

## RESULT BASED FINANCING PROGRAMME IMPACT ON UTILIZATION OF MATERNAL HEALTH SERVICES IN URAMBO

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**ABSTRACT:** The introduction of Result Based Financing to Sub Sahara Africa came as a result to increased maternal death (86% of 289,000 Global maternal death), with decreased expenditure on health sector (9% compared to 15% of European countries) with the main intention to raise health services utilization. This study aimed at evaluating the worth of RBF on utilization of maternal health services through its interventions of paying incentives to health staff, improving facility infrastructure and purchasing essential health commodities to health facilities. Quasi experimental evaluation study, with multistage sampling technique was conducted in Urambo district by comparing intervention and control groups. Baseline data for both groups was collected from DHIS 2 and associations were tested using Chi square at 95% confidence level and 0.05 P-value. After RBF implementation, the performance of health workers with financial incentive was approximately 87% in intervention group compared to 44.7% in control group. Institutional delivery cumulated 51% of all incentives paid to health staff. Likewise, the availability of 50% of medicines and supplies for maternity and postnatal service areas has made an increase for almost twice in the institutional delivery for intervention group (87%) compared to control group (44.7%). It has been concluded that Health workers are motivated to perform duties with high incentives and that RBF was effective on utilization of maternal health services but limited to prenatal visits before 12 weeks and institutional deliveries with effect size of 0.12 and 0.21 respectively.

**Key words:** health staff Incentives, health commodities, facility infrastructure, maternal health service utilization

### I. INTRODUCTION

The result based financing (RBF) is a strategic programme funded by World Bank and USAID to low income countries that develop health facilities resources based on their achievements. These achievements are obtained after quarterly monitoring of predefined and agreed indicators directed to improve the performance of health care providers (Grittner, 2013; The World Bank, 2013; USAID, 2012). Financial instability in Sub Saharan Africa was linked with low performance of health staff, and has also been considered as the reason of failure to achieve the MDG 5 target. While the maternal mortality ratio worldwide dropped from 380 maternal deaths per 100,000 live births in 1990 to 210 in 2013 (United Nations, 2015), sub Saharan Africa alone accounted 86% of prevailing estimated 289,000 Global maternal deaths, with only 9% of expenditure on health sector compared to 15% of the European countries (Africa Progress Panel, 2010). This situation caused the emergence of RBF to African region.

The Tanzanian Government launched RBF as a pilot programme in Kishapu district in 2015 and rolled out in 9 regions including Tabora in 2017 while in Urambo district, 16 out of 23 dispensaries were enrolled after BRN star rating criteria assessment in 2016. RBF has 19 quantity indicators for verification at the end of every quarter, each with specific amount of money set per service offered to one consumer. The number of client's attendances defines the amount of fund to be paid to that particular health facility for each indicator (MoHSW, 2015a, 2015b).

In Urambo district, the deterioration of maternal conditions was believed to be further contributed by the phase out of the Tabora Adolescence and Safe Motherhood (TABASAM) project from Care international that was engaged more on raising the utilization of maternal services by the community and went concurrently

with the withdrawal of EGPAF financial support to reproductive and child health interventions within the district in 2016. In this year, the number of maternal death increased from 12 to 15, the Council management team associated this information with poor utilization of RCH clinic during ANC and delivery as well as after delivery (CHMT Urambo, 2017; Tanzania HMIS, 2016b, 2016a). CHMT of Urambo considered RBF as financial replacement to improve the maternal conditions within the district.

The RBF fund comprises of resources for facility investment (availability of essential maternal health commodities, and improving facility infrastructure) and monetary incentives to health staff aiming to improve maternal health condition from when a woman has noticed that she is pregnant (prenatal stage), continues during the period of labour pain to delivery (intrapartum stage) and ends up to 42 days after delivery (postnatal stage) (MoHCDGEC, 2016; MoHSW, 2015a). These stages are measured by a set of indicators each (MoHCDGEC, 2016; MoHSW, 2015a)

Since the implementation of RBF in January 2017, Urambo district has been the highest funded district from RBF in Tabora region. The annual disbursement of fund to Urambo from RBF is 397,960,244 Tshs for only sixteen (16) dispensaries (Tanzania HMIS, 2018). This high payment to Urambo district is expected to conform to the quality and quantity of health facility service delivery, and be reflected to maternal health service utilization by the community around.

The majority of evaluation reports portrayed positive results about RBF effects, specifically on utilization of maternal health services in terms of hospital deliveries by skilled staff. Evidence from 13 RBF programme evaluations supported the argument, while slight changes were reported in prenatal and postnatal services. However, different models of RBF were implemented at different areas including the PBF, PBC, P4P, HEF, CCT and Vouchers for health, as a result, different methods were used by different evaluators for each RBF model implemented. These might be the reasons that suggest the variation of findings in prenatal and postnatal indicators.

The above variation in findings to prenatal, intrapartum and postnatal indicators suggest a need for an evaluation in Urambo District as generalizability became unpractical. For the fact that there is no any evaluation of such kind that has been conducted at Urambo district and that many authors called for more researchers to examine RBF programme effectiveness, this evaluation is sought to ascertain the effects of RBF incentives offered to health providers, improved their working environment and availability of health commodities at maternity wards and RCH clinics on maternal health services utilization after five quarters of RBF implementation.

Moreover, Even though, the RHMT is conducting quarterly internal verification of health facilities to produce the evidence for RBF payment, there is still a need for an external counter verification to evaluate the worth of RBF programme on the utilization of maternal health services by the people of Urambo. Therefore, this evaluation aimed to *evaluate the utilization of maternal health services after RBF programme implementation in Urambo District*, with the main question of: *“To what extent is RBF programme improved maternal health services utilization in Urambo District?”*

## II. METHOD

### 2.1. Evaluation Design and Area

This evaluation is an outcome quasi experimental study design based on quantitative paradigm. Pre - test observation was secondary data from DHIS 2 database before RBF implementation in 2016 and post - test observation was conducted at the consumers of maternal health services (community) after RBF intervention in April 2018. RBF interventions were staff incentives, improvement of facility infrastructure and availability of health commodities. The expected results were the changes in services utilization measured after RBF implementation for both intervention and control groups.

