EVALUATION OF THE DIRECT HEALTH FACILITY FINANCING PROGRAM IN IMPROVING MATERNAL HEALTH SERVICES IN PANGANI DISTRICT, TANZANIA

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ABSTRACT

Maternal morbidity and mortality remain significant public health concerns globally, with Tanzania reporting 524 deaths per 100 000 live births annually in 2022. While national level data provide some insights into the issue, a focus on sub-national levels is required because of differences in contexts such as rural-urban disparities in maternal mortality. This study examined Direct Health Facility Financing (DHFF) and its effects on the quality of maternal health services in Pangani, a rural district in Tanzania. The study used qualitative and quantitative methods. Direct disbursement of funds from the central government through the Ministry of Finance and Planning to the primary health facilities reduced delays in procurement, improved community outreach services, and improved community leaders' engagements. Deliveries occurring at health facilities increased by 33.6% ($p<0.001$) one year after the DHFF implementation. Various medicines, delivery kits, and some reagents increased significantly ($p<0.05$). However, unavailability of computers and poor internet connectivity, insufficient supply of medical equipment and stock out at Medical Stores Department increased the difficulty of obtaining the missed items from the selected prime vendor. Overall, this study shows a positive impact of the DHFF on maternal health service delivery in Pangani district. Specifically, increase in the number of medical supplies, equipment, and reagents necessary to provide maternal health services contributed to the observed increase in facility deliveries by a third. Moreover, the system minimizes unnecessary delays in the procurement processes of required drugs, supplies, and other facility reagents. To maximize the impact of the DHFF system, unavailability of computers, unstable internet, limited knowledge of the staff about the system, and inadequate health workforce should be addressed. Furthermore, training could include refreshers models on DHFF implementation.

Keywords

Health Financing, Direct Health Facility Financing, Health Governing Committee, Maternal Health, Quality of Care, Tanzania.

DECLARATION

I, Samwel Marco Tukay do declare to the Senate of Nelson Mandela Africa Institution of Science and Technology that this dissertation is my own original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

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The Above declaration is confirmed by:

Prof. Fatuma Manzi

Name and Signature of Supervisor 1 Date

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CERTIFICATION

The undersigned certify that have read and hereby recommend for acceptance by the Senate of the Nelson Mandela African Institution of Science and Technology, the dissertation titled *"Evaluation of the Direct Health Facility Financing Program in Improving Maternal Health Services in Pangani District, Tanzania"* in Partial Fulfillment of the Requirements for the Award of the Master of Science in Public Health Research of the Nelson Mandela African Institution of Science and Technology.

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DEDICATION

I dedicate this dissertation to my family and all persons who in one way or another contributed to making this work possible.

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LIST OF ABBREVIATIONS AND SYMBOLS

BP	Blood Pressure
CHF	Community Health Fund
CHMT	Council Health Management Team
CI	Confidence Intervals
DHFF	Direct Health Facility Financing
DMO	District Medical Officer
DNO	District Nursing Officer
FGDs	Focus Group Discussions
HC	Health Centre
HCW	Health Care Workers
HIV	Human Immunodeficiency Virus
IDIs	In-depth Interviews
LMICs	Low and Middle-income Countries
MMR	Maternal mortality ratio
MoHCDEC	Ministry of Health, Community Development, Gender, Elderly and Children
MSD	Medical Store Department
MFA	Ministry of Foreign Affairs of the People's Republic of China
NHIF	National Health Insurance Fund
SP	Sulfadoxine – pyrimethamine
STV DEV	Standard Deviation
WHO	World Health Organization
WRA	White Ribbon Alliance

CHAPTER ONE

INTRODUCTION

1.1 Background of the Problem

Maternal mortality remains a public health concern, about 303 000 maternal death was reported in 2015 globally (Alkema *et al.,* 2016; Chitando, 2007; Kuruvilla *et al.,* 2016; WHO *et al.,* 2015). Each day, about 830 women were reported to die from pregnancy or childbirth-related complications (WHO, 2018). In low and middle-income countries (LMICs) including Tanzania the maternal mortality is high (WHO *et al.*, 2015). The key contributing reasons for such high mortality include obstetrics complications, diabetes, hypertension, malaria and syphilis (Lawn *et al.*, 2016). It was recommended that vital mechanisms for antenatal care is important to early detection of several pregnancy risks, including hypertension, pre-eclampsia, nutritional deficiencies, anaemia and infections (Tunçal *et al.,* 2017; WHO, 2014). A lot of efforts have been done globally to improve maternal health, however, it is only a 44% reduction (WHO, 2015c).

In Tanzania maternal mortality ratio (MMR) is high at 524 deaths per 100 000 live births in 2022 (Kaaya *et al.,* 2021; Konje *et al.,* 2022). The major cause of maternal mortality includes maternal haemorrhage, maternal sepsis, and other pregnancy-related infections, hypertensive disorders of pregnancy, obstructed labour, abortion, other direct maternal disorders, indirect maternal disorders and HIV (Kassebaum *et al.,* 2014). Good maternal health services delivery requires money for staff, drugs, medical supplies and food (Borghi *et al.,* 2006).

Experience from Kenya shows that direct facility funding can be implemented successfully at primary facilities such as health centres and dispensaries by providing a mechanism to transfer funds to the periphery of the health system (Opwora *et al.,* 2010).

Since independence, various health financing reforms in Tanzania have been introduced to tackle maternal and other health-related problems (Mtei *et al.,* 2007). According to Mtei *et al.* (2007), these reforms were introduced in the late 1960s that included free health care provision for all; the Arusha declaration of 1967; decentralization of 1972, abolition of private for-profit medical practice in 1977; the year 1993 introduction of free health care provision in primary facility and user fees in Grade I and II; In 1994 cost-sharing in all facilities; introduction of user fees in Grades III; Revision of user fees scheme and differentiation of user fees at Grades I, II and III. Other reforms included the introduction of Community health fund (CHF) in 1996 in Igunga as a pilot

area; formulation of NHIF in 1999 for civil servants; official implementation of CHF aimed at informal rural sector; direct health facility financing (Mtei *et al.,* 2007).

Since 1994/95, during the multi-party era, Tanzania government had undergone health sector reforms with the goals of improving health care services for its citizens and the initiatives have improved a number of management and, service delivery and leading to reduction of morbidity and mortality in the country (Møgedal *et al.,* 1995; Opwora *et al.,* 2010). In general, the government is committed to delivering fair, equitable and quality health services to all Tanzanians in line with Universal Health Coverage (Ministry of Health, Community Development, Gender, Elderly and Children [MoHCDEC], 2016).

The previous health financing approach of Decentralization by Devolution (D by D) was officially launched in 1999, whereby the funds were provided by the ministry to the District Medical Officer, rather than directly to the health facility in-charge (MoHCDEC, 2016). This system of decentralization had challenges of delays in terms of fund disbursements from the district medical officer to the primary health care facility level. That compromised the decision and administrative power of facility in charges as they had to wait for funds from the District Medical Officer (DMO) office and instructions on how to use such funds (MoHCDEC, 2017; MoHCDEC, 2016). Until 2017, the policy amendment was done and Direct Health Facility Financing (DHFF) policy was introduced (MoHCDEC, 2017). The goal of DHFF is to decentralize powers to primary health care in-charges where funds are channelled directly to health facility bank accounts and not through the DMO as previously done for the purpose of improving health care services (MoHCDEC, 2016). Council Health Service Boards and health facility governing committees are responsible for planning, budgeting and implementation of DHFF activities (MoHCDEC, 2017). This arrangement is very useful as it helps with the management of the DHFF and brings about community engagement and improves ownership.

