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**KNOWLEDGE, ATTITUDES, AND PRACTICES TOWARDS COVID-19:**

**ESSENTIAL FEATURES**

## An Online Cross-Sectional Survey of Tanzanian Residents

**Integrated  
Disease  
Surveillance  
and Response  
(IDSR):  
Cumulative  
report for  
six months,  
January – June  
2021**



**Magnitude  
Of Viral  
Hepatitis B  
and C Infection  
Among Family  
Replacement  
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in The Year  
2020 in  
Tanzania  
Mainland**

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# Integrated Disease Surveillance and Response (IDSR): Cumulative report for six months, January – June 2021

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## ABSTRACT

**Introduction:** The Ministry of Health, Community Development, Gender, Elderly and Children uses the Integrated Disease Surveillance and Response (IDSR) strategy to monitor reportable diseases and conditions to detect and respond to the leading causes of illness, death, and disability. This paper reports the results of analysis of the cumulative IDSR data for the 6-month period of January to June 2021. Data were analyzed to assess regional performances in reporting data and to count the number of cases and deaths of each disease or condition by age, sex, month, and region.

**Analysis:** All 26 regions of Tanzania Mainland submitted weekly reports to the national level. The regions achieved an average of 92.8% in completeness (i.e., percentage of districts providing complete reports to the region) and 83.2% in timeliness (i.e., percentage of districts reporting on time to the region). The national target for both indicators is >80%. During the 6-month period, a total of 894,057 cases and 9,626 deaths were reported for all IDSR diseases and conditions. The most reported condition was pneumonia (n=418,977, 46.9%). Animal bites, diarrhea, pneumonia, and typhoid were reported in all months under review and in all 26 regions. Most cases (n=833,781, 92.3%) were reported among the population aged below five years. Most conditions were only reported in the population aged below five years except for animal bites and typhoid. Of the 9,626 reported deaths, most cases were caused by pneumonia (n=4109, 42.7%), diarrhea (n=2,876, 29.9%), and typhoid (n=2476, 25.7%). Consequently, the population aged below 5 years had the highest number of deaths (n=8434, 87.6%). The condition with the highest case fatality rate was typhoid. Of the 79,026 cases with suspected typhoid, 2,476 died (CFR=3.1%).

**Conclusion:** Regional performance, based on completeness and timeliness, improved when compared with the corresponding period of the previous year, January to June 2020. Completeness and timeliness averages met the national standard of ≥80%, which suggests that the MOHCDGEC is improving in data capturing, early detection, and reporting that guides immediate responses to control and prevent disease outbreaks. There is an urgent need for the government to strengthen preventive and treatment measures for diarrhea and pneumonia diseases, which were among the leading causes of death in children aged below five years.

## BACKGROUND

In Tanzania surveillance for reportable diseases and conditions under the Integrated Disease Surveillances and Response (IDSR) are published weekly and monthly under the Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC). It should be noted that IDSR is a strategy for multi-disease surveillance of selected priority diseases and conditions. It links the community, health facility, district, and national levels to provide timely information to help public health managers and decision-makers detect and respond to the leading causes of illness, death, and disability in African countries. This article reports cumulative IDSR data for a 6-month period from January to June 2021. Data were analyzed to assess the national and regional performances in report timeliness, completeness and the cumulative number of cases and deaths by age, sex, and region.

## ANALYSIS OUTCOME

### Health Facility Performance

All 26 regions from Tanzania Mainland submitted weekly reports of reportable diseases and conditions to the national level. The overall performance for timeliness and completeness for January to June 2021 was 83.2% and 92.8% respectively (Figure 1). The Month of May had the highest scores for both timeliness (93.7%) and completeness (97.5%),

and all scores for completeness were above the set national standard of ≥ 80%. (Table1).

**Table 1: Average Timeliness and Completeness of Health Facility Reporting by Month, January – June 2021**

Month	Completeness (%)	Timeliness (%)
January	89.5	74.6
February	87.2	73.9
March	89.7	78.7
April	94.8	87.6
May	97.5	93.7
June	97.3	93.1
Overall Performance	92.8	83.7

*Figure 1: Timeliness and Completeness of Health Facility Reporting from the 26 regions, January – June 2021*

## DISTRIBUTION OF CASES AND DEATHS

Total reported cases for all reportable diseases and conditions from January to June 2021 were 894,057. Most cases were reported among the population aged below five years (n=833,781, 93.3%) (Table 2). The most commonly reported condition was pneumonia (n=418,977, 46.9%). There was a total of 9,626 deaths of which, 4,109 (42.9%) were due to pneumonia.

**Table 2: Numbers of cases and deaths by age and sex for all conditions and diseases reported via IDSR, January - June 2021**

Condition/Disease		Total	Below 5 yrs Male	Below 5 yrs Female	Above 5yrs Males	Above 5yrs Female
AFP*	Cases	243				
	Deaths	0				
Animal Bites*	Cases	14,723	2,505	2,242	5,242	4,734
	Deaths	0	0	0	0	0
Anthrax*	Cases	6				
	Deaths	0				
Bloody Diarrhoea*	Cases	71				
	Deaths	0				
Dengue Fever*	Cases	18				
	Deaths	0				
Diarrhoea	Cases	377,789	190,765	187,024	0	0
	Deaths	2,876	1,497	1,379	0	0
Measles*	Cases	573				
	Deaths	0				
Pneumonia	Cases	418,977	217,002	201,975	0	0
	Deaths	4,109	2,835	1,274	0	0
Rabies*	Cases	8				
	Deaths	6				
SARI*	Cases	2,623				
	Deaths	159				
Typhoid	Cases	79,026	29,446	2,822	20,969	25,789
	Deaths	2,476	811	638	489	538
Total	Cases	894,057	439,718	394,063	26,211	30,523
	Deaths	9,626	5,143	3,291	489	538

\*Deaths and cases of Rabies and SARI were not disaggregated by age groups for this reporting period

Table 3 provides the number of cases and deaths for each reportable disease and condition by month for the reporting period. Cases were reported every month for five of the 11 conditions and diseases (animal bites, diarrhea, pneumonia, SARI, and typhoid). April had the highest number of cases, 170,246, due to high case counts of diarrhea (n=74,270) and pneumonia (n=81,142). June had the lowest number of cases (n=132,207). The largest proportions of total reported deaths (N=9,626) were attributed to pneumonia (n=4,109 42.7%), diarrhea (n=2,876, 29.9%), and typhoid

(n=2,476, 25.7%). The condition with highest case fatality rate (CFR) was suspected cases of typhoid. Of the 79,026 cases with suspected typhoid, 2,476 died (CFR=3.1%).