This study was conducted in Urambo District, one among 59 councils that implement the Result Based Financing programme in the country to improve the utilization of maternal health services. Due to familiarity with the council, the researcher decided to conduct this evaluation study in 7 wards of Mchikichini, Muungano, Nsenda, Uyogo, Songambele, Kiloleni and Ugalla. The findings were however generalized to 11 remaining wards of Urambo district that were not covered by the study (National Bureau of Statistics Tanzania (web), n.d.). This evaluation was conducted for the period of seven months starting from December 2017 to June 2018

### 2.2. Evaluation Subjects and Sampling

The target population was households of Urambo District. With 80% relative chance of detection (Power) and the expected type I and type II errors are 5 and 20% respectively. The samples of 150 households for intervention group and 90 households for control group were calculated using the formula for sample size calculation by creative research systems- formula (2016) as follows:

$$n = \frac{(1.96)^2 pq}{d^2} =$$

$$(3.8416)(0.8)(0.2) = 245$$

0.0025

Where:  $n$  = required sample

$q = 1-p$

$p$  = maximum variability of population (0.8)

$d$  = margin of error (0.05)

Multi stage sampling technique was used as follows.

Stage 1: All health facilities enrolled to RBF programme were listed to generate the sampling frame of 16 health facility where each facility had an equal chance of being included into the sample. By using probability sampling procedure, the sample of five (5) health facilities was selected from the list into the intervention group. And 3 facilities of those not enrolled to RBF programme were taken directly into the control group.

Stage 2: From the selected health facilities for both intervention and control groups, the list of households served by these facilities were prepared by village executive officers (VEO) and community health workers (CHW). For both intervention and control groups, households were then selected randomly from the list to get 121 households for intervention group and 73 households for control group to generate the sample of 194 households that were involved into the study.

### 2.3. Measurement

This evaluation study, focused on the extent to which the community was using their health facility to get maternal health services. The baseline situation of maternal health care utilization status before the implementation of RBF programme was portrayed for both intervention and control groups and counter community survey conducted to collect the end line information. Maternal health services utilization findings were converted from percentages into ratios to facilitate the computation of differences not only between base and end line data but also between intervention and control groups. Finally four (4) indicators were used to measure the utilization of maternal services at prenatal clinic, one (1) at maternity ward and one (1) at postnatal clinic in association of staff incentives. Health commodities were categorized to as available if at least 2 items are available at maternal health working area and facility infrastructure indicators scores were summarized to *poor, fair or good*.

### 2.4. Data Collection Tools and Pre-Testing

A Swahili translated semi structured questionnaire was used to collect information for utilization of maternal health service from the community. Whereas an English checklist was used to collect data for staff incentives, facility commodities and infrastructure as well as DHIS 2 baseline information. Both tools were pre tested and reviewed. Levels of education were reduced from eleven (11) and condensed to four (4) that respondents could understand in the questionnaire; questions to determine the availability of facility commodities that their names made confusion to respondents were added to the checklist; and some questions were omitted from questionnaire.

### 2.5. Data Analysis

Data collected was processed using Microsoft excel, and analyzed using Stata. Frequencies and proportions were computed, comparisons between groups pre and post observations was made. Association of health workers incentives and health facility commodities was tested against utilization of maternal health services using Chi square, at 95% confidence level and 0.05 P value. Conclusion was drawn by calculating the effect size of RBF programme.

### 2.6. Ethical Consideration

The Mzumbe University Directorate of Research, Publication and Postgraduate studies (DRPS) approved this evaluation proposal and granted a letter to the District Executive Director of Urambo District Council to seek permission of collecting data to working areas that are under his authority. Since there was involvement of human subject as participants, each participant was given a copy of written informed consent to read, ask questions and made decision by putting signature on the consent to indicate her participation into the evaluation. All collected information from participants was kept confidential and subjected not otherwise than academic purposes.

## III. FINDINGS

### 3.1. Financial Incentive Rewarded to Health Staff of Maternity Wards and RCH Clinics

The total amount of 12,429,263.87 Tshs was paid to health workers of five (5) health facilities forming the intervention group (*See Table 1*).

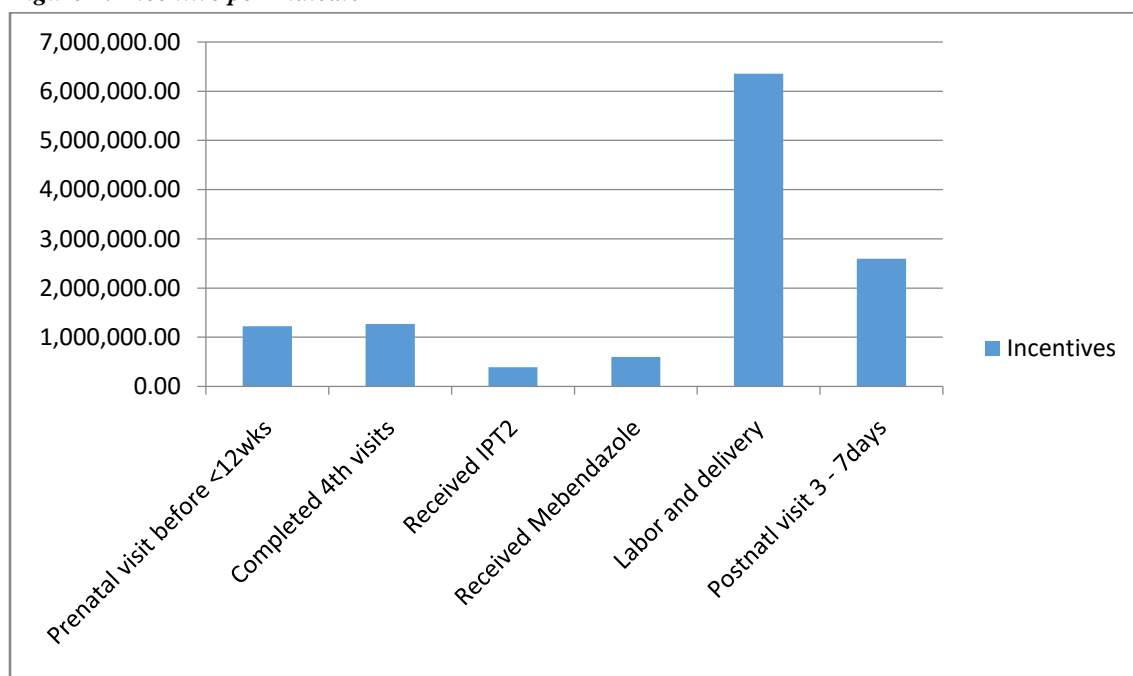
Table 1: Incentive paid to health facilities per each indicator (n=5)

