Effects of Direct Health Facility Financing on Health System Performance and How It Is Implemented in the Public Primary Health Facilities in Tanzania: A non-controlled before and after mixed method study.

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Abstract

Background: In Tanzania, the introduction of Direct Health Facility Financing (DHFF) is viewed as one of the innovative health sector reform initiatives, with the main focus of improving quality of health services provision. DHFF empowers primary health care actors' autonomy in decision making to improve health system performance in the stride forward to reach Universal Health Coverage (UHC). The purpose of this study was to assess the effect of DHFF on health system performance and how it is implemented in the Public Primary Health Facilities (PPHFs) in Tanzania.

Methods: This study used a non-controlled before- after convergent mixed-method study design, with a process evaluation embedded at midline, in data collection and analysis. The study was conducted between January 2018 and September 2019. Quantitative data collection was done through administration of questionnaire to 844 existing patients and 238 Health care workers in 42 Public Primary Health Facilities of seven regions whereas qualitative data was collected using semi-structured individual interview guide for 14-indepth interviews with health facility in-charges, members of health facility governance committee, district medical officers and district DHFF coordinators and 7 Focus Group Discussions with service providers and users representatives. We used descriptive and inferential statistics to analyse quantitative data whereas a thematic analytical approach was used for qualitative data.

Results: A total of 844 patients were studied on seven domains of Health System Responsiveness (HSR) both in the before and after studies. All domains of HSR were found to have positive significant difference between baseline and end-line except for two domains i.e., confidentiality and communication. Also, of all 42 investigated public primary health facilities. Majority (88.9%) of Dispensaries and 60% of Health Centres were below the required staffing level. There were significant differences on structural quality of maternal health services before-and-after studies with scoring 2.38% and 30.9% respectively.

Moreover, there were significant differences in all indicators after DHFF introduction except those for IPT-2, use of modern family planning methods and Mebendazole consumption. Furthermore, about 238 health care providers were studied on the Fidelity of Implementation (FoI), of whom about 76% had knowledge on DHFF initiative implementation issues. However, only 28% had high FoI.

Conclusion: In general, it is clear that, DHFF have had an effect on the health system performance. FoI was low despite training been offered to HCPs (Health Care Providers), this calls for more investment on this aspect so that to have a resilient health system.

Contributions To The Literature

- Our research has shown that**,** Direct Health Facility Financing has overall improved health system responsiveness domains as perceived by patients, structural quality and utilization of maternal health services.

- Success of reforms requires a mechanism for monitoring the implementation fidelity to identify and address gaps that may hinders the implementation success
- These findings contribute in the literature in understanding the context of Direct Health Facility Financing reforms implementation in low resources settings, and evaluation modality

Background

The health system performance is the measure of capacity of the health systems to meet its objectives including the expectations of the beneficiaries and this is crucial for any health care industry in the world. The world health organisation (WHO) has put forward three main goals of the health system to include: health improvement; responsiveness to the expectations of consumers; and fairness in financial contribution [1]. Word over, a well-functioning health system is central to the delivery of quality health services. There exist various models used to measure the health system performance, such as those proposed by WHO and Organization for Economic Cooperation and Development (OECD) [1]. The selection of performance measures is not only critical for sound assessment but also plays a larger role in defining what is considered important at every level of a health system, however the faithfully measures reflect the objectives of the system, the nature and the quality of data, the incentive for stakeholders to scrutinize and act upon the data. Moreover, the culture of the organization within which the data are deployed, are considered to be more important as wee [2, 3]. The common indicators of the health system performance include the responsiveness, clinical quality, utilization, population health outcome, equity and productivity of the health system [2–4].

Countries across the globe are striving to improve the health system performance. The Government of Tanzania in 2017 introduced the Direct Health Facility Financing (DHFF) as the health financing intervention with the aimed at improving quality of health service delivery in the public primary health facilities. The DHFF represents an innovative fund disbursement mechanism adopted by the government of Tanzania [5]. Under DHFF initiative the funds are directly sent to the facilities instead of going through a district council's head office with the aim to address the delays and misappropriation of funds that was experienced when funds were disbursed through the district's office. Correspondingly, the DHFF initiative, although is directly related to the health financing block, it is expected to impact all other blocks such as service delivery, human resources for health and governance. In addition, the DHFF is also viewed as a health sector reform that aims to empower primary health care actors by enhancing autonomy in decision making to improve health system performance [5].

Since DHFF initiative introduction in Tanzania, there is no any attempt to understand its effects on health system performance variables. While there is a widespread belief that this initiative may solve challenges that exist in the public primary health facilities, there is no systematic evidence to that. Existing evidence on the system prior to DHFF introduction, report of leakage of funds in the process of reaching the target primary health facilities [6], insufficient decisions made at district level to ensure constant supply of health commodities and other health system inputs that led to erratic supply of commodities and supplies, failure to maintain physical status of the primary facilities infrastructure and poor autonomy of

the frontline workers including priority setting, planning, budgeting and supervision [7, 8]. The delays and misappropriation of funds led to the inefficiencies in the governance and accountability mechanisms at the primary health care level leading to poor health system responsiveness.

Some studies such as that done by [6] to determine the resource allocation and flow to expenditure unit proposed that insufficient financial resources were reaching service delivery units such as dispensaries. Also [9, 10] argue that health financing especially at public primary health facilities is challenged with late disbursement of funds associated with violation of existing guidelines. On the part of accountability, studies prove existence of unrealistic forecasts and weak internal controls [11–13] WHO estimated about 20–40% of health expenditures were inefficiently allocated and therefore had little to contribute towards people's health[13]

According to existing evidence [10, 14], the functionality of Health Facility Governing Committees (HFGCs) is often poor as their members are less knowledgeable of their roles and responsibilities. Moreover, Kamuzora and collegues [8] showed that despite the significant role of HFGCs in managing and supervising service provision at health facilities, they were faced several hindrances that affected their performance such that lack of financial motivation, insufficient time for making decisions, squat call for consultations and lack of feedback from the approval authorities on their approved priorities [15, 16]

Therefore, the purpose of this study was to determine the effects of DHFF on selected health system performance indicators (health system responsiveness, governance and accountability, health service utilization and the structural quality of maternal health services) and how DHFF is implemented in public primary health facilities in Tanzania.

