Original Article

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Telephonic Verbal Autopsy of Death among Confirmed COVID-19 Cases: Search For The Cause When You Are Not Allowed To Go

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Abstract

Background: COVID-19 is a new viral disease which caused a global pandemic from the end of 2019 into the 2020. The purpose of the studies is to find out factors related to death among COVID-19 admitted patients in early COVID era at a tertiary hospital.

Materials and methods: The study was a retrospective telephonic interview using a pre-structured questionnaire among confirmed COVID-19 deaths from March to September 2020 in three districts of Bangladesh. After taking verbal consent deceased's relative was talked with. At that time pathogenesis was not clear, people were not allowed to go home for communication. So, we modified the standard verbal autopsy through a telephonic one.

Results: Among the 222 deceased COVID-19 patients, 74.8% were males, 52.3% within 6th decade of their ages. Complete information was available for 162 patients. The majority (77.8%) of patients attended hospital; 60.5% died in the hospital and 14% were brought dead in the hospital. 81.1% experienced fever, followed by dyspnea (74.8%) and cough (55.0%). Diabetes and hypertension were risk factors in 49.1% and 32.4%, respectively. 50% were treated with Azithromycin, 30.3% received anticoagulants, 10.8% got high-flow nasal cannula for oxygen delivery, methylprednisolone (26.1%) and favipiravir (17.1%). The respondents pointed out that reasons for death were delay at home and transport to the hospital (23.4%) and 'lack of quality service' by 22.5%.

Conclusion: The findings partly reflect the state of confusion and helplessness of the patients and caregivers during the initial phase of the epidemic. Delays in treatment-seeking, lack of knowledge about pathogenesis, inadequate oxygen supply, and shortage of devices like HFNC were crucial in the initial deaths of COVID-19 in this area.

Key words: COVID-19; Novel corona virus; Pandemic.

Introduction

COVID-19 pandemic caused by a novel coronavirus, SARS-CoV-2, has caused more than 145 million people getting infected and over 30 million dead globally, as of 21st April 2021.[1] While his study was operational, before the end of September 2020, 33 million worldwide infections and 10 million deaths had already occurred.[2] In Bangladesh, since the first three cases were identified on 8th March in Dhaka, from then on till the end of September 2020, 360 thousand confirmed infections and 5 thousand deaths were reported countrywide, whereas in Chattogram district the numbers were 18,800 and 292 for infections and deaths respectively.[3] The Infection Fatality Rate (IFR) was rather low at 1.44% whereas, globally about 3.4% of reported COVID-19 cases have died.[3,4] The main concern though was very low test-counts at 11,300/million population in Bangladesh, only a fraction of acute infections were diagnosed and published, the overall burden of COVID-19 was thought to be much higher than what the published data would suggest.[5,6] SARS-CoV-2 has many similarities to

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SARS-CoV corona virus that caused SARS in 2003, most important of which is the two viruses have the same receptor for entry into the host cell, the Angiotensin-Converting Enzyme 2 (ACE2).[7-9] ACE2 receptors are widely distributed in different host tissues like Type-2 pneumocytes, small intestinal epithelium, vascular endothelium, testis, kidneys, heart, thyroid, and adipose tissue, and explains the COVID-19 presentation with pneumonia, diarrhea, thromboembolic disorders and cardiac injury.[10-12] Apart from viral entry and cellular destruction of the effector cells, hyperinflammation, renin-angiotensin-aldosterone system imbalance, endotheliopathy, thrombotic microangiopathy and intravascular coagulopathy are thought to be the underlying pathogenesis of the disease.[13]