Table 4 lists the number of reportable diseases and conditions by region. All 18 cases of dengue were reported from Dar es Salaam region. The 6 cases of anthrax were reported from Arusha and Kilimanjaro regions. The number of diarrhea cases (N=377,789) was highest in Dar Es Salaam region (n=30,549, 8.1%). The number of pneumonia cases (N=418,977) was highest in Arusha region (n=42,230,10.1%).

**Table 3: Number of cases and deaths caused by reportable conditions, by month, January – June 2021**

Conditions/ Diseases	January		February		March		April		May		June		Total		CFR* %
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
AFP	0	0	0	0	0	0	82	0	78	0	83	0	243	0	0.0
Animal Bites	1,951	0	2,316	0	2,365	0	3,285	0	2,397	0	2,409	0	14,723	0	0.0
Anthrax	0	0	0	0	0	0	4	0	2	0	0	0	6	0	0.0
Bloody Diarrhoea	0	0	0	0	0	0	66	0	3	0	2	0	71	0	0.0
Dengue Fever	0	0	0	0	0	0	0	0	0	0	18	0	18	0	0.0
Diarrhoea	61,348	402	62,927	457	59,355	441	74,270	627	61,443	465	58,446	484	377,789	2,876	0.8
Measles	0	0	0	0	0	0	109	0	209	0	255	0	573	0	0.0
Pneumonia	54,376	339	71,630	381	70,159	433	81,142	555	79,958	1,830	61,712	571	418,977	4,109	1.0
Rabies	0	0	0	0	0	0	1	0	2	2	5	4	8	6	0.8
SARI	323	19	823	64	476	49	407	13	370	8	224	6	2623	159	0.1
Typhoid	22,105	397	10,116	243	8,478	520	10,880	549	18,394	429	9,053	338	79,026	2,476	3.1
Total	140,103	1,157	147,812	1,145	140,833	1,443	170,246	1,744	162,856	1,489	132,207	1,403	894,057	9,626	

**Table 4: Number of reported cases by region, January – June 2021**

Regions	AFP	Animal bite	Anthrax	Bloody Diarrhoea	Dengue Fever	Diarrhoea	Measles	Pneumonia	Rabies	SARI	Typhoid	Total
Arusha	19	1,093	3	0	0	22,216	49	42,230	1	753	982	67,346
Dar Es Salaam	10	677	0	0	18	30,549	11	33,254	0	650	4,686	69,855
Dodoma	13	1,376	0	0	0	29,334	39	33,589	0	818	6,520	71,689

Regions	AFP	Animal bite	Anthrax	Bloody Diarrhoea	Dengue Fever	Diarrhoea	Measles	Pneumonia	Rabies	SARI	Typhiod	Total
Geita	17	424	0	0	0	13,787	5	9,492	0	0	1,732	25,457
Iringa	3	551	0	0	0	6,148	12	8,116	0	0	1,042	15,872
Kagera	7	525	0	0	0	14,458	15	13,358	0	0	2,561	30,924
Katavi	7	168	0	0	0	4,453	23	2,671	0	0	402	7,724
Kigoma	8	402	0	62	0	19,409	37	14,086	0	21	707	34,732
Kilimanjaro	4	735	3	3	0	9,369	10	26,899	1	1	1,607	38,632
Lindi	14	226	0	0	0	6,989	23	7,587	0	0	1,618	16,457
Manyara	7	1,055	0	0	0	19,747	22	34,788	0	31	2,525	58,175
Mara	13	479	0	0	0	10,979	21	14,669	0	0	699	26,860
Mbeya	3	671	0	1	0	17,338	18	17,641	0	0	18,846	54,518
Morogoro	15	1,147	0	0	0	18,469	38	20,830	3	0	5,988	46,490
Mtwara	14	285	0	0	0	8,769	60	9,227	0	176	862	19,393
Mwanza	23	640	0	0	0	22,567	28	17,432	0	173	1,140	42,003
Njombe	4	354	0	0	0	4,191	26	5,938	0	0	3,357	13,870
Pwani	2	546	0	0	0	9,807	10	10,408	0	0	556	21,329
Rukwa	5	404	0	0	0	18,755	5	9,654	0	0	10,913	39,736
Ruvuma	8	595	0	0	0	10,406	24	12,443	0	0	2,699	26,175
Shinyanga	8	181	0	0	0	9,785	5	10,501	2	0	563	21,045
Simiyu	12	323	0	0	0	12,406	43	9,223	0	0	766	22,773
Singida	4	506	0	0	0	12,455	7	9,214	0	0	2,136	24,322
Songwe	2	317	0	0	0	13,739	10	9,249	0	0	3,338	26,655
Tabora	13	532	0	0	0	16,696	21	14,159	1	0	2,269	33,691
Tanga	8	511	0	5	0	14,968	11	22,319	0	0	512	38,334
Total	243	14,723	6	71	18	377,789	573	418,977	8	2,623	79,026	894,057

## CONCLUSION

Analysis of IDSR data for reporting period January to June 2021 showed that regional performance, based on completeness and timeliness, improved when compared with the corresponding period of the previous year, January to June 2020. Completeness and timeliness averages met the national standard of  $\geq 80\%$ , which suggests that the MOHCDGEC is improving in data capturing, early detection, and reporting that guides timely responses to control and prevent disease outbreaks. There is an urgent need for the government to strengthen preventive and treatment measures for diarrhea and pneumonia, which were among the leading causes of death in children aged below five years

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# MUHITASARI

## Mkakati wa Ufuatiliaji na Udhhibiti wa Magonjwa ya Mlipuko (IDSR): Ripoti ya miezi Sita, Januari –June 2021

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Utangulizi: Wizara ya Afya, Maendeleo ya Jamii, Jinsia, Wazee na Watoto (WAMJW) hutumia mkakati wa Ufuatiliaji na Udhhibiti 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 2021. Takwimu zilichambuliwa kutathmini utendaji wa Mkoa katika katika utoaji wa taarifa na kufahamu idadi ya visa vya kila ugonjwa au hali kulingana na umri, jinsia, mwezi, na Mkoa.

