ESSENTIAL FEATURES

Baby Teeth Today, Healthy Smile for Life

Contents

Integrated Disease Surveillance and Response (IDSR): Cumulative report for six months, January – June 2023 (Epidemiological week 1-26)

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ABSTRACT

Introduction: The Ministry of Health continued to carryout surveillance of reportable diseases and conditions. This paper reports the cumulative IDSR data for a period of 6 months from January to June 2023, which are World Health Organization (WHO) weeks 1-26. Data were analyzed to assess the national and regional performances in terms of timeliness and completeness reporting as well as determining the cumulative number of cases and deaths, and distribution by month and region. Performance was assessed based on the newly set national standard of ≥ 90%.

Analysis: All 26 regions of Tanzania Mainland submitted weekly reports to the national level with an overall average performance for all months of 78.2% for timeliness and 90.0% for completeness. Cumulatively, a total of 398,774 cases and 175 deaths were reported for all IDSR immediate reportable diseases and conditions. The most commonly reported condition was diarrhea account for 202,661 (50.8%) of all cases and was reported from all 26 regions. Majority of diarrhea cases were reported in major cities of Dodoma, Dar es Salaam, Arusha and Tanga with 15,656 out of 202,661 (7.7%), 14,392 (7.1%), 12,362 (6.1%) and Tanga 12,292 (6.1%) cases respectively. The months of January had the highest number of cases 123,614 in (31.0%) out of 398,774. Of the 175 reported deaths, majority were caused by severe acute respiratory illness (SARI) (n=95, 54.3%). The condition with highest case fatality rate was suspected cases of rabies 5 (20.8%) of 24 person with suspected rabies died.

Conclusion: The IDSR analyzed data for January to June 2023 (WHO week 1-26) showed that the performance based on timeliness was low and completeness was high based on the newly set national standard of ≥90%. The newly set national standard of ≥90% indicates the need of improving detection and reporting system for immediate response to avert disease outbreak to happen. On the other hand, there is an urgent need for the Government to institute new and reinforce available preventive and control measures against diarrhea and pneumonia as continued to be the leading reportable conditions. Based on high fatality rate of rabies, the Government need to improve preventive measures such as mass dog vaccination and management of cases.

INTRODUCTION

In Tanzania surveillance for reportable diseases and conditions under the Integrated Disease Surveillances and Response (IDSR) are electronically collected, and published weekly and monthly under the Ministry of Health (MoH). It should be noted that IDSR is a strategy for multi-disease surveillance of selected priority diseases or conditions. It links the community, health facility, district and national levels, for providing immediate information for helping public health managers and decision-makers improve detection and response to the leading causes of illness, death, and disability in African countries. The present paper reports cumulative IDSR data for a period of six months of January – June 2023, that corresponds to WHO week 1 to 26. Data were analyzed to assess the national and regional performances in terms of timeliness and completeness reporting as well as determining the cumulative number of cases and deaths, and distribution by age, sex, month and region.

ANALYSIS OUTCOME

Health Facility Performance

All 26 regions of Tanzania Mainland submitted weekly reports of selected priority reportable conditions to the national level. The overall performance for timeliness and completeness for January to June 2023 was 78.2% and 90.0% respectively. The performance of completeness was equal to the set national standard of ≥ 90%. The Month of June had the highest scores for both timeliness (94.9%) and completeness (99.0%) and were above the set national standard of ≥ 90%. (Table 1)

Table 1: Average Timeliness and Completeness of Health Facility Reporting by Month, January – June 2023

Month	% of Completeness	% of Timeliness
January	90.3	81.1
February	91.0	83.1
March	80.7	60.8
April	83.7	63.7
May	95.4	85.8
June	99.0	94.9
Overall Performance	**90.0**	**78.2**
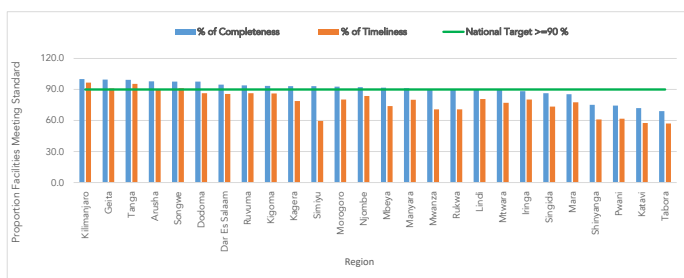
Figure 1: Timeliness and Completeness of Health Facility Reporting from the 26 regions, January – June, 2023

The overall timeliness and completeness of health facilities reporting by all 26 regions are presented in Figure 1. Five regions namely Kilimanjaro, Geita, Tanga, Arusha and Songwe had the overall timeliness meeting the national target of ≥ 90%. All regions health facilities reporting for completeness met the national target of ≥ 90% except Iringa, Singida, Mara, Shinyanga, Pwani, Katavi and Tabora.

DISTRIBUTION OF CASES AND DEATHS

Total reported cases for all reportable diseases and conditions from January to June 2023 were 398,774 of which 202,661 (50.8%) were cases due to diarrhea diseases (Table 2). During the reporting period, there were a total of 175 deaths whereby majority 95 (54.3%) were due to SARI.

Table 2: Numbers of cases and deaths caused by reportable conditions, January - June 2023

Condition / Disease	Cases/Deaths	Total
AFP	Cases	746
	Deaths	0
Animal Bites	Cases	10,890
	Deaths	0
Anthrax	Cases	56
	Deaths	2
Bloody Diarrhoea	Cases	17
	Deaths	0
Cholera	Cases	313
	Deaths	4
CSM	Cases	1
	Deaths	0
Dengue Fever	Cases	109
	Deaths	0
Diarrhoea	Cases	202,661
	Deaths	69
SARI	Cases	10,188
	Deaths	95
Measles	Cases	2,944
	Deaths	0
Neonatal Tetanus	Cases	1
	Deaths	0
Pneumonia	Cases	143,995
	Deaths	0
Rabies	Cases	24
	Deaths	5
Typhoid	Cases	26,829
	Deaths	0
Total	**Cases**	**398,774**
	Deaths	**175**

Table 3: Number of cases and deaths caused by reportable conditions, by month, January – June 2023

Condition / Disease	January		February		March		April		May		June		Total		CFR %
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
AFP	172	0	22	0	103	0	115	0	176	0	158	0	746	0	0.0
Animal Bites	3,340	0	271	0	303	0	1,625	0	3,001	0	2,350	0	10,890	0	0.0
Anthrax	39	1	1	0	1	0	8	0	7	1	0	0	56	2	3.6
Bloody Diarrhoea	3	0	0	0	5	0	1	0	2	0	6	0	17	0	0.0
Cholera	42	3	23	0	7	0	13	0	0	0	228	1	313	4	1.3
CSM	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0
Dengue Fever	0	0	0	0	0	0	10	0	23	0	76	0	109	0	0.0
Diarrhoea	67,730	69	5,632	0	5,506	0	23,700	0	61,313	0	38,780	0	202,661	69	0.03
SARI	2,289	35	395	7	3,361	10	1,274	7	1,474	32	1,395	4	10,188	95	0.9
Measles	785	0	148	0	581	0	450	0	550	0	430	0	2,944	0	0.0
Neotal Tetanus	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0.0
Pneumonia	41,695	0	4,363	0	4,670	0	22,927	0	43,439	0	26,901	0	143,995	0	0
Rabies	4	4	2	0	0	0	9	1	7	0	2	0	24	5	20.8
Typhoid	7,514	0	832	0	640	0	3,524	0	7,954	0	6,365	0	26,829	0	0.0
Total	123614	112	11689	7	15177	10	53656	8	117947	33	79691	5	398774	175	0.2

Table 3 provides the number of cases and deaths caused by immediate reportable conditions each month during January through June 2023. The month total cases varied from 11689 in February to 123,614 in January. The condition with highest case fatality rate was suspected cases of rabies, 5 (20.8%) of 24 person with suspected rabies died.

Table 4: Number of reported cases of illnesses by region, January – June, 2023.

Region	AFP	Animal Bites	Anthrax	Bloody Diarrhoea	Cholera	CSM	Dengue Fever	Diarrhoea	SARI	Measles	Neonatal Tetanus	Pneumonia	Rabies	Rabies Deaths	Typhoid
Arusha	19	701	21	1	228	0	0	12,362	330	96	0	15,550	4	3	429
Dar Es Salaam	40	553	1	1	13	0	109	14,392	2,967	107	0	9,786	2	0	973
Dodoma	36	1,010	0	0	0	0	0	15,656	1,313	166	0	9,517	0	0	2,506
Geita	26	363	0	0	0	0	0	8,694	0	124	0	4,670	2	0	1,049
Iringa	10	338	0	1	0	0	0	10,008	423	109	0	2,061	1	0	377
Kagera	60	343	0	6	0	0	0	8,900	0	152	0	5,861	0	0	1,305
Katavi	17	195	0	0	32	0	0	3,706	0	193	0	1,765	1	0	335
Kigoma	49	469	0	0	7	1	0	9,050	1,438	178	0	5,912	2	0	255
Kilimanjaro	49	511	34	0	0	0	0	5,116	0	85	0	8,159	2	0	527
Lindi	23	390	0	0	0	0	0	3,230	329	130	0	1,794	0	0	561
Manyara	26	373	0	2	0	0	0	5,967	1,003	131	0	7,814	1	0	2,127
Mara	31	370	0	0	0	0	0	9,087	304	145	0	4,233	0	0	870
Mbeya	21	287	0	0	0	0	0	6,169	52	135	0	4,428	0	0	1,854
Morogoro	23	746	0	0	0	0	0	10,623	156	84	0	8,500	3	1	1,890
Mtwara	34	144	0	0	0	0	0	4,130	100	164	0	2,389	0	0	245
Mwanza	49	481	0	0	0	0	0	9,077	232	56	0	6,875	0	0	1,216
Njombe	15	136	0	2	0	0	0	1,106	0	62	0	3,597	0	0	568
Pwani	13	498	0	0	0	0	0	7,109	148	68	0	4,155	1	0	456
Rukwa	18	264	0	0	20	0	0	8,419	119	29	0	3,208	2	0	687
Ruvuma	26	632	0	2	13	0	0	6,098	310	92	0	5,320	1	1	1,588
Shinyanga	22	312	0	0	0	0	0	4,874	0	146	1	3,546	0	0	1,134
Simiyu	37	220	0	0	0	0	0	4,926	0	144	0	2,157	0	0	484
Singida	18	413	0	0	0	0	0	6,818	810	80	0	3,705	0	0	939
Songwe	17	222	0	0	0	0	0	6,718	0	100	0	3,462	0	0	2,696
Tabora	44	396	0	0	0	0	0	8,134	154	127	0	5,745	1	0	1,244
Tanga	23	523	0	2	0	0	0	12,292	0	41	0	9,786	1	0	514
Total	746	10,890	56	17	313	1	109	202,661	10,188	2944	1	143,995	24	5	26,829

During the 6 months beginning January 2023, a total of 398,774 cases of reportable conditions were reported whereby all 26 regions reported Acute Flaccid Paralysis (AFP), animal bites, diarrhea, pneumonia, typhoid and measles cases. Most cases were due to diarrhea and majority of cases were reported in major cities of Dodoma, Dar es Salaam, Arusha and Tanga with 15,656 out of 202,661 (7.7%), 14,392 (7.1%), 12,362 (6.1%) and Tanga 12,292 (6.1%) cases respectively (Table 4).

CONCLUSION

The IDSR analyzed data for January to June 2023 (WHO week 1-26) showed that the performance based on timeliness was low and completeness was high based on the newly set national standard of ≥90%. The newly set national standard of ≥90% indicates the need of improving detection and reporting system for immediate response to avert disease outbreak to happen. On the other hand, there is an urgent need for the Government to institute new and reinforce available preventive and control measures against diarrhea and pneumonia as continued to be the leading reportable conditions. Based on high fatality rate of rabies, the Government need to improve preventive measures such as mass dog vaccination and management of cases.

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MUHTASARI
Mkakati wa Ufuatiliaji na Udhibiti wa Magonjwa ya Mlipuko (IDSR): Ripoti ya Miezi Sita, Januari -Juni 2023 (Wiki 1-26)

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Usuli: Wizara ya Afya (WAF) hutumia mkakati wa Ufuatiliaji na Udhibiti wa Magonjwa ya Mlipuko (IDSR) kufuatilia magonjwa na hali zinazoripotiwa kugundua na kudhibiti magonjwa ambayo ni chanzo cha vifo, na ulemavu. Makala hii inaripoti matokeo ya uchambuzi wa taarifa za IDSR kwa kipindi cha miezi 6 cha Januari hadi Juni 2023 ambapo ni wiki ya 1-26 ya Shirika la Afya Duniani (WHO). Takwimu zilichambuliwa kutathmini utendaji wa mkoa katika utoaji wa taarifa na kufahamu idadi ya visa na vifo vya kila ugonjwa kulingana na mwezi na mkoa. Utendaji utatathminiwa kulingana na kiwango kipya cha kitaifa cha asilimia 90 au zaidi.

Uchambuzi: Mikoa yote 26 ya Tanzania Bara iliwasilisha ripoti za kila wiki kwa ngazi ya kitaifa. Mikoa ilipata wastani wa asilimia 78.2 kwa wakati unaofaa (ufanisi) (kwa mfano, asilimia ya wilaya zinazoripoti kwa wakati kwa ngazi ya kitaifa) na asilimia 90.0 kwa ukamilifu (yaani, asilimia ya wilaya zinazotoa ripoti kamili kwa ngazi ya kitaifa).

Katika kipindi cha miezi 6, jumla ya visa 398,774 na vifo 175 viliripotiwa kwa magonjwa yote IDSR. Ugonjwa ulioripotiwa zaidi ni kuhara (n = 202,661, asilimia 50.8) kati ya visa vilivyoripotiwa kutoka mikoa yote ambapo majiji yalikuwa na visa vingi hii ni Dodoma visa 15,656 kati ya 202,661 (asilimia 7.7), Dar es Salaam visa 14,392 (asilimia 7.1), Arusha visa 12,362 (asilimia 6.1) na Tanga 12,292 (asilimia 6.1).

Mwezi wa Januari ilikuwa na visa vingi, visa 123,614 kati ya 398,774 (asilimia 31.0). Kati ya vifo 175 vilivyoripotiwa, visa vingi vilisababishwa na maabukizi makali ya njia ya kupumua (Severe Acute Respiratory Infection, SARI) (n = 95, asilimia 54.3). Ugonjwa uliokuwa na kiwango cha juu cha vifo ilikuwa ni kichaa cha mbwa.

Kati ya visa 24 vilivyoshukiwa kuwa na ugonjwa wa kichaa cha mbwa, 5 walikufa (CFR = asilimia 20.8).

Hitimisho: Uchambuzi wa data ya IDSR ya Januari hadi Juni 2023 (wiki ya 1-26 ya WHO) ulionyesha kuwa utendakazi kwa kwa kuzingatia wakati unaofaa (ufanisi) kuwa wa chini huku ukamilifu ukiwa wa juu kulingana na kiwango kipya cha kitaifa cha aslimia ≥90. Kiwango kipya cha kitaifa cha asilimia ≥90 kinaonyesha uhitaji wa kuboresha ugunduzi na mfumo wa kuripoti haraka ili kufanya maandalizi ya kuzuia mlipuko wa magonjwa kutokea.

Kwa upande mwingine, kuna haja ya haraka kwa Serikali kuanzisha mbinu mpya na kuimarisha hatua zilizopo za kujikinga na kudhibiti ugonjwa wa kuhara na nimonia kwani ni magonjwa yanayoendelea kuongoza kuripotiwa. Kwa kuzingatia kiwango cha juu cha vifo vya washukiwa wa ugonjwa wa kichaa cha mbwa, Serikali inahitaji kuboresha hatua za kinga ikiwa ni pamoja na kuchanja mbwa kwa wingi na kuboresha matibabu kwa visa vinavyotokea.

Preventing Painful Baby Teeth for a Lifetime of Health Benefits

Using Available Healthcare Opportunities for Prevention of Tooth Decay in Children

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KEY POINTS

» Dental caries is preventable but highly prevalent in under-five Tanzanian children.

» Advanced tooth decay causes severe pain, systemic infections, emergency visits and is the leading cause of oral health facility visits.

» Poorly managed tooth decay in young children progresses into adulthood and is linked to many other chronic diseases.

» Involving health care professionals working with children increases reach and widens scope for prevention

» Integration of oral health promotion in Maternal and Child Health clinics (MCH) is the most cost- effective way of preventing tooth decay in young children.

WHAT IS THE ISSUE?

Oral diseases and conditions occur in individuals throughout their life cycles and affect all population groups: young children, adolescents, adults, and the elderly [1]. Dental caries is one of the common oral diseases caused by acidic attack on hard tooth surfaces due to bacterial action.

Tanzania experiences a very high burden of dental caries. The leading cause of oral health facilities' visits for the years 2019 and 2020 in Tanzania was dental caries. According to Tanzania DHIS2 statistics (2020) [2], a total of 668,359 patients reported to oral health care facilities, of these, 73.3% of the attendance was due to diagnosed dental caries.

The most recent National oral health survey (2020) reports that almost all (99%) five-year old children had dental caries [2]. Untreated dental caries is the greatest oral health disease burden according to the Global Health Survey (2020) and represents a widely underestimated Public Health challenge for almost all countries worldwide, Tanzania included [3].

Untreated dental caries can result in severe pain, systemic infections, and loss of teeth. The cost of managing dental caries and its sequelae is substantial and can be avoided- as the disease is largely preventable. Furthermore, due to the chronic nature of the disease and its social determinants, its occurrence in childhood greatly predisposes the individual to persist with the disease through adolescence and into adulthood.

Figure 1: Dental caries 99% prevalence among five-year old

Inadequate availability of preventive and curative oral health care services has been identified as one of the reasons for low levels of screening and preventive measures against dental caries. This is compounded by insufficient availability of oral healthcare workforce within the country.

These factors have resulted in low coverage of oral health services, precluding possibility for its linkage and integration with the general health care system. Overall, there is a low emphasis on prevention and promotion for oral health care in Tanzania.

WHAT CAN WE DO?
What are the policy options?

To reduce the prevalence of dental caries, pain and loss of teeth, we must introduce measures to prevent the occurrence of the condition or detect it at an early stage, to allow for effective management resulting in maintenance of the teeth.

1. Maintain current situation (Status Quo)

What: Children will be brought to healthcare facilities when they have developed symptoms of dental caries, frequently associated with pain and other oral infections.

Why: Due to the lack of widely available, formalized oral health care services for young children, early detection, screening, and measures to prevent dental caries are not routinely instituted in children.

Feasibility: *High.* This is the current practice which requires no additional efforts or measures to implement.

2. Integration of oral health promotion within Mother and Child Health clinics (MCH)

What: Training, providing teaching aids and orienting MCH healthcare workers to provide oral health education and promotion to pregnant women, mothers, and other caregivers with under five-year old children attending MCH clinic.

Why: Dental caries is multifactorial, with dietary practices and oral hygiene playing a major role in its development. About 80% of Tanzanians under-one-year old attend the antenatal and under five clinics regularly, making it an ideal location for oral health promotion.

Feasibility: *High.* Dietary and feeding practice advice is already provided at the ANC to ensure adequate nutrition to the children. Slight modification of the nutrition promotion package is required to incorporate components for prevention of dental caries and encouraging oral hygiene.

3. Outpatient oral health screening in primary facilities

What: Utilize a quick and simple screening questionnaire to identify young patients with oral health issues and provide referral to the nearest linked facility providing oral care services.

Why: There are only a few health facilities providing oral health care and most patients only report for oral care with advanced disease. The screening tool will allow identification of patients with early-stage disease by non-oral health professionals at primary health facilities and facilitate their referrals to the closest linked health facilities providing oral care.

Feasibility: *Medium.* This will largely depend on the motivations of the health care workers at the primary health care facilities. Further, patients may not necessarily adhere to the provided referral due to the perceived low urgency for detected non-painful condition.

Table 1: Cost effectiveness (CE) and Incremental cost-effectiveness (ICER) of proposed interventions

Intervention	Cost (Tshs)	Children with Dental Caries	Average CE
Status Quo	2,437,307	10716675.2	0.23
Option 2 (MCH integration)	57,013,307	9998800.909	5.70
Option 3 (OPD Screening)	54,011,307	10486868.48	5.15
			Incremental CER
MCH integration - Status Quo	54,576,000	-717874.2912	-76.02
OPD Screening - Status Quo	51,574,000	-229806.72	-224.42

EVALUATION AND RECOMMENDATION

An economic evaluation was conducted to determine the most cost-effective approach in reducing the occurrence of dental caries in under five-year-old children.

Option 2 which is, Integration of oral health promotion in maternal and child health clinics policy option was found to be most cost-effective. This intervention was shown to result in the lowest number of children with dental caries at the lowest cost. Furthermore, it is operationally feasible due to healthcare workers already being engaged in provision of nutritional advice to mothers and caretakers. As a result, we recommend the inclusion of oral health promotion activities in MCH clinics.

NEXT STEPS

The Ministry of Health should consider allocation of funds, develop training materials, and implement training programs to educate health care workers in maternal and child health clinics to empower mothers and caretakers on dietary and hygiene practices for prevention of tooth decay in children. A pilot study in a few selected health facilities will be invaluable in exploring the effects of this intervention on the oral health status of under-fives and their immediate family.

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Kutumia Fursa za Huduma za Afya Zilizopo Kuzuia Kutoboka na Kuoza Kwa Meno kwa Watoto

Kutumia Fursa za Huduma za Afya Zilizopo Kuzuwia Kutoboka na Kuoza Meno kwa Watoto

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MAMBO MUHIMU

» Ugonjwa wa kutoboka kwa meno unaweza kuzuilika lakini umeenea sana kwa watoto wa Kitanzania walio chini ya umri wa miaka mitano.

» Kutoboka kwa meno husababisha maumivu makali, maambukizo ya mwili mzima, kuongezeka kwa safari za kupata matibabu ya dharura na ndiyo sababu kuu ya watoto kutafuta huduma katika vituo vya kutolea huduma ya afya ya kinywa.

