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MUSCULOSKELETAL (MSK) DISORDERS WITH ARTHRITIS SCREENING IN TANZANIA:

New insights into the growing clinical, economic and societal burden of non-communicable disease

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Integrated Disease Surveillance and Response (IDSR): Cumulative report for six months, January – June 2022 (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 2022, 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 will be assessed based on the new 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 84.0% for timeliness and 93.7% for completeness. Cumulatively, a total of 644,243 cases and 149 deaths were reported for all IDSR immediate reportable diseases and conditions. The most commonly reported condition was diarrhea account for 309,113 (48.0%%) of all cases and was reported from all 26 regions with high cases in major cities of Dodoma, Dar es Salaam and Arusha with 25,560 out of 309,113 (8.3%), 24,502 (7.9%) and 20,384 (6.6%) cases respectively. The months of January had the highest number of cases 213,921 (33.2%) out of 644,243. Of the 149 reported deaths, majority were caused by severe acute respiratory illness (SARI) (n=125, 83.9%). The condition with highest case fatality rate was suspected cases of cerebrospinal meningitis (CSM), 1 (50.0%) of 2 person with suspected CSM died.

Conclusion: Analysis of IDSR data for January to June 2022 (WHO week 1-26) showed that the performance based on timeliness to be low while completeness was high based on the new set national standard of ≥90%. The new set national standard of ≥90% indicates to 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 CSM, the Government need to improve preventive measures 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 report cumulative IDSR data for a period of six months of January to June 2022, that corresponds to WHO week 01 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 region. In order to allow timely response, the Government has changed the national standard to ≥ 90% for timeliness and completeness compared to the previous one of ≥ 80%.

ANALYSIS OUTCOME

Health Facility Performance

All 26 regions from 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 2022 was 84.0% and 93.7% respectively. The performance of completeness was above the set national standard of ≥ 90%. The Month of June had the highest scores for both timeliness (100.0%) and completeness (100.0%) 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 2022

Month	% of Completeness	% of Timeliness
January	95.4	86.5
February	87.5	74.1
March	100.0	90.0
April	85.7	69.1
May	93.4	84.5
June	100.0	100.0
Overall Performance	93.7	84.0

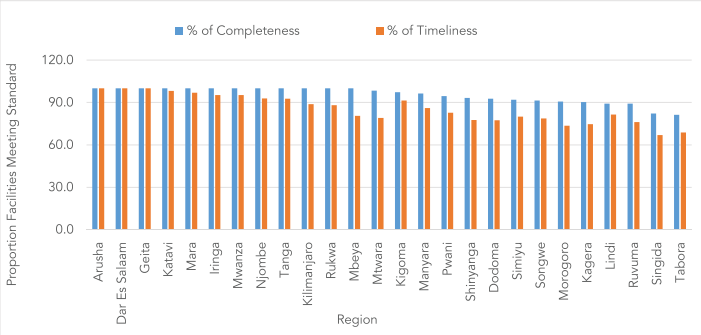

Figure 1: Timeliness and Completeness of Health Facility Reporting from the 26 regions, January – June, 2022

The overall timeliness and completeness of health facilities reporting by all 26 regions are presented in Figure 1. A total of 10 regions had the overall timeliness meeting the national target of ≥ 90% with highest being 100.0% from Arusha, Dar es Salaam and Geita regions and lowest was 67.0% from Singida region. All regions health facilities reporting for completeness met the national target of completeness ≥ 90% with exception of 4 regions namely Tabora, Singida, Ruvuma, and Lindi.

DISTRIBUTION OF CASES AND DEATHS

Total reported cases for all reportable diseases and conditions from January to June 2022 were 644,243 of which 309,113 (48.0%) were cases due to diarrhea diseases (Table 2). During the reporting period, there were a total of 149 deaths whereby majority 125 (83.9%) were due to SARI.

Table 2: Numbers of cases and deaths caused by reportable conditions, January - June 2022

Condition / Disease	Cases/Deaths	Total
Acute Flaccid Paralysis (AFP)	Cases	239
	Deaths	0
Animal Bites	Cases	14,277
	Deaths	0
Anthrax	Cases	12
	Deaths	1
Bloody Diarrhoea	Cases	24
	Deaths	0
Chickenpox	Cases	8
	Deaths	3
Cholera	Cases	445
	Deaths	8
Cerebrospinal Meningitis (CSM)	Cases	2
	Deaths	1
Diarrhoea	Cases	309,113
	Deaths	0
Severe Acute Respiratory Infection (SARI)	Cases	5,157
	Deaths	125
Measles	Cases	433
	Deaths	0
Pneumonia	Cases	271,462
	Deaths	0
Rabies	Cases	40
	Deaths	11
Trypanosomiasis	Cases	375
	Deaths	0
Typhoid	Cases	41,043
	Deaths	0
Yellow Fever	Cases	1,613
	Deaths	0
Total	Cases	644,243
	Deaths	149

Table 3: Number of cases and deaths caused by reportable conditions, by month, January – June 2022

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	3	0	1	0	12	0	38	0	43	0	142	0	239	0	0.0
Animal Bites	4,513	0	576	0	1,877	0	2,235	0	3,004	0	2,072	0	14,277	0	0.0
Anthrax	0	0	0	0	0	0	2	0	0	0	10	1	12	1	8.3
Bloody Diarrhea	15	0	2	0	5	0	2	0	0	0	0	0	24	0	0.0
Chickenpox	8	3	0	0	0	0	0	0	0	0	0	0	8	3	37.5
Cholera	69	3	32	0	22	0	95	0	123	1	104	4	445	8	1.8
CSM	1	1	0	0	1	0	0	0	0	0	0	0	2	1	50.0

Diarrhea	110,762	0	14,285	0	57,416	0	43,867	0	47,359	0	35,424	0	309,113	0	0.0
SARI	1,450	60	238	6	889	32	799	16	842	4	939	7	5,157	125	2.4
Measles	19	0	2	0	19	0	56	0	26	0	311	0	433	0	0.0
Pneumonia	80,160	0	11,556	0	60,279	0	44,315	0	44,554	0	30,598	0	271,462	0	0.0
Rabies	4	2	0	0	4	2	5	4	0	0	27	3	40	11	27.5
Trypanosomiasis	375	0	0	0	0	0	0	0	0	0	0	0	375	0	0.0
Typhoid	14,929	0	2,563	0	5,816	0	5,379	0	7,118	0	5,238	0	41,043	0	0.0
Yellow Fever	1,613	0	0	0	0	0	0	0	0	0	0	0	1,613	0	0.0
Total	213,921	69	29,255	6	126,340	34	96,793	20	103,069	5	74,865	15	644,243	149	

Table 3 provides the number of cases and deaths caused by immediate reportable conditions each month during January through June 2022. The month total cases varied from 29,255 in February to 213,921 in January. The condition with highest case fatality rate was suspected cases of cerebrospinal meningitis (CSM), 1 (50.0%) of 2 person with suspected CSM died.

Table 4: Number of reported cases of illnesses by region, January – June, 2022.

Region	AFP	Animal Bites	Anthrax	Bloody Diarrhoea	Chickenpox	Cholera	CSM	Diarrhoea	SARI	Measles	Pneumonia	Rabies	Trypanosomiasis	Typhoid	Yellow Fever	Total
ARUSHA	13	1,332	2	16	0	0	0	20,384	1,166	28	31,416	3	14	941	43	55,358
D'SALAAM	4	617	0	0	0	0	0	24,502	339	46	23,099	0	36	1,434	46	50,123
DODOMA	9	1,056	0	0	0	0	0	25,560	735	11	16,187	1	131	5,034	334	49,058
GEITA	7	393	0	0	0	0	0	11,045	0	17	6,023	0	0	947	34	18,466
IRINGA	4	598	0	1	0	0	0	6,187	355	20	7,799	1	0	1,022	27	16,014
KAGERA	11	385	0	0	0	0	0	9,115	0	30	7,484	0	1	1,096	46	18,168
KATAVI	2	147	0	0	0	197	0	4,499	0	2	2,208	1	0	326	6	7,388
KIGOMA	6	626	0	0	8	152	0	13,867	807	7	8,733	1	24	547	12	24,790
K'NJARO	11	632	4	1	0	0	0	7,683	0	17	16,805	1	6	1,268	41	26,469
LINDI	4	272	0	0	0	0	0	6,896	197	15	4,769	0	0	593	32	12,778
MANYARA	7	1,125	0	0	0	0	0	14,493	641	6	18,532	0	0	1,906	73	36,783
MARA	13	534	6	0	0	0	0	11,702	0	1	9,988	0	3	850	21	23,118
MBEYA	6	695	0	0	0	0	0	11,779	0	24	10,041	1	9	2,055	62	24,672
MOROGORO	11	775	0	0	0	0	0	14,094	0	22	14,976	0	20	5,576	185	35,659
MTWARA	19	271	0	0	0	0	2	8,831	134	50	6,094	26	9	232	0	15,668
MWANZA	25	615	0	0	0	0	0	17,910	403	20	12,073	0	45	1,635	37	32,763
NJOMBE	5	143	0	0	0	0	0	1,754	0	10	2,774	0	9	1,032	14	5,741
PWANI	8	508	0	0	0	0	0	8,338	22	6	6,669	1	36	328	16	15,932
RUKWA	6	453	0	1	0	96	0	14,670	26	3	8,968	1	9	1,259	54	25,546
RUVUMA	8	648	0	0	0	0	0	9,998	88	3	9,337	2	7	2,733	104	22,928
SHINYANGA	9	276	0	0	0	0	0	8,087	0	10	5,814	0	0	849	8	15,053
SIMIYU	6	349	0	0	0	0	0	10,174	0	30	6,205	0	1	979	39	17,783
SINGIDA	6	391	0	3	0	0	0	11,678	0	20	5,014	0	15	1,377	84	18,588
SONGWE	2	313	0	2	0	0	0	9,465	0	0	5,295	0	0	4,786	244	20,107
TABORA	17	398	0	0	0	0	0	9,443	244	17	7,366	1	0	1,765	42	19,293
TANGA	20	725	0	0	0	0	0	16,959	0	18	17,793	0	0	473	9	35,997
Total	239	14,277	12	24	8	445	2	309,113	5,157	433	271,462	40	375	41,043	1,613	644,243

During the 6 months beginning January 2022, a total of 644,243 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 and Arusha with 25,560 out of 309,113 (8.3%), 24,502 (7.9%) and 20,384 (6.6%) cases respectively (Table 4).

CONCLUSION

The IDSR analyzed data for January to June 2022 (WHO week 1-26) showed that the performance based on timeliness was low and completeness was high based on the new set national standard of ≥90%. The new set national standard of ≥90% indicates to 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 CSM, the Government need to improve preventive measures 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 2022 (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 ya Januari hadi Juni 2022 ambapo ni 1-26 za Shirka la Afya Dunia (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 84.0 kwa wakati unaofaa (ufanisi) (kwa mfano, asilimia ya wilaya zinazoripoti kwa wakati kwa ngazi ya kitaifa) na asilimia 93.7 kwa ukamilifu (yaani, asilimia ya wilaya zinazotoa ripoti kamili kwa ngazi ya kitaifa). Katika kipindi cha miezi 6, jumla ya visa 644,243 na vifo 149 viliripotiwa kwa magonjwa yote IDSR.

Ugonjwa ulioripotiwa zaidi ni kuhara (n = 309,113, asilimia 48.0) kati ya visa vilivyoripotiwa kutoka mikoa yote ambapo majiji yalikuwa na visa vingi hii ni Dodoma visa 25,560 kati ya 309,113 (asilimia 8.3), Dar es Salaam visa 24,502 (asilimia 7.9) na Arusha visa 20,384 (asilimia 6.6). Mwezii wa Januari ilikuwa na visa vingi, visa 213,921 kati ya 644,243(asilimia 33.2). Kati ya vifo 58 vilivyoripotiwa, visa vingi vilisababishwa na maabukizi makali ya njia ya kupumua (Severe Acute Respiratory Infection, SARI) (n = 125, asilimia 83.9). Ugonjwa uliokuwa na kiwango cha juu cha vifo ilikuwa ni homa ya uti wa mgongo (cerebrospinal meningitis, CSM). Kati ya visa 2 vilivyoshukiwa kuwa na ugonjwa wa homa ya uti wa mgongo, 1 alikufa (CFR = asilimia 50.0).

Hitimisho: Uchambuzi wa data ya IDSR ya Januari hadi Juni 2022 (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 la 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 CSM, Serikali inahitaji kuboresha hatua za kinga na matibabu kwa visa vinavyotokea.

Musculoskeletal (MSK) disorders with arthritis screening in Tanzania: New insights into the growing clinical, economic and societal burden of non-communicable disease

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Figure 1: Those with musculoskeletal disorders in their elbow joint (left), knee (centre) and fingers (right)

KEY MESSAGES

- Musculoskeletal (MSK) disorders represent a significant global disability burden which the World Health Organisation expect will increase in coming years
- Tanzania's Strategic Plan for tackling non-communicable diseases (NCDs) does not currently include MSK disorders, yet they pose a significant health and economic burden to Tanzanian society
- Arthritis is common, but very few people receive a formal diagnosis and even fewer are treated; this lack of prevention and treatment in Tanzania can lead to avoidable lifelong deformity, disability and detrimental economic impacts for those affected.
- The Tanzanian Government should consider MSK disorders as part of the growing NCD burden in Tanzania. We recommend the following: -
  - Increasing awareness of MSK health within communities
  - Improving awareness of MSK disorders and skills training at primary healthcare facilities
  - Investing in a clinical capacity for diagnosing and managing MSK disorders
  - Developing guidelines for referral pathways and treatment for many forms of arthritis in Tanzania

PROBLEM STATEMENT

The World Health Organisation has recognised that good musculoskeletal (MSK) health is critical for people's ability to work and participate in all parts of society [1]. Globally, MSK conditions (including arthritis) are the second leading cause of disability, causing 21.3% of total years lived with disability [1]. The burden is increasing worldwide, with the World Health Organization predicting a substantial increase in MSK disorders within Low- and Middle-Income Countries (LMICs) over the coming decades [1].

Most health research on the African continent has focused on infectious diseases; however, the continent is facing a rapid rise of people developing non-communicable diseases (NCDs). The rising prevalence of NCDs in LMICs has been matched by growing attention in the international and national policy arena [2]. Internationally, however, discussions concerning NCDs in LMICs have primarily prioritised four NCDs conditions (cardiovascular disease, cancer, chronic respiratory disease and diabetes) and their associated behavioural risk factors [3,2]. Mirroring this international focus, Tanzania's "Strategic Plan and Action Plan for the Prevention and Control of Non-Communicable Diseases in Tanzania (2016-2020)" does not include analysis of, or planning for, MSK disorders generally or arthritis specifically. The lack of analysis and planning for MSK disorders at international and national scales is disproportionate to the vast disability burden such disorders cause.

MSK disorders' impacts are significant for individuals and society [1]. The pain and decreased mobility caused by MSK disorders restrict people from participating in a range of activities [1, 4], with a recent study in northern Tanzania finding that those with an MSK disorder had a substantially reduced Quality of Life [5]. A significant economic burden was also found, with those with MSK disorders experiencing decreased productivity - missing on average two days per work per month – coupled with two to three times higher healthcare expenditure than their non-arthritic counterparts [5, 1]. In line with current global evidence, community screening in Hai found that women and older adults are more likely to experience MSK disorders [6, 1] and found arthritis to be underdiagnosed in clinical settings [7].