The disease spectrum of COVID-19 is extremely varied. While most of the cases are completely asymptomatic or mild, a significant number might present with bilateral extensive pneumonia progressing to ARDS, respiratory failure, shock, and multi-organ dysfunction.[12,13] Immune dysfunction, Cytokine Release Syndrome (CRS) and resultant coagulopathy are postulated to be the underlying cause for the clinical deterioration.[11, 14-17] Elevated levels of d-dimer, C-reactive protein, lactate dehydrogenase, serum ferritin, interleukin-6, interleukin-10 and bilateral diffuse opacities in chest radiology are the markers of severity.[15-17] A portion of patients who become severe or critically ill would ultimately die. Case Fatality Rate (CFR) was widely variable throughout the world; According to WHO dashboard it was 1.44% before September in Bangladesh, whereas the global CFR was 6.5% and in Italy it was 7.2%.[3,18] The variations in CFR is thought to be mostly due to different demography and other identified factors.[19] Case fatality is higher in the ICU admitted patients and ranged from 26% in Italy, to 39% in New York and 85.45% in Wuhan city.[20-22] Risk factors for severity and mortality include male gender, older age (>65 years) higher Sequential Organ Failure Assessment score (SOFA) high blood d-dimer (>1000 ng/mL) cardiovascular comorbidities, higher concentrations of Interleukin-6 (IL-6) and extensive pulmonary involvement in chest radiology, In Bangladesh no such data is available about the predictors of mortality in the country, but most (82%) of the deaths occurred here were between 61-80 years of age and in males (77%).[19,23-28,4] The COVID-19 deaths reported by the DGHS of Bangladesh were all in the hospitalized patients and counted 5193 out of 63646 or 8% of the total hospitalization for the purpose, As of 28 September 2020, 11605 general and 532 ICU beds were dedicated for the COVID-19 treatment, although most (54%) of them were in the Dhaka city.[4,29]

Apart from the established factors leading to COVID-19 severity, in our low socio-economic condition other factors like delay in hospitalization, lack of available medical care or other unidentified factors could contribute to patients' demise. We used verbal autopsy tool, performed by lay reporting of signs, symptoms and circumstances by family members and caregivers of the deceased person, to assess the temporal events related to the patient's death.[30]

Materials and methods

Retrospective, telephonic interviews of nearest persons of deceased COVID-19 patientswere conducted during the month of September to October 2020 to conduct a verbal autopsy of deaths that occurred from March 2020 to September 2020 in Chattogram, Cox's Bazar and Cumilla districts. Information about RT-PCR of SARS-CoV-2 positive cases who later died during clinical courses irrespective of clinical sign symptoms were collected from their relatives after getting consent. Designated and trained interviewers and pre-structured Case Record Form (CRF) were used for interview. Verbal consent was taken from patient's legal and nearest relatives. Upon consent patient's nearest one/ones who were with the patient during the course of illness and death were interviewed. Information about patient's clinical presentation, temporal course including terminal illness, oxygen requirement and mode of delivery,information about attendants' perception about health care they received/possible factors responsible for outcome and treatment details were documented. Information regarding treatment and drug were obtained by asking direct and/or associated questions like price of the drug, formulation, mode of administration (e.g. subcutaneous enoxaparin). Respondents were also asked to

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Express their views and opinions regarding the possible cause of death of their relatives.

All data were processed with SPSS and Test of significance was performed using the Chi-square (χ^2) test and Independent t-test. Ethical approval was taken from the Ethical Review Committee of Chittagong Medical College.

Results

From a list of 246 dead patients, we could gather 243 with telephone no available. Out of those 10 numbers could be contacted and 222 relatives agreed to participate. (Table I)

Table I Socio-demographic characteristics of the confirmed COVID-19 cases (n = 222)

Characteristics	n=222(%)
Age groups	
≤ 30 Years.	6 (2.7)
31 - 40 Years	22 (9.9)
41 - 50 Years	32 (14.4)
51 - 60 Years	56 (25.2)
61 - 70 Years	60 (27.1)
71 - 80 Years	30 (13.5)
> 80 Years	16 (7.2)
Gender	
Male	66 (74.8)
Female	56 (25.2)
Location	
Chattogram	94 (42.4)
Cumilla	72 (32.4)
Cox's Bazar	50 (22.5)
Others	6(2.7)

Among the 222 dead COVID-19 patients, males were predominant (74.8%). Demographic characteristics are shown in table1. Most of the patients were within 5th and 6th decades of their ages (52.3%). 27.0% patients were below 50 years of age, while 20.7% were aged above 70 years. About 75% patients were from Chattogram and Cumilla districts.

