THE EFFECT OF COVID-19 ON CANCER PATIENTS TAKING CHEMOTHERAPY AT TIKUR ANBESSA SPECIALIZED HOSPITAL ONCOLOGY DEPARTMENT

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CROSS SECTIONAL SURVEY OF COVID 19 AWARENESS AMONG CANCER PATIENTS AND ITS EFFECT ON CANCER PATIENTS TAKING CHEMOTHERAPY IN DAY-CARE OR WARD ADMISSION AT TASH, DEPARTMENT OF CLINICAL ONCOLOGY, ADDIS ABABA, ETHIOPIA FROM APRIL 01 TO JUNE 30, 2020.

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ACRONYMS

AAU	Addis Ababa University
ACS-CAN	American Cancer society Cancer Action Network
CDC	Centers for Disease Control and Prevention
CFR	Case Fatality Rate
CHS	Collage of Health Sciences
CI	Confidence Interval
Coef.	Regression coefficient
COVID-19	Corona Virus Disease 2019
ETB	Ethiopian *Birr*
ICU	Intensive Care Unit
KAP	Knowledge, Attitude and Practice
MERS-COV	Middle East Respiratory Syndrome Coronavirus
R0	Reproductive Number
RNA	Ribonucleic Acid
SARS-COV	Severe Acute Respiratory syndrome Coronavirus
SARS-COV-2	Severe Acute Respiratory syndrome Coronavirus 2
SNNPR	Southern Nations, Nationalities, and Peoples' Region
STATA	Statistics and Data
TASH	Tikur Anbessa Specialized Hospital
TNM stage	Tumor, Node, and Metastasis stage
U.S.	United States
WHO	World Health Organization

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SUMMARY

Background: Coronavirus disease 2019 (COVID-19) pandemic have caused hundreds of thousands deaths worldwide, with the first case in Ethiopia reported on March 13, 2020. Knowledge and awareness of mode of disease transmission, basic hygiene principles and measures in public health crisis are important for developing effective control measure. This pandemic and actions taken to prevent its spread is affecting the world population including cancer patients. In Ethiopia the COVID-19 awareness as well as its effect on cancer patients is not known.

Objective: To evaluate awareness, experiences and effect of COVID 19 on cancer patients in receipt of chemotherapy from April 01 to June 30, 2020 in Ethiopia.

Methods: Phone based cross-sectional survey was conducted among cancer patients attending day care or inpatient chemotherapy treatment from April 01 to June 30, 2020 at TASH, at the Department of Clinical Oncology. All patients taking chemotherapy in day care or ward admissions during the study period whose age was greater than 18 years, and who agreed to participate was included in the study. Descriptive statistics and further analysis for association was conducted using STATA version 16. The level of significance was obtained at $P<0.05$.

Results: A total of 212 patients completed the questionnaire, with median age of 40 years (range 20-82), and 67.9% were females. 44.3% of participants were patients diagnosed with breast cancer and 41% of the participants were on palliative intent treatments. Delay, cancellation, or change in scheduling for receipt of treatment occurred in 78 patients (36.79%). Service interruption by providers accounted for the majority of the impacts (45 patients, 57.7%), followed by transportation difficulties (16, 20.5%), fear of virus exposure (14, 18.0%). Patients on palliative intent of treatment had more effect on treatment compared to adjuvant ($P<0.001$), and likelihood of not having enough medications to last for a month, not having a place to stay in nearby vicinity were associated with effect on treatment ($P=0.009$, and $P=0.03$ respectively). Patients' knowledge and practice regarding COVID-19 and its prevention methods is good.

Conclusion: The coronavirus outbreak or restrictions made in response to the outbreak impacted receipt of chemotherapy for a considerable proportion of patients at TASH.

Key words: COVID-19, Awareness, Experiences, Impact, Ethiopia, STATA.

CHAPTER ONE; INTRODUCTION

1.1, Background

On 31 December 2019, a cluster of pneumonia cases of unknown etiology was reported in Wuhan, Hubei Province, China. On 9 January 2020, China CDC reported a novel coronavirus (2019-nCoV) as the causative agent of this outbreak (1-3), and on 11th March WHO declared the outbreak a pandemic (4). As of 18 June, 2020 there were 8,242,999 confirmed cases and 445,535 confirmed deaths worldwide (5). Ethiopia confirmed the first case of COVID-19 on March 13, 2020, and as of June 18, 2020 the number of confirmed cases were 3,759 (5, 6).

The COVID-19 virus infects people of all ages but the disease is more severe in the elderly and in those with underlying medical conditions such as cancer (7-10). The case fatality rate varies from 2-15% (11-14). It is transmitted via droplets and fomites during close unprotected contact between an infector and infectee (11, 15, 16). Fever is the most prevalent symptom of the disease (88-98%), followed by cough (57-76%), fatigue (38-51%) and dyspnea (18-55%) (7, 8, 12-14).

To prevent infection and to slow the transmission of COVID-19, WHO recommends to wash hands regularly with soap and water, maintain at least 1 meter distance between you and people coughing or sneezing, stay home if you feel unwell, practice physical distancing by avoiding unnecessary travel and staying away from large groups of people (16). Immediately after the first confirmed case of COVID-19 in Ethiopia, the Government took several public health measures to prevent the spread of infection (6). The population of Ethiopia is 114,763,301 as of June 9, 2020 based on Worldometer elaboration and the population density is 115 per Km^2. 21.3% of the population is urban. It hosts closer to 31 million absolutely poor people (17). According to GLOBOCAN 2018, the estimated incidence of cancer cases in Ethiopia were 67,573. The Tikur Anbessa Hospital was Ethiopia`s only center for cancer offering oncologic surgery, chemotherapy and radiotherapy (18). It has a capacity 30 bed dedicated for chemotherapy as admission and a separate daycare center in the department of clinical oncology.

1.2, Statement of the Problem

Knowledge and awareness of mode of disease transmission, basic hygiene principles and measures in public health crisis are important for developing effective control measure (19-22).

In a study conducted Nepal among cancer patients, the overall correct response rate of the knowledge component of the questionnaire was 79.4% (23). Among cancer patients on outpatient chemotherapy in Turkey, more than 90% of the patients had a moderate to severe degree of COVID-19 fear, and 70% treated with chemotherapy were completely isolated in their homes (24). In another study conducted in Kenya, over 97% of participants had heard of coronavirus, and 76% of the participants listed fever and dry cough as a symptom, afraid of losing their jobs (34%) and that it may lead to food shortages (22%) (21). The most trustworthy reported sources of information were from the government (television, SMS). In an Ethiopian online study, 91.2% of the participants have heard about coronavirus disease (22). About 90% of the participants had a good knowledge of prevention methods but the practices of prevention were very low.

According to ACS-CAN COVID-19 impact survey, the pandemic and responses to help prevent its spread have had far-reaching impact on all Americans, and particularly on cancer patients and survivors. 8% of respondents currently in active treatment report that their anti-cancer therapy (chemo or immunotherapy) has been impacted by pandemic. Care or treatment was delayed by more than 2 weeks in 11% of the respondents. Lack of adequate health care infrastructure and human resource, serious supply-chain disruptions, and widespread fear among patients and health care workers have resulted in patient care and safety being compromised (25). For patients currently receiving active treatments oncologists are advised to individualize on the possibility of a delay in treatment. However, evidence-based estimation of impact of treatment delay or interruption on the risk/benefit balance for each individual patient is lacking (25-28). In Ethiopia the COVID-19 awareness as well as effect on cancer patients on chemotherapy is not known. Therefore, we aimed to study the COVID-19 awareness and impact on cancer patients on chemotherapy in day-care or in ward at TASH Department of Clinical Oncology.