Methods

Study settings

For administrative purposes, mainland Tanzania is **divided into 26 regions** followed by 139 districts and 185 councils. This study was conducted in fourteen (14) councils from seven (7) regions (Mbeya, Shinyanga, Dodoma, Pwani, Mtwara, Manyara and Katavi) from seven (7) geographical zones. The reason for selecting seven zones was to seek the country's geographical representation. The seven regions comprised of 42% of the Tanzanian population. The study was conducted in 42 public primary health facilities that are in 14 district councils (see appendix 1).

Study design

This study adopted before and after non-controlled convergent mixed methods design that is employed both qualitative and quantitative methods. Data were collected concurrently in selected health facilities from fourteen councils implementing DHFF both at baseline and one year after the implementation of DHFF, with embedded process evaluation at the Midline. The before after component was employed to measure the effects of the DHFF initiative on health system responsiveness, structural quality of

maternal health services and establishment of relationship among variables. The embedded process evaluation was used to explain the implementation process of the initiative in the view of explaining the heterogeneity in effects of the initiative across contexts as influenced by the implementation variables.

Quantitative component of the study

Sampling Method and Sample Size Estimation

Sampling Methods

This study employed a multistage sampling technique for selection of the study units. We divided the study population into smaller clusters in several stages in order to make primary data collection more manageable. The starting point for first cluster was the geographical zones, from the zones to regions, district and health facilities (dispensary and health centers).

Sample Size Determination

The study sample size calculation was based on the purpose of this study and the nature of the population under scrutiny. Therefore, this study involved 42 public primary health care facilities of which 14 were health centres and 28 were dispensaries.

A total of three primary health facilities were selected through stratified sampling then randomly drawn from each district's list of types of public primary healthcare facilities (i.e. health centres, dispensaries) (https://hfr-por-tal.ucchosting.co.tz/index.php?r=facilities/homeAdvanced-Search), making a total of 42 health facilities (14 health centres and 28 dispensaries).

From each selected health facility, the staff member in-charge and the HFGC chairperson were selected, while exiting patients were randomly selected after gender stratification following medical consultations.

The exit interview patients were approached after they had received the services and ready to go home. Respondents eligible for interview included all existing patients or relatives of patients (aged above 18 years). They were sampled to ensure equal numbers of men and women are captured. A total of 422 patients took part in exit interviews. The sample size was calculated using the Cochran formula (1977); by taking 50% as a proportion of patients' perception to health system responsiveness (as there are no previous similar studies performed in Tanzania) and a power of 80% allowing for an estimated error margin of 5%, the sample size obtained was 384 patients. An additional 10% of the sample size was added (n = 38) to allow for refusals, making a total of 422 patients.

Data Collection tools and procedure

A structured questionnaire to health facility in-charges, district medical officers and health facility governing committees, and health service providers to capture their knowledge of DHFF, FoI and the factors influencing/moderating FoI, was developed, tested, and administered. The Factor analysis was done and the tool was found to have a reliability of 0.812. Six domains with a total of 42 questions were

assessed for their adherence (fidelity): - 1) training on DHFF and FFARS 2) Coordination of DHFF activities 3) Governance and Accountability 4) Financial management 5) Planning and Guidelines 6) Supportive Supervision and Mentorship.

An exit interview was administered to 10 patients per health facility to measure patient experiences with healthcare in relation to prompt attention, access to care, respect of dignity, and quality of communications, quality of basic amenities, confidentiality, and autonomy. A 37 - item with closed-ended Likert scale questionnaire was adopted and modified from the WHO multi-country studies. Items were measured using 3 - or 4 - point Likert scales. To ensure reliability of the tools, the internal consistency of the overall scale (37 items) was measured using Cronbach's alpha.

Data on service utilization were collected from Health Management Information System (HMIS) registers as secondary data using nine selected indicators, the study assessed the maternal health service utilization. These indicators were extracted from District Health Information System (DHIS-2) platform. Whereas data for measuring structural quality were collected by using adopted tools from the Results Based Financing (RBF) program.

To explore the Governance and Accountability of DHFF initiative in the Public Primary Health Facilities (PPHFs.) We used Interview guide to conduct Seven Focus Group Discussion (FGDs) to 49 study participants to explore their insight on the effect of DHFF on governance and accountability. The FGDs were conducted to the group of seven participants from each region. The group was composed of the Council Health Service Board (CHSB) chairperson, one member of Health Facility Governing Committee (HFGC), two-health facility in charges (one from dispensary and one health centre), matrons (one from dispensary and one health center) and account assistants. Each interview lasted for an average of one to one and half hours.

This study used the mobile data collection (MDC) approach for quantitative data gathering, open data kit software (ODK) was used to collect the data. Under this approach all data were collected by enumerators on a daily basis and sent via the mobile phone to the central server. Data from ODK was transferred into an excel sheet and converted to SPSS version for analysis. As part of quality control all selected facilities had GPS coordinates therefore research assistants used tablets, which had GPS sensors.

Data analysis

Statistical analyses in this study used the following approaches; 1) Univariate analysis to describe the sample and distribution of the outcome and explanatory variables; 2) bivariate analysis (logistic regression analysis) to establish the relationship and association between variables; 3) multiple regression analysis to establish whether the explanatory variables could predict the outcome variables and to control for confounding variables.

Descriptive statistics were used to generate frequency distribution, and cross tabulation was used to describe the characteristics of the study participants. The chi-square test (χ^2) was used to compare

groups (categorical data) and odds ratio (OR) with 95% confidence interval were computed and used to determine the strength of association among variables. The statistical significance level was made at p= 0.05 (2-tails) as a cut-off point.

Forward stepwise logistic regressions analysis was done to establish whether the predictor variables were independently associated with outcomes (dependent variable) of interest.