Uchambuzi: Mikoa yote 26 ya Tanzania Bara iliwasilisha ripoti za kila wiki kwa ngazi ya Kitaifa. Mikoa ilipata wastani wa asilimia 92.8 kwa ukamilifu (yaani, asilimia ya Wilaya zinazotoa ripoti kamili kwa ngazi ya Kitaifa) na asilimia 83.2 kwa wakati unaofaa (ufanisi) (kwa mfano, asilimia ya Wilaya zinazoripoti kwa wakati kwa ngazi ya kitaifa). Wastani wa ukamilifu na ufanisi vilifika lengo la Kitaifa la zaidi ya asilimia 80 (> asilimia 80).

Katika kipindi cha miezi 6, jumla ya visa 894,057 na vifo 9,626 vya magonjwa na hali zote za IDSR viliripotiwa. Hali iliyoripotiwa zaidi ni homa ya mapafu (n = 418,977, asilimia 46.9). Kung'atwa na wanyama, kuhara, homa ya mapafu, na homa ya matumbo (typhoid) iliripotiwa katika miezi yote sita iliyofanyiwa kazi na katika mikoa yote 26. Visa vingi (n = 833,781, asilimia 92.3) viliripotiwa kwa watu wa umri chini ya miaka mitano. Matukio menegi yaliripotiwa tu kwa watu walio chini ya miaka mitano isipokuwa kung'atwa na wanyama na homa ya matumbo. Kati ya vifo 9,626 vilivyoripotiwa, visa vingi vilisababishwa na homa ya mapafu (n = 4109, asilimia 42.7), kuhara (n = 2,876, asilimia 29.9), na homa ya matumbo (n = 2476, asilimia 25.7). Kwa hivyo, watu walio chini ya umri wa miaka 5 walikuwa na idadi kubwa zaidi ya vifo (n = 8434, asilimia 87.6). Ugonjwa uliokuwa na kiwango cha juu cha vifo ulikuwa ni homa ya matumbo. Kati ya visa 79,026 vilivyoshukiwa kuwa na homa ya matumbo, 2,476 walikufa (CFR = 3.1%).

**Hitimisho:** Utendaji wa mikoa kulingana na ukamilifu na ufanisi uliboreka ikilinganishwa na kipindi kama hicho katika mwaka uliopita, Januari hadi Juni 2020. Wastani wa ukamilifu na ufanisi ulifikia kiwango cha kitaifa cha asilimia 80 au zaid ( $\geq 80$ ), ambayo inaonyesha kwamba Wizara ya Afya, Maendeleo ya Jamii, Jinsia, Wazee na Watoto (WAMJW) inaboresha ukusanyaji wa takwimu, kugundua mapema, na kutoa taarifa ambayo inatoa mwongozo wa utekelezaji wa haraka wa kudhibiti na kuzuia mlipuko ya magonjwa. Hata hivyo kuna umhimu kwa Serikali kuimarisha hatua za kinga na matibabu ya magonjwa ya kuhara na homa ya mapafu, ambayo ndiyo yalikuwa miongoni mwa magonjwa yaliyoongoza kusababisha vifo kwa watoto wenye umri chini ya miaka mitano.

# Knowledge, Attitudes, and Practices Towards COVID-19: An Online Cross-Sectional Survey of Tanzanian Residents.

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## ABSTRACT

**Background:** The Corona Virus Disease -19 (COVID-19) pandemic is a global health emergency that requires the adoption of unprecedented measures to control its rapid spread. Tanzanians' adherence to control measures is affected by their knowledge, attitudes, and practices (KAP) towards the disease. This study was carried out to investigate knowledge, attitudes and practices towards COVID-19 among residents in Tanzania during the April – May 2020 period of the epidemic.

**Methods:** This cross-sectional study analyzes responses of self-selected Tanzanians who responded to an invitation to complete an online questionnaire. Survey Monkey tool was used to develop the questionnaire used for data collection. The survey assessed demographic characteristics of participants as well as their knowledge, attitudes, and practices toward COVID-19. A Chi-square analysis was used to compare proportions. Analysis of variance (ANOVA) was used to determine differences among age groups, whereas results were considered significant if the p-value was <0.05

**Results:** Four hundred residents completed the survey. The mean age of study participants was 32 years, and the majority was female (n=216, 54.0%). There were no significant differences in demographic variables. Participants with a bachelor's degree or above (n=241, 60.3%) had higher scores. Overall, 84.4% (n=338) of participants had good knowledge, which was significantly associated with education level (p=0.001). Nearly all participants (n=384, 96.0%) had confidence that COVID-19 will be eliminated. The majority of respondents (n=308, 77.0%) did not go to a crowded place in recent days. Multiple linear regression analysis showed that males, age-group 16-29 years, and education of secondary or lower (OR = 1.2, CI = 1.3–1.5) were significantly associated with lower knowledge score.

**Conclusions:** Our findings revealed good knowledge, optimistic attitudes, and appropriate practices towards preventing COVID-19 infection. Suggesting that community-based health education programs about COVID-19 is helpful and necessary to control the disease.

Keywords: COVID-19, Knowledge, Attitude, Practices, Tanzania

## INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a disease caused by a novel coronavirus that was first detected in December 2019 in Wuhan, China. It is characterized by sudden onset, fever, fatigue dry cough, myalgia, and dyspnea. Data show that 10-20% of the patients develop severe cases, which are characterized by acute respiratory distress syndrome, septic shock, difficult-to-tackle metabolic acidosis, and bleeding and coagulation dysfunction [1,2]. World Health Organization (WHO) declared it a public health emergency of international concern and has called for collaborative efforts to prevent its rapid spread [5]. Although clinical data have shown the overall case fatality rate of COVID-19 ranges 2-5% worldwide, which is much lower than those of Severe Acute Respiratory Syndrome (SARS) (9.5%), MERS (34.4%), and H7N9 (39.0%), pathogens continue to emerge and spread to the population at risk. The threat of more contagious and virulent variants demands public health actions to move from purely treatment activities to preventive measures practiced by the public [1-3]. The ongoing COVID-19 pandemic has spread very quickly, and to date at the time of the survey, the virus had reached over 200 countries altogether, resulting in 236,368,875 laboratory-confirmed infections and 4,826,358 deaths [4].

Tanzania is among African countries that have been affected by the COVID-19 pandemic [6]. Until April 24, 2021 government authorities announced only 284 cases of COVID-19, among them 256 were in stable condition, seven in special care, 37 recovery, and 10 deaths [7]. Dar-es-salaam City and Zanzibar Island have the highest number of cases.

