ORIGINAL ARTICLE
COVID VS. NON-COVID AGE-SPECIFIC MORTALITY IN ISLAMABAD: A COMPARATIVE CROSS-SECTIONAL SURVEY

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Background: COVID-19 the ongoing pandemic. Mortality due to other reasons, other than COVID-19 across age groups reduced which was anecdotally reported from Pakistan. This survey was undertaken to assess the number of deaths recorded in Islamabad from 1st March 2019 to 30th May 2019 and from 1st March 2020 to 30th May 2020 and compare the two estimates by age and gender while documenting the cause of deaths. **Methods:** The cross-sectional study was conducted in the Islamabad from 11th to 16th June 2020, comprising of secondary data received on age, gender, cause of death and months of death from the both, large private-public hospitals records and graveyards registers. Data was entered in both SPSS and Microsoft Excel and analysed using SPSS 22. **Results:** The total number of hospitals and graveyards approached in ICT were 14 and 4 respectively. The total number of deaths reported from these during March to June in 2019 and 2020 were 2,389; out of which 1,225 (51.3%) deaths were recorded in 2019 and 1,162 (48.6%) deaths in 2020. In both years, predominant variables with more mortality were both age and gender between 61–70 years of age 511 (21.4%) 1,395 (58.4%) males respectively. **Conclusion:** More deaths were reported in males with old age. Cardio vascular diseases and neurological disorders were the leading causes of mortality. Not much of a larger difference in number of deaths between the both years was seen. Scarcity of data and unavailability of evidence make the anecdotal reports mere just a rumour.
Keywords: COVID-19; Mortality; Hospitals; Graveyards; Islamabad; Pakistan

INTRODUCTION

In December 2019, the coronavirus was seemingly confined to China. But, a few weeks later, the virus, which causes the illness known as Corona virus or COVID-19, became a global pandemic. Experts have professed COVID-19 as highly infectious disease which causes severe respiratory illness. Some of the common clinical symptoms being reported from this virus are severe dyspnoea, cough, fever, myalgia and fatigue. Compared to previous infections such as SARS (severe acute respiratory syndrome) (9.5%), MERS (Middle East respiratory syndrome) (34.4%) and Avian Influenza (H7N9) (39%) the case fatality of corona virus have been reported to be lower.[1]

The virus, which leads to a respiratory illness that can be transmitted from droplets of bodily fluids - such as mucus and saliva, affected nearly all countries across the globe. Due to astound surge of cases of COVID-19, healthcare facilities, especially for elderly and those requiring intensive care have put burden on the health systems of countries globally. Medical scientist public health researchers, officials from the health and governments sector across the world have encouraged citizens to practice physical distancing to lower the transmission from person-to-person, until an effective treatment or vaccine is created while adopt a life style of using proper face mask in routine, while avoiding going out unless for necessary purposes.[2,3]

Globally, countries like New Zealand have had zero new COVID-19 cases, the country started to resume its routine activities by lifting the country wide ban. This became possible after following firm preventive policies, including that of social distancing, enforcing country wised strict lockdown, shutting all public places, businesses and non-essential workplaces.[4] According to the global statistical data compiled by Johns Hopkins University, In June 2020, more than 8.3 million people have been infected, and the global death toll has risen to 0.4 million.[5] Studies from China, Italy and USA have reported few characteristics of patients diagnosed with COVID-19, however there is scarcity in understanding about the factors which associate severity of virus and the hospital admission.[6]

The COVID-19 related deaths across all countries, including Pakistan, is now having its surge of new cases and there has been rise in deaths due to fatal virus. In Pakistan, the first case of COVID-19 was reported on 26th February 2020. As of June 19th, 2020, according to the daily data being updated on COVID-19 Health Advisory Platform by

Ministry of National Health Services Regulations & Coordination, Pakistan surged to 165,062 confirmed cases of COVID-19 while 3,229 deaths have been recorded. The country's capital city Islamabad at the time of writing (19th June 2020), has 9,941 of confirmed cases of COVID-19. Whereas the number of active cases has become 7,076 and deaths recorded due to COVID-19 were 95.[7]

Anecdotally, there have been some reports that mortality due to other reasons (i.e., other than COVID) across age groups has been reduced. The emergency cases been rushed to hospitals also considerably reduce. Though the complete understanding of this phenomenon, if it exists, is not clear.[8]