Multiple regression models were used to determine the variables that could predict the four variables namely: - Health system responsiveness, maternal health service utilization, structural quality of maternal health services and Fidelity of implementation. The comparisons within groups (pre/post) were estimated using independent t-test for HSR, whereas paired t-test was used for structural quality of maternal health services and Wilcoxon ranked sum test was used for maternal health service utilization

Qualitative component of the study

Sampling Methods for Qualitative Data

Multi stage sampling method was employed to select the study units and then focus group discussion was conducted as part of the process evaluation in which a total of seven focus group discussions (FGDs) were purposefully selected for analysis out of 12 FGDs conducted which included the following participants namely, Council Health Service Board (CHSB) chairperson, member of Health Facility Governing Committee (HFGC), two-health facility in charges (one from dispensary and one from health centre), matrons (one from dispensary and one health centre) and account assistants. FGD is a group interview involving a small number of people who have common traits; each FGD had a total of seven people who explored the level of governance and accountability. Members of FGD were fully informed concerning the project and they gave opinions, views and experiences concerning the project since they are the implementers.

Data Collection tools and procedures

this study employed interpretative descriptive qualitative approach and an inductive analytical approach to establish the FoI of DHFF from the implementers. A semi-structured interview guide was employed to collect qualitative data from the study sites. The in-depth interview guide composed of 21 questions categorised into two major areas that measured effects of DHFF, responsiveness and acceptability of DHFF initiative among health managers. The guide for FGD had 16 semi structured questions that were designed to measure two aspects namely governance of DHFF initiative and accountability of DHFF initiative in the public primary health facilities. Interview method was important in collecting information because through these method respondents had the flexibility to answer interview questions, the principal investigator and research assistants easily judged the information because through this method you can see the respondent's facial expressions, emotions and feelings and tell whether the information is genuine or not.

Data Analysis

Two independent researchers on the original transcripts carried out analyses of data from FGDs and In-depth Interviews. The analyses utilized the thematic analysis method [17] and were assisted by IN-Vivo software (QSR-international) version 12. This method was selected due to its flexibility and its step-by-step interconnected stages that guide the analytical process. Previous research [17,18] has put emphasis on the rigor and transparent nature of this approach as demonstrated by its use of the matrix structure. A total of 14 in-depth Interviews were audio taped, transcribed for verbatim, and anonymized for analysis. After data collection that based on six thematic areas, thematic framework was used as the theoretical framework to analyse the data of DHFF implementers. The analysis began by familiarization of data through reading and re-reading of transcripts and listening to the audiotapes systematically and independently by each of the researchers, and coded applying thematic content analysis, which identifies persistent themes that form linked information containing similar meanings.

The extracted data from digital recorders were transcribed for verbatim and then thematically analysed by using NVIVO - QSR version 12 and similar themes were grouped together for quotation, interpretation and reporting. Transcripts from interviews were read by the principal investigator in order to validate findings.

Results

Results are arranged objectively by starting with health system responsiveness, structural quality, service utilization and fidelity of implementation.

1. Health System Responsiveness (HSR) in Public Primary Health Facilities

Socio-Demographic Characteristics of Patients in PPHFs

This study included a population of 844 patients who participated in the exit interview before and after studies for the health system responsiveness study. Of 844 patients (100% response rate) surveyed, 422 were (50%) were female. About 66.7% of all study participants were married with 59.7% of them having an average of 6 members per household. About 36.7% of study participants, aged between 25 and 35 years. The 63% of participants had a primary school education. More than 71% of patients had more than 5 times visits to the health care facility.

Status of Health System Responsiveness (HSR) as perceived by patients in Public Primary Health Facilities (PPHFs) before and after implementation of Direct Health Facility Financing (DHFF)

The perception of health system responsiveness among patients in public primary health facilities was measured by seven domains namely, prompt to attention, respect to dignity, clear communication, respect of autonomy, access to care, respect for confidentiality and quality of basic amenities. The descriptive analysis revealed that the overall percentage mean score of HSR before implementation of DHFF was 62.84, SD was 10.05 and range (23.16–84.21). Subsequently, upon implementation of DHFF the percentage mean score on the perceived HSR was 71.20, SD was 8.05 and range stood at (48.87–99.25).

Almost all regions showed change on health system responsiveness upon the implementation of DHFF except for the Katavi region, which showed no improvement before and after the introduction of DHFF initiative (Table. 1).

2. Level of Structural Quality of Maternal Health Services in the Public Primary Health Facilities before and after Direct Health Facility Financing Implementation

Demographic Characteristics of Public Primary Health

A total of 42 (100%) public primary health facilitates were assessed on structural quality of maternal health services. A total of 14 (33.3%) among the assessed facilities were health centres whereas 28 (66.7%) were dispensaries. Among these facilities, 33% were located in the rural areas. Thirty-three percent of health facilities were located in the rural areas (Table 2). The majority (60%) of Health Centers had less than 39 skilled staff and majority (88.89%) of Dispensaries had less than 15 staff (Table 2). Some of health facilities had critical shortage of staffs for instance five (17.89%) Dispensaries had 2 staffs only while other 16 (57.14%) Dispensaries had 3 staff.

The level of structural quality of maternal health services was assessed using seven domains of maternal related indicators. The overall structural quality was determined by using mean score percentage of 60 cut-off point adopted from previous studies. The descriptive results portray that, mean, median and standard deviation before implementation of DHFF were 29.8, 27.2 and 16.4 respectively. Upon the implementation of DHFF mean, median and standard deviation changed to 44.1, 40.5 and 19.5 correspondingly. The mean difference before and after implementation of DHFF was 14.3, while change in median and standard deviation were 17.4 and 18.6 respectively. However, the overall change of structural quality of maternal health services showed that, before the implementation of DHFF only 2.4% of primary health facilities had higher structural quality of maternal health service but after eighteen months of DHFF implementation there were a hike number of primary health facilities with higher structural quality of maternal health services to 30.95% (Fig. 1).

3. Level of maternal health service utilization in Public Primary Health Facilities before and after implementation of Direct Health Facility Financing

Maternal health service utilization was assessed by wilcoxon signed rank test using selected nine indicators of health service utilization namely number of institutional deliveries, number of women attending 4 Antenatal Care (ANC) visits, number of ANC mothers given IPT2 and number of ANC mother initiated Mebandazole for deworming, availability of 30 tracer medicines and use of modern family planning methods. The result from the descriptive analysis shows that, mean, median and standard deviation before implementation of DHFF were 3652, 1897 and 4476 while after the implementation of DHFF they changed to 4792, 3089 and 4942 respectively.

Moreover, dispensary had significant positive mean difference in all nine indicators compared to only three indicators that were statistically significant in health centers namely number of women attending

forth ANC visit, number of pregnant mothers attending first ANC below 12th weeks and number of HIV positive pregnant women receiving ARV (Table 3).

