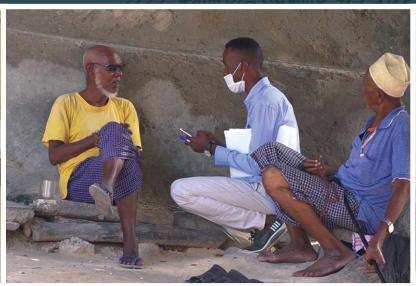
DSU Benadir

COVID-19 IN MOGADISHU:

A COMMUNITY-BASED CROSS-SECTIONAL STUDY

G.BANAADIR

REINTEG
URBAN SOLUTIONS

COVID-19 IN MOGADISHU: A COMMUNITY-BASED CROSS-SECTIONAL STUDY

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ACKNOWLEDGMENTS:

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FOREWORD FROM THE MAYOR

Omar Mohamud Mohamed
Mayor of Mogadishu & Governor of Benadir

The emergence of COVID-19 in Mogadishu increased the degree of vulnerability of the population. It highlighted the lack of adequate housing and access to other basic services such as WASH, health, livelihoods, and education. The urban poor communities have an increased risk to the impacts of COVID-19 as they face barriers in implementing many of the recommended prevention and containment measures such as hand washing, social distancing, self-isolation and quarantine. Before the prevalence of COVID-19 in the region, the Benadir Regional Administration (BRA) developed a strategy for responding to the Coronavirus disease 2019 (COVID-19) in Mogadishu that is interlinked to the Durable Solutions Strategy for the region. The BRA COVID-19 management strategy outlines the plans in place to address and mitigate the effect of COVID-19 in the region. It is especially centred around leaving no one behind and thus pays particular attention to vulnerable populations such as IDPs and the urban poor.

A key element of the BRA's strategy for responding to COVID-19 in Mogadishu is collecting timely and accurate data to understand the prevalence of COVID-19 in order to better inform and guide the municipality's interventions and response. Given the limitations in diagnostic assessments, health infrastructure and resources, the BRA carried out a Community-Based Cross-sectional Study (CBCS) to collect syndromic surveillance data relating to the COVID-19 pandemic to understand its impact and guide the implementation of resources and interventions accordingly.

The CBCS was carried out across all 17 districts of Benadir between the 8th of June and 30th of July 2020 with a sample population size of 79,758 participants. The results are presented within this report. In general, the data collected revealed that there has indeed been community transmission of COVID-19 for some time and that many districts were poorly equipped to manage the impact of COVID-19, particularly the socioeconomic effect. The study has provided clarity on the key interventions needed to strengthen the region's capacity to prevent and control the transmission and short, medium and long-term impacts of COVID-19.

The CBCS is instrumental in that it is the first time that the municipality led in the collection of pertinent information on syndromic data on COVID-19, demographics and socioeconomic data. It is a feat that would not have been possible to accomplish without the integral support of the 392-community health workforce that collected the data, the Mogadishu constituents that participated in the study, the Flatten group that supported in the design of the data collection tools and the financial support of the European Union. Moving forward it will be imperative to apply the lessons learned from the survey and coordinate interventions to COVID-19 in a manner that contributes to the overall development of Mogadishu and builds its resilience to shocks.

Omar Mohamud Mohamed
Mayor of Mogadishu & Governor of Benadir

FOREWORD FROM THE DEPUTY MINISTER FOR HEALTH

Ahmed Hussein Moallim
Deputy Minister of Health and Humanitarian services

The Ministry of Health is very grateful to the Benadir Regional Administration leadership and the Durable Solution Unit for spearheading such an important programme that aims to identify the impact of the novel Corona Virus (COVID 19) on the citizens of the nation's most populous region – Benadir. We, at the ministry are particularly interested in the impact the pandemic has had on displacement affected communities and the urban poor and seek to learn from these findings through a multi-lens gaze including the humanitarian, public health and socio-economic effects.

The community based cross-sectional study has especially laid bare the role government at different levels can play in the fight against COVID-19 and in an increasingly globalised world we are seeing the surge of health pandemics increase therefore lessons need to be learnt through data driven solutions.

We have been striving to establish a concrete health institution in Somalia for the past five years through the successful National Health Sector Strategy launched in 2017. This comprehensive strategy aims to provide essential health services to the public, especially to those most vulnerable such as displacement affected communities, women and urban poor.

Our fragile health system in Somalia following the collapse of the central government three decades ago has made the country very vulnerable to health shocks that crippled the little remaining institutions. This was the case when the COVID-19 pandemic compounded with the existing daily realities of a country rife with malaria, cholera and other infectious diseases shook the very foundations of our already very fragile health sector.

COVID-19 pandemic has drawn the attention of the Federal Government of Somalia, federal member states and the regional authority of Benadir to urgently act towards estabslishing a strategy of controlling the spread, especially seeing how it has devasted the international community to a much larger extent. A consistent narrative found throughout the pandemic is those most vulnerable are hurt the most and I am glad this community based cross-sectional study has specifically focused on collating the impact it has had on vulnerable communities.

I believe it is almost impossible to plan without evidence-based information to guide any intervention needed to handle such crises. This study will give us comprehensive baseline evaluation that can produce effective and efficient intervention for years to come and the Ministry of Health will indeed learn from this community based cross-sectional study to help inform urban interventions especially in the Benadir region.

Ahmed Hussein Moallim
Deputy Minister of Health and Humanitarian services
Federal Republic of Somalia

Nicolás Berlanga Martínez
European Union Ambassador

FOREWORD FROM THE EUROPEAN UNION

COVID took us all by surprise. The impact of COVID on our daily life was unknown, new, and unpredictable. We needed to learn by doing. The work you have before you is an excellent example of the good will of the Municipality of Mogadishu, with Mayor Mohamud Mohamed in the lead, to introduce clarity to the uncertainty of COVID in particular, and to the health situation of Mogadishu's citizens as a whole. The Delegation of the European Union to Somalia has strived to be close to the institutions and the people of Somalia, in particular to those more vulnerable, during the COVID crisis.

Therefore, we did not hesitate to find windows of response to COVID inside our ongoing programmes. In this sense, this Community-based survey in Mogadishu is an innovative example: People's opinions, feelings, and aspirations matter. Beyond rich oral communication, facts and figures depicting the reality confirm the evidence that should guide our actions. The picture presented by the survey is challenging. The proposed recommendations, ranging from immediate actions (WASH), access to basic services (Health) to the status of citizenship (civil registration) are inspiring. I would like to praise the determination of the dynamic team members and leaders inside the local institutions of Mogadishu to tackle the problems. I can assure the determination of the European Union in Somalia to accompany their efforts.

Nicolás Berlanga Martínez
European Union Ambassador

Acknowledgments:

The Benadir Regional Administration through the Durable Solutions Unit is grateful to our European Union partners for supporting the regional authority in combatting the novel Corona Virus (COVID-19) through its EU-Reinteg program.

The European Union is a true friend of the people of Benadir and this study would not have been possible without their full support for regional government led interventions that birth strong institutions through research and knowledge management.

We would like to thank the wider EU-REINTEG partners such as UNDP, UNHABITAT and UNHCR for their support.

Recognitions

Special thanks to FLATTEN, Dr. Ian Furst and Kimberly Gire for outstanding partnership and technical collaboration on data collection.

We want to recognise the youth that have dedicated many weeks into collecting data from every district and sub-district in Benadir.

Finally, we want to thank our over 2.5 million constituents in all 17 districts of Benadir for their patience, trust and unwavering cooperation, we strive to serve you all better through direct engagement, during this landmark study you have allowed us into your homes and communities, without you this would have been impossible.

Thank you all.

Durable Solutions Unit

Benadir Regional Administration

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ABBREVIATIONS

BRA	Benadir Regional Administration
CBCS	Community-Based Cross-sectional Study
COVID-19	Severe Acute Respiratory Syndrome Coronavirus 2
GBV	Gender Based Violence
GIS	Geographic Information System
IDPs	Internally Displaced Persons
REOC	Regional Emergency Operation Center
LSHTM	London School of Hygiene and Tropical Medicine
MCH	Maternal and Childcare Health
MoH	Ministry of Health
NEOC	National Emergency Operation Center
OPM	Office of the Prime Minister
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

Chapter 1

Introduction

The Benadir Regional Administration (BRA) is the mandated governmental entity dealing with public administration in the Benadir Region. The population of the Benadir region (Mogadishu) spans over **17 Districts** constituted by a population of approximately **3 Million**. The urban population of Somalia was approximated to be **45.55%** in 2019. 1 Mogadishu is one of the fastest urbanizing cities in Africa; however, while urbanization confers numerous opportunities, the benefits are not experienced by a large percentage of the population. Approximately **845,000** of Internally Displaced Persons (IDPs) live in Mogadishu in precarious conditions with limited to no access to basic services. While the BRA is committed towards improving service delivery of housing, health, education and water, hygiene and sanitation (WASH) within the region, there are compounding political and socioeconomic challenges that hamper efforts and further marginalized already vulnerable groups including, conflict, natural disasters, lack of livelihood opportunities and evictions inter alia.1 Up to date, solutions to respond to the above-mentioned issues have been centered around emergency response and marginally on durable and sustainable interventions. This leaves the city in uncertain predicaments as risk and shock aversion including adequate preparation and prevention efforts are limited. Given that resources are often diverted to emergency response, the government and the people are in a constant state of experiencing and coping with shocks. This prevents adequate alleviation and leads to temporary coping mechanisms prevailing longer than they should. Such is the case with the onset of Severe Acute Respiratory Syndrome Coronavirus 2 (COVID-19) within Somalia. COVID-19 increased the degree of vulnerability for majority of the population. In a city where nearly a third of the population has limited access to adequate housing and other basic services, COVID-19 highlighted the challenges that

1 Somalia World Bank Development Indicators
2 Somalia Humanitarian Needs Overview. United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). 2019


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would need to be addressed in order to ensure people had the capacity and access to resources to implement many of the recommended prevention and containment measures including, hand washing, social distancing, testing and self-isolation and quarantine.

Since the *first confirmed* case in Somalia in March, the country has reported **3,588 cases** and **99 deaths** (September 29, 2020). This is likely to be a significant underestimate in cases and fatalities due to community transmission taking hold, testing limitations and barriers to access to health services including stigma, perceptions and fears of the community reported around the quality of health services.1 Limited systems to detect and monitor prevalence of the disease contribute to an incomplete understanding of the prevalence of COVID-19. It is on this premise that the BRA launched a Community-Based Cross-sectional Study (CBCS)to collect syndromic data relating to the COVID-19 pandemic, ascertain prevalence and impact and inform the equitable distribution of resources and interventions accordingly. The CBS activity also aimed to collect pertinent information to link COVID-19 response to the greater Mogadishu's Durable Solutions Strategy that aims to address displacement and related protection issues that are averse to sustainable development and resilience in the region.2

Presented in this report are the analyses of COVID-19 progression statistics in Mogadishu based on the data obtained from the CBS. This report presents a description of Mogadishu's demographics and socioeconomic characteristics, including age, sex, education, employment, income, displacement and morbidities at the regional and district level. It also references other research carried out in support of the work of the BRA COVID-19 Task force to make key recommendations and way forward in the management of COVID-19 within the region.

3 Herring, E., Campbell, P., Elmi, M., Ismail, L., Jama, J., McNeil, S., Rubac, A., Saed, A., Saeed, A. and Yusuf, M., 2020. COVID-19 And Sustainable Development in Somalia/Somaliland: Lives, Livelihoods and Inclusion). University of Bristol and Transparency Solutions. Phase 1 available at: https://transparencysolutions.com/wp-content/uploads/2020/07/COVID-19-and-Sustainable-Development-in-Somalia-Somaliland-July-2020-Final.pdf

4 Moving forward: Finding lasting solutions for urban displacement. Mogadishu Durable Solutions Strategy 2020-2024. Available at: https://dsu.so/wp-content/uploads/2020/09/DSU_strategy_report_2020_v11.pdf

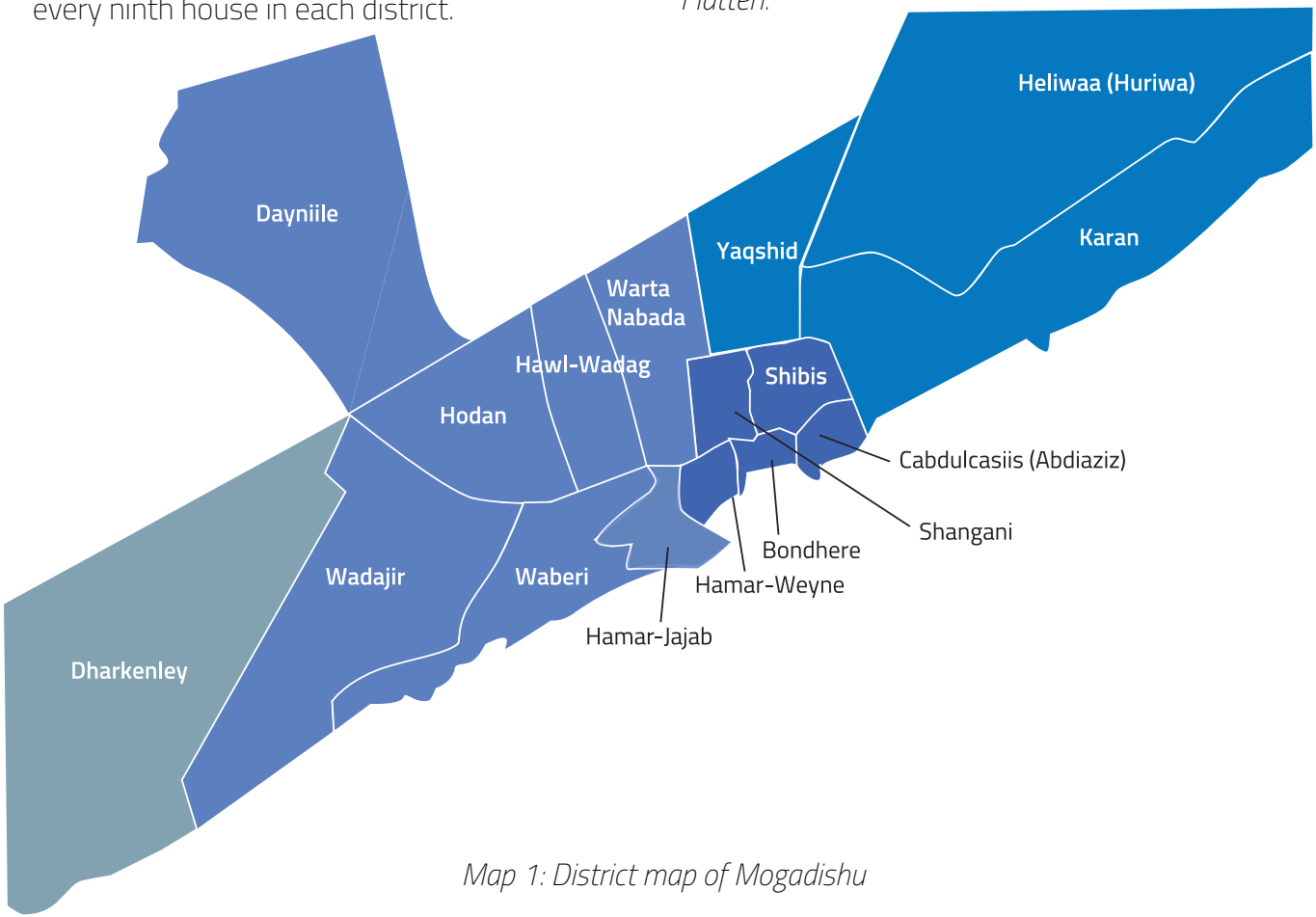
1.1. CBCS OBJECTIVES

The objective of this study was to describe the prevalence of syndromic COVID-19 cases in Mogadishu and all 17 districts of Mogadishu. In addition to this, all-cause mortality rate in Mogadishu within a given period was also reported, and areas of vulnerability were identified enabling government and funders stakeholders to respond in a timely and efficient manner.

1.2. METHODOLOGY

Between 8thof June and 30th of July 2020, a cross-sectional CBCS was conducted in all 17 districts of Mogadishu depicted in Map 1 below to assess the prevalence syndromic COVID-19 cases in Mogadishu Data was collected from every ninth house in each district.

Within each household, every single individual living there was eligible and therefore surveyed. The data was collected using an open-source digital syndromic survey developed by the BRA and a Canadian not-for-profit organization, *Flatten.*



Map 1: District map of Mogadishu

The survey included various demographic, socioeconomic, health, housing, health awareness and mobility questions related to COVID-19 and service delivery by the municipality and other stakeholders beyond COVID-19.

Using the digital survey, a 392-community health workforce working for the BRA was deployed to the **17 Districts** of Mogadishu to survey households. Before being deployed, the health workforce was trained in infection control measures and public health practices in accordance with World Health Organization's (WHO) guideline in delivering community-based healthcare during COVID-19 pandemic.[1]

Within Somalia, literacy is around **40%**[2] and poverty is as high as **71%**[3]; therefore, in order to avoid potential selection bias, the digital survey questionnaire was delivered face-to-face by the community health workers. This ensured participants who are illiterate or without access to digital technology such as phones, computers and/or the Internet were not excluded.

1.1.1. CASE DEFINITIONS

In line with the updated case definitions from the European CDC.[1] The following case definitions were used.