1.3, Significance of the Study

This survey will help to understand the COVID-19 awareness and impact on cancer patients on chemotherapy related to the recent outbreak and actions taken in response to the outbreak. This will also help TASH Department of Clinical Oncology better understand the awareness of cancer patients regarding COVID 19 and its impact on cancer patients receiving chemotherapy there by assisting in better design of future strategy towards cancer care.

CHAPTER 2; LITERATURE REVIEW

What is COVID-19?

Coronaviruses are enveloped, single-stranded RNA viruses that can infect a wide range of hosts including avian, wild, domestic mammalian species, and humans. Six human coronaviruses have been reported; four of them cause mild illness similar to the common cold and gastrointestinal tract infection. The other two, severe acute respiratory syndrome coronavirus (SARS-COV) and Middle East respiratory syndrome coronavirus (MERS-COV), have raised significant public health concerns due to their zoonotic emergence and crossing of the species barrier, causing high pathogenicity and mortality in humans in 2003-2004 and 2012-present, respectively (11).

Several clusters of pneumonia cases of unknown causes were reported in Wuhan city, Hubei province, China, in December 2019. By epidemiological investigations, most of these patients were related to the Huanan Seafood Wholesale Market. The causative agent of this pneumonia was confirmed as the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), previously named 2019 novel coronavirus (2019-nCoV), and the diseases was termed coronavirus disease-2019 (COVID-19) (1, 2). SARS-CoV-2 shares 96.3%, and 79.6-82% nucleotide similarity with a bat coronavirus and SARS-CoV, respectively, which confirms its zoonotic origin (2, 29).

Epidemiology and clinical feature

On 11th March 2020, the WHO declared the novel coronavirus disease (COVID-19) outbreak a pandemic with over 118,000 cases and more than 4000 deaths worldwide (4). Exponential growth in those figures is expected and as of 18 June, 2020 there were 8,242,999 confirmed cases and 445,535 confirmed deaths worldwide, and 194,539 cases, and 4,482 deaths in Africa (5). Ethiopia confirmed the first case of COVID-19 on March 13, 2020, and as of June 18, 2020 there were 3,759 total confirmed cases and 63 deaths (5, 6).

The COVID-19 virus infects people of all ages, but the disease is more severe in the elderly and in those persons with underlying medical conditions (7-10, 12). In a summary of a report from the Chinese CDC, among a total of 72,314 case records, 44,672 (62%) were classified as confirmed cases (10). Among these confirmed cases 87% were 30 to 79 years of age, 1% were

aged 9 years or younger, and 3% were aged 80 years or older. The overall case-fatality rate (CFR) among the confirmed cases was 2.3%. No deaths occurred in those aged 9 years and younger, but cases in those aged 70 to 79 years had an 8.0% CFR and cases in those 80 years and older had a 14.8% CFR. CFR among those with comorbid conditions was 10.5% for cardio-vascular disease, 7.3% for diabetes, 6.3% for chronic respiratory disease, 6.0% for hypertension, and 5.6% for cancer. Generally, the CFR is variable and ranges from less than 2% - 15% (11-14).

COVID-19 presentations vary from asymptomatic to severe pneumonia and death. Around 80% of laboratory confirmed patients have had mild to moderate disease, 13.8% had severe disease and 6.1% were critical (10, 12). Typical signs and symptoms include: fever (87.9%), dry cough (67.7%), fatigue (38.1%), sputum production (33.4%), shortness of breath (18.6%), sore throat (13.9%), headache (13.6%), myalgia or arthralgia (14.8%), chills (11.4%), nausea or vomiting (5.0%), nasal congestion (4.8%), diarrhea (3.7%), and hemoptysis (0.9%) (7, 11-14).

Mode of transmission and preventive measures to control the COVID-19 spread

At the beginning of the outbreak, scientists thought that the disease was initially only transmitted from animals to humans; then only between people who are symptomatic, until the first human to human transmission case from an asymptomatic carrier was documented in Germany (30, 31). SARS-CoV-2 is reported to be transmitted between humans through direct contact, aerosol droplets, fecal-oral route, and intermediate fomites from both symptomatic and asymptomatic patients (11, 15, 16). These studies recommend frequent hand hygiene, respiratory etiquette, environmental cleaning and disinfection, maintaining physical distances and avoidance of close, unprotected contact with people with fever or respiratory symptoms.

COVID-19 is highly contagious disease with reproductive number (R0) of 3.2 and 5.8 in two studies (32, 33). These studies show that active surveillance, contact tracing, quarantine, and social distancing efforts are needed to stop transmission of the virus. Immediately after the first confirmed case of COVID-19 in Ethiopia in March 2020, the Government has taken several public health measures to prevent the spread of infection (6). These included closing all schools, restricting large gatherings and movements of people and adopting WHO recommendations.

COVID-19 awareness and experiences

Knowledge and awareness of mode of disease transmission, basic hygiene principles and measures in public health crisis are important for developing effective control measure (19-22). In a cross-sectional survey conducted in U.S. 24.6% of participants were "very worried" about getting the coronavirus (19). Women, black and Hispanic persons, those living below the poverty level, those with lower health literacy, and unmarried persons were more likely to respond that it was "not at all likely" that they would get COVID-19. Another cross-sectional survey was conducted among the general population of Iran above 15 years of age regarding the knowledge, attitude and practice (KAP) of COVID-19. Among a total of 8591 participants, the overall achieved knowledge score of COVID-19 characteristics was 90%. An overall score of 85% was achieved regarding the knowledge of the mode of transmission and groups at higher risk of COVID-19. Regarding the attitude towards and practice of COVID-19, an overall score of 90% and 89% were achieved among the given population (20).

In a study conducted Nepal among cancer patients, the overall correct response rate of the knowledge component of the questionnaire was 79.4% (23). Among cancer patients on outpatient chemotherapy in Turkey, more than 90% of the patients had a moderate to severe degree of COVID-19 fear, and 70% treated with chemotherapy were completely isolated in their homes (24).

In another study, a mobile phone KAP survey was conducted among participants from five urban slums in Nairobi, Kenya (21). A total of 3,139 calls were placed and 2,009 surveys completed. More than 76% of the participants listed fever and dry cough as a symptom. 35% of respondents perceived that they were at high risk of COVID-19 infection, afraid of losing their jobs (34%) and that it may lead to food shortages (22%).The most trustworthy reported sources of information were from the government (television ads, SMS, and radio ads). In an online cross-sectional study conducted among the sample of Ethiopian residents via social platforms, about 91.2% of the participants have heard about the novel coronavirus disease and Social Medias' were the main source of the information (22). About 90% of the participants had good prevention knowledge of maintaining social distance and frequent hand washing, but he practices of prevention was very low, only 61% and 84% of the participants were practicing social distance and frequent hand washing, respectively.

COVID-19 and cancer-Impact on treatment

Little is known about the outcome of patients with cancer who contract this highly communicable disease. Cancer is among the top causes of death (34). Individuals affected by cancer are more susceptible to infections due to co-existing chronic diseases, overall poor health status, and systemic immunosuppressive states caused by both cancer and anticancer treatments. Compared with COVID-19 patients without cancer, patients with cancer had higher observed death rates, higher rates of ICU admission and higher rates of having at least one severe or critical symptom. Patients with hematologic cancer, lung cancer, or with metastatic cancer had the highest frequency of severe events. Patients with non-metastatic cancer experienced similar frequencies of severe conditions to those observed in patients without cancer. Patients who received immunotherapy or surgery had higher risks of having severe events (9, 34). The overall CFR among the confirmed COVID-19 cases was 2.3% and for those with cancer-5.6% (10).