4. Level of Direct Health Facility Financing (DHFF) Fidelity of Implementation (FoI) and its potential moderators

The Fidelity of implementation of DHFF was assessed in two categories namely the knowledge of health care workers to implement the initiative and the adherence of the health care workers towards the guiding principles for implementation of DHFF in PPHFs.

Social Demographic Characteristics of Health Service Providers in PPHFs

A total of 322 participants was involved in this study, whereby 238 were health service providers and 84 were members of HFGCs. Among health service providers more than two-third (70.6%) were male. Most of the health service providers were between 31 and 44 years old. Majority of health service providers had certificate level education, followed by diploma (30.67%) and university degree (8.40%). More than half of the participants had employment experience below 10 years, while 21% had work experience between 10 and 20 years. Similarly, 50% of health service providers were nurses, while clinicians were 11.8% of the sample and assistant accountants were 3.8%. More than two-third of the health service providers were frontline health.

Knowledge of Health Service Providers on the implementation of Direct Health Facility Financing in Public Primary Health Facilities.

Out of 238 health service providers, 75.63% (180) had adequate knowledge in relation to DHFF (mean scored > 9.286 points) while 24.37% (58) had inadequate knowledge. The mean score was 9.286 (SD, 4.1409; range, 0–16 points) points indicated that, on average, health service providers had adequate content on DHFF.

The current research finds out that, most of social demographic factors analysed were not associated with knowledge on DHFF, except location of the health facilities (Rural) ($p = 0.004$). The result from Logistic regression model found out that, health service providers from PPHFs located in the rural settings had 7 times more DHFF knowledge as compared to their counterpart in the urban [AOR 7.7 (2.093,28.356)] (Table 4).

5. The association between Fidelity of Implementation (FoI) and overall Structural quality of maternal health service in Public Primary Health Facilities.

Looking into the association between changes of structural quality by fidelity of implementation it was found out that, there were positive structural changes among facilities with high fidelity of implementation as compared to those with low fidelity of implementation. Facility with high FoI were almost twice high in structural quality of maternal health services compared with low FoI facilities (AOR = 1.821, CI = 0.994–3.334, $p = 0.00523$)(Table 5).

6. The association between Fidelity of Implementation (FoI) and overall Maternal health service utilization in Public Primary Health Facilities before and after implementation of Direct Health Facility Financing.

Looking into the association between changes of maternal health service utilization by fidelity of implementation it was found out that, there was high maternal health service utilization among facilities with low fidelity of implementation as compared to those with high fidelity of implementation.The results of logistic regression analysis on the association between FoI and utilization of maternal health service portrayed that, there was existence of high FoI of DHFF among health service providers and less utilization of maternal health services (OR = 0.236, CI = 0.113–0.492, $p < 0.001$) compared to high FOI health facilities (Table 6).

7. Governance and Accountability of DHFF in PPHFs

A total of 49 people participated in seven FGDs composed of seven people whose socio-Demographic characteristics are as follows: Council Health Service Board, Health Facility Governing Committee, two matrons (one from Dispensary and one from Health centre), two Health facility in charges (one from Health Centre and One from Dispensary) and Assistant accountants.

Governance

Information was obtained through interview and FGD, the participants pointed out to their roles in the DHFF initiative; their roles are mainly to supervise and endorse various decisions at the primary health care facilities, as pointed out by one of participants of the FGDs

"Our role is to authorize the allocated fund towards the main objectives of the health facility. Dispensary has some priorities that are shared to us for the review" (FGD 1).

Moreover, they highlighted the challenges they face in implementing the DHFF initiative processes that include the following: -

"A challenge is that, FFARS system involves a series of processes and hence time consuming" (FGD 2).

Planning and Budgeting

DHFF has helped to strengthen central role in primary health care planning and budgeting. HFGC's have improved local actors and community involvement in controlling essential primary care functions as a result this has influenced performance in the critical areas of service delivery in the health sector such as improving availability of health commodities, health infrastructure and medical equipment. In this aspect the participants explained their involvement in the process and also spelled out their roles and responsibilities. For example, of the FGD participants said:

"They have to prepare their own budget then share it with us for verification so see if they have followed the rules and guidelines" (FGD 3).

Accountability

In this sub theme, the participants responded to the issues around transparency and community involvement, supportive supervision and mentorship.

Transparency and Community Involvement

Participants were able to explain how they were engaged in various discussions around transparency and their participation in the decision-making processes:

'*All issues discussed and agreed through various committee meetings are posted on the notes board for community consumption"* (FGD 4).

Supportive Supervision and Mentorship

The participants narrated their engagement in supervision and mentorship of DHFF related activity, it was found out that the quality of supportive supervision was in question, as facilities didn't receive regular supportive supervision and mentorship as testified in the group discussion.

"Our main role is to do supervision and to regularly visit the system (FFARS) to see if there are issues not moving smoothly as the system provides a clear picture on what is being implemented and what is not being implemented. E.g. if the received fund is just sitting in the account without being utilized, that signifies that things are not being attended and we have to find the responsible person for more clarification and insist him/her to move things forward" (FGD 5).

Both quantitative and qualitative results indicated differences in the level of knowledge of health care providers towards DHFF initiative. Majority of participants were aware of DHFF however, about 76% had knowledge on DHFF. During FGDs very few participants articulated well what was the DHFF initiative all about. There was also a generalized lack of understanding of DHFF knowledge, specifically the disbursement modality from Ministry of finance and planning to the primary health care facilities.

The quantitative and qualitative findings indicated the variation of implementation of fidelity towards DHFF among health care workers who were residing in rural versus those who were residing in the urban.

The results on implementation fidelity from both strands of data indicate that there were variations of implementation fidelity across the facilities in implementing the DHFF initiative.

Discussion

This study intended to assess health system responsiveness, structural quality of maternal health, service utilization and fidelity of implementation of DHFF initiative.