Possible:	*A case with at least one of the following symptoms: cough, fever, shortness of breath and sudden loss of smell and taste*
Possible (3):	*A case with any three of the four symptoms (Fever, cough, shortness of breath or sudden loss of smell and taste)*
Possible (4):	*A case with all four symptoms (Fever, cough, shortness of breath or sudden loss of smell and taste)*
Probable:	*A case with at least one of the four symptoms plus has had contact with a symptomatic person or a COVID case*
Self-report confirmed:	*An individual who reports they have been tested positive with COVID-19*

5 World Health Organization, 2020. Community-based health care, including outreach and campaigns, in the context of the COVID-19 pandemic: interim guidance, May 2020 (No. WHO/2019-nCoV/Comm_health_care/2020.1). World Health Organization.
6 United Nations Population Fund, 2020. Volume 3: Educational Characteristics of The Somali People | Directorate of National Statistics. [online] Directorate of National Statistics. Available at https://bitly.com [Accessed 20 June 2020].
7 Pape,U.J., Karamba, R.W., 2019. Somali Poverty and Vulnerability Assessment : Findings from Wave 2 of the Somali High Frequency Survey. The World Bank. 8 European Centre for Disease Prevention and Control. Case definition for coronavirus disease 2019 (COVID-19), as of 29 May 2020; retrieved from: https://www.ecdc.europa.eu/en/covid-19/surveillance/case-definition

1.2.2. ANALYSIS

Observed and expected COVID-19 cases were calculated for the whole of Mogadishu and for each district. For the observed cases, the total number of individuals surveyed was used as a denominator. Whereas for the expected cases, Mogadishu population projections from the London School of Hygiene and Tropical Medicine (LSHTM) were used as a denominator.[1] Within this population data, Garasbaley was included as part of Hodan district and Gubadley as part of Kaxda district. Similarly, the observed and expected deaths in Mogadishu and each district were also calculated using Mogadishu population data from the LSHTM as a denominator. Substantial information to determine cause of death were lacking; therefore, all cause deaths that have occurred at the surveyed households within the past two months at the time of the survey are reported. The unit of measure for observed cases and deaths was per **100,000** populations.

Furthermore, maps visualising COVID-19 cases and deaths distribution in Mogadishu and all **17 Districts** are presented. Population demographics were presented in a descriptive format with results visualised where possible. Categorical data were described in whole numbers and proportions. Age was categorised at **15-year** intervals (0-14, 15-29 years etc.,). Persons per room was determined by dividing the number of people in the house by the number of rooms. This was presented at intervals of **0.25** and **0.50** (0.00-0.49, 0.50-0.74 etc.,). In addition, to examine the relationship between COVID-19 and demographic and socioeconomic factors, a correlation test using Pearson's Chi-squared test was conducted. To assess linear trends between COVID-19 cases and education level, the Cochran-Armitage trend test was used.[1]

9 Warsame, A., Frison, S., Gimma, A. and Checchi, F., 2020. Retrospective Estimation of Mortality in Somalia, 2014-2018: A Statistical Analysis. Available at: https://reliefweb.int/sites/reliefweb.int/files/resources/Retrospective%20estimation%20of%20mortality%20in%20Somalia%2C%202014-2018%20-%20a%20statistical%20analysis.pdf
10 Armitage, P., 1955. Tests for linear trends in proportions and frequencies. Biometrics, 11(3), pp.375-386.
11 World Health Organization, 2020. Community-based health care, including outreach and campaigns, in the context of the COVID-19 pandemic: interim guidance, May 2020 (No. WHO/2019-nCoV/Comm_health_care/2020.1). World Health Organization.

1.2.3. SAFETY PRECAUTIONS

Given the highly infectious nature of COVID-19, key procedures and protocols were put in place to mitigate the risks associated with the face to face data collection. Data collectors were trained in infection control measures and public health practices in accordance with WHO's guideline in delivering community-based healthcare during the COVID-19 pandemic.[1] They were also provided with the necessary tools, and resources to minimize the risks of contracting or spreading the virus. To minimize the risk of virus transmission, the following measures were taken:

1.2.4. CONSENT AND DATA MANAGEMENT

An information sheet was read out in Somali to each participant to inform them about the purpose, risks and benefits of the study and the voluntary nature of participation. Before the questionnaire was administered, oral informed consent was sought from each participant. No financial or material compensation was given to participants. Data remained anonymous throughout the study. Confidentiality was ensured by training data collectors to treat data collection as confidential. Only the data managers and the investigators had access to the password-protected database and data collection software.

Chapter 2

Tracking COVID-19 in Mogadishu

A total of 68,635 households (79,758 Mogadishu residents) were surveyed as part of this study, **37%** were men and **63%** women. Moreover, in line with the population of youth in Somalia, majority of the respondents **(56%)** were below the age of 35 (Figure 1).

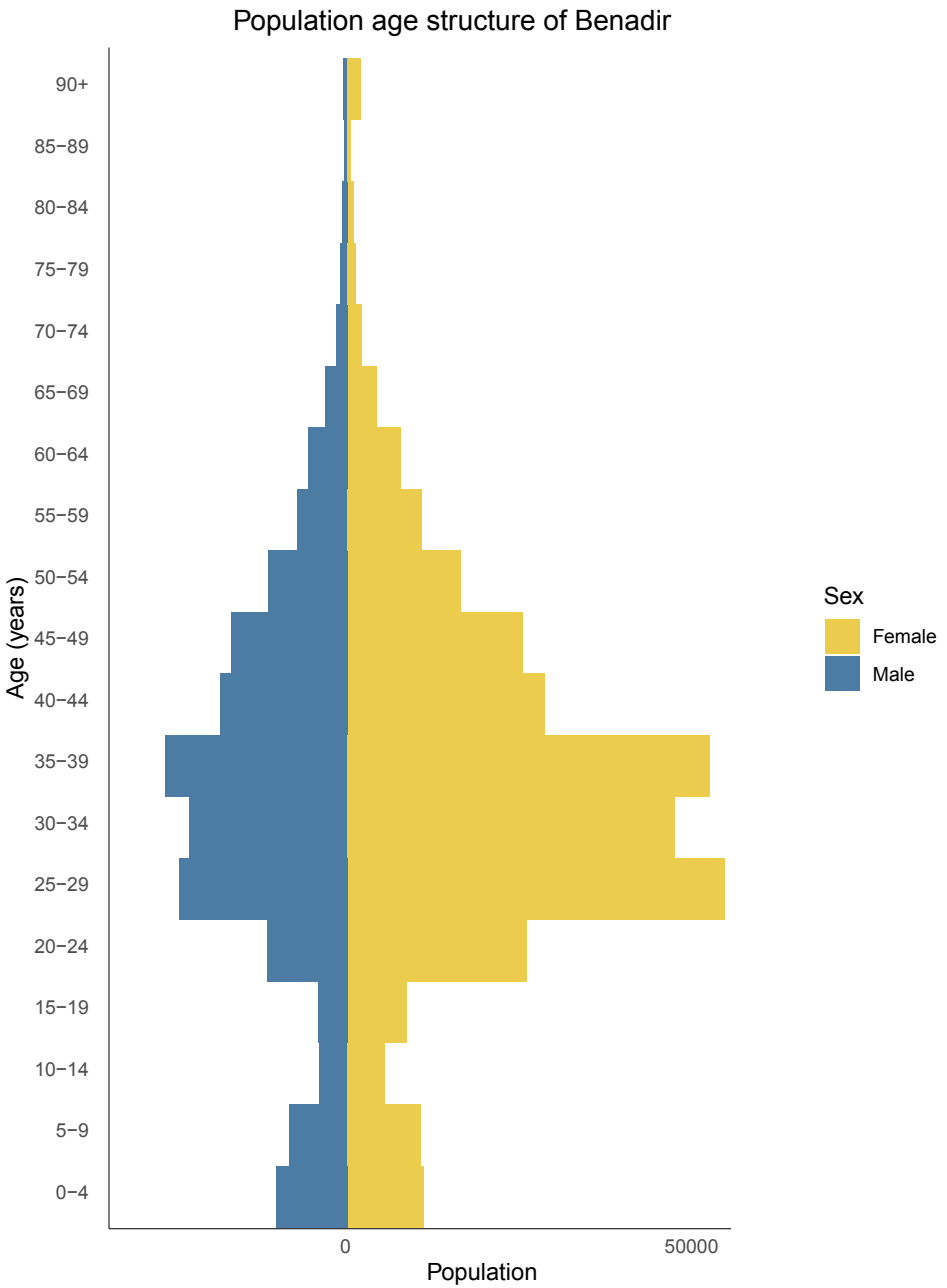


Figure 1: Population age distribution of Benadir Region by sex

2.1. NUMBER OF CASES

Self-report confirmed cases: 192 reported that they had been tested and confirmed to be positive with COVID-19.

Possible (1): Based on symptoms reported, 2,566 people had at least one of the following symptoms: cough, fever, shortness of breath and sudden loss of smell and taste.

Possible (3): *Within this group, 561 individuals displayed at least three of these symptoms.*

Possible (4): 368 displayed at least four of these symptoms.

Probable: An additional 239 qualified as probable considering they exhibited at least one of the aforementioned symptoms and had contact with a symptomatic person or a COVID-19 case.

Self-report confirmed cases: 192 reported that they had been tested and confirmed to be positive with COVID-19.

2.1.1. OBSERVED AND EXPECTED CASES

Based on the ***self-report confirmed, possible and probable*** case definitions, the observed and expected COVID-19 cases in Mogadishu between 8th of June and 30th of July 2020 were calculated. As reported in Table 1:

- There were 3,217 possible cases per 100,000 population and the total number of expected possible cases was 76,034.
- The observed possible (3) and possible (4), rates were 703 and 461 cases per 100,000 population respectively. For expected cases, this was 10,904 and 7,082 respectively.
- The rate of probable cases was 299 per 100,000 population and there were 7,082 expected probable cases overall.
- Additionally, there were 240 per 100,000 population self-reported confirmed cases and 5,689 expected cases overall.

Table 1: Observed and expected cases

Type of cases	Observed number of cases	Observed cases per 100, 000 population	Total expected cases in Mogadishu
Possible	2,566	3,217	76,034
Possible (3)	561	703	16,623
Possible (4)	368	461	10,904
Probable	239	299	7,082
Self-report confirmed	192	240	5,689

Table 2 displays the observed and expected cases within each district and the **supplemental maps** provided below depict the degree to which districts had high numbers. The Yaqshid district has the highest observed *possible (3)* and *possible (4)* cases with 1,215 and 871 cases per 100,000 population in Mogadishu, respectively. Shangani district has the highest probable cases with 644 cases per 100,000 population in Mogadishu. As can be seen in table 2, Yaqshid district also has the highest expected possible cases. Karan had notably high expected probable and *self-report confirmed* cases, with a total of 934 and 901 cases, respectively.

COVID-19 cases in Benadir

District1	Observed possible cases	Observed possible cases (3)	Oberved possible cases (4)	Oberved probable case	Observed self-report confirm..	Expected possible cases	Expected possible cases (3)	Expected possible cases (4)	Expected probable case	Expected self-report confirmed cases
Abdiaziz	2,052	567	306	262	218	1,058	293	158	135	113
Bondhere	2,803	854	644	161	226	2,852	869	656	164	229
Daynile	3,457	645	480	298	149	5,050	942	701	435	217
Dharkenley	2,883	662	410	284	268	4,279	982	608	421	397
Hamar-Jajab	3,769	606	369	264	185	3,328	535	326	233	163
Hamar-Weyne	3,264	653	394	124	259	3,027	605	365	115	240
Hawl-Wadag	2,767	596	255	298	383	3,040	655	281	327	421
Hodan	3,156	526	381	254	218	7,129	1,188	860	574	492
Huriwa	3,374	900	675	195	210	4,775	1,273	955	276	297
Karan	3,384	548	329	384	247	8,243	1,335	801	934	601
Kaxda	3,185	750	444	306	368	3,147	741	439	303	363
Shangani	3,219	429	322	644	107	1,305	174	131	261	44
Shibis	2,980	580	310	155	77	4,772	930	496	248	124
Waberi	3,393	686	362	362	267	3,161	639	337	337	249
Wadajir	3,750	474	388	259	129	6,508	823	673	449	224
Warta Nabada	3,454	673	449	224	359	4,419	861	574	287	459
Yaqshid	3,079	1,215	871	122	243	9,838	3,884	2,783	388	777

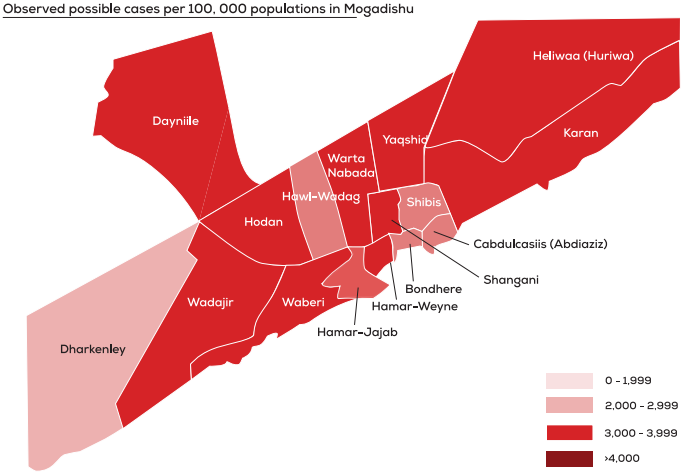
Number of cases

44 9,838

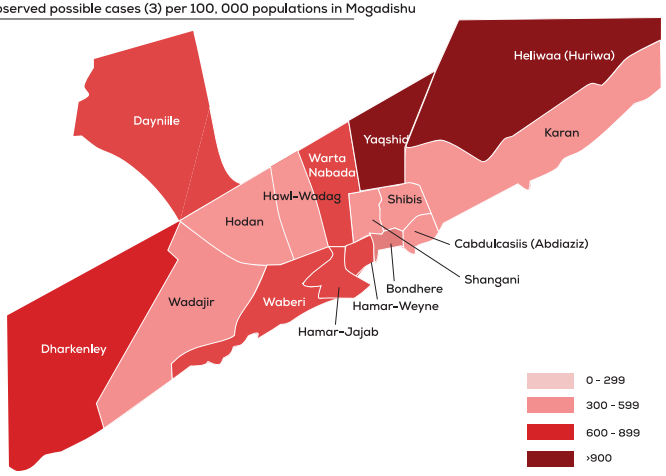
Table 2: COVID-19 cases by district

HEAT MAPS ON OBSERVED AND EXPECTED CASE

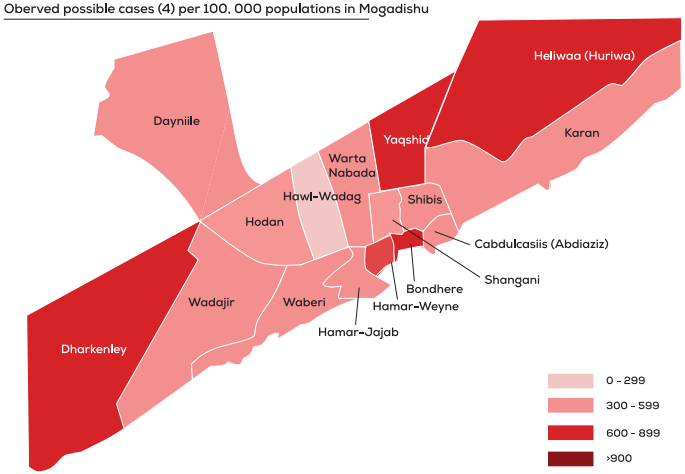
Observed possible cases per 100, 000 populations in Mogadishu



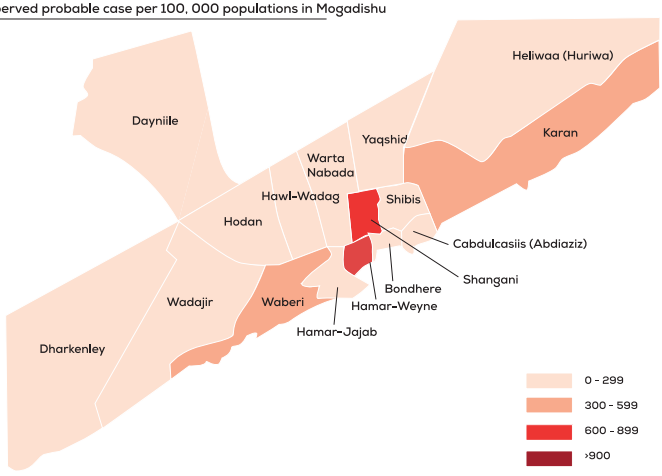
Observed possible cases (3) per 100, 000 populations in Mogadishu



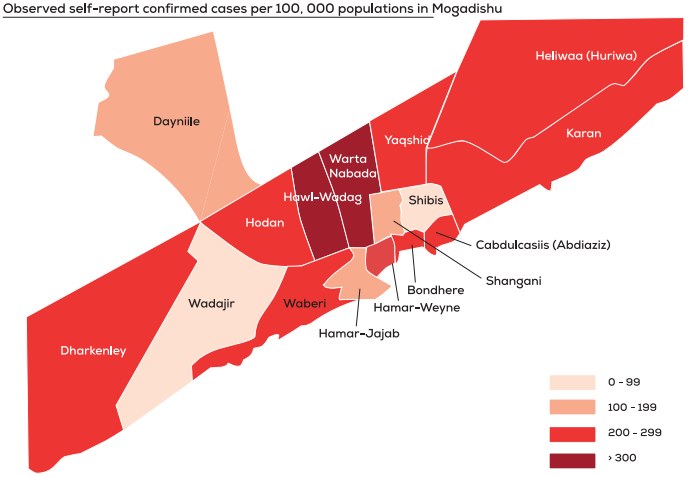
Oberved possible cases (4) per 100, 000 populations in Mogadishu