1.2 Statement of the Problem

Tanzanian government initially used to allocate health budget direct to District Medical Officers offices that they were responsible to send money down to the primary health care facility level. This approach created a lot of challenges as the facility in charge has to wait for the DMO office to take action. Many times, there were delays that impacted negatively on the delivery of health services including those for vulnerable women. In February 2018 Direct Health Facility Funding system was officially launched by the Tanzanian government for the purpose of decentralizing powers to primary health care facility in-charges for the purpose of improving ownership among

community and enhance primary health care creativity and innovation through the operationalization by health facility governing committee that included members from the community (Ministry of Health, Community Development and Gender, 2015). This approach is expected to reduce a lot of existing bureaucracy with the previous approach. It is almost two years now after the introduction of DHFF and there has not been any thorough assessment of its effects on health delivery in the country. In this study specifically, we aimed to evaluate the impact of direct health facility financing (DHFF) on the perception of quality of services provided for maternal health care.

1.3 Rationale of the Study

It is five years now after the introduction of DHFF, there has not been any thorough assessment of the effect that has been done in Pangani. Specifically, to evaluate on the quality of services provided for maternal health care that has bearing on their health improvements. This study was set to evaluate early experiences of DHFF and document the implementation success, challenges and the effects on the facility health system with regards to the quality of services for maternal health care.

1.4 Objective of the Study

1.4.1 General Objectives

The main objective of the study was to assess maternal health services outcomes after the introduction of direct health facility financing in the Pangani District.

1.4.2 Specific Objectives

The present study had the following specific objectives:

(i) To assess the DHFF system's success and challenges in the provision of maternal health services.

(ii) To assess the involvement level of health care workers and health governing committee members in maternal health services before and after the introduction of DHFF.

(iii) To determine the availability of equipment, drugs, and supply necessary for the provision of maternal health services before and after the introduction of DHFF.

(iv) To assess the quality of care provided for maternal health after the introduction of DHFF.

1.5 Research Questions

Present study addressed the following research questions:

(i) What are the DHFF system success and challenges in the provision of maternal health services?

(ii) To what extent health care workers and health governing committee members are involved in maternal health services before and after the introduction of DHFF?

(iii) What is the status of equipment, drugs, and supply necessary for the provision of maternal health services before and after the introduction of DHFF?

(iv) What is the outcome on the quality of care provided for maternal health after the introduction of DHFF?

1.6 Significance of the Study

This will help to improve the current DHFF policy implementation in improving maternal health and population health in general. The findings from this study will contribute to informing the fine-tuning of the current health financing approach towards improving the health services in the country.

1.7 Delineation of the Study

This study was conducted in Pangani district of Tanga region in Tanzania. The study used qualitative and quantitative methods. Qualitative data comprised in-depth interviews with the council health management teams, facility in charges, maternity nurse in charge, and focus group discussions with community health governing committee members. Quantitative data were the number of deliveries occurred in health facilities, medical supplies, equipment, and reagents. The descriptive analysis was conducted and compered before and after the DHFF implementation.

A couple of limitations of this study are worthy highlighting. The contribution of the DHFF on maternal health was assessed in one year. This may be too short a period of time to adequately capture its contribution, which, possibly, is why we could not see adequate improvements in equipment. This study was also limited by the lack of adjustment of confounding variables among the women who delivered before and after the DHFF implementation. However, the study was representative of various health facility levels in Tanzania, hence providing a holistic picture of the functionality of the DHFF.

CHAPTER TWO

LITERATURE REVIEW

2.1 Key Concepts and Meaning

Access to maternal health care is a critical component of Universal Health Care (UHC). Lack of access to maternal health care affects women, their families, communities, and nations at large (McGowan, 2018). According to World Health Organization (WHO, 2018), Universal health coverage has been defined as ensuring that all people have access to needed health services (including prevention, promotion, treatment, rehabilitation, and palliation), of sufficient quality to be effective while also ensuring that the use of these services does not expose the user to the financial hardship. Good maternal health care quality is important for preventing and reducing possible causes of obstetric complications and preventing stillbirths as well as maternal and new born deaths (Tunçalp *et al.*, 2017). Thus, getting facilities ready with required supplies, drugs and equipment is a necessity so as to provide the required care to each individual woman when they visit during antenatal, delivery and postnatal.

Kamath and Jense (2010) defined Health care financing system as a process by which revenues are collected from primary and secondary sources, indirect and direct taxes, donor funding, co-payment, voluntary prepayments, mandatory prepayment, which is accumulated in fund pools in such a way to share risk across large population groups and using the revenues to purchase goods and services from public and private providers for identified needs of the population (Goodman *et al.*, 2010). Thus, the presence of sound financing mechanisms for health for a country paves a way to protect various population groups against catastrophic expenditures.

Karanikolos *et al.* (2013) and Thomson *et al.* (2009) stipulated that government financing of health care services is fundamental to achieving universal health coverage for many countries. Literature shows that a nation can develop quickly in health and attain sustainable development by deploying a multi-sectorial approach whereby a combined action is applied within the health sector, social economic and environmental sectors (Kuruvilla *et al.*, 2016). For example, the Chinese government managed to reduce poverty for approximately 439 million people between 1990 and 2015 that led to decreased maternal mortality by more than 80% and 72% respectively (Ministry of Foreigh Afairs-China [MFA] & United Nations Development Programme [UNDP], 2015; World Health organization [WHO], 2015c).

A recent report from the WHO states that since 2001, only 26 countries managed to increase their total budget spending on health. Surprisingly, Tanzania has achieved the Abuja Declaration target of at least 15% in which other African union countries still struggle to achieve and face financial support challenges whereby they need to encourage more donors to support their health sectors (WHO, 2016). The issue of primary health care facilities financing in most of the African countries is at crossroads as resources for health are limited and elimination of user fee policies have been poorly implemented with no alternative sources of facility income (McIntyre *et al.,* 2005).

Since independence in 1961 to date, Tanzania government has made efforts to provide quality and affordable health care services for its citizens by allocating resources through taxation and some out of pocket user fees like other African countries (Mills *et al.,* 2012). Over the past two decades, the growth rate of the Tanzanian population doubled in size, which means that there is a need for doubling health and social services and health-care financing (Afnan-Holmes *et al.,* 2015). The government subsidized the cost of accessing medical services and introduced a health financing system that played a big role in supporting the elimination of maternity and delivery related fees (Thomson *et al.,* 2009). Experiences from Tanzania and Zambia show that there is a close positive association between good health service delivery outcomes and good governance of public finance (Piatti-Fünfkirchen & Schneider, 2018). Direct health facility financing comes at the right time, not only to improve the accessibility of service but also improved the quality of maternal health services and overall service provision. The study conducted by Opwora *et al.* (2010) shows that introduction of direct facility funds (DFF) had inspired health care workers to work well compared to the era prior to DFF when the supply of funds was unreliable and planning for health services was very challenging. The authors argued that DHFF made it easier for health workers to plan for their activities as they could manage to forecast their budget requirements. Also, health workers established stress-free means to perform their work because of the support from the other staff (Opwora *et al.,* 2010). Thus, an improved management system needed to be in place to realize optimal financial management for better service provision.

