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ASSESSMENT OF THE CONTRIBUTION OF COMMUNITY ACTIVE SURVEILLANCE TO COVID-19 CASE DETECTION IN THE FEDERAL CAPITAL TERRITORY, ABUJA, NIGERIA

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ABSTRACT: *Background: Coronavirus disease (COVID-19) is a global pandemic. Effective surveillance is needed to monitor disease trends, guide risk assessments and ultimately control the spread of the disease. Community active disease surveillance is a process of ensuring community participation in detecting, reporting, responding to and monitoring health events in the community. Objective: The objective of this study is to highlight the significant contribution of community active surveillance to the detection of community transmission of COVID-19 cases in the Federal Capital Territory (FCT), Abuja. Materials and Methods: We retrospectively reviewed the performance of COVID-19 surveillance in the FCT, Abuja with particular focus on the community active surveillance between April 13 to May 18, 2020. We identified COVID-19 high risk communities in which nasopharyngeal and oropharyngeal samples from both symptomatic and asymptomatic community members were collected. Samples were analyzed at the National Reference Laboratory of the Nigerian Centre for Disease Control (NCDC), Gaduwa, Abuja. We evaluated the performance of COVID-19 surveillance both before and during community active surveillance. We also analyzed the epidemiological profile of confirmed COVID-19 cases from the COVID-19 database of the Public Health Department of the FCT, Abuja. Results: A total of 2,753 suspected and 205 confirmed COVID-19 cases were reported during the study period. The number of suspected and confirmed COVID-19 cases reported before the community active surveillance initiation was 3,876 and 212 respectively. The settlements with the highest (85) number of COVID-19 Laboratory confirmed cases during the community active surveillance were Mabushi in the Municipal Council area. The male to female ratio of the COVID-19 confirmed cases was 3:1. The majority of confirmed COVID-19 cases i.e., 57% belonged to age group between 20 to 39 years with mean age of 36 years. Conclusion: Community active surveillance has significantly improved detection of COVID-19 cases and has highlighted the burden of community transmission of the disease. There is the need to expand this approach to other area councils in the FCT. In addition, COVID-19 surveillance should be intensified in the health facilities. Timely detection, reporting, isolation and management of confirmed cases as well as contact tracing and monitoring are essential to curbing the spread of COVID-19.*

KEY WORDS: COVID-19, Community, Surveillance, Federal Capital Territory, Abuja

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INTRODUCTION

In late December 2019, a novel corona viral disease caused by the SARS-CoV-2 virus was first identified in Wuhan, China. The disease, initially known by various names including 'Severe Pneumonia with Novel Pathogens' by the Taiwan Centre for Disease Control (CDC), has been officially named by the World Health Organization (WHO) as 'Coronavirus Disease-2019 (COVID-19), on February 11, 2020[1]. The first COVID-19 cases in Nigeria and the FCT were confirmed on the 27th of February and 20th of March 2020 respectively[2,3]. The outbreak of COVID-19 has currently spread widely around the world, affecting more than 120 countries and territories. As at May 18, 2020, there were 4, 618, 821 and 6,175 cases of COVID-19 globally and in Nigeria respectively. The corresponding number of deaths was 311, 847 and 216[4]. The disease was declared a public health emergency of international concern (PHEIC) by the WHO on 30 January 2020 and subsequently a global pandemic on March 11, 2020[5,6].

Transmission of COVID-19 is through droplets from close contacts or contaminated fomites. There is no sufficient evidence to support airborne or faeco-oral transmission. The mean incubation period is 3-9 days with a range between 0-24 days[7]. Symptoms of COVID-19 infection appear after an incubation period of approximately 5 days. The most common symptoms are fever, cough, and fatigue, while other symptoms include headache, diarrhoea, dyspnoea, and sore throat[8]. While patients with confirmed COVID-19 disease can be asymptomatic or pre-symptomatic (patients not yet symptomatic); however, both categories of cases have been shown to transmit the disease and constitute a group of 'silent spreaders' together with the very mildly symptomatic. Indeed, abnormalities on chest imaging have been noted in some patients before the onset of symptoms[10].