According to ACS-CAN survey of COVID-19 Pandemic Impact on cancer patients and survivors, the pandemic and responses to help prevent its spread have had far-reaching impact on all Americans, and particularly on cancer patients and survivors. 8% of respondents who are currently in active treatment report that their anti-cancer therapy (chemo/immunotherapy) has been impacted by the COVID-19 pandemic. Care or treatment delayed by more than 2 weeks in 11% of the respondents. Moreover, 34% of respondents agreed or strongly agreed with the statement "I am worried that the COVID-19 outbreak and the response to it will make it hard for me to get treatment for my cancer." This concern is even greater among those in active treatment. In subsequent survey, one-fifth of all cancer patients and survivors reported concern that their cancer could be growing or returning due to their challenges in obtaining health care, and 46% of cancer patients and survivors reported a change to their financial situation that affected their ability to pay for care, and 32% were worried about their ability to afford basic household expenses.

In another study of impact of SARS CoV-2 on the status of lung cancer chemotherapy patients, of the 373 scheduled chemotherapy injections in 79 patients, a delay in treatment occurred only 10 times. Three patients refused further chemotherapy because of a fear of getting SARS if they visited the hospital. Fifty-eight patients responded to the questionnaires. Thirty-seven patients

(63.8%) were afraid of visiting hospital during this SARS infection period. Twenty-one patients (36.2%) felt that a SARS infection was more severe and fatal than their lung cancer (35).

Lack of adequate health care infrastructure and human resource, serious supply-chain disruptions, and widespread fear among patients and health care workers have resulted in patient care and safety being compromised (24). For patients currently receiving active treatments oncologists are advised to individualize on the possibility of a delay in treatment. However, evidence-based estimation of impact of treatment delay or interruption on the risk/benefit balance for each individual patient is lacking (25-28). In Ethiopia the COVID-19 awareness as well as effect on cancer patients in who are receiving chemotherapy is not known.

CHAPTER THREE; STUDY OBJECTIVES

3.1, General Objective

- To evaluate the effect of COVID-19 on cancer patients in receipt of chemotherapy in Ethiopia

3.2, Specific Objectives

- To describe the cancer patients' awareness of COVID 19.
- To describe patients' experiences related to COVID-19 outbreak/actions taken in response to it.
- To determine patient practice to prevent COVID 19 infection.
- To evaluate the effect of COVID 19 on receipt of chemotherapy.
- To determine factors associated with discontinuation/ interruption of chemotherapy

CHPTER FOUR; METHODS AND MATERIALS

4.1 Study Area

The study was conducted at the Oncology Department of Tikur Anbessa Specialized Hospital, Addis Ababa University, Addis Ababa, Ethiopia. The department has outpatient department (OPD), 30 beds for inpatient chemotherapy, 15 couches for day care chemotherapy, and Radiotherapy facility.

Black Lion Hospital, Addis Ababa, houses Ethiopia's only cancer referral centre

Figure 1, Study area (Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia)

4.2, Study Design

Phone based cross-sectional survey was conducted among cancer patients attending day care or inpatient chemotherapy treatment from April 01 to June 30, 2020 at TASH, at the Department of Clinical Oncology

4.3, Sources of Data

Data was collected from log books, patients' charts and phone based interview.

4.4, Source Population

Source population was all cancer cases treated at TASH, Department of clinical oncology from April 01, 2020, to June 30, 2020 (03 months).

4.5, Study Population

Cancer patients treated with chemotherapy in day care or ward admissions at TASH, Department of Clinical Oncology from April 01, 2020, to June 30, 2020.

Inclusion criteria

1) Patients attending chemotherapy at day care or oncology ward from April 01 to June 30, 2020 and
2) Age greater than 18 years and

Exclusion criteria (See also figure 2 below)

1) Not willing to participate in phone interview
2) Patients whose charts cannot be traced making it difficult to find phone number

4.6, Study Variables

4.6.1, Independent variables

- Age
- Sex
- Region
- Educational status
- Household income
- Sources of information on COVID-19
- Type of cancer

4.6.2, Dependent variables

- Awareness about COVID-19, its symptoms and prevention methods
- Experiences related to the outbreak or actions taken in response to the outbreak (lost wages, job loss, not having enough food, not having enough medication to last a month, not having a place to stay)
- Effect on treatment such as delay, interruption

4.7, Sample Size and Sampling Method

A total of 383 patients' charts were found from patients attending chemotherapy from April 01-June 30, 2020, and 13 patients excluded for age less than 18 years and 14 patients were piloted. The remaining 356 patients proceeded to phone calling (See figure 2-proceed with contact via phone call).