A call for more financial resources to support maternal health services is of paramount importance in Tanzania. This is because drug availability, medical supplies, referral systems, community access to medical insurance schemes and informal payments at health facilities remain a challenge. There are still big emerging variations between urban and rural areas in MMR in and across regions. The quality of maternal health services provided at urban health facilities seems to be of higher quality as compared to rural health facilities (Shabani *et al.,* 2018). Maternal health equipment in most of the primary health facilities for assisting safe delivery is not enough and those present were not in

good condition to perform the required task, others were out dated and needed to be replaced (Macdonald *et al.,* 2018; Mkoka *et al.,* 2015; Thomson *et al.,* 2009). Other studies revealed that after the introduction of comprehensive emergency obstetric and new-born care services in Tanzania from 2009 to 2014 the number of health facilities deliveries increased in all upgraded rural health centres. The mean numbers of monthly deliveries increased by 151% and obstetric referrals were reduced from 9% to 3% (Nyamtema *et al.,* 2016).

The DHFF emphasis not only in accessibility of service but also improved quality of maternal health services and overall service provision. Therefore, the current study was set to confirm if the expectations were realized and thus evaluated early experiences of the impact of DHFF on the provision of services for women during pregnancy, delivery and postnatal.

2.2 Theoretical Review

For the purpose of understanding DHFF implementation achievement, this study utilizes Theory of Change (ToC) program model to evaluate the progress made by DHFF during its implementation phase (Daruwalla *et al.,* 2019; Lalli *et al.,* 2018). A reason for selecting this type of model is to enable to establish causal and effect pathway relationship which will help us to determine the trend and progress of DHFF interventions. In order to determine program achievement, we will evaluate the trend of facility deliveries, availability of essential drugs medical equipment and reagents for maternal health by making a comparison before and after the intervention. The program's success also will also be measured by analysing narratives on how facility staff and the community health governing committee members were involved in facility decision making and how they effectively managed to achieve implementation of facility annual plans.

2.3 Empirical Literature Review

The study by Akazili *et al.* (2012) showed that the health care financing system is developing gradually by imposing a lower tax rate for their citizens to support health system implementations where personal income tax is progressive and National Health Insurance contributions by the informal sector are regressive. In comparison with DHFF in Tanzania that has a pro-poor outlook while the study from Ghana fever high-income earners.

An increase in direct payments by people to reduce the government’s share, failure to cover insurance for the entire population and difficulties in identifying people from low-income groups and not setting rules for exempting them from taxes are the factors affecting a country’s failure to establish equity in financing the health system (Rostampour & Nosratnejad, 2020).

Other studies in assessing income redistributive effects of health financing include the Zambia's experience. It showed to have progressive achievement in health care financing and led to reductions in income inequality. It also expressed to have positive association between financing health services and reduced income inequality but it called for the government to review the health policy and invest more resources (Mulenga & Ataguba, 2017).

Kenya was the earliest country in the East African country to implement the DHFF system in its health facilities. Experience from this country showed that the scheme was implemented well and provided positive effects on quality of care and service utilization. It was documented that about 62% of all direct facility funding was reported to be important at the dispensary level which is the primary level for health services delivery to the community. Also, the study showed positive results in terms of increased sovereignty by health workers and improvements in governance and accountability (Opwora *et al.*, 2009).

The direct and explicit government injection of resources for health service delivery is an essential vehicle towards universal health coverage (UHC), improving equity, health outcomes, and financial well-being (Wang *et al.*, 2018). The DHFF is thus pro-poor as the resources are given to lower health facilities, directly servicing the needy population in rural areas.

Economic growth increases countries' capabilities to increase the share of the health budget and the likelihood to invest in the health sector for quality care (Moucheraud *et al.*, 2016; Piatti-fünfkirchen *et al.*, 2018). As other countries in eastern and southern Africa, Tanzania has documented a rise in the gross domestic product, and there has been achievements in health system-related investments (Moyo *et al.*, 2012). The recently shift of Tanzania from low to middle-income level due to its economic growth, is expected to leap more towards poverty reduction, good governance, and leadership to stimulate action towards provision and utilization of quality health services (Moyo *et al.*, 2012). This is necessary for the country to attain UHC and meet the SDGs related to women's and children's health.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study Area

Pangani District is in the southern part of Tanga region, extending from 5° 15" S of the Equator to 6°S and from 38° 35" E to 39° 00" East of Greenwich meridian. The main social-economic activities of Pangani residents are cultivation of cash and food crops, livestock and poultry keeping, fishing and small-scale industries (Pangani District profile, 2018). The maps below illustrate the study area from the Pangani District profile 2018.

