

Research Article

Prevention of Mother-To-Child Transmission (PMTCT) Service in Hard to Reach Areas in Tanzania: Mapping Health Facilities in the Fishing Communities of Sengerema and Musoma Rural District Councils in Tanzania

Mgabo MR^{1,3*}, Kasongi N⁴, Msuya SE^{1,2} and Mushi D¹

¹Institute of Public Health, Kilimanjaro Christian Medical University College, Moshi, Tanzania

²Kilimanjaro Christian Medical Centre, Tanzania

³Institute of Rural Development Planning, Tanzania

⁴University of Dodoma, Dodoma, Tanzania

*Corresponding author: Maseke R. Mgabo, Institute of Public Health, Kilimanjaro Christian Medical University College, Moshi, Tanzania

Received: September 09, 2018; Accepted: October 16, 2018; Published: October 23, 2018

Abstract

Aims: This study aimed describing the provision of Prevention of Mother-to-Child Transmission of HIV (PMTCT) services among women in selected fishing communities of Musoma and Sengerema Districts Councils.

Methodology: This was a cross sectional study, where 62 health facilities providing Antenatal Care services (ANC) in fishing communities were visited. Structured checklists collected information on available health personnel by cadre, available drugs and supplies. Data was entered in EpiData version 3.02 then migrated into IBM SPSS Statistics 20 for data analysis and interpretation. Global Positioning System (GPS) was used to take health facilities' geographical positions; Arc GIS (10.2) drew maps. Lastly, MS excel calculated mean, maximum and minimum distance from health facilities to a nearby Care and Treatment Centers (CTC).

Results: Musoma and Sengerema District Councils had the deficit of 64(71%) and 28% (28) of the required facilities respectively. The shortage of Human Resources for Health (HRH) was 43% and 49% in Musoma and Sengerema respectively. The Maximum distance to a nearby CTC was 21kms for Sengerema, 16kms for Musoma. None of the facility in Musoma had ARVs on a visitation day. Besides, drugs for treating opportunistic infections were inadequate in all visited facilities.

Conclusion: All facilities visited had significant deficit of human resource for health. ARVs and drugs for treating opportunistic infections were inadequate; thus structural and contextual challenges in fishing communities need to be considered when planning strategies for scaling up the provision and utilization of PMTCT services in fishing communities.

Keywords: Mapping; Health facilities; MTCT; PMTCT; Fishing community; Lake Victoria; Tanzania

Introduction

Although the first case of HIV/AIDS in East Africa was detected among fishing community of Lake Victoria over three decades ago [1], these communities continue to register high HIV prevalence than national estimates in the respective countries [2,3]. Yet HIV/AIDS health services in fishing communities were reported to be inadequate [2-4]. Women in these communities are reported to have higher HIV prevalence than men [3]. Factors for high susceptibility of HIV infection in fishing community against the general populations within the same regions are well known and almost similar. These factors include low or non-condom use, having multiple sexual partners, alcoholism, presence of commercial sex workers, exchange of fish for sex and income poverty among women [3,4]. Moreover, inadequate HIV/AIDS health related services among fishing communities have been reported [3-6]. Researchers have recommended that if these

HIV/AIDS related challenges are not deliberately addressed, fish landing sites will continue to pose very big public health challenges [3,6]. Infants' deaths caused by HIV/AIDS in these communities will remain a challenge if HIV/AIDS services particularly the PMTCT challenges are left unknown and unaddressed. Thus, the current state of services are to cater for HIV needs particularly PMTCT services need to be investigated. It is from this basis the current study mapped and described the distribution of health facilities in terms of provision of PMTCT services in the selected fishing communities of Musoma and Sengerema District Councils (DCs).

Methods

This cross sectional survey was conducted between August 2015 and April 2016 involved two districts of Musoma Rural and Sengerema from Mara and Mwanza regions respectively. The districts

Table 1: Health facilities available and required in Sengerema and Musoma districts.

District	Type of facility	Number Required	Number Available (%)	Deficit (%)
Sengerema	Hospital	1	01(100)	00(0)
	Health Centre	26	09 (35)	17 (65)
	Dispensary	72	61(85)	11 (15)
	Total	99	71(72)	28(28)
Musoma DC	Hospital	1	00(0)	01(100)
	Health Centre	21	01(5)	20(95)
	Dispensary	68	25(37)	43(63)
	Total	90	26(29)	64(71)

Table 2: Health facilities distribution in Sengerema and Musoma districts.