Other regions affected were Mwanza, Dodoma, Pwani, Kagera, Manyara, and Morogoro [8]. Several measures have been adopted to control COVID-19 transmission in Tanzania, including closing all schools and universities, observing physical distancing, prohibiting mass gatherings, isolating suspected cases, and caring for confirmed and suspected cases. Moreover, Tanzania residents were obliged to perform hand washing with soap and running water or alcohol-based hand sanitizer and urged to wear face masks.

To effectively control COVID-19 in Tanzania, individuals' adherence to these control measures is essential [9-10]. Reports from different outbreaks recommend that knowledge and attitudes towards infectious disease can sometimes result in a level of panic among the population and complicate endeavors to prevent the spread of the disease [9-12].

There is an urgent need to understand the public's awareness of COVID-19 in Tanzania to facilitate outbreak management of COVID-19. This study was carried out to investigate knowledge, attitudes, and practices (KAP) towards COVID-19 among residents in Tanzania during the March –April 2020 period of the pandemic.

## MATERIAL AND METHODS

### Study design

This was a cross-sectional survey among residents conducted from 15<sup>th</sup> – 28<sup>th</sup> of April 2020.

## Sample size and selection

Participants were self-selected when they choose to answer the questionnaire. A total of 5,000 residents were assumed to actively use media connections. Calculation using statistical software gave a minimum sample of 384 [13]. To adjust for non-responders 400 residents conveniently receive the link with the Questionnaire [14].

## Data collection

Due to the infectious nature of disease transmission, online survey forms were used to collect the data. Survey Monkey tool was used to develop a link and KAP questionnaire for data collection.

The questionnaire consisting of 20 questions was prepared following anonymous online KAP questionnaire [20]. This template was modified and adapted to the Swahili language. It was then validated and piloted according to guidelines for clinical and community management of COVID-19 by the Tanzanian Ministry of Health Community Development, Gender, Elderly and Children. Demographic variables included age, gender, and education Level. There were 17 KAP questions regarding clinical presentations, transmission routes, and control of COVID-19. These questions were answered either as Yes/No, true/false, and "I don't know". The total score ranged from 0 to 17, with a higher score indicating a better knowledge of COVID-19. Participants could provide only one response per question. The reliability of the knowledge, attitude, and practice questionnaires was checked and the values of Cronbach's alpha were 0.81, 0.88, and 0.86 respectively, indicating acceptable internal consistency.

## Data analysis

Response data were recoded and analyzed using SPSS 17. Results were considered significant if the p-value was <0.05.

## RESULTS

### Socio-demographic characteristics of the study population

A total of 400 participants completed the survey. The range of the age of the participants was 18 to 75 years, and the mean (SD) was 32 (10.3) years. Women represented 54% of the participants. Majority of the participants (n=242, 60.3%) had a bachelor's degree or above. Participant socio-demographic characteristics are given in Table 1.

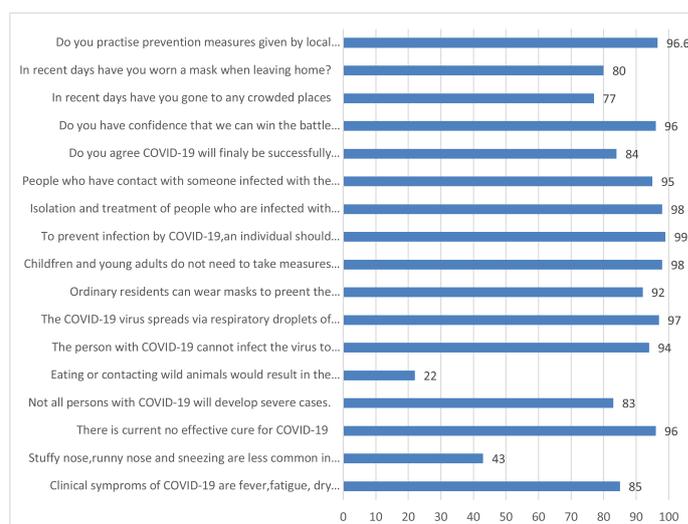
**Table 1: Sociodemographic characteristics of study participants (N=400)**

Variables	Frequency n (%)
Sex	
Female	216 (54.0)
Age (years)	
16-29	34 (8.5)
30-49	247 (61.7)
50-59	114 (28.5)
60+	5 (01.3)
Education Level	
Primary	68 (17.0)
Secondary	90 (22.5)
College/University	242 (60.5)

## Knowledge regarding COVID-19

Overall, 84.4% of the participants scored above the mean. The range of correct answers was two to ten the mean (SD) score was 9.3 (2.0), and the median was nine. A score above nine was considered a good knowledge level. 60.5% of the degree holder score above 9, Figure 1.

**Figure 1: Percentage distribution of correct scores.**



The range of percent of correct answers to the knowledge about COVID-19 was 70.2-98.6% (Table 2). The mean (SD) score was 8.7 (1.6). Knowledge scores varied across genders, age groups, and education levels (P<0.001). Male gender ( $\beta$ : -0.284, P<0.001), age group of 16-29 years ( $\beta$ : -0.302, P<0.001), and education of bachelor's degree or lower ( $\beta$ : -0.191 ~ -1.346, P<0.001), were significantly associated with lower knowledge score Table 2.

**Table 2: Distribution of mean COVID-19 knowledge by demographic variables**

Characteristics	Knowledge Level n		Mean score (SD)	P-Value
	Good	Poor		
Sex				
Male	151	33	8.5 (2.0)	
Female	157	59	8.9 (1.3)	<0.001
Age-group (years)				
16-29	30	4	8.1 (1.9)	
30-49	215	52	9.1 (1.2)	<0.001
50+	90	36	8.9 (1.3)	
Education				
Primary	30	38	7.7 (2.4)	<0.001
Secondary	43	47	8.8 (1.5)	
College/University	235	7	10.0 (1.2)	

## Attitudes and Practices Regarding COVID-19

The majority of respondents agreed that COVID-19 would be successfully controlled (n=384, 96%). The attitude towards the final success in controlling COVID-19 had no significant differences across genders and education levels (P<0.71). The majority of the participants had not visited crowded places (n=308, 77.0%) and wore masks when going out (n=352, 80.0%) in recent days. Almost all participants (n=392, 98.0%) correctly identified that COVID-19 is transmitted through respiratory droplets and that factors such as chronic illnesses and obesity can lead to a serious morbidity (Figure 1).