Health System Responsiveness

In this study, more than half (55.9%) of patients rated responsiveness as satisfactory, showing a strong DHFF initiative effect at PPHF services. Other studies with a comparable context has shown little or no indication of patient satisfaction with non-health aspects of the system's responsiveness [19–21].The

findings of this study, however, are mixed when compared to those of previous studies undertaken in Ethiopia, India, Thailand, and the Islamic Republic of Iran. The three essential factors of health system responsiveness connected to good performance rates are access to care, respect for dignity, and clear communication. Mohammadi&Koorosh in 2014 found that 58.4% of inpatient patients at Zanjan University Hospital in Iran were happy with responsiveness[22]. However, in research conducted in Iran and Ethiopia, the area of respect for dignity discovered to be inadequate [22, 23] .The disparities between these two studies could be owing to the fact that one was conducted with inpatients in India, while the other was conducted with people living with HIV and AIDS who were enrolled in the ART program in Ethiopia by Yakob and Ncama in 2017 [23]. In addition, the current study included clients from various health departments with a wide range of diagnosis and units at primary health care facilities, including individuals living with HIV and AIDS

This study has reported a significant increase in positive health system responsiveness from 69.1% at the beginning to 93.1% at the end, demonstrating that the DHFF efforts had an impact on health system responsiveness. However, this should be interpreted with care, due the possibility of confounding effects from programs such as results-based financing (RBF) in the study facilities, that had some impact on a positive improvement in health system responsiveness [19]. This could be owing to the fact that, the RBF program has similar implementation strategy as the DHFF project, resulting in a multiplier effect on the desired outcome.

Structural Quality of Maternal Health Services

The quality of health care can be measured using a variety of methods and components, including Donabedian's structure, process, and outcome. This study, on the other hand, focused on the structural quality of public primary health care facilities. The majority of health facilities were structurally sound, which was similar to the findings of a research conducted in five African countries [24, 25]. High structural quality was linked to increased maternal health service consumption in the current study, which is in contrast to a demographic health survey conducted in Ethiopia. The survey reported that improving infrastructure alone was not enough to entice mothers to give birth in hospitals [26]. According to a study conducted in resource-constrained nations, there is a link between poor health care quality and poor maternal health outcomes[27]. A shortage of required health practitioners was one of the factors that had a 60% and 85% impact on the structural quality of services offered to the public at health centre and dispensaries respectively. This could be because health centres, as opposed to dispensaries, have better medical equipment and work force. It could also be because some diagnostic procedures, such as X-ray and Ultra Sound, are only offered at health centres rather than dispensaries; making health centres the preferred option. The structural quality of maternal health care was discovered to be a key factor of health system responsiveness in this study, with high structural quality facilities having three times the odds of having good health system responsiveness as low structural quality facilities. This could be due to proper workforce levels, as well as the availability of needed supplies and solid infrastructure in high-quality institutions.

Maternal Health Service Utilization

Health service utilization is applied as a proxy measure in Sub-Saharan Africa to improve maternal health service quality and access [28, 29]. Before and after the investigation, health service usage data acquired from Tanzania's basic health care facilities revealed a significant rise in maternal service utilization. This is consistent with previous research conducted in Tanzania, such as the Tanzanian Service Provision Assessment (TSPA) and the Tanzanian Agricultural Research Agency (SARA), which also found similar results [30]

However, after eighteen months of DHFF implementation, there is a difference in the usage of maternal health services. As Kanyangarara and colleagues in 2017 revealed in another study, additional government activities might have led to greater utilization of maternal health services prior to the implementation of the DHFF, particularly among women who attend basic health care facilities[29]. ANC visits, ANC attendance before the 12th week of pregnancy, and the number of positive pregnant women who got ARV were the only three metrics that indicated positive significant mean differences in dispensaries versus health facilities. This is could be due to the availability of some of maternal health commodities at dispensaries due to DHFF, encouraging women to seek the care at the first point of call that is the dispensary.

The improvement in the availability of family planning, intermittent preventative malaria treatment, and other 30 tracer medicines between baseline and endpoint could be because the DHFF initiative has provided primary health care institutions with more funding, allowing them to order key health commodities before they run out. When funds were disbursed through the district head office, there was misappropriation and reduced autonomy, according to the World Bank's fiduciary system assessment [31]. The World Bank, According to the findings of this study, facilities with good structural quality are 41 times more likely to use maternal health care. This could be because, as several studies in Sub-Saharan Africa have demonstrated [24, 29] many women and other clientele prefer to employ high-quality services.

Fidelity of implementation towards DHFF initiative

There was a strong awareness of the presence of DHFF initiative (100%) which was connected with dilutions effects employed by cascade technique, only 76% of all health service providers had appropriate knowledge and 26% had poor knowledge even after the training. This could also be because certain institutions lacked DHFF guidelines which would have allowed them to get more understanding on their own about the DHFF project. Rural primary health providers, on the other hand, had 7 times more knowledge than urban primary health providers, which could be attributed to rural primary health providers having less workload and more time, allowing them to be more familiar with DHFF initiatives than urban primary health providers. Only 28% of the health care providers evaluated had high fidelity DHFF implementation, which is a low level of practice when considering that they had received DHFF training prior to introduction and had already started implementing six months after being introduced. Many studies around the world, however, have noted the difficulties and challenges faced by new innovations in achieving high fidelity, with Durlak and Dupre claiming that higher fidelity of implementation (85%) has been achieved in some contexts due to early monitoring of the program coupled with constant feedback to the responsible people and the program's need to be sustained[32, 33]

Furthermore, it was discovered that cascade training has resulted in health service providers failing to comprehend what they have been taught by their colleagues, resulting in failure in the implementation of theory of change description frameworks[34]. In addition, in some facilities, there is a lack of HFGC engagement or tenure ship in the decision-making process and implementation of the initiative, despite the fact that HFGC are administrative and financial decisions made at the primary health facility level according to Tanzania's instrumental relationship[35–37]. In line with prior Nurjono and associates, investigations, high implementation fidelity was highly linked to participants' adequate knowledge and the position held by health care workers in the health institution [38]. This is similar to a case study on the implementation of an improvement of community health (iCHF) in Dodoma, Tanzania, which found that implementers responded positively to a newly designed CHF, resulting in high implementation fidelity[39]. Despite this, due to DHFF training and financial resource obligations, health-care managers had a three-fold greater FoI of DHFF activity than their front-line colleagues. Furthermore, poor structural quality of maternal health care was found to be strongly associated to implementation fidelity, since health-care workers' performance is rewarded for DHFF efforts due to low patient/client turnout. Since a result, high maternal health service utilization was linked to low implementation fidelity, as higher performance was focused on DHFF implementation rather than service delivery.