» Matibabu hafifu ya meno ya utotoni yaliyotoboka husababisha matatizo hadi utu uzima na kuhusishwa na magonjwa mengine mengi sugu.

» Kuhusisha wataalamu wengine wa afya wanaohudumia watoto utaongeza uwezekano wa kuwafikia wengi na kupanua wigo wa kuzuia

» Ujumuishaji wa uhamasishaji wa afya ya kinywa na meno katika kliniki za afya ya mama na mtoto (MCH) ndiyo njia ya gharama nafuu ya kuzuia kutoboka na kuoza kwa meno kwa watoto wadogo.

TAARIFA ZA CHIMBUKO LA TATIZO

Magonjwa ya kinywa hujitokeza kwa watu maishani mwao wote, na magonjwa haya huathiri makundi yote ikiwemo: watoto wadogo, vijana, watu wazima, na wazee [1]. Kutoboka meno ni mojawapo ya magonjwa makubwa ya kinywa yanayosababishwa na mashambulizi ya tindikali kwenye sehemu ngumu ya jino ya nje kutokana na bakteria.

Tanzania inakabiliwa na tatizo kubwa sana wa magonjwa ya kutoboka na kuoza meno. Sababu kuu ya watu kuhudhuria vituo vya kutolea huduma ya afya ya kinywa kwa miaka ya 2019 na 2020 nchini Tanzania ilikuwa ni ugonjwa wa kutoboka na kuoza meno. Kwa mujibu wa takwimu za Tanzania DHIS2 (2020) [2], jumla ya wagonjwa 668,359 waliripotiwa katika vituo vya kutolea huduma za afya ya kinywa na meno, kati ya hao, asilimia 73.3 ya waliohudhuria walitokana na kugundulika kuwa na tatizo la kutoboka na kuoza meno.

Utafiti wa karibuni wa Kitaifa wa afya ya kinywa na meno (mwaka 2020) unaripoti kuwa karibu watoto wote (asilimia 99) wenye umri wa miaka mitano walikuwa na meno yaliyotoboka ama kuoza. Ugonjwa wa kutoboka meno ambao haujatibiwa ndiyo tatizo kubwa zaidi la magonjwa ya kinywa kwa mujibu wa Utafiti wa Afya Duniani (mwaka 2020). Hali hii inaonyesha kwamba changamoto ya ugonjwa wa kuoza meno ni tatizo kubwa

kiafya katika jamii karibu nchi zote duniani, ikiwemo Tanzania, pamoja na kupewa kipaumbele kidogo kisera [3].

Meno yalitoboka yasipotibiwa yanaweza kusababisha maumivu makali, maambukizi sehemu mbalimbali za mwili, na kupoteza meno. Gharama ya kutibu meno yaliyotoboka na madhara yake ni kubwa na inaweza kuepukwa- kwani ugonjwa huo unaweza kuzuilika. Zaidi ya hayo, kutokana na hali ya usugu ya ugonjwa huo na visababishi vyake vya kijamii, kutokea kwake katika utoto kunasababisha uwezekano mkubwa wa mtu kuendelea na ugonjwa huo kupitia ujana na hadi utu uzima.

Kielelezo cha 1: Ugonjwa wa kutoboka kwa meno ni asilimia 99 kati ya watoto wa miaka mitano

Upatikanaji hafifu wa huduma za kinga na tiba za afya ya kinywa na meno zimeainishwa kama moja ya sababu za viwango vya chini vya uchunguzi na za uzuiaji dhidi ya kutoboka na kuoza meno. Hii inachangiwa na ukosefu wa wafanyakazi wa huduma ya afya ya kinywa wa kutosha, nchini Tanzania.

Sababu hizi zimesababisha upatikanaji mdogo wa huduma za

afya ya kinywa nchini, hivyo kuzuia uwezekano wa kuunganishwa na kujumuishwa katika mfumo wa huduma za afya kiujumla. Kwa ujumla, kuna msukumo mdogo katika kuzuia na kukuza huduma ya afya ya kinywa nchini Tanzania.

MAONI KISERA
Je, ni Chaguzi Gani za Sera Zilizopo?
Ili kupunguza kuenea kwa tatizo la kutoboka meno, maumivu na kupoteza meno, ni lazima tuanzishe hatua za kuzuia kutokea kwa hali hiyo au kugundua tatizo katika hatua ya awali, ili kuruhusu usimamizi mzuri kihuduma utakaosababisha utunzwaji wa meno.

1. Dumisha Sera ya Sasa (Hali Iliyopo)
Nini: Watoto waendelee kuletwa kwenye vituo vya huduma ya afya wanapokuwa na dalili za kutoboka ama kuoza kwa meno, ambazo mara nyingi huambatana na maumivu makali pamoja na maambukizi mengine ya kinywa.

Kwa Nini: Kwa sababu ya kukosekana kwa huduma nyingi za afya ya kinywa kwa watoto wadogo, utambuzi wa mapema, uchunguzi, na hatua za kuzuia ugonjwa wa kutoboka meno kwa watoto katika utaratibu wa kawaida hazijaanzishwa.

Uwezekano: *Wa juu.* Huu ni utaratibu wa sasa ambao hauhitaji juhudi au hatua za ziada kutekeleza.

2. Ujumuishaji wa uhamasishaji wa afya ya kinywa katika ya kliniki za Afya ya Mama na Mtoto (MCH)
Nini: Kutoa mafunzo, kutumia mabango vitita (vifaa vya kufundishia) na kuwaelekeza wahudumu wa afya wa MCH kutoa elimu ya afya ya kinywa na uhamasishaji kwa mama wajawazito, akina mama, na walezi wengine walio na watoto chini ya miaka mitano wanaohudhuria kliniki ya MCH.

Kwa Nini: Ugonjwa wa kuoza kwa meno una visababishi kadhaa, vikiwemo mtindo wa ulaji na usafi wa kinywa. Takriban asilimia 80 ya watoto wa Kitanzania walio na umri wa chini ya mwaka mmoja huhudhuria kliniki za mama wajauzito na ya watoto chini ya miaka mitano mara kwa mara, na kuifanya MCH kuwa mahali pazuri kwa kuhamasisha afya ya kinywa.

Uwezekano: *Wa Juu.* Ushauri wa matumizi ya lishe na ulishaji tayari unatolewa katika ANC ili kuhakikisha lishe ya kutosha kwa watoto. Marekebisho kidogo ya mafundisho ya kuhamasisha lishe inahitajika ili kujumuisha vipengele vya kuzuia kutoboka meno na kuhimiza usafi wa kinywa.

3. Uchunguzi wa afya ya kinywa kwa wagonjwa wa nje katika vituo vya afya ya msingi [zahanati]
Nini: Tumia dodoso la uchunguzi wa haraka na rahisi ili kutambua watoto wagonjwa wanaokuja kwa ajili ya huduma nyingine za afya wenye matatizo ya afya ya kinywa, na kutoa rufaa kwenda kituo kilicho karibu kinachotoa huduma za kinywa.

Kwa nini: Kuna vituo vichache tu vya afya vinavyotoa huduma ya afya ya kinywa na wagonjwa wengi huripoti tu kwa huduma ya kinywa wakati ugonjwa umekuwa mkubwa zaidi au katika hali mbaya. Dodoso la uchunguzi litaruhusu utambuzi wa wagonjwa wenye ugonjwa wa mapema kwa kutumia wataalam wa afya wasio wa kinywa katika zahanati na kuwezesha kutoa rufaa kwenda kwenye vituo vya afya vilivyo karibu vinavyotoa huduma ya kinywa.

Uwezekano: *Wa kati.* Hii itategemea kwa kiasi kikubwa motisha ya wahudumu wa afya katika vituo vya afya vya msingi. Zaidi ya hayo, wagonjwa huenda wasizingatie rufaa iliyotolewa kwa sababu ya kutokuona uhitaji wa haraka wa utambuzi wa maumivu wa hali iliyogunduliwa.

Jedwali Namba 1: Cost effectiveness (CE) and Incremental cost-effectiveness (ICER) of the proposed interventions

Intervention	Cost (Tshs)	Children with Dental Caries	Average CE
Status Quo	2,437,307	10716675.2	0.23
Option 2 (MCH integration)	57,013,307	9998800.909	5.70
Option 3 (OPD Screening)	54,011,307	10486868.48	5.15
			Incremental CER
MCH integration - Status Quo	54,576,000	-717874.2912	-76.02
OPD Screening - Status Quo	51,574,000	-229806.72	-224.42

TATHMINI NA MAPENDEKEZO
Tathmini ya kiuchumi ilifanywa ili kuamua sera ya gharama nafuu zaidi katika kupunguza matukio ya kutoboka meno kwa watoto chini ya umri wa miaka mitano.

Chaguo la 2 ambalo ni, "Ujumuishaji wa uendelezaji wa afya ya kinywa katika kliniki ya mama na mtoto" lilionekana kuwa sera ya gharama nafuu zaidi. Kutumika kwa sera hii kulionekana kuwa afua inayopunguza kwa kiasi kikubwa zaidi idadi ya watoto wenye matatizo ya kutoboka ama kuoza meno na kwa gharama ya chini zaidi. Pamoja na hilo, haihitaji uwekezaji mkubwa kiutendaji kutokana na kwamba wahudumu wa afya tayari wanashiriki katika utoaji wa ushauri wa lishe kwa akina mama na walezi. Kwa hivyo, tunapendekeza kujumuishwa kwa shughuli za uhamasishaji wa afya ya kinywa katika kliniki za MCH.

HATUA ZINAZOFUATA

Wizara ya Afya inapaswa kuzingatia kutenga fungu la fedha kwa ajili ya kuandaa vifaa vya kufundishia (bango kitita), na kutekeleza programu za mafunzo ya kuwaelimisha wahudumu wa afya katika kliniki za mama na mtoto. Hii itawezesha kuwajengea uwezo akina mama na walezi kuhusu lishe na kanuni za usafi wa kinywa ili kuzuia kutoboka na kuoza meno kwa watoto. Utafiti wa majaribio katika vituo vichache vya afya vilivyochaguliwa utakuwa wa muhimu sana katika kuchunguza manufaa wa afua hii juu ya hali ya afya ya kinywa kwa watoto chini ya miaka mitano na familia zao.

SHUKRANI

Waandishi wanashukuru taasisi zao zilizotoa ruhusa kuwezesha kufanyika kwa utafiti huu. Shukrani za pekee kwa washauri wetu; Dkt. Kwame Nyahko pamoja na wakufunzi wengine wa mradi kwa msaada na ushauri wao pasipo kuchoka. Chanzo cha taarifa hizi ni Mpango wa 'Data for Health Initiative', mradi wa pamoja wa CDC Foundation na Amref Tanzania

REFERENCES

1. Petersen, Poul Erik, et al. "The global burden of oral diseases and risks to oral health." Bulletin of the world health organization 83 (2005): 661-669.

2. THE UNITED REPUBLIC OF TANZANIA, National Oral Health Survey (2020)

3. Vos, Theo, et al. "Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019." The Lancet 396.10258 (2020): 1204-1222.

Demographic, Clinical Characteristics and Risk Factors Associated with Extra-Pulmonary Tuberculosis, 2021 in Tanzania

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ABSTRACT

Introduction: Tuberculosis (TB) is still a significant global health concern. It can manifest in the lungs (pulmonary TB) or in other parts of the body extra-pulmonary TB (EPTB). The most commonly affected areas in EPTB are lymph nodes, pleura, bones and joints, urogenital tract, and meninges. Around 16% of the reported TB cases in 2019 were extra-pulmonary, with regional variations. Understanding the demographic characteristics and factors related to EPTB is crucial for effective TB control programs. This study aimed at examining the clinical and demographic features of EPTB cases in Tanzania and Zanzibar in 2021 using the Electronic TB and Leprosy database.

Methods: Data were obtained from the National Tuberculosis and Leprosy Program (NTLP) data base; all EPTB cases notified from January 2021 up to December 2021 from Tanzania mainland and Zanzibar were included. In this retrospective cross sectional study data were extracted to assess clinical and demographic characteristics. Multivariate logistic regression was done to estimate adjusted odds ratios (AOR), corresponding with 95% confidence interval (CI) and p-value to measure association linked with EPTB.

Results: A total of 31,184 EPTB cases were notified in 2021 whereby majority of patients were males 17176 (55.0%), patients aged 0-14 years 8228 (26.4%), HIV negative patients 25420 (83.3%) and newly registered patients (never been on anti-TB before) 30722 (98.5%). In the multivariate analysis, age of 0-14 years (AOR =2.3, 95% CI: 2.0-2.7) and 45-59years (AOR=1.1, 95% CI; 1.1-1.2), male (AOR = 1.2, 95% CI: 1.2-1.3), and previous TB treated (AOR=1.5, 95% CI ;(1.2 -1.9) were having higher odds of developing EPTB.

Conclusion: This study has provided evidence that EPTB is significantly associated with extreme ages, previously TB treated patients and male gender. The situation is calling for urgent emphasises in good adherence of TB medication and community health education to minimize failure rate and occurrence of relapses cases in the view of decreasing EPTB cases for TB control.

Key words: Characteristics, Demographic, Clinical characteristics, Factors, EPTB.

INTRODUCTION

The WHO estimated 10.4 million incident cases of TB and 1.67million TB deaths in 2020. Although TB most commonly affects the lungs, it can also affect other sites a form known as extra pulmonary tuberculosis (EPTB) [1]. EPTB cause substantial rates of illness and death in various populations, accounting for 16% of the 7.1 million incident cases that were notified in 2019 globally [1, 2]. In countries with a high HIV and TB rates such as Tanzania, 20% of incident TB manifest as (EPTB) [1,3].

The proportion of EPTB is highly variable from one country to another, in the European Union, EPTB without pulmonary involvement account for 19% of all new tuberculosis cases, ranging from 6% to 44%; whereas EPTB with pulmonary involvement account for 6%(4). Studies have reported age, sex, HIV status, co-morbidities, marital status, occupation, smoking and alcoholism to be common factors associated with EPTB [5–7]many more males than females were diagnosed with tuberculosis (TB.

However, researches on EPTB are limited in Tanzania hence the demographic, clinical characteristics and risk factors associated with EPTB are still unclear [3]. Therefore, this analysis aimed at establishing clinical and demographic characteristics of EPTB and its associated factors.

METHODS

Study Design

This was a cross-sectional study conducted using secondary data of EPTB patients, who were enrolled on treatment in the year 2021.

Study Area and Study Population

The study involved all EPTB cases enrolled on treatment for the year 2021 and were accessed in the NTLP database which contains data for all 26 regions in Tanzania mainland and Zanzibar. In this study, all patients with confirmed TB, with any type of EPTB in 2021 in database were included, while all EPTB with missing important variables and all patients with both EPTB and Pulmonary TB were excluded.

Data Abstraction Procedure

Data were extracted from the NTLP database system in form of excel sheet, information usually recorded on case-based system through available Electronic TB and Leprosy System (ETL). This electronic system acts as surveillance tool for monitoring performance of different NTLP program indicators. The system also monitors progress on treatment of TB, drug resistant TB and Leprosy patients from when registered throughout to treatment completion.

Flow of data begins at the primary health facility, once a TB patient is identified is recorded in normal TB register (TB 03), which are available at the facility. Afterwards, notification is sent to the District TB and Leprosy Coordinator (DTLC). DTLC registers the patient in ETL in electronic TB register where the patient is categorized into type of TB, he/she have either PTB or EPTB. Once registered the information is reflected both at Regional and National Level.

EPTB Data of 2021 were extracted from the ETL system in form of excel sheet, then analysed using Stata Version 15.0. Before analysis, range and consistency checks was performed to ensure that the data lie within the maximum and minimum pre-set values and are logical. Demographic characteristics included sex and age, residence. While clinical characteristics included, direct observed treatment (DOT) option, regime, anatomical site etc.

Variable

Independent variables were age, sex, geographical location of the patient, DOT options, HIV status, while dependent variables were EPTB cases that were compared with PTB cases of the same year.

Data Analysis

Data cleaning and analysis were performed using Microsoft excel STATA version 15. A preliminary exploration of the data was done to check for missing values, duplications, and unusual observations before analysis. Descriptive statistics were summarized using frequency for categorical variables whereas continuous variables were summarized with the measure of central tendency-median with respective measures of dispersion -Interquartile Range.

Bivariate and multivariate regression was performed to determine factors associated with EPTB corresponding to 95% confidence interval. Variables with P≤0.2 in the bivariate analysis were then entered one by one in the multivariable regression model. Variable was regarded as potential confounders if the changes of an estimate from crude to adjusted analysis exceed 10%. To account for confounding effects, multivariable logistic regression analysis or their alternative was performed to obtain the adjusted odds ratio and 95% CI for EPTB. In both models, p value < 0.05 was used to declare statistical significance

Ethical considerations

Permission and access to the dataset were granted by the

Ministry of Health through NTLP. Data were extracted by unique TB Identification number instead of names to prevent patient identification.

RESULTS

Description of demographical and clinical characteristics of TB patients, 2021 in Tanzania

A total of 31,185 cases of EPTB were notified, It was found that TB was common among male gender 17176 (55.0%). The most affected age was 0-14 age-group 8228 (26.4%), the other demographic and clinical characteristics are summarized in table 1.

Table1. Demographic characteristics of EPTB patients in the year 2021 in Tanzania (N=31,184)

Characteristics	EPTB Classification	
	n	(%)
Age category		
0-14	8228	26.4
15-29	4150	13.4
30-44	6432	20.7
45-59	5990	19.2
60 and above	6384	20.4
Sex		
Female	14008	45.0
Male	17176	55.0
HIV status		
Negative	25420	83.3
Positive	5072	16.7
TB. history		
New	30722	98.5
Previously treated	378	1.5

Geographical Distribution of EPTB in Tanzania

As shown in Figure 1, Lake-zone was seen to have more cases 9322 (29.5%) and Zanzibar had lowest number of cases of EPTB 300 (0.9%)
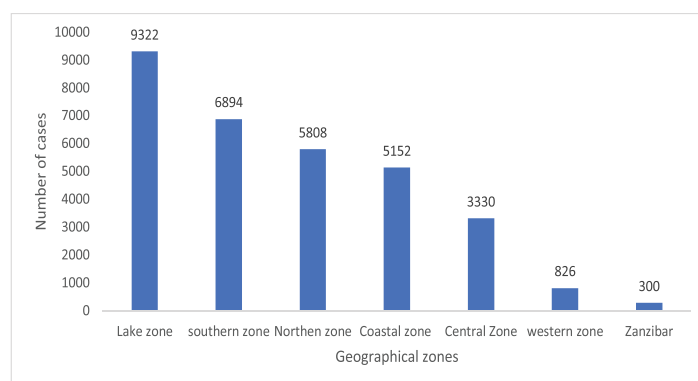
Figure 1: Geographical distribution of EPTB cases in the year 2021, Tanzania

Factors Associated with EPTB, in the Year 2021 in Tanzania

Patients with 0-14 years and 45-59 years had high odds of developing EPTB (AOR =2.3, 95% CI; 2.0 - 2.7) and (AOR=1.1, 95% CI; 1.1-1.2) respectively and these findings were statistically significant. Being male had high odds of developing EPTB (AOR = 1.2, 95% CI: 1.2 -1.3). Moreover, patient with previous TB treatment history had high odds of developing EPTB (AOR=1.5, 95% CI;(1.2 -1.9) as summarized in Table 2.

Table 2: Factor associated with EPTB, in the year 2021 in Tanzania

Variables	EPTB	PTB	Bivariate analysis		Multivariate analysis	
	n (%)	n(%)	OR(95%CI)	P-value	AOR(%CI)	P-value
Age group						
0-14	8228 (31.5)	17864 (68.3)	2.5 (2.2-2.9)	<0.01	2.3 (2.0-2.7)	<0.01
15-29	4150 (17.8)	19184 (82.2)	1.1 (1.0-1.3)	0.03	1.1 (1.0-1.2)	0.19
30-44	6432 (15.5)	35070 (84.5)	0.9 (0.8-0.9)	0.01	0.9 (0.8-0.9)	0.02
45-59	5990 (17.3)	28624 (82.7)	1.1 (1.0 -1.1)	0.01	1.0 (1.1-1.2)	0.01
60 and above	6384 (17.9)	29264 (82.7)	Ref			
Sex						
Female	14008 (21.8)	50134 (78.2)	Ref			
Male	17176 (17.7)	79872 (82.3)	1.3 (1.3-1.3)	<0.01	1.2 (1.20-1.3)	<0.01
HIV status						
Negative	25420 (19.4)	105620 (82.6)	Ref			
Positive	5072 (17.9)	23336 (82.2)	0.6 (0.4-0.9)	0.01	0.7 (0.5-0.9)	0.05
TB.History						
Previously treated	82 (12.7)	564 (87.3)	1.7 (1.3-2.1)	<0.01	1.5 (1.2-1.9)	<0.01
New	30722 (19.5)	126006 (80.6)	Ref			

DISCUSSION

This study revealed a high proportion of EPTB cases among patients with 0-14 years, male patients, HIV negative patients and new patients with treatment history. In the geographical distribution, Lake zone had high proportions of EPTB cases, and Zanzibar reported low proportions of EPTB cases. In the multivariate analysis factors with significant association with EPTB were, age of 0-14 years, male patients, and patients with previous TB treatment history. HIV status had no significant association with EPTB.

In this study, age-group of (0-14) years had higher proportion of EPTB cases, this is similar to studies done in Pakistan and Brazil which reported the same age group to have higher proportion of EPTB cases [4,8]its significance has increased worldwide during the HIV epidemic. The objective of this study was to examine the epidemiology of EPTB in Brazil between 2007 and 2011. Methods: Cross-sectional study involving all cases of TB reported to the Brazilian Notifiable Diseases Surveillance System (Sistema de Informacoes de Agravo de Notificacao - SINAN. This could be explained by low immunity of younger age-group that make them susceptible to get EPTB of which TB lymphadenitis is the most common in children compared to adults. However, other studies conducted in Saudi Arabia, provinces of China reported different advanced age group to have high proportion of cases of EPTB [9,10].