The preferred specimens for COVID-19 diagnosis are nasopharyngeal and oropharyngeal swabs preferably during the early stage of the disease. The molecular test of choice is the reverse-transcription polymerase chain reaction (RT-PCR) assays. There however exist other supplementary diagnostic tools such as the antibody -based serological techniques which are gradually being introduced[11].

There is no current evidence from randomized controlled trials (RCTs) to recommend any specific anti-COVID-19 treatment for patients with a suspected or confirmed COVID-19 infection and vaccine is not yet available. Management is largely supportive in isolation centres to prevent disease transmission to others. Several treatment modalities have however been tried including use of anti-viral drugs (Remdesivir, lopinavir/ritonavir), anti-malarial drugs (chloroquine phosphate, hydroxyl-chloroquine), anti-parasitic drug (Ivermectin), steroids and serum antibodies[12-15].

Case fatality rate from COVID-19 ranges from 1% to 2% depending on the study and Country. Majority of deaths have occurred in elderly patients (over 65 years of age) with pre-existing diseases such as cancer hypertension, coronary heart disease and diabetes. In patients with severe disease, the usual cause of death is progressive respiratory failure due to alveolar damage from the virus. Although young children appear to have mild symptoms, they may infect others and perpetuate transmission[16-18].

Robust and enhanced surveillance for COVID-19 is critical for effective control of the spread of the disease as well as guide the implementation of control measures. He main objective of a sensitive COVID-19 surveillance is to control the spread of disease such that normal socio-

economic activities can resume as early as possible. In addition, surveillance also enables monitoring trends of COVID-19 transmission and risk assessments[19].

Following the Laboratory confirmation of the first 3 COVID-19 cases in the FCT March 20, 2020, a multi-sectoral COVID-19 Emergency Operations Centre (EOC) was activated on March 23, 2020. The EOC is made up of personnel from the FCT Health and Human Services Secretariat (HHSS), Nigeria Centre for Disease Control (NCDC), World Health Organization (WHO), African Field Epidemiology Network (AFENET), Medical and Dental Consultants Association of Nigeria (MDCAN), Private Health Practitioners and other partners who coordinate nine pillars (coordination, logistics, infection prevention and control, epidemiology/surveillance/point of entry, laboratory, risk communication, case management health and safety and research) of response activities as contained in the Incident Action Plan.

METHODS

Study Area and Population

The Federal Capital Territory (FCT), Abuja is the Capital of Nigeria and lies between latitude 8.25 and 9.20 north of the equator and longitude 6.45 and 7.39 east of Greenwich Meridian. It is geographically located in the centre of the country. The FCT is bordered by the states of Niger to the West and North, Kaduna to the northeast, Nasarawa to the east and south and Kogi to the southwest. The total population is close to five million and is sub-divided into 6 Area Councils (Abaji, Bwari, Gwagwalada, Kuje, Kwali and Municipal) which are equivalent to Local Government Areas (LGAs) in other states of Nigeria. The Municipal Area Council is the largest of all the area councils in the FCT accounting for over 55% of the total population. In addition, there are 62 political wards and 2,652 settlements. This study is however, confined to the rural slums which did not report any COVID-19 case but thought to have possibility of significant contacts with confirmed cases that were mainly from the urban locations of the FCT.

Brief Description of COVID-19 Surveillance Including Community Active Surveillance in FCT, Abuja

At the start of COVID-19 outbreak in the FCT, the initial strategy of detecting suspected cases was through receipt of alerts/calls from suspected cases or their proxies (e.g. relations, neighbors or clinicians) by designated members of the EOC who in turn verified that the suspected case satisfied the COVID-19 case definition before arranging for sample collection either in the homes of suspected cases or in a designated area near the International Conference Centre (ICC), Abuja. Through this strategy, a total of 698 samples have been taken as at April 12, 2020 out of which 56 were positive. Contacts of positive cases were line listed and followed up. Samples were not taken from contacts if the contacts did not exhibit symptoms. COVID-19 positive cases were evacuated to designated isolation centres in Abuja University Teaching Hospital, Gwagwalada and the National Hospital for treatment.