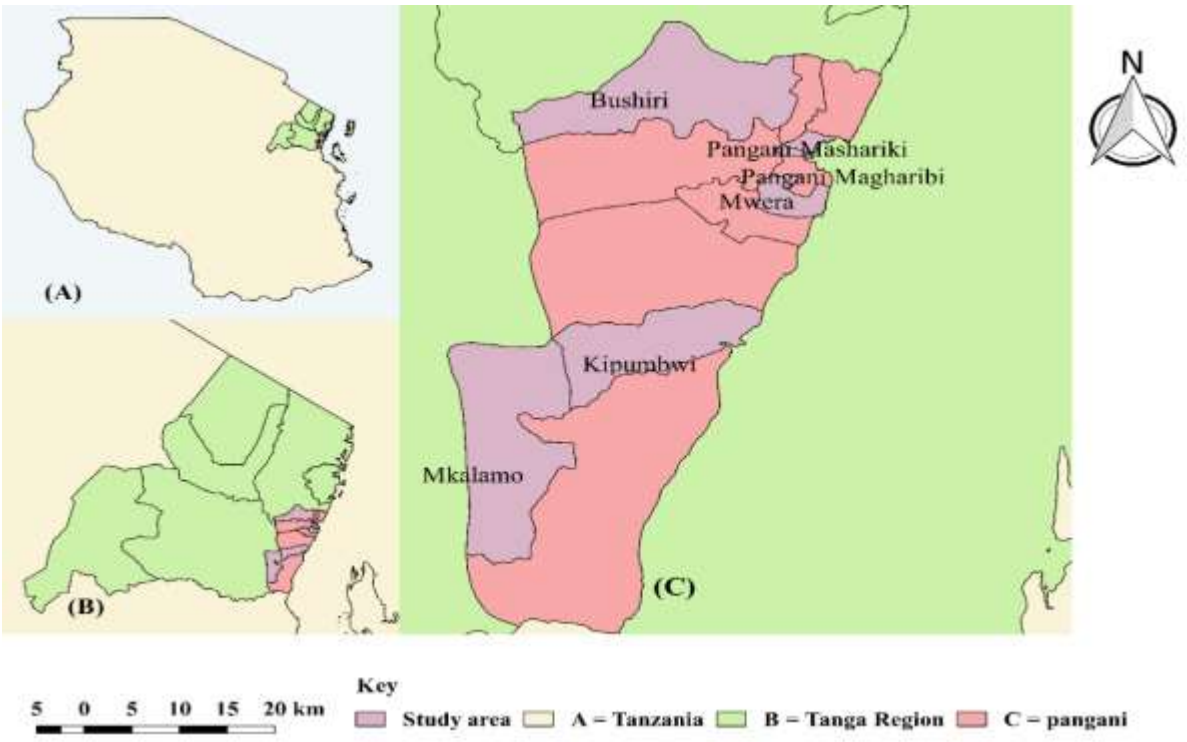

Figure 1: Map Showing the Study Area

3.2 Study Population

According to the census report (2012), Pangani Districts had a total population of 54 025 persons. The distribution of sex per district includes 26 870 males which account for 49.73% and 27 155 females which account for 50.27%. The average household size was approximated to be 4 persons and the average population density in the district was 24 persons per sq. km and about 21% of the population live in the urban centre.

3.3 Study Design

This is a mixed methods study involving a before-after cross sectional study design. The study deployed qualitative (in-depth interviews IDIs and Focus Group Discussion FGDs) and quantitative (survey where data were extracted from registers) methods aimed to assess maternal health services outcomes comparing period before and after the introduction of DHFF. The IDIs were intended to capture individual perspectives about the subject matter while FGDs aimed to collect group perspectives about the phenomena. In order to come up with meaningful comparisons of the findings, the study used data of two financial years: Year 2016/17 as a source of baseline data before the introduction of DHFF and financial year 2017/18 after the intervention.

3.4 Sampling

The study used a purposive sampling approach with stratification to select participants from Pangani district hospital Mwera health centre and three dispensaries which were Masaika, Kwakibuyu, and Mkalamo. A reason for selecting these facilities was to have representation of different levels of services provision available at district level (hospital, health centre and dispensary). Also, the selected facilities had high volume of deliveries as compared with the rest within the district for their specific levels. The selection of these facilities enabled us to access a substantial amount of information related to our study objectives.

3.5 Data Collection Methods

Data collection procedures for both quantitative and qualitative data involved visiting each study facility and meeting all key participants and key informants to capture information relevant to the study objectives. This was consistent with the principles for process evaluation and mixed methods research.

3.5.1 Quantitative Data Collection

Data were collected from five (5) health facilities namely, Pangani district hospital, Mwera health centre, and three dispensaries: Masaika, Kwakibuyu, and Mkalamo to assess changes over time from facility registry for 2016/2017 as a baseline year before the introduction of DHFF and 2017/2018 as follow-up year after the DHFF intervention was implemented. At each facility, the study extracted retrospective information from the health facilities' information system books: book number 4 - ledger book, book number 6 - antenatal care register, book number 12 - labours, and delivery book, and book number 13 - postnatal register. Data was also extracted from the

facility health management information system registry. The variables recorded were services provided for maternal health, medical equipment, maternal drugs, and maternal medical reagents. Health-care workers and health governing committee members from each study facility were interviewed based on their experiences before and after introduction of DHFF to describe changes over time.

3.5.2 Quantitative Data Analysis

The quantitative data aimed to compare births occurred at health facilities before and after the DHFF intervention. Data were collected to assess changes over time from facility registry. Data analysis was done descriptively using Stata (version 12) statistical software. The number of deliveries and those of different medical supplies, equipment, and reagents were compared before and after DHFF implementation using two-sample test of proportions. We calculated confidence interval and used it to decide the statistical significance of the variables of interest.

3.5.3 Qualitative Data Collection

Data were collected by interviewing the key informants, through in-depth interviews and focus group discussions (FGDs) and guided by the Consolidated Criteria for Reporting Qualitative Research (COREQ). The 16 In-depth Interviews (IDIs) with health care workers and 5 Focus Group Discussions (FGDs) which comprised 8 – 12 participants. The participants where community health governing committee members from each facility were conducted. The principal investigator (i.e., Samwel Tukay) used a guiding tool during the collection of qualitative data. There was no prior relationship between the participants and the research team. The investigator took notes during IDIs, and FGDs sessions and all sessions were audio-recorded to facilitate transcription of the information. Digital recordings of interviews were made and transcribed in Kiswahili and then translated to English. The study used digital voice recorder, pen, pencils, and notebooks to capture participants' information and critical issues to answer research objectives. All the audio interviews were transported from the audio recorders to the laptop for further processing. All the interviews were transcribed word for word by the researcher. After transcription, all the transcripts were cross-checked in relation to the audio recording to ensure all the information have been captured correctly as it is in the audio without omission of any information. All the correct transcripts were then translated from Swahili to English by an experienced translator and all the translated transcripts were also checked for clarity before analysis.

The reason why we have conducted qualitative part of our study is to explore the reality of DHFF system implementation success and challenges direct from primary health facilities.

Participants were informed and consented to the publication of anonymized responses. Data collection tools were piloted for five days by the research team in Bagamoyo district. The district was selected for the pilot survey because it is similar in characteristics with Pangani district where the actual study was conducted. All challenges and observations noted during the pilot survey were addressed before the actual field data collection.

3.5.4 Qualitative Data Analysis

Data analysis was undertaken using framework analysis. We grouped relevant themes that answer key issues as per study objectives and the related themes where taken. Coded data were reviewed, organized into tables according to research themes focusing on the study objectives and issues emerging from the interviews. Transcripts were managed and coded in Excel by using a framework analysis approach and group all relevant themes that answer key issues as per study objectives (Tadele *et al.*, 2020). Coded data were reviewed, organized into charts according to research themes focusing on the study objectives and emerging issues from the interviews.

During the development of the questionnaire and interview guide, different steps were taken as stated below:

(i) Reviewing the hypothesis and clear understanding of the objectives of the study.

(ii) Assessing the relevance of the methods in relation to the problem

(iii) Nature of the data needed.

(iv) Identification of appropriate respondents.

(v) Development of data collection tools. At this step, we also considered the use of language that was familiar to the respondent, the use of simple words that held the same meaning as the respondent's, avoiding jargon, and minimizing long questions.

(vi) Determine the relationship of the questions according to the different subtopics

(vii) Prepare the interview guide/questionnaire for pre-testing.

3.6 Hypothesis

H_o: Mean difference in deliveries before DHFF 2016/17 and after the introduction of DHFF 2017/18 is not different from zero.

H_a: The mean difference in deliveries before and after the introduction of DHFF is the difference from zero. ($P<0.05$ or $P<0.001$) Reject the H_o and $P> 0.05$ failed to reject the H_o

3.7 Data Collection Process and Statistical Analysis

We collected quantitative data on a quarterly basis to see changes over time from the facility registry. Health care workers and community health governing committee members were interviewed to capture their views regarding the pre-intervention compared with the intervention period. Exit interviews were conducted with women beneficiaries from each study facility to document their experiences of services received. Qualitative data were collected using material such as digital tape recorder, pen, pencils, and notebooks. We opted to use these techniques to capture participant's information as well as keys issues to answer our research objectives.