Moreover, our study reported males to have higher proportion of EPTB cases than female similar to study findings from Pakistan and Ghana [11,12]. The most probable reason that could explain these findings is that males have more predisposing factors than females which includes smoking and occupational health hazards like mining activities. On the contrary, other studies conducted in China and Africa showed that females had higher proportion of EPTB cases than males [6,7]many more males than females were diagnosed with tuberculosis (TB. The reasons to these discrepancies might be due to different in population characteristics and geographical location of the studies.

Moreover, in this study majority of EPTB cases were HIV negative. Our observation is similar to studies done in Saudi Arabia [10,13] The best explanations to this could be due

to a successful implementation of good Isoniazid Preventive Therapy strategies done in most of HIV Care and Treatment Centres (CTC) . Through this strategy HIV positive group receive prevention of TB, also HIV patients tend to have regular TB screening during their visits to CTC than HIV negative patients.

However, the results of our study were dissimilar to the study conducted in Ulanga Tanzania, were EPTB was more manifested among HIV positive patients [3]. Furthermore, majority of EPTB cases were new cases followed by relapse cases. This observation was similar to WHO TB report of 2020, which it gives an alert on emphasis on good anti-TB adherence to minimizes relapse chances [2,5].

Our study reported age as an important factor for EPTB where younger age had significant association with EPTB and risks decreases as the age increases. These results were similar to a study done in Brazil and China which reported younger ages to have significant association with EPTB [5,14]. This association could be explained by lower immunity among younger ages.

Similar to our study some studies done in Africa and West Asia reported males to be associated with EPTB [11,13]. Nevertheless, other studies from China and Brazil had different results from our findings were by female had higher association with EPTB [5,14]. These dissimilar findings may be due to the difference in study settings and geographical locations, differences in cultural bases since some other society females and males have equal predisposing behavioural factors like, smoking, etc. Similar to our study, some previous studies also reported previous TB treated patients to have significantly associated with EPTB [10,15,16].

CONCLUSION

This study has provided evidence that EPTB is significantly associated with extreme age groups, previously TB treated history and male gender. The situation is calling for emphasis in good adherence of TB medication among patients and community health education is needed for creating awareness towards minimizing failure rate and occurrence of relapses cases in view of decreasing EPTB cases for TB control.

LIMITATIONS

Database comprises of few variables and hence it misses important variables like anatomical sites for EPTB cases, occupation status of patients which have been seen to associate with EPTB cases.

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MUHTASARI

Demografia, Dalili za Ugonjwa na Viashiria hatarishi vinavyohusishwa na Kifua Kikuu Sehemu Zingine za Mwili Licha ya Mapafu, 2021 Nchini Tanzania

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Usuli: Kifua Kikuu (TB) bado ni tatizo kubwa la afya duniani. Inaweza kujidhihirisha kwenye mapafu (TB ya mapafu) au katika sehemu zingine za mwili (Kifua Kikuu Licha ya Mapafu (EPTB). Maeneo yanayoathiriwa zaidi katika EPTB ni tezi, 'pleura', mifupa na viungo, njia ya mkojo, na uti wa mgongo. Takriban asilimia 16 ya visa vya TB vilivyoripotiwa mnamo 2019 vilikuwa vya sehemu nyingine ya mwili zaidi ya mapafu, na vikitofautina kimkoa. Kuelewa sifa za kidemografia (umri, njisia nk) na viashiria ambavyo vinaweza kuhusiana na EPTB ni muhimu kwa mipango madhubuti ya kudhibiti Kifua Kikuu. Utafiti huu ulilenga kuchunguza dalili za ugonjwa na kidemografia za wagonjwa wa EPTB nchini Tanzania na Zanzibar kwa mwaka 2021 kwa kutumia kanzidata ya Kielektroniki ya Kifua Kikuu na Ukoma.

Mbinu: Takwimu zilipatikana kutoka kwenye kanzidata ya Mpango wa Taifa wa Kifua Kikuu na Ukoma (NTLP); visa vyote vya EPTB vivyoripotiwa kuanzia Januari 2021 hadi Desemba

2021 kutoka Tanzania Bara na Zanzibar vilijumuishwa. Takwimu zilichukuliwa na kuchambuliwa ili kutathmini na kupima uhusiano wa kidemografia na dalili za ugonjwa vinavyohusishwa na EPTB

Matokeo: Jumla ya visa 31,184 vya EPTB ziliripotiwa katika mwaka wa 2021 ambapo wagonjwa wengi walikuwa wanaume 17176 (asilimia 55.0), wagonjwa wenye umri wa miaka 0-14 walikuwa 8228 (asilimia 26.4), wasio kuwa na VVU walikuwa 25420 (asilimia 83.3) na waliosajiliwa hivi karibuni ambao hawajawahi kupata matibabu ya TB walikuwa 30722 (asilimia 98.5). Katika uchambuzi wa takwimu, ili bainika kuwa umri wa miaka 0-14 (AOR = 2.3, 95% CI; 2.0-2.7), na miaka 45-59 (AOR = 1.1, 95% CI; 1.1-1.2), kuwa manaume (AOR = 1.2, 95% CI: 1.2-1.3), na kuwahi kupata matibabu ya TB (AOR=1.5, 95% CI; 1.2-1.9) ni hali ambazo zilionyesha kuwa na uhusiano mkubwa wa uwezekano kwa mtu kuugua EPTB.

Hitimisho: Utafiti huu umeonyesha kwamba EPTB inahusishwa kwa kiasi kikubwa na umri mdogo na wazee, wagonjwa waliotibiwa TB hapo awali na jinsia ya kiume. Hali hii inaonyesha uhitaji wa uharaka katika kuendelea kusisitiza uzingatiaji mzuri wa matumizi ya dawa kwa wagonjwa wa TB, na kutoa elimu ya afya kwa jamii ili kupunguza kiwango cha watu wasioweza kutibika na kutokea kwa visa ambavyo ugonjwa unajirudia tena kwa lengo la kupunguza visa vya EPTB kwa udhibiti wa TB.

MANENO MUHIMU: Hali ya kidemografia, Dalili za Ugonjwa, Viashiria, Kifua Kikuu sehemu nyingine za mwili licha ya mapafu

REFERENCE

1. World Health Organization (WHO). Global Tuberculosis report [Internet]. Vol. 188, WHO. World Health Organization.; 2020. 232 p. Available from: https://www.who.int/publications/i/item/9789240013131

2. World Health Organization (WHO). Global Tuberculosis Report 2019. WHO, editor. World Health Organization. Published by Elsevier Ltd/Inc/BV. All rights reserved.; 2019. 284 p.

3. Arpagaus A, Franzeck FC, Sikalengo G, Id RN, Mnzava D, Rohacek M, et al. Extrapulmonary tuberculosis in HIV-infected patients in rural Tanzania : The prospective Kilombero and Ulanga antiretroviral cohort. 2020;175:1–16. Available from: http://dx.doi.org/10.1371/journal.pone.0229875

4. Id ST, Khanzada FM, Baloch AQ. Extrapulmonary tuberculosis in Pakistan- A nation-wide multicenter retrospective study. 2020;(April). Available from: http://dx.doi.org/10.1371/journal.pone.0232134

5. Kang W, Yu J, Du J, Yang S, Chen H, Liu J, et al. The epidemiology of extrapulmonary tuberculosis in China : A large-scale multi- center observational study. 2020;(December 2017):1–15. Available from: http://dx.doi.org/10.1371/journal.pone.0237753

6. Gao M, Qin S, Huang H, Chen X, Xu S. A rare case series of HIV-negative patients with early relapsing cervical tuberculosis lymphadenitis. Vol. 25. 2019. p. 457–64.

7. Ben Jmaa M, Ben Ayed H, Koubaa M, Hammami F, Damak J, Ben Jemaa M. Is there gender inequality in the epidemiological profile of tuberculosis? Tunis Med. 2020;98(3):232–40.

8. T. G, B. R-S, A. B, J.L. J, L.W. R, E.L. M. Epidemiology of extrapulmonary tuberculosis in Brazil: A hierarchical model. BMC Infect Dis [Internet]. 2014;14(1). Available from: http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L52961869%5Cnhttp://www.biomedcentral.com/1471-2334/14/9%5Cnhttp://dx.doi.org/10.1186/1471-2334-14-9

9. Liu Y, Jiang Z, Chen H, Jing H, Cao X, Je C, et al. Description of demographic and clinical characteristics of extrapulmonary tuberculosis in Shandong , China. 2020;27–32.

10. Al-hajoj S, Shoukri M, Memish Z, Alhakeem R. Exploring the Sociodemographic and Clinical Features of Extrapulmonary Tuberculosis in Saudi Arabia. 2015;1–11.

11. Id SO, Bakker MI, Ojo J, Toonstra A, Awudi D, Klatser P. Extra-pulmonary tuberculosis : A retrospective study of patients in Accra , Ghana. 2019;1–13.

12. Id ST, Khanzada FM, Baloch AQ. PLOS ONE Extrapulmonary tuberculosis in Pakistan- A nation-wide multicenter retrospective study. 2020;15790:1–16. Available from: http://dx.doi.org/10.1371/journal.pone.0232134

13. Al-ghafli H, Varghese B, Enani M, Id AA, Al S, Albarrak A, et al. Demographic risk factors for extra-pulmonary tuberculosis among adolescents and adults in Saudi Arabia. 2019;1–14.

14. Gomes T, Reis-Santos B, Bertolde A, Johnson JL, Riley LW, Maciel EL. Epidemiology of extrapulmonary tuberculosis in Brazil: a hierarchical model. BMC Infect Dis [Internet]. 2014;14(1):9. Available from: https://doi.org/10.1186/1471-2334-14-9

15. Abali H, Ortakoylu MG. A rare case series of HIV-negative patients with early relapsing cervical tuberculosis lymphadenitis. Int J mycobacteriology. 2022;11(4):448–53.

16. Fang Y, Zhou Q, Li L, Zhou Y, Sha W. Epidemiological characteristics of extrapulmonary tuberculosis patients with or without pulmonary tuberculosis. 2022;

Distribution and Determinants of Cholera Outbreak in Katavi and Kigoma: A Case-Control Study - April 2022

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ABSTRACT

Introduction: Globally, cholera imposes many deaths due to dehydration. Until 2017 Africa had contributed almost 5% of all cases in the world and half of them are from Sub-Saharan countries. In Tanzania, the first confirmed cases of cholera were reported in mid 1997 during a cholera outbreak. Until 2017 case fatality rate was 1.5%. Kigoma and Katavi have been classified as second high-risk cluster regions in 2019 due to the recurrence of the cholera outbreaks. This study reports the epidemiological distribution and risk factors of the cholera outbreak that occurred recently in Kigoma and Katavi regions from 18th April to 5th May 2022.

Methods: A total of 71 symptomatic cholera patients with their respective controls at (1:2) from the household were enrolled. Standard descriptive epidemiological approaches were used to describe participants in demographic characteristics, symptoms, and trends of the outbreak, highlighting the villages where cases were obtained. Both cases and controls were compared for their exposures using logistic regression analysis at 95% confidence intervals. After adjusting variables for confounders in multivariate analysis, the retained variables at p-value < 0.05 were reported as risk factors and discussed in the results.

Results: No remarkable difference was observed in demographic characteristics between cases and controls. Of six villages studied in this outbreak, Kashagulu and Sibwesa were found to have a high percentage of cases of 25.0% and 23.8% respectively, Kalya had only 1.0% of all cholera cases. For demographic factor, the case fatality rate was only 2.8% where Cholera outbreak was found to be statistically associated with young age of 5 to 18 years (aOR,10.52; 95% CI, 5.11-21.68), and for those who had exposure of using river water were 5 times likely to develop cholera compared to those who are not using river water (aOR,5.02;95%CI,1.67-15.01).

Conclusion: Young people are at increased risk of contracting cholera infection from the source and spreading it at home which ultimately causes an outbreak. Additionally, water bodies were mainly reported to be the main source of cholera infection, especially when using without treating such as boiling. Despite it being a highly infectious disease, cholera outbreak could be prevented when public health measures like washing hands after using toilets/latrines, eating and treating drinking water have well been adhered to at both individual and community level.

KEY WORDS: Cholera, outbreak, village, distribution case, control.

INTRODUCTION

Cholera outbreaks impedes the development of the country by imposing a big loss on the economy through public health, the source of cost used can be categorized into items like staff incentives, facility, medical and drug supplies, and other costs like fuel and burial process when deaths occur [1]. Cholera imposes many deaths due to dehydration globally [2]. Until 2017 Africa had contributed almost 5% of all cases in the world and half of them are from Sub-Saharan countries [1]. In Tanzania, the first confirmed cases of cholera were reported in mid 1997 during a cholera outbreak whereby the case was significantly determined by factors like bathing in river water, eating dried uncooked fish, and walking long distance to fetch water [3]. However, another study done in Tanzania reported the burden of cholera could be much more influenced by an increase in temperature rather than rainfall[4]. Following a reported progressive increase in the number of cases with symptoms of profuse watery diarrhea in Uvinza District Council (DC) and Tanganyika DC, the Ministry of Health deployed a team to investigate and intervene the situation. Therefore, this study focused on describing the epidemiology and risk factors associated with the recent cholera outbreak that happened in Uvinza DC and Tanganyika DC of Kigoma and Katavi regions respectively.

METHODS

An unmatched case-control (1:2) study was done to investigate this outbreak. This aimed obtaining estimates of the exposure between those who were observed with any clinical manifestation of cholera (cases) and their respective friends or relatives whom did not contract any illness (control). Controls were selected from those living in the same house as well as those having close interaction with cases during an outbreak. The study was conducted in 6 villages, 3 from each Uvinza DC and Tanganyika DC in Kigoma and Katavi regions respectively. These villages were Kalya, Kashagulu and Sibwesa in Kigoma as well as Ikola, Karema, and Kasagantongwe in Katavi. Cases which were either confirmed by laboratory investigation or not (whether confirmed, probable,

or suspected) were obtained from the line list at the treatment centre. The outcome variable of this study was the cholera case and the independent variables included age, residency, occupation, state of household, source of water used for household purposes, and availability and state of latrines. Data was collected using structured questionnaires, where the same questionnaire was used to collect data from both cases and controls. Questionnaires were administered by the deployed team from the Ministry of health. Questions were focused on collecting demographic and social information and possible cholera risk factors.

Data were organized and analyzed using STATA version 15. Categorical variables were described as percentages while continuous variables were described using the median since the data were skewed. Risk factors for this outbreak, were assessed by running univariate logistic regression. Variables that displayed p-value < 0.2 in the model have been put on multivariate analysis. The association of factors between cases and controls was expressed as an odds ratio. The variables that maintained significance at a p-value of less than 0.05 were identified as risk factors.

RESULTS

Demographic characteristics

This study involved 213 persons from 2 regions affected by outbreak, out of them 71 were cases of cholera and 142 were their unmatched controls (ratio 1:2). Majority 116 (75.5%) of participants were aged above 18 years. There was no significant difference between female 108 (50.7%) and male 105 (49.2%) participants. Among both cases and controls participated in this study, those who had secondary level education were only 14 (6.6%) as shown in table 1 below. The main presenting symptoms of this outbreak was diarrhea 71 (100%) and vomiting 62 (87.0%) followed by other symptoms like general body malaise and fever (data not shown)

Table 1: Demographic Characteristics of Cases and Controls of Cholera Outbreak in Katavi and Kigoma – 2022

Variables	Cases n_1 (%)	Control n_2 (%)	Total N (%)	P-value
Sex				
Male	42 (59.2)	63 (44.3)	105 (49.2)	
Female	29 (40.9)	79 (55.6)	108 (50.7)	0.042
Age group				
5-18	38 (53.5)	14 (8.9)	52 (24.4)	
above 18	33 (46.5)	128 (90.1)	116 (75.5)	<0.001
Occupation				
Other	35 (49.3)	35 (24.7)	70 (32.9)	
Fishers	4 (5.6)	17 (12)	21 (9.9)	
Peasant	32 (45.1)	90 (63.4)	122 (57.2)	<0.001
Residency				
Kalya	1 (1.41)	2 (1.4)	3 (1.4)	

Kashagulu	17 (23.94)	27 (19.0)	44 (20.7)	
Sibwesa	19 (26.76)	43 (30.3)	62 (29.1)	
Kasagantongwe	13 (18.3)	21 (4.7)	34 (16.0)	
Ikola	12 (16.90)	16 (11.3)	28 (13.1)	
Karema	9 (12.68)	33 (23.3)	42 (20.0)	0.308
Education				
Nil	45 (63.4)	48 (33.8)	93 (43.7)	
Primary	21 (29.6)	85 (58.9)	106 (49.8)	
Secondary	5 (7.1)	9 (6.34)	14 (6.6)	<0.001
Household size				
0 – 3	10(14.08)	20 (14.8)	30 (14.1)	
4 – 6	26(36.62)	69 (48.9)	95 (44.6)	
Above 6	35(49.3)	53 (37.3)	88 (41.3)	0.206

Distribution Pattern of the Outbreak

The overall attack rate was 12.6 persons per 100,000 population. Death reported were 2, and the case fatality rate (CFR) was 2.8%. The most affected age was the young population of 5-18 years of age with the median age being 16 (IQR 4-26). Unlike in controls, cholera cases were dominants in people with other occupations 35(49.3%), followed by peasants 32(45.1%) and the least group affected were fishers 4(5. 6%). Cholera symptoms were least revealed by those who had a secondary school education 5(7.1%) and most by those who did not acquire any education 45(63.4%).

We also identified from this study that a lot of cases 35(49.3%) were those who are living in congested homes with more than 6 members in the same house (Table 1). The outbreak was characterized by more than two peaks which explains the intermittent rise in the number of cases. There is a maximum of only 5 days before the case starts to remerge and a minimum of 1 day (Figure 1).

Of six villages in Kigoma and Katavi, the higher number of cholera cases were reported from Swibwesa and Kashgulu in Kigoma region which had 19 and 17 cholera cases respectively (Figure 2)
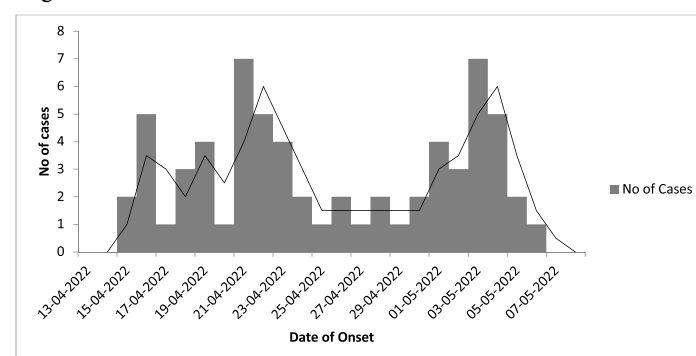
Figure1: Epidemiological curve for cholera cases in Katavi and Kigoma, 18th July to 5th May 2022

Factors Associated with a Cholera Outbreak

All variables used in this study were tested for their association with cholera infection, in univariate analysis, the strong risk factors for the cholera outbreak were found to be young age (Odds Ratio (OR),10.5; 95% CI, 5.1-21.7), other types of occupation (OR,2.8; 95% CI,1.51-5.1), communal handwash (OR,2.5;95% CI,1.1-6.1) and use of river water (OR,5.0;95% CI,1.7-15.0) (Table 2). When variables were adjusted for confounders on multivariate analysis, the youngest population (5-18years) in this study maintained a steady association of developing cholera infection cases (aOR, 10.5; 95% CI,5.1- 21.7) compared to an older age.

Also, the use of river water was statistically significantly associated with cholera as the odds of acquiring cholera among people who used river water were five times more than those who didn't (OR,5.0;95% CI,1.6-15.0). Variables like male sex, (OR,1.8; 95%CI, 1.0 – 3.2), while communal-handwashing (aOR,1.8;95% CI,0.5-6.6), and dirty latrine (aOR,1.9; 95%CI,0.5-6.6) (Table 2) were found to be associate with cholera infection, but were not statistically significant.

Table 2: The crude and adjusted odds ratio on risk factors for Cholera outbreak in Katavi and Kigoma - 2022

Variable	Bivariate analysis		Multivariate analysis	
	cOR (95% CI)	P-value	aOR (95% CI)	P-Value
Sex				
Female	1		1	
Male	1.8(1.0 -3.2)	0.043	1.8 (0.8-4.1)	0.158
Age group				
19 and above	1		1	
5-18	10.5 (5.1-21.7)	<0.001	9.1 (2.6-31.8)	0.001
Education level				
Secondary	1		1	
Primary	0.4 (0.1-1.2)	0.183	0.3 (0.1-1.4)	0.129
Nil	1.7 (0.5-5.4)	0.379	0.9 (0.2-3.8)	0.899
Occupation				
Peasant	1		1	
Fishers	0.7 (0.2-2.1)	0.486	0.5 (0.1-2.9)	0.473
Others	2.8 (1.5-5.1)	0.001	0.8 (0.2-2.7)	0.722
Household Size				
0-3	1			
4-6	0.8 (0.3-1.8)	0.530		
Above 6	1.3 (0.6-3.2)	0.531		
State of Latrine				
Clean	1		1	
Dirty	1.8 (0.9-3.4)	0.083	1.6(0.7-3.7)	0.264
Treating Water				
Boiling	1			
Not Boiling	1.2 (0.6-2.8)	0.597		
Communal Handwash				
No	1		1	
Yes	2.5 (1.1-6.1)	0.037	1.7 (0.6-5.2)	0.325
Use River Water				
No	1		1	
Yes	5.0 (1.7-15.0)	0.004	5.6 (1.4-23.3)	0.017
Use Tape Water				
Yes	1		1	
No	1.9 (0.9-4.2)	0.098	1.7 (0.5-5.1)	0.398

Laboratory Investigation

Throughout this outbreak, 1 sample from each source of water in the studied villages was taken for laboratory investigation and all except for the deep long wells were observed to be contaminated with fecal matters under microscopy. Besides 7 stool samples were taken to a national laboratory and all tested culture positive for vibrio cholera.

