Original Article

Comorbidity of COVID-19 related Fatalities in Tertiary Care Hospitals of Rawalpindi, Pakistan

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Abstract

Objectives: To assess the COVID-19 associated fatalities with respect to demographics, comorbidity, critical illness, and length of hospital stay in tertiary care hospitals.

Subjects & Methods: A retrospective hospital data-based research was done among 216 COVID-19 associated mortalities registered in 4 tertiary care hospitals Holy Family Hospital (HFH), Benazir Bhutto Hospital (BBH), District Head Quarters Hospital (DHQ) and Rawalpindi Institute of Urology & Transplantation (RIU & T) affiliated with Rawalpindi Medical University from 29th March-15th June 2020. The data was gathered by consecutive sampling pertinent to demographics, hospital stay, comorbidity, critical illness, and ventilator or oxygen support. The length of hospital stay among fatalities with and without comorbidity was compared by an independent sample z-test. Data were analyzed by using SPSS version 25.0.

Results: Of the total 216 COVID-19 related mortalities, 150(69.4%) were males and 66(30.6%) were females. The mean age of fatalities was 55.66 ± 13.97 years. About 76.7% of dying males were 41-70 years old while 56.1% of females dying of COVID-19 were 41-60 years old. Most (60.8%) of study subjects had hypertension followed by diabetes (53.8%), Ischemic Heart Disease (17.5%), and respiratory disorders (12.3%). About 75% of the critically ill patients needed a ventilator for respiratory support. Length of hospital stay was determined to have a statistically insignificant association ($P > 0.10$) with the presence or absence of comorbidity among COVID-19 patients. Critical illness had a highly significant association ($P < 0.000$) with ventilator support among COVID-19 related mortalities.

Conclusion: People 41-70 years should preferably adopt stringent precautions for protection against COVID-19. Comorbid states chiefly hypertension, diabetes, cardiac and respiratory diseases need special consideration amid COVID-19 pandemic to abstain from adverse health outcomes.

Keywords: COVID-19, tertiary care hospitals, ventilator, diabetes, hypertension, comorbidity, Ischemic Heart Disease.

Introduction

The world is confronted with new challenges owing to the rapid person to person transmission of coronavirus infection.[1] Due to the novelty of coronavirus, very little authentic information is known to the public pertinent to its transmission, prevention, and treatment, thus attributing to escalating mortalities across the world.[2] Uncontrolled spread of COVID-19 across the borders[3] and its unclear coverage are major contributors to grave health outcomes and poor socio-economic effects.[4] World Health Organization declared COVID-19 as pandemic on 11th March 2020 due to its gigantic spread[5] that has encompassed about 213 countries across the globe with approximately 8,406,195 confirmed cases and 451,387 mortalities till 19th June 2020.[6] The first COVID-19 case was reported in Karachi on 26th March 2020.[7] Around 160,000 confirmed COVID-19 cases have emerged in Pakistan till Mid-June 2020 with peak figure (55,878 cases) reported in Punjab province illustrating approximately 3093 deaths.[8]

COVID-19 cases present with mild to severe clinical manifestations.[9] Therefore patient management is also quite diverse ranging from ward-based care to oxygen provision in high dependency unit and even reliance on ventilators in case of severe respiratory distress.[10] Attributes of coronavirus infected patients like age and comorbidity are determined to have some influence on the seriousness of disease and duration of hospital stay.[11,12] According to the World Health Organization, about 80% of COVID-19 cases are likely to have a mild illness, 14% of patients are presenting with severe symptoms while 6% are categorized as critically ill. Keeping in view the wide spectrum of clinical manifestations among COVID-19 cases, vigorous risk assessment among people is of paramount significance for prompt clinical management.[13] Apart from the spectrum of this illness, the inability to test the whole population estimated the actual number of COVID-19 cases impossible. The deaths are also underrated due to the non-hospitalization of the patients or hiding of disease.[14]

The present study is primarily carried out to verify the key characteristics of COVID-19 related fatalities among the Pakistani population. The data of COVID-19 mortalities was therefore scrutinized from all 4 tertiary care hospitals affiliated with Rawalpindi Medical University. This research would prove very significant in planning the level of healthcare provision to COVID-19 patients in accordance with their demographics and comorbid states.