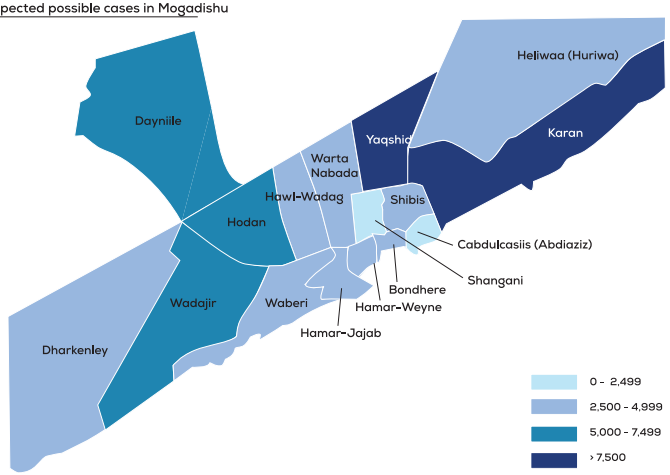
Oberved probable case per 100, 000 populations in Mogadishu



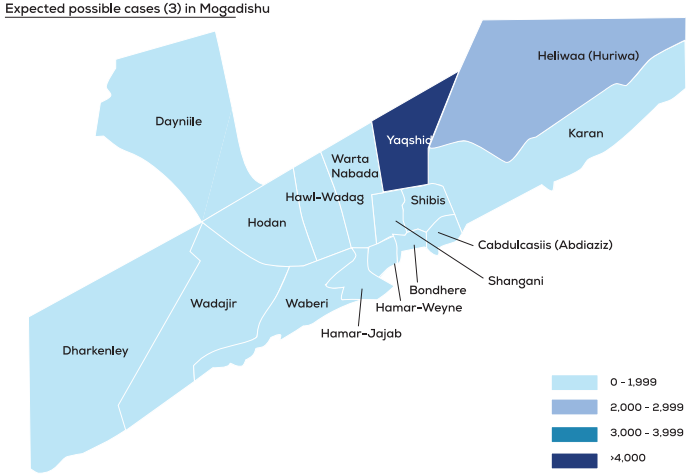
Observed self-report confirmed cases per 100, 000 populations in Mogadishu



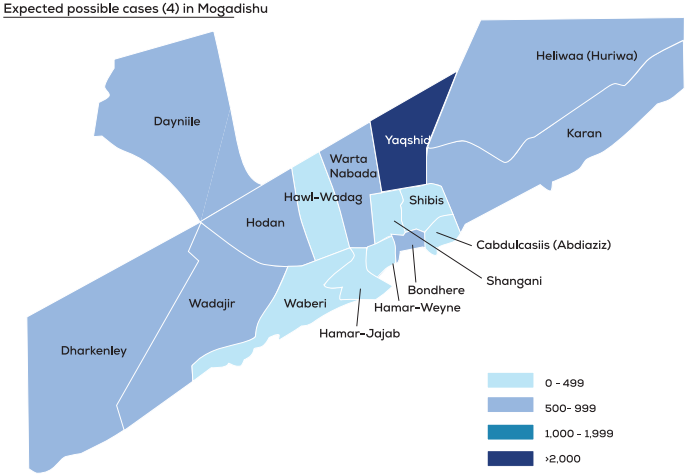
Expected possible cases in Mogadishu



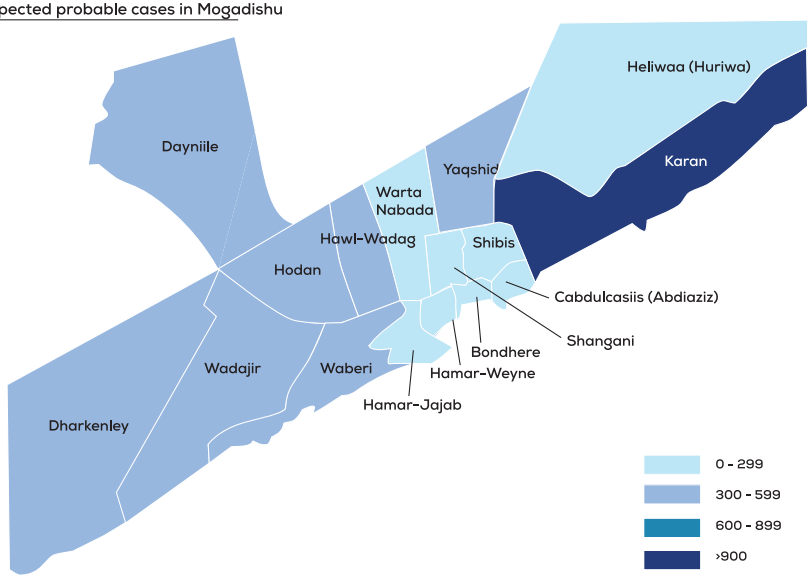
Expected possible cases (3) in Mogadishu



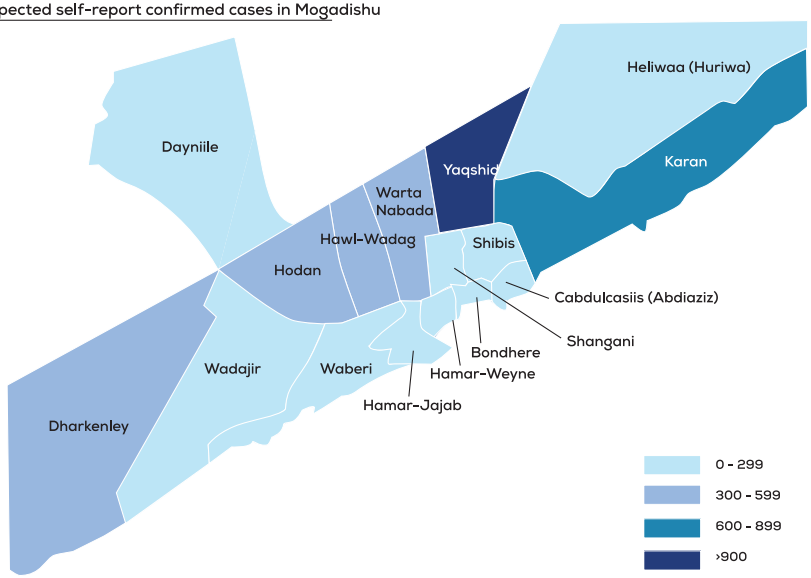
Expected possible cases (4) in Mogadishu



Expected probable cases in Mogadishu



Expected self-report confirmed cases in Mogadishu



COVID-19 cases by age group

Age group	Possible (1)	Possible (3)	Possible (4)	Probable	Self-report confirmed
0-14	10.4%	2.0%	1.1%	3.3%	5.2%
15-29	17.9%	20.0%	20.7%	10.2%	24.5%
30-44	35.8%	29.2%	29.1%	59.1%	35.4%
45-59	26.0%	38.9%	39.4%	26.5%	31.8%
60-74	8.1%	7.8%	7.9%	0.9%	3.1%
75-89	1.5%	2.1%	1.9%	0.0%	0.0%
90+	0.2%	0.0%	0.0%	0.0%	0.0%

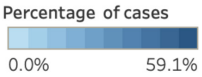


Table 3: COVID-19 cases by age group

2.2. POPULATION CHARACTERISTICS OF COVID-19 CASES

2.2.1. AGE

As demonstrated in Table 3, those who were aged between 30 to 44 years old were most likely to be *possible (1), probable and self-report confirmed* cases, whereas for *possible (3)* and *possible (4)* it was those aged between 45 and 59, with **59.1%** of probable cases reported within this group; these differences were statistically significant (p <0.0001).

2.2.2. EDUCATION AND AWARENESS LEVEL

As depicted in Table 4, educational level was strongly associated with all types of COVID-19 cases (p <0.0001). For all the *possible* cases, those with no education were highly represented **(32.6-37.2%).** For *probable cases* it was those who completed only primary school **(37.9%)**, and for *self-report confirmed* cases it was those who attended University **(39.2%).** There was a linear trend between educational level and *self-report confirmed* case; the greater the educational level likelihood of being a *self-report confirmed case (p<0.0001).* From the possible cases there was no linear trend with educational level. Though, a trend was observed between educational level and *probable cases (p <0.025)*, here cases were likely to be those who had little to no education. Similarly, when examining the educational level, those who were University educated were more likely to get a COVID-19 test *(p<0.0001).* A linear trend can also be observed within this relationship; the more educated individuals were more likely to seek out testing.

COVID-19 cases by education level

Education level	Possible (1)	Possible (3)	Possible (4)	Probable	Self-report confirmed
None	35.3%	37.2%	32.6%	22.3%	19.4%
Primary school	27.8%	19.0%	20.4%	37.9%	18.8%
Secondary school	17.6%	20.1%	20.4%	15.6%	22.6%
University degree	19.3%	23.8%	26.6%	24.2%	39.2%

Percentage of cases: 15.6% – 39.2%

Table 4: COVID-19 cases by education level

2.2.3. OCCUPATION AND INCOME

Majority of COVID-19 cases were unemployed, this ranged from 63.1% in the possible (1) cases to **35.6%** in the *self-report confirmed* cases (Table 5). Within the probable cases, services and sales were the most represented **(24.2%)**, then it was professionals **(22.8%).** In terms of income, Table 6 illustrates that for *possible (1)* and probable cases, the majority (**42.6%** and **77.2%,** respectively) had a monthly income of $0 to $99, whereas for *possible (3)* and possible (4), **61.5%** and **65.2%** of cases reported a monthly income of $100 to $499. For the for *self-report confirmed* cases, most common income was $100 to $499.

COVID-19 cases by type of occupation

Type of occupation	Possible (1)	Possible (3)	Possible (4)	Probable	Self-report confirmed
Professionals	6.9%	8.7%	9.8%	22.8%	13.5%
Clerical Support Workers	2.8%	7.8%	9.0%	4.2%	19.3%
Services and Sales Workers	4.9%	4.3%	4.3%	24.2%	6.3%
Craft and Related Trades ..	4.9%	2.1%	1.6%	14.9%	3.6%
Plant and Machine Operat..	0.1%	0.0%	0.0%	0.0%	0.0%
Elementary occupations	11.6%	8.7%	11.4%	13.5%	7.8%
Student	2.1%	8.2%	11.7%	0.9%	4.2%
Other	3.5%	5.0%	5.4%	3.7%	9.4%
Unemployed	63.1%	55.1%	46.7%	15.8%	35.9%

Percentage of cases: 0.0% – 63.1%

Table 5: COVID-19 cases by type of occupation

COVID-19 cases by income level

Income	Possible (1)	Possible (3)	Possible (4)	Probable	Self-report confirmed
$0-99	42.6%	12.8%	13.9%	77.2%	17.2%
$100-499	35.7%	61.5%	65.2%	11.6%	38.5%
$500-999	6.7%	14.8%	14.9%	2.8%	27.1%
$1,000-1,999	0.8%	2.1%	2.2%	0.0%	5.7%
Above $2,000	1.0%	0.4%	0.3%	0.0%	0.0%
Undisclosed	13.1%	8.4%	3.5%	8.4%	11.5%

Percentage of cases
0.0% 77.2%

Table 6: COVID-19 cases by income level

2.2.4. HOUSING

Stone and corrugated iron housing and stone corral houses/Villas were the most common types of housing with nearly **80%** all types COVID-19 cases living within them (Table 7).

All five types of COVID-19 cases lived in an overcrowded setting, with more than 40% living in a house with 2.00–2.50 persons per room (Table 8).

COVID-19 cases by house type

House Type	Possible (1)	Possible (3)	Possible (4)	Probable	Self-report confirmed
Tents	4.0%	2.9%	3.5%	2.3%	4.2%
Traditional hut	4.0%	3.0%	3.3%	3.7%	4.7%
Apartment/Flat	11.7%	10.3%	9.5%	7.0%	13.5%
Stone corral house/Villa	31.5%	32.1%	30.7%	32.6%	27.1%
Corrugated iron	48.4%	51.7%	53.0%	54.4%	50.5%

Percentage of cases
2.3% 54.4%

Table 7: COVID-19 Cases by house type

COVID-19 cases by persons per room

Persons per room	Possible (1)	Possible (3)	Possible (4)	Probable	Self-report confirmed
0 - 0.49	0.8%	0.9%	0.8%	0.5%	0.0%
0.50 - 0.74	3.3%	3.2%	4.1%	3.7%	5.2%
0.75 - 0.99	2.6%	2.5%	2.7%	2.8%	1.0%
1.00 - 1.24	6.7%	5.5%	6.0%	7.9%	6.8%
1.25 - 1.49	8.1%	8.0%	7.1%	4.2%	7.8%
1.50 - 1.74	15.0%	13.9%	12.2%	16.3%	16.1%
1.75 - 1.99	6.5%	7.0%	7.1%	5.1%	4.7%
2.00 - 2.49	23.6%	25.3%	25.0%	26.0%	25.0%
2.50 - 2.99	11.5%	12.5%	13.3%	12.1%	10.4%
3.00+	22.0%	21.2%	21.7%	21.4%	22.9%

Percentage of cases
0.0% 26.0%

Table 8: COVID-19 Cases by persons per room

2.3. DEATHS REPORTED IN THE HOUSEHOLDS

As part of the survey, each household was asked whether there were deaths in the household within the past two months. While 556 households reported deaths in their households within the two months, **74%** of the deaths reported were missing the required information needed to categorize the deaths into *possible, probable or self-report confirmed* cases such as age and sex, and symptom data and morbidities. Therefore, it is not possible to establish if the deaths were likely to be linked to COVID-19 deaths.

Table 9 shows the observed and expected deaths reported in Mogadishu.

These include all-cause deaths that have occurred at the surveyed household within two months at the time of the survey. Similar to the COVID-19 case estimates, the denominator used was based on population estimates from LSHTM.

Overall, in Mogadishu, there were 1,156 deaths reported across all the households surveyed in the study Table 1 in the appendix contains crude mortality rates by district. *This equated to an observed crude mortality rate of 1,449 deaths per 100,000 population, and an overall of 34,254*

deaths expected within Mogadishu. Yaqshid and Hamar-weyne had the highest observed death, with 3,241 and 3,144 deaths per 100,000 population, respectively. Furthermore, Yaqshid had 10,356 expected deaths, while Karan had 3,805 and Daynile had 3,649.

Reported deaths in Benadir

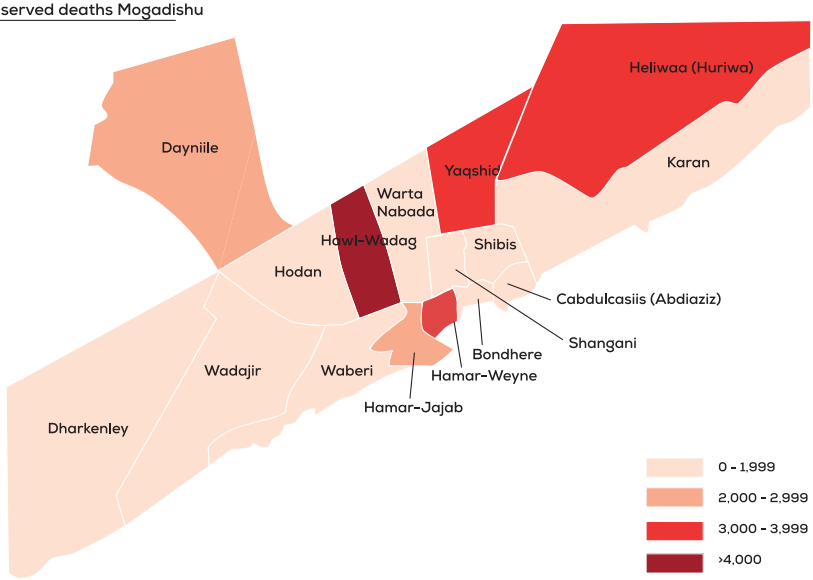
District	Observed death	Expected deaths
Abdiaziz	218	113
Bondhere	1,804	1,836
Daynile	2,498	3,649
Dharkenley	1,938	2,876
Hamar-Jajab	580	512
Hamar-Weyne	3,174	2,943
Hawl-Wadag	426	468
Hodan	816	1,844
Huriwa	180	255
Karan	1,562	3,805
Kaxda	1,087	1,074
Shangani	429	174
Shibis	387	620
Waberi	210	195
Wadajir	431	748
Warta Nabada	1,660	2,124
Yaqshid	3,241	10,356

Number of deaths
113 10,356

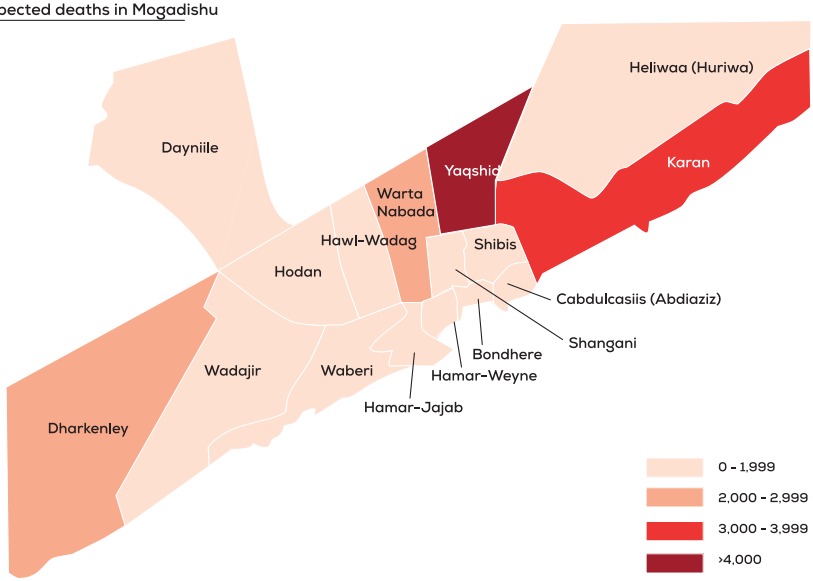
Table 9: Self-report deaths observed and expected

Heat Maps on Observed and Expected Death

Observed deaths Mogadishu



Expected deaths in Mogadishu



Chapter 3

Vulnerable Populations

From the data collected, it was possible to indicate population sub-groups and characterise those who may be vulnerable to COVID-19 due to pre-existing health or socioeconomic factors. These factors included health status, employment, education, housing and demographics.