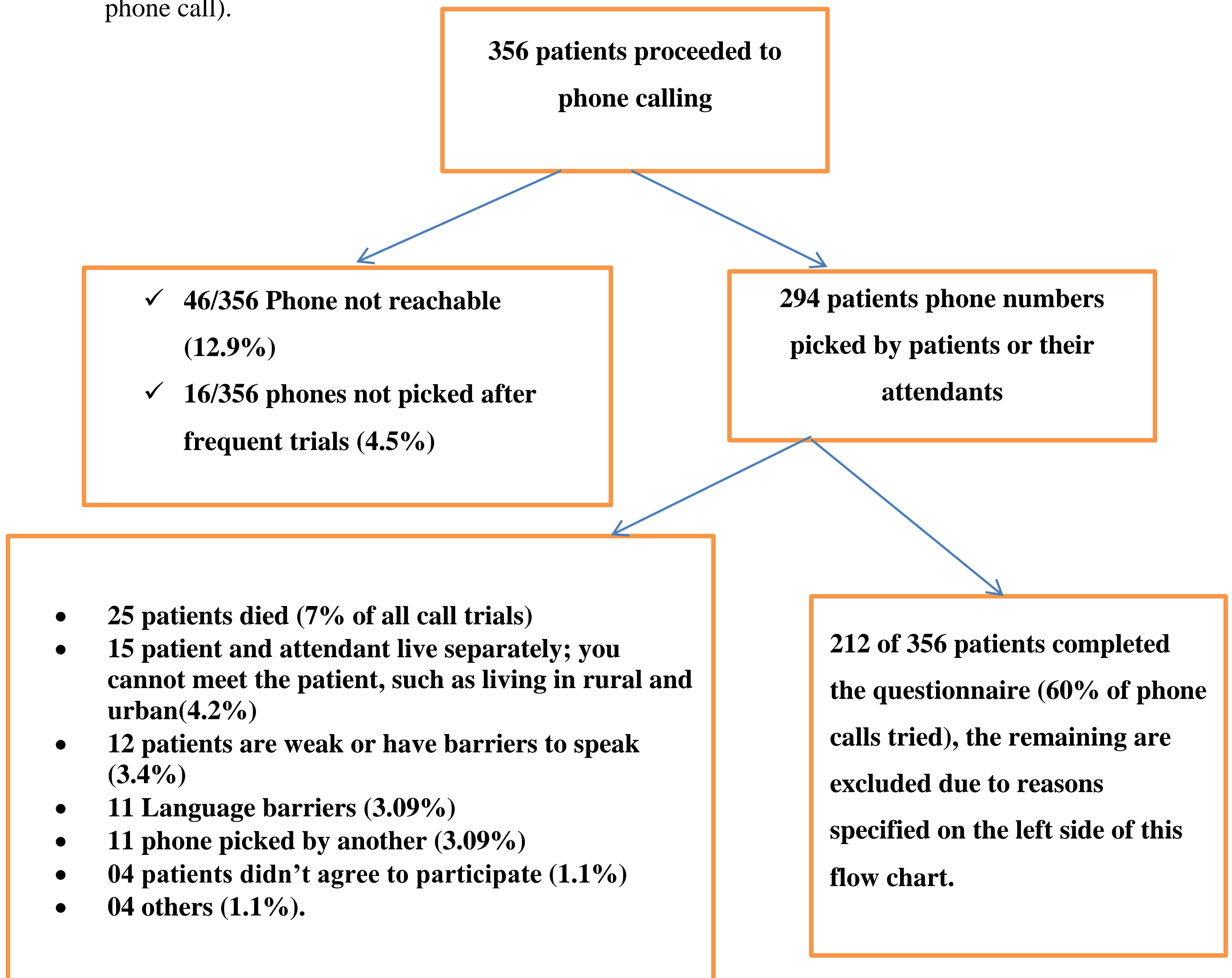

Figure 2, Flow chart of sampling method

4.8, Data Collection Tool and Procedure

We developed a questionnaire to extract data regarding general patient characteristics including type of cancer, stage and intent of treatment, and awareness about the new coronavirus disease (the disease, its symptoms, ways of prevention and their concern). It also included patients practice regarding the methods of prevention of the disease, impact on their day to day life, impact on treatment, and trusted source of information they use. The questionnaire included yes/ no questions if patients have heard about the new coronavirus disease, if they have heard about the symptoms of coronavirus disease, and if they have made any changes to their lifestyle or daily activities because of coronavirus disease outbreak. It has 6 fill in the blank questions (patient's age, educational status, type of cancer, stage, intent of treatment, and list symptoms of coronavirus disease if they have heard about it). The remaining questions were multiple choice and contains others-specify or not sure or none as an option depending on the question. Knowledge score was also assessed out of 10 by adding the following values: if they have heard about coronavirus disease and its symptoms 1 for yes and 0 for no for each, for list at least two symptoms 1 for each correct answer and 0 for wrong or no answer; and for what do you think people protect from becoming ill of COVID-19 (1 for each correct answer and 0 for wrong answer). After collecting the patients' charts and phone numbers, phone base data collection method and chart review was used to fill this questionnaire. The questionnaire was translated to Amharic language for the data collection. Data was collected at TASH starting from July 25, 2020 to September 30, 2020 on twice weekly basis, 20 charts per day (10 for each data collector). Each phone number was tried up to three times.

Two days training was given on the purpose of the study, data extraction techniques for data collectors, chart finders and others who were involved in the data collection team. The collecting team consisted of three chart finders from chart room; two oncology residents and a supervisor. Pretesting of the data extraction format was conducted by the principal investigator prior to the actual study on 14 of the cancer patients who took chemotherapy from April 01-June 30, 2020, which was not include in the study. Appropriate modifications were made based on the pre-test result. The Questionnaire was filled by the data collectors, collected on the same day it is filled and checked for completeness by the principal investigator and supervisors. The supervisor ensured that each form is filled correctly, and data entry as planned by the data clerk and principal investigator.

4.9, Operational Definitions

Group stage: this explains the combined score of Tumor, Node and Metastasis stages.

Impact of COVID-19- can be impact on treatment such as treatment delays or cancellations or impact on day to day life like losing job, place to stay, lack of enough medications or food.

Treatment delays- classified as less than 02 weeks and greater than 02 weeks, and cancellations as treatment cancelled and the patient do not know when it will be rescheduled /do not expect it to be rescheduled.

Knowledge Score- Score out of 10 from 4 questions added. High score shows better knowledge.

Have you heard about the new coronavirus disease? Yes -1, No- 0

Have you heard about the symptoms of coronavirus disease? Yes-1, No- 0

List at least two symptoms of coronavirus disease- scored out of 2, 01 for each correct answer

What do you think protects people from becoming ill with coronavirus? Please check all that apply (Scored out of 6, 1 for each correct answer and 0 for each wrong answer).

4.10, Data Processing and Analysis

Fully completed questionnaires were entered to a Microsoft Excel for cleaning and coding. The cleaned data was exported to STATA for analyses. Descriptive statistics, and binary and multinomial analyses using chi-square tests, fisher tests, or analysis of variance was conducted to observe associations between patient characteristics and responses to COVID-19 awareness, experiences, perceived concern, and impact on treatment. The statistical significance level was set at $p < 0.05$.

4.11, Ethical Consideration

An ethical clearance for the study was obtained from Addis Ababa University, TASH Department of Clinical Oncology. The study was phone based survey and the data collectors informed the study participants about the general objective of the study, and that their answers will remain anonymous to ensure the confidentiality of the information they provided. Results will also be in aggregates without personally identifying information. Each participant was requested for informed consent prior to proceeding to fill questionnaire.

4.12, Dissemination of Result

This result will be submitted to oncology department, Addis Ababa University College of Health Science**.** The findings will be presented at different conferences. It may be sent for possible publication in national and international medical journals. In addition, it will be presented to FMOH through presentation and hard copy.

CHAPTER FIVE; RESULTS

5.1, General Patients Characteristics

A total of 356 phone calls were enrolled of which 212 patients completed the questionnaire, making approximately 60% response rate. Of the non-responders, phone not reachable accounted first, 46 patients (32% of non-responses) followed by patients' death 25(17.4%) (See figure 2 above). The median age of our patients was 40 years (95% CI 38-44.55, range 20-82), and 67.9% were females. Most of the patients came from Addis Ababa 127(59.9% of the patients) followed by Oromia region 38(17.9%), then Amhara region 22(10.4%). The remaining 11.8% came from other regions. Regarding patient's educational attainment in years, 45.8% of patients were illiterate or learned primary school only (See table 1 below).

The most common type of cancer was breast cancer 94(44.3%) followed by colorectal cancer 32(15%) (See table 1 below for type of cancer, group stage and intent of chemo). Stage IV was the commonest group stage of our patients (37.7%) followed by stage III (22.6%), and 16.5% of them had inadequate staging (lack of appropriate pathology or imaging for staging). Palliative and adjuvant chemotherapy accounted 41% each for the intent of chemotherapy. 26/35 patients (74.3%) with inadequate staging were breast cancer and received adjuvant treatment.

5.2, Awareness, concern and sources of information about COVID-19

All patients have heard about COVID-19, and 202 (95.3%) of patients have heard about the symptoms of coronavirus disease. Cough and fever was the most commonly listed symptoms of COVID-19 (72% each) followed by sneezing (34.7%) (See figure 3). More than 99% of patients think staying away from others or practicing social distancing, washing hands with soap and water more frequently, using hand sanitizer, wearing a face mask when going out protects people from becoming ill with coronavirus disease. Some patients also think herbal remedies and younger age protects them from becoming ill with coronavirus disease in addition to these stated above (16.51% and 13.68% respectively).

Table 1 Characteristics of patients attending chemotherapy at TASH, from April 01, 2020- June 30, 2020.

Educational attainment in years	**Frequency**	**Percent of the cases**	**Cumulative**
Illiterate	31	14.62	14.62
Primary school	66	31.13	45.75
Secondary school	66	31.13	76.89
Higher education	49	23.11	100
Total	212	100	
Type of cancer			
Breast	94	44.34	
Colorectal	32	15.09	
Gynecologic	18	8.49	
Other GI	17	8.02	
Head and Neck	15	7.08	
Sarcoma	12	5.66	
Other	24	11.32	
Total	212	100	
Group Stage			
Limited cutaneous	4	1.89	1.89
II	27	12.74	14.63
III	48	22.64	37.27
Inadequate (unknown)*	35	16.51	53.78
Local recurrence	18	8.49	62.27
IV	80	37.73	100
Total	212	100	
Intent of treatment			
Adjuvant	87	41.04	
Concurrent	2	0.94	
Induction/ Neo-adjuvant	25	11.79	
Palliative	88	41.51	
Radical (Definitive primary chemotherapy)	10	4.72	
Total	212	100	

* To mean the imaging pathology or surgical reports or procedures are not sufficient for proper staging.