Materials and Methods

A retrospective hospital data-based study was conducted among 216 fatalities reported in four tertiary care hospitals namely Holy Family Hospital (HFH), Benazir Bhutto Hospital (BBH), District Head Quarters Hospital (DHQ) and Rawalpindi Institute of Urology & Transplantation (RIU & T) affiliated with Rawalpindi Medical University Rawalpindi. The data was collected by consecutive sampling pertinent to date of admission and expiry, demographics, length of hospital stay, comorbidity and ventilator or oxygen support among COVID-19 associated fatalities. Data was entered and analyzed using SPSS version 25.0.

STATISTICAL ANALYSIS

Frequency and percentage were calculated for gender. Mean ± Standard Deviation was computed for continuous variables like age and length of hospital stay. The mean duration of hospital stay among fatalities with and without comorbidity was evaluated by an Independent sample z-test. Association of critical illness with the need for ventilators among COVID-19 fatalities was determined by Fisher's Exact test. P-value ≤ 0.05 was taken as significant.

Results

Of the total 216 COVID-19 related mortalities reported in the four tertiary care hospitals affiliated with Rawalpindi Medical University, 150(69.4%) were males and 66(30.6%) were females. The trend pertinent to COVID-19 related mortality is depicted below in Figure 1.

Table 1:

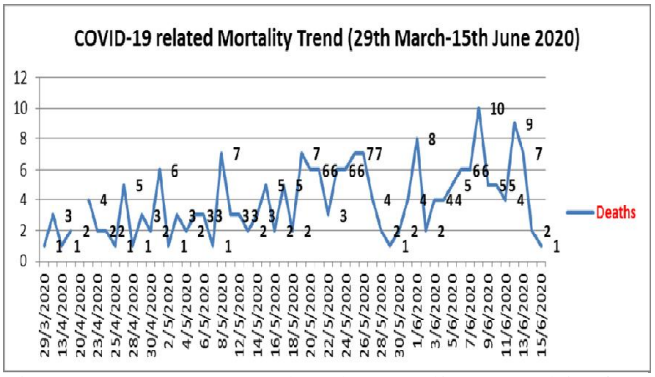

Figure 1: COVID-19 related Mortality Trend in four tertiary care hospitals of RMU

The mean age of dead patients was reported to be 55.66 ± 13.97 years. The gender-based distribution of these deaths from each hospital is reflected below in Figure 2.

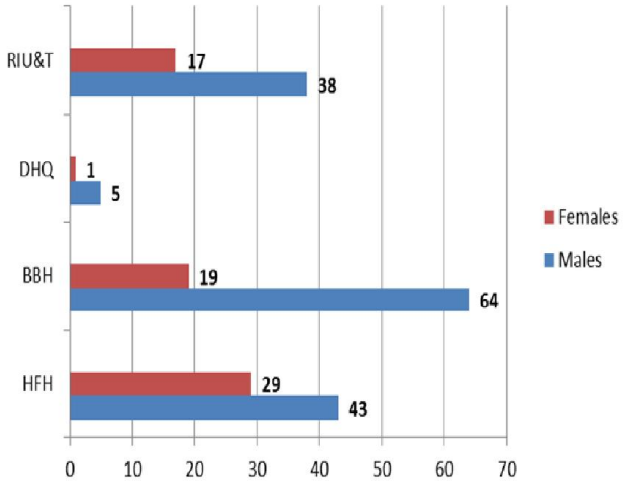

Figure 2: Gender-based distribution of fatalities from tertiary care hospitals of RMU

Table 1: Age-based distribution of COVID-19 related mortality in both genders

Age groups	*Males*	*Females*	*Total*
1-10 years	0	01	01
11-20 years	02	01	03
21-30 years	03	07	10
31-40 years	10	05	15
41-50 years	30	19	49
51-60 years	39	18	57
61-70 years	46	12	58
71-80 years	15	03	18
81-90 years	05	0	05
Total	**150**	**66**	**216**

The proportion of COVID-19 related mortality was also greater among males as illustrated in Figure 3.