Since the onset of the lockdown in Abuja on March 31, 2020 to April 4, 2020, a total of 140 samples were collected down from 255 during the previous five (5) days. This was a decline of 45% and was a reflection of the decline in the alerts received at the EOC. The decline was attributed to several reasons such as real reduction in the number of suspected cases, some of the suspected cases did not know the number to call, inadequate mobilization of the public, the

suspected cases did not want to call for fear of being stigmatized, it could be as a result of the lockdown of Abuja with attendant poor access to health facilities; or suspected cases were patronizing other health care providers in the community (patent medicine vendors, traditional and spiritual healers). Whatever may be the cause of the decline, it was imperative that COVID-19 surveillance be intensified such that all infected cases were identified and put under isolation and their contacts followed up. This was what informed the initiation of community active surveillance for COVID-19 in the FCT. The EOC developed a concept note for a ‘’modified’’ community surveillance. The search was not based on house-to-house visitation, but community leaders were sensitized and they in turn mobilized community members to avail themselves to be tested at the designated client triage and sample collection sites in the community. Key areas of methods adopted are highlighted below:

- The NCDC was informed of the plan to improve COVID-19 surveillance in the FCT. This was done to prepare the laboratory of the anticipated increase in the number of collected samples such that the laboratory was not overwhelmed. In addition, to cover as many communities as possible.

- Community active case search for COVID-19 cases was conducted in settlements adjacent to where most of the COVID-19 cases were confirmed (Maitama, Wuse 2, Asokoro, Gwarimpa) based on the existing epidemiology. The settlements adjacent to these urban areas are mostly slum areas, where domestic house helps (drivers, cleaners, gardeners) of the confirmed cases who just returned from trips abroad resided.

- Before the initiation of community active case search, there was sensitization meetings with community leaders of targeted settlements. The meetings highlighted the objectives and importance of the active case search, the role of community leaders and identification of sample collection points in the community, usually primary schools since the schools were closed due to the pandemic.

- Because of the limited supply of sample collection materials, samples were collected from community members with emphasis on symptomatic members of the community. Samples from close contacts of confirmed cases regardless of symptoms and random samples from alerts received from community members regardless of fulfilling case definition criteria were also collected.

- Public sensitization was intensified through integrated media approach (print, radio, television, social media). Emphasis was placed on the need for individuals with symptoms to call for testing. The EOC phone numbers to call was announced.

- Community sensitization through the use of public Announcement Vans going round the community during the community active case search was conducted to further mobilize community members to the sample collection points. At least two or three sample collection points were identified in order to reduce overcrowding at sample collection points. The already mobilized community leaders ensured proper crowd control, dispensed masks, hand sanitizers and ensured social distancing was respected.

- Community sensitization at sample collection points on Coronavirus disease, its prevention, the objective of the sample collection and possible outcomes was conducted daily before sample collection was started. In addition, community members were allowed to ask questions on the disease and answers were provided.

- COVID-19 confirmed cases were appropriately isolated, close contacts were followed up and monitored.
- Throughout this period of community active case search for COVID-19, the usual surveillance through alert receipts continued.

Data Collection and Analysis

Data sources for analysis were from the COVID-19 excel database of the Public Health Department of the FCT as well as the master list of FCT settlements at the WHO office in the FCT. We abstracted data from the start of the outbreak on March 20, to May 18, 2020. We conducted key analysis using Microsoft Office Excel 2010 to highlight the following:

- Trend and number of samples collected
- Trend and number of samples with positive results
- Number of communities and area councils in which active case search was conducted
- Epidemiological profile (age, sex, location) of confirmed COVID-19 cases

The Chi Square test was used to compare COVID-19 detection through the alert surveillance system and in the community active case search using WinPepi version 3.85. A 95% confidence interval was calculated and values of $P < 0.05$ were considered significant