Our patients' median knowledge score was 10, IQR 9-10, and 89.15% of them scored 9 or 10 (see table 2). High educational attainment was associated with higher knowledge score, Coefficient 0.228 (95% CI 0.1097264-0.3463927, $P<0.001$).

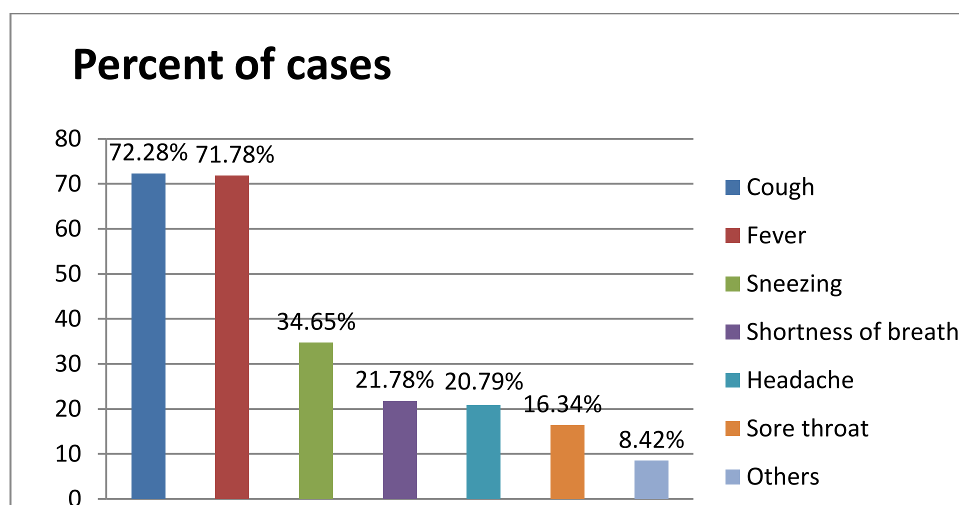

Figure 3 Knowledge on COVID-19 (symptoms) among patients attending chemotherapy at TASH from April 01, 2020-June 30, 2020

Nearly 70% of patients were very concerned or extremely concerned about coronavirus disease. (See figure 4). There was statistically significant association between concern and age, Coef. 0.013371 (95% CI 0.0003737 -0.0263683, P-value=0.044). There was also statistically significant association between type of cancer and concern (P=0.039), but multinomial linear regression showed no statistically significant association with age as well as with type of cancer.

News media (television, radio, newspaper, and internet) was used as a trusted source of information in 208 patients (98.11%), and Doctors/ health professionals in 150(70.75%) of the patients, friends or family members in 103(48.58%), and Social media (like Facebook or twitter) in 30(14.15%) of the patients.

5.3, Patients Practice

Regarding patients' practice for COVID-19 prevention methods, 99.5% of patients have made changes to their lifestyle or daily activities because of the coronavirus disease outbreak. 99.5% of patients practiced more hand washing and cleaning, 97.6% avoiding social gatherings, 30.8% not using public transport, and 21.3% avoiding or cancelling domestic travel. 84.4% of our patients stayed at home nearly all the time, or has social interaction only to family members who live in the same house.

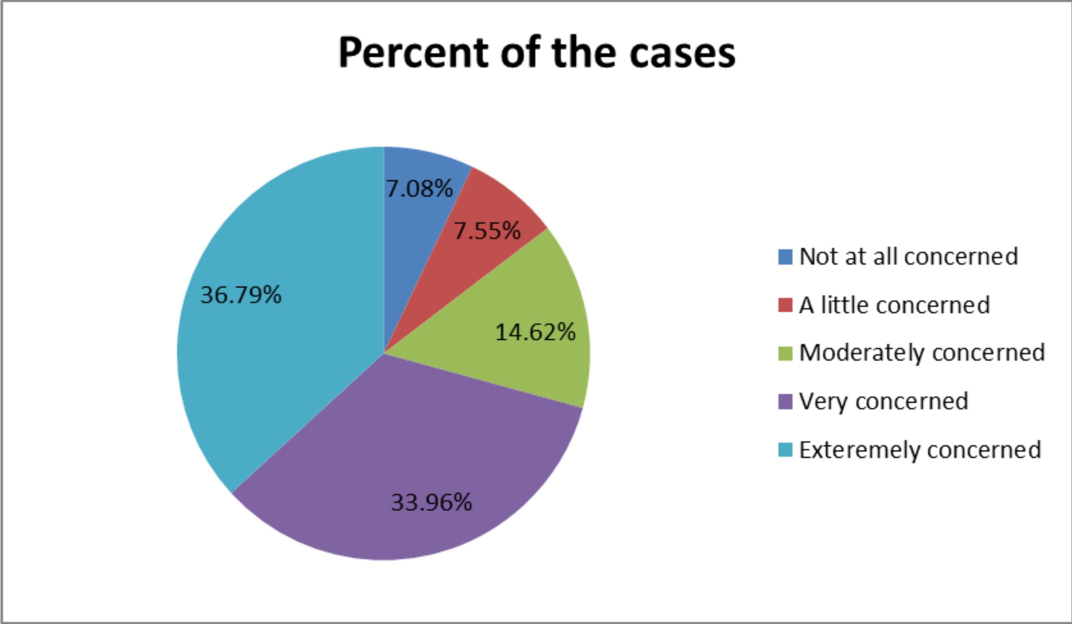

Figure 4 Concern about coronavirus disease (percent of cases) among patients attending chemotherapy at TASH from April 01, 2020-June 30, 2020

Table 2 Total knowledge score among patients attending chemotherapy at TASH from April 01, 2020-June 30, 2020

Total knowledge score	Frequency	Percent	Cumulative
5	1	0.47	0.47
6	3	1.42	1.89
7	6	2.83	4.72
8	13	6.13	10.85
9	63	29.72	40.57
10	126	59.43	100
Total	212	100	

5.4, Experience or difficulties related to COVID-19 outbreak

The coronavirus disease had extremely or very much impacted on their day to day life in 57% of the patients. 77% of patients have experienced fear of getting COVID-19, 58.5% difficulties in transportation and one third of patients faced difficulties in getting routine or essential medications (See table 3). 17.5% of patients have lost a place to stay or were at very likelihood

of not having a place to stay (See table 4). Difficulty in getting a place to stay is associated with lower age, lower educational attainment in years and Region other than Addis Ababa (P values 0.014, 0.01 and <0.001 respectively).

Table 3, Experiences or difficulties due to coronavirus outbreak among patients attending chemotherapy at TASH from April 01, 2020-June 30, 2020

Having experienced the following difficulties due to coronavirus crisis.	Frequency	Percent of responses	Percent of cases
Reduced wages or work hours	54	8.75	25.47
Losing your job	23	3.73	10.85
Childcare	42	6.81	19.81
Getting food	45	7.29	21.23
Getting hand sanitizer/cleaning supplies	44	7.13	20.75
Getting routine / essential medications	71	11.51	33.49
Transportation	124	20.1	58.49
Accessing healthcare	47	7.62	22.17
Fear of getting coronavirus disease	164	26.58	77.36
Other	3	0.49	1.42
Total	617	100	291.04

Table 4 Likelihood of the experiencing difficulties during coronavirus disease outbreak among patients attending chemotherapy at TASH from April 01, 2020-June 30, 2020

Likelihood of losing/reducing ones source of income	Frequency	Percent of the cases	Cumulative
Very unlikely	53	25	25
Somewhat unlikely	5	2.36	27.36
Somewhat likely	17	8.02	35.38
Very likely	25	11.79	47.17
Home maker/ no fixed known source of income	67	31.6	78.77
Recently laid off	45	21.23	100
Total	212	100	