Health facility	ANC <12wks	Completed 4 visits	IPT2	Meb	Institutional deliveries.	3 - 7 days after delivery	Total	%
Igunguli	347,815.66	291,870.00	62,436.95	125,245.92	1,393,420	384,724.81	2,605,513.33	21.0
K/mela	115,404.06	215,021.25	50,139.99	49,449	675,990	169,411.5	1,275,415.8	10.3
Isongwa	91,190.00	111,034.80	45,418.32	94,264.10	989,380	426,935.00	1,758,222.22	14.1
I?landa	385,485.00	324,472.50	130,510.00	212,748.88	1,688,680.	1,004,164.80	3,746,061.18	30.1
S/mbele	281,549.13	323,452.82	101,766.49	117,187.91	1,610,980.	609,315.00	3,044,251.34	24.5
Total	1,221,443.84	1,265,851.37	390,271.74	598,895.81	6,358,450.	2,594,551.11	12,429,463.87	100
Percentage	9.8	10.2	3.1	4.8	51.2	20.9	100	

Source: DHIS 2

Approximately half of the total incentives were paid for institutional deliveries by skilled health provider (51.2%) followed by postnatal visits within 3 – 7 days after delivery (20.9%) and the least paid is the second dose of Intermittent presumptive therapy for malaria (IPT2) (3.1%)

Figure 1: Incentive per Indicator



Source: DHIS 2

### 3.2. Availability of Essential Health Commodities to Maternity Wards and RCH Clinics.

Before RBF implementation, availability of medicine and supplies displayed very slight change to the situation after RBF implementation for both prenatal and postnatal areas.

Hospital supplies at prenatal clinic were highly available by 63.2% compared to 57.9% before RBF, however furniture was the only commodity that was purchased to all three maternal working areas 52.6% at prenatal and 38.9% each at maternity ward and postnatal clinic with no purchase before RBF implementation; while Medicines and supplies were purchased at maternity and postnatal clinic by 50% each with an increase of 3.7% compared to before RBF implementation (see Table 2).

*Table 2: Availability of commodities before and after RBF implementation*

	Prenatal (n=57)	clinic	Delivery (n=54)	and	postnatal areas
<b>Before RBF implemetation</b>					
<b>Commodities</b>	Supplies	Furniture	Medicines	Supplies	Furniture
Availability	33	0	25	25	0
<b>Percentage</b>	<b>57.9</b>	<b>0</b>	<b>46.3</b>	<b>46.3</b>	<b>0</b>
<b>After RBF implemetation</b>					
<b>Commodities</b>	Supplies	Furniture	Medicines	Supplies	Furniture
Availability	36	30	27	27	21
<b>Percentage</b>	<b>63.2</b>	<b>52.6</b>	<b>50</b>	<b>50</b>	<b>38.9</b>

**Source:** Researcher (2018)

### 3.3. The Status of Health Facility Infrastructure.

Infrastructure indicators were status of the building that qualified the roofing, sealing body, floor and walls; the availability of water source that measure not only presence of dip well, Sim tank or harvesting tank but also the accessibility of that water throughout the whole year; the availability of power source including the national grid and alternative power source (solar energy and/or m-power); and means of communication that involves the availability of communication network and passable road throughout the whole year; finally the availability of emergency transport that measure the amount of time from the need to execution. (See Table 3 and 4).

**Table 3: Health facility infrastructure status before and after RBF implementation**

*Intervention group*

Period	Before RBF implementation															After RBF implementation														
Health facility	Status of the building			Water source			Power source			Communication			Emergency transport			Status of the building			Water source			Power source			Communication			Emergency transport		
Score	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
Igunguli	0	0	24	0	0	24	0	0	24	24	0	0	0	0	24	24	0	0	24	0	0	24	0	0	24	0	0	24	0	0
Isongwa	0	0	20	0	0	20	0	0	20	20	0	0	20	0	0	0	20	0	20	0	0	20	0	0	20	0	0	20	0	0
Itebulanda	0	0	25	25	0	0	0	0	25	25	0	0	0	25	0	25	0	0	25	0	0	25	0	0	25	0	0	25	0	0
Kalemela	0	0	19	0	0	19	19	0	0	19	0	0	0	19	0	19	0	0	0	19	0	19	0	0	19	0	0	19	0	0
Songambebe	0	0	23	23	0	0	0	0	23	23	0	0	0	23	0	0	23	0	23	0	0	23	0	0	23	0	0	23	0	0
<b>Total</b>	0	0	<b>111</b>	<b>48</b>	0	<b>63</b>	<b>19</b>	0	<b>92</b>	<b>111</b>	0	0	<b>20</b>	<b>67</b>	<b>24</b>	<b>68</b>	<b>43</b>	0	<b>92</b>	<b>19</b>	<b>0</b>	<b>111</b>	<b>0</b>	<b>0</b>	<b>111</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>67</b>	<b>24</b>
%	0	0	<b>100</b>	<b>43.2</b>	0	<b>56.8</b>	<b>17.1</b>	0	<b>82.9</b>	<b>100</b>	0	0	<b>18</b>	<b>60.4</b>	<b>21.6</b>	<b>61.3</b>	<b>38.7</b>	0	<b>82.9</b>	<b>17.1</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>18</b>	<b>60.4</b>	<b>21.6</b>