RESULTS

The total number of samples collected as at May 18, 2020 was 6,629 (Figure 3) out of which 417(6.3%) was confirmed and 8 died (Figure 1). Of the 8t cases that died, 7(88%) were males. The total number of samples collected during COVID-19 community active case search (from April 13, to May 18, 2020) was 2,753 out of which 205(7.4%) were confirmed. A total of 275(65%) of the 417 confirmed COVID-19 cases were asymptomatic at admission. The Male to female ratio of COOVID-19 cases was 3:1. The majority of COVID-19 cases i.e., 57% belonged to age group between 20 to 39 years with mean age of 36 years (Figure 2). The contribution of community active case search for COVID-19 was significant ($P = 0.002$). The number of settlements in which community active case search was conducted was 22 in Nine political wards of two area councils (Table 1). The most COVID-19 affected communities were Garki village, Mabushi, Nyanya and Lugbe all in municipal area council and Kubwa village in Bwari area council.

DISCUSSION

The decline in the COVID-19 alerts received that necessitated the initiation of community active cases search could be due to poor knowledge of COVID-19 in addition to digitally marginalized population who do not have access to COVID-19 testing information, do not have phones or credit in their phones due to poverty. During the period of community active surveillance (April 13 to May 18, 2020), the number of COVID-19 samples collected (2,753)

as well as the number of laboratory confirmed cases (205) represent 42% of the total samples (6,629) and 49% of the total laboratory confirmed (417) cases in the Federal Capital Territory, Abuja. The success of the community active surveillance was enhanced by the circular on compulsory work at home for non-essential civil service staff as well as the lockdown in the FCT. The lockdown meant that many businesses were closed as people were required to stay indoors, except for essential journeys. In addition, the role of community involvement in improving the quality of disease surveillance such as polio, Guinea Worm and Smallpox has been well documented[20-22].

Initially as with every region of the world, the first COVID-19 cases in the country and indeed the FCT came from exposure to international contacts—travel, trade, tourism, or business (x). These initial cases were mostly clustered in Maitama settlement in the Municipal Area Council. Subsequently, community transmission set in[23]. The rising new COVID-19 cases where there is no recent history of travel to infected areas or recent contact with confirmed cases is strongly suggestive of community transmission. this underscores the need for COVID-19 preventive measures such as physical distancing, use of masks, hand hygiene, cough etiquette and expanded testing[24]

The male to female ratio of COVID-19 cases in the FCT was high at 3:1. While some countries have similar pattern of sex ratios, in others no difference in the proportion of males and females with confirmed COVID-19 was observed[25]. If the proportion of people tested from each sex that are tested is not known, it will be difficult to fully interpret these sex figures. In addition, many countries are yet to disaggregate their COVID-19 data by sex.

However, the sex difference in infection rate may be artificial especially in some communities where female movements in the community are restricted due to cultural practices and hence their access to COVID-19 testing is limited. It may also be a reflection of poor surveillance and lesser testing capacity and misdiagnosis due to high prevalence of other infectious diseases with similar symptoms especially fever[26].

Of the total 417 laboratory confirmed COVID-19 cases in the FCT as at May 18, 2020, 275(65%) were asymptomatic at admission. This prevalence of asymptomatic presentation is relatively high considering findings from one study of 213 PCR-confirmed COVID-19 patients in South Korea that reported asymptomatic prevalence of 19.2% at admission[27]. Another study from Yokohama, Japan, using statistical modelling to derive the delay-adjusted asymptomatic proportion of infections estimated asymptomatic proportion to be 17.9%[28]. What is important here however is the fact that transmissibility of the asymptomatic cases among close contacts is comparable to that of symptomatic cases[29].

Of the eight COVID-19 cases that died in the FCT, 7(88%) were males. While men and women may have the same prevalence, it is almost unanimous that men with COVID-19 are more at risk for worse outcomes including need of intensive care and death, independent of age[30]. Many postulates tried to explain this observation as caused by the genes, hormones, the immune system, behavior (e.g. smoking) and prevalence of chronic diseases (e.g. heart disease, diabetes and cancer)[31].