Global trends [1] and greater insight into the impacts of MSK in Tanzania [4,5,6,7,8], demonstrate the importance of paying increasing attention to MSK disorders within policy, health settings and communities together with increasing the clinical capacity for managing MSK disorders within Tanzania. A detailed survey of over 2,500 households with clinical screening was conducted in the Hai District, providing new insights into the prevalence of MSK disorders in the community setting, the economic impact of MSK disorders and the many ways it impacts peoples' quality of life.

- Of the screened participants, 1 in 17 (5.9%) had confirmed joint problems, and 1 in 20 (5%) had generative 'wear and tear' arthritis, most commonly involving knees, fingers, hips and lower back with associated pain and restriction in movement.
- MSK disorders negatively impact people's ability to work and participate in all aspects of society: this research calculated that the quality of life of those with MSK disorders is reduced by 25% compared to those without MSK disorders.
- Participants with MSK disorders had 2-3 times higher health care costs than those without MSK disorders.
- Relatively simple and easy to learn assessments such as gait, arms, legs and spine (GALS) and regional examination of the *musculoskeletal* system (REMS) can detect arthritis and MSK issues and are suitable for primary care level training.

POLICY OPTIONS

Consider MSK disorders as part of the growing NCDs burden in Tanzania.

Rationale: Within the global arena, MSK is frequently overlooked in NCD considerations; Tanzania could play a world-leading role by including MSK in discussions, prioritisation and budgeting of the NCD burdens by highlighting not only the clinical and quality of life burden but the associated economic burden. Given the anticipated global rise of NCDs, this would place Tanzania in a strategically advantageous position to handle this growing burden.

Implementation Route: NCD Unit within the Ministry of Health could include MSK under their remit, increasing the required political attention.

Increasing awareness of MSK health within communities

Rationale: Some arthritis is preventable through lifestyle choices, physical exercise and diet management, while these measures often also help reduce the impact of arthritis when present. Increasing awareness within communities in culturally appropriate ways can help reduce the burden.

Implementation Route: Working with primary health care facility, duka la dawa's and key community leaders could increase awareness of MSK appropriately for different populations through materials such as flyers or posters.

Improving awareness of MSK disorders and skills training at primary healthcare facilities

Rationale: MSK disorders are currently underdiagnosed; improving awareness at primary healthcare facilities (what, for many patients, will be their first port of call) is vital for improving the overall management of MSK conditions.

Implementation Route: Working with professional councils and primary care professionals to devise and deliver training in primary care settings. While financing may be an issue, partner funding from development organisations could assist. Furthermore, a 'train-the-trainer' model could work to ensure sustainability. Working with Medical Schools could also embed MSK within the national curriculum.

Investing in a clinical capacity for diagnosing and managing MSK disorders

Rationale: Quick and relatively simple and easy to learn clinical assessments such as gait, arms, legs and spine (GALS) and regional examination of the musculoskeletal system (REMS) can detect arthritis and MSK issues and be easily used at the primary care level after suitable training. This could ensure more people receive an adequate diagnosis and, in-turn improved management.

Implementation Route: A Tanzanian-led training video is currently in production; this could be a vital tool for GALS and REMS training. The Ministry of Health could disseminate this widely through social- and traditional-media and via CPD Offices to ensure the resource is known to crucial change makers and practitioners.

Developing guidelines for referral pathways and treatment for many forms of arthritis in Tanzania

Rationale: As well as painkillers and steroids, there are disease-modifying treatments for rheumatoid arthritis and related conditions which can stop the condition's progression before deformities occur. While the newer disease-modifying agents are costly, the older ones are less so and would potentially be affordable. These could prevent lifelong deformity and disability.

Implementation Route: Constructing guidelines and protocols for care treatments at different levels could happen by bringing together a range of stakeholders, including Professional Associations, Policy and Planning within the Medical Stores Department, Tanzanian Medicines and Medical Devices Authority; Standard Treatment Guidelines, and the NCD Unit. While this would take significant coordination, a focal point champion could coordinate. The National Council or Technical and Vocational Education and Training, Tanzanian Commission for Universities and Professional Councils could provide training on the protocol to ensure implementation.

POLICY RECOMMENDATIONS

The following recommendations will likely improve diagnosis and reduce the burden of MSK in Tanzania:

- Increasing awareness of MSK disorders within communities, health settings and the policy arena in Tanzania.
- Expanding training in clinical skills using simple methods such as gait, arms, legs and spine (GALS) and regional examinations of the *musculoskeletal* system (REMS) among healthcare providers.
- Developing referral pathways and treatment protocols in Tanzania could reduce the disability burden, improve the quality of life and increase the economic activity of those with MSK by improving access to painkillers and steroids and preventing the condition's progression before deformities occur through disease modifying treatments.
- Investing in the clinical capacity for diagnosing and managing MSK disorders by introducing the simple GALS and REMS examination method in training curriculum.
- Some MSK problems are preventable through lifestyle choices such as exercise and diet; disseminating information on promoting good MSK health to communities could reduce the burden of MSK

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Ugonjwa wa misuli na mifupa (Musculoskeletal, MSK) na uchunguzi wa maumivu kwenye maungio ya mifupa, (yabisi) (arthritis) nchini Tanzania: Mtazamo mpya juu ya ongezeko kubwa kiafya, kiuchumi na kijamii wa magonjwa yasiyoambukiza.

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Kielelezo 1: Wale wenye matatizo misuli na mifupa kwenye kiwiko cha mkono (kushoto), goti (katikati) na vidole (kulia)

UJUMBE MUHIMU

- Matatizo ya mfumo wa Misuli na Mifupa (Musculoskeletal (MSK) disorders) ni ugonjwa unaochangia sehemu kubwa ya tatizo la hali ya ulemavu duniani kote ambapo Shirika la Afya Ulimwenguni linatarajia utaongezeka katika miaka ijayo.
- Mpango Mkakati wa Tanzania wa kukabiliana na magonjwa yasiyo ya kuambukiza (NCDs) kwa sasa haujumuishi matatizo ya Misuli na Mifupa, licha ya kuwa yanasababisha tatizo kubwa la kiafya na kiuchumi kwa jamii ya Kitanzania.
- Ugonjwa wa Yabisi (arthritis) ni ugonjwa unaofahamika, lakini watu wachache sana hupata huduma ya uchunguzi wa kitalaamu na hata wachache hupatiwa matibabu; hivyo, ukosefu wa matibabu na kinga unaweza kusababisha ulemavu wa kudumu unaoweza kuepukika na athari mbaya za kiuchumi kwa wale walioathirika.
- Serikali ya Tanzania inapaswa kuzingatia matatizo ya MSK kama sehemu ya tatizo kubwa la magonjywa yasiyoambukiza (NCDs) linaloongezeka nchini Tanzania.Tunapendekeza yafuatayo: -
  - Kuongeza ufahamu wa afya ya MSK katika jamii
  - Kuboresha ufahamu wa matatizo ya MSK na mafunzo ya ujuzi katika vituo vya afya ya msingi
  - Kuwekeza katika uwezo wa uchunguzi kutambua na kutibu matatizo ya MSK
  - Kuandaa miongozo kwa ajili ya rufaa na matibabu ya aina mbalimbali za ugonjwa wa Yabisi nchini Tanzania

TAARIFA ZA CHIMBUKO LA TATIZO

Shirika la Afya Ulimwenguni limetambua afya nzuri ya Misuli na Mifupa (musculoskeletal, MSK) kuwa ni muhimu ili kuwezesha watu kufanya kazi na kushiriki katika shughuli zote za jamii [1]. Ulimwenguni, hali za MSK (ikiwa ni pamoja na ugonjwa wa yabisi) ni chanzo cha pili kinachoongoza kusababisha ulemavu, unaosababisha asilimia 21.3 ya jumla ya miaka ya kuishi na ulemavu [1]. Ukubwa wa tatizo unaongezeka duniani kote, huku Shirika la Afya Ulimwenguni likitabiri ongezeko kubwa la matatizo ya MSK katika Nchi za Kipato cha Chini na Kati (LMICs) katika miongo ijayo [1].

Utafiti mwingi wa afya katika bara la Afrika umezingatia magonjwa ya kuambukiza; hata hivyo, bara hili linakabiliwa na ongezeko la kasi la watu wanaougua magonjwa yasiyo ya kuambukiza (NCDs). Kuongezeka kwa ukubwa wa matatizo ya NCDs katika LMICs kumehusishwa na kuongezeka kwa umakini katika nyanja ya sera ya kimataifa na kitaifa [2]. Kimataifa, hata hivyo, majadiliano kuhusu NCDs katika LMICs kimsingi yameweka kipaumbele kwa aina nne za NCDs (ugonjwa wa moyo na mishipa, saratani, ugonjwa sugu wa kupumua na ugonjwa wa kisukari) ikiwa ni pamoja na tabia zinazosababisha hatari zaidi [3,2]. Kwa kuakisi mtazamo huu wa kimataifa, "Mpango Mkakati na Mpango Kazi wa Tanzania wa Kuzuia na Kudhibiti Magonjwa Yasiyo ya Kuambukiza Tanzania (2016-2020)" haujumuishi uchanganuzi wa, wala kupanga juu ya matatizo ya MSK kwa ujumla au hususani ugonjwa wa Yabisi. Ukosefu wa uchambuzi na upangaji wa matatizo ya MSK katika viwango vya kimataifa na kitaifa haulingani na ukubwa mkubwa wa tatizo la ulemavu unaosababishwa na matatizo ya MSK.

Athari za matatizo ya MSK zina madhara makubwa kwa watu binafsi na jamii [1]. Maumivu na kupungua kwa uwezo wa kuhama toka sehemu moja kwenda nyingine kunakosababishwa na matatizo ya MSK huwazuia watu kushiriki katika shughuli mbalimbali [1, 4], na kwa utafiti uliofanyika hivi karibuni Kaskazini mwa Tanzania uligundua kuwa wale walio na ugonjwa wa MSK walikuwa na upungufu mkubwa wa Ubora wa Maisha [5]. Matatizo makubwa ya kiuchumi pia yaligundulika kuambatana na wale walio na matatizo ya MSK wakipata kupungua kwa tija katika shughuli za uzalishaji – kukosa wastani wa siku mbili kwa kazi kwa mwezi – ikijumuisha na gharama za juu za matumizi ya huduma za afya ikiwa ni mara mbili hadi tatu zaidi kuliko wenzao wasio kuwa na ugonjwa wa Yabisi [5, 1]. Kwa mujibu wa taarifa za sasa kimataifa, uchunguzi wa jamii huko Hai uligundua kuwa wanawake na watu wazima wazee wana uwezekano mkubwa wa kupata matatizo ya MSK [6, 1] na iligundulika kuwa uchunguzi wa ugonjwa wa Yabisi hufanyika kwa kiwango cha chini katika vituo vya kutolea huduma ya afya [7].

Mtiririko wa kimataifa [1] na ufahamu zaidi juu ya athari za MSK nchini Tanzania [4,5,6,7,8], zinaonyesha umuhimu wa kuongeza umakini juu ya matatizo ya MSK ndani ya sera, mipangilio ya afya na jamii pamoja na kuongeza uwezo wa uchunguzi kwa ajili ya kutibu matatizo ya MSK ndani ya Tanzania. Utafiti wa kina wa zaidi ya kaya 2,500 zilifanyiwa uchunguzi katika Wilaya ya Hai, na kutoa mwanga kuhusu kuenea kwa matatizo ya MSK katika jamii; athari za kiuchumi zitokanazo na MSK pamoja na jinsi unavyoathiri ubora wa maisha ya watu.

- Kati ya washiriki waliofanyiwa uchunguzi, 1 kati ya 7 (asilimia 5.9) alikuwa amethibitisha matatizo ya viungo, na 1 kati ya 20 (asilimia 5) alikuwa na ugonjwa wa Yabisi, ambao mara nyingi ulihusisha magoti, vidole, nyonga na sehemu ya chini ya mgongo yanayojumuisha maumivu na kufanya ugumu wa kutembea.
- Matatizo ya Misuli na Mifupa (MSK) huathiri vibaya uwezo wa watu kufanya kazi na kushiriki katika nyanja zote za jamii: utafiti huu ulikadiria kwamba ubora wa maisha ya wale walio na matatizo ya MSK umepunguzwa kwa asilimia 25 ikilinganishwa na wale wasio na matatizo ya MSK.
- Washiriki waliokuwa na matatizo ya MSK walikuwa na gharama kubwa ya huduma ya afya mara 2-3 zaidi kuliko wale wasio na matatizo ya MSK.
- Kwa kutumia njia rahisi na nyepesi kujifunza kwa kuchunguza kama vile mwendo (tembeaji/kutembea), mikono, miguu na uti wa mgongo (GALS) na kufanya uchunguzi katika maeneo ya mfumo wa Misuli na Mifupa (REMS) inaweza kugundua magonjwa ya Yabisi (maumivu ya viungo vya mifupa) na MSK ambayo inafaa kwa mafunzo kwa ngazi ya huduma ya msingi.

MAONI KISERA

Zingatia matatizo ya MSK kama sehemu ya tatizo kubwa la NCDs linalongezeka nchini Tanzania.

Mantiki: Katika nyanja ya kimataifa, mara nyingi MSK haionekani kupewa kipaumbele katika masuala ya NCD. Tanzania inaweza kuwa na nafasi kubwa duniani kwa kujumuisha MSK katika majadiliano, kuweka vipaumbele na kupanga bajeti kwa ajili ya kushughulikia matatizo ya NCD kwa kuangalia sio tu ukubwa wake kiafya na ubora wa maisha bali athari zitokanazo na ukubwa wa tatizo kiuchumi. Kwa kuzingatia ongezeko la kimataifa la magonjwa yasiyoambukiza, hii ingeiweka Tanzania katika nafasi nzuri ya kimkakati ya kushughulikia tatizo hili linaloongezeka.

Njia ya Utekelezaji: Kitengo cha NCD ndani ya Wizara ya Afya kinaweza kujumuisha MSK katika kulisemea sehemu mbalimbali na kuongeza uelewa wa tatizo katika nyanja za kisiasa.

Kuongeza ufahamu wa afya ya MSK katika jamii

Mantiki: Baadhi ya ugonjwa wa yabisi unaweza kuzuilika kupitia uchaguzi wa mtindo wa maisha, mazoezi ya viungo na udhibiti wa lishe, ilhali hatua hizi mara nyingi husaidia kupunguza athari za ugonjwa wa yabisi wakati zikitekelezwa. Kuongeza ufahamu katika jamii kwa kutumia njia zisizoathiri utamaduni wa kitanzania zinaweza kusaidia kupunguza ukubwa wa tatizo.

Njia ya Utekelezaji: Kufanya kazi na vituo vya kutolea huduma ya afya ya msingi, maduka ya dawa na viongozi maarufu katika jamii kunaweza kuongeza ufahamu wa MSK ipasavyo kwa makundi mbalimbali kupitia nyenzo kama vile vipeperushi au mabango.