Source: Researcher (2018)

**Table 4: Health facility infrastructure status before and after RBF implementation**

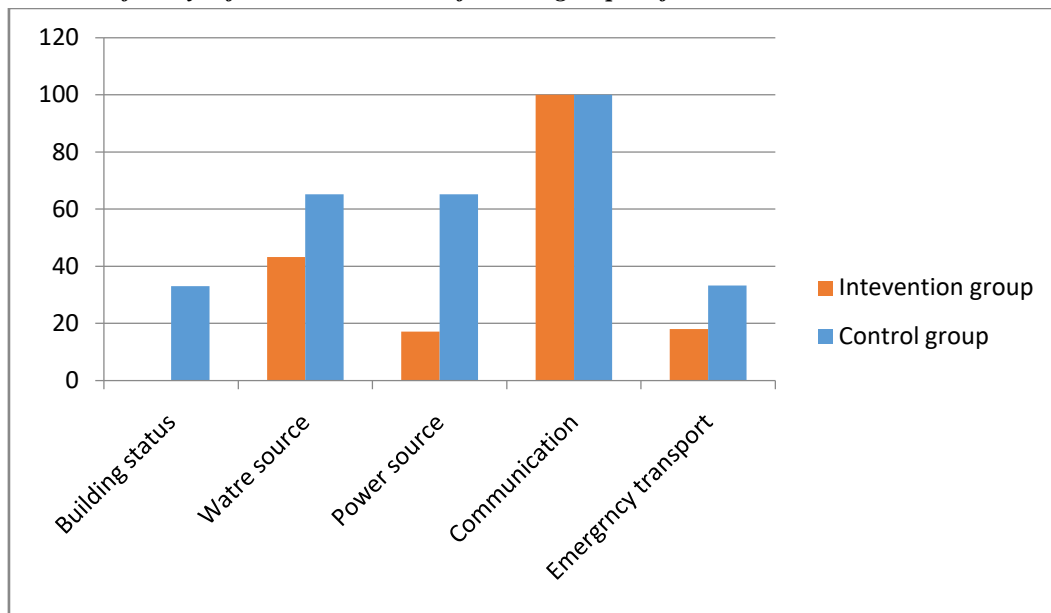
*Control group*

Period	Before RBF implementation															After RBF implementation														
Health facility	Status of the building			Water source			Power source			Communication			Emergency transport			Status of the building			Water source			Power source			Communication			Emergency transport		
Score	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor	Good	Fair	Poor
Jionee	0	24	0	0	0	24	0	24	0	24	0	0	0	24	0	0	24	0	0	0	24	24	0	0	24	0	0	24	0	0
Kamsekwa	23	0	0	23	0	0	23	0	0	23	0	0	23	0	0	0	23	0	23	0	0	23	0	0	23	0	0	23	0	0
Kiloleni	0	22	0	22	0	0	22	0	0	22	0	0	0	22	0	22	0	0	22	0	0	22	0	0	22	0	0	0	22	0
<b>Total</b>	<b>23</b>	<b>46</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>24</b>	<b>45</b>	<b>24</b>	<b>0</b>	<b>69</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>46</b>	<b>0</b>	<b>46</b>	<b>23</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>24</b>	<b>69</b>	<b>0</b>	<b>0</b>	<b>69</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>46</b>	<b>0</b>
%	<b>33.3</b>	<b>66.7</b>	<b>0</b>	<b>65.2</b>	<b>0</b>	<b>34.8</b>	<b>65.2</b>	<b>34.8</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>33.3</b>	<b>66.7</b>	<b>0</b>	<b>66.7</b>	<b>33.3</b>	<b>0</b>	<b>65.2</b>	<b>0</b>	<b>34.8</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>33.3</b>	<b>66.7</b>	<b>0</b>

Source: Researcher (2018)

Before implementation of RBF, both intervention and control groups had good means of communication (100), but the majority of health facility building infrastructure in intervention group were poor (100%) compared to control that not only they had one quarter of their building in good status of repair, but they were also ahead of intervention group in availability water and power sources and even for time consumed waiting for transport during emergencies by 21.8%, 48.1% and 15.3% (See Table 3, 4 and Figure 2)

**Figure 2: Health facility infrastructure statuses for both groups before RBF**



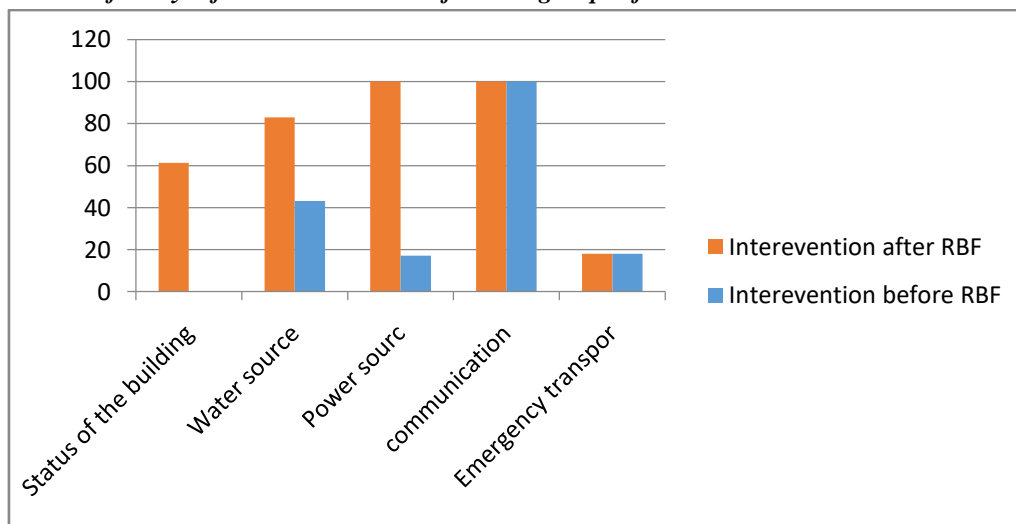
Source: Researcher (2018)

After RBF implementation, the score matrix with the same categories as before its implementation changed and demonstrated improvement of infrastructure in intervention group for all inspected indicators as it had also appeared in control group.