Sengerema DC						Musoma DC		
Health Facility	Nearby CTC	Km	Health Facility	Nearby CTC	Km	Health Facility	Nearby CTC	Km
1Kahunda Dsp	2Mwangika HC	7.5	Nyakasungwa Dsp	Nyakaliro HC	10	Kigeraetuma Dsp	Nyegina Dsp	7.1
Bupandwa Dsp	Mwangika HC	3.9	Kasisa Dsp	Nyakaliro HC	9.4	Kiriba Dsp	Bwai -Dsp	4.2
Iligamba Dsp	Mwangika HC	13.2	Luchili Dsp	Nyakaliro HC	15.5	Kome Dsp	Bukima Dsp	9.3
Buhindi Dsp	Mwangika HC	7.4	Nyazenda Dsp	Nyakaliro HC	18	Kurugee Dsp	Bukima-Dsp	13
Kafunzo Dsp	Mwangika HC	8.4	Ruharanyonga Dsp	Nyehunge HC	8.2	Kwikuba Dsp	TegerukaDsp	6.8
Bilulumo Dsp	Mwangika HC	12.1	Mwabasabi Dsp	Nyehunge HC	10	Masinono Dsp	Murangi-Dsp	15
Nyamadoke Dsp	Nyehunge HC	6.7	Magulukande Dsp	Nyehunge HC	3.8	Mugango Dsp	Tegeruka-HC	9
Kayenze Dsp	Nyehunge HC	7	Kabingo Dsp	Kome HC	20	Nyakatende Dsp	Nyegina-Dsp	8.2
Kalebezo Dsp	Nyehunge HC	6.6	KazunzuA Dsp	Kome HC	15.2	Nyambono Dsp	Suguti -Dsp	11.1
Katoma Dsp	Nyehunge HC	9	KazunzuB Dsp	Kome HC	14.5	Rusoli Dsp	Bukima- Dsp	6.4
Busekeseke Dsp	Nyehunge HC	6.8	Kasansa Dsp	Nyakaliro HC	9.7	Rwanga Dsp	Murangi- HC	8
Bukokwa	Nyakaliro HC	5.5	MbuganiDsp	Nyakaliro HC	18.3	Seka Dsp	Suguti- Dsp	6.6
Nyangalamila Dsp	Nyakaliro HC	9	Liteli Dsp	Nyakaliro HC	7.8	Wanyere Dsp	Tegeruka Dsp	10.3
Itabagumba Dsp	Kome HC	20.7	Kisaba Dsp	Mwangika HC	17.9	Bugoji Dsp	Suguti- Dsp	15.6
Lushamba Dsp	Mwangika HC	20.8	Maisome Dsp	Mwangika HC	15.2	Chitare Dsp	Bukima- Dsp	10
Kakobe Dsp	Nyakaliro HC	14.8	JumaKisiwani Dsp	Katunguru HC	10.4	Etaru Dsp	Nyegina- Dsp	4.9
Lugata Dsp	Kome HC	6.1	Nyamitelela Dsp	Katunguru HC	2.3	Busungu Dsp	Bukima- Dsp	3.3
Buhama Dsp	Kome HC	4	Nyamizeze Dsp	Sengerema DDH	7.4	Bwasi Dsp	Bukima- Dsp	11
Sukuma Dsp	Nyakaliro HC	11.9	Kasungamile Dsp	Sengerema DDH	10.1	Bugunda Dsp	Bukima Dsp	7
Mean Km to CTC		10.5						8.6
Min Km to CTC		2.3						3.3
Max Km to CTC		20.8						15.6

were purposively selected based on their involvement in fishing activities and HIV prevalence which is 4.4 for Sengerema and 4.7 for Musoma [7]. Apart from fishing as being the main economic activity, other economic activities done in these districts include; agriculture-livestock keeping, crops production and trade [8,9]. Sengerema had an estimated population of 663,034, of whom 143,592 were women of Reproductive Age (WRA). In total, Sengerema DC had 50 health facilities; one hospital, 4 health centers and 45 dispensaries (This was before Sengerema DC was split into two; Sengerema and Buchosa Districts). Musoma DC had a total population of 178,356 people, female being 91,032, where women of reproductive age were estimated to be 38,631 [10].

Study population and sampling procedure

The study purposefully involved government and private health facilities providing ANC services in Musoma and Sengerema DCs. A total of 62 health facilities were involved in this study. Out of the 62 facilities, 25 facilities were from Musoma DC. However, Musoma DC had no hospital [11]. All the identified facilities were within a range of not more than 10 kilometers from the lakeshore. For the purpose of this study, 37 facilities from Sengerema DC were purposefully selected from the health facilities found in northern eastern to western of Sengerema where large part of the lake water body is, and inhabitable islands are found as well as fishing activities dominate as main economic activities. For Sengerema DC, the

Table 3: Health personnel status for Musoma and Sengerema districts.