Figure 2: The distribution of cholera cases among affected villages in Kigoma and Katavi - 2022

DISCUSSION

The distribution of cholera cases among villages in Kigoma and Katavi regions was nearly the same, the most affected areas were villages located near Lake Tanganyika. This observation corresponds to a study done in Uganda that reported that of the population in Uganda, only a few villages that touched lake Victoria were experiencing the cholera outbreak [5]. Like in several other studies, we observed in this study majority of cholera patients presented with diarrhea which is watery as the first symptom of infection and a few of them developed bloody diarrhoea and sometimes the patient presented with only diarrhoea throughout the illness [6–8].

It should be noted that the pathophysiology and life cycle of vibrio cholera pathogen could explain the immediate clinical presentation of cholera patients being diarrhea [9–11]. The shape of the epidemic curve in this outbreak is propagated, as it has been reported in many other studies[12]. This suggests that the infection is being transmitted from one person to another whereas the interval between peaks showed the time the vibrio cholera takes before occurrence of clinical manifestation which it's not more than five days, which is similar in many other studies [13].

We found from our study that people aged below 18 years was one of the major determinants of cholera outbreak. This implies that young population are likely to be carefree yet dynamic, hence they may easily contract the disease from the infected people.

However, despite our observation, a case-control study in Burundi showed that the increased risk of contracting cholera illness was highly associated with time spent on lake surface water bodies [14].

The use of river water appeared to be the major risk factor in this outbreak. These findings are in line with previous studies which showed untreated open water including holly water, rivers, and lakes to be highly associated with the cholera outbreak [6,7,14,15]. A systematic review study done in Denmark showed that 80% of studies had statistically proven water vehicles being the major risk factor for cholera outbreaks [16]. This observation is true in the fact that villagers in Katavi an Kigoma which were highly affected, use lake and river water more than tape water.

CONCLUSION

In this study we found that young people are at increased risk of contracting cholera infection from the source and spreading it at home which ultimately causes an outbreak. Additionally, water bodies were mainly reported to be the main source of cholera infection, especially when using without treating such as boiling. Despite it being a highly infectious disease, cholera outbreak could be prevented when public health measures like washing hands after using toilets/latrines, eating and treating drinking water have well adhered to at both individual and community level.

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MUHTASARI
Usambaaji na Visababishi vya Mlipuko wa Kipindupindu katika Mikoa ya Katavi na Kigoma, Aprili 2022

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Usuli: Kimataifa, kipindupindu husababisha vifo vingi kutokana na upungufu wa maji mwilini. Hadi mwaka 2017 Afrika ilikuwa imechangia karibu asilimia 5 ya wagonjwa wote duniani na nusu yao wanatoka nchi za Kusini mwa Jangwa la Sahara. Nchini Tanzania, visa vya kwanza vilizothibitishwa vya kipindupindu viliripotiwa katikati ya mwaka 1997 wakati wa mlipuko wa kipindupindu. Hadi mwaka 2017 kiwango cha vifo vya kesi za kipindupindu zilikuwa asilimia 1.5. Mwaka 2019 mikoa ya Kigoma na Katavi imeainishwa kuwa katika ngazi ya pili katika makundi hatarishi kutokana na mlipuko wa ugonjwa wa kipindupindu kujirudia. Utafiti huu unaripoti mtawanyiko wa uagonjwa kiepidemiologia na visabishi vya mlipuko wa kipindupindu uliotokea hivi karibuni katika mikoa ya Kigoma na Katavi kuanzia tarehe 18 Aprili hadi Mei 5, 2022.

Mbinu: Jumla ya wagonjwa 71 wenye dalili za kipindupindu waliandikishwa kutoka kaya wakilinganishwa na watu 2 ambao hawakuwa na dalili za kipundupindu kwa kila 1 mwenye dalili za kipindupindu, yaani kwa uwiano wa (1:2). Mbinu za kiepidemiolojia zilitumiwa kuelezea washiriki katika wasifu wa kidemugrafia (umri, njisia, nk), dalili, na mwenendo wa mlipuko, ikiangazia vijiji ambako visa vilipatikana. Takwinu za visa vya kipindupindu na watu wale wasiokuwa na dalili za kipindupindu (vidhibiti) zililinganishwa, kuchambuliwa na kuchanganuliwa ili kuanisha visabishi hatarishi vya kipindupindu na matokeo yake yamejadiliwa.

Matokeo: Hakuna tofauti kubwa iliyoonekana katika wasifu wa kidemgrafia kati ya visa na vidhibiti. Kati ya vijiji sita vilivyofanyiwa utafiti katika mlipuko huu, Kashagulu na Sibwesa vilibainika kuwa na asilimia kubwa ya wagonjwa wa 25.0 na 23.8 mtawalia, Kalya ilikuwa na asilimia 1.0 tu ya wagonjwa wote wa kipindupindu. Kiwango cha waliokufa kati ya waliougua kipindupindu (CFR) kilikuwa asilimia 2.8 tu. Kitakwimu mlipuko wa kipindupindu ulionekana kuhusishwa na umri mdogo wa miaka 5 hadi 18 ambapo walikuwa na uwezekano wa kupata kipindupindu mara 10 ikilinganishwa na umri mwingine (aOR, 10.52; 95% CI, 5.11-21.68), na kwa wale ambao walikuwa wametumia maji ya mto walikuwa na uwezekano mara 5 wa kupata kipindupindu ikilinganishwa na wale ambao hawatumii

maji ya mto (aOR,5.02;95%CI,1.67-15.01).

Hitimisho: Vijana wako katika hatari kubwa ya kuambukizwa ugonjwa wa kipindupindu kutoka kwenye chanzo na kueneza majumbani ambapo hatimaye husababisha mlipuko. Zaidi ya hayo, vyanzo vya maji viliripotiwa hasa kuwa vihatarishi vikuu vya maambukizi ya kipindupindu, hasa wakati wa kutumia bila kutibu kama vile kuchemsha. Licha ya kuwa kipindupindu ni ugonjwa unaoambukiza sana, mlipuko wa kipindupindu unaweza kuzuilika endapo hatua za afya kwa umma kama vile kunawa mikono baada ya kutumia choo, kula na kutibu maji ya kunywa zimezingatia vyema katika ngazi ya mtu binafsi na jamii.

MANENO MUHIMU: Kipindupindu, mlipuko, kijiji, usambaaji wa visa, udhibiti

REFERENCE

1. Juma NH. Cost analysis of treating Cholera patient in Tanzania: a public health care system perspective. Graduate School of Public Health; 2020.

2. Ali M, Emch M, Donnay J-P, Yunus M, Sack RB. Identifying environmental risk factors for endemic cholera: a raster GIS approach. Health Place. 2002;8(3):201–10.

3. Acosta CJ, Galindo CM, Kimario J, Senkoro K, Urassa H, Casals C, et al. Cholera outbreak in southern Tanzania: risk factors and patterns of transmission. Emerg Infect Dis. 2001;7(3 Suppl):583.

4. Trærup SLM, Ortiz RA, Markandya A. The costs of climate change: a study of cholera in Tanzania. Int J Environ Res Public Health. 2011;8(12):4386–405.

5. Bwire G, Munier A, Ouedraogo I, Heyerdahl L, Komakech H, Kagirita A, et al. Epidemiology of cholera outbreaks and socio-economic characteristics of the communities in the fishing villages of Uganda: 2011-2015. PLoS Negl Trop Dis. 2017;11(3):e0005407.

6. Wolfe M, Kaur M, Yates T, Woodin M, Lantagne D. A systematic review and meta-analysis of the association between water, sanitation, and hygiene exposures and cholera in case–control studies. Am J Trop Med Hyg. 2018;99(2):534.

7. Dan-Nwafor CC, Ogbonna U, Onyiah P, Gidado S, Adebobola B, Nguku P, et al. A cholera outbreak in a rural north central Nigerian community: an unmatched case-control study. BMC Public Health. 2019;19(1):1–7.

8. Fredrick T, Ponnaiah M, Murhekar M V, Jayaraman Y, David JK, Vadivoo S, et al. Cholera outbreak linked with lack of safe water supply following a tropical cyclone in Pondicherry, India, 2012. J Health Popul Nutr. 2015;33(1):31.

9. Nelson EJ, Harris JB, Glenn Morris J, Calderwood SB, Camilli A. Cholera transmission: the host, pathogen and bacteriophage dynamic. Nat Rev Microbiol. 2009;7(10):693–702.

10. Bennish ML. Cholera: pathophysiology, clinical features, and treatment. Vibrio cholerae cholera Mol to Glob Perspect. 1994;227–55.

11. Rabbani GH, Greenough WB. Pathophysiology and clinical aspects of cholera. In: Cholera. Springer; 1992. p. 209–28.

12. Moradi G, Rasouli MA, Mohammadi P, Elahi E, Barati H. A cholera outbreak in Alborz Province, Iran: a matched case-control study. Epidemiol Health. 2016;38.

13. Azman AS, Rudolph KE, Cummings DAT, Lessler J. The incubation period of cholera: a systematic review. J Infect. 2013;66(5):432–8.

14. Birmingham ME, Lee LA, Ndayimirije N, Nkurikiye S, Hersh BS, Wells JG, et al. Epidemic cholera in Burundi: patterns of transmission in the Great Rift Valley Lake region. Lancet. 1997;349(9057):981–5.

15. Dinede G, Abagero A, Tolosa T. Cholera outbreak in Addis Ababa, Ethiopia: A case-control study. PLoS One. 2020;15(7):e0235440.

16. Phelps MD, Simonsen L, Jensen PKM. Individual and household exposures associated with cholera transmission in case–control studies: a systematic review. Trop Med Int Heal. 2019;24(10):1151–68.

National and Regional Zones Trends and Predictors of Mortality among People Living with HIV Initiating Antiretroviral Therapy from 2017 to 2021 in Tanzania

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ABSTRACT

Introduction: The disproportionate magnitude of mortality among people receiving HIV care and treatment services across national and subnational levels remains challenging despite the universal expansion of HIV care services. Moreover, factors associated with mortality at pre-and post-initiation phases of antiretroviral treatment evolve with time. We assessed the mortality rate trends at the subnational level and the predictors of mortality among people who initiated antiretroviral therapy (ART) from 2017 to 2021 in Tanzania.

Methods: This was a retrospective cohort study of people initiated on antiretroviral therapy from 2017 to 2021. Data were retrieved from the National HIV Application Database (CTC-3 Macro). Descriptive statistics summarized categorical and continuous variables. Mortality rates were calculated in 1000 person-years. The Cox regression proportional hazards analysis assessed predictors of mortality. Survival probability was estimated by Kaplan-Meier, and a log-rank test was applied to assess differences in survival across categories. Quantum Geographical Information System (QGIS) software was used to map the mortality rate distribution across regions.

Results: A total of 857,081 records were analysed, of which 548,460 (64.0%) were female. All participants contributed a total follow-up time of 1,404,583 person-years. A total of 41,513 (4.9%) deaths were recorded during the follow-up period. The overall mortality rate was 29.6 (95% CI, 29.3-29.8) per 1,000 person-years. The mortality rate trend was from 62.8 to 49.1 deaths per 1000 person-years from 2017 to 2020 at the national level and then slightly increased to 53.3 deaths per 1000 person-years in 2021. The same pattern, but at varying rates, was observed across regional zones of the country. PLHIV with (WHO) clinical stage IV (Adjusted Hazard Ratio, AHR=2.16, 95% CI = 1.78–2.63), underweight (AHR=1.9, 95% CI = 0.72–2.09), suspected tuberculosis (AHR = 1.9, 95% CI 1.40–2.50), and viral load > 1000 copies/ml (AHR = 3.51, 95% CI = 3.17-3.89) in the first test after ART initiation were associated with early mortality.

Conclusion: The study has shown a progressive decline in trends of mortality at all levels. The predictors of early mortality include being male, aged 50 years and above, underweight, advanced WHO clinical stage (III and IV), TB suspect and having viral load ≥1000 copies/ml in the first test after ART initiation. In order to reduce early mortality, integrated community health education is needed to improve medical-seeking behaviour and about nutrition. However, in view of new era of using modern highly effective antiretroviral drugs, we suggest to have frequent evaluation studies. This approach is likely to ascertain other factors that might act as predictors of mortalities and be causes of disproportionate mortality rates at the subnational level. This will allow HIV control programs to take prompt measures and formulate targeted health interventions and care approaches over time.

Key Words: Antiretroviral therapy, HIV, Survival, Mortality

INTRODUCTION

HIV and AIDS remain public health challenges that have claimed over 40 million lives around the globe over the past 4 decades. Sub-Saharan Africa is the most devastated region, accounting for more than two-thirds of all cases globally and 85% of all HIV-related deaths reported annually [1,2]. Approximately 1.7 million people are estimated to live with HIV in Tanzania, with an estimated general prevalence of 4.7% [3,4]. Despite the universal expansion of HIV care services around the globe, the disproportionate mortality rate among people initiating antiretroviral therapy across national and subnational levels remains challenging.

Many studies have revealed substantial variation in HIV mortality rates within and across countries in sub-Saharan Africa, with mortality rates ranging from 8 to 68 deaths per 1000 person from one country to another [11]. These studies have reported that the variation in mortality rates is substantially greater at the subnational level than at the national level [5–7]we developed a framework that used the geographically specific HIV prevalence data collected in seroprevalence surveys and antenatal care clinics

to train a model that estimates HIV incidence and mortality among individuals aged 15–49 years.

We used a model-based geostatistical framework to estimate HIV prevalence at the second administrative level in 44 countries in sub-Saharan Africa for 2000–18 and sought data on the number of individuals on antiretroviral therapy (ART.In Tanzania, the mortality rate among people who receive antiretroviral therapy (ART) is estimated at 37 to 58 per 1000 person-years [8–10]. This mortality estimate is above the global HIV mortality rate of 18 and 20 per 1000-person mong HIV patients on ART [12] Furthermore, factors associated with mortality after the initiation of ART treatment have evolved over time [11–14]the purpose of this work was to provide a scoping review of the literature to assess the risk factors for COVID-19 mortality among PLWH. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR. Although several studies have been conducted to determine factors associated with mortality among ART clients and overall trend in Tanzania, currently, nothing is known about regional (sub-national) distribution, variation in mortality trends and predictors of mortality among people who are on ART care.

Additionally, most of the studies conducted used data collected from a few selected health facilities in some of the regions, and none utilized large datasets from national databases [5,9,18,21]. Therefore, the statistical inference of the findings made from these studies could inadequately represent the picture of the whole country. Moreover, inconsistent findings from various studies support further studies to be conducted to assess whether there are changes in the pattern of associated factors over time due to various health HIV interventions that have been implemented by the Ministry of Health in recent years.

This study utilized a large dataset from the National AIDS Control Program (NACP) database, which covers the whole country. The purpose of this study was to assess mortality rate trends at both national and regional levels, survival probabilities and predictors of mortality among people who were initiated on ART in Tanzania.

METHODS

Study Design

We conducted a retrospective cohort study of people who were initiated on ART and enrolled from January 2017 to December 2021.

Study Setting

All facilities registered to provide care and treatment services from all 26 Tanzania mainland regions, whose medical records were available in NACP database (CTC-3 Macro). By 31 December 2022, over 3000 health facilities were registered to provide care and treatment services in Tanzania and were linked with the HIV case-based surveillance system (CTC-2). This is an electronic PLHIV monitoring system that captures details of every person receiving care and treatment services from day one of enrolment, the subsequent visits, to the final outcome (alive, lost to follow-up or died).

Study Population

All patients living with HIV (PLHIV) aged 15 years to 60 years who were initiated on ART enrolled from January 2017 through December 2021 and whose visits and medical records were available in the database of the NACP were involved in this study.

Power of Study Estimation

This study was conducted using secondary data from the national HIV database (CTC-3 Macro). Therefore, we calculated the power of the study using the formula for estimation of power for cohort studies (15). We used Open-Epi software Version 3.01 to calculate the power of the study, which was accessed through https://www.openepi.com/Menu/OE_Menu.htm, and yielded a power of 99.9%.

Data Collection and Data Sources

The data were retrieved from the National HIV Application Database (CTC-3 Macro), which is linked with an electronic medical record system from a facility (CTC-2). The Ministry of Health uses a paper-based Comprehensive Care Clinic Patient Card (CTC2 card) to record patient data during clinic visits. Data clerks/officers based at health facilities enter this longitudinal patient-level data into the CTC-2 system at every clinic visit, which is then uploaded at least once every week to the national database (CTC-3). Both CTC-2 and CTC-3 Macro are electronic databases designed through the support of the US President's Emergency Plan for AIDS Relief (PEPFAR) used for HIV surveillance, program monitoring and evaluation at both the subnational and national levels.

The sampled dataset was obtained from the national HIV database main server hosted by the University Computing Centre of the University of Dar es Salaam and then exported into Stata Version 15.1 software.

Outcomes and Independent Variables

Outcome Variable

The main study outcome was either death, irrespective of the cause at any time within the study period, or survival after initiation of ART. The values were labelled as died or censored if (completed the follow-up study period or lost to follow-up).

Independent Variables

These included sociodemographic and clinical characteristics that were available in the database. Demographic characteristics included sex, age, marital status, region, types of health facilities, and type of referral. Clinical characteristics included body mass index, WHO stage, first viral load test results after the initiation of ART treatment, the first line regimen ARV combination the client received at the beginning of the care and treatment services. In the database, these variables were recorded as follows: age as a continuous variable, which we categorized as (15-19, 20-29, 30-44,

45-49, years, 50 and above); sex (male and female); marital status (married, divorced, widow/widower, cohabiting); facility type (dispensary, health centre, hospital, others); facility ownership (public, private and faith based organization FBO); referring point (self-referral/CITC, index, PITC, community, others); body mass index (<18.5, 18.5-24.9, 25-29.9, and above 30 kg/m2); TB status (no TB, TB presumptive); WHO stage (I, II, III, IV); first viral load results (< 1000 copies/ml, ≥ 1000 copies/ml); ARV regimen (TLE, TLD, other first line); and regions (name of reporting region), which we grouped into zones (lake zone, eastern zone, southern highland zone, western zone, northern zone, southern zone, and central zone).

Data Analysis

Descriptive statistics used to summarize categorical data are presented as frequencies and proportions. For continuous variables, the mean (standard deviation (SD) was used. Pearson's chi-square test was used for comparison of differences in proportions. The duration of stay from the date of initiation of ART to death or censoring (time in years) was used as the survival time.

People who were lost to follow-up during the study period or who were alive at the end of follow-up period of the study were considered censored. We calculated the overall and covariate-specific mortality rates per 1000 person-years (Person-years) among clients who initiated ART treatment from January 2017 to December 2021.

The overall survival probabilities among ART clients at 1,2 and above 3 years were calculated using the Kaplan–Meier estimator. Kaplan–Meier curves were plotted to estimate the differences in survival probability across categories such as TB status and first-line antiretroviral (ARV) combination given at the start of ART services, and the log-rank test was used to test statistically significant differences between the survival curves.

We calculated the median survival time among PLHIV on ART who died during the follow-up time using the Kaplan–Meier estimator.

Missing data were handled through the multiple imputation method (generating replacement values for missing data and repeating this procedure many times, resulting in many data sets with replaced missing information) by chain equations after assessment of the pattern of missing values that were missing at random (MAR). The imputed variables included body mass index group, functional status, and HIV Viral Load (HVL) results. The Cox regression proportional hazard model was used to assess the predictors in performing univariate and multivariate analyses after verification of the proportional hazard assumption using Schoenfeld's test [16]relating failure time to covariate values, proposed by Cox (1972. All of the selected covariates satisfied the proportional hazard assumption and were hence fitted in the model for analysis.

Factors that were statistically significant at a p value of ≤ 0.2 in the univariate analysis were considered potential risk factors and included in the multivariable model. We assessed both a main effects multivariable model and a model including significant two-way interaction terms between covariates. The overall P value for each variable is estimated using the likelihood ratio test. Hazard ratios and their respective 95% confidence intervals were reported.

We mapped the mortality rate per 1000 person-years for each region to identify subnational geographic differences in the HIV mortality rate among ART clients. Mortality rates per 1000 person-years were exported from Stata into Microsoft Excel and then imported into QGIS. Furthermore, the one-year follow-up mortality rate by geographical zone was calculated and plotted in a line graph to visualize its trend variation across geographical zones from 2017 to 2021.

Ethical Considerations

Ethical approval to conduct this study was obtained from the Ethical Review Board of the Muhimbili University of Health and Allied Sciences, No. MUHAS-REC-11-2022-1447. Approval to access and use the data was granted by the Ministry of Health through NACP. Confidentiality and data security were ensured, as access to data and to the database main server was limited to approved persons only.

RESULTS

Participants Characteristics

A total of 1,108,643 PLHIV records were found in NACP database during the study period from January 2017 to December 2021. Of these, 251,562 (22.0%) were excluded from the analysis due to missing important variables such as treatment outcome, unique identification number, sex, date of ART initiation, and WHO clinical stage at enrolment time. Approximately 857,081 records were included in the final analysis.

More than three-quarters 705,615 (82.6%) of the study population accessed treatment from public facilities. Females accounted for more than two-thirds 548,460 (64.0%) of the study population. Approximately half 410,392 (47.9%) of the population was aged between 30 and 44 years. The mean and standard deviation (SD) age at antiretroviral start was 34 ± 10 years. Nearly two-thirds 515,106 (60.1%) of people initiated the TLE ARV regimen, and approximately more than half 440,616 (51.4%) had initial viral load results of < 1000 copies/ml taken within 6 months of ART treatment initiation.

Nearly all 854,253 (99.7%) had no signs or symptoms of TB coinfection during the initiation of ART.

The mean (SD) age at ART initiation and follow-up time were 34±13 years and 1.98±1.7 years, respectively, with a total follow-up time of 111740.81 person-years. Other demographic and clinical characteristics are presented in Table 1a and 1b respectively.