The difference between the mean ages of the COVID-19 patient's according to gender is not statistically significant ($p > 0.05$). That means the distribution of gender among the patients was isometric (Table I).

Out of the 222 dead COVID-19 cases, verbal information could be collected from 162 patients (Remaining 60 not providing complete information). Among them, majority were treated in hospital (77.8%). 60.5% patients died in the hospital. About 14% patients were brought dead in the hospital, who actually either died at home or deceased on the way to the hospital.

Table II Frequency and percentage of reported symptoms and co morbidities

Characteristics	n=222(%)
Comorbidities	
Diabetes Mellitus	109(49.1)
Hypertension	72(32.4)
Chronic Heart Disease	28(12.6)
Bronchial Asthma	20(9)
Chronic Kidney Disease	15(6.8)
Obesity	15(6.8)
Smoking	14(6.3)
Cerebro-vascular disease	8(3.6)
COPD	8(3.6)
Chronic Liver Disease	2(0.9)
others	36(16.2)
Symptoms	
Fever	180(81.1)
Dyspnea	166(74.8)
Cough	122(55)
Altered sense of taste	30(13.5)
Confusion	30(13.5)
Chest pain	24(10.8)
Anorexia	24(10.8)
Fatigue	22(9.9)
Diarrhea	18(8.1)
Sore throat	16(7.2)
Dizziness	14(6.3)
Others	34(15.3)

Majority of the patients (81.1%) experienced fever as a key symptom, dyspnea (74.8%) and cough (55.0%) coming to the next. The frequencies of other common symptoms of COVID-19 infection are supplied in the Table II. Among the COVID-19 patients, Diabetes Mellitus and Hypertension were commonly present as associated risk factors (49.1% and 32.4%). Other comorbidities are listed in the Table II.

Table III. Drugs administered to COVID-19 patients.

Treatments	Frequency=n(%)
Azithromycin	110(49.6)
Injectable Antibiotics	105(47.3)
Low Molecular Weight Heparin	85(38.3)
Oxygen (Prongs)	80(36.0)
Oxygen (Mask)	75(33.8)
Methylprednisolone	58(26.1)
Favipiravir	38(17.1)
High Flow Nasal Cannula	24(10.8)
Ivermectin	24(10.8)
Remdesivir	8(3.6)
Tocilizumab	6(2.7)
Doxycycline	4(1.8)
Others	30(13.5)

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About 50% of the patients were treated with Azithromycin, while 47.3% were given injectable antibiotics. LMW Heparin was given to 38.3% patients. Oxygen therapy was provided for 36% (Prongs) and 33.8% (Mask) patients. HFN cannula was used for 10.8% patients. Among other drugs, Methylprednisolone (26.1%) Favipiravir (17.1%) and Ivermectin (10.8%) were other commonly used medications. (Table III)

Table IV What respondent/attendant think most crucialreason of death?

What respondent/attendant think about reason of death (Most crucial)?	n(%)
Loss of time at home	52(23.4)
HCW did not attend in time	28(12.6)
Lack of Doctor	28(12.6)
Lack of Nurse	22(9.9)
Lack of Machine (For resp support)2	0(9.0)
Lack of bed in Hospital	18(8.1)
Lack of Oxygen	16(7.2)
Lack of Transport	8(3.6)
Financial constraints	6(2.7)
Others	42(18.9)

According to the respondents' verdict, the most crucial reason for death was the time they lost at home and during transport to the hospital (23.4%). The lack of service provided by doctor, nurse and other health care workers, combined, was accountable for about 35%. Only 7.2% blamed lack of Oxygen (Table IV).