Kuboresha ufahamu wa matatizo ya MSK na mafunzo ya ujuzi katika vituo vya afya ya msingi

Mantiki: Matatizo ya MSK kwa sasa yanatambuliwa kiuchunguzi kwa hali ya chini; kwa hiyo kuboresha ufahamu wa wafanyakazi katika vituo vya huduma ya afya ya msingi (ambapo wagonjwa wengi huhudhuria ili kupata huduma ya afya kwa mara ya kwanza) ni muhimu kwa kuboresha matibabu ya MSK kwa jumla.

Njia ya Utekelezaji: Kufanya kazi na mabaraza ya kitaaluma na wataalamu wa huduma ya msingi ili kubuni na kutoa mafunzo katika sehemu zinazotoa huduma ya msingi. Ingawa suala la ufadhili linaweza kuwa tatizo, ufadhili wa washirika kutoka kwa mashirika ya maendeleo mbalimbali unaweza kusaidia. Zaidi ya hayo, mtindo wa kufundisha wakufunzi "train-the-trainer" unaweza kufanya kazi ili kuhakikisha uendelevu. Kufanya kazi na Vyuo vya mafunzo vya Utabibu kunaweza pia kuongeza suala la MSK katika mtaala wa kitaifa.

Kuwekeza katika uwezo wa uchunguzi kutambua na kutibu matatizo ya MSK

Mantiki: Njia ya haraka, rahisi na nyepesi ya kujifunza kuchunguza ni njia ya kutathmini hali ya kiafya kama vile kutembea, mikono, miguu na mgongo (GALS) na uchunguzi wa katika maeneo ya mfumo wa misuli na mifupa (REMS) unaweza kugundua magonjwa ya yabisi na MSK. Uchunguzi wa aina hii unaweza kutumika kwa urahisi katika ngazi ya vituo vya huduma ya afya ya msingi baada ya kupatiwa mafunzo sitahiki. Hii inaweza kuhakikisha watu wengi zaidi wanapata uchunguzi wa kutosha na, kwa upande mwingine kuboresha matibabu.

Njia ya Utekelezaji: Video yenye mafunzo iliyotayarishwa katika mfumo wa Kitanzania kwa sasa inazalishwa; hii inaweza kuwa zana muhimu kwa mafunzo ya GALS na REMS. Wizara ya Afya inaweza kusambaza hii video kwa upana zaidi kupitia mitandao ya kijamii na njia zingine za mawasiliano na kupitia Ofisi za mafunzo endelevu (CPD) ili kuhakikisha kuwa mafunzo haya yanajulikana kwa wanaharakati wanaopenda mabadiliko na kwa watumishi wengine wa afya.

Kuandaa miongozo kwa ajili ya rufaa na matibabu ya aina mbalimbali za ugonjwa wa Yabisi nchini Tanzania

Mantiki: Pamoja na dawa za kutuliza maumivu na steroidi, kuna matibabu ya kurekebisha ugonjwa wa Yabisi baridi na hali zinazofanana na hizo ambazo zinaweza kuzuia kuendelea kwa hali kabla ya ulemavu kutokea. Ingawa matibabu ya kisasa kurekebisha magonjwa ni gharama kubwa, hata hivyo matibabu ya zamani gharama yake ni ndogo na inawezakana kuzimudu. Hizi zinaweza kuzuia ulemavu wa maisha.

Njia ya Utekelezaji: Kuunda miongozo na itifaki za matibabu katika ngazi mbalimbali kunaweza kuwaleta pamoja wadau mbalimbali, wakiwemo Vyama vya Kitaalamu, Sera na Mipango ndani ya Idara ya Bohari ya Dawa, Mamlaka ya Dawa na Vifaa vya Tiba Tanzania; Miongozo ya Matibabu, na Kitengo cha NCD. Ingawa hii inaweza kuhitaji uratibu maalum, na hivyo kuwepo kwa mtu maalumu wa kuratibu. Baraza la Taifa au Elimu na Mafunzo ya Ufundi, Tume ya Vyuo Vikuu na Mabaraza ya Taaluma Tanzania inaweza kutoa mafunzo kuhusu itifaki ili kuhakikisha utekelezaji.

MAPENDEKEZO YA SERA

Mapendekezo yafuatayo yataboresha utambuzi na kupunguza tatizo la MSK nchini Tanzania:

- Kuongeza ufahamu wa matatizo ya MSK ndani ya jamii, mazingira ya afya na nyanja ya sera nchini Tanzania.
- Kupanua mafunzo ya ujuzi wa kimatibabu kwa kutumia mbinu rahisi za kutambua ugonjwa kwa kuchunguza kama vile jinsi ya kutembea, mikono, miguu na uti wa mgongo (gait, arms, legs and spine, GALS) na uchunguzi wa maeneo yanayohusisha mfumo wa MSK (regional examinations of the musculoskeletal system, REMS) miongoni mwa watoa huduma za afya.
- Kuanzisha njia za rufaa na itifaki za matibabu nchini Tanzania kunaweza kupunguza ukubwa wa tatitzo la ulemavu na kuboresha ubora wa Maisha na kuongeza shughuli za kiuchumi kwa wale walio na matatizo ya MSK kwa kuboresha upatikanaji wa dawa za kutuliza maumivu na steroidi na kuzuia kuendelea kwa hali hiyo kabla ya ulemavu kutokea kupitia matibabu ya kurekebisha magonjwa.
- Kuwekeza katika uwezo wa kimatibabu wa kutambua na kutibu matatizo ya MSK kwa kuanzisha mbinu rahisi za uchunguzi kutumia njia ya GALS na REIMS katika mtaala

wa mafunzo.

» Baadhi ya matatizo ya MSK yanaweza kuzuilika kupitia uchaguzi wa mtindo wa maisha kama vile mazoezi na lishe; kusambaza taarifa za kukuza afya bora juu MSK kwa jamii kunaweza kupunguza tatizo la MSK

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Evaluation of the Acute Flaccid Paralysis Surveillance System in Tanzania, 2020

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ABSTRACT

Background: Poliomyelitis is a highly contagious viral infection caused by wild poliovirus (WPV). It is transmitted from one person to another through contaminated fecal matter via oral route. Majority of infections are subclinical (>90%), while the rest present with a self-limiting illness of fever, myalgia, malaise, sore throat, and headache. The paralytic disease is the least common presentation accounting for 1 per 1000 cases among infants and 1 per 100 cases among adolescents. Acute flaccid paralysis surveillance (AFP) is an essential strategy of the WHO's Polio Eradication Initiative.

Objectives: Evaluation of AFP surveillance system in Tanzania for the year 2020 to find out whether it meets the set objectives.

Methods: Review of secondary data collected during routine health services delivery from January to December 2020. All reported AFP cases from all the 26 administrative regions of the mainland Tanzania and 4 regions from

Zanzibar islands were included in this study. Descriptive analysis was conducted to describe the epidemiology of AFP in Tanzania and generate statistics based on the standard WHO-specified performance indicators.
Results: A total of 897 cases of AFP were reported from 191 districts out of 195 during the study period, an annual incidence is 2.9/100,000 children <15 years. Suspected poliovirus cases (n = 5, 0.6%), Non-Polio Enterovirus (NPENT) (n = 56, 6.2%), negative cases (n = 769, 85.7%) and missing results (n = 67, 7.5%) cases. Children under five years is the age group with the most reported cases (n = 500, 55.7%), followed by 5-9 years (n = 286, 31.9%). Majority of male children (n = 479, 53.4%) were affected as compared to their counterpart females.
Conclusions: The system met its objective of actively surveying for WPV through reporting and laboratory testing of all AFP cases among children <15 years annually. Despite meeting its objectives, there is a room for the MoH to improve the operation in area of representativeness by setting a national local indicator for districts considering low population (less than 100,000 children under 15 years) apart from the WHO pre-set indicator (number of cases per 100,000 children under 15 years). Also, the MoH should improve the issue of data completeness and timeliness especially on time for specimen transportation. In addition, the MoH should conduct vaccination campaigns continuously to under five year's children against poliovirus to prevent potential polio outbreaks as well as conducting operational researches in districts with high and underreporting AFP cases to find out the causes.
Key words: Evaluation, AFP, Tanzania, 2020

INTRODUCTION

Poliomyelitis is a highly contagious viral infection caused by Wild Poliovirus (WPV), and is transmitted from one person to another through contaminated faecal matter via oral route [1]. Majority of infections are subclinical (>90%), while the rest present with a self-limited illness of fever, myalgia, malaise, sore throat and headache (abortive polio) or aseptic meningitis (I.e., non-paralytic polio) [3]etiology, distribution, and surveillance performance of AFP in Iraq.

Methods: Surveillance data about the AFP cases under the age of 15 years reported from Iraq during January 1997 to December 2011 were depended in the current study.Results: A total of 4974 cases of AFP were reported from Iraq during the study period, with an annual incidence of 2.5/100,000 population. Guillain-Barre´ syndrome represented more than half of the reported cases (N = 2611, 52.5%. The paralytic disease is by far the least common presentation, accounting for 1 per 1000 cases among infants and 1 per 100 cases among adolescents. Polioviruses are of three related serotypes enteroviruses, types 1, 2 and 3 in which type 1 causes epidemic polio, types 2 and 3 are the main cause of vaccine associated paralysis. Circulating enterovirus type 2 has not been isolated since October, 1999 [1,2,3].

In May 1988, the World Health Organization (WHO) hosted the 41st World Health Assembly meeting which resulted into adoption of resolution on global eradication of poliomyelitis by the year 2000 (WHA.41.28). The Global Polio Eradication Initiative (GPEI) included four principal strategies: (1) Immunize infants at high rates with four doses of oral polio vaccine (OPV) in the first year of life in developing and endemic countries, and immunize routinely with OPV and/or inactivated polio vaccine (IPV) elsewhere; (2) Organize "National Immunization Days" to provide supplementary doses of OPV to all children less than five years of age; (3) Actively survey for WPV through reporting and laboratory testing of all AFP cases among children <15 years of age; (4) Target "mop-up" campaigns once WPV transmission is limited to specific focal areas [4,5].

Implementation of Polio eradication strategies in the African Region began in the mid-1990s. African Heads of States and Government at the 32nd Organization of African Unity (OAU) meeting in Yaounde Cameroon in July 1996 adopted the Yaounde Declaration on Polio Eradication in Africa (AHG/Decl.1 (xxxii) [6].

Tanzania is implementing polio eradication activities nationwide through the Immunization and Vaccine Development (IVD) program under the Department of Preventive Services – Ministry of Health (MoH). According to the assessment for the burden of polio disease in 1992, which was conducted national widely, showed polio to be of Public Health Importance [7] .

Tanzania and other countries remain at risk of poliovirus importation from polio endemic countries like Pakistan due to interlink through international trade and travel. For this reason, it is important that sensitive AFP surveillance meet the performance indicators set by WHO to detect any polio case early and before outbreaks can develop. However, poliovirus could be prevented if more than 90% of people in the community are vaccinated. Therefore, a study aiming at evaluation of the AFP surveillance in Tanzania for the year 2020 was conducted to find out whether it meets the set objectives by establishing the AFP surveillance system performance, its attributes, and source areas all over the country and determining the mostly affected population in terms of age group and sex.

OBJECTIVE AND OPERATIONS OF THE AFP SURVEILLANCE SYSTEM

Main objective of the AFP surveillance system is to adhere to the Global Polio Eradication Initiatives (GPEI) especially in the principle that says; actively survey for WPV through reporting and laboratory testing of all AFP cases among children <15 years of age.

Specific objectives of the AFP surveillance system are:

1. To maintain polio free status of the country as it has been achieved in 2015.
2. Collaborate with global societies in achieving polio end game goal at 2028.
3. Submit annual document report to the WHO on polio status of the country.

Stakeholders' Description

AFP surveillance system stakeholders are persons and or organizations that utilizes and/or contribute to the data collected via the AFP surveillance system. These include the Government of Tanzania through the Ministry of Health (MoH) & Presidents Office Regional Administration and Local Governments (PORALG). Other stakeholders are WHO, UNICEF, and all staff in the health system political leaders, village leaders, community health workers, and the general public.

Population under AFP Surveillance

Population under AFP surveillance system are children aged below 15 years.

AFP Case Definition

AFP case definition states "Any child under 15 years of age with acute (sudden onset) flaccid paralysis (weakness of the limb – arm, leg or both), or any person of any age when paralytic illness if Polio is suspected by a clinician"

Flow of Information

The AFP surveillance system in Tanzania, is mainly case based system whose data flow depends mainly on case detection. Active case search is also done periodically in accordance with the health authority's set plans of a given district or health facility. Cases from all health facilities are notified to their respective districts and Regional levels then to the IVD programme at national level. Stool specimen collected from the notified AFP cases for investigation and their respective case investigation forms, case notes, and a copy of case vaccination cards if any are forwarded to the IVD programme for logistics such as Epid number prior to transportation to the reference WHO accredited laboratory for WPV isolation and analysis. For Tanzania cases, the reference laboratory is – the Uganda Virus Research Institute (UVRI). An adequately investigated AFP case requires the collection of two-stool specimens 8 – 10 grams, about the size of two adult thumbnails from the AFP case within 14 days of onset of paralysis. The stool samples are collected 24-48 hours apart, transported on ice parks and should arrive at IVD programme – Mabibo Dar es Salaam within 72 hours of collection and from IVD to laboratory within 72 hours.

AFP Data Structure

AFP case investigation form (CIF) is the tool used to collect data on each case of AFP. The form enables the collection of personal data on the case that will allow for the case tracing, as well as data on the clinical presentation, and risk factors for polio. All data fields must be filled during the initial investigation and 60 days follow-up. AFP surveillance data is on paper and electronic based system.

Sixty-Day Follow-up

Approximately 60 days, i.e., 8-9 weeks, following the onset of paralysis, all surviving patients must be re-examined for residual paralysis. The importance of this re-visit is even greater for cases with inadequate stool specimen, whose laboratory results are negative. The presence of residual paralysis at this time is further evidence that the cause of paralysis is most likely poliovirus. It is preferable that re-examination be conducted by the same person who conducted the first investigation of the cases (filled out the case investigation form).

Situation that can be expected, during the 60-day follow up visit:

1. Weakness or residual paralysis: 60 days after date of onset, paralysis persists (no improvement or slight improvement)
2. No residual paralysis: 60 days after date of onset, paralysis has receded, the limb recovers all functions
3. Lost follow up: case missing for whatever reason
4. Cases deceased

AFP Case Classification

The National Polio Expert Committee (NPEC) is a group of independent technicians, working closely with the Expanded Programme on Immunization (EPI) team at country level. The NPEC is comprised of leading scientists/senior physicians/ academics, independent of polio initiative and EPI. Their role includes determining the final classification of all AFP cases and assessing, verifying (field visit if deemed necessary) the certification documentation prepared by national staff. Three or 5 members are required in the NPEC supported by 2 or 3 persons from the secretariat (including WHO, Laboratory and EPI personnel).

In Tanzania, the NPEC conducts final classification of AFP cases meet regularly to review the cases. Within 90 days of onset of paralysis, all suspected cases are classified as confirmed polio, polio-compatible or discarded (i.e., non-polio) by the NPEC.

Given that the laboratory has isolated cases in which wild poliovirus are automatically confirmed, only case with inadequate specimen are reviewed by the NPEC. So, NPEC does not need

to classify all cases but should concentrate on detailed review of those cases that are 'difficult to classify' because of limited available data with the goal to either discard them or classify them as 'polio-compatible'.