SN	Type of personnel/Cadre	Musoma N=25			Sengerema N=37		
		Number required	Staff Available	Deficit (%)	Number required	Staff Available	Deficit (%)
1	Medical Specialist	0	0	0	0	0	0
2	Medical Doctor	2	3	01(+50)	0	0	0
3	Health Secretary	1	1	0	2	2	0
4	Social Welfare Officer	2	2	0	4	1	03(75)
5	Community Health Worker/Social Welfare Assistant	55	0	55(100)	0	0	0
6	Assistant social Welfare Officer	1	0	01(100)	34	1	33(97)
7	Assistant Medical Officer	3	3	0	28	12	16(57)
8	Clinical Assistant	54	18	36(67)	34	12	22(65)
9	Clinical Officer	29	8	21(72)	146	73	73(50)
10	Pharmacist	1	1	0	1	0	1(100)
11	Technologist Pharmaceutical	1	1	0	1	1	0
12	Assistant Pharmaceutical Technician	28	0	28(100)	6	0	6(100)
13	Lab Scientist	1	0	01(100)	9	3	6(67)
14	Technologist Lab	1	0	1(100)	*	*	*
15	Assistant Lab Technologist	29	23	6(21)	60	10	50(83)
16	Dental Officer	1	0	01(100)	1	0	1(100)
17	Assistant Dental Officer	1	0	01(100)	5	2	3(60)
18	Dental Technologist	1	1	0	0	0	0
19	Dental Therapist	1	0	1(100)	0	0	0
20	Health Officer	1	1	0	2	0	2(100)
21	Asst Environmental Officer	21	6	15(71)	35	22	13(37)
22	Environmental Health Asst	1	1	0	2	0	2(100)
23	Nursing Officer	1	1	0	14	5	9(64)
24	Ass. Nursing Officer	29	17	12(41)	65	48	17(26)
25	Nurse	94	57	37(39)	342	141	201(59)
26	Nutrition Officer	1	0	1(100)	2	0	2(100)
27	Medical Recorder	1	1	0	10	0	10(100)
28	Mortuary Attendant	1	0	1(100)	0	0	0
29	Medical Attendant	35	56	21(60)	177	167	10(6)
30	Accountant	2	0	2(100)	1	0	1(100)
31	Total	399	201(57)	171(43)	975	500(51)	475(49)

administrative boundaries between Buchosa and Sengerema districts were ignored with a reason that community members are not bound with administrative boundaries when it comes to seeking for medical services and these DCs were just split [12].

Data collection tools

The Tanzania PMTCT guide [12] provides a guide on how to assess the capacity of health facilities providing PMTCT services. This guide helped in designing the data collection tools for this study. Tools developed include structured checklists for available health personnel by cadre, checklist for available PMTCT drugs, a checklist for available drugs for treating opportunistic infections, available HIV kits, reagents and supplies.

These tools collected varied information. Checklist for health

personnel collected information on the required and available staff. Checklist for drugs collected information on the drugs required for PMTCT health services on the visiting day and the availability of those drugs in the previous three months. Similarly, a checklist for drugs for treating opportunistic infections and checklist for HIV kits, reagents and supplies collected information of the availability of drugs on the visiting day as well as cross checking if were available in the past three months. Facility in charges or any other responsible health personnel found at the facility on the visiting day were interviewed to provide the required information. Along the interview, observations on available drugs and equipment was done.

Lastly, mapping of health facilities indicating their locations and distance from district hospital as well as distance to nearby CTC were done. All health facilities were visited for taking location coordinates

Table 4: Availability of drugs for AIDS treatment.

Type of Medicine	Sengerema N=37				Musoma N=25			
	Available last month		Available on a visiting day		Available last month		Available on a visiting day	
	n	%	n	%	n	%	n	%
Efavirenz	8	21	8	21	8	32	7	28
Tenofovir/Lamivudin/Efavirenz (TLE)	32	86	31	83	0	0	0	0
Zidovudin and Lamivudin (Combivir)	7	18	7	18	0	0	0	0
Niverapine Tablet	1	2.7	1	2.7	0	0	0	0
Nevirapine Suspension	29	78	28	75	0	0	0	0
Clotrimazole Vaginal Pessaries	15	41	20	54	4	16	2	8
Fluconazole Tablets	11	30	9	24	24	96	6	24
Clotrimazole Cream	19	51	16	43	25	100	13	52
Nystatin Suspension	3	8	3	8	25	100	4	16
Septrin Syrups	27	73	24	65	25	100	18	72
Septrin Tablets	23	62	19	51	25	100	17	68
Nystatin Cream	1	3	2	5	22	88	4	16
Ferrous Surphate	29	78	28	76	24	96	19	76
Dakarin Oral Jelly	1	3	2	5	18	72	1	4
Folic Acid Tablets	27	73	24	65	24	96	21	84
Betamethasone Cream	10	27	10	27	0	0	0	0
Ampicillin/ Amoxicillin	6	16	6	16	21	84	1	4
Flagyl	28	76	28	76	18	72	6	24
Gentamycin	26	70	25	67	12	48	4	16
Cephalosporin /3 rd or 4 th generation	21	6	21	57	23	92	1	4

using Global Positioning System (GPS) device. The coordinates collected were in Universal Transverse Mercator (UTM) format (Easting and Northing) using Datum of World Geodetic System (WGS) 84. Thereafter, database was created in Arc GIS (10.2) to store spatial and attribute data collected from the field.