3.1. HEALTH

3.1.1. SYMPTOMS

In figure 2, the symptoms are categorized according to age groups. Study participants exhibiting at least one COVID-19 symptom in Mogadishu were all between 30 and 60 years old. Respondents who were *self-report confirmed* cases had a mean age of **37.2** with **13.1%** between 45 and 49 years. Those who were classified as probable cases had a mean age of 37.5 with **25.1%** of these cases between the ages of 35 and 39.

Lastly, **6.2%**, age 65 and above exhibited at least one symptom, **0.04%** were *probable* and **0.08%** were *self-report confirmed.*

With regards to locale, as illustrated in Figure 3, certain districts exhibited more prevalence of symptoms amongst participants surveyed, in particular those with high numbers of internally displaced persons (IDPs) and areas further away from urban centers and with limited access to health facilities including: Dharkenley, Garasbaley, Kaxda, Karan, Daynile, and Yaqshid.

> *"Study participants exhibiting at least one COVID-19 symptom in Mogadishu were all between 30 and 60 years old. Respondents who were self-report confirmed cases had a mean age of 37.2 with 13.1% between 45 and 49 years.*

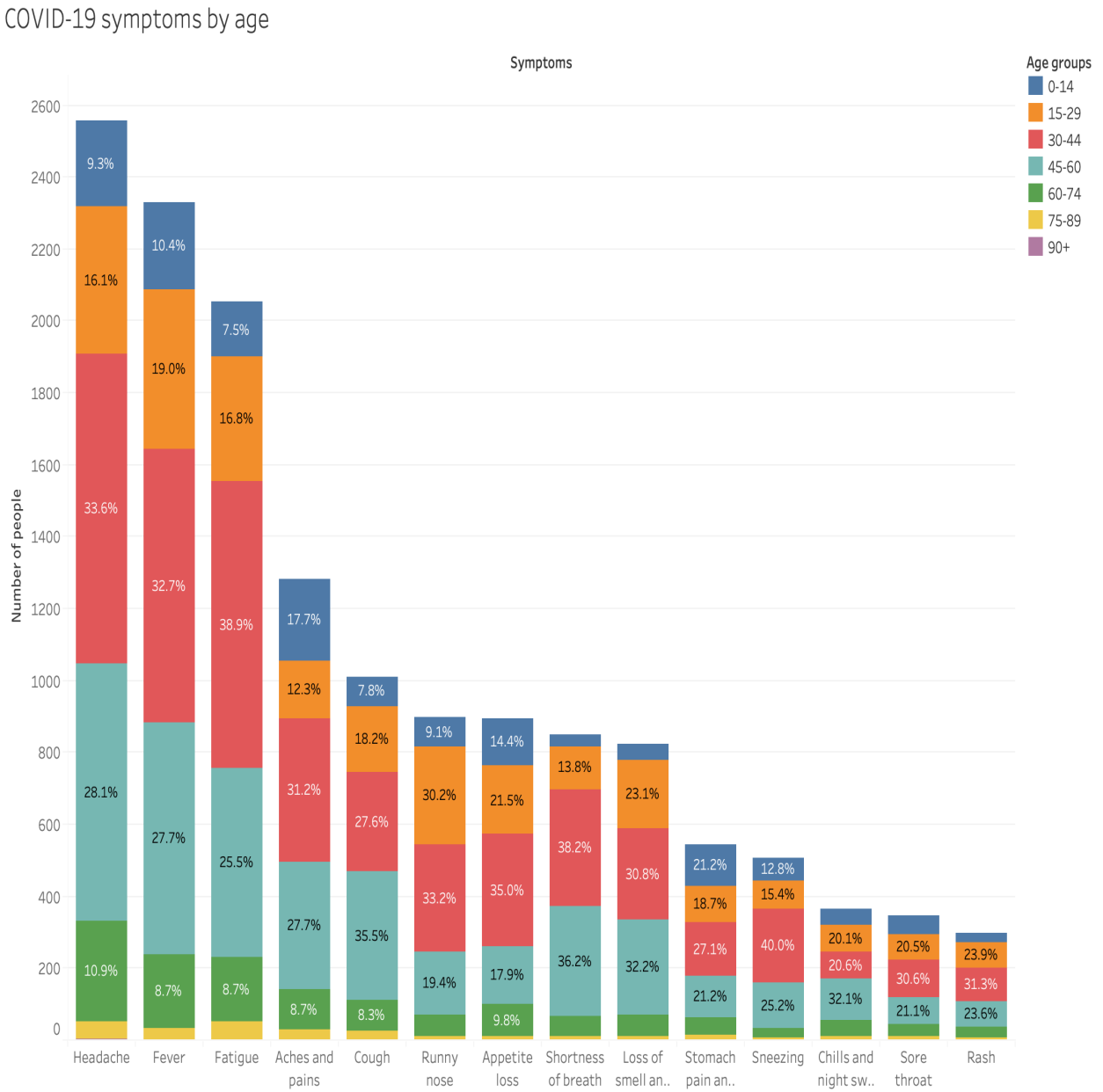


Figure 2: Symptoms by age groups

COVID-19 symptoms by district

Symtoms	Dharkenley	Yaqshid	Huriwa	Karan	Gubadley	Kaxda	Garasbaley	Hamar-Jajab	Hawl-Wadag	Hamar-Weyne	Waberi	Daynile	Bondhere	Wadajir	Abdiaziz	Hodan	Warta Nabada	Shangani	Shibis
Aches & pains	459	68	69	216	43	66	159	12	25	50	18	41	10	5	16	5	16	2	1
Appetite loss	240	78	53	54	65	64	94	20	22	26	19	37	22	22	35	19	15	8	1
Chills & night sweats	98	44	79	40	10	15	25	8	23	4	0	8	1	3	3	1	1	1	0
Cough	315	256	140	59	10	46	33	8	38	42	18	9	16	7	2	6	1	0	3
Diarrhea	96	25	37	25	7	8	30	1	18	0	1	14	0	0	2	1	3	1	0
Fatigue	678	176	164	224	142	120	49	186	30	70	18	29	66	43	2	7	34	9	8
Fever	563	315	248	95	76	183	112	329	57	51	93	32	29	51	46	22	22	1	5
Headache	607	59	169	82	691	147	73	58	33	31	101	53	39	46	47	19	15	11	6
Loss of smell & taste	197	216	225	39	4	23	5	11	26	21	9	2	11	4	2	24	2	0	1
Rash	140	13	22	7	27	10	7	16	15	3	5	13	4	10	0	0	1	2	2
Runny nose	45	42	53	35	12	15	18	4	22	6	0	8	4	0	0	3	1	0	0
Shortness of breath	193	231	83	216	4	40	14	1	20	12	11	7	3	5	2	3	2	1	1
Sneezing	65	62	41	182	16	52	20	0	21	9	4	10	13	6	0	2	5	0	0
Sore throat	79	37	47	37	34	16	29	8	20	7	1	10	1	1	7	8	2	1	1
Stomach pain & cramps	184	24	30	49	34	21	92	25	17	4	15	17	6	10	3	8	7	0	0

Number of people
0 691

Figure 3: COVID-19 symptoms by district

3.1.2. MORBIDITIES

Morbidities that have been reported to be risk factors for fatality include cardiovascular and respiratory disease, hypertension, diabetes and cancers.[1] In the CBCS, many participants self-reported these conditions (Figure 4). Dharkenley was the most represented in majority of the morbidities, this includes lung disease, heart disease, diabetes and high blood pressure. cancer or poor immunity,

12 Deng, G., Yin, M., Chen, X. and Zeng, F., 2020. Clinical determinants for fatality of 44,672 patients with COVID-19. Critical Care, 24(1), pp.1-3.

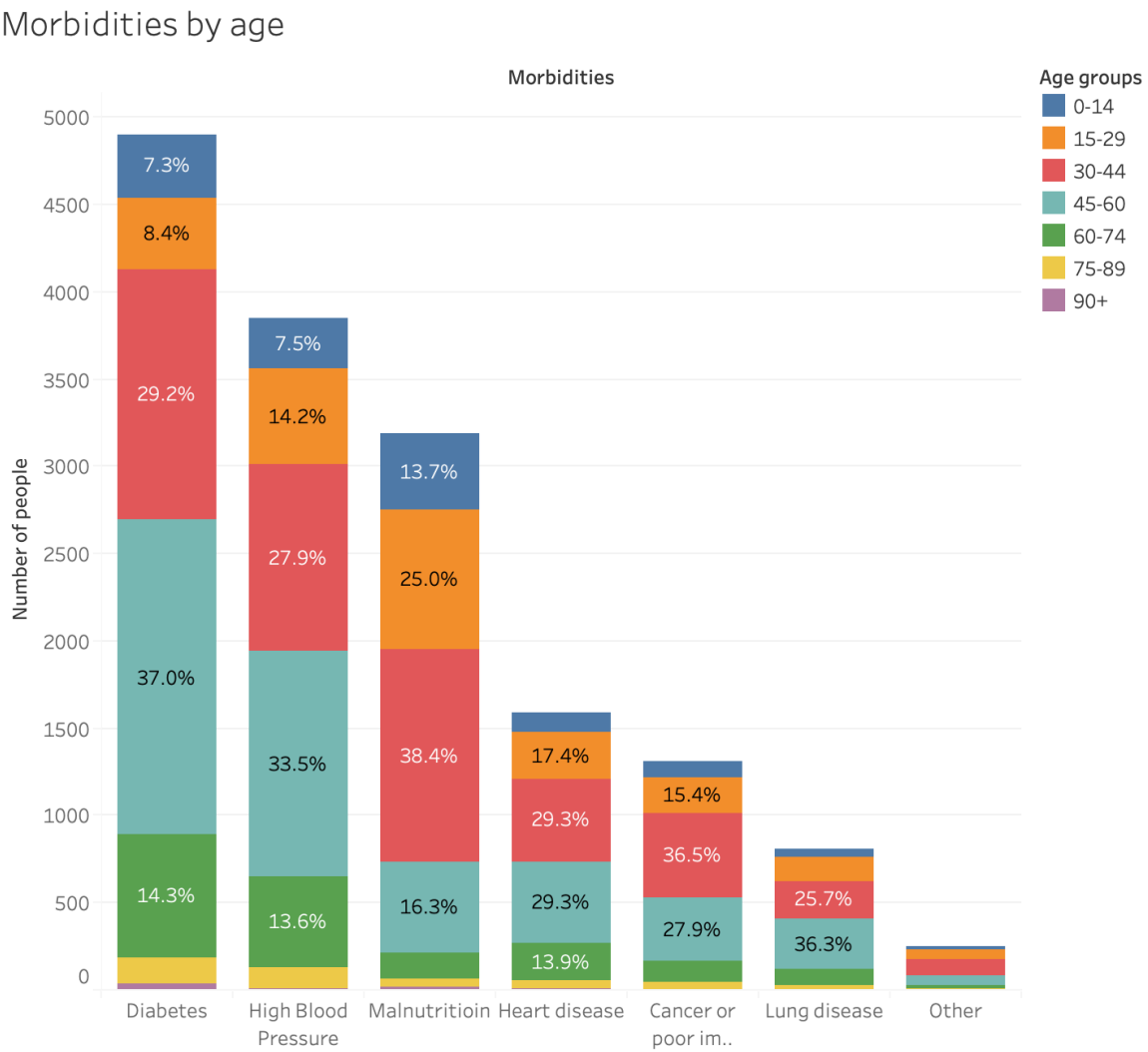


Figure 4: Morbidities by age groups

In Table 10, it is evident that similar to symptoms, certain districts exhibited more prevalence of morbidities amongst participants surveyed. Morbidities were highly reported in districts with high numbers of IDPs and areas further away from urban centers and with limited access to health services including: Dharkenley, Garasbaley, Kaxda, Karan, Daynile, and Yaqshid.

Morbidities by district

Morbidities	Dharkenley	Garasbaley	Huriwa	Kaxda	Yaqshid	Karan	Daynile	Bondhere	Waberi	Hamar-Jajab	Hamar-Weyne	Wadajir	Gubadley	Hodan	Abdiaziz	Warta Nabada	Hawl-Wadag	Shibis	Shangani
	District																		
Lung disease	42.1%	2.8%	13.6%	4.3%	20.8%	2.9%	2.0%	1.0%	0.9%	1.3%	1.5%	1.5%	1.3%	1.3%	0.4%	0.5%	1.0%	0.5%	0.5%
Heart disease	34.4%	5.8%	8.3%	4.4%	8.2%	6.8%	7.7%	3.6%	3.9%	3.0%	1.3%	1.9%	4.0%	1.2%	2.4%	1.2%	1.3%	0.1%	0.6%
Cancer or poor immunity	31.4%	20.5%	14.3%	4.6%	3.3%	4.3%	5.9%	1.7%	1.1%	2.1%	2.0%	2.6%	2.1%	1.5%	0.3%	0.6%	0.7%	0.3%	0.7%
Diabetes	25.0%	2.8%	6.1%	6.5%	9.2%	10.8%	5.2%	8.9%	4.8%	2.5%	3.3%	3.2%	2.7%	2.9%	1.4%	1.3%	1.3%	1.3%	0.9%
High Blood Pressure	24.3%	3.4%	7.3%	9.9%	7.1%	6.0%	7.2%	7.2%	8.0%	2.1%	3.7%	3.1%	3.1%	2.5%	0.5%	1.9%	1.2%	1.1%	0.4%
Malnutritioin	15.3%	20.8%	9.0%	11.5%	2.1%	5.7%	5.1%	2.6%	3.0%	8.4%	3.3%	3.0%	2.9%	1.6%	2.4%	1.1%	1.0%	0.6%	0.6%
Other	3.5%	3.1%	6.3%	3.5%	15.0%	5.5%	16.9%	2.0%	9.8%	6.3%	10.2%	2.0%	0.8%	3.5%	0.4%	0.8%	7.5%	2.0%	0.8%

Percentage of morbidity
0.1% 42.1%

Table 10: Self-reported morbidities by district

3.2. HOUSING

Within the population surveyed, **52.9%** owned the houses they lived in, **28.9%** rented and **17.8%** occupied the place they were living. As per figure 5 below, more than 8/10 of surveyd houses were either Corrugated iron housing or stone corral houses/villas. Additionally, Hamar-weyne had the most flats **(74.1%)**, while Gubadley, Kaxda and Hamar-jajab had the most corrugated iron housing. Majority of stone corral houses/ villas were from Shibis, Waberi, Dharkenley and Bondhere. Overcrowding remained a vulnerability factor, as **4.6%** of surveyed households were tents and **4.1%** were traditional huts. Most of the households reported living in tents were located in high IDP populated areas including, Garasbaley, Kaxda and Daynile (Figure 6).

> *"The high occupancy rate of most households; presents further challenges to self-isolate and self-quarantine as one of the main actions to containing the spread of the virus.*