Specific changes for both intervention and control groups were similar changes of their facility in reliability of electricity (100%) and improved building status by 61.3% and 66.7% respectively with no change in availability of water sources, Communication and emergency indicators (See Table 3 and 4).

Score for intervention group on facility building indicator shifted from 100% poor condition to 61.3 % of good state of repair, and an increase of almost 50% in availability of power and water sources by 82.9% and 50% respectively while communication and emergency transport remained constant (See Figure 3).

**Figure 3: Health facility infrastructure statuses for both groups after RBF**



Source: Researcher (2018)



### 3.4. Utilization of Maternal Health Services Delivered at Prenatal, Intrapartum and Postnatal Periods as a Result of RBF Programme Initiative

The baseline data in intervention group explained that out 2400 clients, the majority 2,354 (98.1%) received anti worm medicine; while 510 (21%) visited the clinic before 12 weeks of pregnancy; 1,136 (47.3%) completed their 4<sup>th</sup> prenatal visits before delivery and 1,149 (47.9%) received the second dose of Intermittent Presumptive Therapy for malaria (IPT2) at prenatal clinic. For the maternity ward and postnatal clinic 1,085 (45.2%) cases were reported for institutional deliveries assisted by skilled staff and 823 (34.3%) returned for postnatal services consultations within 3 – 7 days after giving birth (*See Table 5*) (National Bureau of Statistics, 2016).

**Table 5: Maternal health service utilization before RBF implementation**

Health facility	Target	ANC <12wks	%	4 visits	%	IPT2	%	Meb	%	Inst. Deliv.	%	3-7 days	%
<b>Intervention group (n=2,400)</b>													
Igunguli	647.0	201.0	31.1	321.0	49.6	243.0	37.6	802.0	124.0	289.0	44.7	198.0	30.6
Isongwa	239.0	49.0	20.5	120.0	50.2	130.0	54.4	152.0	63.6	152.0	63.6	150.0	62.8
I/landa	738.0	169.0	22.9	341.0	46.2	359.0	48.6	905.0	122.6	320.0	43.4	276.0	36.2
K/mela	528.0	24.0	4.5	151.0	28.6	205.0	38.8	238.0	45.1	127.0	24.1	62.0	11.7
S/mbele	248.0	67.0	27.0	203.0	81.9	212.0	85.5	257.0	103.6	197.0	79.4	146.0	58.9
Total	2,400	510.0	21.3	1,136	47.3	1,149	47.9	2,354	98.1	1,085	45.2	823.0	34.3

Source: DHIS 2/NBS 2016

The total number of respondents in end line information was the sample of 180 respondents where by 111 (61.7%) respondents were in intervention group and 69 (32,3%) were in control group. In intervention group, out of 111 respondents, 57 (51.3%) pregnant women attended prenatal services while 54 (48.6%) were already delivered. At prenatal clinic, pregnant women who received IPT2 were 43 (75.4%), followed by those who received Mebendazole 39 (68.4%) and prenatal visits before 12 weeks of pregnancy 22 (38.6%) and lastly those who completed 4 visits before delivery accounted 10 (17.5%) only.

For institutional deliveries assisted by skilled personnel scored 47 (87%) out of 53 deliveries, and postnatal visits 3 – 7days post delivery 32 (59.3%) (*See Table 6*).

**Table 6: Maternal health service utilization after RBF implementation in intervention group**

Health facility	Prenatal attendance	ANC <12wks	%	Completed 4 visits	%	IPT 2	%	Meb	%	Deliveries	Inst. Deliv.	%	PNC 3 – 7 days	%
<b>Intervention group (n=111)</b>														
Igunguli	19	9	47.4	7	36.8	8	42.1	8	42.1	5	3	50	4	75
Isongwa	8	4	50.0	0	0.0	9	112.5	6	75.0	12	8	66.7	5	41.7
I/landa	9	3	33.3	0	0.0	8	88.9	8	88.9	16	16	100	15	93.7
K/mela	8	0	0.0	1	12.5	6	75.0	4	50.0	11	11	100	4	36.4
S/mbele	13	6	46.2	2	15.4	12	92.3	13	100.0	10	9	90	4	40
Total	57	22	38.6	10	17.5	43	75.4	39	68.4	54	47	87	32	59.3

Source: Researcher (2018)

Whereas the control group constituted 1,479 expected pregnant women and mothers, out of them 1,144 (77.3%) received anti worm medicine, 339 (22.9%) visited the clinic before 12 wks of pregnancy, 652 (44.1%) completed their 4<sup>th</sup> prenatal visits before delivery and 840 (56.8%) received IPT2. At maternity and postnatal clinic 355 (24%) mothers were reported for institutional deliveries assisted by skilled staff and only 268 (18.1%) returned for postnatal services within 3 – 7 days (*See table 7*).



Table 7: Maternal health service utilization before RBF implementation in control group

Health facility	Target	ANC <12wks	%	4 visits	%	IPT2	%	Meb	%	Inst. Deliv.	%	3-7 days	%
<b>Control group (n=1,479)</b>													
Jionee	468.0	85.0	18.2	221.0	47.2	143.0	30.6	385.0	82.3	196.0	41.9	124.0	26.5
K/sekwa	545.0	86.0	15.8	253.0	46.4	435.0	79.8	542.0	99.4	0.0	0.0	46.0	8.4
<b>Kiloleni</b>	<b>466.0</b>	<b>168.0</b>	<b>36.1</b>	<b>178.0</b>	<b>38.2</b>	<b>262.0</b>	<b>56.2</b>	<b>217.0</b>	<b>46.6</b>	<b>159.0</b>	<b>34.1</b>	<b>98.0</b>	<b>21.0</b>
<b>Total</b>	<b>1,479</b>	<b>339.0</b>	<b>22.9</b>	<b>652.0</b>	<b>44.1</b>	<b>840.0</b>	<b>56.8</b>	<b>1,144</b>	<b>77.3</b>	<b>355.0</b>	<b>24.0</b>	<b>268.0</b>	<b>18.1</b>