The FCT has relatively younger age group of COVID-19 cases. The most affected age group was 20-39 with a mean age of 36 years. This may have contributed to the observed relatively low case fatality (1.9%); but the economic impact may be significant considering the

productivity of this age group. Five (63%) of the 8 confirmed COVID-19 cases that died in the FCT were over 50 years. Older population are more vulnerable to the disease. Persons older than 50 years are more likely to have the severe form of the disease given that they have a weaker immune system and are likely to have underlying chronic illnesses[32-34].

Some of the key challenges of this study are inadequate supply of testing materials and other logistics including transportation, thereby restricting optimal coverage of communities and persons within communities, low turnout of persons in some communities due to easing of lockdown, inadequate mobilization and fear of stigmatization. In addition, we encountered some data quality issues relating to missing variables of some suspected COVID-19 cases in the database.

We conclude that the community active case search for COVID-19 has significantly improved COVID-19 detection in the FCT and has demonstrated intense community transmission of the disease. The settlements most affected were Garki village, Mabushi, Nyanya and Lugbe in municipal council and Kubuwa village in Bwari area council.

With increasing community transmission of COVID-19, we recommend that all the EOC pillars of response be further strengthened in addition to maintaining a strong community engagement and participation in order to improve timely case detection, fortify prevention, interrupt transmission and reinforce the capacity of the health care system at all levels. Particular attention should be given to expanded testing capacity (in communities and health facilities) considering the NCDC's target of testing two million people over the next two months, timely isolation and treatment as well as contact tracing and monitoring.

Community involvement in surveillance should be strengthened. This involves involvement of community leaders, identification and engagement of community surveillance focal points, identification and working with traditional community health care providers including traditional and spiritual healers as well as giving regular feedback to community

Author Contributions

All authours have made significant contributions to the conception of the work, data collection and to literature search. They also contributed substantially to writing the manuscript, its critical review for quality, approved its final version, and agreed to its submission.

Conflict of Interest

The authors declare no conflict of interest, be it commercial, financial or sentimental.

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APPENDIX

Table 1: Distribution of COVID-19 Sample Collection and Confirmed Cases during Community Surveillance in the FCT as at May 18, 2020

Date	Area Council	Ward	Settlement	No. tested	No. Confirmed (%)
13-14/04/2020	Bwari	Dutse	Mpape	189	1(0.5)
15-16/04/2020	Municipal	Gwarimpa	Utako Village	98	2(2.0)
15-16/04/2020	Bwari	Kubwa	Kubwa Village	56	9(16.1)
15-17/04/2020	Municipal	Gwarimpa	Gishiri	144	1(0.7)
15-28/04/2020	Municipal	Asokoro	Guzape	70	0(0.0)
15-28/04/2020	Municipal	Gwarimpa	Mabushi	447	85(19.0)
23-24/04/2020	Municipal	Karu	Karu	70	6(8.6)
23-24/04/2020	Municipal	Nyanya	Nyanya	70	10(14.3)
23-24/04/2020	Municipal	Karu	Jikwoyi	72	1(1.4)
27-28/04/2020	Municipal	Kabusa	Lugbe	171	12(7.0)
29-30/04/2020	Municipal	Garki	Garki Village	230	44(19.1)
1-2/05/2020	Municipal	Garki	Durumi I	109	4(3.7)
1-2/05/2020	Municipal	Garki	Durumi II	89	4(4.5)
1-2/05/2020	Municipal	Gwarimpa	Daki Biu	185	7(3.8)
5-6/05/2020	Municipal	Gwarimpa	Jahi II	101	10(9.9)
5-6/05/2020	Bwari	Dutse	Dutse Alhaji	92	6(6.5)
5-6/05/2020	Municipal	Kabusa	Aleyita	87	0(0.0)
8/5/2020	Bwari	Byazhin	Fulani Hamza Nomadic	37	0(0.0)
14/05/2020	Municipal	Gwarimpa	Kuchingoro	122	1(0.8)
14/05/2020	Municipal	Gwarimpa	Kado Kuchi	77	2(2.6)
14/05/2020	Municipal	Kabusa	Chika	42	0(0.0)
15-16/05/2020	Municipal	Kabusa	Kabusa Village	195	0(0.0)
FCT	**2 Area Councils**	**9 wards**	**22 settlements**	**2753**	**205(7.4)**