Health Care Provider's experience on implementation of Direct Health Facility Financing in Public Primary Health Facilities.

Participants in this study's in-depth interview emphasized the benefits of the DHFF project as well as some of the difficulties that have been addressed since its inception, such as punctuality in cash disbursement and health-care utilization. This was also the situation in Kenya, where an evaluation study was carried out [40, 41]. Although they accepted that the cascade technique was utilized for teaching them, the participants demonstrated that they had awareness of the DHFF initiative and that they had received training that assisted them in the implementation of the DHFF project. Participants' attitudes toward the DHFF implementation, on the other hand, were positive, with the majority claiming that they had a good time with the initiative's implementation and that they are willing to take on the idea without hesitation. This could be due to the initiative's mandatory nationalization, as well as the fact that DHFF has been able to address a number of issues they had previously faced, such as late disbursement of funds and a lack of financial control. In this study, the existence of account assistants and FFARS, which facilitated the process, showed that the health facility's capacity for managing DHFF was good. In contrast, a study done in Kenya and Rwanda indicated that such facilities lacked adequate capacity to manage funding and the overall program[42].

Governance and Accountability on DHFF implementation

Governance

According to the findings of this study, the functionality of existing governance structures (health facility governing committee (HFGC)) is explored through a number of pre-determined themes, as some members stated: *"Our role is to authorise the allocated funds towards the facility's main objective."* This

demonstrated the main health facility's financial management autonomy and ownership without intervention from the district. A comparable study was undertaken in Kenya, where the facility's governing committee expressed similar concerns[41] However, in this study, the implementation of the Facility Financial Accounting System (FFARS) system for financial management in primary health care facilities overburdened health care professionals because the task was seen as an addition to their regular responsibilities.

On the other hand, planning and budgeting developed as a significant governance role because members of the planning and budgeting team were fully engaged in the assignment at the outset, allowing them to own what was happening at the health facilities during the implementation period. This is similar to findings from Kenya, where the introduction of direct facility financing assisted in the full engagement of all members of the community and health institutions in the planning and budgeting of welfare[40, 43]).Furthermore, a study conducted in European countries with similar contexts found that planning, budgeting, and finance are more crucial aspects of governance activities for primary health care institutions to thrive[44]. According to certain Tanzanian authors, governance structures play a critical role in the implementation of various interventions through effective planning and budgeting at the primary health care level [35, 45]

Accountability

The current study looked at two important elements of accountability: transparency and community involvement, as well as supportive supervision and mentorship. Both showed high levels of dimension synergy in the development of health service delivery quality at PPHFs. Involvement problems linked to reporting systems, inclusive decision-making processes, endorsement procedures, and the availability of revenue and expenditure data were examined as part of the transparency and community study. These were linked to PPHFs' compliance with external accountability systems. This finding indicates that the implementers adjured the relevance of HFGC throughout the entire process of making DHFF effective towards its ultimate goal in their ToC for DHFF[40]. According to a similar study undertaken in Kenya[40] (the functionality of HFGC rose dramatically once direct facility financing was introduced, owing to enhanced financial autonomy in the facilities. The current study's second level of accountability was helpful supervision and mentorship. Kapologwe and assicaites in 2019, suggested a ToC to measure the performance of DHFF in PPHFs [34]. The extent to which supportive supervision was investigated in the current study through in-depth interviews with health managers at the council and facility levels revealed anomalies in the execution of this crucial component. Members of the CHMT under the direction of the DHFF coordinator are responsible for ensuring quality planning and effective implementation of the plan, according to the DHFF operating standard

The examination at the council level confirmed that the plans presented by health facilities address all of the requirements as outlined in the health facility planning and budgeting guideline. Furthermore, the current practice addressed the proposed benefits of supportive supervision as recorded by other studies[46, 47] that affirm that mentorship and supportive supervisions at all levels ensure the quality of program implementation and effectiveness. In the current study, an in-depth interview with health

managers at the facility level revealed that supportive supervision is lacking since it is not completed on time due to funding constraints in some councils. In comparison to others, there were also solid financial management techniques in councils with sufficient supportive supervision and guidance. These findings were similar to those reported in Kenya, Tanzania, and Pakistan investigations[15, 35, 48]. However, the current study differs from earlier studies in that it was conducted in a more decentralized environment, with health facilities being given the authority to plan and use their own resources.

Conclusion

The findings of this research have established the foundation for future research. It allows for highly precise future impact and process evaluations in areas connected to DHFF as a crucial component of health system performance as we move closer to universal health care. According to the findings of this study, there has been a significant rise in health system responsiveness in Tanzania since the implementation of the DHFF. There was likely of confounding effects from some existing initiatives such as RBF and continuing restoration and building of primary health care facilities. Furthermore, since the DHFF project was implemented, there has been a significant change in the structural quality of maternal health services as well as maternal health service utilization. The results of this study revealed that the governance of the DHFF program necessitates collaboration from both the supply and demand sides. It is crucial that the governance structures are strengthened as they determine the program's success and, hence, its long-term viability. Internal accountability among health managers elicited conflicting responses, with some participants admitting to good responsibility and others claiming that there are insufficient accountability measures in place. As a result, despite the fact that the majority of health-care practitioners had enough experience, the DHFF effort's implementation fidelity was poor. This conclusion necessitates a review of the training approach employed, as well as a search for motivators and facilitators required to carry out the DHFF program as planned. This study also offers important feedback to the development partners and policy makers to strengthen health structures in the primary health care level in resource limited countries like Tanzania. Through DHFF fiscal decentralization establish good environment for HFGC’s to accomplish their responsibilities which impacts accountable health structures. Both external and internal support is still needed to strengthen more conducive environment for health care workers through capacity building and sensitizing them to continue managing primary health care facilities.

Recommendations

As a result, we strongly urge that HSR surveys using exit interviews be conducted routinely such as on a monthly or quarterly basis at all primary health care institutions in order to provide feedback to facility management as well as district and regional officials on areas where they may improve. Furthermore, the study suggests that all financial resources, as well as all financial management tools, be made available to all primary health care facilities in order for them to conduct proper bookkeeping in accordance with the government's financial regulations and memorandum. Some of the things which need to be done to

maximize the effect of the initiative is by making sure all the funds that disbursed to the Local Government level follows the DHFF guidelines so that fidelity of implementation can be appreciated.