Source: DHIS 2/NBS 2016

After RBF implementation, the control group that has not been exposed to RBF interventions has the total number of 69 respondents, out of them 31(44.9%) were pregnant and 38 (54.1%) were delivered. Like in intervention group, pregnant women who received IPT2 led to 27 (87.1%), followed by those who received Mebendazole 21 (67.7%), then those who completed 4 visits before delivery 10 (32.3%) and lastly prenatal visits before 12 wks of pregnancy 9 (29.0%). Institutional deliveries assisted by skilled personnel accounted 17 (44.7%) out of 38 deliveries, and 3 - 7 days after delivery 21 (55.3%) (See Table 8).

Table 8: Maternal health service utilization after RBF implementation in control group

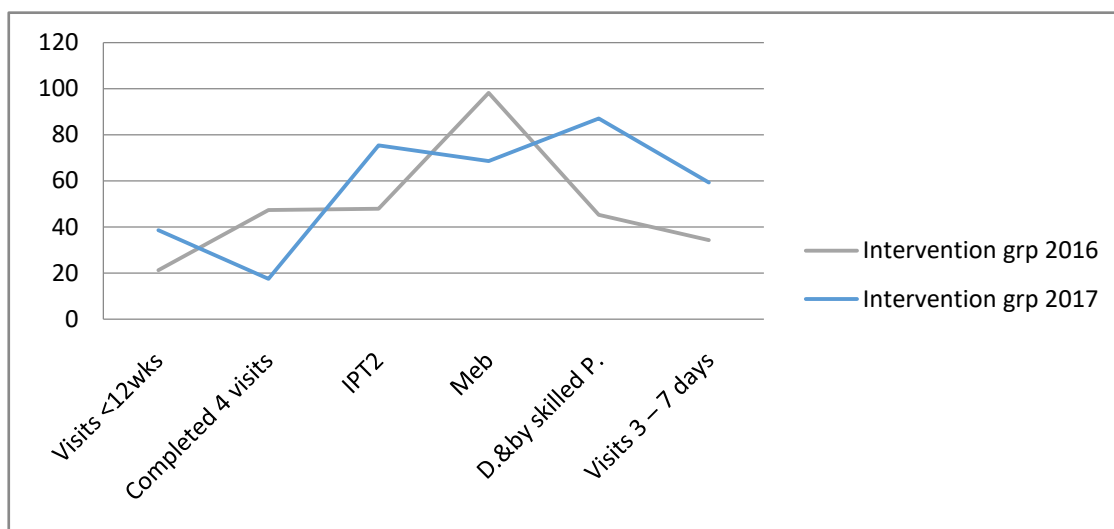
Health facility	Prenatal attendance	ANC <12wks	%	Completed 4 visits	%	IPT2	%	Meb	%	Deliveries	Inst. Deliv	%	PNC 3 - 7 days	%
<b>Control group (n=69)</b>														
Jionee	11	2	18.2	4	36.4	11	100.0	8	72.7	13	7	53.8	6	46.1
K/sekwa	10	3	30.0	1	10.0	8	80.0	6	60.0	13	0	0	4	30.8
Kiloleni	10	4	40.0	5	50.0	8	80.0	7	70.0	12	10	83.3	11	91.7
<b>Total</b>	<b>31</b>	<b>9</b>	<b>29.0</b>	<b>10</b>	<b>32.3</b>	<b>27</b>	<b>87.1</b>	<b>21</b>	<b>67.7</b>	<b>38</b>	<b>17</b>	<b>44.7</b>	<b>21</b>	<b>55.3</b>

Source: Researcher (2018)

Trends for maternal services utilization in both intervention and control groups has raised tremendously higher after RBF implementation than before for all indicators except for those pregnant women who completed 4 prenatal visits before delivery, and those who received deworming services with mebendazole.

Comparative presentation of intervention group findings before and after the implementation of RBF disclosed falling of pregnant women who completed 4 prenatal visits indicator before delivery from 47.3% in 2016 to 17.5% in 2017. Likewise for pregnant women who received mebendazole the number dropped from 98.1% in 2016 to 68.4% in 2017 (See Figure 4).

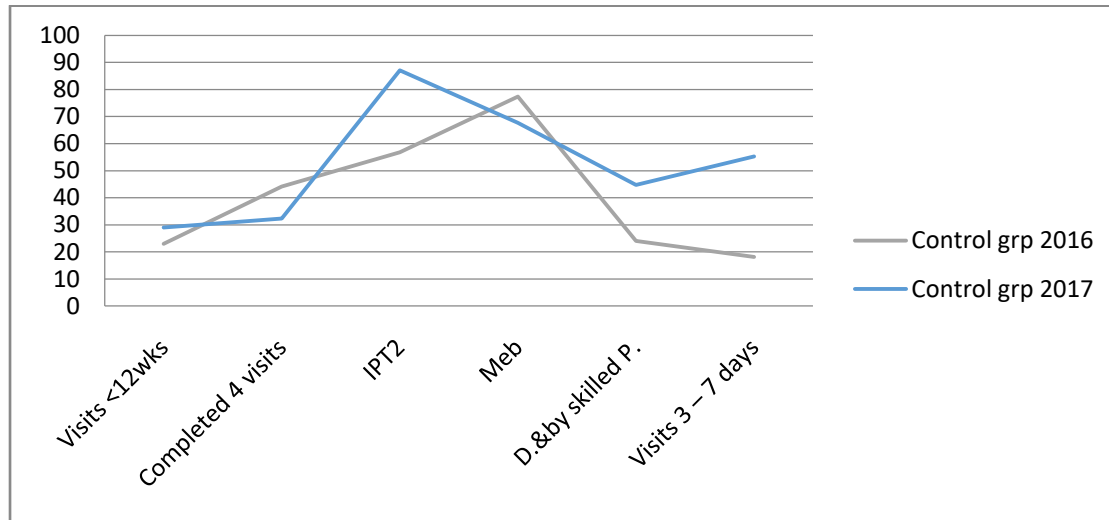
Figure 4: Intervention group 2016 vs 2017



Source: DHIS 2/ Researcher (2018)

The same results were observed in control group for indicators of pregnant women who completed 4 prenatal visits that the number has dropped from 44.1% in 2016 to 32.3% in 2017, and those who received deworming with mebendazole the Figure went down from 77.3% in 2016 to 67.7% in 2017 (See Figure 5).