Every case that is classified as polio-compatible should have an explanatory note, e.g., Inadequate specimens and no follow up or death child can be classified as compatible because of zero evidence versus inadequate specimen and residual paralysis compatible with polio clinically. NPECs are careful not to 'over-discard' AFP cases with limited data; these cases should only be discarded as non-polio if there is conclusive additional evidence ruling out polio.

Feedback Provider

At different levels of the surveillance network, AFP surveillance activities require regular feedbacks based on the results of the case investigation, the laboratory results and the 60-days follow-up examination.

Resources Used

Resources used are the Government expenses and WHO contribution yet it is not that easy to get the full information to quantify the expenses in monetary terms or in terms of percentage. Both active and passive AFP surveillance is impossible without technical and other staff, health system infrastructure and logical support, including transportation; functional reverse cold chain, stool collection kits, etc. The Transportation is accompanied with payments to cover costs for subsistence allowance, communication systems like use of post-office mail services and DHL, telephone system, internet and intra-net systems.

EVALUATION METHODS

Study Area

The study covered the entire United Republic of Tanzania. The country is divided into 30 administrative regions, with an estimated total population of about 59,734,218 people at midyear 2021 according to UN data. The population of children under the age of 15 years is estimated to be about 26.8 million, which is 44.8% of the total population according to the 2012 revision of the World Population Prospects.

Study Approach

This was a retrospective conducted using secondary AFP surveillance data collected during routine health services delivery in the year 2020. Therefore, the study conducted a review of AFP surveillance data recorded from surveillance system database at IVD programme covering the population of children under 15 years of age for a period of one year from January – December 2020.

Sample Size and Sampling Methods

All AFP cases reported during the year 2020 throughout the country were purposively selected and reviewed.

Data Analysis and Presentation

Data were analyzed and presented graphically, in tabular form and by map using Epi Info7, MS Excel and QGIS (version 3.10.13). Descriptive analyses were conducted to describe the epidemiology of AFP in Tanzania and to generate statistics based on the standard WHO-specified performance indicators for AFP surveillance systems.

Ethical Considerations

All the data analyzed in this study were captured from the AFP surveillance data recorded from surveillance database and only unique identification was used whereby MoH and IVD programme management granted permission.

AFP Surveillance Indicators

The WHO has set some minimum performance standard indicators that should be used to evaluate the quality of AFP surveillance. In this study, the performance of the AFP surveillance system was evaluated using these WHO-specified indicators.

Annualized Non-polio AFP Rate: This is an indicator of the sensitivity of the AFP surveillance system. The system should be able to detect at least two AFP cases per 100,000 children under 15 years. The rate is based on the fact that in the absence of wild poliovirus, cases of AFP continue to occur due to other causes like Guillain-Barre syndrome, transverse myelitis, etc.

Stool Adequacy: Adequate stools are defined as two stool specimens collected from an AFP patient 24-48 hours apart and within 14 days of onset of symptoms. At least 80% of all AFP cases should have adequate stool specimens.

Condition of Stool on Arrival at Laboratory: At least 80% of the stool specimens should arrive at the WHO-accredited laboratory in "good condition". A stool specimen is said to have arrived in good condition if it was transported under reverse cold chain conditions (with ice packs and a temperature indicator) and was received by the WHO-accredited polio isolation laboratory in sufficient quantity (at least 8 grams) and with correct documentation.

Timeliness of Case Investigation: At least 80% of AFP cases should be investigated within 48 hours of being notified.

Timeliness of Transportation of Specimens to the Laboratory: At least 80% of stool specimens collected from AFP cases should arrive at WHO-accredited polio isolation laboratory within 72 hours of being sent.

Timeliness of Specimen Processing in the Laboratory: At least 80% of specimen results should be sent from the polio isolation laboratory within 28 days of specimen receipt by the laboratory.

Non-polio Enterovirus Isolation Rate: At least 10% of stool specimens submitted to the laboratory should have non-polio enterovirus isolated. This is an indicator of the quality of the reverse cold chain and how well the laboratory is able to perform in the routine isolation of enterovirus.

Sixty-day Follow-up Examination: At least 80% of AFP case requiring a follow-up examination should be examined at 60 days after the onset of paralysis, to verify the presence of residual paralysis or weakness.

RESULTS OF THE EVALUATION

Usefulness of the AFP Data

The evaluation noted that the AFP surveillance system data are used in array of activities including; estimating community polio vaccine coverage for the given district, alert services delivery on AFP incidence, given an alert as to where to intensify AFP surveillance activities due to silent districts like Mbulu district council, also surveillance data were used to provide – alert for health officials on where poliovirus may be circulating due to available case data, identify population mostly affected in terms of age and sex, identify location from where most cases have been reported.

AFP Surveillance System Attributes

Simplicity of the System: Results show details of fields were left in blank cells example field groups like "Identification" out of 897 reported cases, (n = 12, 1.3%) cases had blank cells in the field "Sex". To fix this, a review from the particular CIF by using Epid case number had to be done.

Flexibility of the System: The system is both paper – work and electronic system it integrates other surveillance systems like Rota, Congenital Rubella Syndrome (CRS), and Measles/Rubella.

Data Quality of the System: Data quality was assessed by using two indicators ~ proportion of blank cells in each field out of total fields/variables. In this indicator the following fields had blanks as shown with their respective proportions out of 897 records; Date of birth 4, (0.4%), geographic coordinates 60, (6.7%), name of AFP case notifier 12, (1.3%), date of notification 11, (1.2%), date of investigation 13, (1.4%), date of onset of paralysis/weakness 18, (2.0%), paralysis/weakness progression in 3 days following paralysis/weakness onset 44, (4.9%), asymmetric information of the site(s) of paralysis/weakness 89, (9.9%), and provisional diagnosis 29, (3.2%). The proportion of valid data out of completed field cells, from this indicator all the field groups with data had the correct one.

Acceptability of the System: This study result shows that, a total of (n = 830, 92.5%) stool specimen results were shared to the district levels with exception of (n = 67, 7.5%) stool specimens which had missing laboratory results. Again, it shows a total of (n = 191, 97.9%) districts out of 195 existing districts throughout the system reported AFP cases. A total of 16 districts each reported single AFP case with exception of four (4) districts, Mbulu district council and the other 3 from Zanzibar islands were silent due to inadequate population size.

Sensitivity of the System: The results are presented in Figure 1 where of the total cases analyzed majority (n = 769, 85.7%) were negative with (n = 5, 0.6%) suspected polio cases.

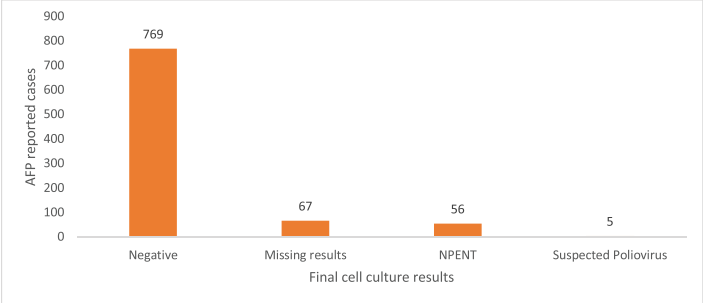

Figure 1: AFP reported cases during 2020 against laboratory results

Predictive Value Positive (PVP): It is the proportion of reported cases that actually AFP cases under surveillance. Results that non-polio enterovirus (NPENT) cases were (n = 56, 6.2%). To determine how many cases were really AFP cases, is done clinically that is difficult to observe the cases during evaluation process.

Table 1: Timeliness for case investigation, sample transportation, and spacemen processing.

Timeliness for AFP case investigation			
	Within 48 hours	>48 hours	Total
AFP cases	820	77	897
Percent	91.4%	8.6%	100%
Timeliness for AFP sample transportation to isolation laboratory			
	Within 72 hours	>72 hours	Total
AFP cases	306	591	897
Percent	34.1%	65.9%	100%
Timeliness for specimen processing for laboratory results			
	Within 28 days	>28 days	Total
AFP cases	606	291	897
Percent	67.6%	32.4%	100%

Representativeness of the System: For a system to be representative, the proportion of occurrence of the cases in person, place and time should satisfy the parameters throughout the system, that at least 2 AFP cases per 100,000 children below 15 years be reported from every district. Results show (n = 16, 8.4%) of the reported districts had 1 AFP case regardless of the population size of the children below the age of 15 years. Other 16 districts including Ukerewe district council reported at least 10 AFP cases and at most 25 cases regardless of the target population

size. The rest 159 reported districts reporting at least 2 and at most 9 AFP cases regardless of the target population size. Some districts remained silent, such as Mbulu district council and the other three districts from Zanzibar, the system is not representative.

Timeliness of the System: The results for timeliness on case investigation, sample transportation, and specimen processing are presented in Table 1. Timeliness for AFP case investigation was (n = 820, 91.4%) above recommended ≥80%. On the other hand timeliness for AFP sample transportation to viral isolation laboratory from field was below recommended ≥80% (n = 306, 34.1%). Similarly, timeliness for specimen processing to obtain laboratory results was below recommended ≥80% (n = 606, 67.6%). This indicated on average, the system was not timely operated.

Stability of the System: There has been increasing, national and WHO commitment in supporting AFP surveillance system towards the AFP endgame 2028 that there is allocation of fund for every reported AFP case plus other activities like AFP active case search.

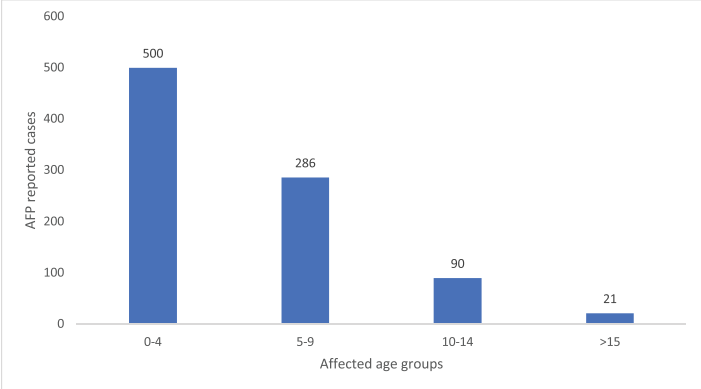

Figure 2: Number of reported AFP cases per age group

As presented in Figure 2, it was clear that number of cases were decreasing with increase in age. Children aged -04 years were highly affected (n = 500, 55.7%) while the population aged above 15 years is less affected (n = 21, 2.3%). Overall, males were slightly more affected (n = 479, 53.4%) compared to females, but the difference was not significant (n = 61, 6.8%).

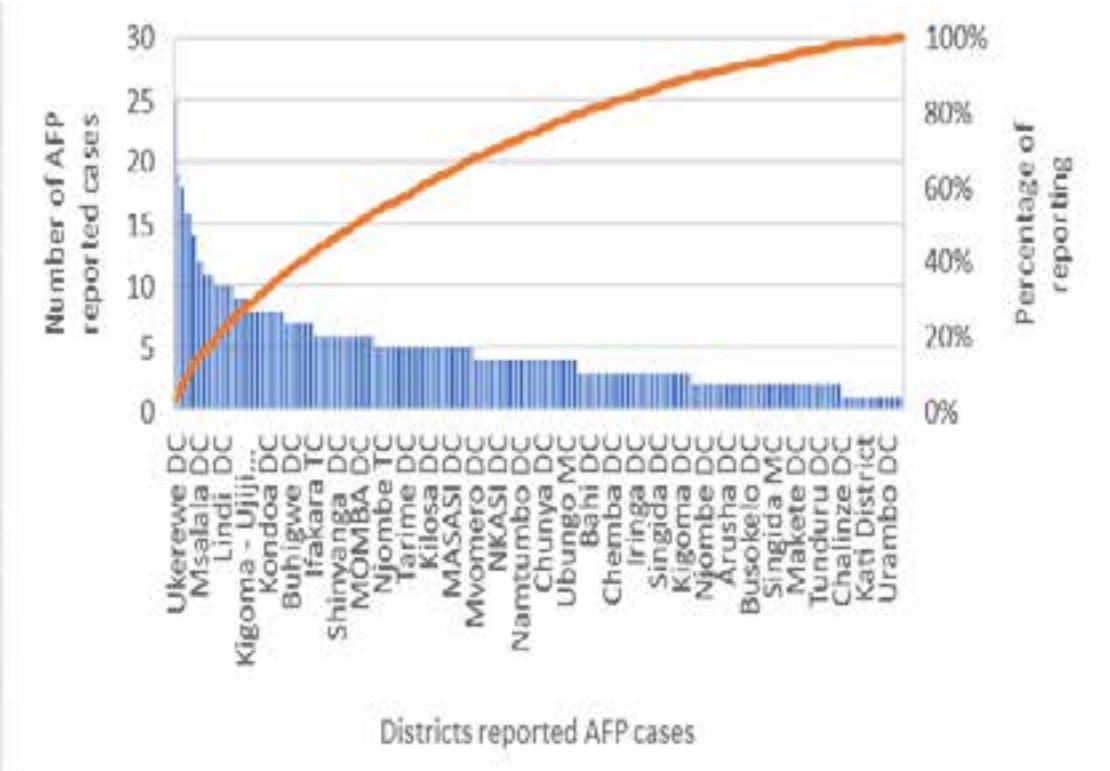

Figure 3: Number of AFP reported cases by each district council in Tanzania.

Figure 3 presents the number of AFP cases reported from each district council in Tanzania based on percentage of reporting. During the evaluation, Ukerewe district council had high number of cases (n = 25, 2.8%) while Madaba district council reported the least (n = 1, 0.1%).

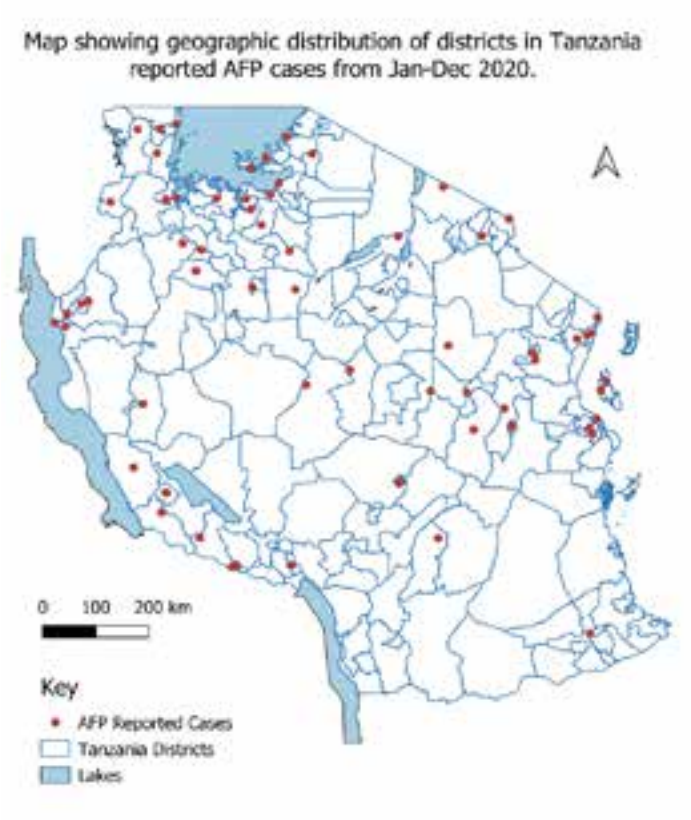

Figure 4: Geographic distribution of health facilities reported AFP cases during 2020.