Methodological considerations

The strength of this study is being conducted before and after DHFF introduction, however, this research has several limitations. The main weakness of this study is that it used a non-controlled before and after design because the DHFF effort was launched as part of a national initiative; hence, there is no control. A case-control study or experimental approach would have been ideal in this circumstance, but that could not be done since DHFF has been implemented for a while.

The study used a cross-sectional survey at both the baseline and endpoint, which only provides a snapshot of thoughts at that time, making it impossible to demonstrate a causal effect pathway. Also the study relied on utilization statistics to measure maternal health service utilization, which is insufficient when compared to other social demographic indicators like education level and social quintile level.

Abbreviations

CHSB: Council Health Service Board

DHFF: Direct Health Facility Financing

FFARS: Facility Financial Accounting and Reporting System

FoI: Fidelity of Implementation

HFGC: Health Facility Governing Committees

HSR: Health System Responsiveness

PPHFs: Public Primary Health Facilities

Declarations

Ethics approval and consent to participate

Ethical approval for this study has been granted by the University of Dodoma (UDOM) ethical clearance committee and endorsed by the National Health Research Ethics Committee (NatHREC)-(Ref.No.NIMR/HQ/R.8a/Vol.IX/2740). All interviewees signed an informed consent form prior to the administration of the questionnaire and were assured full confidentiality and anonymization.

Consent for publication

Not applicable.

Availability of data and materials

Data used/analysed for conducting this research can be availed if requested.

Competing interest

GMR, SMK, HS, GM and AK declared no competing interest, however NAK, SM and JTK works at the President's Office Regional Administration and Local Government (PORALG)

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Authors contribution

NAK, GMR, SMK, HS, GM, SM, JTK and AK developed and reviewed the Manuscript. All authors read and approved the final manuscript.

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Tables

Table 1: Perception of Patients towards Health System Responsiveness before and after implementation of Direct Health Facility Financing (DHFF) in Public Primary Health Facilities (PPHF) (n=844, p=0.05)

Domain	Patient's perception before DHFF implementation (Mean [95% CI])	Patient's perception after DHFF implementation (Mean [95% CI])	Mean deference	T-value	P-value
Respect of autonomy	76.74[74.18, 79.30]	85.60[83.89, 87.30]	8.86	5.67	<.0001
Quality of basic amenities	62.30[61.16, 63.45]	69.07[68.26, 69.88]	8.17	9.51	<.0001
Access to care	48.61[46.63, 50.59]	55.44[53.85, 57.02]	6.83	5.30	<.0001
Respect for dignity	78.95[76.82, 81.07]	82.02[80.28, 83.75]	3.07	2.20	0.0282
Prompt attention	79.40[77.48, 81.32]	81.01[79.47, 82.55]	1.61	1.28	0.2000
Clear communication	74.64[72.31, 76.98]	61.22[59.74, 62.69]	13.43	-9.58	<.0001
Respect for confidentiality	87.64[85.01, 90.26]	85.70[84.05, 87.36]	1.93	-1.22	0.2210
Overall responsiveness	**62.84[61.88, 63.80]**	**71.20[70.42, 71.97]**	**8.36**	**13.33**	**<.0001**

Table 2: Characteristics of the public primary Health facilities before and after implementation of Direct Health Facility Financing (n=42).

Variable	Before DHFF		After DHFF	
	Number of HFs	Percentage	Number of HFs	Percentage
Location of health facility				
Urban	21	50.00	21	50.00
Rural	21	50.00	21	50.00
Facility type				
Dispensary	28	66.67	28	66.67
Health centre	14	33.33	14	33.33
Number of staffs (Mean, SD, Range) Dispensary	6(6,2-34)		6(4,2-18)	
0 – 14	26	92.86	24	88.89
≥15	2	7.14	3	11.11
Number of staffs (Mean, SD, Range) Heath centre	39(33,10-110)		42(35,13-120)	
0 – 38	10	71.43	9	60.00
≥39	4	28.57	6	40.00
Availability of ambulance				
Not available	28	66.67	28	66.67
Available	14	33.33	14	33.33
Status of HFGCs				
Dispensary				
Active	167	95.98	112	82.35
Inactive	7	4.02	24	17.65
Health center				
Active	168	96.55	96	94.12
Inactive	6	3.45	6	5.88

Table 3: Change in Maternal Health Service Utilization before and after implementation of Direct Health Facility Financing in Public Primary Health Facilities (n=42, p= 0.05).

Indicator	Before DHFF (2017)	After DHFF (2019)	Difference Mean	Student's t	p-value
Institutional deliveries					
Dispensary	170	194	72	4.39	0.0003
Health center	1203	1701	526	2.55	0.0244
Overall	537	765	249	2.85	0.0074
Use of IPT2					
Dispensary	197	465	271	3.59	0.0016
Health center	1004	1091	4.92	0.01	0.9885
Overall	492	686	175	1.36	0.1835
Number of ANC mother initiated on Mebandazole (De-Worming)					
Dispensary	302	428	127	3.56	0.0016
Health center	974	1172	325	1.64	0.1295
Overall	537	676	191	2.78	0.0085
Number of Women attending 4th ANC Visit					
Dispensary	137	263	181	4.50	0.0001
Health center	363	831	573	3.47	0.0046
Overall	220	452	315	4.62	< .0001
Number of HIV positive pregnant on ARVs					
Dispensary	17	3	-19	-3.44	0.0262
Health center	39	14	-35	-34.67	0.0061
Overall	24	7	-24	-24.62	0.0009
Number of new users on modern Family Planning methods					
Dispensary	826	1225	595	4.04	0.0005
Health center	2961	2838	408	1.04	0.3154
Overall	1589	1819	262	3.114	0.0036
Public health facility with all 30-tracer medicines.					
Dispensary	91.23	95.61	4.36	4.31	0.0002