## DISCUSSION

This is the first online cross-sectional study examining KAP towards COVID-19 among Tanzania residents. In this study, 84.4% of the participants had a good knowledge of COVID-19, which is comparable with a study conducted in China where more than seventy percent of study participants had good knowledge. Previous studies from different countries have identified good knowledge in infection control as a predictor of good practice [17, 18]. These studies also highlighted that major gaps in disease knowledge could result in uncertainties and non-stringent control measures [19].

Most of the participants had confidence that COVID-19 will be contained and had a certainty that we can win the fight against the disease. This attitude could have attributed to positive practice with majority reporting not visiting crowded places and wearing masks whenever they go out of their homes. Furthermore, nearly all reported adhering to preventive measures as instructed by their national health care authority. The findings are useful for policy makers to consider the need for a comprehensive specific group target health education program for COVID-19 prevention and control.

The finding of a high level of knowledge among residents is a good predictor of positive impact initiative to involve the community in a

fight for COVID-19. However, the results may have been affected by the convenience sampling method used. The majority of participants (n=278, 69.5%) held a secondary degree or higher, and all participants had access to the internet. These are the privileged group who would actively seek information of this infectious disease from various channels of information, including the official website of the Ministry, and the WhatsApp account. The same study should be conducted among vulnerable populations or underprivileged communities.

The strength of this study lies in its large sample recruited during a peak of the COVID-19 outbreak. Nevertheless, compared to the population statistics, our sampling method picked middle and high economic societies, we speculate that knowledge might have been overestimated and attitude and practice underestimated. Community based national cross-sectional study is recommended when an outbreak is over.

## CONCLUSIONS

Our findings emphasize the need to investigate the KAP towards COVID-19 among Tanzania residents of low socioeconomic status. This will encourage an optimistic attitude and maintaining safe practices. Community-based health education programs about COVID-19 are likely to be helpful and necessary approach to control the disease.

## ACKNOWLEDGMENTS

We are grateful to all participants who took time to fill the questionnaire.

## AUTHORS DETAILS

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## MUHTASARI

# Uelewa, Mitazamo, na Mazoea Juu ya UVIKO-19: Utafiti kwa njia ya mtandao kwa Wakazi wa Tanzania.

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**Utangulizi:** Janga la Ugonjwa wa Virusi vya Korona -19 (UVIKO-19) ni dharura ya kiafya ulimwenguni ambayo inahitaji kutumia njia za ziada ili kudhibiti kuenea kwake haraka. Uzingatiaji wa njia za kudhibiti UVIKO-19 kwa Watanzania kunaathiriwa na uelewa, mitazamo, na mazoea yao juu ugonjwa huu. Utafiti huu ulifanywa kuchunguza uelewa, mitazamo na mazoea juu ya UVIKO-19 kwa wakaazi wa Tanzania wakati wa kipindi cha mlipoko janga hili mwezi Aprili-Mei 2020.

**Mbinu:** Utafiti huu unachambua majibu ya Watanzania waliochagua kwa hiari yao wenyewe kuitikia mwaliko wa kushiriki kwa kukamilisha dodoso lililotumwa mkondoni. Dodoso lililotumika kukusanya taarifa lilitengenezwa kwa njia ya kuuliza maoni ya watu mtandao inayo juilikana kama 'survey monkey'. Utafiti ulipima sifa za washiriki ikiwa ni pamoja na uelewa, mitazamo, na mazoea yao juu ya UVIKO-19. Uchambuzi wa takwini ulifanywa ili kulinganisha asilimia ya watu walio shiriki na kuangalia tofauti katika makundi ya umri mbalimbali. Matokeo yalizingatiwa kuwa ni muhimu ikiwa thamani ya p ilikuwa <0.05.

**Matokeo:** Wakazi mia nne walishiki katika utafiti huu. Umri wa wastani wa washiriki wa utafiti ulikuwa miaka 32, na wengi walikuwa wanawake (n = 216, asilimia 54.0). Hakukuwa na tofauti kubwa katika takwimu za taarifa binafsi za watu. Washiriki walio na digrii ya kwanza au zaidi (n = 241, asilimia 60.3) walikuwa na alama za juu. Kwa jumla, asilimia 84.4 (n = 338) ya washiriki walikuwa na uelewa mzuri, ambao ulihusishwa sana na kiwango cha elimu (p = 0.001). Karibu washiriki wote (n = 384, asilimia 96.0) walikuwa na imani kwamba UVIKO-19 itatokomezwa. Wengi wa waliosailiwa (n = 308, asilimia 77.0) hawakuenda kwenye sehemu zilizo na mkusanyiko wa watu wengi katika siku za hivi karibuni. Uchambuzi ulionyesha kuwa wanaume, wenye umri wa miaka 16-29, na elimu ya sekondari au chini (OR = 1.2, CI = 1.3-1.5) zilihusishwa sana kuwa na alama za chini za uelewa.

**Hitimisho:** Matokeo yetu yameonyesha kuwa na uelewa mzuri, mitazamo yenye matumaini, na mazoea yanayofaa yanaweza kuzuia maambukizo ya UVIKO-19. Hivyo mipango ya elimu ya afya ya jamii kuhusu UVIKO-19 inasaidia na ni muhimu katika kudhibiti ugonjwa huu.

**Maneno Mhimu:** UVIKO-19, Uelewa, Mitazamo, Mazoea, Tanzania

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# MAGNITUDE OF VIRAL HEPATITIS B AND C INFECTION AMONG FAMILY REPLACEMENT BLOOD DONORS IN THE YEAR 2020 IN TANZANIA MAINLAND

Baraka Nzobo<sup>1</sup>, Azma Simba<sup>1</sup> and Magdalena Lyimo<sup>2</sup>

## ABSTRACT

**Introduction:** Hepatitis is a viral infection that affects the liver and can cause both acute and chronic infection. Most people with viral hepatitis infection do not experience any symptoms when newly infected. A proportion of people develop chronic hepatitis B infection, which can then lead to progressive liver disease and result in cirrhosis or hepatocellular carcinoma.

**Objective:** The paper reports the prevalence of the hepatitis B and C among the family replacement blood donors by age group to account for immunization status in mainland Tanzania.