Figure 5: Control group 2016 vs 2017



Source: DHIS 2/ Researcher (2018)

To determine the variance of maternal health services utilization before and after RBF, findings were first converted from percentages (Table 9 and 10) into ratios to facilitate the computation of differences not only between baseline and end line data but also between intervention and control groups data. Marked change of 0.42 for institutional delivery assisted by skilled health worker and 0.27 for IPT 2 occurred in intervention group after one year of RBF implementation, while in control group 3 - 7 days after delivery took the lead of 0.37 followed by IPT 2 (0.30) (See Table 9).

Table 9: Changes before and after RBF interventions within group

Indicators	Interv. Grp 2016	Interv. Grp 2017	Difference	Control Grp 2016	Control Grp 2017	Difference
Prenatal visits <12wks	0.21	0.39	0.18	0.23	0.29	0.06
Complete 4 visits	0.47	0.17	-0.30	0.44	0.32	-0.12
IPT2	0.48	0.75	0.27	0.57	0.87	0.30
Meb	0.98	0.68	-0.30	0.77	0.67	-0.10
Intituional delivery	0.45	0.87	0.42	0.24	0.45	0.21
3 - 7 days postnatal	0.34	0.59	0.25	0.18	0.55	0.37

Source: Researcher (2018)

After RBF implementation, a positive net RBF effect size of 0.12 and 0.21 were observed by subtracting changes in control group from changes in intervention group to remain with net RBF contribution in intervention group (See Table 10).

**Table 10: The EFFECT of RBF on utilization of maternal health services**

Indicators	Intervention grp variance	Control grp variance	RBF Effect
Prenatal visits <12wks	0.18	0.06	0.12
Complete 4 visits	-0.30	-0.12	-0.18
IPT2	0.27	0.30	-0.03
Meb	-0.30	-0.10	-0.2
Intituional delivery	0.42	0.21	0.21
3 – 7 days postnatal	0.25	0.37	-0.12

**Source:** Researcher (2018)

RBF interventions of incentives payment and availability of health commodities have been related to six maternal health indicators; four (4) of them measured the utilization of maternal services at prenatal clinic, one (1) at maternity ward and the last one (1) at postnatal clinic.

### 3.5. Association of RBF Interventions to Maternal Health Service Utilization

At prenatal clinic, visits of pregnant women before 12 weeks of gestation age (38.6%) was the only indicator that was statistically significant (P – value = 0.023) with incentives of 1,221,443.84 Tshs paid to health workers.

Both Institutional deliveries assisted by skilled health workers and post natal visits were also statistically significant with incentives of 6,358,450 and 2,594,551 Tshs with P – values of 0.006 and 0.000 respectively. Likewise facility infrastructure was found statistically significant with prenatal visits of pregnant women before 12 weeks, and institutional deliveries respondents affiliated to 13 and 44 facilities with p – values of 0.014 and 0.001 respectively. Whereas commodities have been found statistically significant (P – value = 0.042) with number of pregnant mothers who received deworming with mebendazole (21). Post natal visits within 3 – 7 days (19) was also statistically significant with P – value = 0.029. The facility infrastructure that was focused on general condition of the facility was significant to prenatal visit before 12 weeks of pregnancy (P – value = 0.014) and showed strong significance to institutional deliveries assisted by health workers (*See Table 11*).

**Table 11: Association of RBF interventions to maternal health utilization**

Indicator	Visits	%	Incentive (Tsh)	P-value	Commodities	P-value	Infrastructu re	P-value
<i>Prenatal visits n=57</i>								
Visits<12wks	22	38.6	1,221,443.84	0.023	16	0.254	13	0.014
Compl 4 visits	10	17.4	1,265,851.37	0.185	7	0.592	3	0.000
IPT2 given	41	75.4	390,271.74	0.655	20	0.367	33	0.679
Meb given	39	68.4	598,895.81	0.060	21	0.042	29	1.000
<i>Institutional deliveries and postnatal visits n=54</i>								
Inst. Deliveries.	47	87	6,358,450.00	0.006	25	0.070	44	0.001
3 -7 days postanal	32	59.3	2,594,551.11	0.000	19	0.029	28	0.137

**Source:** Researcher (2018)

## IV. DISCUSSION

Institutional deliveries by skilled health provider cumulated approximately half of the total fund for incentives (51.2%). The basis for this information is high pricing of more than two times for institutional delivery indicator of 20,720 Tsh per client for maternity working area, compared to price of 8,290 for prenatal visit before 12 weeks of pregnancy indicator and postnatal visit within 3 – 7 days after delivery respectively. As a result more skilled health workers were motivated to achieved institutional delivery by 87% just after one year of RBF implementation in Urambo compared to national target of 80% by 2020 (MoHCDGEC, 2016).

Though the national target of maintaining 80% of life saving commodities has not been achieved in Urambo, the availability of 50% of medicines and supplies for maternity and postnatal service areas has contributed an increase for institutional delivery (86.7%) by 2 times in the intervention group compared to that of control group (44.7%) after RBF implementation. With exception to mebendazole indicator that the receipt of its dozes has dropped down for both intervention and control group from 98.1% to 68.4% and from 77.3% to 67.7%

respectively when comparing baseline and end line data that might be due inconsistency of commodities availability at health facility.