Health center	92.72	95.13	2.41	0.92	0.3717
Overall	91.77	95.44	3.6439	3.20	0.0027
Number of mothers receiving Post Natal Services within 3-7 days after delivery					
Dispensary	63	119	52	2.69	0.0126
Health center	591	653	62	1.12	0.2824
Overall	256	310	56	2.39	0.0219
ANC before 12 weeks of Gestation					
Dispensary	50	145	95	3.54	0.0022
Health center	202	431	216	3.99	0.0021
Overall	107	246	140	5.04	<. 0001
Overall Utilization					
Dispensary	1657	2386	1149	4.39	0.0002
Health center	7243	8374	1130	1.76	0.0998
Overall	3652	4794	1143	4.09	0.0002

Table 4: Level of FoI among Health Service Providers in PPHFs

Variable	Frequency (Percent)
Knowledge	
Adequate knowledge (>9.9878049)	180 (75.63)
In adequate knowledge (<=9.9878049)	58(24.37)
Fidelity/ Adherence	
High fidelity (>=80%)	66(27.73)
Low fidelity (<80%)	172(72.27)

Table 5: Association between Changes of Structural Quality by Fidelity of Implementation

Variable	Overall Structural	Quality of Maternal Health Services	Chi-square	P-value
	Low Structural Quality (%)	High Structural Quality (%)		
FoI			3.8199	0.0506
Low fidelity	76(44.19)	96(55.81)		
High fidelity	20(30.30)	46(69.70)		

Table 6: Association between overall changes of health service utilization and Fidelity of Implementation of Direct Health facility Financing in PPHFs.

Variable	Utilization		Chi-square	P-value
	Low maternal health service utilization (%)	High maternal health service utilization (%)		
FoI			16.3856	<. 0001
Low fidelity	16(9.30)	156(90.70)		
High fidelity	20(30.30)	46(69.70)		

Appendix

Appendix 1: Visited District Councils

Region	Council
Dodoma	• Dodoma City Council • Bahi District Council
Pwani	• Kibaha Town Council Kisarawe District Council
Mtwara	• Mtwara Municipal Council Nanyumbu District Council
Mbeya	• Mbeya City Council • Rungwe City Council
Shinyaga	• Shinyanga Municipal Council • Ushetu District Council
Manyara	• Babati Town Council • Hanang District Council in
Kitavi Region	• Mpanda Municipal Council • Mlele District Council

Figures

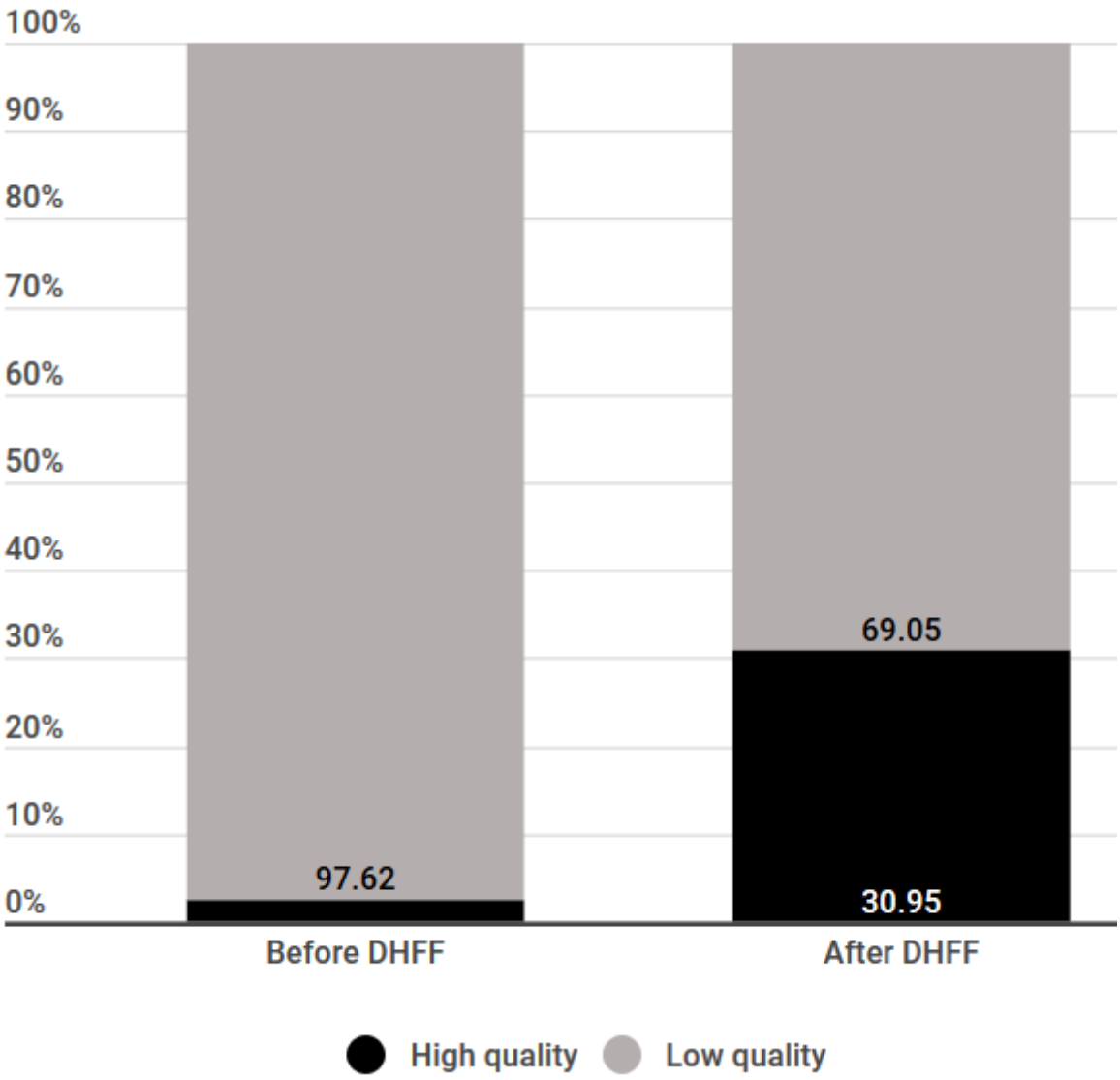

Figure 1

Percentage Change of Structural Quality of Maternal Health service in Public Primary Health Facilities before and after implementation of Direct Health Facility Financing (n=42).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementalMaterialQuestionnarel.doc