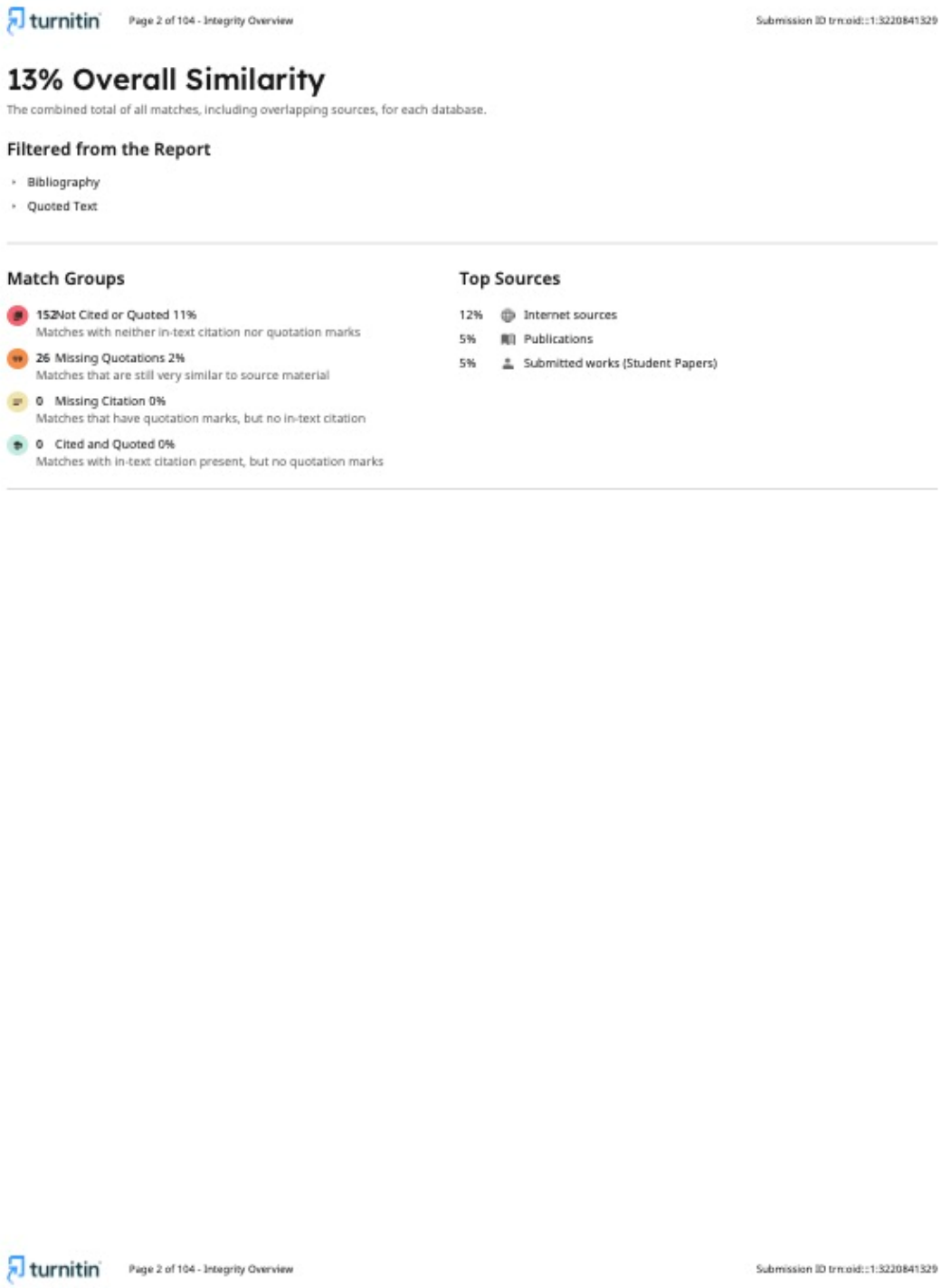
Section B: involvement of boma health initiative

5. Number of mobilizations coordinated by BHI _____
6. Number of Outreach activities planned: _____ conducted: _____ together with BHI
7. Number of infants 0-11 months reached through the BHI mobilization: Penta-1_____ Penta-3: _____

Section C: Immunization registers

8. Were immunization registers filled correctly for the preceding month? Yes No
9. How many infants 0-11 months did not come for subsequent visit for Penta-3: _____
10. Was there an effort by the health workers to link the identified defaulters and trace them? Yes No

Appendix Iii: Similarity Report



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13% Overall Similarity

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- 152 Not Cited or Quoted 11%
  Matches with neither in-text citation nor quotation marks
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Appendix IV: Approval Letter

REPUBLIC OF SOUTH SUDAN

Ministry of Health, Research Ethics Review Board (MOH-RERB), Juba.