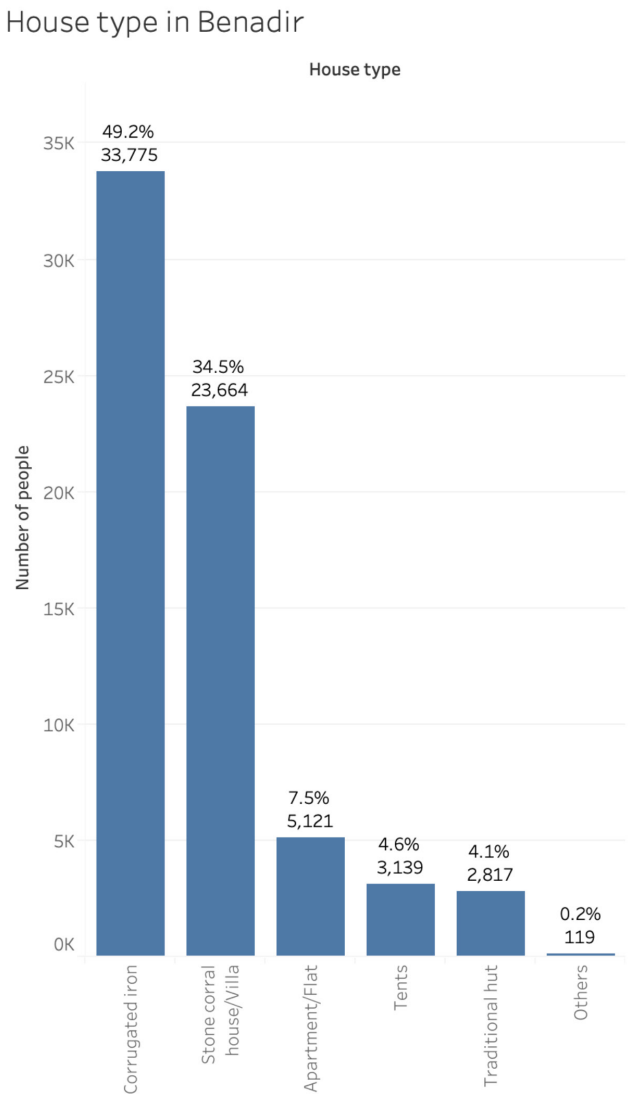


Figure 5: Housing types in the Benadir Region

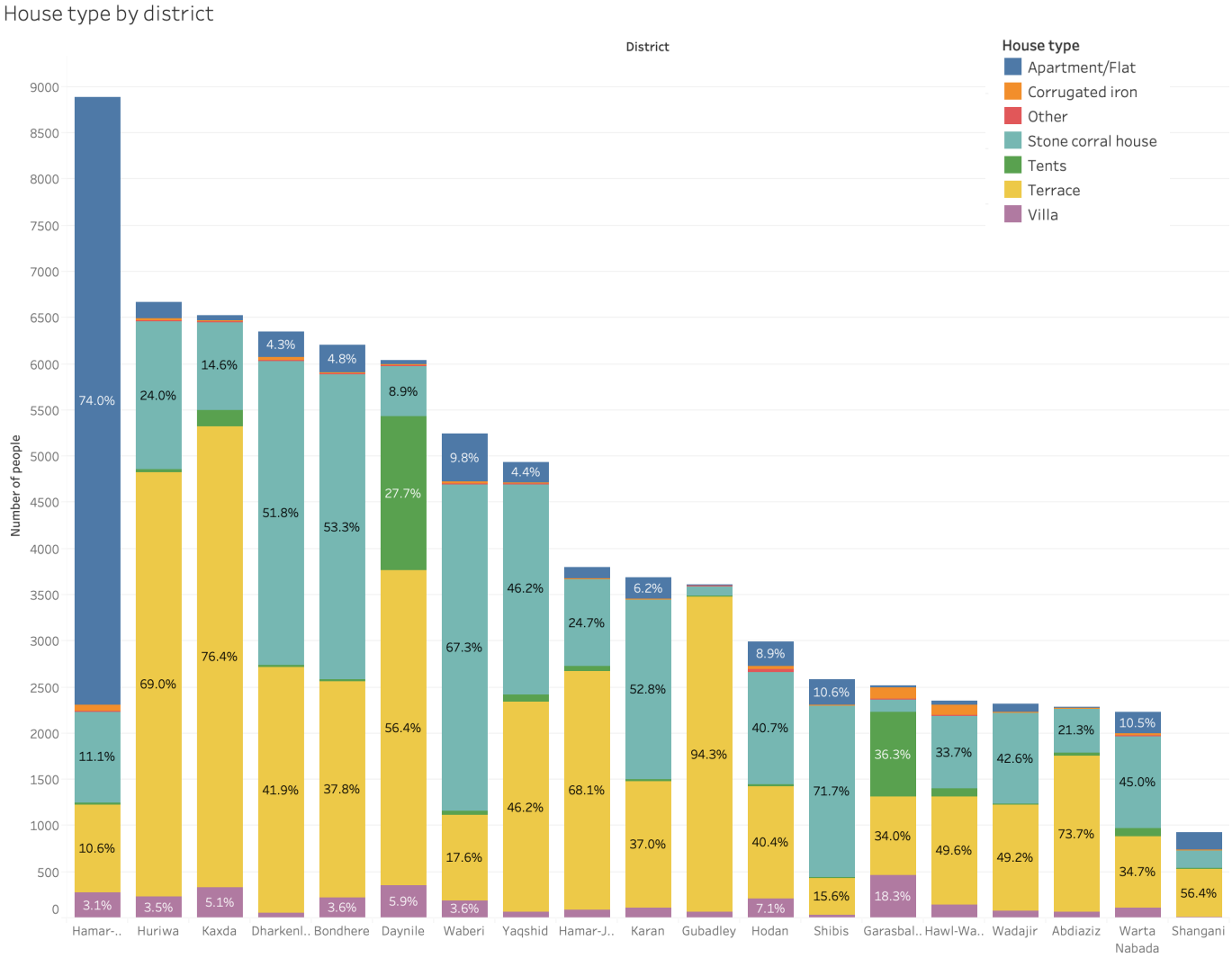


Figure 6: Housing type by district

Persons per a room by district

Overcrowding	Abdiaziz	Bondhere	Daynile	Dharkenley	Garasbaley	Gubadley	Hamar-Weyne	Hamar-Jajab	Hawl-Wadag	Hodan	Huriwa	Karan	Kaxda	Shangani	Shibis	Waberi	Wadajir	Warta Nabada	Yaqshid
	District																		
0 - 0.49	0.3%	0.6%	0.2%	0.2%	0.3%	2.0%	0.4%	1.3%	0.8%	0.6%	0.4%	1.7%	2.0%	1.3%	1.1%	1.4%	1.0%	0.5%	0.1%
0.50 - 0.74	2.9%	4.0%	0.7%	1.3%	1.1%	8.1%	3.8%	2.4%	4.8%	3.3%	3.2%	5.0%	8.4%	2.6%	4.7%	3.0%	9.2%	2.4%	1.7%
0.75 - 0.99	2.6%	2.2%	0.5%	3.3%	1.6%	3.4%	0.4%	1.1%	2.7%	3.2%	2.9%	4.2%	5.1%	0.6%	4.5%	1.7%	6.8%	2.5%	2.4%
1.00 - 1.24	4.2%	2.8%	2.6%	7.3%	1.9%	8.5%	20.4%	4.0%	4.6%	7.7%	5.4%	5.5%	9.4%	7.4%	6.3%	5.4%	9.0%	4.2%	3.8%
1.25 - 1.49	8.6%	7.3%	2.7%	9.4%	3.3%	10.0%	3.0%	3.6%	4.8%	11.0%	8.5%	10.3%	9.9%	1.8%	11.3%	6.2%	15.4%	8.4%	7.0%
1.50 - 1.74	11.6%	13.6%	9.7%	14.2%	8.0%	19.1%	13.8%	8.4%	9.8%	18.7%	16.0%	18.3%	21.4%	9.7%	19.8%	10.7%	18.6%	18.7%	13.4%
1.75 - 1.99	5.6%	6.3%	3.7%	10.9%	2.7%	4.9%	0.8%	3.5%	3.8%	6.8%	6.6%	9.5%	6.3%	2.5%	8.8%	5.0%	7.8%	8.9%	9.1%
2.00 - 2.49	27.0%	26.1%	23.0%	28.3%	16.7%	25.3%	22.5%	18.3%	16.4%	23.3%	22.1%	24.4%	21.3%	18.4%	27.2%	25.1%	18.0%	29.1%	27.3%
2.50 - 2.99	12.2%	14.6%	17.7%	12.9%	10.8%	8.9%	8.3%	13.6%	8.8%	11.4%	12.3%	8.9%	7.9%	12.2%	6.9%	12.3%	6.1%	13.4%	14.3%
3.00+	25.0%	22.5%	39.2%	12.2%	53.6%	9.9%	26.6%	43.9%	43.6%	14.1%	22.7%	12.1%	8.3%	43.5%	9.4%	29.2%	8.2%	12.0%	20.9%

Percentage of district
0.1% 53.6%

Table 11: Persons per room by district

Persons per room by house type

Persons per room	House type				
	Stone corral house/Villa	Corrugated iron	Apartment/Flat	Traditional hut	Tents
0 - 0.49	0.9%	0.8%	0.7%	0.5%	0.2%
0.50 - 0.74	3.6%	3.5%	4.8%	3.4%	1.0%
0.75 - 0.99	2.9%	2.7%	2.9%	1.9%	0.7%
1.00 - 1.24	6.0%	5.1%	15.4%	5.9%	3.5%
1.25 - 1.49	8.7%	7.0%	9.4%	5.5%	2.1%
1.50 - 1.74	14.4%	14.7%	17.9%	11.4%	6.5%
1.75 - 1.99	8.5%	5.6%	5.2%	2.6%	1.1%
2.00 - 2.49	27.8%	22.6%	21.5%	16.5%	13.7%
2.50 - 2.99	12.0%	12.4%	7.7%	9.3%	12.5%
3.00+	15.4%	25.5%	14.6%	43.0%	58.8%

Percentage of house ty..
0.2% 58.8%

Table 12: Persons per room by house type

3.2.1. HOUSEHOLD NEEDS

As part of the questionnaire, respondents were asked to identify specific support needed within their households. The urgent housing need was access to WASH, followed by health services, food and sustenance and education as illustrated in Figure 7.

It is important to note that at the district level, WASH, health services, food and sustenance and education were also listed as requiring immediate support particularly in areas with high

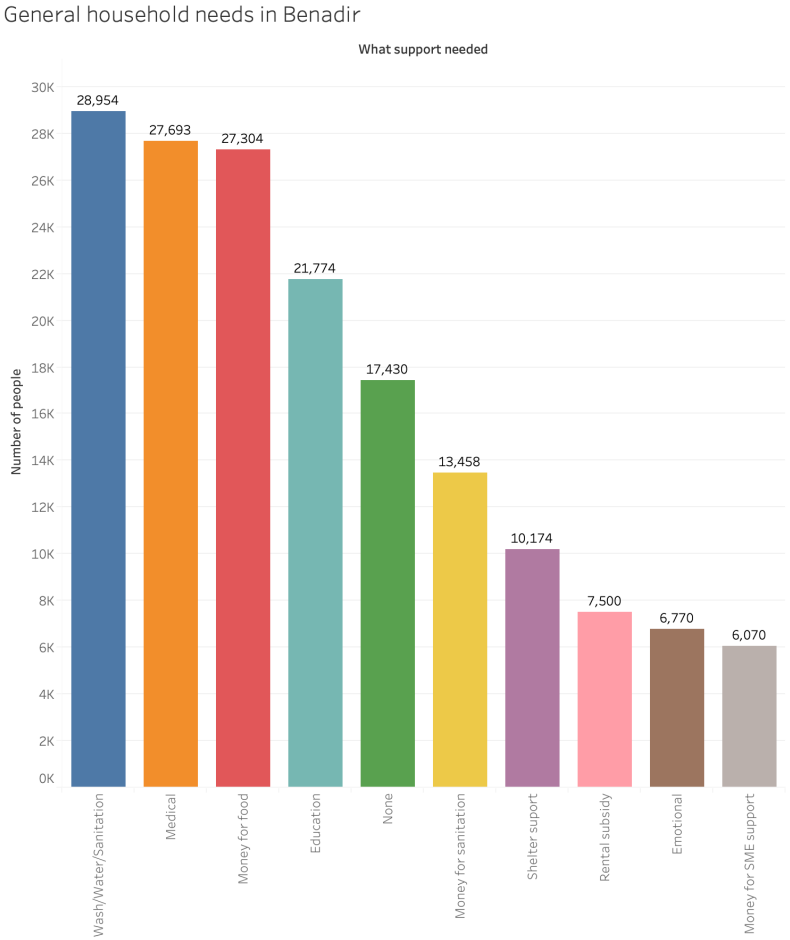


Figure 7: General household needs in Benadir

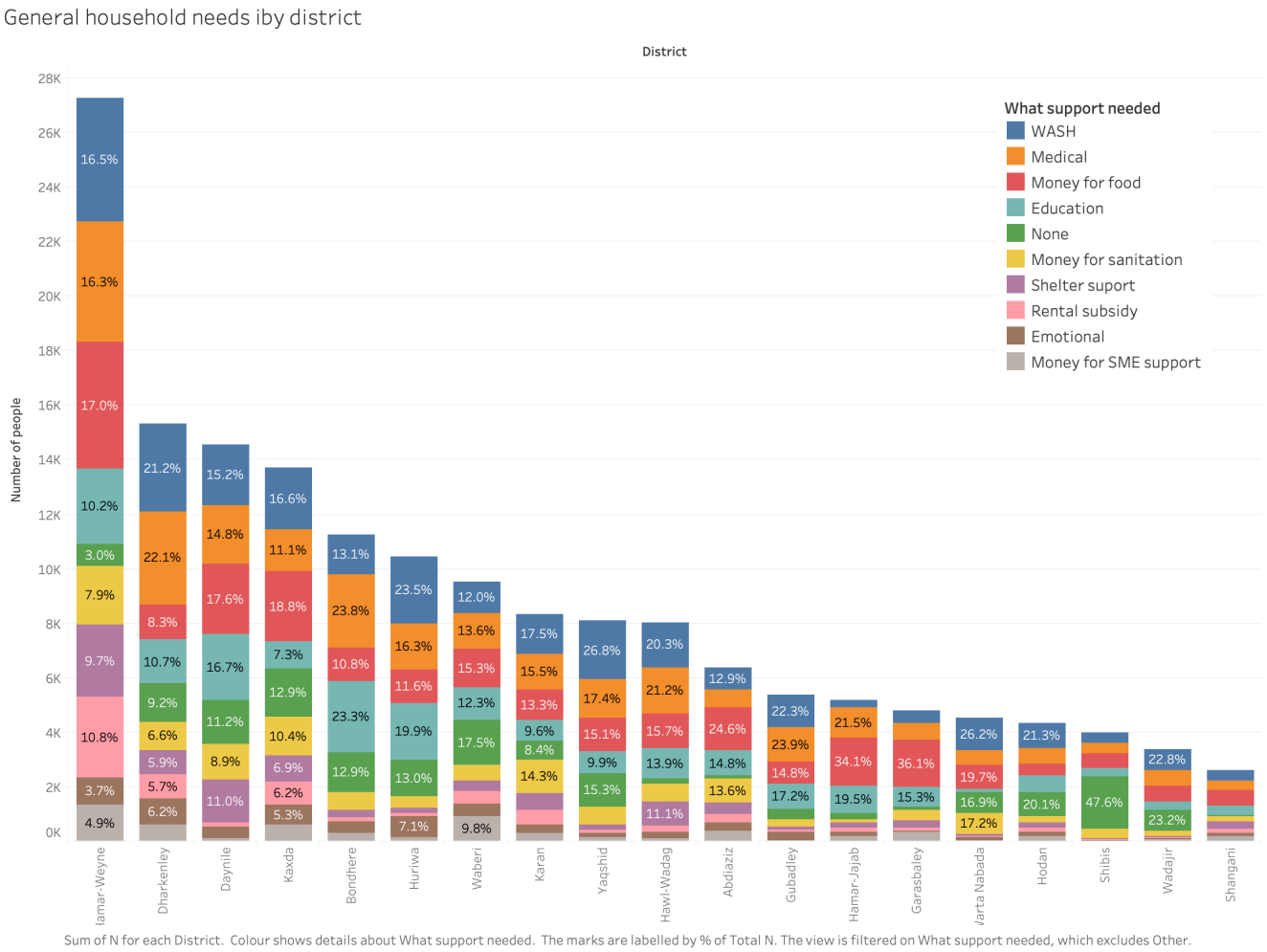


Figure 8: General household needs by district

populations of IDPs as displayed in Figure 8.

The main means of support majority of participants expressed would be crucial in bolstering their capacity and agency to prevent and cope with the impact of COVID-19 was the provision of WASH, increased access to health services and financial support to meet their other needs including food and shelter (Figure 9 and 10).