Likelihood of not having enough food			
Very unlikely	95	44.81	44.81
Somewhat unlikely	28	13.21	58.02
Somewhat likely	56	26.42	84.43
Very likely	28	13.21	97.64
You have lost it soon	5	2.36	100
Total	212	100	
Likelihood of not getting enough medication to last a month	**Frequency**	**Percent of the cases**	**Cumulative**
Very unlikely	100	47.17	47.17
Somewhat unlikely	15	7.08	54.25
Somewhat likely	45	21.23	75.47
Very likely	48	22.64	98.11
You do not have it already before	1	0.47	98.58
You have lost it soon	3	1.42	100
Total	212	100	
Likelihood of not having a place to stay			
Very unlikely	158	74.53	74.53
Somewhat unlikely	2	0.94	75.47
Somewhat likely	15	7.08	82.55
Very likely	36	16.98	99.53
You have lost it soon	1	0.47	100
Total	212	100	

5.5, Effect on cancer treatment/chemotherapy due to coronavirus outbreak or restrictions related to the outbreak

Effect on active anti-cancer treatment/chemotherapy occurred in 78 patients (36.79%). Treatment has been delayed by less than 2 weeks in 29(13.68%) of the patients, greater than 02 weeks in 39(18.4%) of the cases and the remaining 10 patients (4.7%) treatment changed to a different regimen or cancelled (See table 5). Service interruption by provided accounted the most common patients responses of possible reasons for impact in 45 patients (57.69%), followed by difficulties in transportation 16(20.51%) and anxious about being exposed to corona virus

14(17.95%) (See table 6). 66.68% of patients agree or strongly agree with the statement "I'm worried that the changes to my treatment due to corona virus disease will make my cancer worse or more difficult to cure or control." Our patients' first priority was treating their cancer or preventing it from coming back 119 patients (56.13%), making sure they do not become infected with coronavirus disease 62(29.25%), and others 31(14.62) (See table 7).

Table 5 Effect on cancer treatment/chemotherapy related to recent corona virus outbreak or any community guidelines or restrictions related to the outbreak among patients attending chemotherapy at TASH from April 01, 2020-June 30, 2020

Effect on cancer patients attending chemotherapy at TASH	**Frequency**	**Percent of the patients**
Treatment has been delayed by less than 2 weeks	29	13.68
Treatment has been delayed by more than 2 weeks	39	18.4
Treatment has been cancelled and I do not expect it to be rescheduled	8	3.77
My treatment was changed (for example, I was switched from an infused medication to a different medicine that I can take orally)	2	0.94
There was no impact	134	63.21
Total	212	100

Table 6 Respondent answer of why they experienced any effect/ delays or cancellations among patients whose treatment has been affected, at TASH from April 01, 2020-June 30, 2020,

Respondent answer of why they experienced any impact/ delays or cancellations	**Frequency**	**Percent of responses**	**Percent of cases**
Service interruption by provider	45	46.39	57.69
I no longer had transportation	16	16.5	20.51
I was anxious about being exposed to corona virus	14	14.43	17.95
I was concerned about my ability to pay for treatment	12	12.37	15.38
Others	10	10.31	12.82
Total	97	100	124.35

Table 7 Patients priority needs among patients attending chemotherapy at TASH from April 01, 2020-June 30, 2020

First priority	**Frequency**	**Percent of patients**
Treating my cancer or preventing it from coming back	119	56.13
Making sure I do not become infected with coronavirus disease	62	29.25
Obtaining basic necessities like food and housing	20	9.43
Being able to take care of family members	10	4.72
Others	1	0.47
Total	212	100

5.6, Associations with Effect on treatment

There was statistically significant association between higher effect on treatment delay/ cancellation and being male sex (P=0.009), type of cancer (P<0.001), increasing group stage (P=0.004), palliative intent of treatment (P<0.001) and lower knowledge score (P=0.038), but on multinomial linear regression only intent of treatment was associated with effect on treatment (P=0.035). Likelihood of not having enough medications that last a month, and not having a place to stay in nearby vicinity was significantly associated with higher effect on treatment (P=0.009 and P=0.03 respectively) (See table 8).

Table 8 Associations with Effect on cancer treatment/chemotherapy

Impact on chemotherapy	**Coef.**	**Std. Err.**	**T**	**P>t**	**[95% Conf. Interval]**	
Male sex	0.5187908	0.197547	2.63	**0.009**	0.1293615	0.9082202
_cons (Female)	0.8194444	0.1118812	7.32	**0**	0.5988903	1.039999
Cancer Type	0.1723543	0.0453167	3.8	**0**	0.0830204	0.2616883
_cons	0.5159396	0.1532346	3.37	**0.001**	0.2138644	0.8180147
Colorectal	1.063165	0.2550548	4.17	**0**	0.5602981	1.566032
Gynecologic	0.9763593	0.3206239	3.05	**0.003**	0.3442161	1.608503
Head and neck	-0.001418	0.34649	0	**0.997**	-0.6845594	0.6817225
Others	1.156915	0.285009	4.06	**0**	0.5949902	1.71884
Other Gastrointestinal	1.590738	0.3284431	4.84	**0**	0.9431788	2.238298
Soft tissue sarcoma	0.2819149	0.3820194	0.74	**0.461**	-0.4712759	1.035106
_cons (Breast cancer)	0.4680851	0.1285355	3.64	**0**	0.214664	0.7215062
Group stage	0.1701766	0.0592253	2.87	**0.004**	0.0534243	0.2869289
_cons	0.2537686	0.2708552	0.94	**0.35**	-0.2801751	0.7877122

Intent of Chemo	**Coef.**	**Std. Err.**	**T**	**P>t**	**[95% Conf. Interval]**	
Concurrent	-0.586207	0.9406526	-0.62	**0.534**	-2.440694	1.268281
Induction/ Neo-adjuvant	0.2937931	0.2984615	0.98	**0.326**	-0.2946208	0.882207
Palliative	0.8342476	0.1988506	4.2	**0**	0.4422156	1.22628
Radical/primary	0.5137931	0.4391725	1.17	**0.243**	-0.3520312	1.379617
_cons (Adjuvant)	0.5862069	0.1410098	4.16	**0**	0.3082075	0.8642063
Total Knowledge Score	-0.216878	0.1037369	-2.09	**0.038**	-0.4213774	-0.012379
_cons	3.027778	0.9810869	3.09	**0.002**	1.093737	4.961819
Likelihood of not having enough medications that last a month	0.185545	0.0700286	2.65	**0.009**	0.0474843	0.3236058
Likelihood of not having a place to stay	0.1679524	0.0769706	2.18	**0.03**	0.0162055	0.3196992
_cons	0.0030745	0.2739089	0.01	**0.991**	-0.5369343	0.5430833

CHAPTER SIX; DISCUSSION

The non-response rate in our study was higher than the study done in informal settlements of Kenya, Nairobi; there was 36% non-response rate, but in our study it was 40%, this can partly be explained by our patients' death which accounted for 17.4% of non-responders and 7% of all calls tried. The cause of death was not studied in our study, but as 20 of 25 deaths (80%) were being treated as palliative intent the cause of death may be disease progression, but can also be due to complications of treatment, or complications of the disease or others.

In our study, 67.9% of the patients are female, and breast cancer is the commonest (44.3% of the patients) which is similar to data from a population based cancer registry in Ethiopia; from which 67% were female, and breast cancer was the commonest accounting for 31.5% of all cases (36). The majority of our patients presented with stage IV disease (37.73%), and unknown or inadequate stage (16.51%), which is similar percentage with stage IV patients which was 38.8%, but lower unknown stage (36.65) compared with another study done in Ethiopia (37). Although inadequate staging rate looks improved, 16.51% is still high. In our study, 26/35 patients (74.3%) with inadequate staging were breast cancer and received adjuvant treatment showing lack of adequate surgical or pathologic staging. A high percentage of patients are being treated as palliative intent (41%).