Table 1a: Baseline demographic characteristics of people initiated on antiretroviral therapy from year 2017 to 2021 in Tanzania.

Variables	Number	Percentage (%)
Sex		
Female	548,460	64.0
Male	308,621	36.0
Age groups (years)		
15-19	33,381	3.9
20-29	264,285	30.8
30-44	410,392	47.9
45-49	76,774	9.0
Above 50	72,249	8.4
Marital status		
Married	522,219	60.9
Unmarried	213,597	24.9
Divorced	75,392	8.8
Widow/widower	33,287	3.9
Cohabiting	12,586	1.5
Facility type		
Dispensary	384,606	44.9
Health Centre	289,832	33.8
Hospital	180,049	21.0
Others	2,594	0.3
Facility ownership		
Public	705,615	82.3
Private	128,467	15.0
FBO	22,999	2.7
Referring point		
Self-referral/CITC	349,462	40.7
Index	152,589	17.8
PITC	127,281	14.9
Other	123,068	14.4
Community	104,681	12.2
Regional zone		
Lake zone	294,551	34.4
Eastern zone	176,221	20.6
Southern highland zone	126,392	14.7
Western zone	98,560	11.5
Northern zone	69,477	8.1
Southern zone	55,485	6.5
Central zone	36,395	4.2

*ARV=Antiretroviral drugs, *HVL= HIV Viral Load, *TLE = Tenofovir Lamivudine Efavirenz, *TLD = Tenofovir Lamivudine Dolutegravir

Table 1b: Baseline clinical characteristics of people initiated on antiretroviral therapy from year 2017 to 2021 in Tanzania.

Variables	Number	Percentage (%)
Body mass index		
<18.5	25,626	16.0
18.5-24.9	101,958	63.8
25-29.9	23,582	14.7
Above 30	23,582	5.5
TB status		
Unconfirmed TB	854,253	99.7
Confirmed TB	2,828	0.3
WHO stage at enrolment		
I	542,166	63.3
II	187,656	21.9
III	110,220	12.9
IV	17,039	2.0
First HVL result		
< 1000	440,616	51.4
≥ 1000	31,486	3.7
Missing	384,979	44.9
ARV based regime		
TLE	515,106	60.1
TLD	325,691	38.0
Other first line	16,285	1.9

*ARV=Antiretroviral drugs, *HVL= HIV Viral Load, *TLE = Tenofovir Lamivudine Efavirenz, *TLD = Tenofovir Lamivudine Dolutegravir

Mortality Rate

During the study period 2017-2021, a total of 1,404,583 person-years of follow-up time were accumulated from 857,081 clients. Of the 857,081 clients, 41,513 died, giving a 5-year mortality of 4.9%. The overall crude mortality rate was estimated to be 29.6 per 1000 person-years (95% CI, (29.3-29.8). The highest mortality rate of 50.9 (95% CI, 0.3-51.4) per 1000 person-years was observed within the first year of ART initiation.

PLHIV who were suspected to have TB coinfection at enrolment had an almost three times higher mortality rate 87.6 (95% CI, 79.6-96.3) than those with no TB coinfection. Those who had an HIV viral load ≥1000 copies/ml within the first 6 months of ART treatment had a fourfold higher mortality rate 36.5 (95% CI, 34.4-38.6) than those with less than 1000 copies/ml. Other specific mortality rates per variable category are summarized in Table 2a and 2b.

Table 2a: Mortality rates per 1000 person-years by sociodemographic characteristics among people initiated on antiretroviral therapy from 2017 to 2021 in Tanzania

Variables	Person-time(year)	Number of deaths	Mortality rate per 1000 person-year, (95% CI)
Crude incidence mortality rate	1404582.7	41513	29.6(29.3-29.8)
Sex			
Female	916335.0	21337	23.3(23.0-23.6)
Male	488247.7	20176	41.3(40.8-41.9)
Age (years)			
15-19	51929.5	768	14.8(13.8-15.9)
20-29	409811.6	7543	18.4(18.0-18.8)
30-44	684866.3	21611	31.6(31.3-32.0)
45-49	131283.6	5451	41.5(40.4-42.6)
Above 50	126691.7	6140	48.5(47.2-49.7)
Marital status			
Married	884221.2	23181	26.2(25.9-26.6)
Unmarried	321565.3	10521	30.6(29.1-34.9)
Divorced	120759.6	4896	40.5(39.4-41.7)
Widow/widower	59374.2	2403	40.5(38.8-42.1)
Cohabiting	18660.8	512	27.4(25.2-29.9)
Regional zone			
Lake zone	488706.6	12799	26.2(25.7-26.6)
Eastern zone	276526.5	8811	31.9(31.2-32.5)
Southern highland zone	238225.88	5817	24.4(23.8-25.1)
Western zone	154347.8	4690	30.4(29.5-31.3)
Northern zone	100389.5	4323	43.1(41.8-44.4)
Southern zone	90073.7	2827	31.4(30.2-32.6)
Central zone	56312.7	2246	40.0(38.3-41.6)

*CI=Confidence Interval

Table 2b: Mortality rates per 1000 person-years by clinical characteristics among people initiated on antiretroviral therapy from 2017 to 2021 in Tanzania

Variables	Person-time(year)	Number of deaths	Mortality rate per 1000 person-year, (95%CI)
Body mass index (kg/m2)			
<18.5	58080.8	2816	48.5(46.7-50.3)
18.5-24.9	236144.6	4544	19.2(18.7-19.8)
25-29.9	56577.6	678	12.0(11.1-12.9)
Above 30	22218.0	226	10.2(8.9-11.6)
TB status			
Unconfirmed TB	1399752.9	41090	29.4(29.1-29.6)
Confirmed TB	4829.8	423	87.6(79.6-96.3)
WHO stage at enrolment			
I	836625.49	15884	19,0(18.7-19.30
II	331975.1	10691	32.2(31.6-32.8)
III	210721.1	11136	52.8(51.8-53.8)
IV	25261.0	3802	150.5(145.8-155.4)
First HVL results			
< 1000	1077573.8	6314	5.9(5.7-6.0)
≥ 1000	79572.5	1526	19.2(18.2-20.2)
ARV based regime			
TLE	1060225.6	26409	24.9(24.6-25.2)
TLD	311574.0	13909	44.6(43.9-45.4)
Other first line	32783.1	1195	36.5(34.4-38.6)
Cohort follow up (years)			
≤1	628524.1	31974	50.9(50.3-51.4)
>1& ≤2	393620.1	5769	14.7(14.4-15.0)
>2 & ≤3	230880.6	2413	10.5(10.0-10.9)
Above 3	151557.9	1357	9.0(8.5-9.4)

* ARV= Antiretroviral drug combination, *CI=Confidence Interval, *HVL= HIV Viral Load, *TLE = Tenofovir Lamivudine Efavirenz, *TLD = Tenofovir Lamivudine Dolutegravir.

Distribution of Mortality Rates Across Geographical Locations (Regions)

A subnational difference in mortality rate was observed across regions in the country. The northern zone regions, such as Kilimanjaro, Tanga, and Dodoma, had higher mortality rates of over 40 per 1000 person-years. (Figure 1)
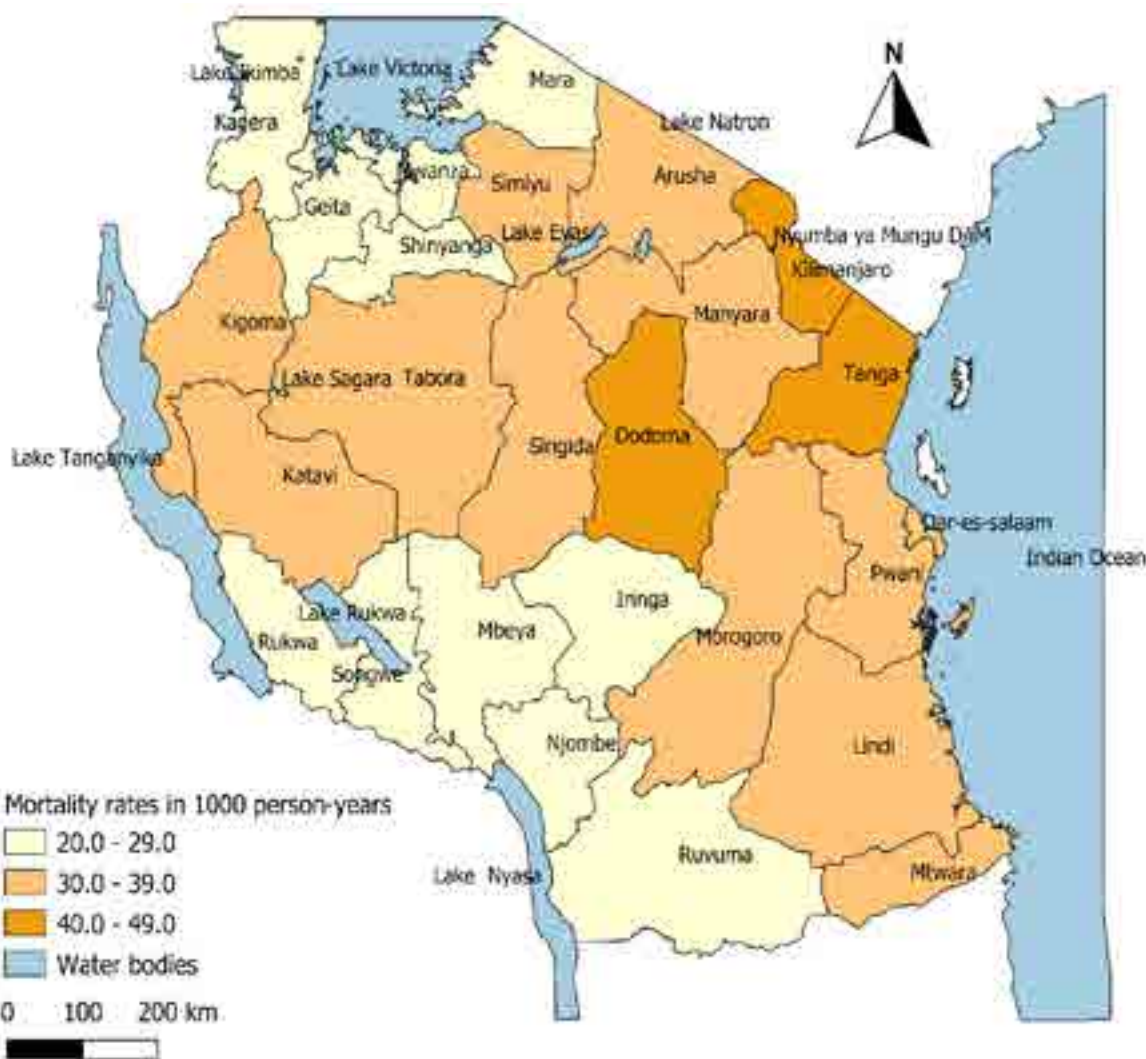
Figure 1: Distribution of mortality rate per 1000 person-years among clients enrolled in ART treatment from 2017 to 2021 across the regions of Tanzania

National and Regional Zones Mortality Rate Trends Within the First Year of ART Initiation from 2017 to 2021.

The trend of mortality rate within the first year of ART treatment among PLHIV at the national level was observed to decline progressively from 62.8 to 49.1 per 1000 personal years in 2017 to 2020. Then, it slightly increased to 53.1 per 1000 person-years in 2021. However, the variation of trend in mortality over the period of years was not statistically significant (p-value 0.11), (Figure 2). Correspondingly, at the subnational level, the trends across all regional zones declined almost gradually at different rates (p-value 0.74), except in the northern and southern zones, where some elevations were retrospectively observed in 2017 and 2018 (Figure 3).
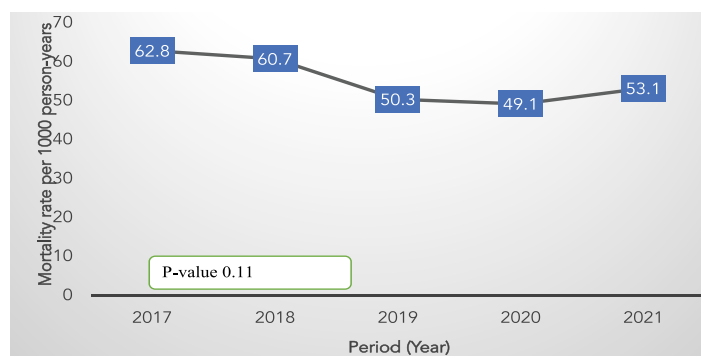
Figure 2: The overall national level mortality rate trends among clients who were initiated on ART in Tanzania from 2017 to 2021.
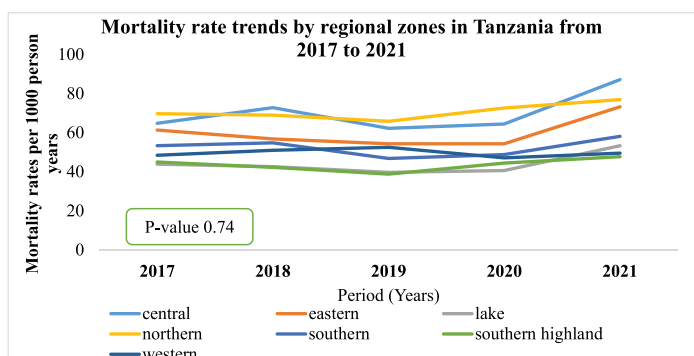
Figure 3: Mortality trends among clients who initiated ART across regional zones of Tanzania from 2017 to 2021

Survival Probabilities

HIV/TB coinfected patients had lower survival probabilities of 82.0%, 81.5% and 81.3% at 1, 2 and 3 years of follow-up, respectively, compared to 97%, 95% and 94% among HIV only patients (Figure 4).
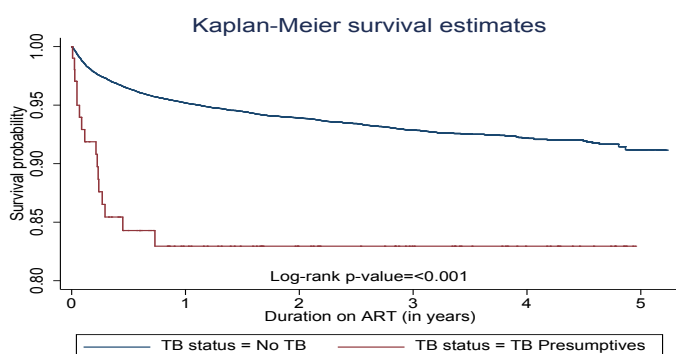
Figure 4: Kaplan-Meier survival curves showing survival probabilities among PLHIV who initiated ART from 2017 to 2021 based on their TB status

Predictors of Short Time to Mortality

Predictors of mortality in the multivariable analysis included age, sex, WHO stage, body mass index, TB status, duration on ART and adherence status at the last visit.

Table 3: Cox Proportional Hazard regression analysis of predictors of mortality among clients who were in initiated on ART from January 2017 -December 2021, in Tanzania

Variables	Crude Hazard Ratio (CHR)	P-value	Adjusted Hazard Ratio (AHR)	P-value
Sex				
Female	Reference		Reference	
Male	1.72(1.69-1.75)	<0.01	1.58(1.45-1.73)	<0.01
Age group (years)				
20-29	Reference		Reference	
15-19	0.82(0.76.7-0.89)	<0.01	1.07(0.80-1.41)	0.66
30-44	1.76(1.72-1.81)	<0.01	1.38(1.22-1.55)	<0.01
45-49	2.34(2.26-2.42)	<0.01	1.83(1.57-2.13)	<0.01
Above 50	2.76(2.67-2.86)	<0.01	2.25(1.94-2.60)	<0.01
Referring point				

| Variables	Crude Hazard Ratio (CHR)	P-value	Adjusted Hazard Ratio (AHR)	P-value
Self-referral/ CITC	Reference		Reference	
Index	0.94(0.92-0.97)	<0.01	1.23(1.03-1.48)	0.02
PITC	1.05(1.01-1.08)	<0.01	0.89(0.80-0.99)	0.03
Other	0.91(0.87-0.93)	<0.01	1.09(0.94-1.26)	0.26
Community	0.90(0.87-0.93)	<0.01	1.32(1.10-1.57)	<0.01
Functional status				
Working	Reference		Reference	
Ambulatory	5.43(4.92-6.00)	<0.01	1.47(0.88-2.46)	0.14
Bed-ridden	5.35(4.71-6.07)	<0.01	1.69(0.80-3.56)	0.17
Body mass index(kg/m2)				
18.5-24.9	Reference		Reference	
<18.5	2.53(2.41-2.65)	<0.01	1.90(0.72-2.09)	<0.01
25-<30	0.64(0.59-0.69)	<0.01	0.82(0.71-0.95)	<0.01
30+	0.56(0.48-0.64)	<0.01	0.73(0.57-0.93)	<0.01
WHO stages				
I	Reference		Reference	
II	1.84(1.80-1.87)	<0.01	1.27(1.14-1.41)	<0.01
III	3.22(3.14-3.29)	<0.01	1.33(1.20-1.47)	<0.01
IV	8.42(8.13-8.72)	<0.01	2.16(1.78-2.63)	<0.01
TB status				
No TB	Reference		Reference	
TB presumptive	3.11(2.83-3.42)	<0.01	1.9(1.4-2.5)	<0.01
ARV based regime				
TLD	Reference			
TLE	0.93(0.92-0.95)	<0.01	0.54(0.47-0.62)	<0.01
Other first line	1.36(1.28-1.45)	<0.01	0.62(0.49-0.79)	<0.01
First HVL results				
<1000 copies/ml	Reference			
≥ 1000 copies/ml	3.28(3.08-3.49)	<0.01	3.51(3.17-3.89)	<0.01

*** ARV= Antiretroviral drug combination, *CI=Confidence Interval, *HVL= HIV Viral Load, *TLE = Tenofovir Lamivudine Efavirenz, *TLD = Tenofovir Lamivudine Dolutegravir. PITC = Provider initiated testing and counselling**

Table 3 summarizes the predictors of death among ART clients enrolled in the study period. There was a twofold-fold higher risk of mortality among those aged above 50 years (AHR= 2.3 [95% CI 1.9–2.6], p < 0.01). Males were more likely to have two times the instantaneous risk of a shorter time to mortality than females (AHR = 1.6 [95% CI 1.5–1.7], p < 0.01). Mortality risk

increased with the WHO stage at ART initiation, being 30% higher for those enrolled in WHO stage III (AHR = 1.3 [95% CI 1.2–1.5], p < 0.01) and twofold for those enrolled in WHO stage IV (AHR = 2.16 [95% CI 1.8-2.6], p<0.01). Furthermore, people who were screened for TB and found with TB presumptive status at initiation of ART had a twofold higher risk of mortality (AHR = 1.9 [95% CI 1.4–2.5], p < 0.01).

DISCUSSION

The majority of people who initiated ART from 2017 to 2021 were women, which reflects the national sex distribution of HIV with the likelihood reason being awareness of HIV status being higher than that of men who have low health-seeking behaviour. Additionally, this could have been contributed by the mandatory of HIV testing among pregnant women attending antenatal clinics [8,17]. The majority of clients in this analysis were also aged between 20-35 years, which is similar to the age pattern of the most vulnerable subpopulation with a high risk of contracting HIV as it has been reported in other sub-Saharan African countries[13,18].

The overall mortality rate in our analysis was low compared with a similar analysis conducted in Tanzania from 2011 to 2015 [8]. This finding is consistent with other recent studies conducted in other sub-Sahara countries, which have reported a decrease in mortality rates in all age groups of those who have been initiated ART [19–22]Myanmar implemented routine viral load (VL. Expanded HIV programs focusing on improving the quality of care for clients from early detection of infection and timely initiation of ART to proper management of advanced HIV diseases have been mentioned as drivers of this progressive decline in mortality [5,23–25]the existing hospitals are still overcrowded with ART service seeking patients may be because of the common belief that treatment outcome is better for hospital patients than those treated at the primary health centers. However, documented evidence comparing the treatment outcome for the two categories of health facilities is scarce in the study setting. The purpose of the current study was to compare major treatment outcomes among new patients treated at the two health facility categories. Method: Retrospective cohort study was implemented using secondary data from medical records collected between October 2010 and January 2014 in the selected health facilities. All patients (1895.

Our study identified a variability in mortality rates across regions in Tanzania. The regions from the northern and central zones showed inconsistent trends in mortality rates from 2017 to 2020. The remaining regional zones were observed with consistent rates from 2017 to 2020. The variation in mortality rate trends within the same country across subnational levels was consistent with findings highlighted from other studies conducted in SSA, which explained the influences of differences in socioeconomic and sociocultural factors on HIV mortalities [5,6,26]based on data through 2014, may no longer be accurate due to expanded paediatric HIV care and treatment eligibility, and the possibility of unreported deaths in CHIV considered lost to follow-up (LTFU.

The slight increase in mortality rates at national and subnational

levels observed from 2020 to 2021 could have been attributed to the effect of COVID-19 disease pandemic. This subpopulation was among the vulnerable populations at risk of contracting the virus and developing a severe form of illness, hence putting them at high risk of dying due to COVID-19 [27,28]. However, contrasting findings on the effect of COVID-19 among clients who are on ART treatment were highlighted in other studies showing no differences [11,29,30]. However, this could also indicate the beginning of another surge in HIV mortality in our country.

A lower survival probability was observed among people with presumptive TB status when starting ART treatment than among those who were diagnosed with HIV infection only. This is consistent with study findings conducted in Tanzania and Ethiopia [9,31]. Similarly, this lower survival probability among HIV/TB clients was also reported in other studies [13,23]the existing hospitals are still overcrowded with ART service seeking patients may be because of the common belief that treatment outcome is better for hospital patients than those treated at the primary health centers. However, documented evidence comparing the treatment outcome for the two categories of health facilities is scarce in the study setting. The purpose of the current study was to compare major treatment outcomes among new patients treated at the two health facility categories. Method: Retrospective cohort study was implemented using secondary data from medical records collected between October 2010 and January 2014 in the selected health facilities. All patients (1895. The double immune suppression effect due to the dual infections, the systemic pathological manifestations of both conditions to an individual and the delay in diagnosis among HIV/TB patients starting ART [27,32] might have been among the drivers contributing to the observed finding among this subgroup. Therefore, our study supports the idea of extensive TB screening among people initiating ART for early diagnosis and prompt initiation of full TB treatments or TB presumptive treatment cascades if screened negative.