**Methodology:** This was a 2020 calendar year retrospective secondary data analysis 263,119 family replacement blood donors in Tanzania Mainland aged 18 to 65 years. Data are from National Blood Transfusion Services (NBTS) in all twenty-six regions.

**Results:** In the year under review (2020), the National Blood Transfusion Services received a total of 263,119 family replacement blood donors' samples in Tanzania mainland. A total of 15,923 (6.1%) blood donors were Hepatitis B positive and 6,914 (2.6%) were hepatitis C positive. The highest prevalence of Hepatitis B was observed among blood donors from Mara (9.3%), Geita (8.7%), Morogoro (7.7%), Rukwa (7.6%), and Shinyanga (7.4%) while those with high prevalence of hepatitis C were from Mtwara (5.5%), Ruvuma (4.6%), Geita (4.6%) and Lindi (4.5%). The most affected age group by hepatitis B and hepatitis C viral infection was the age group of 21-65 years at 7.0%, and 2.9% respectively.

**Conclusion:** Even though data from NBTS are not representative of the regional or national population, they are indicative of the current situation of Hepatitis B and C burden in Tanzania. Hence, this one-year retrospective study demonstrates the need to continue screening to all blood donors and introduce a program entails vaccine for all whereas all donors and population at large screened negative be vaccinated

## INTRODUCTION

Hepatitis is a viral infection that affects the liver and can cause both acute and chronic infection, of which about 352 million people worldwide live with hepatitis infection [1]. Most people with viral hepatitis infection do not experience any symptoms when newly infected. A proportion of people develop chronic hepatitis B infection, which can then lead to progressive liver disease and result in cirrhosis (a scarring of the liver) or hepatocellular carcinoma [2]. Chronic infection occurs in the majority (90%) of infants infected from their mothers or before 5 years of age [1]. However, those infected after the age of five years are much less likely (<5%) to develop a chronic infection [1]. In the absence of any preventive interventions, the risk of transmission from mother to child ranges from 70% to 90% for mothers with high Hepatitis B Virus (HBV) viral load (or are HBeAg-positive) and from 10% to 40% for those that are hepatitis B e-antigen (HBeAg) negative [1]. Sub-population studies in different parts of Tanzania showed the prevalence of HBV to range between 4.4-11.2% [3]. Analysis of National Blood Transfusion Service (NBTS) data on blood screening from 2007 to 2016 revealed a prevalence of 6.2% of hepatitis B surface antigen (HBsAg) among blood donors [3].

Information available for Tanzania show that the overall prevalence of HBsAg among pregnant women attending Antenatal clinics to be 8.03% in Temeke Municipality, Dar es Salaam in the year 2017 and 3.8% in Nyamagana District Mwanza in the year 2016 [4]. World Health Organization (WHO) since 2000 has called for integrated and standardized prevention of mother-to-child transmission (PMTCT) for HIV, syphilis and HBV. However, despite this call, Tanzania has not scaled up PMTCT services to include HBV infection [3]. This study estimated the prevalence of hepatitis B and C among the family replacement blood donors in the country (A family replacement donor is one who gives blood when a member of his/her family or community requires it). The

study also calculated the prevalence of hepatitis B infection among the age group who received Pentavalent Vaccine, which was introduced in the country in 2002 (Pentavalent vaccine is a combination vaccine which protects against five killer diseases: diphtheria, pertussis, tetanus, hepatitis B and pneumonia)

## METHODOLOGY

This was a one-year January through December 2020 retrospective secondary data analysis of 263,119 family replacement blood donors in Tanzania Mainland aged between 18 to 65 years. Data are from NBTS and include all twenty-six regions. We purposefully categorize the age group into two categories (i) 18-20 years (a group received a Pentavalent Vaccine in their childhood) and (ii) 21-65 years (a group who did not receive the Pentavalent Vaccine). The collected data were entered into excel spreadsheet for storage and analysis. However, it should be noted that data are from the first screening test of donors prior to blood transfusions. The first screening test is not confirmatory hence false positive results were inevitable.

## RESULTS

### Burden of viral hepatitis B and C

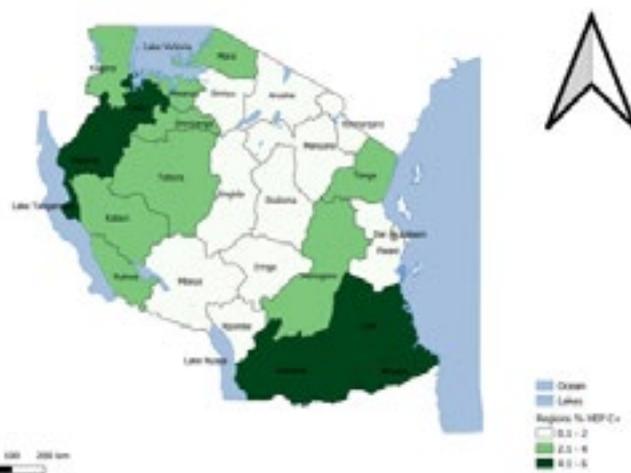
In the year 2020 the National Blood Transfusion Services, received a total of 263,119 blood samples from family replacement blood donors in Tanzania mainland. A total of 15,923 (6.1%) blood donors were Hepatitis B positive while 6,914 (2.6%) were hepatitis C positive.

The highest prevalence of Hepatitis B was observed among blood donors from Mara (9.3%), Geita (8.7%), Morogoro (7.7%), Rukwa (7.6%), and Shinyanga (7.4%) while those with high prevalence of hepatitis C were from Mtwara (5.5%), Ruvuma (4.6%), Geita (4.6%) and Lindi (4.5%) as shown in Table 1 and Figure 1 a and 1b