During data transcriptions, the digital recording of interviews was transcribed in Swahili and then selected quotes were translated to English. We extracted quantitative data from Health facilities Information System books where variables were recorded such as services provided, medical equipment, maternal drugs, and maternal medical reagent. We performed this test using STATA 12 College Station Texas. We extracted confidence interval obtained from the test and used them to make the decision on the statistical significance of the variables of interest.

3.8 Conceptual Framework

A reason for presenting this framework was to explore concepts, assumptions, expectations, beliefs of health care workers and community health governing committee members and theories that supporting and informs the DHFF system implementation at rural primary health facilities in Tanzania.

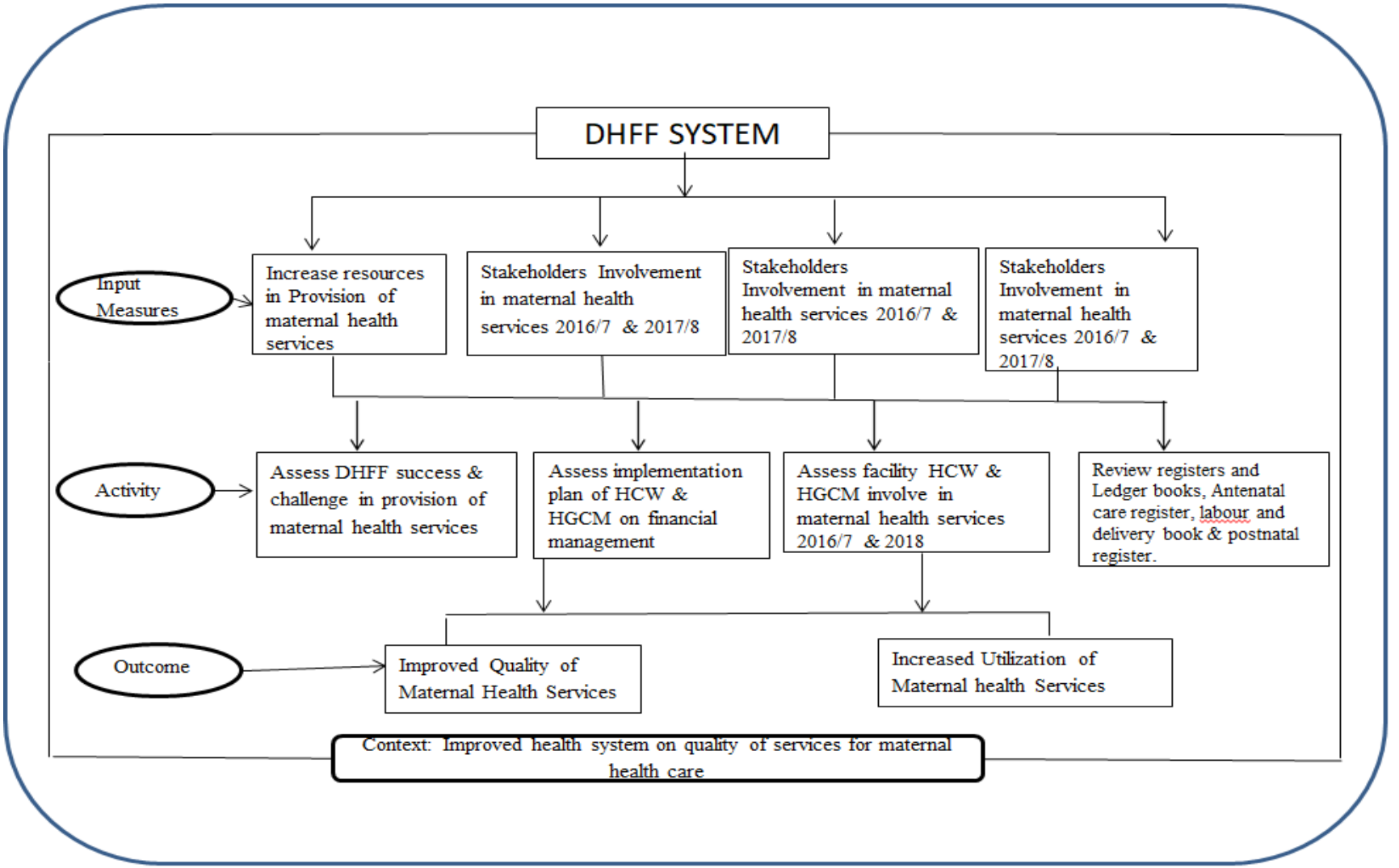

Figure 2: Conceptual Framework

3.8.1 Detailed Research Framework

Table 1: Research Framework

Research Objective	Methodology	Activity	Outcome Measure
To assess the DHFF system success and challenges in the provision of maternal health services	IDIs with CHMT and health care workers and FGDs with health governing committee members	To assess the success and challenges of the implementation plan and financial management (skills and knowledge of health care workers and health governing committee members) on financial management and procurement system. Also, to explore successes that has been documented and challenges encountered.	Number of deliveries occurring at health facilities, availability of drugs, medical supplies, and medical reagents necessary for maternal health services.
To assess the involvement level of health care workers and health governing committee members in maternal health services before and after the introduction of DHFF	IDIs with CHMT and health care workers and FGDs with health governing committee members	Observe the meeting minutes in budget planning and their involvement in the implementation of the budget for maternal health	Involvement of health-care workers and Health governing committee members in all decision-making stages. E.g. planning, budgeting, and purchasing of drugs, medical supplies, and medical reagents
To observe the availability of equipment, drugs, and supply necessary for the provision of maternal health services before and after the introduction of DHFF.	Review of document/ medical records and register books	Review registers like Ledger book, Antenatal care register, labour and delivery book and Postnatal register in each study facilities to know availability of supplies, drugs and equipment's related to antenatal and post-natal services including blood pressure monitoring, urine, and blood testing, the trend flow and availability of essential medicine and medical equipment necessary for provision of maternal health from facility medical store records and making In-depth interview with district pharmacist and facility in charge. (1. Medical equipment = Bp machine, Weighing scale, Fetoscope, Delivery kit. 2. Medicine = Folic acid and Iron supplement, Magnesium sulphate, SP and urine dipstick for protein). This covers 2017 and 2018 which is a year before and after the introduction of DHFF.	Improvement of maternal health services availability indicators. This included more equipment's and supplies
To assess the quality of care provided for maternal health after the introduction of DHFF.	Exit interview with women	Women experience of care	Improvement of maternal health indicators. Documented services received and positive experiences of care.

3.9 Ethical Considerations

Ethical clearance was obtained from the Ifakara Health Institute Review Board (IHI - IRB) review board with reference number IHI/IRB/No: 01-2019 in the eastern zone. An information sheet about the study was drawn up in Swahili, explaining why it was being carried out, by whom and what it

involved. Respondents were asked if they had any questions and whether they agreed to take part in the study. Written consent of all respondents was obtained. Confidentiality for all study participants was assured by informing them that all personal information taken will be stored safely under using password accessed only by principal Investigator to avoid leakage. No report or publication will show the names of the study participants. Responsible district authorities (Pangani) were informed before to ensure their support and intervention on likely drawbacks.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

In this Chapter, we present our findings from the study as stated in our research objectives.

4.1.1 Findings on the Effects of Direct Health Facility Financing

(i) Direct Health Facility Financing System Success in the Provision of Maternal Health Services

The findings showed a positive impact on the number of pregnant women attending health facilities for delivery services compared with the situation before the introduction of DHFF as described in Table 2.

Table 2: Status of Facility Deliveries before and After the Direct Health Facility Financing Implementation in Pangani District

Facility name	Number of deliveries before the DHFF implementation	Number of deliveries one (1) year following the DHFF implementation	Change in the number of deliveries	P-value
	A (2016/17)	B (2017/18)	B - A	
District Hospital	875	1,108	233 (26.6%)	<0.001
Mwera Health Centre	124	240	116 (93.5%)	<0.001
Masaika Dispensary	38	42	4 (10.5%)	0.045
Kwakibuyu Dispensary	40	62	22 (55.0%)	<0.001
Mkalamo Dispensary	112	137	25 (22.3%)	<0.001
All facilities (total)	**1189**	**1589**	**400 (33.6%)**	**<0.001**

Notes: "A" represents financial year 2016/17 and "B" represents financial year 2017/18. P-value <0.05 indicates that the difference is statistically significant

Source: District Health Management Information System Registry

(ii) Direct Health Facility Financing Challenge in the Provision of Maternal Health Services

In Pangani district sometimes funds to implement health facility planning are not received on time from the ministry of finance.

> *For example, other charges (OC) to supplement health facility budget these results to un necessaries delaying in implementation of some facilities operations* (CHMT Member, IDIs).

Allocated basket fund budgeted celling in most of the health facilities were not enough to run all facility activities (Health facility in-charge, IDI).

In these parts, we also assess the way DHFF infrastructure if was capable to support the implementation mechanisms of this system and here are some of the responses from the system users.

Internet service accessibility in peripheral health facilities, availability of computers and stable power supply to run this DHFF system is a challenge. These results in unnecessary delaying during conducting facility transactions, report preparations, and other implementations (Facility accountant, IDIs).

The majority of health care workers and community health governing committee members are not familiar with the effective use of the DHFF system. These results in underperformance for some facilities activities during planning, implementation, and preparation of facility financial statements (Community health governing committee members, FGDs).

Health workers reported various coping strategies to address DHFF implementation challenges, including traveling long distances to use district headquarters' computers or work late at night to access the internet.

I normally go to the DMO office and use their computer to prepare our facility requests, some health facilities they do send facility requests late at night; that is when the internet service is stable (Facility maternity nurse in charge and facility in charge, IDI).

To strengthen the DHFF system so that it functions effectively, interviewees suggested training all staff regarding the system and including it as part of pre-service. It was also advised to install alternative power sources like generators or solar power and recruit enough accountants for each health facility.

Provision of training to the facility on how to operate this system so that all staff can be aware of how to use this system (CHMT Level Participant, IDI)

In conjunction with this, it was also proposed that in the future this system should be part of the syllabus taught in the health institutions, this will help to impart the required skills and knowledge to health care workers to simplify the implementation of this new system.

This system needs to run in parallel with the speed of financial flow in our facility as this will help to implement our planning at the right time and facility staff need to be trained on

how to operate this system so that all staff can be aware of how to use this system (CHMT Level Participant, IDI).

4.1.2 Involvement in Maternal Health Services

We conducted IDIs interviews with health care workers and FGD with health governing committee members to assess their involvement level in maternal health services before and after the introduction of DHFF. The findings showed that facility health care workers and community health governing committee members participated fully in all facility planning, budgeting, and purchasing of general facility requirements as stated in facility annual action plan. This was a success as it was not done before DHFF interventions. Before implementation of the DHFF system, all facility decisions were carried out by CHMT members on behalf of primary health facilities in charges and health governing committee members. This was confirmed as quoted:

We health governing committee members with previous health financing approach we were not involved in any of facility decision making. After the introduction of DHFF system we are fully involved in all steps of facility decisions and we have room to ask, discuss and to know all transaction conducted in our facility (Community health governing committee members, FGDs).

Before DHFF all facility plans were carried out by CHMT on behalf of primary health facilities and we were asked to prepare minutes and send them to council headquarter requesting for facility requirements (Health facility in-charge, IDI).
Nowadays there are great changes facility staff and community health governing committee members are fully involved in all matters related to the health facility..." (CHMT Member, IDIs).

*We make our own health facility planning, budgeting and implementation for all facility matters (*Health facility in-charge, IDI).

DHFF help to make sure that all essential requirements for maternal health are available all the time at primary health facilities and provide better and quality services for maternal health (Community health governing committee members, FGDs).

Facilities receive the fund on time and use it as plans by so doing helps to provide better maternal health services (CHMT Member, IDIs).

DHFF system helps primary health facility to procure their maternal health requirement direct from MSD hence minimize the time for goods delivery (CHMT Member, IDIs).

The facility has the freedom to choose what they need to buy based on their thresholds level different from the previous approach which requires a person from DMO office to make the decision on behalf of all items (Facility in charge, IDIs).

During IDIs with CHMT and facility in-charges, we discover Pangani district hospital to have a high number of deliveries because it receives a lot of referrals from the district dispensaries and Mwera health center:

Reasons for the high number of deliveries in these two facilities they serve a large population from outside the district from Kigombe village in Muheza District, Tundauwa and Kirare village of Tanga Municipality which is not within hospital annual plans (CHMT Member, IDIs).

Mkalamo dispensary apart from providing services to the targeted population it also serves a population from neighbouring villages from Handeni district which includes Kwamsisi, Kwemigunga, Magunga Chesa, Puzo and Mkalamo of Handeni side (*Health facility in-charge, IDI*).

Reasons for these achievements that were the contributing factors included regular supportive supervision and follow up to primary health facility conducted by CHMT.

The supervision conducted to the primary health facilities helps to create awareness among health facility staff and community health governing members on the provision of public maternal health education explaining the importance of early visit at a health facility during pregnancy (CHMT Member, IDIs).

Integrations of community health governing committee members to the health facility decision-making process help to send information related to maternal health down to the community level (Facility in-charge, IDIs).

The introduction of the DHFF system helps to create community awareness about services provided at their health facility which in turn leads to the creation of ownership among community members (Community health governing committee members, FGDs).

Also, this system helped to bring together health facility staff and Community health governing committee members in all facility planning, budgeting, and purchasing of drugs, medical supplies,

and medical reagents. This was witnessed by some of health facility staffs and Community health governing committee members during IDIs and FGDs interviews as presented below:

> *We are involved especially when there is a shortage of drugs facility in charge conduct meeting with us and explain about drugs situations and we plan together* (Community health governing committee, FGDs).

> *We have regular facility meetings, through this meeting is where we plan and discuss facility development issues* (Facility in charge, IDIs).

> *When there is a shortage of drugs facility in charge conduct meeting with us and plan together on how to settle the situation* (Community health governing committee members,

> *Before DHFF things ware worse compared to existing situation all essential medical equipment's for maternal health are available all the time* (Community health governing committee members, FGDs).

4.1.3 Availability of Equipment, Drugs and Supply Necessary for Maternal Health Services

(i) Medical Equipment for Maternal Health Services

The findings showed that there was improvement in the availability of equipment, drugs and supply necessary for provision of maternal health services after DHFF system. It was observed that all health facility dealing with maternal health the introduction of DHFF system helped facilities to be better equipped with modern medical equipment's like Bp machine, weighing scale, Fetoscope and delivery kit as shown in Table 3.

Table 3: Status of Medical Supplies, Medical Equipment, and Medical Reagents before and after the DHFF Implementation in Pangani District

variable		Number before the DHFF implementation	Number one (1) year following the DHFF implementation	Change	P-value
	Unit of measurement	A (2016/17)	B (2017/18)	B - A	
MEDICINE					
Folic Acids	5 mg Tabs	3200	12 000	8800 (275.0%)	<0.001
Iron supplement	(Ferrous Sulphate 200 mg + folic Acid 0.25 mg) Tabs	18 450	19 950	1500 (8.1%)	<0.001
Magnesium Sulphate	50% W/V Injection	70	95	24.8 (35.3%)	<0.001
Sulfadoxine-pyrimethamine	(Tabs)	6020	6160	140 (2.3%)	<0.001
MEDICAL EQUIPMENT					
Blood Pressure Machine	Piece	2	8	5.8 (241.7%)	0.070
Weighing Scale Machine	Piece	2	4	1.4 (58.3%)	0.322
Fetal Scope	Piece	3	4	1.4 (53.8%)	0.252
Delivery Kit	Packs	265	513	248.2 (94.8%)	<0.001
MEDICAL REAGENTS					
Syphilis Test (RPR)	Strips	2348	6142	3794.5 (161.6%)	<0.001
Malaria Rapid Diagnostic Test	Strips	4185	9425	5240 (125.2%)	<0.001
Urine Deep Stick for Protein	Strips	3140	1800	-1340 (-42.7%)	<0.001

Notes: "A" represents financial year 2016/17 and "B" represents financial year 2017/18. P-value <0.05 is statistically significant

Source: District Health Management Information System Registry

The result from Table 3 above implies that, the study shows a positive impact of the DHFF on maternal health service delivery in Pangani district. Specifically, increase in the number of medical supplies, equipment, and reagents necessary to provide maternal health services contributed to the observed increase in facility deliveries by 33.6%.

Statistics show that after the introduction of the DHFF system there is an increased flow of essential drugs and medicine necessary for maternal health at the primary health facility as compared to the existing situation prior to DHFF intervention. This means that DHFF contributes a lot to create good environments for the supply of essential drugs and medicine.

The results from Table 3 again shows that, after the introduction of DHFF there was an increase of essential maternal drug for maternal health services which implies positive contributions to service deliveries for maternal health services with 95% CI.

We observed greater changes for maternal health services demonstrated by an increase of supplies of syphilis test, urine dipstick for protein and MRDT after the introduction of DHFF were shown to higher as compared to the prior introduction of DHFF. This is an achievement for the DHFF system success as shown in Table 3. However, this change was not statistically significant which can be probably be due to shorter duration of study periods.

(ii) Quality of Care provided for Maternal Health after the Introduction of Direct Health Facility Financing

During assessing outcome on quality of care provided for maternal health after the introduction of DHFF we conducted an exit interview with a total of 60 pre and postnatal beneficiaries' women. The results obtained from our discussion with this group of people show to have a positive impact in terms of improved quality of care for the health services provided at the health facilities after the introduction of DHFF as compared to the situation before implementation of DHFF at primary health facilities.

Some of the health services which were reported to be improved were investigation diagnosis, maternal health education, maternal health diagnosis, exclusive breastfeeding, HIV/AIDS testing, child spacing, syphilis test, and family planning techniques. Findings from this assessment show most of our participants report to be satisfied with maternal health services provided in their health facilities.

> *For sure since I was pregnant for this baby, I was satisfied with investigation diagnosis, maternal health education, maternal health diagnosis and exclusive breastfeeding* (Exit interview, IDI).

Another client quoted reporting that:

> *I am happy about HIV/AIDS testing, health education sessions on the importance of child spacing and family planning techniques* (Exit interview, IDI).

Where others were quoted as:

> *Honestly, I am proud of investigations carried out regularly when I am attending antenatal health clinics for a regular check-up* (Exit interview, IDI).

Furthermore, the syphilis test, blood pressure, temperature, and weight were conducted for all pregnant women attending antenatal care clinics something which was not properly taken before the DHFF intervention:

> *In this facility respiration (breathing rate) was not carried out at antenatal only provided at post-natal clinics this is because register for an antenatal clinic is not designed to capture information related to breathing rate* (Facility in charge, IDIs).

Facility doctors and other health care professionals were reported to be easily accessible and quickly respond to any medical care attention when needed:

> *We don't have any problem when we need facility health care provider, we are able to access s/he is basing on the queen system* (Exit interview, IDI).

At the post-natal health care unit, it was reported to provide satisfactory maternal health services during deliveries and after deliveries and at least all essential requirements for deliveries, services reported to be available in all primary health facilities:

> *Two years ago, when we visit this facility for delivery services, we are requested to come with delivery packs but nowadays all of the essential requirements for delivery are provided hire at an antenatal unit prior delivery period* (Exit interview, IDI).

The study manages to investigate the professionalism of the health care workers in all maternal health facilities, and it was observed to be very good by the participants when they visit a health facilities, for maternal health. For the purpose of improving maternal health services provided at primary health facilities, we collected ideas and suggestions from beneficiaries, here are some of their comments:

> *We thank God medical equipment's reagents, drugs and supplies for maternal health services is available in most of our primary health facility, but we need sustainability of these supply all the time and number of health care staffs should be enough* (Exit interview, IDI).

> *Treatments for under-five should be separated from the normal queuing system and the number of deliveries units should be enough to meet population demand* (Exit interview, IDI).

We use a very long time to access laboratory services we need more laboratories staffs to speed up laboratory investigation services. The bed occupancy rate at the maternity ward should be increased enough (Exit interview, IDI).

Another area that is reported to be improved is blood pressure, temperature, and weight. Also, it is easier for pregnant women and mothers who visiting health facilities to access facility doctors and other health care professionals and get quickly respond to any medical care attention when they needed them.

4.2 Discussion

4.2.1 Success and Challenges in Provision of Maternal Health Services

Findings from this study are aiming at evaluating the progress made by the introduction of DHFF on the services provided for maternal health where in one way or another will give pathways on how to make a good intervention plan for the health care financing system in Tanzania. The study showed positive impact on maternal health services delivery at Pangani district as compared with the situation prior to intervention. The quality of services improved as there was more availability of essential supplies and equipment's, there were increased deliveries and women had positive experiences of the services received. This progress is an important aspect for the government, policymakers and other related parties dealing with maternal health services.

Overall, the study revealed that DHFF in Pangani was implemented well and was perceived to have positive effects on the provision of quality maternal health service in all levels of utilization. This confirms the already documented evidence that increased in resources can lead to improved services quality (Daruwalla *et al.*, 2019). Although the results were not statistically significant due to shorter period of implementation since the intervention was introduced, it is indicative that service quality is improving and as experience is gained, it will become better and better.