We found a higher risk of death among males in this cohort. This finding was consistent with other previous studies conducted in sub-Saharan Africa and Canada, which revealed that high mortality in males was influenced by delay in seeking health care, together with their reluctance to perform regular checks of their HIV status, which led them to be diagnosed at an advanced stage of the disease [33–36]particularly in low- and middle-income countries (LMIC.

Although proportionally, we had a low number of people aged above 50 years in our cohort, they still had a higher risk of death. Our findings are in line with many studies that have reported the same observation and suggested an association with other comorbidities, especially noncommunicable diseases, at this age. Moreover, studies have suggested that the increase in circulating inflammatory biomarkers due to the long effect of HIV infection as age advances contributes to the early onset of noncommunicable conditions among PLHIV compared to

the general population [37–40]stratified by HIV status, in a community with a high burden of HIV. Methods: We conducted a home-based HIV counselling and testing study in KwaZulu-Natal, South Africa between November 2011 and June 2012. Contiguous households were approached and all adults ≥18 years old were offered an HIV test. During follow-up visits in January 2015, screening for HIV, depression, obesity, blood glucose, cholesterol and blood pressure were conducted using point-of-care tests. Results: Of the 570 participants located and screened; 69% were female and 33% were HIV-positive. NCD risk factor prevalence was high in this sample; 71% were overweight (body mass index (BMI. However, in contrast, a study conducted in four HIV programs in Kenya, Uganda, and Malawi reported high mortality rates among children 5–14 years of age [14,18,41–44]. Furthermore, our analysis revealed that clients with factors such as WHO stage III and IV disease at ART initiation to be associated with an increased likelihood of death. This is similar to several previous studies conducted in Ethiopia, Zimbabwe and South Africa[9,13,17,42–46].

LIMITATIONS

We encountered several limitations. Since our study used an existing database, we included only a limited range of variables with the intention of explaining the risk factors for mortality among PLHIV who are initiating ART services for their first time. Additionally, the data available in the database do not specify whether the death was HIV-related; instead, it reflects only all-cause mortality, which might overestimate HIV-related mortality since the exact cause of death was not determined. Additionally, missing information for variables was among the limitations encountered. However, our study used a large sample of all PLHIV who were initiated ART treatment in Tanzania in the given period of study. To address the issues of methodological limitations, clients lost to follow-up were censored at the outcome date (the day that they were considered lost to follow-up). Moreover, multiple imputation approaches were used to address the issue of missing data for the variables.

CONCLUSIONS

Our study has shown that the predictors of early mortality include being male, aged 50 years and above, underweight, advanced WHO clinical stage (III and IV), TB suspect and having viral load ≥1000 copies/ml in the first test after ART initiation. In order to reduce early mortality, integrated community health education is needed to improve medical seeking behaviour and about nutrition. However, in view of new era of using modern highly effective antiretroviral drugs, we suggest to have frequent evaluation studies. This approach is likely to ascertain other factors that might act as predictors of mortalities and be causes of disproportionate mortality rates at the subnational level that will allow HIV control programs taking prompt measures and formulate targeted health interventions and approaches of care over time.

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MUHTASARI
Mwenendo na Vibashiri vya Viwango vya Vifo Ngazi ya Taifa na Kanda za Mikoa, Miongoni mwa Watu Walioanzishwa Tiba ya Kufubaza Makali ya Virusi Vya Ukimwi (VVU) Kutoka Mwaka 2017 Hadi 2021 Nchini Tanzania

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Usuli: Idadi isiyolingana ya vifo miongoni mwa watu wanaopata huduma ya matibabu ya VVU kwa ngazi ya nchi na kimaeneo ndani ya nchi bado ni changamoto licha ya kupanuka kwa huduma za VVU kidunia na kikanda. Zaidi ya hayo, sababu zinazohusiana na vifo kabla, wakati na baada ya kuanza kwa matibabu ya kutumia dawa kurefusha maisha hubadilika kulingana na wakati. Tulitathmini mtawanyo, mwenendo wa kiwango cha

vifo katika ngazi ya taifa na kanda za mikoa na vibashiri vya vifo miongoni mwa watu waishio na VVU walioanzishiwa matibabu ya kufubaza makali ya VVU (kurefusha maisha) (ART) kuanzia mwaka 2017 hadi 2021 nchini Tanzania.

Mbinu: Huu ulikuwa utafiti uliohusisha kikundi cha watu walioanzishiwa matibabu ya kufubaza makali ya VVU kuanzia mwaka 2017 hadi 2021. Twakwimu zilizo tumika zilitolewa kutoka kanzidata ya Taifa ya watu waishio na VVU (CTC-3 Macro) walioanzishiwa matibabu katika kipindi hicho. Takwimu zilichanganuliwa kwa kutumia programu na mbinu mbalimbali za uchambuzi wa kisayansi kuainisha mwenendo wa viwango vya vifo, vibashiri vya vifo, na makadilio ya kiwango cha muda wa kuishi katika kipindi husika baaada ya kuanzishiwa matibabu. Pia mtawanyiko wa mjumuiko wa viwango vya vifo katika mikoa yote ya Tanzania bara katika kipindi husika uliainishwa.

Matokeo: Jumla ya rekodi 857,081 za watu waishio na VVU walio anzishiwa matibabu katika kipindi hicho zilichambuliwa, ambapo kati yao 548,460 (asilimia 64.0) walikuwa wanawake. Washiriki wote walichangia muda wa ufuatiliaji wa jumla wa miaka 1,404,583 ya mtu (1,404,583 person-years). Jumla ya vifo 41,513 (asilimia 4.9) vilirekodiwa katika kipindi cha ufuatiliaji. Kiwango cha jumla cha vifo kilikuwa 29.6 (95% CI, 29.3-29.8) kwa miaka 1,000 ya mtu (1,000 person-years). Kiwango cha mwenendo wa vifo kilikuwa kutoka vifo 62.8 hadi 49.1 kwa kila miaka 1000 ya mtu kutoka mwaka 2017 hadi 2020 katika ngazi ya taifa na kisha kuongezeka kidogo hadi vifo 53.3 kwa kila miaka 1000 ya mtu kwa mwaka 2021. Hali ya vifo iliendena ile ya kitafa katika kanda zote za mikoa nchini, lakini kitika viwango tofauti. Visababishi kama vile, ngazi ya IV ya ugonjwa kulinga na Shirika la Afya Dunia (WHO) (AHR=2.16, 95% CI = 1.78–2.63), uzito mdogo (AHR=1.9, 95% CI = 0.72–2.09), wanaoshukiwa kuwa na ugonjwa kifua kikuu (TB) (AHR = 1.9, 95% CI 1.40–2.50), na wenye uwingi wa virusi > nakala 1000/ mililita (AHR = 3.51, 95% CI = 3.17-3.89) katika uchunguzi wa kimaabara wa kwanza baada ya kuanzishiwa matibabu Vilionekena kuwa moja ya vibashiri vya vifo vya mapema kwa watu walionzishiwa matibabu ya kufubaza makali ya VVU katika kipindi hicho cha utafiti.

Hitimisho: Utafiti huu umeonyesha kuendele kushukuka kwa mwenendo wa vifo kwa watu anaoishi na VVU waliyoanza matibabu katika ngazi ya kitaifa na kanda za mikoa. Vibashiri vya vifo vya mapema ni pamoja na kuwa mwanamme, umri wa miaka 50 na zaidi, uzito mdogo, walio ngazi ya III na IV ya WHO ya hali ya ugonjwa, kuwa mhisiwa wa TB wakati wa uanzaji matibabu na kuwa na kiwango cha juu cha virusi ≥1000 nakala/mililita katika kipimo cha kwanza baada ya Kuanzishiwa matibabu. Ili kupunguza vifo vya mapema, elimu jumuishi ya afya ya jamii inahitajika kwa lengo la kuboresha tabia ya watu kuwahi kutafuta matibabu mapema na juu ya uboreshaji wa lishe kwa waathirika. Hata hivyo, kwa kuzingatia kipindi hiki ambapo matumizi ya dawa za kisasa za kufubaza makali ya VVU (kurefusha Maisha) zenye ufanisi mkubwa, tunapendekeza kufanyika kwa tafiti za tathmini mara kwa mara. Tafiti hizi zinaweza kubainisha viashiria vingine ambavyo vinaweza kuwa visababishi vya vifo na kuwa chanzo cha viwango vya vifo vinavyosababisha kuwa na utofauti katika ngazi ya mikoa. Hii itatoa nafasi kwa Mpago wa Taifa wa Kudhibiti VVU kuchukua hatua za haraka na kuunda mbinu na afua za kiafya zinazolenga utoaji huduma kwa eneo husika na kwa wakati mahususi.

MANENO MUHIMU: Tiba ya kufubaza makali ya VVU (kurefusha Maisha), VVU, Kuishi, Vifo

REFERENCES

1. United Nations Programme on HIV/aids. UNAIDS. UNAIDS data 2021. 2021;4–38. Available from: https://www.unaids.org/en/resources/documents/2021/2021_unaids_data

2. HIV Programme Fact Sheet.pdf. Available from: https://www.unicef.org/tanzania/reports/hiv-and-aids-fact-sheet

3. Tanzania Ministry of Health 2021. Health Sector Strategic Plan V 2021-2026. 2012;2026(July). Available from:https://mitu.or.tz/ministry-of-health-community-development-gender-elderly-and-children-health-sector-strategic-plan-july-2021-june-2026-hssp-v/

4. Tanzania HIV Impact Surv 2016-2017. 2018;(December 2017):2016–7. Available from: https://www.nbs.go.tz/index.php/en/census-surveys/health-statistics/hiv-and-malaria-survey/382-the-tanzania-hiv-impact-survey-2016-2017-this-final-report

5. Sartorius B, VanderHeide JD, Yang M, Goosmann EA, Hon J, Haeuser E, et al. Subnational mapping of HIV incidence and mortality among individuals aged 15–49 years in sub-Saharan Africa, 2000–18: a modelling study. Lancet HIV. 2021;8(6):e363–75.

6. Kassanjee R, Johnson LF, Zaniewski E, Ballif M, Christ B, Yiannoutsos CT, et al. Global HIV mortality trends among children on antiretroviral treatment corrected for under-reported deaths: an updated analysis of the International epidemiology Databases to Evaluate AIDS collaboration. J Int AIDS Soc. 2021;24(S5):83–95.

7. Joshi K, Lessler J, Olawore O, Loevinsohn G, Bushey S, Tobian AAR, et al. Declining HIV incidence in sub-Saharan Africa: a systematic review and meta-analysis of empiric data. J Int AIDS Soc. 2021;24(10):1–11.

8. Kilama BK. Pre-ART Mortality and its Determinants in a Tanzania Public Driven HIV Care Program. Online J Public Health Inform. 2015;7(1):2579.

9. Vanobbberghen F, Weisser M, Kasuga B, Katende A, Battegay M, Tanner M, et al. Mortality Rate in a Cohort of People Living with HIV in Rural Tanzania after Accounting for Unseen Deaths among Those Lost to

Follow-up. Am J Epidemiol. 2021;190(2):251–64.

10. Mageda K, Leyna GH, Mmbaga EJ. High initial HIV/AIDS-Related mortality and -its predictors among patients on antiretroviral therapy in the kagera region of Tanzania: A five-year retrospective cohort study. AIDS Res Treat. 2012;2012. Available from :https://www.hindawi.com/journals/art/2012/843598/

11. Varshney K, Ghosh P, Stiles H, Iriowen R. Risk Factors for COVID-19 Mortality Among People Living with HIV: A Scoping Review. AIDS Behav [Internet]. 2022;26(7):2256–65. Available from: https://doi.org/10.1007/s10461-022-03578-9

12. Rubaihayo J, Tumwesigye NM, Konde-Lule J, Makumbi F, Nakku EJ, Wamani H, et al. Trends and predictors of mortality among HIV positive patients in the era of highly active antiretroviral therapy in Uganda. Infect Dis Rep. 2015;7(3):66–73.

13. Damtew B, Mengistie B, Alemayehu T. Survival and determinants of mortality in adult HIV/Aids patients initiating antiretroviral therapy in Somali Region, Eastern Ethiopia. Pan Afr Med J. 2015;22:1–8.

14. McLigeyo A, Wekesa P, Owuor K, Mwangi J, Isavwa L, Mutisya I. Factors Associated with Treatment Outcomes among Children and Adolescents Living with HIV Receiving Antiretroviral Therapy in Central Kenya. AIDS Res Hum Retroviruses. 2022;38(6):480–90.

15. Charan J, Biswas T. How to calculate sample size for different study designs in medical research? Indian J Psychol Med. 2013;35(2):121–6.

16. SCHOENFELD D. Chi-squared goodness-of-fit tests for the proportional hazards regression model. Biometrika [Internet]. 1980 Jan 1;67(1):145–53. Available from: https://www.semanticscholar.org/paper/Chi-squared-goodness-of-fit-tests-for-the-hazards-Schoenfeld/b3acaac417cd1560dc8bea8baa3c5e0a6668387b

17. Birhanu H, Alle A, Birhanu MY. Rate and predictors of mortality among adults on antiretroviral therapy at debre markos referral hospital, North West Ethiopia. HIV/AIDS - Res Palliat Care. 2021;13:251–9.

18. Tesfayohannes S, Shine S, Mekuria A, Moges S. Mortality and Its Predictors among Adult Human Immune-Deficiency Virus-Infected Patients Attending Their Antiretroviral Treatment at Health Centers , Addis Ababa , Ethiopia : Multicenter Retrospective Cohort Study. 2022;2022.

19. Thinn KK, Thekkur P, Kyaw NTT, Aye NS, Zaw TM, Soan P, et al. Uptake of routine viral load testing among people living with HIV and its implementation challenges in Yangon region of Myanmar: A mixed-methods study. BMJ Open. 2019;9(12):1–10.

20. Rabkin M, De Pinho H, Michaels-Strasser S, Naitore D, Rawat A, Topp SM. Strengthening the health workforce to support integration of HIV and noncommunicable disease services in sub-Saharan Africa. Aids. 2018;32(April):S47–54.

21. Nduka CU, Stranges S, Sarki AM, Kimani PK, Uthman OA. Evidence of increased blood pressure and hypertension risk among people living with HIV on antiretroviral therapy: a systematic review with meta-analysis. J Hum Hypertens. 2016;30(6):355–62.

22. Eugine D, Mbchb A, Health G. PEOPLE LIVING WITH HIV / AIDS (PLHIV) IN KENYA BY. 2021;

23. Megerso A, Garoma S. Comparison of survival in adult antiretroviral treatment naïve patients treated in primary health care centers versus those treated in hospitals: retrospective cohort study; Oromia region, Ethiopia. BMC Health Serv Res [Internet]. 2016;16(1):1–7. Available from: http://dx.doi.org/10.1186/s12913-016-1818-3

24. Mollel EW, Todd J, Mahande MJ, Msuya SE. Effect of tuberculosis infection on mortality of HIV-infected patients in Northern Tanzania. Trop Med Health. 2020;48(1).

25. Grinsztejn B, Luz PM, Pacheco AG, Santos DVG, Velasque L, Moreira RI, et al. Changing Mortality Profile among HIV-Infected Patients in Rio de Janeiro, Brazil: Shifting from AIDS to Non-AIDS Related Conditions in the HAART Era. PLoS One. 2013;8(4).

26. Yang CH, Huang YF, Hsiao CF, Yeh YL, Liou HR, Hung CC, et al. Trends of mortality and causes of death among HIV-infected patients in Taiwan, 1984-2005. HIV Med. 2008;9(7):535–43.

27. Chang CC, Mina M, Post JJ, Cameron BA, Lloyd AR, French MA, et al. HIV and co-infections. 2013;254:114–42.

28. Madhi SA, Nel J. Epidemiology of severe COVID-19 from South Africa. Lancet HIV. 2021;8(9):e524–6.

29. Davies M-A. HIV and risk of COVID-19 death : a population cohort study from the Western Cape Province , South Africa . Author : Western Cape Department of Health in collaboration with the National Institute for Communicable Diseases , South Africa . Corresponding aut. medRxiv [Internet]. 2020;1–21. Available from: https://www.medrxiv.org/content/10.1101/2020.07.02.20145185v2

30. Liang M, Luo N, Chen M, Chen C, Singh S, Singh S, et al. Prevalence and Mortality due to COVID-19 in HIV Co-Infected Population: A Systematic Review and Meta-Analysis. Infect Dis Ther [Internet]. 2021;10(3):1267–85. Available from: https://doi.org/10.1007/s40121-021-00447-1

31. Teka Z, Mohammed K, Workneh G, Gizaw Z. Survival of HIV/AIDS patients treated under ART follow-up at the University hospital, northwest Ethiopia. Environ Health Prev Med. 2021;26(1):1–9.

32. Hoffmann CJ, Schomaker M, Fox MP, Mutevedzi P, Giddy J, Prozesky H, et al. CD4 Count Slope and Mortality in HIV-Infected Patients on Antiretroviral Therapy. JAIDS J Acquir Immune Defic Syndr. 2013;63(1):34–41.

33. Beckham SW, Beyrer C, Luckow P, Doherty M, Negussie EK, Baral SD. Marked sex differences in all-cause mortality on antiretroviral therapy in low-and middle-income countries: A systematic review and meta-analysis. J Int AIDS Soc. 2016;19(1).

34. Kibuuka H, Musingye E, Mwesigwa B, Semwogerere M, Iroezindu M, Bahemana E, et al. Predictors of All-Cause Mortality Among People With Human Immunodeficiency Virus (HIV) in a Prospective Cohort Study in East Africa and Nigeria. Clin Infect Dis. 2022;75(4):657–64.

35. Cescon A, Patterson S, Chan K, Palmer AK, Margolese S, Burchell AN, et al. Gender differences in clinical outcomes among HIV-positive individuals on antiretroviral therapy in Canada: A multisite cohort study. PLoS One. 2013;8(12):6–13.

36. Druyts E, Dybul M, Kanters S, Nachega J, Birungi J, Ford N, et al. Male sex and the risk of mortality among individuals enrolled in antiretroviral therapy programs in Africa: A systematic review and meta-analysis. Aids. 2013;27(3):417–25.

37. Van Heerden A, Barnabas R V., Norris SA, Micklesfield LK, Van Rooyen H, Celum C. High prevalence of HIV and non-communicable disease (NCD) risk factors in rural KwaZulu-Natal, South Africa. J Int AIDS Soc. 2017;20(2).

38. Vos AG, Hoeve K, Barth RE, Peper J, Moorhouse M, Crowther NJ, et al. Cardiovascular disease risk in an urban African population: A cross-sectional analysis on the role of HIV and antiretroviral treatment. Retrovirology [Internet]. 2019;16(1):1–10. Available from: https://doi.org/10.1186/s12977-019-0497-7

39. Bloomfield GS, Hogan JW, Keter A, Sang E, Carter EJ, Velazquez EJ, et al. Hypertension and obesity as cardiovascular risk factors among HIV seropositive patients in Western Kenya. PLoS One. 2011;6(7).

40. Rabkin M, Nishtar S. Scaling Up chronic care systems: Leveraging HIV programs to support noncommunicable disease services. J Acquir Immune Defic Syndr. 2011;57(SUPPL. 2):1–9.

41. Wekesa P, McLigeyo A, Owuor K, Mwangi J, Ngugi E. Survival probability and factors associated with time to loss to follow-up and mortality among patients on antiretroviral treatment in central Kenya. BMC Infect Dis [Internet]. 2022;22(1):1–10. Available from: https://doi.org/10.1186/s12879-022-07505-0

42. Gunda DW, Nkandala I, Kilonzo SB, Kilangi BB, Mpondo BC. Prevalence and Risk Factors of Mortality among Adult HIV Patients Initiating ART in Rural Setting of HIV Care and Treatment Services in North Western Tanzania: A Retrospective Cohort Study. J Sex Transm Dis. 2017;2017:1–8.

43. Chimbetete C, Shamu T, Roelens M, Bote S, Mudzviti T, Keiser O. Mortality trends and causes of death among HIV positive patients at Newlands Clinic in Harare, Zimbabwe. PLoS One [Internet]. 2020;15(8 August):1–13. Available from: http://dx.doi.org/10.1371/journal.pone.0237904

44. Nigussie F, Alamer A, Mengistu Z, Tachbele E. Survival and predictors of mortality among adult hiv/aids patients initiating highly active antiretroviral therapy in debre-berhan referral hospital, amhara, ethiopia: A retrospective study. HIV/AIDS - Res Palliat Care. 2020;12:757–68.

45. Ayalew MB. Mortality and Its Predictors among HIV Infected Patients Taking Antiretroviral Treatment in Ethiopia: A Systematic Review. AIDS Res Treat. 2017;2017(in 2005).

46. Otwombe KN, Petzold M, Modisenyane T, Martinson NA, Chirwa T. Factors associated with mortality in HIV-infected people in rural and urban South Africa. Glob Health Action. 2014;7(1).

Adherence of Road Safety Measures Among Motor Vehicle and Motorcycle Users in Unguja-Zanzibar

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ABSTRACT

Introduction: Road traffic accidents are major causes of morbidity and mortality in high and low-income countries including Tanzania. To counter this epidemic, the Government has put in place several road safety measures for road users to adhere. This survey aimed at assessing the practice of road safety measures among motor vehicle and motorcycle users during daytime in Unguja, Zanzibar.