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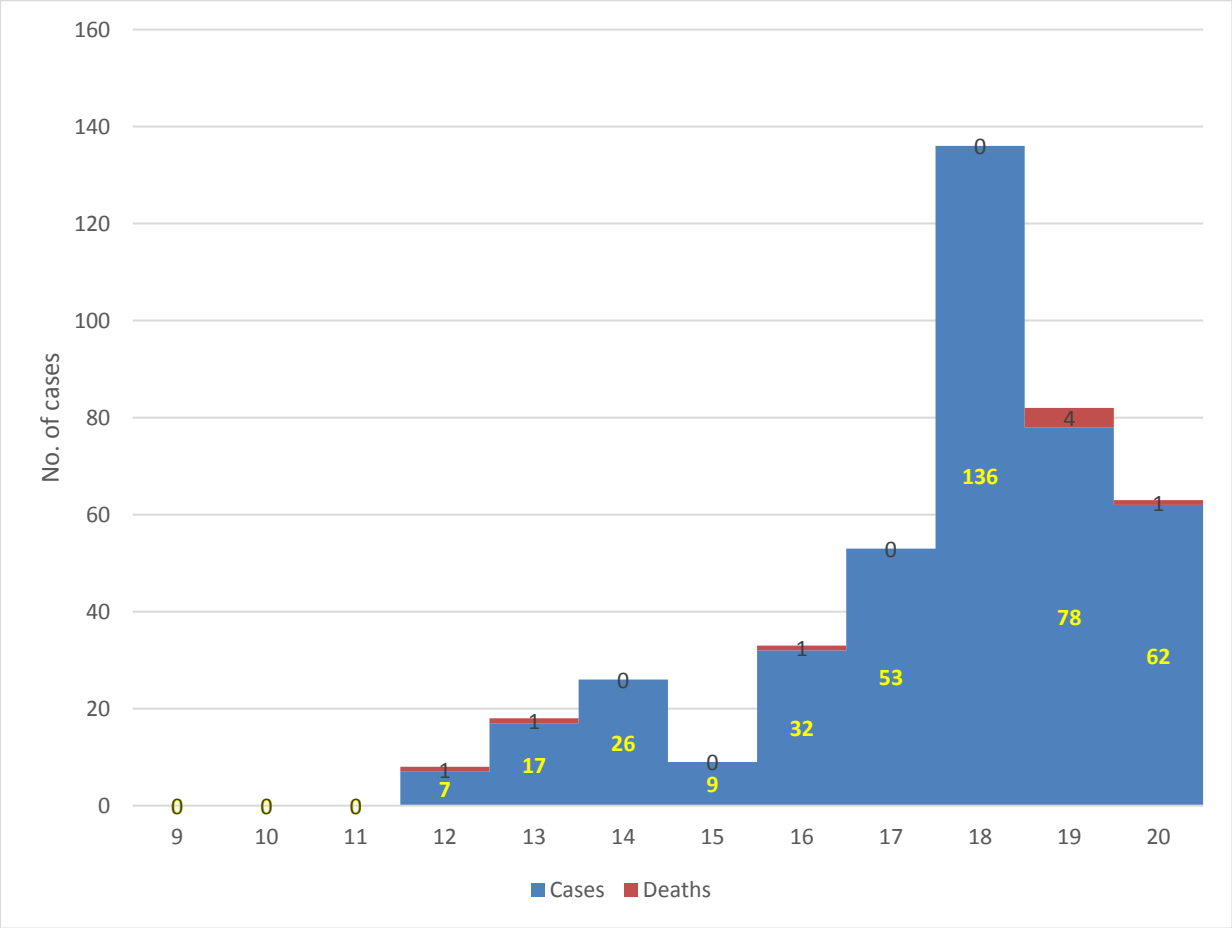