To our knowledge, there is no published data regarding COVID-19 awareness and effect on cancer patients in receipt of chemotherapy in Ethiopia as well as in Africa. All patients have heard about COVID-19, and 95.3% of patients have heard about the symptoms of coronavirus disease. Cough and fever were the most commonly listed symptoms of COVID-19 (72% each), and the symptom of severe infection shortness of breath was reported in 21.8% of the patients; which is lower than those listed in the Kenyan study (cough in 86%, fever-77%, and shortness of breath in 42% of the respondents) . Uncommon symptom sneezing was mentioned in 34.7% of our patients which is better than the Kenyan study which was mentioned in 56% of the participants (21). More than 99% of patients think staying away from others or practicing social distancing, washing hands with soap and water more frequently, using hand sanitizer, wearing a face mask when going out protects people from becoming ill with coronavirus disease. But some patients also think herbal remedies and younger age protects them from becoming ill with coronavirus disease in addition to these stated above (16.51% and 13.68% respectively).

Our patients' median knowledge score was 10, IQR 9-10, mean score was 9.5 (95%), and 89.15% of them scored 9 or 10 (see table 2). This score is better than reported in Iranian study among the general population (Mean score of 85-90%) as well as the study in Nepal among cancer patients (Mean score of 79.4%) (20, 23). High educational attainment was associated with higher knowledge score, Coefficient 0.228 (95% CI 0.1097264-0.3463927, and P<0.001). In the study conducted in Nepal, higher knowledge score was associated with age >60, male sex and higher educational attainment; p- values <0.001, 0.008 and <0.001respectiveley (23). Nearly 70% of patients were very concerned or extremely concerned about coronavirus disease. News media was used as a trusted source of information in 98.11% patients, This is better than study in Turkey cancer patients applied to the outpatient chemotherapy, where 91.9% of patients acquired their knowledge about COVID-19 from television (24).

Patients' practice regarding COVID-19 prevention methods was good. 99.5% of patients have made changes to their lifestyle or daily activities because of the coronavirus disease outbreak. 99.5% of patients practiced more hand washing and cleaning, 97.6% avoiding social gatherings. This is better than the study conducted among Ethiopian residents via social platform, where only 61% and 84% of the participants were practicing social distance and frequent hand washing, respectively (22). 84.4% of our patients stayed at home nearly all the time, or has social interaction only to family members who live in the same house, better than that reported in Turkey; 70% treated with chemotherapy were completely isolated in their homes (24).

The coronavirus disease had extremely or very much impacted on their day to day life in 57% of the patients. 77% of patients have experienced fear of getting COVID-19, 58.5% difficulties in transportation, one third of patients faced difficulties in getting routine or essential medications and 36% of patients had reduced wages or work hours or lost their job (See table 3). More than 90% of the patients had a moderate to severe degree of COVID-19 fear among the patients on systemic therapy in Turkey (24). In the ACS-CAN survey of COVID-19 Pandemic Impact on cancer patients 38% of cancer patients and survivors reported a change to their financial situation that affected their ability to pay for care. 17.5% of patients have lost a place to stay or were at very likelihood of not having a place to stay (See table 4). Difficulty in getting a place to stay is associated with lower age, lower educational attainment in years and Region other than Addis Ababa (P values 0.014, 0.01 and <0.001 respectively).

Effect on active anti-cancer treatment/chemotherapy occurred in 78 patients (36.79%). Treatment has been delayed by less than 2 weeks in 29(13.68%) of the patients, greater than 02 weeks in 39(18.4%) of the cases and the remaining 10 patients (4.7%) treatment changed to a different regimen or cancelled (See table 5). Service interruption by provided accounted the most common patients responses of possible reasons for the effect in 45 patients (57.69%), followed by difficulties in transportation 16(20.51%) and anxious about being exposed to corona virus 14(17.95%) (See table 6). According to ACS-CAN survey of COVID-19 Pandemic Impact on cancer patients and survivors, 27% of patients who are currently in active treatment report a delay to their treatment, and more than13% of those in active treatment have had care delayed without knowledge of when it will be rescheduled. Furthermore, 8% of respondents who are currently in active treatment report that their anti-cancer therapy (systemic therapy) has been impacted by the COVID-19 pandemic. Our study's effect on 36.79% of the patients is much higher than the 8% in the above study. In subsequent ACS CAN initiated survey effort on April 30, 2020, most cancer patients and survivors report that their health care provider initiated the changes to their cancer care (64%). Where patients suggested changes to care, they most often did so because of anxiety about exposure to COVID-19 (55%) and lack of certainty about whether they should go out in public to obtain care (18%).

In another study of impact of SARS CoV-2 on the status of lung cancer chemotherapy patients, of the 373 scheduled chemotherapy injections in 79 patients, a delay in treatment occurred only 10 times. Three patients refused further chemotherapy because of a fear of getting SARS if they visited the hospital. Fifty-eight patients responded to the questionnaires. Thirty-seven patients (63.8%) were afraid of visiting hospital during this SARS infection period. Twenty-one patients (36.2%) felt that a SARS infection was more severe and fatal than their lung cancer (35).

In our study, there was statistically significant association between higher effect on treatment delay/cancellation and being male sex ($P=0.009$), type of cancer ($P<0.001$), increasing group stage ($P=0.004$), palliative intent of treatment ($P<0.001$) and lower knowledge score ($P=0.038$), but on multinomial linear regression only intent of treatment was associated with effect on treatment ($P=0.035$). Likelihood of not having enough medications that last a month, and not having a place to stay in nearby vicinity was significantly associated with higher effect on treatment ($P=0.009$ and $P=0.03$ respectively) (See table 8).

Nearly two third (66.68%) of patients agree or strongly agree with the statement "I'm worried that the changes to my treatment due to corona virus disease will make my cancer worse or more difficult to cure or control." Our patients' first priority was treating their cancer or preventing it from coming back 119 patients (56.13%), making sure they do not become infected with coronavirus disease 62(29.25%), and others 31(14.62) (See table 7).

Lack of adequate health care infrastructure and human resource, serious supply-chain disruptions, and widespread fear among patients and health care workers have resulted in patient care and safety being compromised (24). For patients currently receiving active treatments oncologists are advised to individualize on the possibility of a delay in treatment. However, evidence-based estimation of impact of treatment delay or interruption on the risk/benefit balance for each individual patient is lacking (25-28).

CHAPTER SEVEN; CONCLUSION AND RECOMMENDATIONS

7.1, Conclusion

Impact on chemotherapy (delays, interruptions or change in treatment) occurred in more than one third of our patients due to the COVID-19 outbreak, or restriction made in response to the outbreak. Service interruption by provider was the most commonly reported patients' response of possible reasons for this effect. Higher effect on treatment was associated with patients on palliative intent of treatment, likelihood of not having enough medications that last a month, and not having a place to stay in nearby vicinity. The knowledge and practice of our patients regarding coronavirus disease and its prevention methods is good. The majority of our patients had fear of getting coronavirus disease and faced difficulties in transportation.

7.2, Recommendations

Creating awareness and improving patients' practice regarding COVid-19 and its preventions methods are important, though service interruption as well as lock down of transportations are not right move as many patients might be suffering at home due to lack of treatment/palliation.

First, patients and physicians have to individualize on how to proceed, and patients priority needs has to be taken in to consideration. Second, service interruption was due to exposure of some staffs and quarantine of contacts (personal information), so adequate replacements of staffs including working in shifts and in different teams have to be practiced at normal times so that can be helpful during outbreak of pandemics. Third, cancer patients take chemotherapy frequently (usually weekly, twice weekly, or every 03 weeks or else), so a place to stay in nearby facility is needed, and the government with or without charity organizations has to provide this in order to have best quality of care to our patients.