Methods A cross-sectional study was conducted in 3 Municipals of Urban West and 2 districts (North B and Central) in Unguja Island in January 2022. This study involved users of motor vehicles and motorcycles to obtain data on helmet use, buckling of seat belts and cell phone use while driving during daytime through a standardized checklist. Data were analyzed using PI Info version 7.2.5.0. Proportions, chi-square and p-values were used to show the level of adherence of different variables of interest.

Results: A total of 2208 motor vehicles and 2722 motorcycles were observed. Most of the drivers were males 4807(97.5%). Private vehicles accounted for the majority 3414 (69.3%) of motor vehicles assessed. Helmet wearing and seatbelt buckling was found to be the most violated safety measure with the practice of 854 (52.7%) and 340 (31.9%) respectively. Not using a mobile phone while driving was highly observed by 4685 (96.7%).

Conclusion: Despite available road traffic enforcement mechanisms put by the Government of Tanzania on helmet use and seatbelt buckling for both driver and passenger, Unguja motor vehicle drivers, motorcyclists and passengers were observed not adhering to these safety measures. Hence, we recommend further studies to find out factors associated with low level of road safety measures adherence in order to come up with solutions that could prevent the increasing morbidity and mortality due to road accidents

Keywords: Adherence, road safety measures, Unguja, Tanzania

INTRODUCTION

Road traffic accidents (RTA) have been a global concern for years now since motor vehicles have come into use. The number of deaths due to RTA is on a steady increase where for the year 2021, a total of 1.3 million deaths were reported of which 90% of these deaths were from low and middle-income countries (LMICs) [1]. In Africa, RTA accounts for about 52.8 deaths per 100 000 population [2] . In Tanzania road traffic accidents contributed to 4.8% of total deaths [3].

Reasons for the observed increase in RTA are postulated to be due to inadequacy adherence to road safety measures which includes running over red traffic lights, overloading of motor vehicles [4]Dhaka respectively. Study Period: The study was conducted from July 2007 to June 2008. Subjects: A total of 400 Road Traffic Accident (RTA, driving on the pedestrian footpath (zebra crossing) [5], failure to use safety equipment such as helmets for motorcyclists and using mobile phones while driving [6].

Several studies have been conducted in Tanzania to find out the main causes of motor traffic accidents [7]. The Government has also gone further in instituting safety measures in reducing road traffic accidents such as providing education to bus owners and drivers to abide to traffic rules and regulations. This includes emphasizing drivers to follow traffic regulations, setting of bus alarming notification for limiting bus speed, road signs, speed limit signs, and road bumps [7].

Despite promoting the use of road safety measures, little has been done to evaluate the implementation of the recommended practices. This paper therefore, describes the level of adherence among motor vehicles drivers, motorcyclists and passengers on implemented traffic road safety related to seatbelt buckling, wearing of helmets and using mobile phone while driving.

METHODS

Study Area and Study Population

This study was conducted in 3 Municipals of Urban West region (Urban, West A and West B) and 2 districts (North B and Central) in Unguja Island-Zanzibar. It involved users of motor vehicles and motorcycles (drivers and passengers). All motor vehicles that passed at the observation points were included in

this study, but all those with tinted windows were excluded.

Study Design

Descriptive cross-sectional study was conducted whereby motor vehicle users were observed on their use of helmets, seatbelt buckling and mobile phone use while driving.

Sampling Method

A convenience sampling technique was used, which involved the observation and recording (using a checklist with variables of interest) of any motor vehicle described in our study passing at the site of observation. Vehicles were selected randomly at any given observation site as long as it met study criteria (i.e., any motor vehicle/motorcycle/tricycle motorcycle).

Data Collection

An observation checklist was used to collect data on motor vehicle users, drivers and passengers on adherence to using safety measures (i.e., helmet, seatbelt and mobile phone use while driving). Data were collected in seven observational sites identified with high traffic flow.

Data Analysis

Preliminary data exploration was done to check for missing values, duplications, and unusual observations before analysis using Microsoft excel, then were analyzed by EPI Info version 7.2.5.0. Demographic variables were presented using frequencies and proportions for all categorical data. Descriptive statistics and tables were generated from Epi Info program to calculate prevalence of variables under study for all objectives. Proportions, chi-square and p-values were used to show the level of adherence of different variables of interest.

Ethical Clearance

This was an observational study which did not involve interview of participants with no human risk involved. Permission was granted by Zanzibar Ministry of Health and Zanzibar Road Transport and License Department before commencing the study. All information collected were handled with great confidentiality.

RESULTS

Socio-demographic Profile of the Study

A total of 2208 motor vehicles and 2722 motorcycles were observed. Most of the drivers were males 4807 (97.5%). Majority of the motor vehicles observed were two-wheels 2683 (54.4%). Also, more than half 3414 (69.3%) of the motor vehicles were registered as private. Out of seven observational sites for data collection, Mchina Mwanzo 1069 (21.7%) and Kwerekwe 979 (19.9%) accounted for the majority of the motor vehicles observed (Table 1)

Table 1: Social demographic characteristics of the studied motor vehicles users in Unguja-Zanzibar January 2022 (n=4930)

Variable	Frequency (n)	Percentage (%)
Sex of the driver		
Female	123	2.5
Male	4807	97.5
Motor vehicle classification		
Four-wheel	2208	44.8
Three-wheel	39	0.8
Two-wheel	2683	54.4
Registration type		
Commercial	1226	24.9
Diplomat	215	4.4
Government	74	1.5
Private	3414	69.3
Site of data collection		
Dunga	597	12.1
Kwerekwe	979	19.9
Mazizini Airport	671	13.6
Mchina Mwanzo	1069	21.7
Mkapa Road	580	11.8
Mkunazini	571	11.6
Mkwajuni	463	9.4

The Proportion of Wearing a Helmet among Motorcycle Drivers

Overall, it was observed that 854 (52.7%) of the drivers wore helmet while driving a motorcycle. The proportion of wearing helmets among drivers without passengers was higher among males 852 (52.8%) (p = 0.340) than female drivers. Likewise, the observed proportion of drivers wearing a helmet was higher among government-registered motorcycles 3 (60.0%) (p = 0.457) compared to other motorcycles with different registration types (Table 2).

Additionally, observation of drivers and passenger on helmet wearing practice was found that 372 (33.7%) of both motorcycle drivers and passengers did not wear helmets. Also, 371 (33.5%) of the drivers were observed to be wearing helmets more compared to their passengers (Figure 1).
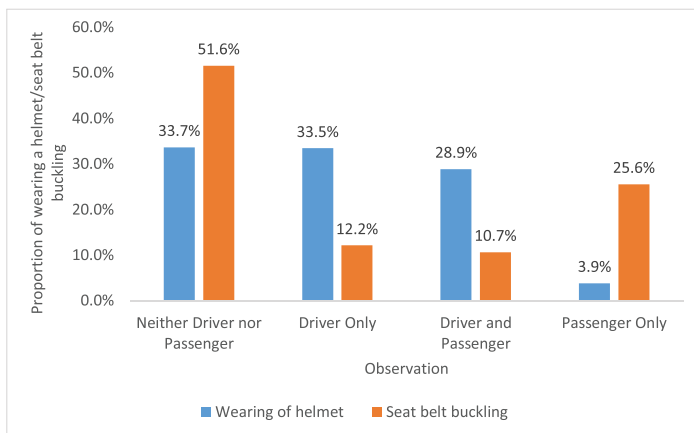
Figure 1: Practice of helmet wearing and seatbelt buckling among drivers with passengers in Unguja Zanzibar January 2022

The Proportion of Drivers and Passengers Buckled Seat Belts

Among 1066 observed drivers, only 340 (31.9%) of the drivers buckled their seatbelts whereby female drivers 31 (51.0%) (p-value<0.001) adhered more to seat belt buckling compared to males. Furthermore, between 1066 different motor vehicles observed, all diplomat car drivers buckled their seat belts during driving while only 3 (15.0%) (p-value <0.001) of government motor vehicles users buckled their seat belts (Table 2).

Correspondingly, out of 1509 drivers and passengers observed for seat belt buckling, the proportion of drivers and passengers who never buckled seatbelts was 778 (51.6%) (Figure 1).

Table 2: Practice of helmet wearing and seatbelt buckling among drivers associated by sex of the driver and motorcycle registration type in Unguja-Zanzibar January 2022

Variable	Wearing of helmet among drivers only (n=1619)		p-value	Seat belt buckling among drivers (n=1066)		p-value
	Yes (n, %)	No (n, %)		Yes (n, %)	No (n, %)	
Overall	854 (52.7)	765 (47.3)		340 (31.9)	726 (68.1)	
Sex						
Female	2 (33.3)	4 (66.7)		31 (51.0)	30 (49.0)	
Male	852 (52.8)	761 (47.2)	0.340	309 (30.8)	696 (69.2)	<0.001
Registration Type						
Commercial	119 (56.4)	92 (43.6)		120 (39.7)	182 (60.3)	
Diplomat	0	0		5 (100)	0	
Government	3 (60)	2 (40)	0.457	3 (15)	17 (85)	<0.001
Private	731 (51.9)	676 (48.1)		214 (28.9)	525 (71)	

The Proportion of Mobile Phones Uses While Driving

Generally, the safety measure of not using a mobile phone while driving was highly observed 4685 (96.7%). On assessing mobile phone use among drivers with respect to motor vehicle

classification, it was observed that 3 (7.7%) (p <0.001) of three-wheel drivers to have a higher proportion of mobile phone use compared to others. Moreover, female drivers 6 (4.9%) (p=0.312) use mobile phones more while driving compared to male drivers. Additionally, private registered motor vehicle drivers 119 (3.5%) (p=0.199) were observed to use mobile phone more compared to other motor vehicle registration type (Table 3).

Table 3: Association between sex of the driver, motor vehicle classification and car registration type on mobile phone use while driving in Unguja-Zanzibar January 2022

Variable	Mobile phone use while driving		Total	p-value
	Yes (n, %)	No (n, %)		
Overall	160 (3.3)	4685 (96.7)	4845	
Sex of the driver				
Female	6 (4.9)	116 (95.1)	122	
Male	154 (3.3)	4,569 (96.7)	4,723	0.312
Motor vehicle classification				
Four-wheel	131 (6.1)	2,023 (93.9)	2,154	
Three-wheel	3 (7.7)	36 (92.3)	39	<0.001
Two-wheel	26 (1)	2626 (99.0)	2,652	
Car registration type				
Commercial	37 (3.1)	1,164 (96.9)	1,201	
Diplomat	2 (0.9)	213 (99.1)	215	
Government	2 (2.8)	70 (97.2)	72	0.199
Private	119 (3.5)	3,238 (96.5)	3,357	

DISCUSSION

This study observed that helmet use and seatbelt buckling were the most violated road safety measures.

In previous studies conducted in Africa, the proportion of wearing helmets among motorcycles drivers ranged from 25%-54% [9–11], which is similar to our study findings. This similarity could be explained by the fact that sub-Saharan African countries display cultural and behavioral interactions. Contrary to that, a study conducted in Dar es salaam, Tanzania demonstrated a higher proportion of wearing a helmet (73.3% to 82.1%) [8,12]. The differences could be explained by inadequate reinforcement of road safety policies implementation and adherence as well as limited knowledge among motorcycle users in Unguja.

The proportion of seatbelt buckling among motor vehicle users was low among drivers in Unguja, Zanzibar. The proportion obtained in this study is low compared to a previous study conducted in Tanzania which showed the percentage of those who buckle to range from 75% to 90% [13]000 inhabitants. Other studies conducted in Africa showed the proportion of

seatbelt buckling is very inequitable since the proportion of seatbelt buckling ranged from 18.7% to 84.1%, which is similar to what has been observed in this study [14,15]. Moreover, the proportion of seatbelt buckling among drivers and passengers in our study was comparatively low contrary to studies conducted in Asia which showed the proportion to range from 67.3% and 18.9% respectively [16–18]. Additionally, the proportion of seatbelt buckling was low in our study compared to 71% that was observed in Europe. Studies of the same nature done in the USA showed seatbelt buckling to be higher more than three times (97%) contrary to what was observed in our study [19]. The low proportion of seatbelt buckling can be explained by inadequate reinforcement of road safety measures by relevant government authorities and either due limited knowledge or negligence of both drivers and passengers.

In this study, the proportion of drivers who used mobile phones while driving was low compared with the prevalence of 10% reported in a study conducted in Tanzania Mainland [13000 inhabitants]. Also, our study showed that the proportion of mobile phone use among motorcyclists (two-wheel motor wheel) was extremely low compared with findings of the study which was conducted in Indonesia [20].

The study did not include observations of drivers and passengers during the nighttime, a period when it is presumed that there is poor adherence to road safety measures due to limited number of law enforcers such police traffic officers. While this might slightly lead to an underreporting of non-adherence, it's important to note that the reported levels of adherence remained reasonably representative.

CONCLUSIONS

Despite available road traffic enforcement mechanisms put by the Government of Tanzania on helmet use and seatbelt buckling for both driver and passenger, Unguja motor vehicle drivers, motorcyclists and passengers were observed not adhering to these safety measures. Hence, we recommend further studies to find out factors associated with low level of road safety measures adherence in order to come up with solutions that could reduce the increasing morbidity and mortality due to road accidents.

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MUHTASARI

Kufuatwa kwa Sheria za Usalama Barabarani Miongoni mwa Watumiaji wa Magari na Pikipiki Jiji la Unguja-Zanzibar

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Usuli: Ajali za barabarani ndio chanzo kikuu cha magonjwa na vifo katika nchi za kipato cha juu na cha chini ikiwemo Tanzania. Ili kukabiliana na janga hili, sheria kadhaa za usalama barabarani zimewekwa kwa watumiaji wa barabara kuzizingatia. Utafiti huu ulilenga kutathmini uzingatiaji wa sheria za usalama barabarani miongoni mwa watumiaji wa magari na pikipiki wakati wa mchana katika jiji la Unguja Zanzibar.

Mbinu: Utafiti huu ulifanyika katika Manispaa 3 za Mjini Magharibi na Wilaya 2 (Kaskazini B na Kati) katika Kisiwa cha Unguja Januari 2022. Utafiti huu ulihusisha watumiaji wa magari na pikipiki ili kupata takwimu za matumizi ya helmeti (kofia ngumu), ufungaji wa mikanda ya usalama (buckling of seat belts) na matumizi ya simu ya mkononi wakati wa kuendesha gari ama pikipiki wakati wa mchana kwa kutumia dodoso lenye orodha sanifu (matukio pendekezwa ya kutathimini). Takwimu zilichambuliwa kwa kutumia programu ya EPI Info toleo la 7.2.5.0 ili kuelezea uhusiano ulipo wa uzingatiaji wa sheria ya usalama barabari

Matokeo: Jumla ya magari 2208 na pikipiki 2722 zilichunguzwa. Wengi wa madereva walikuwa wanaume asilimia 97.5 (4807). Magari ya kibinafsi yalichukua sehemu kubwa, ambapo yalikuwa asilimia 69.3 (3414) ya magari yote yaliyochunguzwa. Uvaaji wa helmeti (kofia ngumu) na kufunga mikanda ilionekana kuwa ni

sheria ya usalama ambazo zilikiukwa zaidi ambapo watuamiaji walikuwa 854 asilimia 52.7 na 340 asilimia 31.9 mtawalia. Kutotumia simu ya kiganjani wakati wa kuendesha kulizingatiwa sana kwa jumla ya asilimia 96.7 (4685).

Hitimisho: Licha ya kuwepo kwa taratibu za utekelezaji wa sheria za barabarani zilizowekwa na Serikali ya Tanzania kuhusu matumizi ya helmeti (kofia ngumu) na kufunga mikanda ya usalama kwa madereva na abiria, madereva wa magari ya Unguja, waendesha pikipiki na abiria walionekana kutozingatia sheria hizi za usalama. Hivyo, tunapendekeza tafiti zaidi zifanyike kubaini mambo yanayochangia kuwa na kiwango kidogo cha uzingatiaji wa hatua za usalama barabarani ili kuweza kuja na suluhisho litakaloweza kupunguza ongezeko la majeruhi, wagonjwa na vifo vinavyotokana na ajali za barabarani.

Maneno Muhimu: Kufuatwa, sheria za usalama barabarani, Unguja, Tanzania

REFERENCES

1. World Health Organization (WHO). Road traffic injuries 21. 2021;(June). Available from: https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries

2. Adeloye D, Thompson JY, Akanbi MA, Azuh D, Samuel V, Omoregbe N, et al. Incidence des accidents, traumatismes et victimes de la route en Afrique: Revue systématique et méta-analyse. Bull World Health Organ. 2016;94(7):510A-521A.

3. Toroyan T, Peden MM, Iaych K. WHO launches second global status report on road safety. Inj Prev. 2013;19(2):150.

4. Jabbar M, Islam M, Sultana R, Akhter S. Risk Factors of Road Traffic Accidents (RTA) in context of Bangladesh. J Dhaka Med Coll. 1970;18(2):161–5.

5. Seflers M, Kreicbergs J, Sauter G. EQUIPMENT CONDITION FOR ZEBRA CROSSING NIGHT-TIME SAFETY PERFORMANCE IN LATVIA. 2021;16(4):108–25.

6. Barengo NC, Mkamba M, Mshana SM, Miettola J. Road traffic accidents in Dar-es-Salaam, Tanzania during 1999 and 2001. Int J Inj Contr Saf Promot. 2006;13(1):52–4.

7. Rwebangira T, Pearce T, Maunder D a. C. Public Transport Safety in Tanzania. World Hear Rep. 1997;(1976):1–14.

8. Kauky CG, Kishimba RS, Urio LJ, Abade AM, Mghamba JM. Prevalence of helmet use among motorcycle users in Dar Es Salaam, Tanzania. Pan Afr Med J. 2015;20:1–7.

9. Karau PB. School of Medicine, the University of Nairobi 3. Ministry of Health. Ann AFRICAN Surg [Internet]. 2015;12(1). Available from: www.annalsofafricansurgery.com

10. Bachani AM, Hung YW, Mogere S, Akunga D, Nyamari J, Hyder AA. Helmet wearing in Kenya: prevalence, knowledge, attitude, practice and implications. Public Health [Internet]. 2017;144(410):S23–31. Available from: http://dx.doi.org/10.1016/j.puhe.2016.12.005

11. Oginni FO, Ugboko VI, Adewole RA, Oginni FO, Ugboko VI, Adewole RA, et al. Knowledge , Attitude , and Practice of Nigerian Commercial Motorcyclists in the Use of Crash Helmet and other Safety Measures Knowledge , Attitude , and Practice of Nigerian Commercial Motorcyclists in the Use of Crash. 2015;9588(November).

12. Nguyen T, Vissoci N, Joelson T. Injury prevalence and safety habits of boda boda drivers in Moshi , Tanzania : A mixed methods study. 2018;220:1–16.

13. Kircher K, Andersson J. Truck Drivers' Opinion on Road Safety in Tanzania-A Questionnaire Study. Traffic Inj Prev. 2013;14(1):103–11.

14. Siviroj P, Peltzer K, Pengpid S, Morarit S. Non-seatbelt use and associated factors among Thai drivers during Songkran festival. 2012;

15. Alghnam S, Alyabsi M, Aburas A, Alqahtani T. Predictors of Seatbelt Use Among Saudi Adults : Results From the National Biobank Project. 2020;8(October):1–10.

16. Br G, Madar A, Bo D, Adina B. Road Safety Education in the Context of the Sustainable Development of Society : The Romanian Case. 2016;

17. Tore S, Larsson M, Holtan A, Staff T, Vindenes V, Gjerde H. Associations between driving under the in fl uence of alcohol or drugs , speeding and seatbelt use among fatally injured car drivers in Norway. Accid Anal Prev. 2015;78:14–9.

18. Article O. Pattern of seat belt wearing in Nanjing , China. 2007;388–94.

19. Stats C, Hs DOT, Carolina N, Carolina S. Raffic afety acts. 2016;2–3.

20. Widyanti A, Pratama GB, Anindya AH, Permata F, Sumali A, Salma SA, et al. Mobile phone use among Indonesian motorcyclists : prevalence and influencing factors Mobile phone use among Indonesian motorcyclists : prevalence. Traffic Inj Prev. 2020;0(0):1–5.

The art of Social Support Group Participation: Optimizing ART Adherence among Young Adults in Tanzania

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KEY MESSAGE

» Optimum adherence to Antiretroviral therapy (ART) has been shown to reduce HIV-related morbidity and mortality

» Despite provision of routine ART counseling on ART use, 32% of young people have self-reported non- adherence to ART.

» Viral loads test is a good predictor of measuring adherence among people taking ART.

» Strengthening Social support group participation improves ART adherence among almost 13,000 youth thus reducing HIV related morbidity and mortality, increasing retention to care, and improving quality of life.

PROBLEM STATEMENT

Human immunodeficiency virus (HIV) continues to be a major global public health concern. Globally, it is estimated that 38.4 million people were living with HIV in 2021, with Tanzania having an HIV prevalence of 4.7% among the general population. In Tanzania the prevalence of HIV among young people aged 15-19 years was 1% (1.3% among girls, and 0.8% among boys). Furthermore, the percentage of women aged 20-24 infected with HIV is higher (4.4%) than that of men (1.7%) in the same age group [1].

Optimum adherence to Antiretroviral therapy (ART) has been shown to reduce HIV-related morbidity and mortality among people living with HIV and further reduces transmission of the virus. Patients with HIV are encouraged to take all of their medications strictly as directed because suboptimal adherence can lead to detectable viremia, decreased CD4 counts, viral resistance, higher rates of transmission, earlier death, and an overall poorer quality of life [2]. However, despite availability of ART, non-adherence to these medications remains a challenge among young people living with HIV. It has been estimated that nonadherence to ART among young people is approximately 60% and 48% globally and regionally, respectively. Viral load measurement is a good indicator of adherence to optimal use among people taking ART. Figure 1 shows the flow of comparisons between the number of young people who were given ART treatment and those who managed to have an amount of virus in the body <1000/mls copies. In Tanzania 32% of young people on ART have self-reported sub optimal adherence to ART [3].