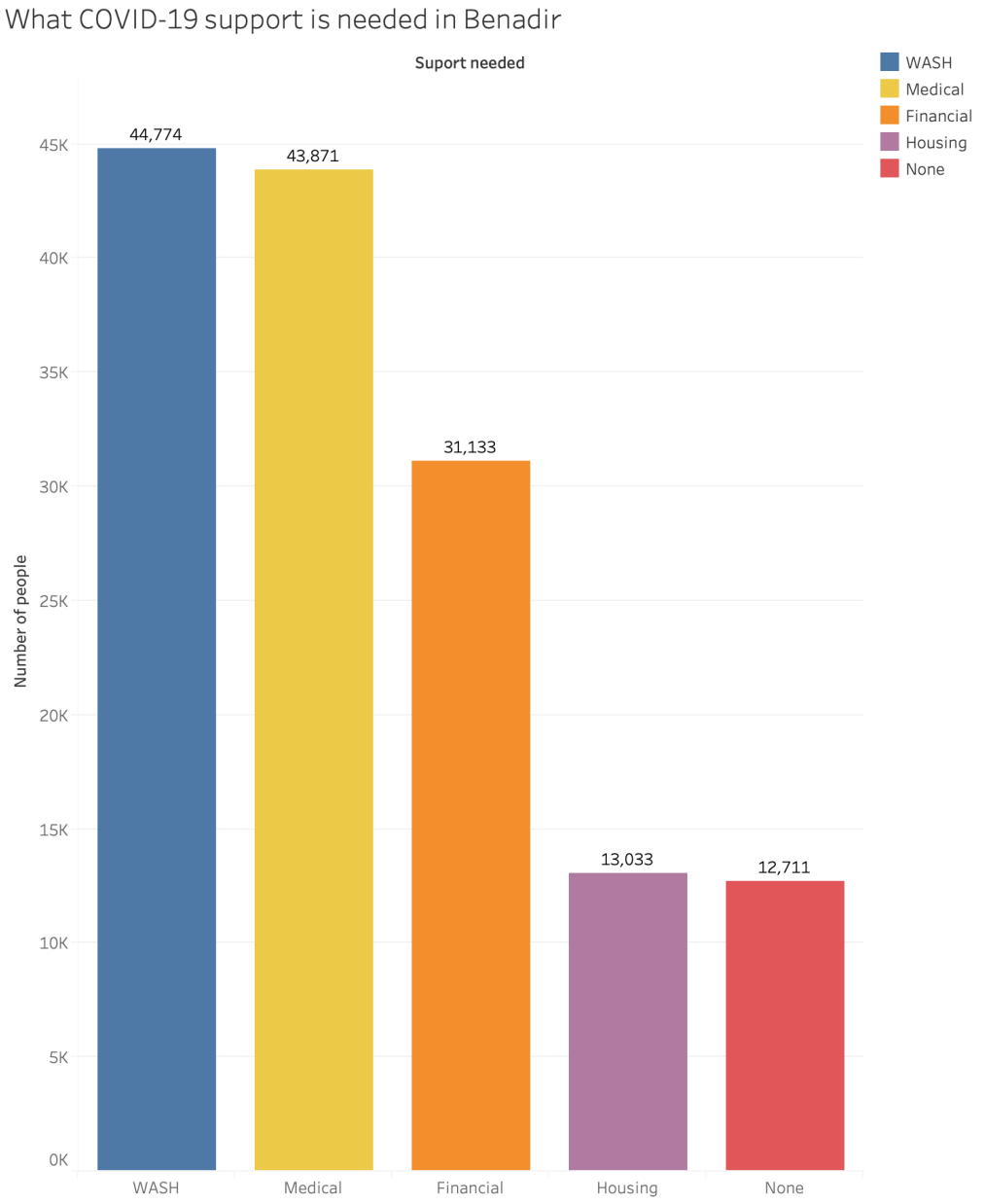


Figure 9: COVID-19 support needed in Benadir

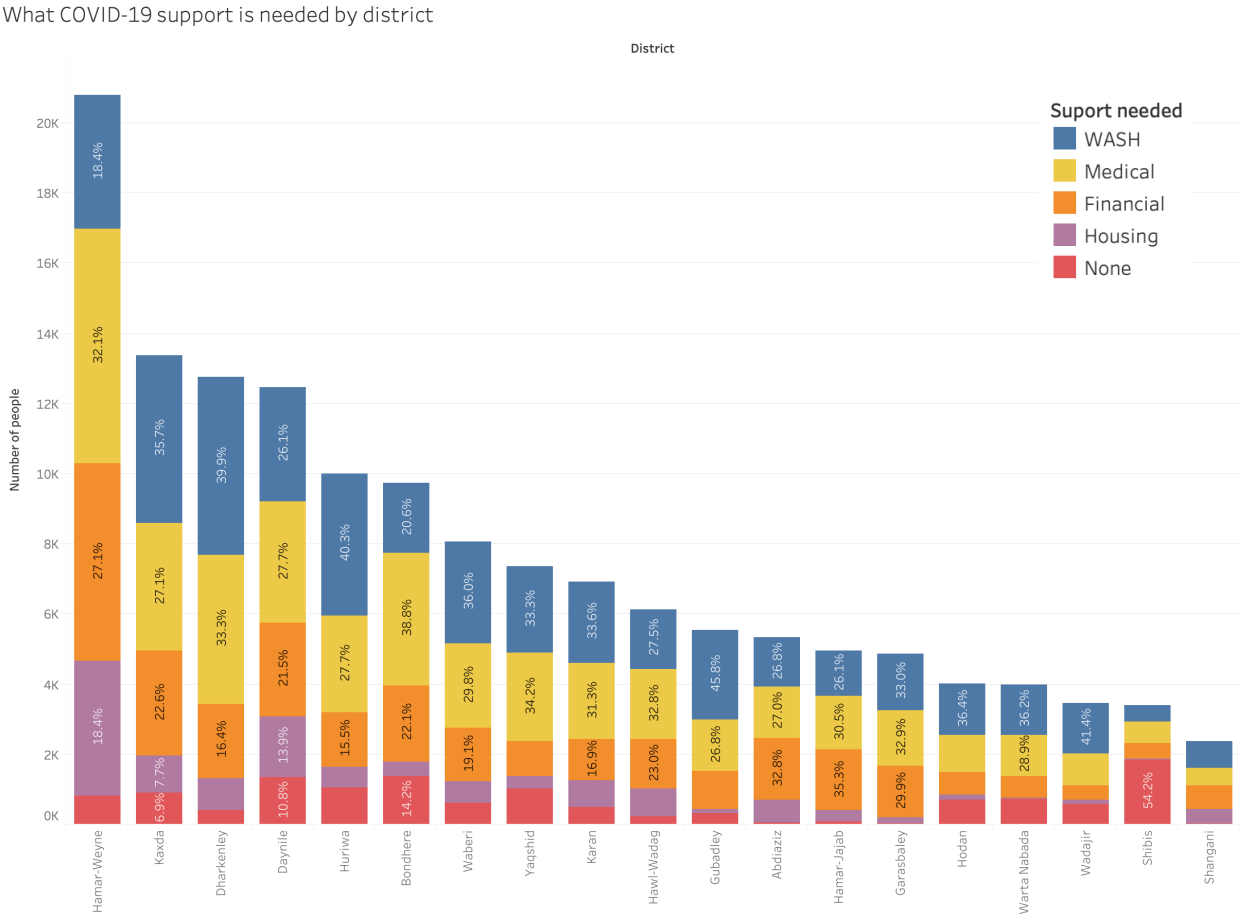


Figure 10: COVID-19 support needed by district

3.3. ECONOMICS

Based on the CBCS, over 63% of the participants were unemployed; 78.3% of all women were unemployed whereas only 46.5% of men were unemployed. The employed reported working as professionals, clerks, and in sales, agriculture, crafts, and education as per Figure 11.

For many of these jobs, working from home was not an option. Further, women are not evenly represented in most of these professions. The majority of the participants **(91.8%)** reported they made under $499 USD on a monthly basis, approximately less than $16.60 USD per day,

with the majority of this group making under $3.30 per day. Nearly **10%** of the participants did not disclose their income and the rest made over $500 USD per month (Figure 12). In addition, more men are represented in the higher income bracket than women; specifically, **10.8%** of all men and **6.7%** of all women earn more than $500 a month. Although it is difficult to determine whether this is the household income or just the amount earned by men and women individually, this is reported in Figure 13. Majority of those surveyed who were above the age of 90 **(61.3%)** earned between $100 and $499 per month, while those above age 45 were most likely to earn $500 to $999 per month. Once income levels were stratified according to age groups, while still majority earned between $0 to $99 and $100 to $499, majority of those above the age of 30, reported having an income level between $100 to $499. Most notably, **29%** of those over the age of 90 reported an income level between $0 to $99, **over 61%** were in the $100 to $499 For those below the age of 30, majority reported earning between $0 to $99, per month. See Table 13.

Figure 11: Observed deaths per 100,000 populations in Mogadishu


Mini foot ball

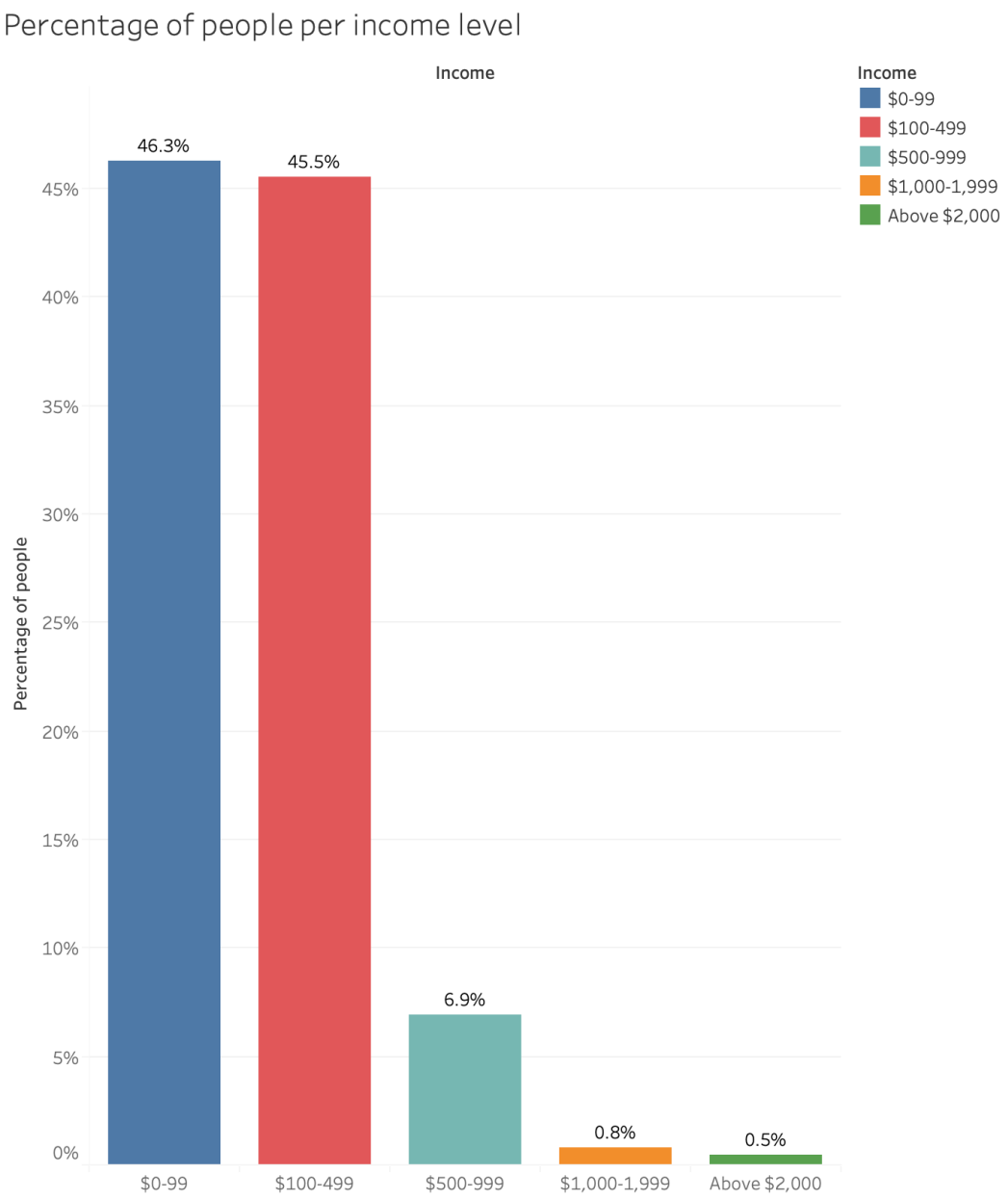


Figure 12: Percentage of people per income level

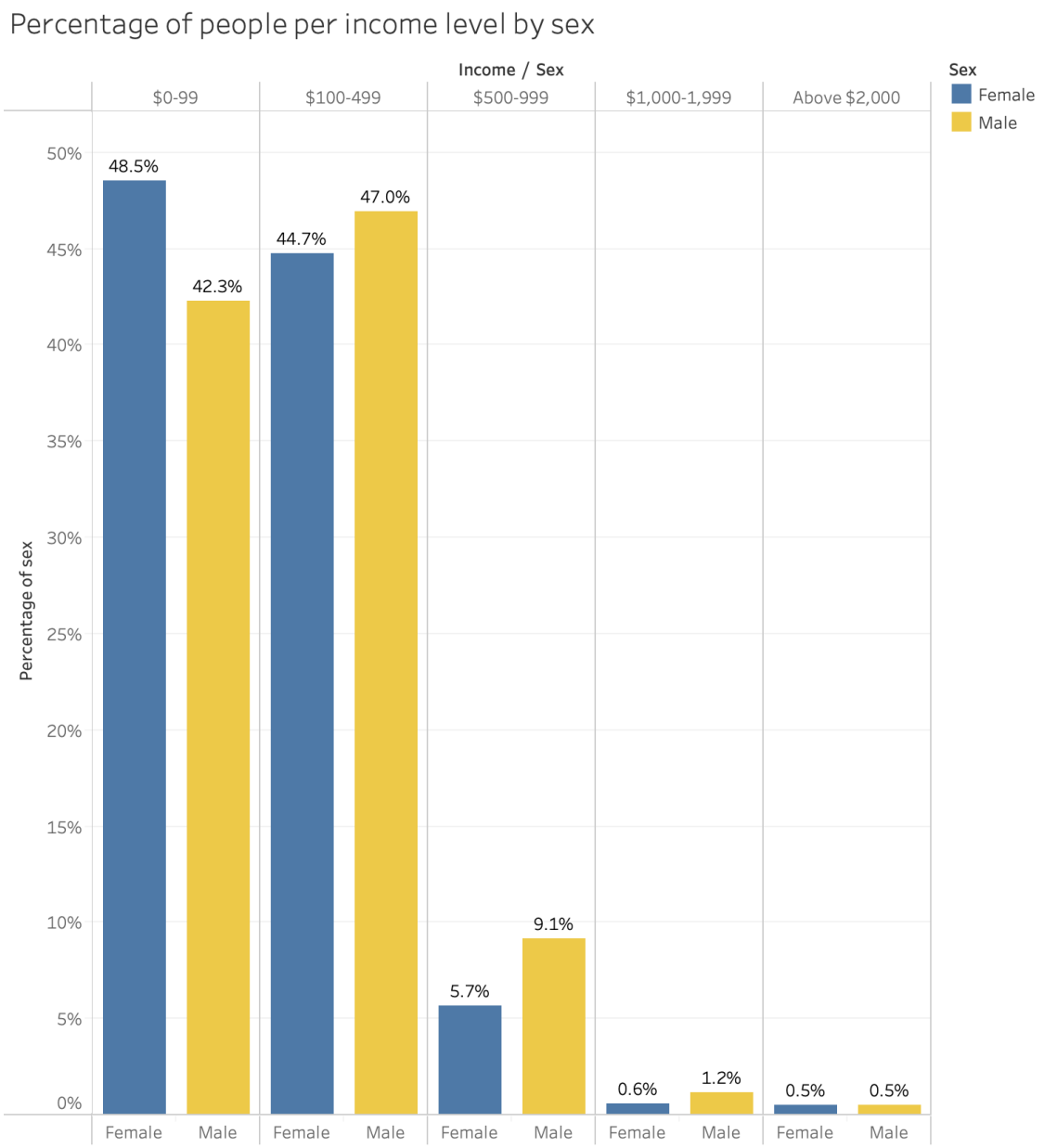


Figure 13: Income level disaggregated by sex

Persons per room by house type

Persons per room	House type						
	Apartment/Flat	Corrugated iron	Other	Stone corral house	Tents	Terrace	Villa
0 - 0.49	0.4%	1.6%	0.8%	0.9%	0.2%	0.8%	0.5%
0.50 - 0.74	3.0%	3.2%	2.3%	3.7%	1.0%	3.8%	4.0%
0.75 - 0.99	1.7%	1.4%	3.1%	2.9%	0.7%	2.8%	1.7%
1.00 - 1.24	11.8%	7.7%	3.1%	6.0%	3.5%	5.5%	6.4%
1.25 - 1.49	6.9%	3.4%	6.3%	8.8%	2.1%	7.3%	5.3%
1.50 - 1.74	16.5%	10.7%	12.5%	14.6%	7.2%	15.2%	11.7%
1.75 - 1.99	3.6%	4.3%	5.5%	8.5%	1.1%	5.7%	2.5%
2.00 - 2.49	24.4%	14.0%	22.7%	27.7%	13.9%	22.8%	16.7%
2.50 - 2.99	9.7%	7.5%	15.6%	11.7%	12.5%	12.2%	9.3%
3.00+	22.0%	46.2%	28.1%	15.1%	57.8%	23.9%	42.0%

Percentage of house ty..
0.2% 57.8%

Table 13: Percentage of age group per income level

3.4. EDUCATION AND KNOWLEDGE OF COVID-19

While majority of participants reported to have some form of formal education (primary, secondary and/or university) as their highest education level, a vast majority reported not attaining a secondary school degree. As illustrated in Figure 14, **32.3%** reported not having attained any education, while **7.6%** had partaken in Islamic studies. With regards to education levels amongst the men surveyed, **48.8%** had attained at least a secondary school level of education. In comparison, amongst the women only a third had attained at least a secondary school level of education. See Figure 15.