To help, understand if COVID does have a lowering of deaths reported from other reasons, the Health Services Academy and the Federal Ministry of National Health Services undertook a quick survey in Islamabad Capital Territory (ICT), to ascertain the number of age specific non-COVID deaths recorded last year in 2019 and deaths recorded this year in 2020 when COVID pandemic started peaking. This survey obtained information from hospitals and graveyards (public and private sectors) in ICT as well as causes of death. The overall survey objectives were: (i) to assess number of deaths recorded in Islamabad Capital territory (ICT) from 1st March 2019 to 30th May 2019 and from 1st March 2020 to 30th May 2020 and compare the two estimates, (ii) to document and disaggregate the deaths recoded by age and gender during these two years and compare if any differences between current and last year's number of deaths exist and (iii) to document the cause of deaths in the designated months and years.

MATERIAL AND METHODS

Using a retrospective database of Islamabad Capital Territory (ICT) based public and private hospitals and graveyards, the cross-sectional descriptive study was conducted from 11th to 16th June 2020. After approval from institutional review board of the Health Services Academy, 17 public and private tertiary teaching hospitals while 4 graveyards from urban and rural ICT were approached through convenient sampling. Out of total hospitals approached, 14 hospitals agreed to share their deaths recorded data and 4 graveyards agreed to share their burial recorded data (Table-1). The institutes were approached through official letters, fax, emails and physical visits by the survey team. The heads of institutes, medical directors, chief executive officers and in-charges were approached with requisite letters from the Ministry of National Health Services Regulations & Coordination and the Health Services Academy, Islamabad describing the objectives of the survey.

Hospitals were requested to share electronic data/record or scanned copies of all deaths registered with their age, gender and cause of death for the months of March to May 2019 as well as the same information for the months of March 2020 to May 2020. Out of total, 6 public and 7 private hospitals agreed to share their data/record. Similarly, ICT based main graveyards from both divisions of rural and urban were approached through Metropolitan Corporation Islamabad and Deputy Commissioner Islamabad offices to share their data on total number of burials recorded, ages, gender and cause of death during the designated time frame of this survey. Data was extracted from the death registers of graveyards during the requisite time period.

All deaths and burials recorded during the requisite time period were included in the survey while we excluded the deaths and burials recorded out of requisite time frame for this survey. The team at the Health Services Academy, Islamabad followed up via personal visits to the listed institutes to gather the requisite information. Data extracted from the both public-private hospitals and graveyards was entered manually which was analysed using SPSS version 22 and visualizations were made on Microsoft Excel 16. Descriptive statistics were explored with respect to key demographic variables including age, sex and cause of death over time. The trends captured to see the overall proportion of deaths and deaths attributed to COVID-19 and non-COVID-19 during the required time period.

RESULTS

The study was conducted with objective of assessing the mortality rate recorded in Islamabad for three months (March, April and May-2019) as non-COVID period and (March, April and May-2020) as COVID period. The mortality data was collected from two main sources, i) hospitals and ii) graveyards. Total sample size of the survey was 2,388, out of which 1,225 (51.3%) deaths were recorded in 2019 with 95% confidence interval (0.49 lower and 0.53 upper limit) following with 1,162 (48.6%) deaths in 2020 with (0.47 lower and 0.51 upper limit).

Out of the total data collected, 1,369 (57.3%) of the sample was taken from - public and private- hospitals, whereas 1,020 (42.7%) deaths were recorded from graveyards record. Out of hospital data 653 deaths reported in 2019 during the three months, i.e., March, April and May, following with 716 deaths reported in 2020 of same three months, whereas from the graveyards 573 burials were recorded in 2019 and 447 in 2020. There was one missing value of death which was reported in the month of March, April and May. The graveyards data indicated that, location of death of 1,481 (62%) persons was unknown, 571 (23.9%) persons died in hospitals, 328 (13.7%) at home and buried in ICT graveyards. Month wise data showed that the deaths reported in hospitals was greater than burials reported from the graveyards, 253 deaths in May 2020 being the highest overall in hospitals. (Figure-1)

According to the available data, 1,395 (58.4%) males (0.56 lower and 0.60 upper limit) deaths were reported which was greater than females 993 (41.6%) with (0.40 lower and 0.44 upper limit at 95% CI). Out of total 2,388 deaths, 61–70 age group reported the highest number of deaths 511 (21.4%) in two years whereas 0–10 age group with lowest death rate 46 (1.9%). Comparing year wise deaths, 61–70 age group had highest number of deaths 235 (46%) in three months of 2019 and 275 (54%) death in 2020. (Figure-2) Cause of death of more than half of the sample 1,277 (53.8%) was unknown. The main cause of death reported in 2019 and 2020 was CVS, i.e., 424 (17.75%) followed by, stroke with 163 (6.8%), COVID-19 with 80 (3.4 %) in years 2020. (Table-2).