Data management and analysis

Data was checked for mistakes and errors were corrected immediately. Then the data were entered into a computer database using EpiData version 3.02. Double entry system was used to ensure quality and accuracy. Then all data were migrated into SPSS (Statistical Package for Social Sciences, USA, and version 20). Data were summarized using descriptive statistics and geographical summary, in which continuous data were summarized into mean while categorical variables were summarized into proportion to assess the availability of drugs and equipment. Whereas, in mapping the health facilities, several stages were involved in analysis of spatial data. Initially all health facilities were visited for collection of location coordinates using Global Positioning System (GPS) device. Proximity analysis was performed in Arc GIS (10.2) using near tool and generate near table tool purposely to generate linear distance from individual health facility to nearby CTC. Then the output database table was exported to MS Excel for calculating Mean, Maximum and Minimum distance from health facilities to near CTC. Lastly, the analysis stratified the study into Musoma and Sengerema DCs sites.

Results

Available health facilities

The current study found that only Sengerema DC had a District Designated Hospital operated by the Roman Catholic Church Sengerema Diocese. Musoma DC had no hospital. Basing on 2015/2016 Comprehensive Council Health Plans (CCHP), both DCs had shortage of health centers. Musoma DC was falling short of 20(95%) of the required health centers, whereas, Sengerema lacked 17(65%) of the needed health centers. In terms of dispensaries, Musoma DC was falling short of 43(63%) of the needed dispensaries comparing to Sengerema which had a shortage of 11(15%) (Table1). Generally, Musoma DC had a deficit of 64(71%) of the required facilities compared to Sengerema which had a deficit of 28 (28%) (Table 1).

Accessibility to health services: Distance

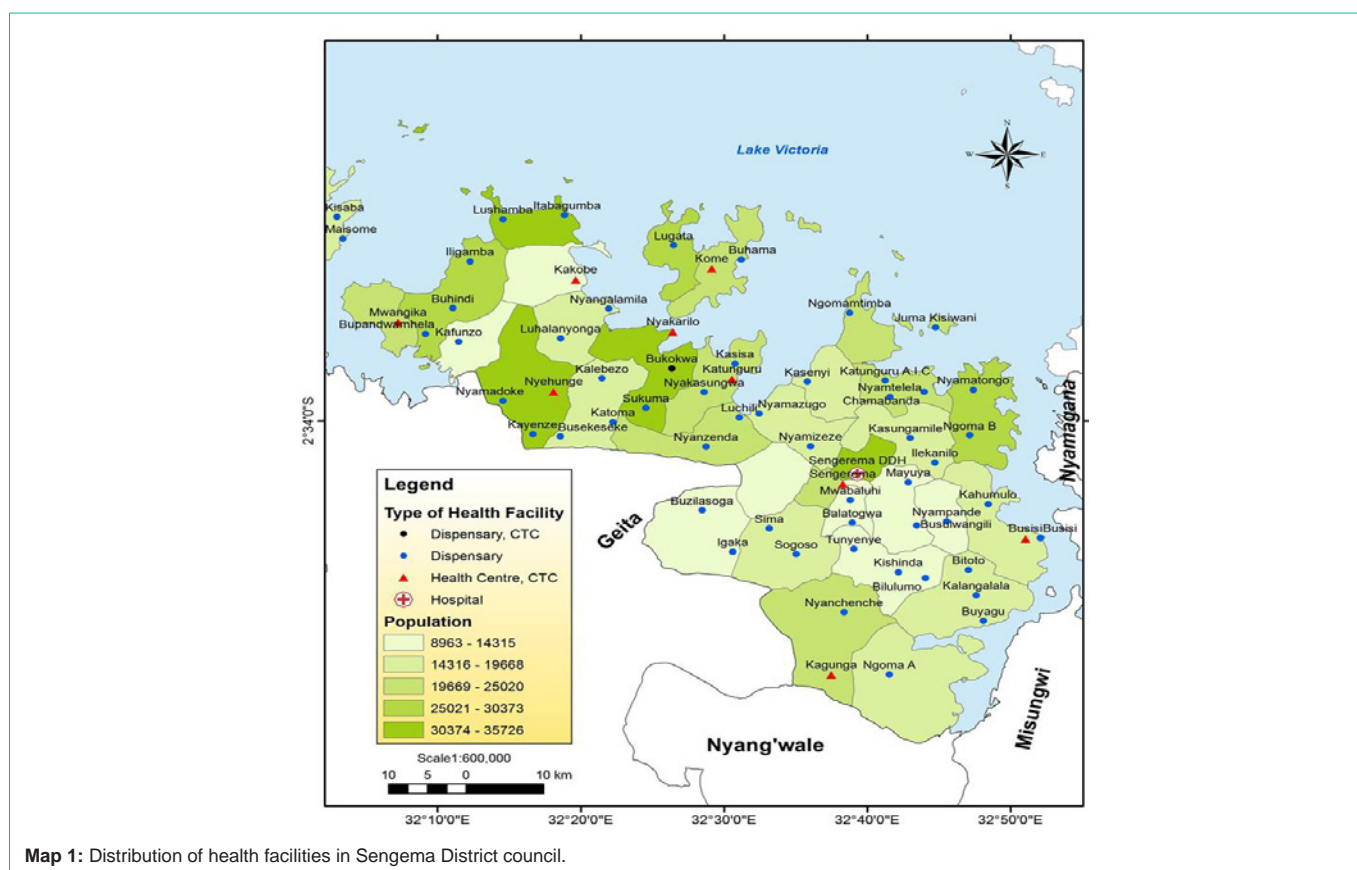
In both sites health facilities were unevenly distributed. The mean distance to a health facility was 10.5km, minimum distance being 2.3km and Maximum distance being 20.8km for Sengerema DC; whereas, for Musoma DC, the mean distance to health facility was 8.6 km, minimum distance being 3.3Km and maximum distance was 15.6kms (Table 2) (Map 1&2).