Figure 4 shows the distribution and location of respective healthcare facilities that reported AFP cases during the evaluation period of the year 2020. Most health facilities were from the Lake Victoria zone.

DISCUSSION

Evaluation of this study has been done by considering two categories of standard criteria; namely pre-set WHO indicators and description of epidemiological distribution of AFP reported cases by person, place in that particular time-the year 2020. Starting with the latter, objective of this study was to evaluate the AFP surveillance system in Tanzania in 2020 to find out whether it meets the set objectives by establishing the AFP surveillance performance, its attributes, and source areas all over the country and to determine the mostly affected population in terms of age group and sex. The system meets its objective of actively survey for WPV through reporting and laboratory testing of all AFP cases among children <15 years annually. Our results are in line with the previous studies done in Kenya, Iraq, South Africa and Jordan [1,2,3,5]. It was interesting that there was no poliomyelitis case was reported covering the evaluated period, hence certify the polio-free status [1]23 (1.35%.

Findings from this study by person considering age category showed that majority of the AFP cases were below the age of 5 years (59 months). This agrees with findings from the studies conducted in Kenya, South Africa, and Jordan [1,2,5]. On the other hand, the study conducted in Iraq in this parameter described mean age to be 3 years with median age of 2.5 years [3]. Results by sex revealed that the mean proportion of AFP cases was high in males although the difference was not significant. This observation is similar with the results reported from previous studies conducted in Kenya, Iraq, and Jordan [1,3,5]. This could be associated with the likelihood of boys be at high risk. Based on place, the study results showed that most of the districts reported AFP cases with the exception of few districts like Mbulu. These results comply with other studies conducted in Kenya, and Jordan [1,5]. The situation reported in our study is not peculiar as other studies conducted in South Africa in 2005-2009 showed some provinces performed exceptionally well and poorly [2].

Based on WHO pre-set indicators by considering AFP surveillance system attributes in relation to the usefulness of the surveillance system, the AFP surveillance system in Tanzania is very useful as it meets the definition of how a useful system is expected to offer. According to Services, 2001)[8] a public health surveillance system is useful when it contributes to prevention and control of adverse health-related events, including an improved understanding of the public health implications of such events. It is also becomes useful when it helps determining that an adverse health-related event previously thought to be unimportant is actually important. On the other hand, when a surveillance system data contributing to performance measures, including health indicators that are used in needs assessments and accountability. In this regard, the AFP surveillance system under evaluation is useful since it complies the first and the third points of the definition of usefulness of the system.

Regarding simplicity of the system, the AFP surveillance system qualify for criteria prescribed by (Services, 2001) [8] that a simplicity of a public health surveillance system refers to both its structure and ease of operation i.e., it has to be simple while meeting their objectives. The AFP surveillance system is simple although the presence of blank cells in the database indicates a call for continuous training to data collectors.

On flexibility of the system, according to (Services, 2001) [8], a public health surveillance system to be flexible, it must be capable of adapting to changing information needs or operating conditions with little additional time, personnel, or allocated funds. It must be capable of accommodating for example new health-related events, changes in case definitions or technology, and variations in funding or reporting sources. Systems that can easily be interchanged with other systems example those use standard formats in electronic data are considered flexible.

The AFP surveillance system is characterized in both paper and electronic based system operations, it accommodates other systems like measles/rubella, Rota and CRS surveillance systems, so it is flexible.

Data quality reflects completeness and validity of the data recorded in the public health surveillance system is what reflecting data quality [8]. The existence of blank cells in the database of the evaluated AFP surveillance system distorts it qualifications. The issue of data quality is questionable in many African countries as a similar observation was reported.

Willingness of persons and organizations to participate in the surveillance system, echoes acceptability of the system [8]. Therefore, the AFP surveillance system evaluated, nearly all stool specimen were collected in adequacy, properly handled and results from laboratory were shared to district level. This was a clear indication that the AFP surveillance system met the necessary criteria of being acceptable.

Sensitivity of a surveillance system is considered in two levels. At the level of case reporting, it refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system. It also refers to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time [8] . In order to strengthen AFP surveillance system sensitivity in Africa region, through risk assessment and risk management meeting organized early June 2005, it was decided to increase the non-polio AFP rate target to >2/100,000 children <15 years of age (WHO, 2006). The results of our study met the WHO set target, the rate was 2.9 per 100,000 children under 15 years. Our findings of meeting the WHO set target are in line with studies conducted in Jordan, and Iraq [3,5].

As it has been defined, predictive value positive (PVP) is the proportion of reported cases that actually have the health-related event under surveillance [8]. In diagnosis, it was difficult to determine PVP for the AFP surveillance system in Tanzania as the diagnosis is strictly clinical and only the true AFP cases are virtually registered in the database.

According to (Services, 2001) [8] for a surveillance system to be representative it needs to accurately describes the occurrence of a health-related event over time and its distribution in the population by place and person. Results from our study showed few districts reported single cases each, instead of two cases per 100,000 children under 15 years. In some districts, this has been due to low number of target population being below 100,000 children per district like in Zanzibar districts – Chakechake, wete, and Urban West A or B. This indicates the system was not precisely representative. Lack of representativeness noted from our study was also reported from other countries like South Africa and Jordan [2,5]. In reference to 2012 Census General Report, out of 169 total districts by then, only 91 districts met the criteria of reporting 2 AFP cases annually, i.e., districts having at least 100,000 children under-15 years. This means that 78 districts (46.2%) had not met the criteria of reporting 2 AFP cases annually rather than after every two years or longer due to their target population being less than 100,000 children below the age of 15 years (after projection) unless the system ignores the criteria. Therefore, our dataset may be representing only 53.8% of the whole country districts.

To accommodate this shortage of population, there is a need to establish a national local indicator for districts. Suppose we had our local indicator for data collection purpose let's say, "at least 2 AFP cases per 50,000 children <15 years is detected annually". In referring from the same 2012 Census General Report, out of 169 total districts those with at least 50,000 children <15 years will have expanded to 144 (85.2%) districts, with this coverage it is even sound better to say the data represent the whole country system. Setting a local target indicator apart from that of WHO, has also been practiced with countries like South Africa [9].

Timeliness reflects the speed between steps in a public health surveillance system [8] , and the following tasks are to be timely implemented by a surveillance team in case of AFP. Notify and investigate immediately, collect2 specimens 24-48 hours apart and ≤14 days of paralysis onset, send in reverse cold chain to arrive within 3 days of being sent (or freeze) [6]. Results from our study indicate timeliness for AFP case investigation was above recommended ≥80%, while for sample transportation to viral isolation laboratory, and for specimen processing to obtain laboratory results were below recommended ≥80%. On average, the system is not timely operated.

Stability refers to reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system [8]. Based on the evaluation, it is clear that there has been increasing Government and WHO support in the AFP surveillance system since its adoption, and more efforts have been put in place since the acquisition of polio-free certificate in August 2015 towards the AFP endgame 2028 that there is allocation of fund for every reported AFP case.

CONCLUSIONS

The system met its objective of actively surveying for WPV through reporting and laboratory testing of all AFP cases among children <15 years annually. Despite meeting its objectives, there is a room for the MoH to improve the operation in area of representativeness by setting a national local indicator for districts considering low population (less than 100,000 children under 15 years) apart from the WHO pre-set indicator (number of cases per 100,000 children under 15 years). Also, the MoH should improve the issue of data completeness and timeliness especially on time for specimen transportation. In addition, the MoH should conduct vaccination campaigns continuously to under five year's children against poliovirus to prevent potential polio outbreaks as well as conducting operational researches in districts with high and underreporting AFP cases to find out the causes.

LIMITATION

- Lack of primary information from health care providers to ascertain the acceptability and simplicity of the system due to inadequate fund to conduct primary interview throughout the country, the first attribute was addressed by considering sharing of the stool specimen results from laboratory to district levels as an indicator for the acceptability of the system, and the latter was addressed by considering proportion of fields which were left blank out of the required field cells.
- Lack of data from laboratory for timeliness of specimen processing for laboratory results, this was addressed by considering time difference from when stool specimen were sent to the laboratory to when the results were out.

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MUHTASARI
Tathmini ya Mpango wa Ufuatialiji wa Ugonjwa wa Kupooza Ghafla Tepetepe Nchini Tanzania, Mwaka 2020

Shabani Msanga Kaimu[1,2], Ally K. Hussein[1,2], Loveness Urio[1,2], Richard Magodi3, Rogath Kishimba[1,2], Florian Tinuga[3], Julius J. Massaga[4] and Germana Leyna[1,5]

Usuli: Ugonjwa wa kupooza ghafla tepetepe unatokana na maambukizi ya virusi vinavyo ambukiza sana vinavyosababishwa na virusi vya polio mwitu (wild poliovirus, WPV). Ugonjwa huu huambukizwa kutoka kwa mtu mmoja hadi mwingine kupitia njia ya mdomo kwa kula chakula kilichochafuliwa na kinyesi. Maambukizi mengi zaidi ya asilimia 90 huwa hayaoneshi dalili za ugonjwa, wakati wengine huonesha dalili za ugonjwa ambazo siyo kali ikiwa ni pamoja na homa, misuli kuuma, mwili kuchoka, kuwashwa koo na maumivu ya kichwa. Ugonjwa wa kupooza kwa kawaida huwa na madhara ya kiwango cha chini katika jamii ambapo kunakuwa na mgonjwa 1 katika kila visa 1000 kati ya watoto wachanga na mgonjwa 1 kwa kila visa 100 kati ya vijana balehe. Ufuatiliaji wa ugonjwa wa kupooza ghafla tepetepe (Acute flaccid paralysis, AFP) ni mkakati muhimu wa Shirika la Afya Duniani (WHO) katika Mpango wa Kutokomeza Polio Duniani.

Lengo: Kufanya tathmini ya mfumo wa ufuatiliaji wa ugongwa wa kupooza ghafla tepetepe (AFP) nchini Tanzania kwa mwaka 2020 ili kujua kama unakidhi malengo yaliyowekwa.

Mbinu: Utafiti ulifanya mapitio ya takwimu zilizokusanywa wakati wa utoaji wa huduma za afya za kawaida (za kila siku) kuanzia Januari hadi Desemba 2020. Matukio yote ya kupooza ghafla tepetepe (AFP) yaliyoripotiwa kutoka mikoa yote 26 ya Tanzania Bara na mikoa 4 kutoka visiwani Zanzibar yalijumuishwa katika utafiti huu. Uchambuzi yakinifu wa takwimu ulifanywa ili kuelezea epidemiologia ya ugonjwa wa kupooza ghafla tepetepe (AFP) nchini Tanzania na kutoa taarifa za maendeleo ya utendaji wa mpango wa ufuatiliaji kulingana na viwango mahususi vya kiutendaji vilivyoainishwa na Shirika la Afya Duniani (WHO).

Matokeo: Jumla ya visa 897 vya AFP viliripotiwa kutoka wilaya 191 kati ya 195 wakati wa kipindi cha utafiti, ambapo ni sawa na visa vipya – watoto 2.9 kwa kila watoto 100,000 chini ya umri wa miaka 15 kwa mwaka. Kati ya visa vyote vilivyoripotiwa, visa vilivyoshukiwa kuwa na virusi vya polio (n = 5, asilimia 0.6), visa vyenye maambukizi ya virusi visivyokuwa vya polio (Non-Polio Enterovirus, NPENT) (n = 56, 6.2%), visa ambavyo havikuwa na maambukizi ya virusi vya polio (n = 769, asilimia 85.7) na visa ambavyo havikuwa na majibu ya maabara (n = 67, asilimia 7.5). Watoto chini ya miaka mitano ni kundi ambalo visa viliripotiwa zaidi (n = 500, asilimia 55.7), ikifuatiwa na miaka 5-9 (n = 286, asilimia 31.9). Idadi kubwa ya watoto wa kiume (n = 479, asilimia 53.4) waliathirika ikilinganishwa na wenzao wa kike.

Hitimisho: Imedhihirika kuwa mfumo ulifikia lengo lake la ufuatiliaji wa WPV kwa njia ya kuripoti na upimaji wa kimaabara wa visa vyote vya AFP miongoni mwa watoto chini ya miaka 15 kwa mwaka. Licha ya kukidhi malengo yake, kuna nafasi kwa Wizara ya Afya (WAF) kuboresha utendaji kazi kwa kuweka kiwango cha kitaifa cha ukokotoaji wa takwimu ili kupata usawa wa uwakilishi kwa kila wilaya hasa zenye idadi ndogo ya watoto wenye umri wa chini ya miaka 15 (chini ya watoto 100,000) mbali na kiwango kilichowekwa na WHO cha visa kwa kila watoto 100,000 chini ya miaka 15. Aidha WAF inahitaji kuboresha juu ya utimilifu wa takwimu na muda mwafaka (ufanisi) hususan katika muda wa usafirishaji wa

sampuli. Kwa nyongeza, WAF inapaswa kufanya kampeni za chanjo dhidi ya virusi vya polio kwa watoto wenye umri wa chini ya miaka mitano kwa mfululizo ili kuzuia uwezekano wa milipuko ya ugonjwa wa polio. Hii itajumuisha kufanya tafiti mahususi kulenga wilaya zilizoripoti visa vingi vya AFP na wilaya ambazo haziripoti sana ili kujua sababu.

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Trends in maternal and perinatal mortality in Morogoro region from 2016 to 2020: A retrospective study

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ABSTRACT

Background: In the last decade (2011 – 2020) there had been various interventions at international, regional and national levels aiming at reducing maternal and perinatal deaths. Some of these interventions might have affected the trends of maternal and perinatal deaths in Tanzania including Morogoro region. Despite of these various interventions being implemented in Tanzania; no study had been done to show the trend of maternal and perinatal deaths in Morogoro region. Therefore, we conducted a study to assess the trend in maternal and perinatal deaths for five years (2016-2020) in the region, the information which will provide a platform for planning implementing specific future interventions.

Methods: This was a retrospective descriptive cross-sectional study whereby data were collected from district database involving all nine district councils, summarized and analyzed.

Results: There was a general increase of both total deliveries and births to about 14.1% (n=9,802) from 69,341 in 2016 to 79,143 in 2020 for deliveries and 14.6% (n=10,220) for births from 70,176 in 2016 to 80,396 in 2020. The number of maternal deaths increased by 34% (n=28) from 82 deaths with Maternal Mortality Ratio (MMR) of 119 per 100000 live births in 2016 to 110 deaths, MMR 139 per100000 live births in 2020. There was a slight decrease in perinatal deaths by 5% (n=107) from 2086 deaths, Perinatal Mortality Rate (PMR) of 30 per 1000 live births in 2016 to 2193 deaths, PMR of 27 per 1000 live births in of 2020. Deliveries without skilled attendants decreased by 43.3% (n=1,366) from 4522 in 2016 to 3156 in 2020 and the number of deliveries from private health facilities decreased by 8.3% (n=1,247) from 16,276 in 2016 to 15,029 in 2020.

Conclusion: Despite of various intervention implemented at the regional and district level, maternal and perinatal deaths remined high, with an increase of MMR and slight decline of PMR. Therefore, there is still a need of concerted efforts to improve maternity care focusing on improving accessibility and quality of maternity care services as well as post-natal period.