The results in this study show that there is a great improvement for pregnant women to attend health facilities for maternal health and delivery services compared with the situation before introducing the DHFF. In all study health facilities, the attendance of pregnant women was recoded higher after the intervention as compared to prior to the intervention.

The improved services attracted clients from outside the catchment areas. These created a large working load for these facilities on the provision of maternal health services. These results are also supported by other schollars (Basinga *et al.*, 2011; MFA & UNDP, 2015; WHO, 2015b). The study

revealed that there was a decline in maternal mortality in China by more than 80% after introducing the DHFF.

Health facility staffs and community health governing committee members have been given chance to participate in all facility planning, budgeting, and purchasing of drugs, medical supplies, and medical reagents because are the one who is familiar with facility demand. This raised working morale and sense of ownership among health facility staff, community health governing committee members and the beneficiaries of the service as compared with the situation before the introduction of DHFF.

4.2.2 Stakeholders Involvement in Maternal Health Services

Introduction of DHFF in Pangani has enabled health facility staff and community health governing committee members to participate fully in all facility planning, budgeting, and purchasing of drugs, medical supplies, and medical reagents. This approach helps to raised working morale and ownership among facility health care workers and community health governing committee members in doing facility duties like Planning, Budgeting and Purchasing as compared to the situation before DHFF introduction. It was noted that among the staff who participated in facility planning, budgeting, and purchasing of drugs, medical supplies, and medical reagents were said to be easier for them to plan for their facility demand since they worked with a predetermined budget and actual facility demands. These are witnessed by the study done in Kenya that revealed that the health workers found easier to do their work after the introduction of the DHFF compare with the prior intervention (O *et al.,* 2009).

The study identifies that the introduction of DHFF helped to reduce bureaucratic processes during procurement and ensure value for money for all facility requirements purchased and service provided at the health facility. As a result, DHFF helped create trust and the community felts proud to use good health services provided by health facilities in their areas. Also, the result shows that health facility staff and community health governing committee members can make decisions on behalf of the entire community. These results are also complemented by the study conducted in Tanzania and Zambia which shows to have a positive association between good health service delivery outcomes and good governance of Public finance (Piatti-Fünfkirchen & Schneider, 2018). Therefore, the establishment of DHFF in Pangani helped the health care workers and community health governing committee members to make the right decision basing on their demand at a convenient time.

Furthermore, availability of more resources through DHFF contributed to more regular supportive supervision and follow up to primary health facility conducted by council health management team that helped to create awareness among health staff, community health governing committee members and the general community on the importance of early visit at a health facility for maternal health services.

Integrations of community health governing committee members in collaborations with village government leaders helped to send information related to maternal health to the community and create community awareness about services provided at their health facility.

The DHFF system helps to link different financial information from different health facilities and simplified report preparation which helped to reduce bureaucracy during procurement processes and enabled value for money for all facility requirements purchased and service provided at the facility. This helped to create trust and community felt proud to use services provided by health facilities in their areas.

The DHFF system empowers health facility staff and community health governing committee members to make decisions on behalf of the entire community. This helps to make the right decision basing on their needs, demands and wants hence facilitating the provision of good health service to the community.

The introduction of DHFF enabled sufficiency supply of drugs and medical reagents necessary for maternal health which in turn facilitated an increased flow of pregnant women attending health facilities for maternal health compared to the previous approaches.

4.2.3 Availability of Equipment, Drugs, and Supply for Maternal Health Services

The results from study show that having a proper flow of financial support to the primary facility enabled facility health care workers to meet their budget expectation as planned by facility annual action plan by doing so they can procure all the essential requirements for the provision of maternal health services.

Having such medical equipment's health facilitates managed to provide better maternal health services for reproductive health services like family planning methods, reproductive health education, vaccination services, and prevention of HIV from mother to child transmission as courted during FGDs.

Also, DHFF enabled health facilities to provide better services for maternal health as they have all required essential drugs for maternal health. The result shows an increased number of medical equipment, drugs, and supply necessary for the provision of maternal health services after the introduction of DHFF.

These findings are supported by the study conducted in Rwanda dealing with the effect on maternal and child health services in Rwanda of payment to primary health-care providers for performance where it showed some positive association between primary health care financing and availability of equipment, drugs, and supply necessary for the provision of maternal health services (Basinga *et al.,* 2011; Kapologwe *et al.,* 2019).

4.2.4 Quality of Care Provided for Maternal Health after Introduction of Direct Health Facility Financing

It has been revealed that the introduction of the DHFF system in Pangani facilitates a large number of mothers to seek maternal health services at primary health facility this is due to several reasons. This included the availability of almost all the essential requirements for maternal health care were available. This led to service satisfaction like investigation diagnosis, maternal health education, maternal health diagnosis, exclusive breastfeeding, HIV/AIDS testing, child spacing, syphilis test, and family planning techniques as compared to the situation before the introduction of the DHFF. These findings confirm evidence by the study conducted by the Medicare spending, the physician workforce, and beneficiaries' quality of care and understanding the implementation of direct health facility financing and its effect on health system performance in Tanzania (Baicker & Chandra, 2004; Kapologwe *et al.,* 2019). All these show that DHFF is working and contributed to positive services provision.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Overall, this study shows a positive impact of the DHFF on maternal health service delivery in Pangani district. Specifically, increase in the number of medical supplies, equipment, and reagents necessary to provide maternal health services contributed to the observed increase in facility deliveries by a third. Moreover, the system minimizes unnecessary delays in the procurement processes of required drugs, supplies, and other facility reagents. To maximize the impact of the DHFF system, unavailability of computers, unstable internet, limited knowledge of the staff about the system, and inadequate health workforce should be addressed. Furthermore, training could include refreshers models on DHFF implementation.

The DHFF is functional in Pangani and initial experiences shows that it has positive impact in quality of services provided. We advise the government, policymakers, and other implementing partners to act upon the observed DHFF system challenges for the sustainability of the health system in Tanzania.

5.2 Recommendations

Based on the DHFF system success and challenges in provision of maternal health services, DHFF has shown to be working and promising in improvement of health services delivery. We recommend the DHFF system be part of the syllabus in the health academy institute. This will help to impart required skills and knowledge to health care workers and simplify the implementation of this system as this will help to increase awareness among health care workers and community health governing committee members on effective implementation of DHFF. System improvement is also recommended use of the system and equipment such as computers and internet services to fasten service delivery. We also recommend more training to health care workers and community health governing committee members to build up their technical skills and ability on the effective use of the system. We recommend that, there should be at least one accountant at each health facility. This will help health facility to make realistic facility planning and prepare facility financial statement which complies with facility requirements.

We recommend funds to implement DHFF to release and received at the health facility level on time as this will allow health care workers and community health governing committee members to deliver a better quality of care provided for maternal health all the time.

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RESEARCH OUTPUTS

(i) Publication

Tukay, S. M., Pasape, L., Tani, K., & Manzi, F. (2021). Evaluation of the Direct Health Facility Financing Program in Improving Maternal Health Services in Pangani District, Tanzania. *International Journal of Women's Health*, *13*, 1227.

(ii) Poster Presentation

(iii) Symposium of Health and Academic Research awarded certificate

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