Date: 16th OCT, 2023

Protocol No: RERB-P NO:62/2023 **Approval No: MOH/RERB 62/2023**

To: Principal Investigator: Mr.Daniel Opinile (danielmarkigga@gmail.com) Amref University

Title of the Project: Effectiveness of Monitoring Mechanisms in Reducing Immunization Dropouts Among Infant In Health Facilities of Maridi County, South Sudan.

Dear Opinile,

The Ministry of Health Research Ethics Review Board (MOH-RERB) at its regular meetings reviewed your research proposal and has given a favorable ethical opinion for implementation.

The approval was based on the quality of your application form, protocol and supporting documents that complied with the conditions and principles established by the International and national guidelines for carrying out research involving humans as research participants. This approval shall be valid until 30th Dec 2023.

In this regard, you are expected to commence implementation of this research. Please note that the annual report and the request for renewal (if applicable), should be submitted to the MOH-RERB one month before the expiry of the approval time.

The progress report should not exceed five pages. In addition, any serious problem related to implementation of this research protocol should be promptly reported to the MOH-RERB, and any changes to the protocol should not be implemented without the MOH-RERB approval except in instances where such a change is necessary to eliminate or prevent an immediate hazard to the research participants. Note that any information generated from the study should not be published without the consents of the MOH-RERB. We wish you all the best in implementing this research.

Mr. Amanya Jacob Kasio. MPH SMU

Deputy Director Research& Deputy Chairperson MOH-RERB

Ministry of Health, Republic of South Sudan Juba

16 OCT 2023

CC: Director General State Ministry of Health Western Equatoria Yambio–South Sudan
CC: County Health Departments,Maridi County in charge.

Tel: +211920536030 Email: ministryofhealthrerb@gmail.com

Data analysis for reference

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
is the monitoring chart updated with the data from the monthly summary report?	18.613	41	.000	1.238	1.10	1.37
was the monitoring chart plotted correctly?	18.378	41	.000	1.262	1.12	1.40
were immunization registers filled correctly for the preceeding month?	43.000	41	.000	1.024	.98	1.07
was there an effort by HCW to link the identified defaulters and trace them	22.126	41	.000	1.119	1.02	1.22
Dropout rate	9.340	41	.000	.952	.75	1.16

Table 16 T test analysis of semi-structured interview data

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Dropout Rate of the health facility classified	5.491	13	0	1.071	0.65	1.49
Is the monitoring chart updated with previous month data	10.262	13	0	1.286	1.02	1.56
Why facility use Immunization Monitoring chart	3.982	13	0.002	1.429	0.65	2.2

Dropout rate of the health facility as it stands	2.259	13	0.042	7.857	0.34	15.37
Tools to record infants information for first time vaccination session	41	13	0	2.929	2.77	3.08
who support health facility	11.776	13	0	1.143	0.93	1.35
Gender of the respondent	10.67	13	0	1.214	0.97	1.46
Marital Status of the respondent	27	13	0	1.929	1.77	2.08
Educational level of the respondent	13.682	13	0	1.714	1.44	1.98
Monitoring tool used to identify immunization defaulters	6.853	13	0	1.786	1.22	2.35
Health facility have monitoring chart	10.67	13	0	1.214	0.97	1.46
How many times in a quarter do you check performance using monitoring chart	5.967	13	0	1.5	0.96	2.04
Stockout of vaccines and supplies in the health facility increase the number of defaulters in the health facility and reduce coverage	15	13	0	1.071	0.92	1.23
if yes to 24, How many boma health workers	17.737	13	0	2.357	2.07	2.64
if yes to 24, does the boma health workers or community	15	13	0	1.071	0.92	1.23

mobilizers refer infants for vaccination service						
Did you receive referral for immunization from the boma health workers or community mobilizers	11.776	13	0	1.143	0.93	1.35
if yes to 27, what type of immunization referral do you recieve from the boma health workers or community mobilizers	4.941	13	0	1.857	1.05	2.67
Does the boma health workers counsel mothers of infants who defailted to complete vaccination schedule of the child before reaching 1 year	8	13	0	1.143	0.83	1.45
Majority of the referral for immunization from the boma health workers or community mobilizers are zero dose referral that needed to be vaccinated for the first time	12.362	13	0	1.643	1.36	1.93
Majority of the referral for immunization from the boma health workers or	15	13	0	1.071	0.92	1.23

community mobilizers are defaulters, infants who did not complete their vaccination appointments						
Boma health workers or community mobilizers received list from the vaccinators indicating children who defaulted in their area so that they can look for these children and refer them for vaccination services	15	13	0	1.071	0.92	1.23
Does the HF have defaulter tracing system	15	13	0	1.071	0.92	1.23
Does the HF use defaulter tracing cards to record information of the infants during vaccination session for follow up?	11.776	13	0	1.143	0.93	1.35
Why is ticker file as a defaulter tracing system is very important in a health facility?	6.233	13	0	2.786	1.82	3.75
When do you collect information about defaulters from the tickler file?	8.453	13	0	2.071	1.54	2.6