Highest number of cause of deaths reported was CVS 424 (17.8%) (137) due to CVS, followed by neurological cause 163 (6.8%), cancer 132 (5.5%) and COVID-19 in year 2020, 80 (3.4%).
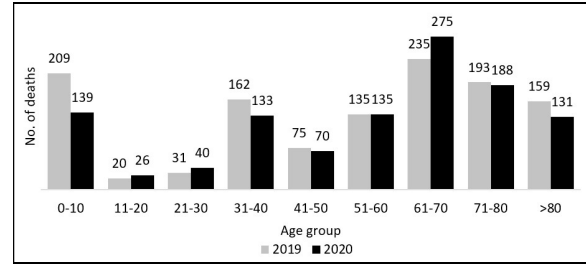

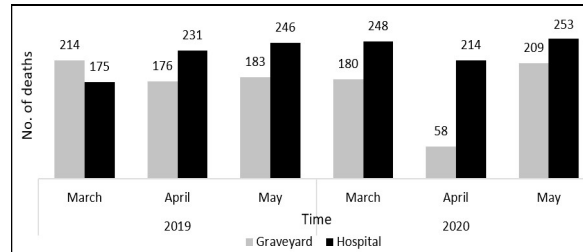**Figure 2: Number of deaths over time by age distribution in Islamabad.**

Figure-1: Number of deaths over time and by source

Table-1: List of data collection sources (Hospitals and graveyards of Islamabad)

S#	Public Hospitals
1	Pakistan Institute of Medical Sciences
2	National Institute of Rehabilitation Medicine
3	Federal Government Services Hospital (Poly Clinic)
4	Federal General Hospital
5	Capital Development Authority Hospital
6	MCH center - Aabpara
	Private Hospitals
7	Shifa International Hospital
8	Kalsoom International Hospital
9	Ali Medical Centre
10	Maroof International Hospital
11	Al Nafees Medical College & Hospital
12	HBS General Hospital, Alipur
13	Islamabad Medical and Dental College (IMDC)
14	Rawal General & Dental Hospital
	Graveyards
1	H-8
2	H-11
3	Bhara Kahu
4	Humak Town

Table 2: Cause of death by gender disaggregation (hospital and graveyard): 2019-2020

	Male	Female	Total: n (%)	95% Confidence Interval
CVS (Cardiac Arrest)	270	154	424 (17.8)	(0.16–0.19)
Stroke	101	62	163 (6.8)	(0.06–0.08)
Pulmonary disease	25	31	56 (2.3)	(0.02–0.03)
Respiratory infection	51	30	81 (3.4)	(0.03–0.04)
Chronic liver disease	23	15	38 (1.6)	(0.01–0.02)
Tuberculosis	2	4	6 (0.3)	(0.00–0.00)
Diarrheal disease	2	3	5 (0.2)	(0.00–0.00)
RTAs/Injuries	5	3	8 (0.3)	(0.00–0.01)
Cancer	68	64	132 (5.5)	(0.05–0.06)
COVID19	45	35	80 (3.4)	(0.03–0.04)
Renal failure	20	14	34 (1.4)	(0.03–0.04)
Other	47	38	85 (3.6)	(0.01–0.01)
Don't know	736	540	1276 (53.4)	(0.51–0.55)
Total	1395	993	2388	

DISCUSSION

The study aim was to assess a mortality perspective on COVID-19 recorded in Islamabad from 1st March to 30th May 2019 and from 1st March to 30th May 2020 and to compare the two estimates in the disaggregates of the age, gender and causes of the deaths in the designated months and years. Numbers of the COVID 19 death seem small when expressed in per capita terms in a populous country like Pakistan. The direct deaths from COVID-19 in the study sample were may be only 3.4% percent in the months of March, April and May 2020 then the non-COVID causes of the death 93.1% in the Islamabad city.