Health personnel

Shortage of health personnel in almost all the health cadres was observed in all districts. For instance, none of the district had the Nutritionist, Pharmacist and Medical Records personnel. Moreover,

Table 5: Available equipment and supplies related to HIV/AIDS service provision on a visiting day.

Equipment/Supply	SENGEREMA N=37				MUSOMA N=25			
	Available three months ago		Available on a visiting Day		Available three months ago		Available on a visiting Day	
	n	%	n	%	n	%	n	%
Determine HIV 1 /HIV 2	26	70	23	62	25	100	24	96
Vacationer needles	8	22	8	22	2	8	2	8
UNIGOLD(HIV-kit)	28	76	25	68	25	100	24	96
Vacationer tubes	7	19	7	19	1	4	1	4
Filter paper (DBS Kits)	10	27	10	27	25	100	21	84
Syphilis Kits(RPR& Determine)	7	19	7	19	23	92	8	32
Homecuc Machine (Hb)	30	81	30	81	7	28	6	24
Homecuc microcuvelter	21	57	21	57	0	0	0	0

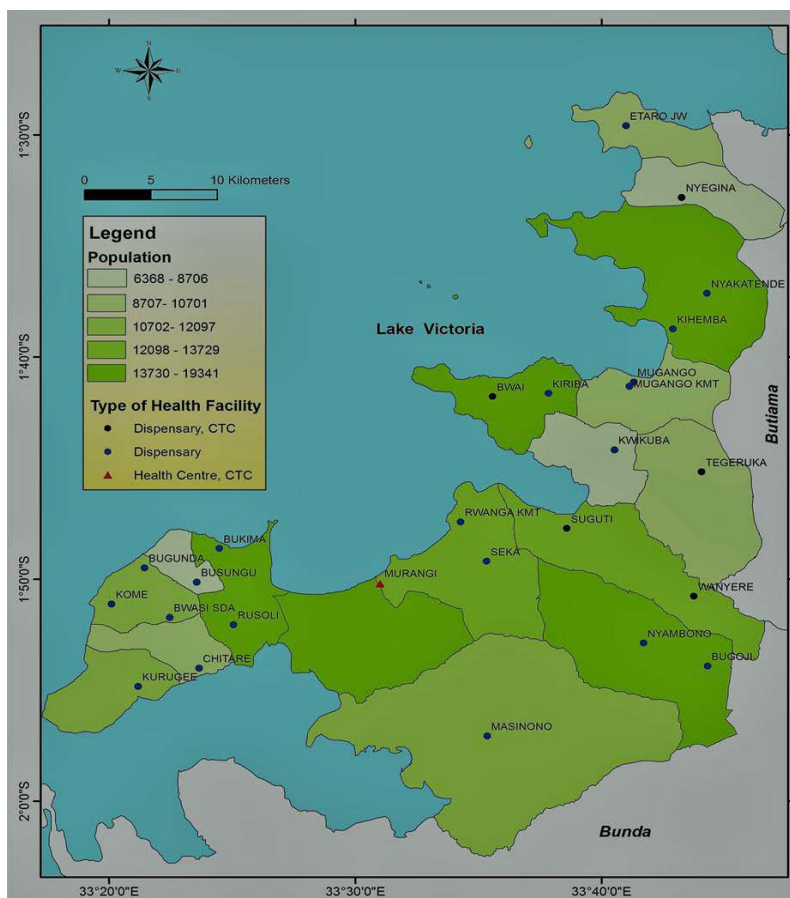


variation in work force shortage in other cadres was realized. For example, Musoma DC had no Social Welfare Officer while Sengerema DC had a shortage of 3(75%) of all the needed staff. Similarly, Sengerema had a deficit of 33(97%) of the Assistant Social Welfare Officers while Musoma DC had none in this cadre. Another area with a challenge of health personnel shortage was the clinical services section. A shortage of 21(72%) and 73(50%) of Clinical Officers as well as 36(67%) and 22(65%) of the Assistant Clinical Officers for Musoma and Sengerema DC respectively was observed.