Defaulters tracing system is important in the health facility to reduce the number of infants who did not come on time for the vaccination	11.776	13	0	1.143	0.93	1.35
In place with telephone network, monitoring tickler file help to call mothers of the infants when they missed their appointment for vaccination quickly	11.776	13	0	1.143	0.93	1.35
When there is no defaulter tracing system in the health facility, a lot of children will not complete their vaccine doses such as penta-3 or measles vaccine	10.262	13	0	1.286	1.02	1.56
To ensure all children vaccination with BCG or Penta-1 in the health facility complete their vaccination schedule, defaulter tracing cards need to be filled for every child and placed into the tickler file for easy tracing	15	13	0	1.071	0.92	1.23

if yes in 46, whats the estimated population for your catchment area?	4.941	13	0	5852.571	3293.46	8411.68
if yes in 47, whats the under one year target per month for your facility?	4.048	11	0.002	28.917	13.2	44.64
Does Health facility have documented microplanning that specify the location for outreach, stakeholders, sketch map, analyzed problem for local situation on immunization services	15	13	0	1.071	0.92	1.23
When was the last time the health facility microplanning was updated or done?	5.828	13	0	1.286	0.81	1.76
Do you know how to use the health facility microlanning document to help reduce defaulters?	15	13	0	1.071	0.92	1.23
Health Facility Microplanning map location of the villages with its population for easy estimation ofo vaccine quantity required	15	13	0	1.071	0.92	1.23

before outreach session						

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Is the monitoring chart updated with previous month data	Between Groups	2.000	2	1.000	12.833	.001
	Within Groups	.857	11	.078		
	Total	2.857	13			
Does the HF have defaulter tracing system	Between Groups	.071	2	.036	.458	.644
	Within Groups	.857	11	.078		
	Total	.929	13			
Did you receive referral for immunization from the boma health workers or community mobilizers	Between Groups	.714	2	.357	3.929	.052
	Within Groups	1.000	11	.091		
	Total	1.714	13			
When was the last time the health facility microplanning was updated or done?	Between Groups	4.190	2	2.095	4.939	.029
	Within Groups	4.667	11	.424		
	Total	8.857	13			

Is the monitoring chart updated with previous month data * Dropout Rate of the health facility classified

Crosstab

Count

		Dropout Rate of the health facility classified			
		No Monitoring Chart	Less than 10%	More than 10%	Total
Is the monitoring chart updated with previous month data	yes	0	6	4	10
	No	3	1	0	4
Total		3	7	4	14

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.800[a]	2	.007
Likelihood Ratio	11.010	2	.004
Linear-by-Linear Association	7.090	1	.008
McNemar-Bowker Test	.	.	.[b]
N of Valid Cases	14		

a. 5 cells (83.3%) have expected count less than 5. The minimum expected count is .86.

b. Computed only for a PxP table, where P must be greater than 1.

Did you receive referral for immunization from the boma health workers or community mobilizers * Dropout Rate of the health facility classified

Crosstab

Count

		Dropout Rate of the health facility classified			
		No Monitoring Chart	Less than 10%	More than 10%	Total
Did you receive referral for immunization from the boma health workers or community mobilizers	yes	3	7	2	12
	No	0	0	2	2
Total		3	7	4	14

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.833[a]	2	.054
Likelihood Ratio	5.938	2	.051
Linear-by-Linear Association	3.775	1	.052
McNemar-Bowker Test	.	.	.[b]
N of Valid Cases	14		

a. 5 cells (83.3%) have expected count less than 5. The minimum expected count is .43.

b. Computed only for a PxP table, where P must be greater than 1.

was there an effort by HCW to link the identified defaulters and trace them * Dropout rate

Crosstab

Count

		Dropout rate			
		No Monitoring chart	Less than 10%	More than 10%	Total
was there an effort by HCW to link the identified defaulters and trace them	yes	9	24	4	37
	no	1	0	4	5
Total		10	24	8	42

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.348[a]	2	<.001
Likelihood Ratio	13.070	2	.001
Linear-by-Linear Association	5.451	1	.020
McNemar-Bowker Test	.	.	.[b]
N of Valid Cases	42		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .95.

b. Computed only for a PxP table, where P must be greater than 1.

is the monitoring chart updated with the data from the monthly summary report? * Dropout rate

Crosstab

Count

		Dropout rate			
		No Monitoring chart	Less than 10%	More than 10%	Total
is the monitoring chart updated with the data from the monthly summary report?	yes	0	24	8	32
	no	10	0	0	10
Total		10	24	8	42

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	42.000[a]	2	<.001
Likelihood Ratio	46.105	2	<.001
Linear-by-Linear Association	27.261	1	<.001
McNemar-Bowker Test	.	.	.[b]
N of Valid Cases	42		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.90.

b. Computed only for a PxP table, where P must be greater than 1.