This study presented that there was a male predominance in terms of the number of deaths in the all the cases of the COVID 19. Li LQ, Huang T, Wang YQ, *et al* also noticed the similar findings in their study in China that there was a male predominance in case of the death over the female gender.[9,12,13,17,18]

Strong dependency is seen in the death related to the COVID 19 and gender and age, the study reflected that there was highest mortality seen in the age group of 61–70 age in the two comparative years. Wang D, Yin Y, Hu C, Liu X, Zhang X, Zhou S et al in their study found the similar findings that the median age affected with COVID 19 was over 51 years (IQR, 36–65; range, 19–92 years.[10,12,17]

As Center for Disease Control and Prevention (CDC) reported that among adults, the risk for severe illness from COVID-19 increases with age, with older adults at highest risk. Severe illness means that the person with COVID-19 may require hospitalization, intensive care, or a ventilator to help them breathe, or they may even die. There are also other factors that can increase your risk for severe illness, such as having under lying medical conditions. Data from CDC shows that in general, risk of getting severely ill from COVID-19 increases with age. In fact, 8 out of 10 COVID-19-related deaths reported in the United States have been among adults aged 65 years and older.[22]

The study showed that the cause of death for more than half of the cases was (53.8%) unknown because they were brought dead in the hospital or the graveyards, although the main causes of the diagnosed death in the hospitals were from the cardiovascular disease, i.e., 17.7%, stroke 6.8% (163) and other reasons with 3.2%. Deaths due to COVID-19 is reported 3.4 % out of all hospital diagnosed death after the Polymerase Chain Reaction (PCR) test is done. The reason for the small number of the diagnosed deaths in the year 2020 between months of the March till May was the smaller number of COVID-19 diagnosing test availability in the beginning of the outbreak in the Pakistan, and the ones who were diagnosed and tested positive were then included in the COVID-19 death bracket. There are possibilities that patients coming with strokes and the cardiovascular disease may have COVID-19 infection. Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H *et al* found in their study that reported, patients with a history of cerebrovascular disease are at increased risk of becoming critically ill or dying if they have SARS-CoV-2 infection.[11–13,18,20]

To make this a fair comparison, note that seasonal flu or pneumonia mostly occurs over a few months, usually in late fall or early winter. So, the time periods are roughly comparable, with most of the COVID-19-related deaths occurring since late March. However, COVID-19 does not appear to be seasonal, and fatalities are a lagging measure because the time from infection to death is weeks if not months in duration, so will multiplies greater by the end of the year.[15]

Today, COVID-19 ranks as the sixth leading cause of death in the United States, following heart disease, cancer, accidents, lower chronic respiratory diseases and stroke.[7] According to the Islamabad Capital Territory (ICT) data COVID-19 is the fifth leading cause of death in ICT while the heart disease is the leading cause, with over 216,926 people dying each year. Of course, it is important to note that the COVID-19 deaths have occurred in about the past four months while the number of non-COVID-19 deaths is for a year, so it requires time to understand the complete dynamics and estimates of the COVID 19 related deaths.

Data quality—accuracy, completeness, consistence, timeliness, and validity—is likely the main culprit because the true death toll is not reflected in the statistics. Where testing has been limited or untimely, data quality will suffer—as the experience in high-income countries has demonstrated.[8] Comparisons like these can help us understand the dimensions of the crisis better by referring to typical mortality patterns and common causes of death. Deviations from these patterns indicate pressure points, most notably on health systems.[16]

CONCLUSION

This survey has shown not much of a larger difference in number of mortalities between both the years (2019 & 2020) from Islamabad Capital Territory. More deaths were reported in males with old age. Cardio vascular diseases and neurological disorders were the leading causes of mortality. As per the reports spread anecdotally that deaths due to COVID-19 were being under reported and deaths due to other causes increased, this survey concludes that the such circulating reports did not have prevailing evidence and were just a mere rumour.

AUTHORS' CONTRIBUTION

FA: Drew up the first draft of manuscript, contributed in designing data collection form, conducted literature search and coordinated entire process of study. UA: Helped organize information for the first draft and revised the draft manuscript. HMFA: Provided interpretation of results. MU: Contributed in data management and data analysis. NG: Collected data. ZZ: Provided inputs and comments. SS: Designed the study, provided oversight to the quality of data collection, and conduct of the study and mentored the manuscript. AH: Provided concept &

study design and conduct of the study & mentored the manuscript.

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