**Table 1: Prevalence of Hepatitis B and C among Family Replacement Blood Donors by Regions, Tanzania Mainland, 2020**

Region	Blood Donors	HBV+ (%)	HCV+ (%)
Arusha	6,037	303 (5.0)	57 (0.9)
D'salaam	31,868	1,804 (5.7)	305 (1.0)
Dodoma	8,829	524 (5.9)	91(1.0)
Geita	14,389	1,249(8.7)	669 (4.6)
Iringa	2,210	97 (4.4)	28(1.3)
Kagera	10,429	557(5.3)	416 (4.0)
Katavi	3,536	208 (5.9)	125(3.5)
Kigoma	8,586	534 (6.2)	354(4.1)
Kilimanjaro	8,672	337(3.9)	72(0.8)
Lindi	6,512	369(5.7)	291(4.5)
Manyara	5,365	277(5.2)	53(1.0)
Mara	15,634	1,461(9.3)	591(3.8)
Mbeya	14,824	516(3.5)	221(1.5)
Morogoro	15,049	1,162(7.7)	335(2.2)
Mtwara	15,933	537(3.4)	876(5.5)
Mwanza	27,096	18,24(6.7)	610(2.3)
Njombe	3,177	168(5.3)	47(1.5)
Pwani	9,795	670(6.8)	199(2.0)
Rukwa	2,383	181(7.6)	54(2.3)
Ruvuma	5,637	309(5.5)	257(4.6)
Shinyanga	7,428	549(7.4)	244(3.3)
Simiyu	6,614	408(6.2)	134(2.0)
Singida	7,065	429(6.1)	104(1.5)
Songwe	1,678	98(5.8)	37(2.2)
Tabora	16,050	781(4.9)	466(2.9)
Tanga	8,323	571(6.9)	278 (3.3)
TOTAL	263,119	15,923 (6.1)	6,914 (2.6)

**Figure 2a: Map showing the Prevalence of Hepatitis B among Family Replacement Blood Donors in the Year 2020 Tanzania Mainland.**



**Figure 2b: Map showing the Prevalence of Hepatitis C among Family Replacement Blood Donors in the Year 2020 Tanzania Mainland.**

### Prevalence of Viral Hepatitis B & C by age groups

The most affected age group by hepatitis B viral infection was 21-65 years (7.0%), while 18-20 years is less affected (3.3%). Proportion of hepatitis C viral infection among age group (18 -20) is 2.1% and (21-65) is 2.9%. There is no statistically significant difference in the prevalence among the age groups (Table 2).

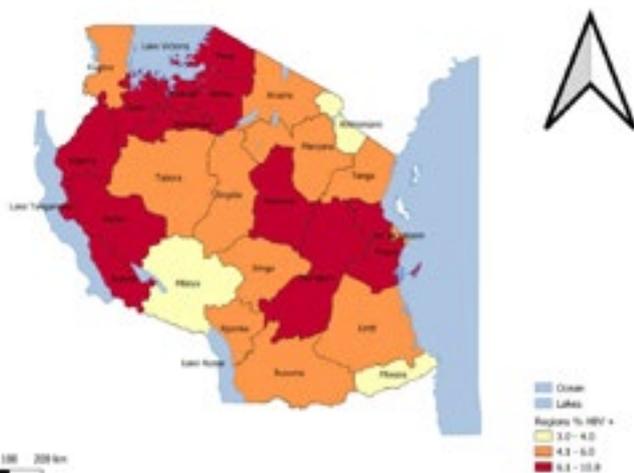
**Table 2. Prevalence of Viral Hepatitis B & C by age groups among Family Blood Donors in Mainland Tanzania 2020**

Age (Years)	Blood Donors	HBV+ (%)	HCV+ (%)
18-20	65,700	2,176 (3.3)	1,372 (2.1)
21-65	196,715	13,716 (7.0)	5,731 (2.9)

### DISCUSSION

The overall prevalence of Viral hepatitis B and C in this report among family replacement blood donors in Tanzania was 6.1% and 2.6%, respectively as compared to the year 2019 which was 5.5% and 2.1% for Viral hepatitis B and C, respectively [5]. There were remarkable regional differences in the prevalence of Hepatitis B infection among family replacement blood donors in lake zone regions appeared to have high proportion of both Hepatitis B and C. We are having no conclusive explanation to the observed differences; therefore, further studies are needed to find out why lake zone regions have high prevalence of Viral hepatitis B infections.

The proportion of hepatitis B and C was low in the age group of 18-20 years compared to 21-65 years. The difference could be associated with the fact that those aged 18 years would have benefited with Pentavalent Vaccine, which was introduced in 2002 in Tanzania. Tanzania introduced Hepatitis B vaccination in routine childhood vaccine program in the year 2002 given at 4, 8, and 12 weeks as (DPT-HepB-Hib). Although the prevalence among 18-20 years age group was low compared to the age group of 21-65 years, which did not receive Pentavalent Vaccine in their childhood, but the difference was not much high. The current study used secondary data with no history vaccination; therefore, the observed



infection could mean that not all blood donors aged 18-20 years were vaccinated during their childhood. Since, Pentavalent Vaccines is a combination vaccine, which protects against five killer diseases: diphtheria, pertussis, tetanus, hepatitis B and Hib, hence, the increase of its coverage will prevent hepatitis B infection resulting in reducing the associated morbidity and mortality in Tanzania

## CONCLUSION

Even though data from National Blood Transfusion Services are not a representative sample, they are indicative of the current situation of Hepatitis B and C burden in Tanzania. Hence, this one-year retrospective study demonstrates the need to continue screening among all blood donors and introduce a program entails vaccine for all whereas all donors and population at large screened negative be vaccinated. In addition,

there is a need to reinforce the on gonging mandatory screening for viral hepatitis among pregnant women as this approach will protect the Mother to Child Transmission route of infection.

## ACKNOWLEDGEMENT

We would like to convey our sincerely thanks to National Blood Transfusions Services for their willingness to produce row data to the Department of Preventive Services in Epidemiology and Disease Control Section.

## AUTHORS DETAILS

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# MUHTASARI

## UKUBWA WA MAABUKIZI YA VIRUSI VYA HOMA YA INI (HEPATITIS B NA C) KWA WACHANGIAJI DAMU wa ndugu zao KATIKA MWAKA WA 2020 KWA TANZANIA BARA

Baraka Nzobo<sup>1</sup>, Azma Simba<sup>1</sup> and Magdalena Lyimo<sup>2</sup>

**Utangulizi:** "Hepatitis" ni maabukizi virusi ambavyo huathiri ini na inaweza kusababisha maambukizo makali na sugu. Watu wengi walio na maambukizo mapya ya virusi vya hepatitis hawaonyeshi dalili yoyote. Sehemu ya watu hupata maambukizo sugu kutokanana *kirusi cha homa ya ini aina ya B* ambayo inaweza kusababisha ugonjwa wa ini ambao huendelea na kusababisha ugonjwa wa saratani.

**Lengo:** Makala hii inatoa taarifa juu ya ukubwa wa virusi aina ya hepatitis B na C vinavyosababisha homa ya ini kati ya wachangiaji damu kulingana na umri ili kuonyesha hali ya chanjo kwa Tanzania Bara.