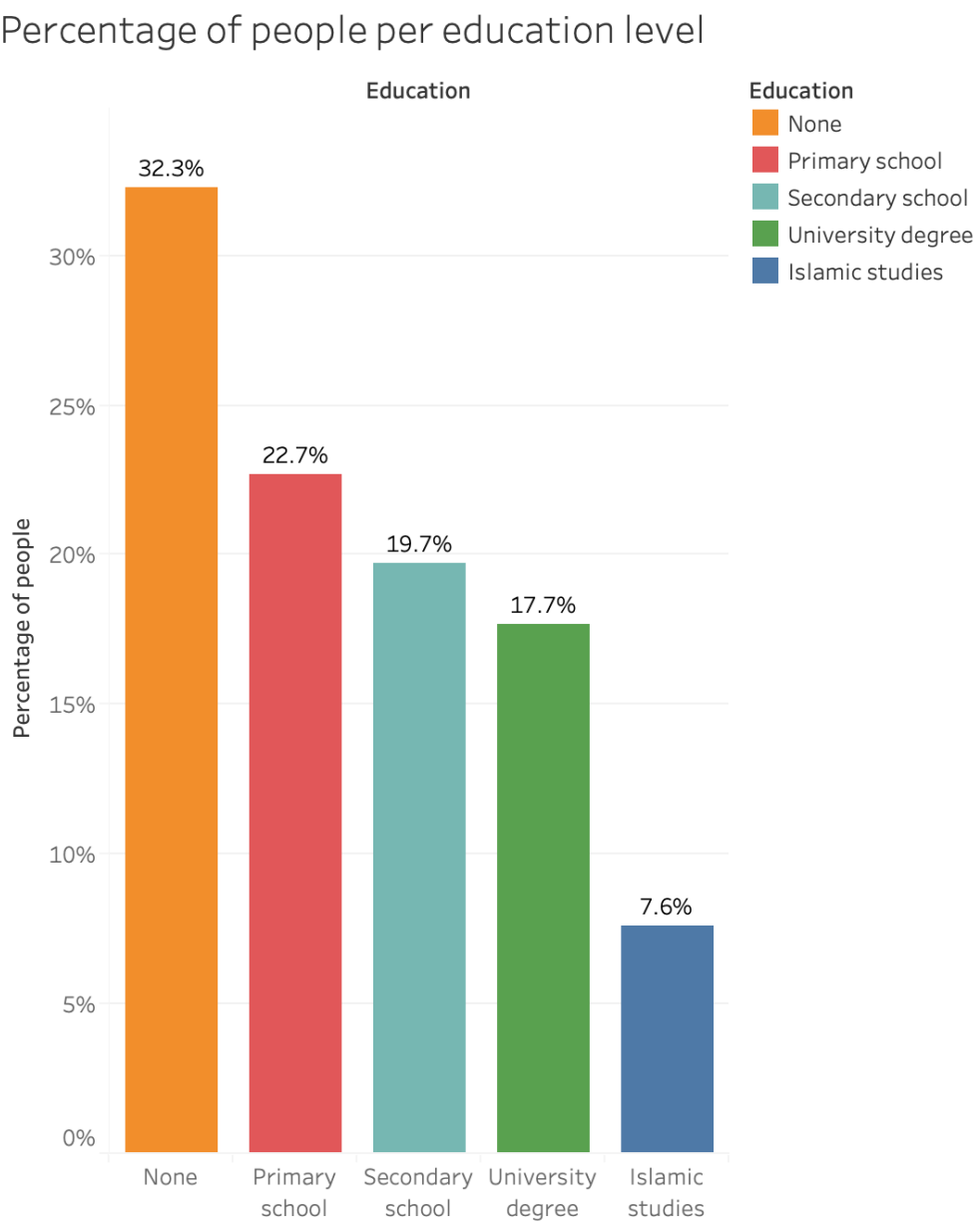


Figure 14: Percentage of people per education level

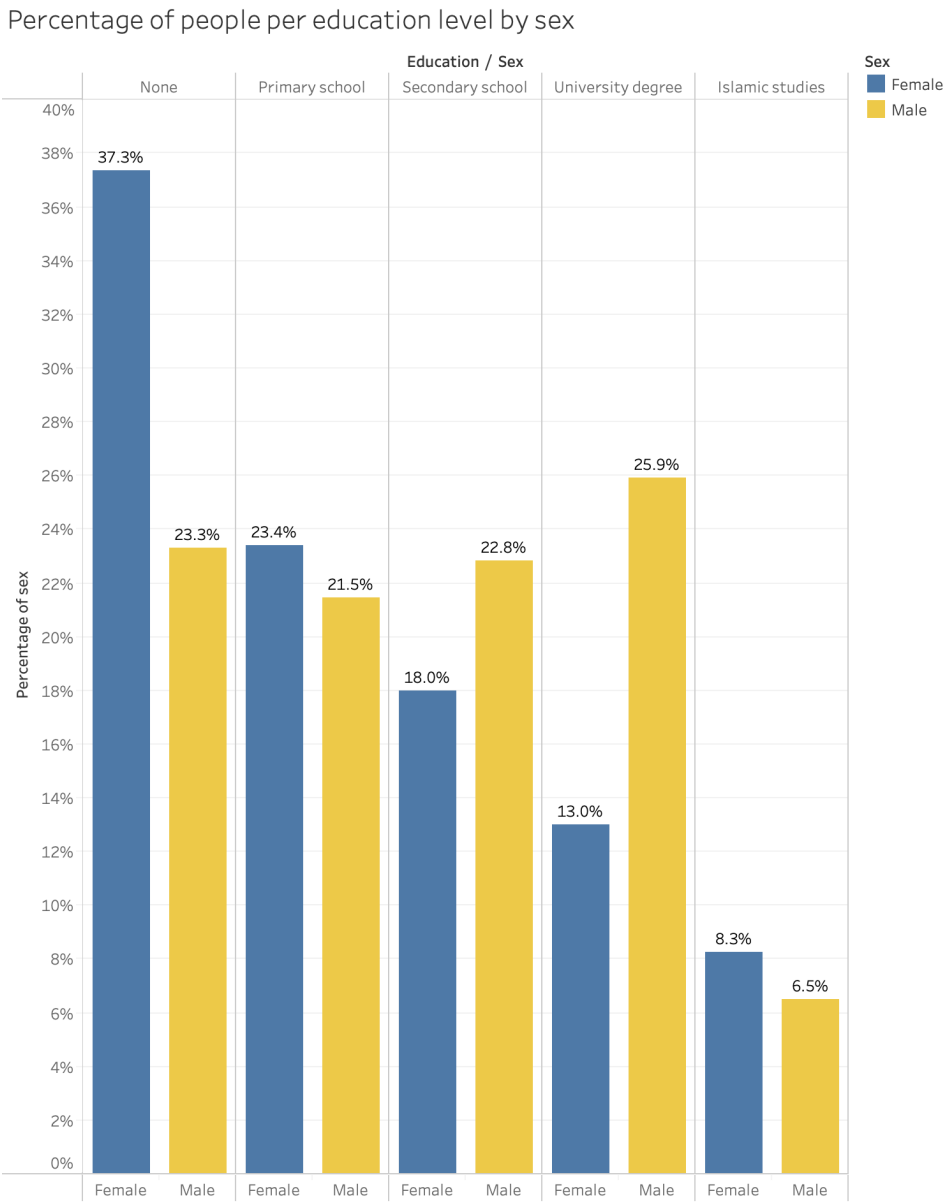


Figure 15: Education level disaggregated by sex

With regards to awareness of COVID-19, on average, very few people reported that they were well informed about COVID-19. Majorities in all districts reported they had minimal to no knowledge about COVID-19 (Figure 16). Additionally, 71.9% of those who reported to have no knowledge about COVID-19 had also reported no educational attainment. Those who were well-informed also reported to hold a secondary education or a university degree. See Table 14.

Level of COVID-19 knowlegde by district

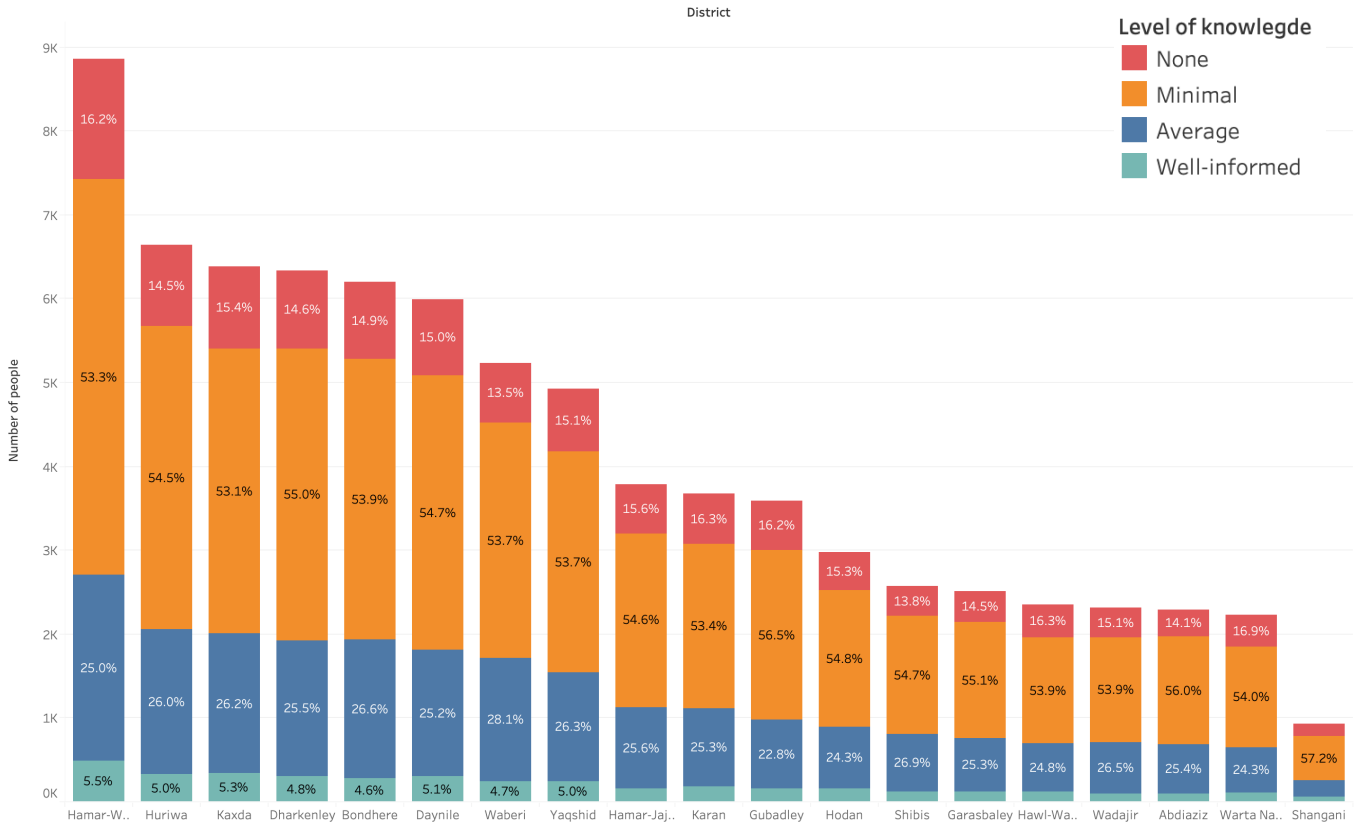


Figure 16: Level of COVID-19 knowledge by district

It is crucial to note that over **71%** of those who reported not having attained any education level also reported having no knowledge on COVID-19 and **31%** of the same education level group reported having minimal knowledge (Table 14). Majority of those with a primary school level of education reported having minimal knowledge, while majority of those who reported having at least average knowledge of COVID-19 reported having attained at least a secondary school level of education. The main modes of communication that participants reported as their source of information on COVID-19 was mainly through phone, radio, television, friends, family and social media (Figure 17). Very limited participants reported that they received COVID-19 information from mosques **(2.5%)**, traditional elders **(1.6%)** and schools **(1.3%).**

Level of COVID-19 Knolwedge by education level

Education	Level of COVID-19 Knowledge			
	None	Minimal	Average	Well-informed
None	71.9%	30.9%	15.2%	14.5%
Islamic studies	5.2%	8.8%	5.8%	11.9%
Primary school	11.6%	30.7%	13.6%	16.1%
Secondary school	6.4%	19.2%	26.4%	32.1%
University degree	4.9%	10.5%	38.9%	25.4%

Percentage of total kno..
4.9% 71.9%

Table 14: Knowledge of COVID-19 by education level

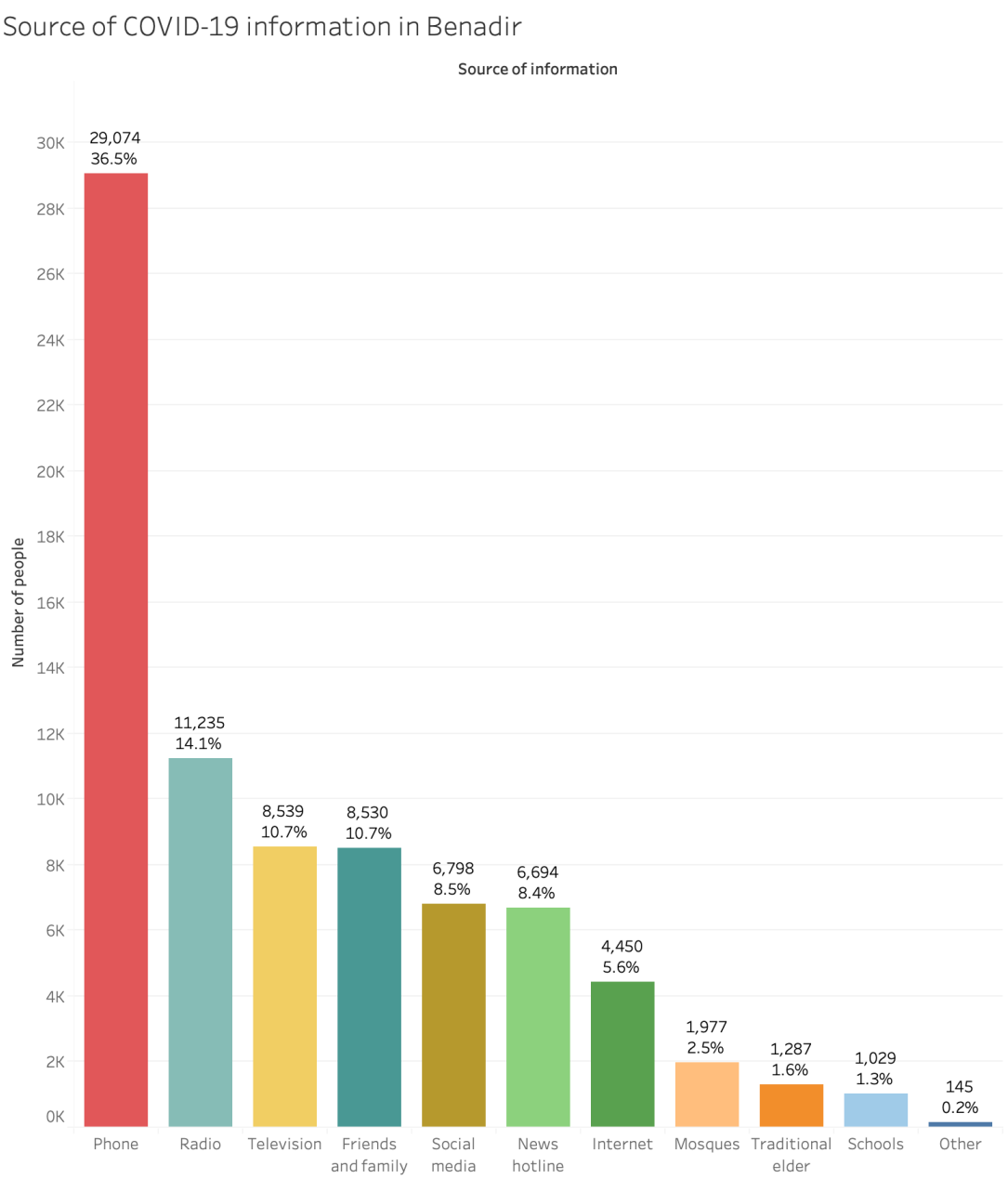
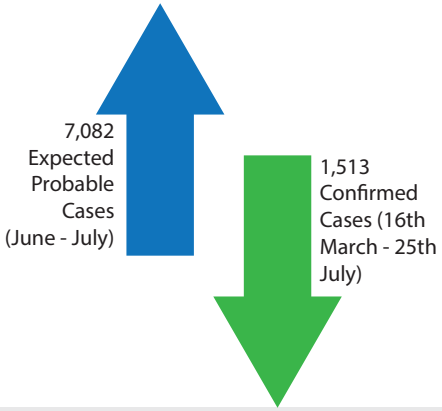


Figure 17: Source of COVID-19 information in Benadir

Chapter 4

Discussion

The CBCS conveys that there was a large number of syndromic COVID-19 cases within Mogadishu. By the 25th July 2020, 1,513, nearly half of the **3,178** confirmed cases in Somalia were reported in the Benadir region by the Ministry of Health (MoH). Comparing to the syndromic data collected over a period of two months by the CBCS, it is estimated that the expected *probable* cases in Mogadishu was **7,082**. The study depicts that cases with at least one of the four symptoms and has had contact with a symptomatic person or a COVID case were ~5 times more than the number of *confirmed* cases.



13 Who.int. 2020. COVID-19, Locusts, Flooding: WHO and Triple Threat In Somalia. [online] Available at: https://www.who.int/news-room/feature-stories/detail/covid-19-locusts-flooding-who-and-triple-threat-in-somalia

While it was not possible to establish correlation between the deaths reported in the CBCS study to COVID-19, expected all-cause mortality within Mogadishu was 34,254. The district with the highest expected death rates was Yaqshid, estimated at **10,356 deaths,** over **30%** of the total expected in the region. Concurrently, Yaqshid also has one of the highest expected syndromic cases within Mogadishu; however, more syndromic data would be necessary to attribute these deaths to COVID-19. Furthermore, excess mortality during these periods could not be determined as Somalia lacks vital statistic systems to record deaths. Therefore, it was not possible to determine what the typical death rate in Mogadishu could be during non-pandemic times.

With regards to testing capacity, within the Benadir Region, there is one molecular testing lab[1], the Somalia's National Public Health Reference Laboratory (NPHRL), which is the primary facility in the diagnostic testing informing response to COVID-19

in the country. By the end of June, it was reported by WHO that it has the capacity to test 180 samples per day and can be upgraded to 360 when necessary.[1] Since its inception in April to the end of June the NPHRL had tested **6,572** cases. However, from the study we are able to estimate that the number of expected cases that had at least one to three of the four symptoms including those who had contact with a symptomatic person or a COVID case was **110,643**. Moreover, while nearly **50%** of *confirmed* cases in Benadir are from Madina (Wadajir), Hodan, and Warta Nabada (previously known as Wardigley)[2], through the CBCS it was determined that districts reflecting the highest concentration of expected *probable* cases were Karan, Hodan, Wadajir, Daynile and Dharkenley, which are areas that have high populations of IDPs and many are on the outskirts of the city and thus face multiple barriers in accessing basic services. This was further confirmed through the data collected on compounding vulnerabilities. It was deduced that while testing capacity exists, actual propensity for the population to seek out testing is low largely due to socioeconomic factors.

Particularly on compounding socioeconomic factors, **77%** of *probable* cases reported earning less than 3 dollars a day with most reporting unemployment and or working as service and sales workers, in crafts inter alia, which are areas of work that entail a high degree of interaction with others and outside the home. Through the data it was also evident that health literacy is lagging despite increased communication and awareness raising interventions as majority of participants responded having little to no information on COVID-19. It was also ascertained that education levels are associated with awareness levels of COVID-19 given that nearly **72%** of participants who reported having no education reported having no knowledge on COVID-19. Moreover, majority of those with a primary school level of education reported having minimal knowledge, while majority of those who reported having at least average knowledge of COVID-19 reported

14 UNSOM. 2020. On Visit To National Laboratory, UN Envoy Hails Benefits To COVID-19 Response And Somalia's Future. [online] Available at: https://unsom.unmissions.org/visit-national-laboratory-un-envoy-hails-benefits-covid-19-response-and-somalias-future
15 WHO Somalia Country Office. COVID-19 Dashboard, Somalia. Available at: https://bmgf.maps.arcgis.com/apps/opsdashboard/index.html#/d0d9a939c5fa401caa3a7447e72b2017

having attained at least a secondary school level of education. It was also clear from the data that those with a university degree were more likely to get a COVID-19 test.

In addition, data on phones being primary modalities used by the participants to source information on COVID-19 also suggests that even though mitigating efforts can be applied to promote awareness using multimedia, community-based groups and targeted and tailored messaging using local language, increasing overall education levels and literacy are a key prerequisite to increasing access to information. The low literacy rates in the country, especially amongst vulnerable groups will be key in not only development and economic growth but also in building resiliency to shocks in the short and long term.