Discussion

This study tried to describe the terminal illnesses of the deceased, treatments they received and possible factors leading to death from the attendants' perspectives. People with COVID-19 had a wide range of symptoms, among which fever was the main one which was about 81.1%, followed by respiratory distress (74.8%) and cough (55.0%) that had also been reported in other studies[31]. With COVID-19, we found people with severe chronic illness had a higher mortality rate or became critically ill. Therefore, it is no wonder that we found diabetes (49.1%) and hypertension (32.4%) to be the statistically significant comorbidities among the patients with COVID-19 cases which is similar to many previous studies.[32]

About 50% of patients were treated by Azithromycin, though routine use of azithromycin is not supported/recommended for the treatment of COVID-19 patients. In COVID-19, the efficacy of antibiotics is proved mostly in secondary bacterial infection and antibiotic is also recommended in severe cases. 47.3% were given injectable antibiotics. Recent data suggest that, administration of anticoagulant (Therapeutic doses of LMWH) is beneficial in moderate to severe COVID-19 cases in the absence of contraindications to prevent coagulopathy and thus to reduce the risk of death.[33] In our study, we found about 38.3% of patients were treated with LMWH.

Oxygen was given to 36% (Prongs) and 33.8% (Mask) patients. For COVID patients, the optimal SpO_2 is targeted to 93% and oxygen is delivered at an escalating dose using different delivery devices depending on the rate of oxygen flow (i.e. Nasal prong, mask, non-rebreathing mask etc.) The HFNC is used only when the above measures fail and we can provide upto 60 l/m oxygen through it. In our study, we found only 10.8% of patients were provided with HFNC. More importantly in about 7% cases patients' attendants blamed unavailability of Oxygen even after reaching hospital as probable cause of death. At the beginning of the epidemic, many of our hospitals were not equipped with enough oxygen supply or delivery system to provide required service to all attending patients. This created the unfortunate scenario of patients being carried from one health care facility to other in search of oxygen and admission in COVID unit.

During pandemic outbreaks people felt comfortable receiving treatment at home rather than suffering or experiencing the uncomfortable environment in hospitals, hence some of them choose to stay at home till the last moment and lost much valuable time at the crucial moments.[34] In this study, about 23.4% of participants reported this. But when a patient's condition suddenly worsened, it was difficult to manage the immediate transfer and admit them to a hospital. Thus, patients who were elderly as well as or had co-morbidity died at home.

According to the respondents of this study, lack of doctors, nurses and health care workers led to the chance of death in about 35% of cases. This study depicts a timeline at the beginning of the epidemic

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when health care systems and institutions were overwhelmed by the number of patients and need for oxygen, health care providers were at a loss regarding proper management of this illness. There was an 'epidemic' of panic among public as well as among health care providers. Moreover, there was a shortage of health care personals as older ones or those with comorbidities were excused from COVID-19 duties.

We think the findings of the study will be helpful for formulating a response plan should there be another epidemic in future.

Limitation

Short time duration of study.

Conclusion

Bangladesh, a middle-income country, was not prepared to combat an epidemic of a novel, infectious and fatal disease initially like many other countries in world. Chaos in management system along with lack of knowledge with resource limitation caused a great deal of suffering in the beginning.

Recommendation

With time, the system developed, virulence of virus changed, recommended and proven treatment plans developed and case fatality is reducing. We have to prepare our setting to combat new infectious diseases.

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Contribution of authors

RAMEU-Conception, acquisition of data, drafting & final approval.

AAS-Acquisition of data, data analysis, drafting & final approval.

MSJ-Acquisition of data, data analysis, drafting & final approval.

EEU-Acquisition of data, data analysis, drafting & final approval.

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CDG-Acquisition of data, data analysis, drafting MARC-Acquisition of data, data analysis, drafting & final approval.

GBM-Acquisition of data, data analysis, drafting Acquisition of data, data analysis, drafting & final approval.

OSP-Acquisition of data, data analysis, drafting Acquisition of data, data analysis, drafting & final approval.

AD-Acquisition of data, data analysis, drafting Acquisition of data, data analysis, drafting & final approval.

SFR-Data analysis, Interpretation of data, drafting & final approval.

MBI-Conception, critical revision & final approval.

MA-Design, critical revision & final approval.

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Disclosure

All the authors declared no conflict of interest.

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