A shortage of nurses was also observed whereby Sengerema DC experienced a shortage of over half 201(59%) of the required were

lacking while Musoma DC had a shortage of 37(39%) of the needed Nurses. In terms of Assistant Nurse Officers, Musoma had a shortfall of 12(41%) while Sengerema registered a deficit of 17(26%) nurses.

It was further noted that none of these DCs had a Laboratory Technologist, whereas Sengerema had a deficit of 6 (67%) Laboratory Scientists and Musoma had 100% deficit. Furthermore, Sengerema had a shortage of 50(83%) Assistant Laboratory Technicians while Musoma lacked 6(21%) of the requirement in same the cadre. Generally, the HRH deficit was 43% for Musoma and 49% for Sengerema. (Table 3).



Map 2: Distribution of health facilities in Musoma District council.

Availability of drugs for AIDS treatment

All the visited health facilities were providing PMTCT services. In assessing the availability of medical equipment, drugs and supplies needed for PMTCT in these health facilities, a total of 62 (37 Sengerema, 25 Musoma) facilities in the study site were visited. On a visiting day, the study found that Tenofovir/Lamivudin/Efavirenz (TLE) tablets; Zidovudine and Lamivudin (Combivir), Niverapine tablet, Nevirapine suspension were not available in all 25 health facilities visited in Musoma district while available in Sengerema district by 31(83%), 7(18%), 1(2.7%) and 28(75%) respectively.

The deficit in availability of drugs for treating opportunistic infections was observed on a visiting day. For example, Clotrimoxazole Tablets were available to 19(51%), 17(68%) of Sengerema and Musoma facilities respectively. While Clotrimoxazole Vaginal Pessaries were available to 20(54%) for Sengerema and 2(8%) for Musoma DCs. Fluconazole Tablet were available by 9(24%) for Sengerema and by 6(24%) for Musoma DC; Clotrimoxazole Cream was available in 16(43%) of facilities in Sengerema; 13(52%) facilities in Musoma. Similarly, Nystatin Suspension was available by 3(8%), 4(16%); Dakarin Oral Jelly in 2(5%), 1(4%) while Nystatin Cream was available in 2(5%), 4(16%); Ampicillin/ Amoxicillin in 6(16%), 1(4%) and Ciprofloxacin/Third or fourth generation Cephalosporin in 21(57%), 1(4%) facilities Sengerema and Musoma districts respectively (Table 4).

Availability of HIV kits, reagent and supplies

The current study found that the Vacutainer Tubes were 7(19%), 1(4%); Vacutainer Needles 8(22%), 2(8%), Filter Paper (DBS Kits) were 10(27%), 21(84). Others were determine HIV1/HIV 2(HIV-kit of 100) 23(62%), 24(96%) and UNIGOLD (HIV-kit) were 25(68%), 24(96%) and Syphilis Kits (RPR & Determine) 7(19%), 8(32%) for Sengerema and Musoma respectively (Table 5).

Discussion

The study brought to light the following important issues; there is unevenly distribution of health facilities coupled with a shortage of health professionals and challenges on availability ARVs, drugs for treating opportunistic infections as well as HIV test kits and laboratory consumables as discussed below.

The current study indicates that Musoma DC council had the highest deficit (71%) of the required number of the facilities compared to Sengerema DC, where the deficit was almost 28%. Unevenly distribution of the health facilities compelled community member to walk long distance, spending time and pay considerable high transport cost when seeking for medical help. Inability to afford transport costs and long walking distance to health facilities have been mentioned as factors hampering efforts to fight against HIV/AIDS and the consequences have been late initiation of ART to children and pregnant women [6,13].

Tanzania PMTCT guide requires the PMTCT team at a facility to comprise doctors, nurses, laboratory personnel, records personnel, administrative staff, social workers and nutritionists where available [14]. Contrary to this, the current study exhibited immensely shortfall of the required staff as per above guide. This shortage ranged from 21% to 100%. Pathetically important cadres such as Laboratory Technologists, Social Welfare Officers and nutritionists were not available at all. This study conforms to a report which indicated that the total number of social welfare officers in Tanzania were estimated to be 437 (13%) of requirements whereas a national total shortage of human resources for health was estimated to be about 56% [15]. The shortage of HRH in Tanzania has been a crisis across regions, districts and facilities [13,16]. This has been again supported by a recent report which shows that staffing shortages in the health sector have undermined Tanzania's efforts to achieve HIV epidemic control [17].

However, the crisis of lacking a multidisciplinary medical team is a structural challenge. Tanzania has trained and is seemed to be still training a big number of Nutritionist and Social Welfare professionals. The question is "have these cadre being given a priority to be part of the medical team?". Reports indicate that psychosocial and nutrition needs are very important in Anti-Retroviral Therapy (ART) intervention [18,19]. The absence of nutritionists and psychologists or personnel who can provide counseling might possibly lead to inadequate handling of the psychosocial and nutritional challenges to HIV positive pregnant, nursing mothers and their children as well as people living with HIV/AIDS at large.