7.3, Limitations of the Study

There was significant non-response mainly due to the study being on phone call, but also significant patients' death, for which the cause of death was not studied in this study. Whether this impact on treatment has resulted in worse outcome subsequently is not studied. Impact on patients not taking chemotherapy is not studied.

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ANNEXES

ANNEX –I: Data Extraction Tools

Serial number	Variable	Category
1	Study subject ID number	___________________
2	Current age (in years)	___________________
3	Sex of patient	1. Female 2. Male
4	Region	1. Addis Ababa 2. Afar 3. Amhara 4. Benishangul gumuz 5. Dire Dawa 6. Gambela 7. Harari 8. Oromia 9. SNNPR 10. Somali 11. Tigray
5	Educational attainment in years	___________________
6	Type of cancer	________________________
7	Stage (TNM/Group)	________________________
8	Intent of treatment	________________________
9	Have you heard about the new coronavirus disease?	1. Yes 2. No
10	Have you heard about the symptoms of coronavirus disease? If no, proceed to Q13.	1) Yes 2) No
11	If the answer to Q11 is yes, list at least two symptoms	1. ______________________ 2. ______________________
12	What do you think protects people from becoming ill with coronavirus? Please check all that apply	1. Staying away from others or practicing social distancing 2. Herbal remedies 3. Younger age 4. Washing hands with soap and water more frequently 5. Using hand sanitizer 6. Wearing a face mask when I go out 7. None of the above

13	How concerned do you feel about new coronavirus disease? (Please select one):	1. Not at all concerned 2. A little concerned 3. Moderately concerned 4. Very concerned **5.** Extremely concerned
14	Have you made any changes to your lifestyle or daily activities because of coronavirus disease outbreak? (if no proceed to Q17), and if the answer is yes, proceed to Q16	1. Yes, I have made some changes to my lifestyle or daily activities **2.** No, I have not changed my lifestyle or daily activities; I am doing everything I normally do
15	Which of the following are you doing? (Select all that apply):	1. More hand washing and cleaning 2. Avoiding social gatherings 3. Not attending classes 4. Avoiding gym and exercise classes 5. Avoiding going to the doctor or dentist for routine appointments 6. Working from home 7. Not using public transport 8. Avoiding or cancelling domestic travel 9. Avoiding or cancelling international travel 10. Stocking up on food and supplies 11. Others(Specify___________)
16	To what extent are you self-isolating?	1. All of the time. I am staying at home nearly all the time 2. Most of the time. I only leave my home to buy food and other essentials 3. Some of the time. I have reduced the amount of times I am in public spaces, social gatherings, or at work 4. I am limiting social interaction to family members who live in the same house 5. None of the time. I am doing everything I normally do
17	Who do you look to as a trusted source of information about the corona virus disease pandemic?	1. News media (television, radio, newspaper, internet) 2. Social media (like Facebook or twitter) 3. Friends or family members 4. Doctors/ health professionals 5. Other(specify) _______________
18	Have you experienced any difficulties	1. Reduced wages or work hours

	due to the coronavirus crisis? (Select all that apply):	2. Losing your job 3. Childcare 4. Getting food 5. Getting hand sanitizer/cleaning supplies 6. Getting routine / essential medications 7. Transportation 8. Accessing healthcare 9. Fear of getting coronavirus disease 10. Other (Please specify):________
19	How likely is you would experience (are you experiencing) the following event during corona virus pandemic? Please Ask Q 20.1-20.4	1. Very unlikely 2. Somewhat unlikely 3. Somewhat likely 4. Very likely 5. You do not have it already before 6. You have lost it soon
19.1	You would lose/ reduce your source of income (Example, lost wages, job loss)	_____________
19.2	You would not have enough food.	_____________
19.3	You would not have enough medication to last a month	_____________
19.4	You would not have a place to stay	_____________
20	How much is/did coronavirus disease impact on your day-to-day life	1. Not at all 2. A little Much 3. Very much 4. Extremely
21	What, if any, effect has the recent corona virus outbreak or any community guidelines or restrictions related to the outbreak had on your cancer treatment/chemotherapy? (Select all that apply) Proceed to Q 24 if there was no impact	1. Treatment has been delayed by less than 2 weeks 2. Treatment has been delayed by more than 2 weeks 3. Treatment has been delayed and I do not know when it will be rescheduled 4. Treatment has been cancelled and I do not expect it to be rescheduled 5. My treatment was changed (for example, I was switched from an infused medication to a different medicine that I can take orally) 6. There was no impact **7.** Other (specify) ________________ 8. I am not sure
22	[Ask the Why, if respondent has experienced any effect/delays or	1. I no longer had transportation 2. I could not find or afford a place to

	cancellations]	stay close to facility 3. I was concerned about my ability to pay for treatment 4. I was anxious about being exposed to corona virus 5. I did not want to go to the treatment without a caregiver 6. Service interruption by provider 7. Other (specify)________________ 8. I am not sure
23	To what extent do you agree or disagree with the following statement? "I'm worried that the changes to my treatment due to corona virus disease will make my cancer worse or more difficult to cure or control."	1. Strongly disagree 2. Disagree 3. Neither agree nor disagree 4. Agree 5. Strongly agree
24	From the following needs which ones are your highest priorities right now? Select your top three starting from the highest priority. 1st ___________________ 2nd ___________________ 3rd ___________________	1. Treating my cancer or preventing it from coming back 2. Making sure I do not become infected with coronavirus disease 3. Obtaining basic necessities like food and housing 4. Being able to work 5. Being able to take care of family members 6. Others (specify)________

ANNEX II, Patient Information Sheet (English version)

We are calling from Tikur Anbessa specialized hospital (TASH), Department of Clinical Oncology coronavirus disease-19 (COVID-19) survey. This survey is meant for cancer patients over the age of 18 years, living in Ethiopia; who are receiving chemotherapy in day-care basis or ward admissions at Tikur Anbessa specialized hospital, Department of Clinical Oncology, from April 1 to June 30, 2020.

This survey is designed to understand the thoughts and experiences of these individuals related to the recent COVID-19 outbreak and actions taken in response to the outbreak. The findings from this survey will help TASH, Department of Clinical Oncology better understand the awareness of cancer patients regarding COVID 19 and its effect on cancer patients receiving chemotherapy thereby assisting in better design of future strategy towards cancer care.

Today's survey should take less than 15 minutes to complete. This survey is to be taken using a phone call and chart review. This survey poses no risk to you. It will be completed without providing any personally identifying information.

I have listened and understood the consent information above. I agree to take part in the TASH Department of Clinical Oncology COVID-19 (coronavirus disease) survey.

- o I agree to participate
- o I decline to participate (If the user declines, they will be routed to the end of the survey without seeing any further questions).

Study subject ID number ____________

Date of interview (Ethiopian calendar DD/MM/YYY) ______________________

Interviewer ID __________________

Result; (A) complete (B) incomplete (C) excluded (Specify reason______________________)

Supervisor ID __________________

Principal Investigator address: 0914518786

ANNEX – III, Assurance of the Investigator

I, the undersigned Clinical Oncology Resident agree to accept responsibility for the scientific, ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the research and publications office of the Addis Ababa University.

Name of the Investigator: Dr. Hailemichael Welekidan (4th Year Clinical Oncology Resident)

Signature___________ Date_____/_____/______

Approval of the Primary Advisor

Advisor Name: Dr. Mathewos Assefa, Consultant Oncologist, Associate professor of medicine, AAU, CHS.

Signature______________ Date _____/_____/_____________