Despite the fact that the Ministry of Health has planned to achieve 90% of 4 prenatal care visits by 2020, there is a drop out of this indicator by 29.8% when baseline and end line data were compared in intervention group. This falling down suggests that the community is not well aware of risk factors related to pregnancy; they feared malaria more (IPT 2 = 75.4%) than complications that could arise from not completing 4 prenatal visits., both intervention and control groups have presented an increase in the utilization of maternal health service for other indicators, and trending for the same fashion. This reality suggests that health workers from control group performed much better for the intention and desire of being enrolled into RBF programme latter.

Unlike RBF incentive to health workers, availability of commodities have shown negative association with RBF outcome, the receipt of mebendazole for deworming is associated with availability of commodities at prenatal clinic with P – value of 0.042 but with variance of -0.20 comparing intervention group before and after RBF implementation. The same observation was found in post natal visits within the first week after delivery, with P – value of 0.029 and variance of -0.12. Similar findings were reported by USAID (2016) in DRC reported that procurement of essential health commodities did not make any significant change for both intervention and control groups for maternal health service utilization (USAID/DRC, 2016).

The fact that control group was ahead of intervention group in availability of water and power sources by 48.1% and 21.8% might be due contribution of SIM tank from partner (Friends of Urambo and Mwanhala) and supply of water from the Urambo district water supply corporate supporting the availability of water to Kiloleni and Kamsekwa dispensaries respectively, as well as the location of Kamsekwa to Town suburb minimized the waiting time for transport from the district office (Ambulance) by 15.3 % compared to intervention group or else cheaper expenses for relative to hire a private transport. Changes that were observed after RBF implementation, especially in intervention group from 100% poor building status to 61.3% of good state of repair and an increase in availability of power and water sources by 82.9% and 50% respectively suggested the contribution of RBF programme.

Both groups have presented big changes comparing baseline and end line data in increasing the utilization of maternal health service. This reality can be explained not only by intervention group been exposed to the programme but also health workers from control group performed much better for the intention and desire of being enrolled into the programme latter on. Several studies were conducted and revealed positive changes contributed by RBF. In Asia, Mishra et al in India 2011 and Eichler et al in Bangladesh 2010 reported an increase of institutional deliveries from 30% to 53% and 27% to 64% respectively, and most East African countries reported the same findings at different magnitude of increase in institutional deliveries, while in Uganda 2011 Kiracho revealed an increase from 52% to 61% of institutional deliveries (Eichler et al., 2013; Ekirapa-Kiracho et al., 2011).

Moreover, both intervention and control groups have presented big changes comparing baseline and end line data in increasing the utilization of maternal health service, and trending for the same fashion. This reality can be explained not only by incentive paid to the intervention group but also the presence of RBF programme motivate even those health workers who are not enrolled to the RBF programme, increased utilization of maternal health service to the control group in 2017 compared to baseline in 2016 suggest that health workers from these facilities performed much better for the intention and desire of being enrolled into the programme latter. With exception to mebendazole indicator that the receipt of its dozes has dropped down for both intervention and control group from 98.1% to 68.4% and from 77.3% to 67.7% respectively when comparing baseline and end line data. It might be due inconsistency of commodities availability at health facility.

Changes observed in institutional deliveries for intervention group (0.42) was twice than that observe in control group (0.21) and that occurred in prenatal visits <12wks (0.18) was three times than that occurred in control group when these group were compared before and after RBF implementation. This implies that variations within these two indicators collectively comprise the RBF effects and contributions from other maternal health interventions. And finally by further making difference between intervention and control variances, the net RBF effect sizes of 0.12 and 0.21 were obtained prenatal visits before 12 weeks and institutional delivery respectively. This suggest that there other factors contributing the observed changes in control group and these factors needs more studies to be conducted.

Therefore, in considering the associations of RBF interventions to maternal health service, maternal health utilization have been have measured by 6 indicators sub classified into maternal working areas of prenatal, intrapartum and postnatal. These findings have revealed diverse explanations based on the type of RBF intervention associated with. Out of 6 indicators, 3 of prenatal visits before 12 weeks, institutional delivery and post natal visit 3 – 7 days post-delivery are statistical significant with P – values of 0.023, 0.006 and 0.000 respectively to financial incentives paid to health staff. These Figures suggest strong association between

incentives and intrapartum as well as postnatal indicators than prenatal one, and this fact is supported by data from the RBF variance of outcomes between baseline and end line results in interventional group of 0.42 and 0.25 for institutional delivery and post natal visits 3 – 7 days compared to 0.18 of prenatal visits before 12 weeks.

Contrary to RBF incentive to health workers, availability of commodities have shown association to indicators with negative RBF outcome, the receipt of mebendazole for deworming is associated with availability of commodities at prenatal clinic with P – value of 0.042 but present the RBF variance of -0.30 comparing interventional group before and after RBF implementation.

Maternal health services areas were among health facility building that were aimed for rehabilitation and construction. 200,000,000 Tshs was paid to 20 health facilities for improvement of infrastructure by RBF as startup fund (CHMT Urambo, 2017). This could be the reason behind that facility infrastructure was found statistically significant with prenatal visits of pregnant women before 12 weeks, and institutional deliveries assisted by skilled health workers to respondents affiliated to 13 and 44 facilities with p – values of 0.014 and 0.001 respectively.

## V. CONCLUSION

The RBF programme has been found to be effective to maternal health utilization in Urambo District, but its effectiveness is limited to maternal health indicators of *prenatal visits before 12 weeks* and *institutional deliveries assisted by skilled staff* with the effect of 0.12 and 0.21 respectively. Furthermore, its presence in the district motivates even health workers from those facilities not enrolled to the programme to perform more for the wish of either not being left behind or desire of achieving the criteria of at least 1 star for enrollment to RBF programme.

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## VII. CONFLICT OF INTEREST

Authors declare that there is no sided conflict of interest whatsoever.

## VIII. AUTHORS CONTRIBUTIONS

A.N. designed the study and collected, cleaned and analyzed data. D.M. critically reviewed the study, contributed significantly to the development of the study, and drafting of the manuscript. All authors read, revised, and approved the final manuscript.

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