The current study indicates that Tenofovir/Lamivudin/Efavirenz (TLE) Tablets; Zidovudine and Lamivudin (Combivir), Niverapine Tablet, Nevirapine Suspension were not available in all 25 health facilities visited in Musoma DC while they were available in Sengerema DC by 31(83%), 7(18%), 1(2.7%) and 28(75%) respectively. Studies have shown that ARV drugs and medical equipment stock-outs in public health facilities lead to unnecessary suffering, financial loss and an erosion of the users' faith in the ability of the facilities to meet their needs [20]. On the other hand, patients with chronic diseases may interrupt treatment, which increases the risk of falling ill, developing drug resistance and transmitting HIV and TB to others [21–23]. Similarly, in Tanzania, shortage of HIV drugs and related equipment have been previously reported to be caused by supply chain management system challenges [24] and has not been successfully resolved. The affected regions identified were Mwanza in, Kigoma, Kilimanjaro, Tabora, Shinyanga, Morogoro and Dar Es Salaam [25].

Shortage of HIV/AIDS drugs and supplies in fishing communities has recently been reported [6,26]. Furthermore, reports indicate that Lake Victoria fisher folks are largely untouched by initiatives to increase access to antiretroviral therapies, because of their mobility, distance from services, and other social, economic, and cultural factors [3,4,27]. This exacerbates the missed opportunity and HIV infections spread as a result of inadequate provision of necessary HIV/AIDS related services in such high HIV prevalence communities with risk sexual behaviors [2,3,4,5,6].

Although the Tanzania national guideline for comprehensive package of HIV interventions for key populations recognizes fishing communities as a key population, the current guide has no clear

strategies for fishing communities. Other key population such as people who use and inject drugs (PWUD/PWID), men who have sex with men (MSM), transgender people, sex workers and prisoners are known and strategic interventions have been set [28]. This is to underestimate HIV infection in fishing communities and this could be the reason why no clear guide and interventions have been set to curb HIV spread in these communities as well as providing reliable HIV/AIDS services as compared to other key populations [26,28]. Opportunities are yet well utilized to reach fishing communities. HIV prevalence in fishing communities, fisher folks' sexual behaviors and mobility should not be underestimated [2,3,4,23]. As it has been previously suggested, maintained by Hoshi et al, fishing communities are potential key population and live in settings that are potential breeding ground for HIV/AIDS that need to be curbed [27,28]. Deliberate measures need to be taken to curb further infections and mortality by providing adequate and reliable HIV/AIDS services.

Conclusion

Although provision of PMTCT services remain a getaway which can eliminate Infants mortalities caused by HIV/AIDS, this study reveals that both studied districts had unevenly distribution of health facilities with shortage of health personnel, drugs stock out as well as shortage of laboratory consumables for HIV diagnosis and treatment. All of these pose challenges in providing adequate PMTCT services in the study area which might exacerbate mortalities caused by HIV/AIDS in the study area. Since fishing communities lack specific strategies to curb the spread of HIV/AIDS and particularly PMTCT, deliberate efforts on innovative health care delivery strategies need to be designed to address the unique challenges facing HIV prevention, care and support services among the fishing communities in Tanzania.

What is already know on this topic

- HIV prevalence is very high in fishing communities
- Women are more infected than men
- There is inadequate provision of HIV/AIDS services

What this study adds

- Inadequate health facilities
- Inadequate human resources for health in the study area
- Lack of reliable and suitable strategy to curb the spread of HIV and provision of HIV/AIDS related service

Authors' Contributions

MRM did data collection, analysis and writing of the first draft of the article. NK did the mapping. NK, SEM and DM contributed to manuscript drafting and inputs to the article. All authors read and approved the final manuscript.

Acknowledgments

The authors would like to extend their sincere gratitude to the Institute of Rural Development Planning (IRDP) in Tanzania for funding this study. The authors would also like to thank District Medical Officers and health professionals for Musoma and Sengerema Districts for their support that enabled data collection. These thanks are extended to health personnel who were interviewed for this study.