**Mbinu:** Huu ulikuwa uchambuzi wa takwimu za mwaka 2020 ambapo wachangiaji damu 263,119 kutoka Tanzania Bara wenye umri wa miaka 18 hadi 65 walihusika. Takwimu hizi zinatoka Mpango wa Taifa wa Damu Salama ambapo inajumuisha Mikoa yote ishirini na sita.

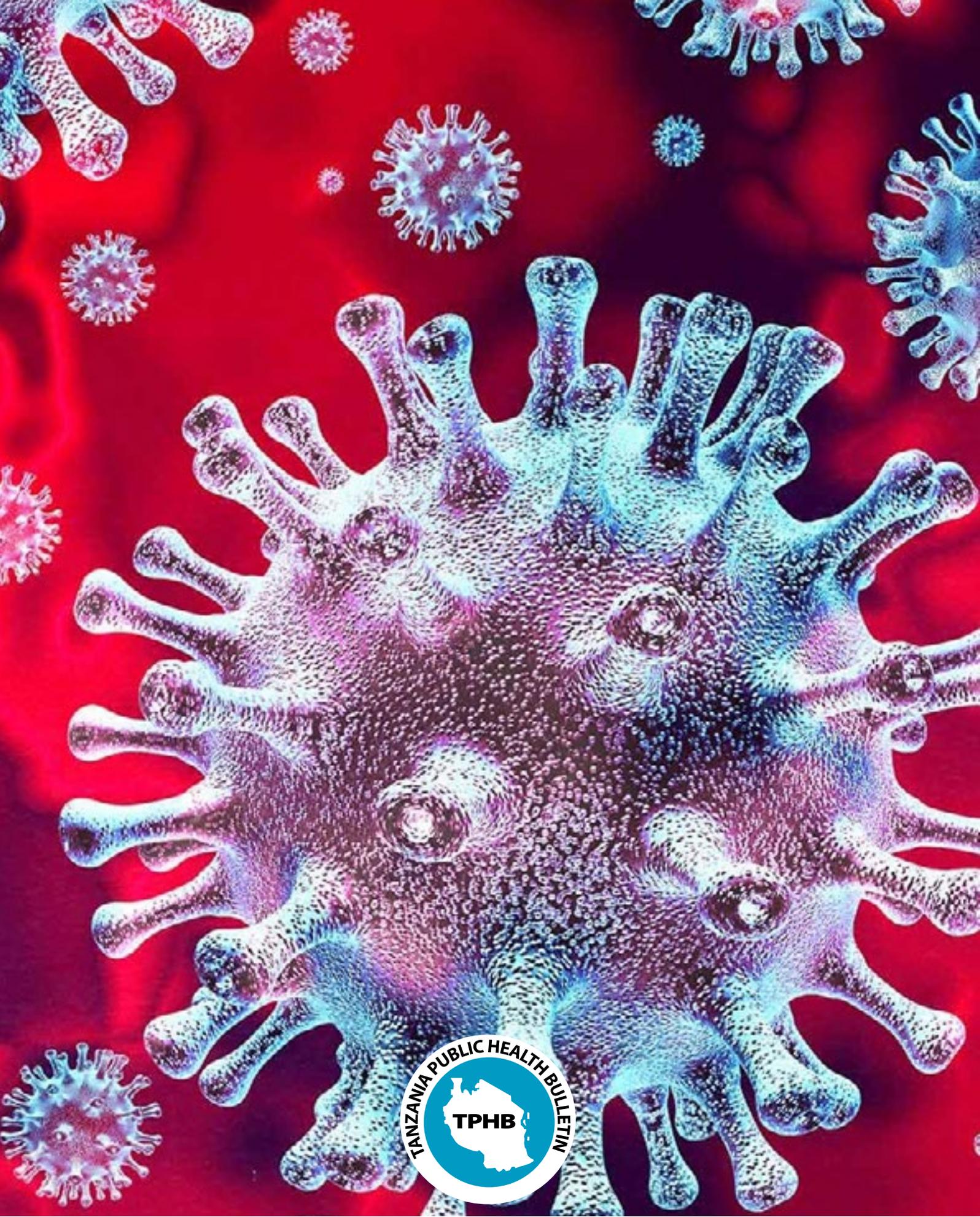
**Matokeo:** Katika mwaka 2020, Mpango wa Taifa wa Damu Salama ulipokea jumla ya sampuli 263,119 za wachangiaji damu za ndugu zao kwa Tanzania Bara. Jumla ya wachangiaji damu 15,923 (asilimia 6.1) walikuwa na virusi aina ya Hepatitis B na 6,914 (2.6 asilimia) walikuwa

na virusi aina hepatitis C. Maambukizi makubwa zaidi ya kirusi aina ya Hepatitis B yalionekana kwa wachangiaji damu kutoka Mikoa ya Mara (9.3%), Geita (8.7asilimia), Morogoro (asilimia 7.7), Rukwa (asilimia 7.6), na Shinyanga (asilimia 7.4); wakati wale walio na kiwango kikubwa cha kirusi aina ya hepatitis C walikuwa kutoka mikoa ya Mtwara (5.5 asilimia), Ruvuma (4.6asilimia), Geita (asilimia 4.6) na Lindi (asilimia4.5). Umri ambao ulikuwa umeathirika zaidi na maambukizi ya kirusi aina ya hepatitis B na C ulikuwa kwa wachangiaji damu wenye umri wa miaka 21-65 kwa asilimia 7.0 (hepatitis B) , na asilimia 2.9 (hepatitis C).

**Hitimisho:** Ijapokuwa takwimu kutoka ofisi kuu ya Mpango wa Taifa wa Damu Salama haziwakilishi kwa usawa kwa wakazi wa mkoa au kitaifa, zinaonyesha hali ya sasa ya ukubwa wa tatizo la maabukizi ya virusi vinavyosababisha homa ya ini (Hepatitis B na C) nchini Tanzania. Kwa hivyo, matokeo ya utafiti huu kwa kipindi cha mwaka mmoja wa 2020 unaonyesha uhitaji wa kuendelea kuchunguzwa kwa wachangiaji damu wote na kuanzisha mpango wa chanjo kwa wote ambapo wachangiaji damu wote na watu kwa jumla wachunguzwe na wale wote watakaogundulika kutokuwa na maambukizi wapatiwe chanjo.

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