Social support group participation where education and psychological support is provided will improve ART adherence thus reducing HIV related morbidity and mortality, increasing retention to care, and improving quality of life. Social group consist of people with common experiences and concerns that come together to discuss how to achieve a common goal. Members receive educational, emotional, social, and spiritual support to improve their clinical outcome.
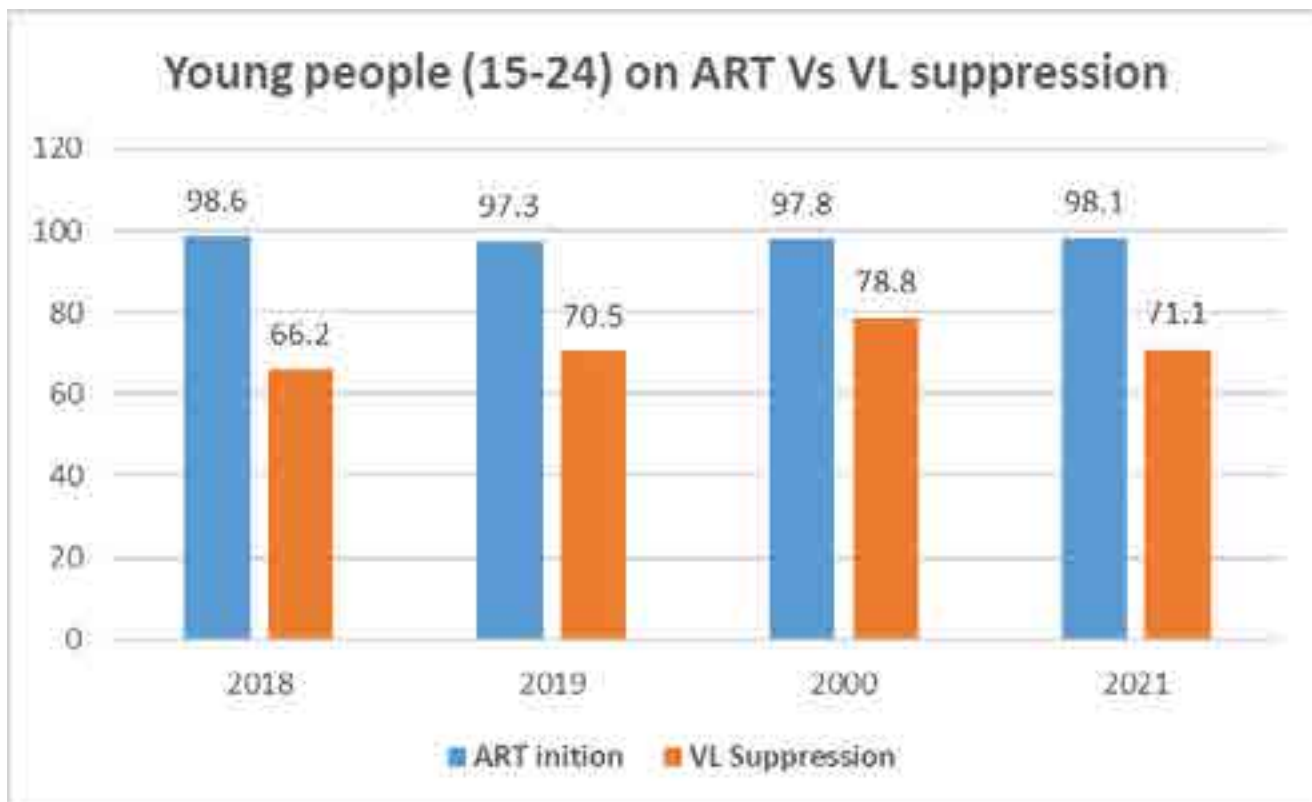
Figure 1: Young People (15-24 years) on ART Vs Viral Load Suppression

POLICY OPTIONS

In view of the above identified problem, the following are the proposed policy options:

Option I: Status quo or routine adherence counseling on ART medication

- » What: Sessions on ART adherence counseling is conducted during every clinic visit by health providers at the facility. Young people with viral loads >1000/mls copies are subjected to enhanced adherence counseling to help boost adherence [4].
- » Why: Despite routine ART counseling provided to young people taking ART, some of them still have suboptimal adherence to ART medication.
- » Feasibility: Medium. This is highlighted in the National treatment guideline but need strengthening and integration at different point of health service delivery

Option II: Strengthen participation in social support groups among young people taking ART at facility

- » What: Strengthen participation in social support groups by the young people that are on ART.
- » Why: A study conducted in Zimbabwe showed that young people who join social intervention groups were

3.9 times more likely to adhere to treatment compared to the control group [5].

- » Feasibility: High. This is already being implemented at some selected facilities but needs facility enforcement to ensure all young people attending clinics are linked to a support group.

Option III: Strengthening community-based ART adherence support

- » What: Increase community ART adherence support groups available to the youth. Community based ART adherence support involves engaging stable community adolescents on ART to provide social support to other adolescents so as to improve ART adherence and retention to care.
- » Why: Community based ART programs have been shown to improve ART adherence and retention into care [6,7]. Additionally, a South African study reported that young people who received community-based adherence support had an independently reduced probability of attrition [8].
- » Feasibility: Medium. There are community health care workers who may be employed to monitor ART adherence at household level

Table 1: Economic Evaluation Results

Interventions	Population with VL suppression	Effect difference	Total cost per year ($)	Cost difference	Cost per VL suppression ($)
Status quo	291,8430		3,567.45		
Social support group participation	304,719	12,875	4,311.74	44.28	0.06
Community based adherence support	300,427	8,584	4,635.64	1,068.18	0.12

VL = viral load

Table 2: Feasibility determination

Interventions	Political feasibility	Operational feasibility
Social support group participation	🟩	🟩
Community based adherence support	🟩	🟨

Key: High: 🟩   Medium: 🟨

EVALUATION AND RECOMMENDATION

After conducting the economic evaluation, strengthening the social group participation policy option was found to be the most cost-effective option. For 6 cents (US dollars) per person and strengthening social group participation will result in almost 13,000 youth with VL suppression per year. Also, it was found that the community-based adherence support intervention will result in an extra 8,584 youth with VL suppression of less than 1000 copies/ml per year, but at double the cost per person compared to social support group participation of young people in health facilities. As a result, we recommend the social support group participation in facilities to increase VL suppression. Furthermore, the social groups are politically and operationally feasible (Table 2).

NEXT STEP

For execution of the cost-effective policy option, the Government through Ministry of Health should allocate funds, develop training materials and implement training programs to educate health workers about the importance of social support group participation. Furthermore, the social groups must be designed in a way that it's attractive to young people to increase participation.

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Ufanisi wa Ushiriki katika Vikundi vya Kijamii: Kuboresha Uzingatiaji Bora wa Utumiaji wa Tiba ya Kufubaza Makali ya Virusi vya Ukimwi (ART) Miongoni mwa Vijana Nchini Tanzania

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UJUMBE MUHIMU

» Uzingatiaji bora zaidi wa tiba ya kufubaza virusi vya Ukimwi (ART) umeonyesha kupunguza magonjwa na vifo vinavyohusiana na Virusi vya Ukimwi (VVU).

» Licha ya utoaji wa ushauri nasaha juu ya matumizi ya ART, asilimia 32 ya vijana wameripoti kutozingatia utumiaji bora wa ART hapa Tanzania

» Kipimo cha wingi wa virusi ni kiashiria kizuri cha kupima uzingatiaji wa utumiaji bora kati ya watu wanaotumia ART.

» Inakadiriwa kuwa kuimarisha utumiaji wa vikundi shirikishi vya kijamii katika huduma za VVU, vitaboresha uzingatiaji wa utumiaji bora wa ART kwa takribani vijana 13,000 ambao pia utapunguza vifo vinavyohusiana na VVU, kuongeza idadi ya watu wanao baki kuendelea na matibabu, na kuboresha ubora wa maisha.

TAARIFA ZA CHIMBUKO LA TATIZO

Virusi vya Ukimwi (VVU) vinaendelea kuwa tatizo kubwa la afya kwa umma duniani. Duniani kote, inakadiriwa kuwa watu milioni 38.4 walikuwa wanaishi na VVU mwaka 2021, huku Tanzania ikiwa na maambukizi ya VVU kwa asilimia 4.7 kati ya watu wote. Nchini Tanzania maambukizi ya VVU miongoni mwa vijana wenye umri wa miaka 15-19 yalikuwa asilimia 1 (ikiwa ni aslimia 1.3 kwa wasichana, na asilimia 0.8 kwa wavulana). Zaidi ya hayo, asilimia ya wanawake wenye umri wa miaka 20-24 walioambukizwa VVU ni kubwa (asilimia 4.4) kuliko ile ya wanaume (asilimia 1.7) katika kundi la umri sawa [1].

Uzingatiaji bora zaidi wa matunizi ya tiba ya kufubaza makali ya VVU (ART) umeonyesha kupunguza magonjwa na vifo vinavyohusiana na VVU miongoni mwa watu wanaoishi na VVU na kupunguza zaidi maambukizi ya virusi hivyo. Wagonjwa walio na VVU wanahimizwa kutumia dawa zao zote kwa usahihi kama walivyoelekezwa. Hii inatokana na sababu kwamba uzingatiaji bora mdogo wa utumiaji wa ART unaweza kusababisha kuongezeka VVU kwa wingi, kupungua kwa chembembe za damu kinazotoa kinga mwilini (CD4), kuzalisha usugu wa virusi, viwango vya juu vya kueneza maambukizi, vifo vya mapema, na ubora duni wa maisha kwa ujumla [2]. Hata hivyo, licha ya

kuwepo kwa ART, uzingatiaji bora mdogo wa utumiaji dawa hizi bado ni changamoto miongoni mwa vijana wanaoishi na VVU. Imekadiriwa kuwa kutozingatia utumiaji bora wa ART miongoni mwa vijana ni takriban asilimia 60 na asilimia 48 kwa ya kimataifa na kikanda, mtawalia. Kipimo cha wingi wa virusi ni kiashiria kizuri cha kupima ufuasi wa utumiaji bora kati ya watu wanaotumia ART. Kielelezo namba 1 kinaonesha mtiririko wa mlinganisho kati ya idadi ya vijana walioanishiwa matibabu ya ART na wale waliofanikiwa kuwa na wingi wa virusi mwilini chini ya nakala 1000/mililita. Nchini Tanzania asilimia 32 ya vijana wanaotumia ART wamejiripoti kuwa uzingatiaji wao wa utumiaji bora wa ART ni mdogo [3].

Kuimarisha ushiriki wa vijana katika vikundi vya kijamii vya kusaidiana husaidia vijana wanaotumia ART kupata elimu na ushauri wa kisaikolojia ambao humwongoza katika kuzingatia matumizi bora ya ART. Washiriki hupata ushauri na msaada wa kielimu, kihisia, kijamii na kiroho ili kuboresha matokeo ya ya kimatibabu ya ART. Kikundi cha kijamii kinajumuisha washiriki walio na uzoefu na hoja ambazo huletwa hujadiliwa kwa pamoja ili kupata jinsi ya kutatua changamoto mbali mbali zinazowakumba vijana kwenye matibabu ya ART. Katika makundi haya kijana huamasishwa katika kutafuta huduma za afya pale anapokuwa anaumwa. Hatua hii hivyo huimarisha afya ya kijana

na kusababisha matokea mazuri ya tiba ambapo kijana huweza kupata hali ya kuwa na nakala chini ya 1000/millilita ya VVU. Hali hii hupunguza magonjwa na vifo vinavyohusiana na VVU, hivyo kuongeza idadi ya watu wanao baki kuendelea na matibabu, na kuboresha ubora wa maisha.
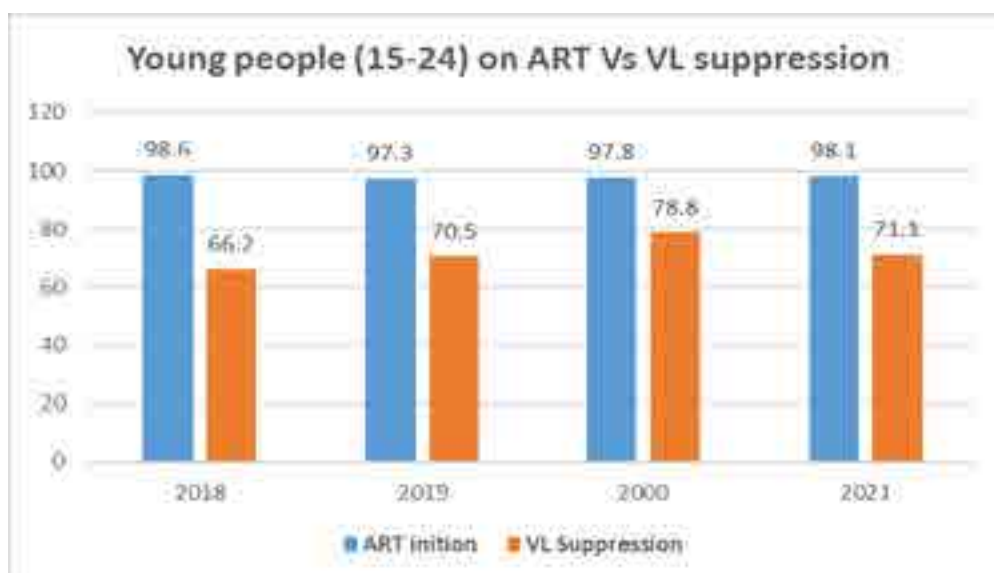
Kielelezo 1: Vijana wa Miaka 15-24 wanatumia ART ikilinganishwa na wingi wa VVU

MAONI KISERA

Kwa kuzingatia tatizo lilivyoainishwa hapo juu, yafuatayo ni maoni ya chaguzi za kisera zilizopendekezwa:

Chaguo I: Kudumisha Sera ya sasa ya kutoa ushauri ulioimarishwa wa uzingatiaji bora kwa njia ya kawaida ya kutumia dawa za ART

» **Nini:** Vipindi vya ushauri wa uzingatiaji wa matunizi bora ya ART hufanyika kila hudhurio la mteja katika kituo cha kutolea huduma, na hutolewa na wahudumu wa afya. Vijana walio na wingi wa virusi zaidi ya nakala 1000/mililita hupewa ushauri ulioimarishwa ili kusaidia kuongeza uzingatiaji bora wa kutumia tiba ya ART [4].)

» **Kwa nini:** Licha ya vijana wanaotumia ART kuongeza kupokea ushauri ulioboreshwa wa uzingatiaji bora wa kutumia tiba ya ART, baadhi yao bado wanapata shida kuzigatia matumizi ya ART ambapo hali hii husababisha kuongezeka kwa wingi wa virusi mwilini na kudhoofika kiafya.

» **Uwezekano:** *Wa Kati*. Utaratibu wa utoaji wa ushauri ulioimarika umeainishwa katika muongozo wa matibabu wa Kitaifa wa VVU lakini unahitaji kuimarishwana huduma jumuishi katika vituo mbalimabli vya kutolea huduma za afya

Chaguo II: Imarisha ushiriki katika vikundi vya kijamii miongoni mwa vijana wanaotumia ART katika ngazi kituo cha kutolea huduma ya afya

» **Nini:** Kuimarisha ushiriki katika vikundi vya kijamii kwa vijana wanaotumia ART vilivyopo katika vituo vya kutolea huduma za afya

» **Kwa nini:** Utafiti uliofanywa nchini Zimbabwe ulionyesha kwamba vijana wanaojiunga na kushiriki katika vikuundi vya kijamii na kupata msaada wa ushauri na mawazo vilivyopo vituo vya kutolea huduma za afya, walikuwa na uwezekano mkubwa wa kuzingatia utumiaji bora wa matibabu mara 3.9 ikilinganishwa na kikundi ambacho hakikupata msaada wa ushari (afua ya majaribio) [5].

» **Uwezekano:** *Wa Juu*. Hili linatekelezwa kwakuwa tayari linafanyika katika baadhi ya vituo vilivyochaguliwa kwa majaribio, lakini linahitaji utekelezaji katika vituo vyote vinavyotoa huduma ya afya ili kuhakikisha vijana wote wanaohudhuria kliniki wanaunganishwa na kikundi cha kutoa usaidizi.

Chaguo III: Kuimarisha usimamizi wa uzingatiaji bora wa matumizi ya ART katika ngazi ya jamii

» **Nini:** Ongeza vikundi vya usaidizi vya uzingatiaji wa matumizi bora ya ART vya kijamii vinavyopatikana kwa vijana katika ngazi ya jamii. Usaidizi wa uzingatiaji bora wa matumizi ya ART katika ngazi ya jamii unaotokana na jamii iliyo imara kuwashirikisha vijana katika jamii walio na uthabiti juu ya uzingatiaji bora wa matumizi ya ART ili kutoa usaidizi wa kijamii kwa vijana wengine ili kuboresha uzingatiaji bora wa matumizi ya ART na kuongeza idadi ya watu

wanaobaki kuendelea na matibabu.

» **Kwa nini:** Programu za ART za kijamii zimeonyesha kuboresha uzingatiaji bora wa matumizi ya ART na kuongeza idadi ya watu wanaobaki kuendelea na matibabu [6.7]. Zaidi ya hayo, utafiti uliofanyika Afrika Kusini uliripoti kuwa vijana ambao walipokea usaidizi wa uzingztiaji bora wa matumizi ya ART katika kijamii walikuwa na uwezekano wa kujitegemea binafsi kuendelea na matibabu [8].

» **Uwezekano:** *Wa Kati*. Kuna wahudumu wa afya ya jamii ambao wanaweza kuajiriwa kufuatilia uzingatiaji bora wa matumizi ya ART katika ngazi ya kaya

Jedwali Namba 1: Matokeo ya Tathimi ya Kiuchumi ya Mapendekezo ya Kisera

Interventions	Population with VL suppression	Effect difference	Total cost per year ($)	Cost difference	Cost per VL suppression ($)
Status quo	291,8430		3,567.45		
Social support group participation	304,719	12,875	4,311.74	44.28	0.06
Community based adherence support	300,427	8,584	4,635.64	1,068.18	0.12

Jedwali Namba 2: Uamuzi wa uwezekano wa utekelezaji

Afua za majaribio kiseara	Uzekano wa Kisiasa	Upembuzi yakinifu wa kiutendaji
Ushiriki katika vikundi vya kijamii katika vituo vya kutolea huduma ya afya	🟩	🟩
Usimamizi wa uzingatiaji bora wa matumizi ya ART katika jamii	🟩	🟨

Kielelezo

🟩 Wa Juu   🟨 Wa Kawaida

TATHMINI NA MAPENDEKEZO

Baada ya kufanya tathmini ya kiuchumi (Jedwali Namba1), kuimarisha ushirikishi wa vijana wanaotumia ART katika vikundi vya kijamii, ilionekana kuwa chaguo la kisera lenye gharama nafuu zaidi. Kwa kutumia senti 6 (dola za Marekani) kwa kila mtu, kuimarisha ushirikishi kwa vikundi vya kijamii kutasababisha takribani vijana 13,000 kuwa na wingi wa virusi chini ya nakala 1000/mililita kwa mwaka. Pia, ilibainika kuwa kuimarisha usimamizi wa matumizi ya ART katika vikundi ngazi ya jamii utasababisha takribani vijana 8,584 pekeee watakaokuwa na wingi wa virusi chini ya nakala 1000/mililita kwa mwaka

kwa gharama mara mbili zaidi kwa kila mtu ikilinganishwa na sera ya kuimarishwa ushirikishi wa vijana katika vikundi vya kusaidia vilivyopo vituo vya kutolea huduma ya afya. Kwa hivyo, tunapendekeza vikundi shirikishi vya kusaidia na kushauriana katika masuala ya huduma za VVU vilivyopo katika vituo vya kutolea huduma ya afya vidumishwe na kuimarishwa ili kuongeza idadi ya vijana watakaonufaika na huduma, kwa kuwa sera hii inatekelezeka na inaungwa mkono kisiasa na kiutendaji (Jedwali Namba 2).

HATUA ZINAZOFUATA

Kwa ajili ya utekelezaji wa chaguo la sera ya gharama nafuu, Serikali kupitia Wizara ya Afya inapaswa kutenga fedha, kuandaa vifaa vya mafunzo na kutekeleza programu za mafunzo ili kuwaelimisha watumishi wa afya kuhusu umuhimu wa kutekeleza sera hii ya kuimarisha ushiriki wa vijana katika vikundi shirikishi vya kijamii vya kusaidiana na kushauriana katika masuala ya huduma za VVU vilivyopo katika vituo vya kutolea huduma ya afya. Zaidi ya hayo, vikundi vya kijamii lazima viundwe kwa njia ambayo inavutia kwa vijana kuongeza ushiriki.

REFERENCES

1. Tanzania Health Impact Survey (THIS) 2017

2. UNAIDS Report 2022, Young People with HIV

3. (Grimwood A et al, 2012): Community adherence support improves programme retention in children on antiretroviral treatment: a multicentre cohort study in South Africa

4. Zachary Tabb, BS 2017; Association of Self-Reported Adherence and Antiretroviral Drug Concentrations in Hair Among Youth with Virologic Failure in Tanzania

5. Emma O'Halloran Leach 2021: Defining the optimal cut-point of self-reported ART adherence to achieve viral suppression in the era of contemporary HIV therapy: a cross-sectional study

6. Nicola Willis 2019; Effectiveness of community adolescent treatment supporters (CATS) interventions in improving linkage and retention in care, adherence to ART and psychosocial well-being: a randomized trial among adolescents living with HIV in rural Zimbabwe

7. Joia S. Mukherjee 2016; Community-Based ART Programs: Sustaining Adherence and Follow-up

8. Grimwood A, Fatti G, Mothibi E, Malahlela M, Shea J, Eley B 2012; Community adherence support improves programme retention in children on antiretroviral treatment: a multicentre cohort study in South Africa. J Int AIDS Soc.;15(2):17381. doi: 10.7448/IAS.15.2.17381. PMID: 22713255; PMCID: PMC3499784.