References

1. Tanzarn N, Bishop-Sambook. The dynamics of HIV/Aids in small scale fishing communities in Uganda. Rome. FAO. 2013.
2. Kwena ZA, Camlin CS, Shisanya CA, Mwanzo I, Bukusi EA. Short-Term Mobility and the Risk of HIV Infection among Married Couples in the Fishing Communities along Lake Victoria, Kenya. *PLoS One*. 2013; 8: e54523.
3. Chang LW, Grabowski MK, Ssekubugu R, Nalugoda F, Kigozi G, Nantume B, et al. Heterogeneity of the HIV epidemic in agrarian , trading , and fishing communities in Rakai , Uganda : an observational epidemiological study. *Lancet*. 2016; 3018:1–9.
4. Opio A, Muyonga M, Mulumba N. HIV Infection in Fishing Communities of Lake Victoria Basin of Uganda – A Cross-Sectional Sero-Behavioral Survey. *PLoS ONE*. 2013; 8: e70770.
5. Mwaluko G, Masha F, Kishamawe C, Mashauri F. The EALP HIV and AIDS Baseline Study in Fishing Communities : Lake Victoria Basin, Tanzania. Technical Report African. Medical Research Foundation (AMREF). 2011.
6. Akullian AN, Mukose A, Levine GA, Babigumira JB. People living with HIV travel farther to access healthcare: A population-based geographic analysis from rural Uganda. *J Int AIDS Soc*. 2016; 19:1–8.
7. President's Emergency Plan for AIDS Relief. PEPFAR 2015 Annual Report to Congress. USAID. 2015.
8. United Republic of Tanzania. Mara Region Health Profile. Prime Minister's Office – Regional Administration and Local Government (PMO-RALG). Musoma. 2004.
9. United Republic of Tanzania - Mwanza Investment Profile - 2013. Prime Minister's Office – Regional Administration and Local Government (PMO-RALG). Mwanza Region.
10. National Bureau of Statistics (NBS). Tanzania. 2012. Population and Housing Census Population Distribution by Administrative Area. 2013. Dar ES salaam.
11. United Republic of Tanzania. Mara Region Strategic Plan for Accelerated Reduction of Maternal and Newborn Deaths 2013 – 2016. 2013. Regional Commissioner's Office Health Department.
12. United Republic of Tanzania Ministry of Health and Social Welfare. Tanzania National PMTCT Guidelines 2013. Dar Es Salaam. Ministry of Health and Social Welfare.
13. Bottlenecks Hindering Full Coverage of PMTCT in Tanzania: Analysis and the way forward for Campaign to End Pediatric AIDS in Tanzania. 2009. Human Development Trust.
14. United Republic of Tanzania Ministry of Health and Social Welfare. Tanzania PMTCT Pocket Guide. 2013. Dar Es Salaam; 2013.
15. United Republic of Tanzania Ministry of Health and Social Welfare. Human Resource for Health and Social Welfare Strategic Plan 2014 - 2019. 2014. Ministry of Health and Social Welfare.
16. Kwesigabo G, Mwangu AM, Kakoko CD, Mkony AC, Killewo J, Sarah MB, Kaaya E E, Freemane P. Tanzania ' s health system and workforce crisis. *J Public Health Policy*. 2012; 33: S35–S44.
17. Chi BH, Adler MR, Bolu O, Mbori-Ngacha D, Ekouevi DK, Gieselman A, et al. Progress , Challenges , and New Opportunities for the Prevention of Mother-to-Child Transmission of HIV Under the US President's Emergency Plan for AIDS Relief. *J Acquir Immune Defic Syndr*. 2012; 60: 78–87.
18. Mori A, Owenya J. Stock-outs of antiretroviral drugs and coping strategies used to prevent changes in treatment regimens in Kinondoni District, Tanzania: a cross-sectional study. *Journal of Pharmaceutical Policy and Practice*. 2014; 7: 3.
19. Doctors without Borders (MSF), the Rural Doctors Association of Southern Africa (RuDASA), the Rural Health Advocacy Project (RHAP), the Treatment Action Campaign (TAC), SECTION27 and the Southern African HIV Clinicians Society (SAHIVSoc). Doctors without Borders. 2016.
20. National Department of Health (SA). Joint Review of HIV, TB and PMTCT Programmes in South Africa. Main Report. National Department of Health (SA). 2014.
21. Blazer, Cassandra, Bisola Ojikutu, Karen Schneider, and Molly Higgins-Biddle. Assessment of the Integration of PMTCT within MNCH Services at Health Facilities in Tanzania. Arlington, VA: USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One, Task Order 1. 2012.
22. Advocacy Paper on Budget Allocation for Essential Medicines, Medical Supplies and Equipment. Dar Es Salaam, Tanzania. 2014.
23. Lubega M, Nakyaaanjo N, Nansubuga S, Hiire E, Kigozi G, Nakigozi G, et al. Risk Denial and Socio-Economic Factors Related to High HIV Transmission in a Fishing Community in Rakai, Uganda: A Qualitative Study. *PLoS ONE*. 2015; 10: e0132740.
24. Cassels S, Camlin CS. Geographical mobility and heterogeneity of the HIV epidemic. *Lancet HIV*. 2016; 3: e339–341.
25. United Republic of Tanzania Ministry of Health and Social Welfare. National Guideline for Comprehensive Package of HIV Interventions for Key Populations. Ministry of Health and Social Welfare. 2014.
26. United Republic of Tanzania Ministry of Health and Social Welfare /National AIDS Control Programme. Third Health Sector HIV and AIDS Strategic Plan (HSHSP III) 2013-2017. Ministry of Health and Social Welfare /National AIDS Control Programme. 2014.
27. Hoshi T, Fuji Y, Nzou SM, Tanigawa C, Kiche I, Mwau M, et al. Spatial distributions of HIV infection in an endemic area of Western Kenya: Guiding information for localized HIV control and prevention. *PLoS One*. 2016; 11: 1–14.
28. PEPFAR A. Tanzania Country Operational Plan (COP) 2018 Strategic Direction Summary. 2018.