Figure 1: Epidemic curve of COVID-19 in the FCT as at week 20, 2020

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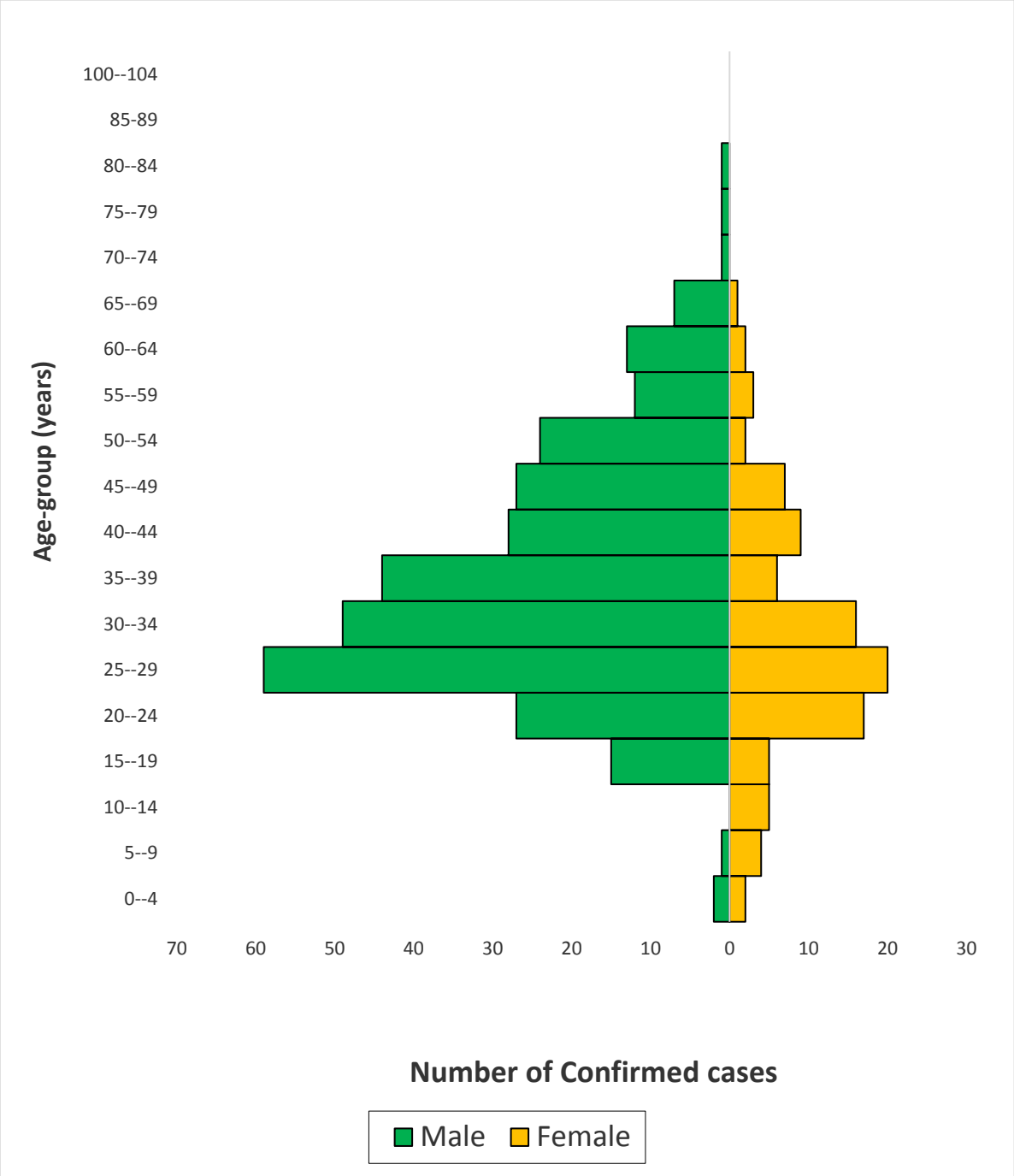