INTRODUCTION

Over half a million young women die every year worldwide as a result of complications arising from pregnancy and childbirth, and more than 78% occur in sub-Saharan Africa [1]. This is also reflected in Tanzania where Maternal and Perinatal ratios are still high, currently reported to be 556 per 100,000 and 39 per 1000 live births respectively [3]. Morogoro Region is among the 26 regions in Tanzania where women and newborns are still dying from pregnancy related complications. In 2019/2020, Morogoro region reported maternal mortality ratio of 133 per 100,000 live births and perinatal mortality ratio of 24 per 1000 [4].

In the last decade, there had been various interventions at international, regional and national level to avert the situation. In Tanzania, such efforts included mentorship to health providers, improved referral system, availability of medicine, medical supplies and equipment as well as improving and increasing health facility infrastructure. The main focus was to improve accessibility, availability and quality of maternal and newborn services.

Despite all these efforts, no follow up studies had been done to establish maternal and perinatal mortality trends in Morogoro region. Therefore, the purpose of this study was to examine the trends in maternal and perinatal mortality in Morogoro region in order to assess the current status, review interventions in place and plan for the future.

METHODS

Study Design

This was a retrospective descriptive cross-sectional study using secondary data abstracted from District Health Information Software (DHIS2) database from all district councils in Morogoro region.

Study Site

Morogoro region is one of the 26 regions in Tanzania Mainland, bordered by seven regions; Arusha and Tanga to the North, Pwani region to the East, Dodoma and Iringa to the West, Ruvuma and Lindi to the South. The Region has a population of 2.7million of which 1,093,302 and 1,195,190 are males and females respectively [5]. Women of reproductive age account for 545,084 (71.3%) with fertility rate of 4.5%.

The region has 482 health facilities, private health facilities included. Out of these, 18 (3.7%) are hospitals, 55 (11.4%) are health centers and 379 (78%) are dispensaries. More than 50% of health centers and 80% of dispensaries provides Basic Emergency Obstetric Neonatal Care (BEmONC) and Comprehensive Emergency Obstetric and Neonatal Care (CEmONC) services.

Study Population

All women of reproductive age delivered and captured in DHIS2 database from 2016 to 2020 in all district councils of Morogoro region.

Data Collection

All registered deliveries and deaths in DHIS2 which occurred either in health facilities or outside health facilities in the region were extracted. District Reproductive and Child Health Coordinators (DRCHCo) were requested to extract all registered deliveries and deaths which occurred in all health facilities (public and private) including those without skilled attendants for a period of five years (2016 to 2020).

Information collected from DHIS2 included: total deliveries, total births, total live births, fresh still births, macerated still births, neonatal deaths (0-7 days), neonatal deaths (0-28 days) and maternal deaths.

Data Analysis

Data extracted were entered in excel sheet and analyzed to calculate different maternal and neonatal outcome indicators

Ethical Clearance

Permission was granted by Regional Medical Officer, Morogoro region and respective District Medical Officers as well as in-charge of health facilities visited.

RESULTS

All nine district councils were involved in the maternal and perinatal health data review. During the period under review of 5 years, there were a total 576,963, 383,184 and 376,601 deliveries, births and live births respectively. There was an increase of deliveries 14.1% (n=9802) from 69341 in 2016 to 79143 in 2020 and 14.6% (n=10220) for births from 70176 in 2016 to 80396 in 2020. As presented in Figure 1, generally the number of deliveries, births and live births were steadily increasing. Other outcome indicators assessed are presented in Table 1.

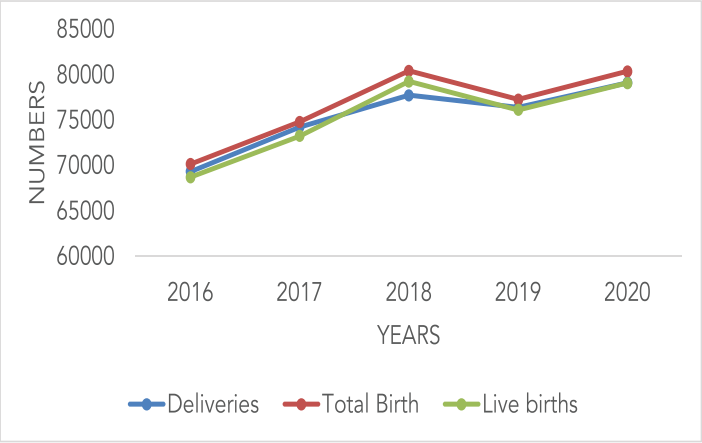

Figure 1: Total deliveries, births and live births per year for a period of five years 2016-2020.

Table 1: Neonatal and maternal outcome indicators per year for a period of five years 2016-2020

OUTCOME INDICATORS	YEARS				
	2016	2017	2018	2019	2020
Fresh still Birth (FSB)	599	688	676	604	527
Macerated still Birth (MSB)	779	891	764	716	742
Neonatal deaths (0-7 days)	708	724	970	586	924
Neonatal deaths (0-28 days)	458	634	343	294	173
Maternal Deaths	82	79	124	119	110
Delivery without skilled attendance	4522	4831	5152	3656	3156
Delivery from private health facilities	16276	15819	15970	15463	15029

The number of maternal deaths increased from 82 in 2016 to 110 in 2020. Delivery of pregnant women without skilled labour attendants has been declining as well as the delivery from private health facilities (Table 1).

Table 2: Perinatal Death per year for a period of five years 2016-2020

Condition	YEARS				
	2016	2017	2018	2019	2020
FSB + MSB	1378	1579	1440	1320	1269
0 – 7 days	708	724	970	586	924
TOTAL	2086	2303	2410	1906	2193

Perinatal deaths are presented in Table 2 while perinatal mortality rate (PMR) which is defined as the sum of the number of perinatal deaths (stillbirths and early neonatal deaths) divided by the number of pregnancies of seven or more months' duration (all live births plus stillbirths) is given in Figure 2. Perinatal Mortality Rate indicated a slight decrease by 5% (n=107) from 2086 deaths PMR 30 per 1000 live births in 2016 to 2193 deaths, PMR 27 per 1000 live births in 2020. From Table 2, there is clear evidence that still births (fresh and macerated) have contributed more in perinatal deaths than early neonatal deaths (age 0 -7days) by 66 %(n=1378) in 2016 and by 57%(n=1269) in 2020.

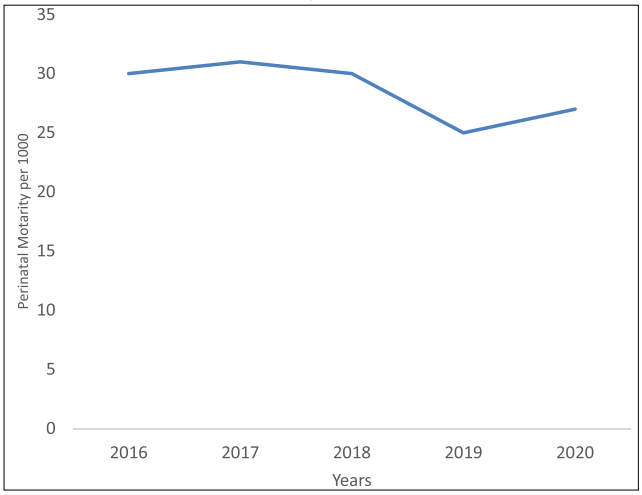

Figure 2: Perinatal Mortality Rate for Morogoro region from 2016-2020

In case of Maternal Mortality Rate (MMR) which is defined as the number of maternal deaths during a given time period per 100,000 live births during the same time period, there was an increased number of maternal deaths by 34% (n=28) from 82 deaths with MMR of 119 per 100000 live births in 2016 to 110 deaths, MMR 139 per 100000 live births in 2020 with fluctuations between years within five years period (See Figure 3). However, MMR was highest in 2018 and 2019 which was 156 per 100,000 live births.

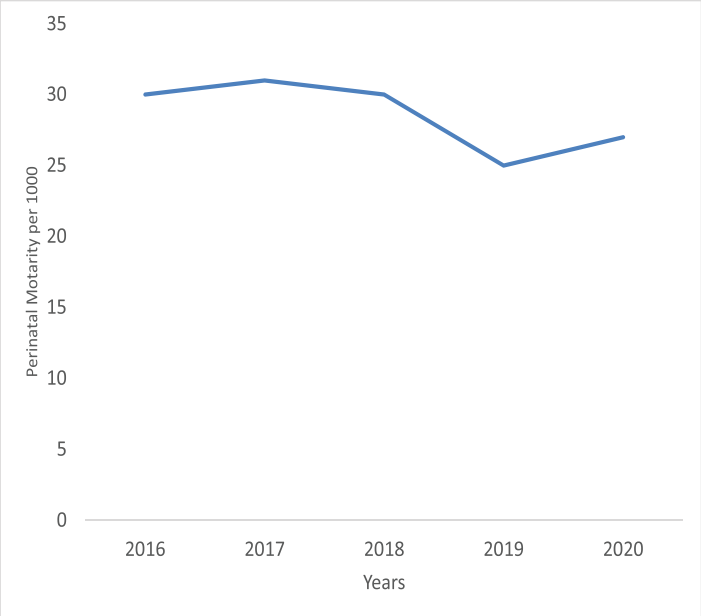

Figure 3: Maternal Mortality Rate for Morogoro region from 2016-2020

The numbers of deliveries in private health facilities are presented in Figure 4. There was a clear trend of decline in number deliveries from private health facilities, which were 8.3% (n=1,247) from 16,276 in 2016 to 15,029 in 2020.

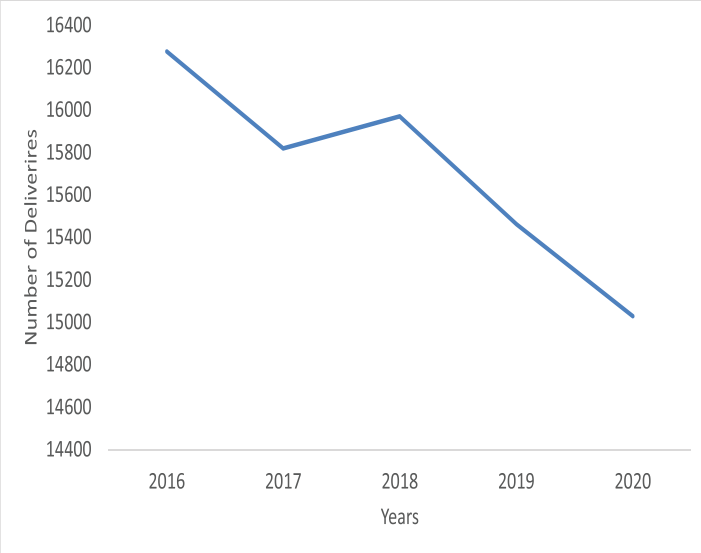

Figure 4: Trend of deliveries in private health facilities in Morogoro region from 2016-2020

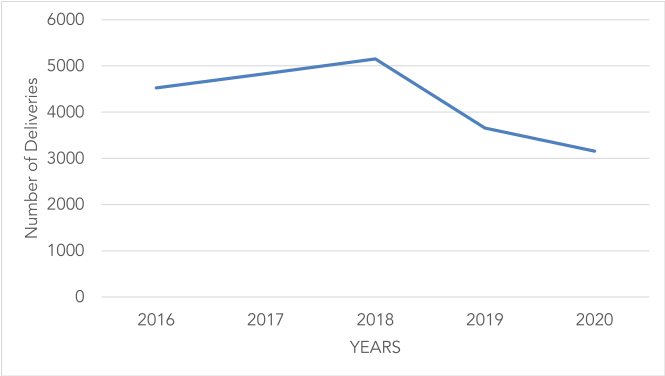

Figure 5: Trend of deliveries without skilled attendance in Morogoro region from 2016-2020

Figure 5 shows the trend of deliveries of pregnant mothers without skilled attendance in health facilities of Morogoro region for the period of five years from 2016 to 2020. The number of deliveries declined by 43.3% (n=1,366) from 4,522 in 2016 to 3,156 in 2020.

DISCUSSION

In the view of ongoing interventions national wide in maternal health, the present study noted that in Morogoro region for the past five years from 2016 to 2020, maternal death remained high with decline in perinatal mortality rate. The numbers of deliveries from private health facilities and without skilled attendants declined. Therefore, planning and reviewing operating interventions to reduce maternal and perinatal mortality deaths are essential.

Our study assumed that, the trends of maternal and perinatal deaths are the reflection of various interventions that had been taking place in the period of ten years including five years of our study (2016 – 2020) and that, the major cause of maternal and perinatal deaths are the same and interrelated across all district councils of Morogoro region. The period also coincided with the implementation of Millennium Development Goals (MDG) and Sustainable Development Goals (SDG). Thus, our focus in this discussion was directed more to the major indicators as depicted from the results namely deliveries, maternal, perinatal and neonatal mortality aiming at the indicators of SDG number three [2].

Maternal and perinatal mortality are closely related. While maternal mortality describes the status of woman, their access to healthcare and adequacy of health care system, perinatal mortality indicates the quality of care women receive in labour rooms. Although it is difficult to measure maternal and perinatal deaths particularly in our setting where documentation of maternal and perinatal events is inadequate, neverthess, the present study has highlighted some observations which show the trend of these important indicators.

The study has observed a slight increase of MMR from 119 per 100000 live births in 2016 to 139 per 100000 live births. The failure of decline of MMR in Morogoro region is not peculiar as it has been reported in most other developing countries including

Tanzania [6]. In this study, maternal mortality remained high despite different global and national preventive efforts which is in line with previous studies conducted in Tanzania [6,8]. In general, the findings in this study are in line with WHO observation which pointed out that, maternal mortality declined by less than half than what was expected during the period of 15 years of Millennium Development Goals hence the need of the Sustainable Development Goal number 3 to accelerate the reduction of maternal and neonatal mortalities [6,2]. The noted high maternal mortality could be associated with delays of pregnant mother in seeking medical care and poor quality of health care services in health facilities within the region coupled with acute shortage of health care workers.

Perinatal mortality rate indicated a slight declining from 30 to 27 per 1000 total births in 2016 and 2020 respectively. However, still births (fresh and macerated) contributed more to the total death than early neonatal deaths (age 0 -7days) and this probably is amongst the reasons of a slow decline trend in PMR. A study on trend and causes of neonatal mortality in Tanzania indicated that, majority of neonatal deaths (87.5%) occurred in the first week of life which differs from our findings, as there were more still birth deaths [6]. Based on these observations, we suggest a need to strengthen quality maternity care especially during labour and post natal period

In relation to deliveries, the study has revealed an increase by 14% (9803) from 63941 of 2016 to 79143 of 2020; which have been reflected in total births. Interestingly, there was a downhill trend of deliveries attended by unskilled attendants. This observation is also pointed out by the Regional Reproductive and Child health annual report 2020 which indicated that, there was a marked increase of deliveries in health facilities between 2017 and 2020 with decreased number of deliveries without skilled attendants [4]. The probable reasons for this change may be due to increased community awareness on utilization of maternal and neonatal health care services as well as increased number of health facilities in the region closer to communities.

On the other hand, deliveries from private health facilities were noted to decrease by 7.6% in our current study. Although private sector is being promoted to provide health care services including maternity care, the observed trend in our study is likely due to the availability of public health facilities closer to community and improved health care services with easy accessibility and affordable cost.