Moreover, less than **2.5%** of participants responded sourcing information on COVID-19 through mosques. In Somali culture, religious and traditional elders often play a central role in guiding the public, raising awareness and supporting in disseminating key messages. In the case of COVID-19, while social distancing and avoiding large crowds are key measures in limiting the spread of COVID-19, the government has struggled with closing down mosques and since the first case was confirmed most have remained open.

This along with the data depict that innovative and culturally sensitive strategies are needed specifically towards religious elders in garnering changes in social and health related behaviors in the community.

In addition, the capacity to utilize conventional measures of self-isolation and self-quarantine are particularly unfeasible given that overcrowding was a reality for many households. This was especially true for participants who lived in tents as they reported having more than 3 people per room in their shelter.

4.1. LIMITATIONS

While the results collected in the CBS are key and useful, there are some caveats which need to be taken into consideration when interpreting the results reported in this survey. Mainly the use of syndromic criteria to assess prevalence, limited existing population estimates for the region

and the potential for selection and response bias. These limitations were amply considered, and mitigation efforts applied. Additionally, the limitations have been taken on board in the design of the prospective cohort study that will follow subsequently with the aim to establish the incidence and mortality of COVID-19 in Mogadishu.

4.1.1. SYNDROMIC CRITERIA

CBCS mainly utilized syndromic data to determine COVID-19 cases. While this provided insight to the prevalence of COVID-19 in Mogadishu, syndromic surveys have poor specificity and are likely to detect common and benign symptoms. An example of this is seen with the possible case (1) definition whereby anyone who may have had a fever, cough, shortness of breath or sudden loss of smell and taste was classified as a case; this likely inflated these cases. Conversely, by using the syndromic criteria, a large proportion of individuals who may be asymptomatic could also be missed thus contributing to an underestimation of potential cases. However, despite these caveats, in a low-resource setting such as Somalia where there is a limited capacity in testing and disease surveillance is non-existent,[3] syndromic surveys provide an alternative, scalable and practical solution to capture population-based data to better understand the burden of COVID-19. A key mitigating effort applied to address the non-specificity of the case definition of possible (1) was to have several criteria that were more strict in their definition, these include possible (3) and possible (4), where a minimum of three to four of the key symptoms had to have been present in individuals for them to be considered a case.

4.1.2. LIMITED POPULATION ESTIMATES

It is important to note that there have not been population estimation surveys in Somalia in recent years. The last available information is from a census conducted in 1975. Therefore, for the CBCS, a pragmatic decision was made to use available population estimates as the denominator for observed and expected cases and deaths. This potentially led to an overestimate in the number of cases and deaths

16 Abat C, Colson P, Chaudet H, et al. Implementation of Syndromic Surveillance Systems in Two Rural Villages in Senegal. PLoS Negl Trop Dis 2016;10(12):e0005212.

reported in this survey as it is likely the population estimates applied are conservative and may not reflect the true population size of Mogadishu and its 17 districts.

4.1.3. SELECTION BIAS

Given that within each district population estimates were not available at the time of the study, the known probability of being selected was not used to determine the sample size in each district. Thus, as a mitigating measure the study employed a systematic sampling approach whereby data was collected from every ninth household in each district.

Another potential selection bias is that men and women did not have the same likelihood of being surveyed. Traditionally, within the Somali culture, women stay at home while men are away at work. Therefore, there could be a large proportion of men who could have had exposure to COVID-19 through work setting not being surveyed. This is the same for employment, those who are employed and financially well-off may have been away working at the time of the survey and therefore are likely to be underrepresented within this survey.

4.1.4. RESPONSE BIAS

Response bias could have also been introduced with the mortality questions as the reported 1,156 deaths are significantly lower than previous mortality estimates of Mogadishu in the absence of emergencies such as drought, flooding or epidemics.[4] It is unclear whether there were more deaths within the household that were not reported.

Additionally, a large proportion of information on the deceased reported in the survey were missing such as age, sex and symptoms. Furthermore, within retrospective mortality surveys, details on the full household roster (age, sex), information on departures and arrivals during the two months, in addition to births and deaths should have been collected. This detail would allow for a robust ascertainment of the death attributed to COVID-19 within Mogadishu.

17 Warsame, A., Frison, S., Gimma, A. and Checchi, F., 2020. Retrospective Estimation of Mortality in Somalia, 2014-2018: A Statistical Analysis. Available at: https://reliefweb.int/sites/reliefweb.int/files/resources/Retrospective%20estimation%20of%20mortality%20in%20Somalia%2C%202014-2018%20-%20a%20statistical%20analysis.pdf

Chapter 5
Recommendations

Based on the data collected, it is clear that there are numerous emergency and immediate response efforts needed; however, these efforts must have elements of durability and sustainability to prevent recurring unpreparedness. The particular characteristics of COVID-19 in terms of transmission and symptoms also need to be considered. Those in concentrated areas of population, with poor WASH facilities and little ability to social distance due to their occupation or overcrowded accommodation have increased vulnerability to COVID-19 and limited resources to contribute to efforts to contain and prevent the spread of the virus.

Measures to prevent transmission of COVID-19 and respond to infection need to be related to the overall context of the needs of the population. COVID-19 is a threat to lives and livelihoods, but people may be facing bigger threats from other diseases and from poverty. It is vital that COVID-19 is addressed in ways that positively and sustainably serve all the needs of the population in an appropriately balanced way.

5 .1. IMPROVING COORDINATION

The BRA has launched a Regional Emergency Operation Center (REOC) for regional-level coordination, planning, monitoring and epidemiological surveillance that works in close coordination with the National Emergency Operation Center (NEOC), the Office of the Prime Minister (OPM) and the MoH. The REOC currently consists of various staff physically and virtually who are medical professionals, Geographic Information System (GIS) experts, enumerators, communication and Gender Based Violence (GBV) specialists.

To bolster reach and impact, improved coordination is needed especially with regards to the collection and provision of solid information concerning the statistics on spread, case load,

death rates and medical care capacity and arrangements. It is expected that through the REOC, the BRA will be able to enhance solid coordination between the various parties mainly government, communities, private sector, the civil society and the international community for specific response actions to avoid overlap, double investment, double or conflicting messaging, and stimulate and as efficient and effective use of limited resources as possible.

5.2. INCREASING ACCESS TO BASIC SERVICES

5.2.1. HEALTH SERVICES

The BRA's mapping of health centers and maternal and childcare health (MCHs) facilities in the region have identified very limited facilities in some areas. While the CBCS only captured syndromic data, such data is key for increasing local testing capacity. With respect to follow up, the areas depicting the larger percentages of *possible* and *probable* cases should be particularly targeted with testing efforts, awareness campaigns around changing perceptions and stigma around testing and increased access to testing and isolation and quarantine facilities. The locations that require immediate prioritization would be: Yaqshid, Karan and Shangani.

As testing and care facilities improve, they must be complimented with targeted awareness raising. Especially, given that confidence in the quality of health care is low due to doubts about the competence of staff and poor quality of the facilities, equipment and medicines. As a result of low confidence, there is a reluctance among a significant number of people to use health services even when they are free.[1] It follows that there is a need for work to evaluate the quality of health care, ensure that the quality is at least adequate and properly regulated, affordable or preferably free, and communicate to the public reasons to have confidence in their access to decent quality health care.

There also needs to be clear protocols established at the local level to contain outbreaks and protect vulnerable populations.

18 Herring et al. 2020a, 43-44 and 49-50; Herring et al. 2020b, pp. 7-11, 19-22 and 25.
19 Mogadishu Durable Solutions Strategy 2020-2024

5.2.2 HOUSING

As commonly espoused, housing is more than 4 walls and a roof. Adequate housing connotes the access to other interrelated elements including, water, sanitation, education, tenure security, cultural adequacy, and affordability. The common emergency shelter solutions to the displacement crisis in Mogadishu have rendered certain vulnerable communities ill equipped to prevent and cope with the impact of COVID-19 and other preventable diseases.[2] Moreover, with compounding emergencies, the emergency shelters provided place the IDPs in more risk especially with the ongoing rapid floods in Mogadishu which heightens their vulnerability to COVID-19. Overcrowding is also a key barrier to mitigating risks to COVID-19 and impede containment efforts. It will be key to re-evaluate the standards for housing provision especially in the emergency context. What the data shows is that shelter provision needs to be revolutionized and adapted to not only suit the local context but also the needs of the displaced families in addition to diversifying the level of support offered including rental subsidies and conditional cash transfers to enable security of tenure. This should also be planned and implemented with an exit strategy in mind to curb dependency and promote self-reliance and autonomy.

5.2.3. WASH

The BRA has mapped and identified, through GIS and Urban Planning, high risk areas which lack water and sanitation, particularly in IDP camps and informal settlements throughout the city and noted potential areas for the construction of WASH points. The use of the map created can ensure that local and district governments can plan for potential hot-spots and move to ensure necessary provisions are made to alleviate potential outbreaks. As clusters of cases are identified through the CBCS, the locations may be changed to respond to the needs of the communities. Due to the fact that WASH was a prevailing need to many communities before COVID-19 and continues to be, there needs to be more concerted efforts toward sustainable interventions targeted towards the provision of sustainable WASH solutions.

5.2.4. LIVELIHOODS

A large proportion of the population is not

20 Herring et al. 2020a: 23-25, 27, 33-34, 37

able to achieve a decent or reliable standard of living. Due to the near absence of a social safety net, COVID-19 response measures that make poverty even worse are likely to be a greater threat to the population than COVID-19. There is an urgent need to address poverty among the population, provide income support when COVID-19 measures that are deemed to be vital look likely to exacerbate poverty and address the needs of specific groups such as small informal traders. Some people are aware of what they need to do but have to work in ways that expose them to the virus or lack the money to buy sufficient soap and water or rent accommodation with enough space to allow for self-isolation.[3]

5.2.5. EDUCATION

Evidently, education level is related to COVID-19 case outcomes as well as the ability to get testing. These relationships had a gradient, whereby those who were more educated sought-after tests, and those who were less educated were overrepresented as syndromic cases. Similarly, education level was also related to awareness of COVID-19, and a linear trend was observed as the more educated had a higher awareness of COVID-19. The relationship between education and these outcome indicators could be mediated by health literacy.[4] Therefore, achieving inclusive and high-quality education within Mogadishu, and Somalia in general, is a fruitful endeavour that compounds with time. Not only would this impact individual's health literacy and the ability to make healthy choices, it would also be the vehicle for them to move up the socioeconomic ladder; this would also have fruitful implications on the nation's sustainable development goals.

5.3. AWARENESS RAISING

Across the region, there is need for targeted awareness raising with regards to COVID-19. Over **36%** of respondents noted that they sourced information on COVID-19 from the phone, **14.1%** from the radio and **10.7%** from the television. Enhancing the use of multimedia, using Somali and Maay and illustrative images will be crucial in communicating messages to the public. Contrary to sources where the community often frequents and uses as resources for different

21 Galobardes, B., Shaw, M., Lawlor, D.A., Lynch, J.W. and Smith, G.D., 2006. Indicators of socioeconomic position (part 1). Journal of Epidemiology & Community Health, 60(1), pp.7-12.
22 Herring et al. 2020a: 31-33.

kinds of information, only **4%** of the participants reported getting information from mosques and traditional elders. Thus, more communication efforts should target these sources, including schools especially since **10.7%** of participants reported that they receive COVID-19 information from their friends and family.

Further research needs to be done to identify what specifically people do and do not know about COVID-19 prevention and what to do if they think they or a member of their family has the disease.[5] More efforts should also prioritize raising awareness of those actions that can have the most effect and that are easiest to do, especially washing hands with soap more often, reducing sustained contact with large unfamiliar groups of people in poorly ventilated spaces, social distancing generally and using face coverings. While most respondents reported generally low overall levels of knowledge about COVID-19, what matters from a public health perspective is whether they have the knowledge of the key measures and social validation and resources to act on that knowledge.

Moreover, stigma remains a key barrier with respect to accessing the available health resources be it for testing, isolation or quarantine. Thus, targeted messaging should be geared towards tackling existing stigma and perceptions around COVID-19. Even where people do not think that people with COVID-19 have anything to be ashamed about, they are often worried that others will stigmatize them. The fear of stigma has many components, including the fear of not being able to have a proper Islamic burial (ghusl), fear of not being able to work and earn a living, fear of being mocked, fear of having their reputation permanently tarnished and fear of being ostracized as a health threat.[6] Some attitudes that appear to be a product of stigma are actually grounded in legitimate fears of people who live hand-to-mouth being denied the work that they need to survive or who reasonably fear quarantine in health care facilities where standards are dangerously low; these points show that systemic weaknesses as well as community awareness need to be addressed simultaneously.[7]

23 Herring et al. 2020a: 40-42.
24 Herring et al. 2020a: 43-44.

5.4. CIVIL REGISTRATION

One of the main justifications for carrying out this survey was to fill the knowledge gap surrounding the impact of COVID-19 in Mogadishu. This is largely due to sub-optimal health systems and lacking infrastructure in capturing vital statistics. For this reason, it has not been possible to determine excess mortality as expected deaths rates during non-pandemic times are unknown. For a well-functioning health system, death and birth registration is paramount. Countries without such vital statistics, only have an approximate idea in the number of annual deaths, leading causes of death, and longevity of their population. Scarcity of such information makes it difficult to effectively direct public health interventions. This is the case within Mogadishu and Somalia in general. To strengthen Mogadishu's health system, a functioning civil registration system needs to be established. This will not only aid the cities response to future epidemics, but it will also guide the response to curbing non-communicable diseases, which are some of the most burdensome diseases within Somalia.[8] To achieve this, effective policies need to be set in place and barriers and facilitators to civil registration need to be identified and addressed.[9]

5.5. COHORT STUDY

Moving forward, the BRA is expanding the CBCS study to include a prospective cohort study across Mogadishu to attain pertinent data to monitor COVID-19 in Mogadishu and determine what stage the city is on the epidemic curve. Learning points from the current CBCS have fed into the design and conceptualisation of this study. Knowledge established from this prospective study will guide the local policy response and will contribute to the planning and implementation of interventions, as well the allocation of resources to contain and mitigate the impact of the outbreak in Mogadishu.

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26 Suthar, A.B., Khalifa, A., Yin, S., Wenz, K., Ma Fat, D., Mills, S.L., Nichols, E., AbouZahr, C. and Mrkic, S., 2019. Evaluation of approaches to strengthen civil registration and vital statistics systems: A systematic review and synthesis of policies in 25 countries. PLoS medicine, 16(9), p.e1002929.

Appendix 1: Population surveyed, crude syndromic COVID-19 cases and self-report mortality in Mogadishu

District	N	Reported deaths	Possible (1)	Possible (3)	Possible (4)	Probable	Self-report confirmed
Abdiaziz	2,291 (2.9)	5 (0.4)	49 (1.9)	1 (0.2)	1 (0.3)	0 (0.0)	0 (0.0)
Bondhere	6,172 (8.0)	112 (9.7)	42 (1.6)	2 (0.3)	0 (0)	5 (2.1)	15 (6.0)
Daynile	5,986 (8.4)	147 (12.7)	38 (1.5)	1 (0.2)	0 (0)	2 (0.8)	3 (1.2)
Dharkenley	6,288 (9.6)	123 (10.6)	627 (24.2)	191 (31.6)	115 (31.1)	1 (0.4)	2 (0.8)
Garasbaley	2,506 (3.8)	37 (3.2)	146 (5.6)	2 (0.3)	0 (0)	0 (0.0)	0 (0.0)
Gubadley	3,598 (5.5)	41 (3.5)	89 (3.4)	2 (0.3)	0 (0)	0 (0.0)	7 (2.8)
Hamar-Jajab	3,786 (5.8)	22 (1.9)	327 (12.6)	0 (0.0)	0 (0)	14 (5.9)	20 (8.0)
Hamar-Weyne	8,821 (13.5)	280 (24.2)	84 (3.2)	5 (0.8)	0 (0)	11 (4.6)	3 (1.2)
Hawl-Wadag	2,342 (3.6)	10 (0.9)	86 (3.3)	7 (1.2)	4 (1.1)	0 (0.0)	24 (9.6)
Hodan	2,987 (4.6)	8 (0.7)	41 (1.6)	3 (0.5)	0 (0)	1 (0.4)	2 (0.8)
Huriwa	6,661 (10.2)	12 (1.0)	323 (12.4)	107 (17.7)	29 (7.8)	5 (2.1)	24 (9.6)
Karan	3,654 (5.6)	67 (5.8)	76 (2.9)	44 (7.3)	35 (9.5)	182 (76.2)	14 (5.6)
Kaxda	6,509 (10.0)	67 (5.8)	232 (8.9)	7 (1.2)	1 (0.3)	9 (3.8)	6 (2.4)
Shangani	930 (1.4)	4 (0.3)	2 (0.1)	0 (0)	0 (0)	0 (0.0)	0 (0.0)
Shibis	2,582 (4.0)	10 (0.9)	6 (0.2)	0 (0)	0 (0)	2 (0.8)	1 (0.4)
Waberi	5,242 (8.0)	9 (0.8)	106 (4.1)	3 (0.5)	0 (0)	1 (0.4)	2 (0.8)
Wadajir	2,315 (3.5)	10 (0.9)	63 (2.4)	1 (0.2)	0 (0)	0 (0.0)	0 (0.0)
Warta Nabada	2,211 (3.4)	37 (3.2)	26 (1.0)	0 (0)	0 (0)	0 (0.0)	27 (10.8)
Yaqshid	4,865 (7.5)	155 (13.4)	233 (9.0)	229 (37.9)	185 (50.0)	6 (2.5)	101 (40.2)
Total	**79,746**	**1,156**	**2,596**	**605**	**370**	**239**	**251**

DSU Benadir




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