Figure 2: Age/Sex distribution of confirmed COVID-19 cases in the FCT as at May 18, 2020

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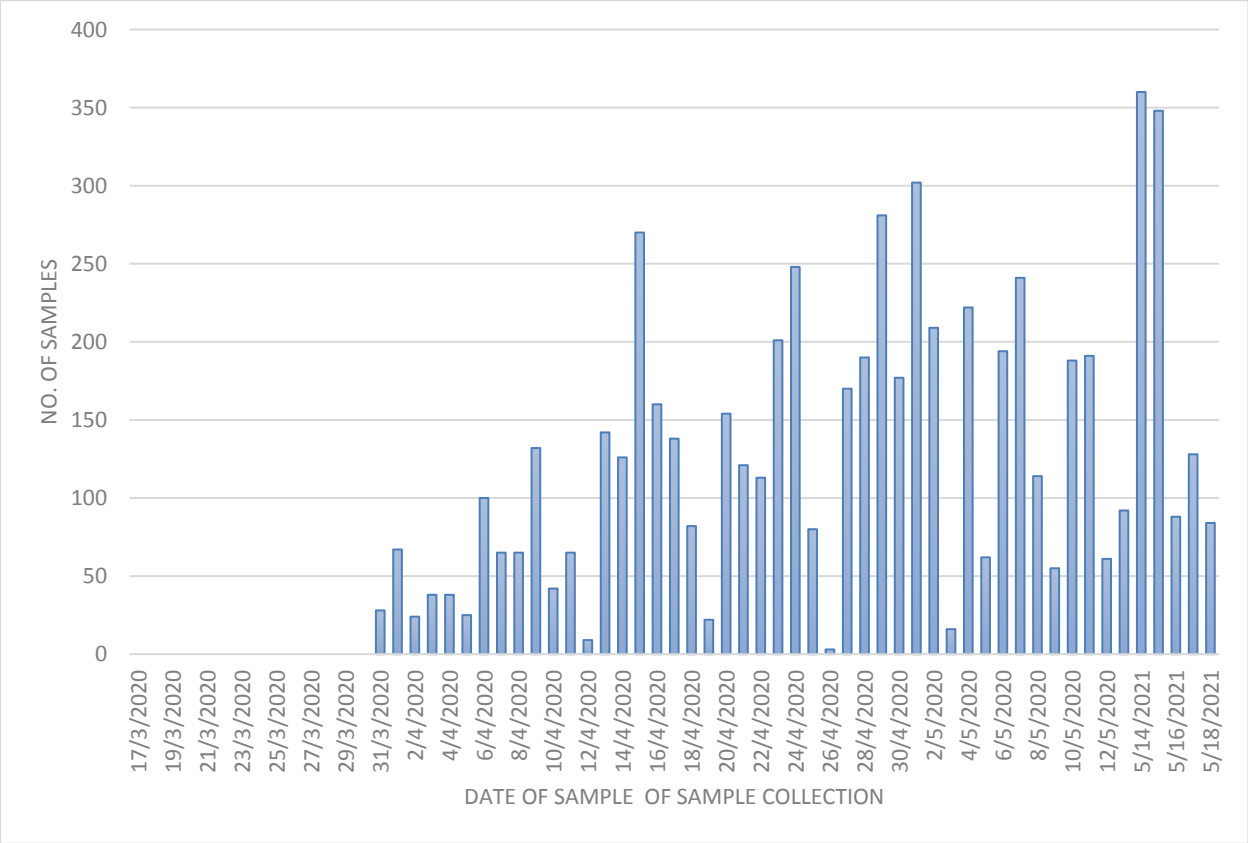

Figure 3: Daily COVID-19 sample collection in the FCT as at May 18, 2020