CONCLUSION

Despite all the interventions at the regional and district level, maternal and perinatal deaths remained high. There is still a need of concerted efforts to improve maternity and neonatal care focusing on improving accessibility and quality of maternity care services, post natal period, as well as essential newborn care.

ACKNOWLEDGEMENTS

We are grateful to the Regional Medical Officer and his team for allowing this study to be conducted in Morogoro region. We are also very grateful to all Council Medical Officers for their acceptance and readiness to use their districts database as a source of data. Our heartfelt thanks go to all Council Reproductive and Child health Coordinators for their willingness and cooperation during data collection. Last but not the least, all service providers across the region, provided care to the mothers and new born as well as documenting and keeping the maternal and newborn records. To all of them, we register our profound appreciation.

AUTHOR DETAILS

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MUHTASARI

Mwenendo wa vifo vya akina mama vinavyotokana na matatizo ya ujauzito na vifo vya watoto wachanga ndani ya wiki moja baada ya kuzaliwa mkoani Morogoro, Tanzania kuanzia mwaka 2016 hadi 2020: Utafiti wa kutukutumia kanzi data

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Usuli: Katika muongo uliopita (2011 – 2020) kumekuwa na afua mbalimbali katika ngazi ya kimataifa, kikanda na kitaifa kwa lengo la kupunguza vifo vya akina mama kutokana na matatizo ya ujauzito na vifo vya watoto wachanga ndani ya wiki moja baada ya kuzaliwa. Baadhi ya afua hizi zinaweza kuwa zimechangia mwelekeo wa vifo vya uzazi nchini Tanzania ikiwemo mkoa wa Morogoro. Licha ya afua hizi mbalimbali zinazotekelezwa nchini Tanzania; hakuna utafiti uliofanyika kuonyesha mwenendo wa vifo vya mama wajawazito na watoto wachanga mkoani Morogoro. Kwa hiyo, tulifanya utafiti wa kutathmini mwelekeo wa vifo vitokanavyo na matatizo ya ujauzito na vifo vya watoto wachanga ndani ya wiki moja kwa kipindi cha miaka mitano

(2016-2020) katika mkoa wa Morogoro. Taarifa itokanayo na utafiti huu itatoa frusa ya kupanga kutekeleza afua mahususi kwa siku zijazo.

Mbinu: Huu ulikuwa ni utafiti ambapo takwimu zilikusanywa kutoka kwenye kanzi data za takwimu za afya za wilaya. Utafiti ulihusisha halmashauri zote tisa za wilaya, ambapo takwimu zilijumuishwa na kuchambuliwa.

Matokeo: Kulikuwa na ongezeko la idadi ya akina mama waliojifungua na watoto waliozaliwa. Kwa wastani ongezeko likikuwa takriban asilimia 14.1 (n=9,802) kwa waliojifungua kutoka 69,341 mwaka 2016 hadi 79,143 mwaka 2020 na aslimia 14.6 (n=10,220) kwa watoto waliozaliwa kutoka 70,176 mwaka 2016 hadi 80,396 mwaka 2020. Idadi ya vifo vya uzazi iliongezeka kwa asilimia 34 (n=28) kutoka vifo 82 vilivyo na Kiwango cha Vifo vya Akina Mama Kitokanacho na Matatizo ya Ujauzito (MMR) ya119 kwa kila idadi ya uzazi salama [kwa kila vizazi hai] 100,000 mwaka 2016 hadi vifo 110, MMR 139 kwa kila idadi ya uzazi salama [kwa kila vizazi hai] 100000 mwaka 2020. Kulikuwa na kupungua kidogo kwa vifo vya Watoto kabla ya kujifungua na watoto wachanga ndani ya wiki moja kwa silimia 5 (n=107) kutoka vifo 2,086, Kiwango cha Vifo cha Watoto Kabla ya Kujifungua na Wachanga Ndani ya Wiki Moja (PMR) cha 30 kwa kila vizazi hai 1000 mwaka 2016 hadi vifo 2193, PMR ya 27 kwa kila vizazi hai 1000 mwaka 2020.

Waliojifungua bila wakunga wenye ujuzi walipungua kwa asilimia 43.3 (n=1,366) kutoka 4,522 mwaka 2016 hadi 3,156 mwaka 2022. Aidha idadi ya wajawazito waliojifungua kutoka vituo vya kutotelea huduma ya afya vya kibinafsi ilipungua kwa asilimia 8.3 (n=1,247) kutoka 16,276 mwaka 2016 hadi 15,029 mwaka 2020.

Hitimisho: Licha ya afua mbalimbali zilizotekelezwa katika ngazi ya mkoa na wilaya, vifo vya wajawazito na Watoto kabla ya kujifungua vilibaki kuwa juu, ambapo kulikuwa na ongezeko la Kiwango cha Vifo vya Akina Mama Kitokanacho na Matatizo ya Ujauzito (MMR) na kupungua kidogo kwa Kiwango cha Vifo cha Watoto Kabla ya Kujifungua na Wachanga Ndani ya Wiki Moja (PMR). Kwa hivyo, bado kuna haja ya juhudi za pamoja za kuboresha huduma ya uzazi ikilenga kuboresha upatikanaji na ubora wa huduma za uzazi na kipindi cha baada ya kujifungua.

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Epidemiological Investigation of Leptospirosis Outbreak in Ruangwa, Lindi – Southern Tanzania, July 2022

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ABSTRACT

Introduction: Leptospirosis is a zoonotic disease of global importance, which is caused by bacteria of the genus Leptospira, and is considered a re-emerging disease. In Tanzania, leptospirosis outbreak was previously reported in Buhigwe, Kigoma region in 2004, using serological tests that are liable to cross-reactivity with other pathogens. This study, using advanced molecular techniques, aimed at verifying and identifying the etiology and distribution of leptospirosis in Ruangwa and Kilwa districts during July 2022.

Methods: Detection of leptospirosis in 20 suspected cases was done using next-generation sequencing using Oxford MinION nanopore technology. Bioinformatic analysis was performed using standard pipelines to identify the aetiological agent. Detection of pathogenic Leptospira was performed on plasma using real-time PCR using primers that target the rrs (16S rRNA) gene of pathogenic Leptospira. Analysis was done using EpiInfo software version 7 (CDC, Atlanta, GA, USA).

Results: Out of the 20 suspected cases, 15 cases were laboratory confirmed to have pathogenic Leptospira. Of the confirmed cases, 14 recovered while one case died making a case fatality rate (CFR) of 6.7%. Majority of cases reported onset of symptoms between the 2nd and 6th July, 2022. Three-quarters of the cases were male. Almost all (nine-tenths) of the cases originated from Naungo village.

Conclusions: The leptospirosis outbreak that occurred in Lindi Region, southern part of Tanzania, had a case fatality rate of 6.7%. The outbreak highlighted the need of strengthening the Tanzania IDSR system for rapid and timely detection of disease events at community level. This may include the implementation and integration of mobile phones and computer-based technologies in the infectious disease surveillance process and deployment mobile sequencing facilities.

INTRODUCTION

Leptospirosis is a zoonotic bacterial disease caused by Leptospira species [1]. The disease is prevalent in tropical and subtropical regions [2]. Leptospirosis is currently considered a re-emerging disease [3], spreading from animals to humans through water contaminated with animals' urine and stool [4]. Leptospira species enter the human body through the abstracted skin and mucosal membranes. Dogs, horses, buffalos, raccoons, rodents, cattle, swine, and goats are among the reservoir for leptospira [5].

Infection with Leptospira is closely associated with outdoor activities that involve water contact and soil [6]. Sewer workers, farmers, dairy farmers, fishermen, and animal caretakers have been reported to be among the people who are at risk of infection [7]. Globally the incidence of leptospirosis is estimated to be 1.03 million cases and 58,900 deaths per year, while the annual morbidity is approximated to be 14.8 cases per 100,000 population [8]. In approximately 80% of the outbreaks that occurred from 1970 to 2012 [8], an outbreak investigation was conducted. Latin America countries accounted for 35.8% of all the outbreaks reported [8]. In these outbreaks, the overall case fatality rate was 5%, ranging from 0 to 60%. (9,10) The case fatality rates (CFR) for the outbreaks that occurred in Indonesia 2007 and Sri Lanka 2008 were 8% and 1.3%, respectively [11,12]. In Tanzania, the incidence of leptospirosis is estimated to be 75-102 cases per 100,000 persons per year [9, 10].

The challenge in establishing diagnosis of Leptospirosis is that it is associated with a wide range of symptoms that could be mistaken for other diseases, that include high fever, headache, chills, muscle aches, vomiting, yellow skin and eyes (jaundice), red eyes and abdominal pain [13]. However, in severe cases, leptospirosis has several consequences including epistaxis, haemoptysis, jaundice, meningo-encephalitis and multiple organ failure [14,15].

Furthermore, diagnosis of leptospirosis by culture is laborious and difficult, and can take up to three months [16], and the microscopic agglutination test (MAT), depends on anti-Leptospira antibodies that can only be detected by the second week after initial symptoms [17]. To add to this, the dynamics that follow infection with leptospira are complex. During the acute phase, which lasts for about 10 days, the leptospira can often be cultured from blood or cerebrospinal fluid (CSF), disappear from the blood when specific antibody response is detected (at approximately 10 days), leptospirosis. During the second phase of infection, which may last up to several months, bacteriuria is often intermittent [18]. Recently molecular techniques have been developed that can detect the presence of leptospiral DNA in blood, urine or spinal fluid, and have shown to be highly sensitive and specific [19]. Sensitive assay for the detection of Leptospira DNA that is based upon amplification of the Leptospira rrs (16S)

gene have been developed [20]. Data suggest that the PCR assay can be used on biological samples such as CSF, urine, or blood as a diagnostic tool for cases of suspected leptospirosis [21].

In this study we investigated an outbreak of unknown febrile illness that occurred in Naungo area and was detected at Mbekenyera Health Center, in Lindi Region, southern Tanzania, in July 2022. Given the clinical presentation of the suspected cases and the anthropogenic activities in the affected area, which are predominated with livestock farming, we highly suspected an outbreak of leptospirosis. To undertake our investigation, we used next-generation sequencing and Bioinformatic analysis using standard pipelines to identify the aetiological agent. The detection of pathogenic Leptospira was afterwards performed on plasma using real-time PCR using primers that target the rrs (16S rRNA) gene of pathogenic Leptospira.

METHODS

Setting and Suspected Cases

The present epidemiological investigation was based on the unusual cases and deaths attending at Mbekenyera Health Center on 5th and 7th July 2022 respectively. These two suspected cases presented with fever, difficulty in breathing, generalized body malaise, and bleeding from the nose (epistaxis) and died within 2 hours of arrival. These initial cases, as well as the subsequent ones, were from Naungo area, a temporary residence for seasonal farming and livestock keeping, located in the neighboring Kilwa district (figure 1 A&B).

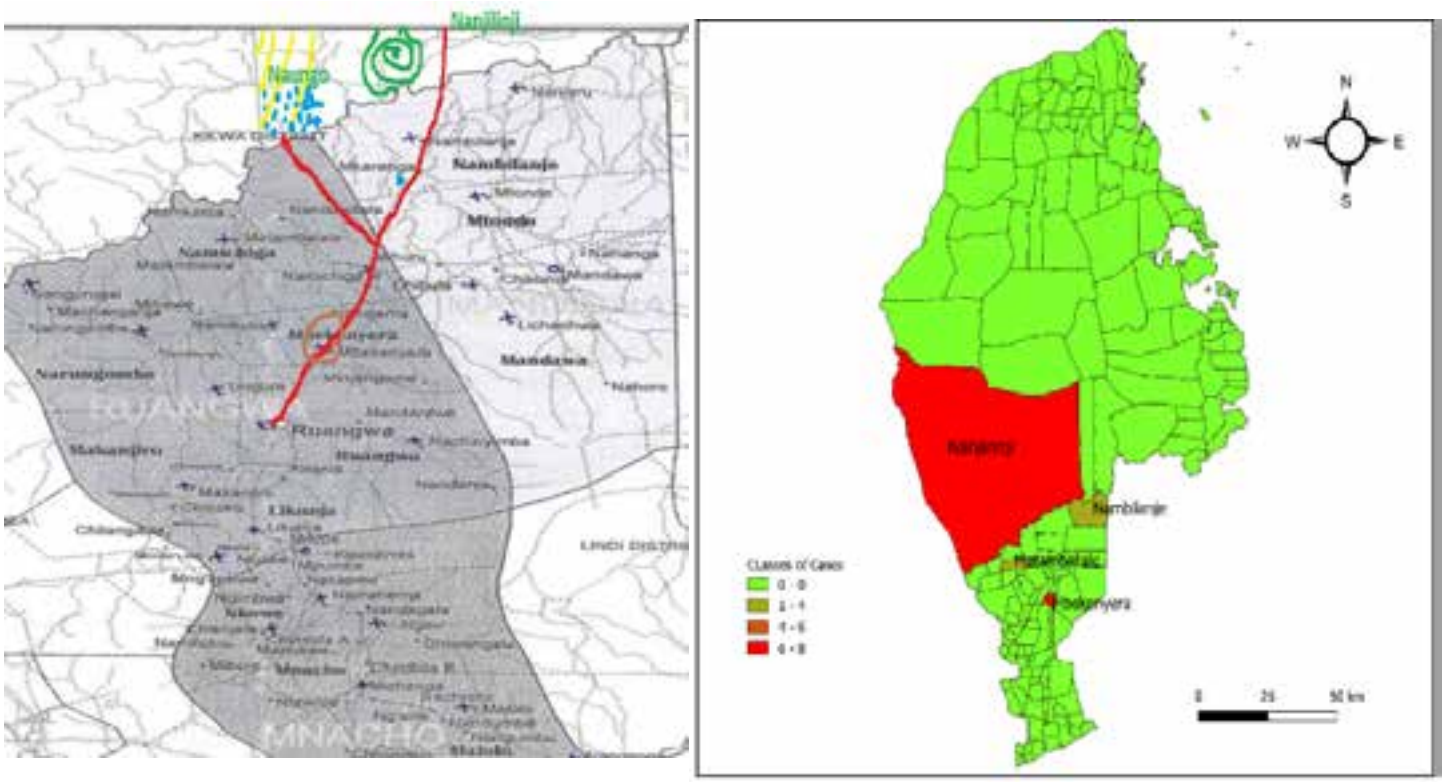

Figure 1A&B: Affected Wards with Leptospirosis Cases, Ruangwa and Kilwa Districts

Epidemiological Investigation

Case Detection

Cases were identified using standard case definitions that were developed based on the presenting symptoms of the first patient.

Suspected Case: Any person from Ruangwa or Kilwa Districts, presenting with fever and bleeding from the nose, bleeding from the ear, epistaxis, blood in vomitus, in sputum, on stool or in urine with or without difficulty in breathing, headache, abdominal pain, diarrhea, and vomiting from 5th July 2022.

Probable Case: Any suspected case with the above-mentioned symptoms and signs, coming from Naungo area in Nanjilinji ward, Kilwa District or any dead person who presented with the above-mentioned symptoms and signs

Confirmed Case: Any suspect or dead body confirmed in the laboratory to have been infected by the pathogen (Leptospira)

Active Case Finding

Active case finding was performed in the communities where the cases had reported in the health facilities, as well as in the affected area, ie. Naungo area, which is a temporary residence for farmers from Ruangwa and Kilwa Districts, who seasonally shifted from their homes for farming. A questionnaire was used to obtain information from the cases. During active case finding a line list was filled. A treatment center was established at Mbekenyera Health Center.

Contact Tracing

Cases were interviewed to identify people (contacts) with whom they had interacted from the time they started developing symptoms. These contacts were followed up for 21 days, the maximum incubation period for most Viral Haemorrhagic Fevers, in order to detect if any of them had developed symptoms of the condition under investigation so as to interrupt transmission.

Sample Collection and Processing

From each suspected case, whole blood for serum and plasma were collected in a clot activator vacutainer tube and Ethylenediaminetetraacetic acid (EDTA) tube, respectively. Four (4) vacutainer tubes of 5 ml were collected for each suspected case. Blood was kept in coolers filled with ice packs from the field and then taken to the district hospital laboratory in less than 10 hours for centrifugation in order to separate serum from plasma. Plasma and serum were kept in 2 vials each with 2.5 ml respectively and stored at 20 °C. One sample of plasma and serum was for testing and the rest for backup at the National Public Health Laboratory. Unique identification numbers were put on each sample including all important information along with test requisition forms, which were carefully filled showing the kind of tests to be performed. Samples were securely transported to Dar es Salaam at 2-8 °C in ice packs. Samples were processed and tested at the National Public Health Laboratory and SACIDS Foundation for One Health laboratory of the Sokoine University of Agriculture.

Laboratory Investigation

Plasma samples were tested for COVID-19, influenza and viral haemorrhagic fevers using reverse transcription polymerase chain reaction (RT-PCR) after RNA extraction. Complementary DNA synthesis was conducted from total extracted RNA followed by next-generation sequencing using Oxford MinION nanopore technology. Bioinformatics analysis was performed using standard pipelines to identify the aetiological agent. Detection of pathogenic Leptospira was afterwards performed on plasma using real-time PCR using primers that target the rrs (16S rRNA) gene of pathogenic Leptospira.

Environmental Investigation

Water samples from the sources used in the affected area were collected. Five water samples were collected, 2 from river Mbwemkulu and 2 from Naungo well and 1 from Kakulu well.

Analysis of Water Samples

Water samples were cultured to identify the cause of the outbreak. Samples were centrifuged to concentrate the contents before culture. The deposit was then cultured into chocolate agar (CA), 7% sheep blood agar (SBA) and MacConkey agar (MCA) and then incubated at 36.5 °C for 24 hours in ambient air. From all samples that had visible growth in some of the inoculated media, fresh isolated colonies were prepared for identification of pathogen using a VITEK MS equipment. VITEK MS equipment uses a principle of Matrix Assisted Laser Desorption Ionization Time-of-Flight (MALDI-TOF) that identifies a bacterial pathogen to species level.

Table 1: Demographic characteristics of Leptospirosis outbreak cases in Ruangwa District- Lindi, July 2022 (N=20)

Variable	Frequency (n)	Percentage (%)
Sex		
F	5	25.0
M	15	75.0
Age group		
18 to 35	4	20.0
36 to 55	13	65.0
55 and above	3	15.0
Mean 43.6 SD 13.4		
Ward		
Matambalale	1	5.0
Mbekenyera	9	45.0
Nambilanje	3	15.0
Njirinji	7	35.0
Incident Area		
Mkaranga	1	5.0
Namapanya	1	5.0
Naungo	18	90.0
Permanent Residency		
Maisha Marefu	2	10.0
Mbekenyera	5	25.0
Milola	1	5.0
Mkaranga	1	5.0
Nachiulaga	1	5.0
Nambilanje	1	5.0
Namkatila	1	5.0
Nanjaru (Majengo)	1	5.0
Nanjirinji	7	35.0
Occupation		
Peasant	20	100.0

Data Processing and Analysis

Data were entered in the Microsoft Excel program and checked for completeness and if correctly filled in. Analysis of quantitative data was done by using EpiInfo software version 7 (CDC, Atlanta, GA, USA). Descriptive statistics were used to summarize data. Descriptive statistics was performed whereby categorical variables were summarized by using frequency and percentage while continuous variable (age) by mean and standard deviation.

Ethical Considerations

The investigating team did not seek ethical clearance since the investigation was conducted as part of a response to an outbreak by the Tanzania Ministry of Health. Confidentiality was maintained by sharing the information only among the people involved in the investigation. Privacy was maintained by assigning a special identification number to each case, from whom consent was obtained before the interview.

RESULTS

Descriptive Epidemiology

Active case finding using the case definition yielded a total of 20 suspected cases of leptospirosis whereby all were peasants and majority, 15(75.0%) were males. A total of 4 administrative wards were affected (Table 1). Out of the suspected cases, 15 were laboratory confirmed to have pathogenic Leptospira. Out of the confirmed cases, 14 recovered while one case died making a case fatality rate (CFR) of 6.7%. Three cases were negative for leptospirosis, of whom 1 died.

Samples were not collected from two suspected cases, of whom, 1 had died. The majority of cases reported the onset of their symptoms between 2nd and 6th July 2022. The disease onset of the last reported cases was 7 July (Figure 2). Three-quarters of the cases were male. Six-tenths of the cases were aged between 36 to 55 years with a mean age of 43.6 and a standard deviation of 13.4. Almost all (nine-tenths) of the cases were coming from Naungo village (Table 2). Majority of the cases presented with general body weakness, headache, and fever. (Figure 3)

Table 2: Leptospirosis positivity rate by demographic characteristics in Ruangwa District, July 2022 (N=18)

Variable	Number of suspects	Positive n (%)	Negative n (%)
Age group(years)			
18 to 35	4	3 (75.0)	1(25.0)
36 to 55	12	12(100.0)	0(0.0%)
55and above	2	0(0.0)	2(100.0)
Sex			
Female	4	3 (75.0)	1(25.0)
Male	14	12(85.7)	2(14.3)
Incident area			
Mkaranga	1	0 (0.0)	1(100.0)
Namapanya	1	0 (0.0)	1(100.0)
Naungo	16	15 (93.8)	1(6.2)

**N=18 because only those who were tested for leptospirosis in the laboratory were included in this table.*

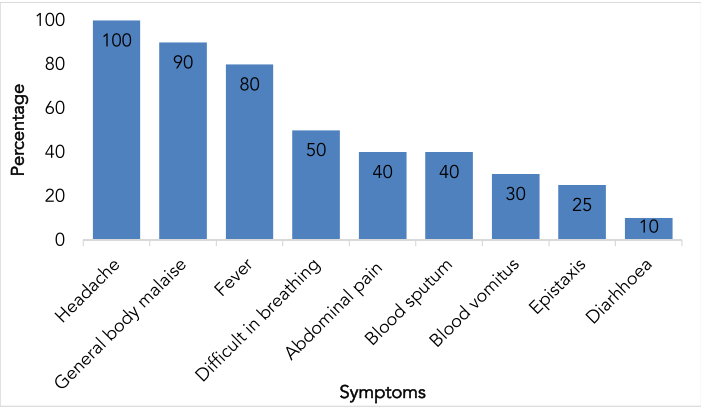

Figure 3: Symptoms and signs presented by leptospirosis cases in Ruangwa Lindi, July 2022 (N=20)

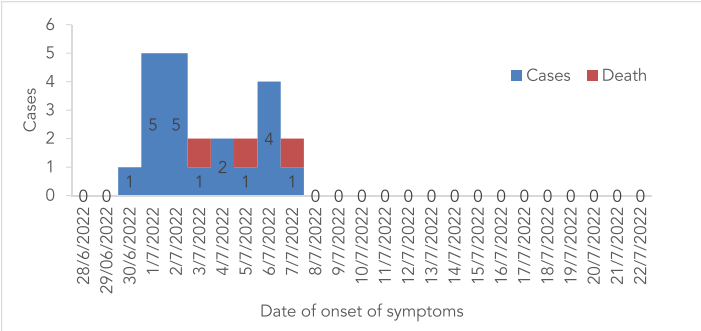

Figure: 2 Distribution of leptospirosis cases, by date of onset, Ruangwa Lindi, July 2022 (N=20)

As presented in Figure 3, the most common reported symptoms were headache, general body malaise and fever while diarrhea was least reported.

Water Analysis Findings

The following organisms were isolated from water samples, Enterococcus faecalis, Pseudomonas alcaligenes, Aeromonas hydrophila, Comamonas testosterone, Chryseobacterium gleum, Acinetobacter junii, Comamonas aquatic and Exignobacterium acetylicum.

Environmental Investigation Findings

The investigation conducted revealed that the affected people were peasants who perform their agricultural activities in a government wild reserve area called Naungo, located in Nanjilinji ward, of Kilwa district neighbouring Ruangwa District.

Contact Follow-up

From the identified cases, total of 15 contacts were listed and followed up for 21 days. None of the identified contacts had presented with reported symptoms.

DISCUSSION

In our investigation, using advanced molecular techniques, we found a significant number of the suspected cases to have leptospirosis. All cases were peasants that have established a temporary camp for agriculture in a wild reserved area at Naungo village, where they normally stay for six months. Livestock keepers feed their animals in the same field after the harvest season. Most of the cases presented with headache, general body malaise, and fever. Being a zoonotic disease, we attribute this outbreak to have originated from contaminated water from wells or river Mbwemkulu consumed by the farmers. Similar outbreaks have been reported in Australia among raspberry farmers in 2018 [22]an outbreak of leptospirosis was identified among raspberry workers from a mixed-berry farm in New South Wales, Australia. Initial testing had not revealed a cause, but eventually leptospirosis was detected via polymerase chain reaction (PCR, with the outbreak occurring during the sesame harvesting season[23].

Of particular note, in this outbreak males were the most affected compared to women, and cases were mainly aged between 35 and 55 years. This can be explained by the fact that men are most involved in farming activities while women are left at home taking care of children. These results are congruent with investigations conducted in Australia.(24)Australia, during the wet season in early 2021. There were 14 outbreak cases; most

were male (12/14, 86%. This age distribution can be explained by the fact that agricultural activities require a well-abled person, a finding which is similar to an outbreak of leptospirosis reported in Germany in 2014 among strawberry harvesters [18].

This investigation reveals a number of important findings i) the significance of a strong rapid and coordinated response that involved deployment of experts from various sectors ii) the importance of PCR for rapid and direct diagnosis of leptospirosis and can be deployed for other febrile illnesses iii) need to sensitize communities of occupational-related health risks and required protective measures, iv) the need for deployment of mobile genetic sequencers at the site of outbreak and v) that it is crucial to build an electronic health system to promote early identification and alert of epidemics at the local level.

The strength of our investigation was that it was highly coordinated involving experts from the national and regional level, who collaborate with local health authorities, and the flow of information was smooth and rapid. The using advanced molecular techniques lead to early detection of the outbreak.

Control Measures

Patients with symptoms which met standard case definitions were isolated in the ward, suspected cases were advised for self-isolation while waiting for final results. Peasants and community members were educated on preventive measures including avoiding eating meat from dead wild animals and not drinking milk from sick cattle.

CONCLUSION

The causative agent of the outbreak among peasants at Naungo was confirmed as pathogenic Leptospira. This outbreak alerts public health officials and the community of its epidemic potential. The initiation of leptospirosis surveillance in the Tanzania IDSR system is highly recommended. Occupations with an increased risk of leptospirosis should be aware of its prevention mechanism together with the signs and symptoms so they can report to a health facility immediately.

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MUHTASARI

Uchunguzi wa Epidemiologia wa Mlipuko wa Homa ya Mgunda (Leptospirosis) Wilaya ya Ruangwa, Lindi – Kusini mwa Tanzania, Julai 2022

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Usuli: Homa ya Mgunda ni ugonjwa uenezwao kutoka kwa wanyama kwenda kwa binadamu, unaosababishwa na bakteria aina ya Leptospira na ni kati ya magonjwa muhimu ambayo yalitoweka, na sasa yanaibuka upya. Nchini Tanzania, mlipuko wa Homa ya Mgunda uliripotiwa hapo awali huko Buhigwe, mkoani Kigoma mwaka 2004, kwa kutumia vipimo ambavyo huenda vingeweza kutoa majibu yanayofanana, sambamba na vimelea vingine vya magonjwa. Utafiti huu, kwa kutumia vipimo mahsusi vya kimaabara, ulilenga kuhakiki na kubainisha chanzo cha Homa ya Mgunda na jinsi ugonjwa huo ulivyoenea kwenye wilaya za Ruangwa na Kilwa katika kipindi cha mwezi Julai 2022.

Mbinu:

Mfumo rasmi wa Usimamizi wa Matukio ulitumiwa kuratibu mwitikio wa mlipuko huu. Utafutaji wa kesi ulifanyika ili kubaini watu wenye dalili zinazofanana na ugonjwa husika. Watu waliotangamana na wagonjwa waliorodheshwa na kufuatiliwa hali zao. Wagonjwa walitibiwa katika eneo maalum tengefu. Orodha ya watu walioshukiwa kuwa na ugonjwa ilitumiwa wakati wa uchunguzi wa milipuko huo.

Uchunguzi wa kimaabara kutoka kwenye sampuli 20 za washukiwa wa Homa ya Mgunda ulifanyika kupitia "next generation sequencing" kwa kutumia teknolojia ya nanopore ya Oxford MinION. Uchanganuzi wa kibiolojia ulifanyika kwa kutumia "Standard Pipelines" ili kutambua kisababishi cha

ugonjwa. Ugunduzi wa Leptospira ulifanywa kwenye "Plasma" kwa njia ya PCR kwa kutumia "Primers" zinazolenga jeni ya rrs (16S rRNA) ya Leptospira. Uchambuzi wa takwimu ulifanyika kwa kutumia programu ya EpiInfo toleo la 7 (CDC, Atlanta, GA, USA).

Matokeo: Kati ya watu 20 walioshukiwa kuwa na ugonjwa, 15 walithibitika kuwa na vimelea vya bakteria aina ya Leptospira. Watu 14 kati ya waliothibitika, walipona na kuruhusiwa, huku mtu mmoja akiwa amepoteza maisha. Hii ilifanya kiwango cha waliokufa kati ya waliougua ugonjwa huo (CFR) kuwa ni asilimia 6.7. Kulikuwa na visa vingi zaidi vya watu walioanza kupata dalili za Homa ya Mgunda kati ya tarehe 2 na tarehe 6 Julai, 2022. Wanaume walikuwa na Idadi kubwa zaidi (Robo tatu) ya waliougua na takriban wote waliougua walitoka katika kijiji cha Naungo.

Hitimisho: Mlipuko wa ugonjwa wa Homa ya Mgunda uliotokea mkoani Lindi, kusini mwa Tanzania, ulikuwa na kiwango cha asilimia 6.7 cha watu waliokufa kati ya waliougua. Mlipuko huu umeonesha umuhimu wa kuimarisha ufuatiliaji wa magonjwa yaliyopewa kipaumbele (IDSR) kwa ajili ya utambuzi wa haraka wa magonjwa katika ngazi ya jamii. Hii ni pamoja na kuimarisha matumizi ya simu pamoja na technolojia inayotumia kompyuta katika ufuatiliaji na uchunguzi wa magonjwa ya kuambukiza.

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