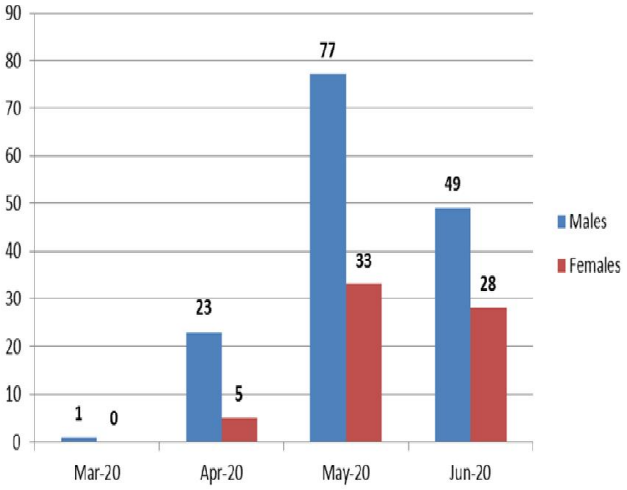

Figure 3: Gender-based COVID-19 related Mortalities from March -June 2020

Of the total 216 fatalities enrolled in our research, 171 (79.2%) were determined to have comorbidity with hypertension representing the highest frequency that is 104(60.8%), followed by diabetes 92(53.8%), Ischemic Heart Disease 30(17.5%), Respiratory Disorders 21(12.3%), Chronic Liver Diseases 16(9.3%) and Chronic Kidney Disease 12(7%). Also, 8(4.7%) were smokers, 5(2.9%) had a psychiatric illness and 4(2.3%) were obese. Comorbidity among study subjects is categorized as shown below in Figure 4.

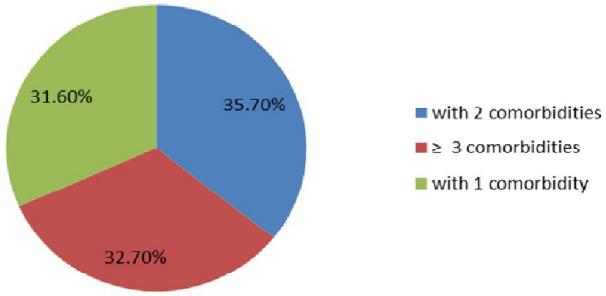

Figure 4: Grouping of co-morbidities among COVID-19 related fatalities in tertiary care hospitals of RMU (n = 171)

The mean duration of hospital stay among our study participants was determined to be 6.54 ± 6.04 days. Statistical difference in length of hospital stay among COVID-19 fatalities with and without comorbidity is shown below in Table 2.

Table 2: Statistical difference in mean length of hospital stay among COVID-19 related Mortalities (n = 216)

Mean length of hospital stay		*P-value*
Mortalities with comorbidity (n = 45)	**Mortalities without any comorbidty (n = 171)**	
8.13 ± 7.5 days	6.25 ± 7.1	> 0.10

About 131 (75%) out of 175 critically ill study subjects had comorbidity. Of the total 175 critically ill fatalities, 101 were put on ventilators. The critical illness seemed to have a highly significant association (P < 0.000) with ventilator support among COVID-19 related mortalities.

Discussion

COVId-19 is established to be a disease with varied symptoms ranging from mild illness to severe condition. Early identification of this problem, therefore, is of paramount significance for prompt management and prevention of grave consequences.[15] Out of a total of 216 COVID-19 associated deaths reported in our tertiary care public sector hospitals, the majority (69.4%) were males. Similarly, the highest proportion of COVID-19 related fatalities in China was comprised of their male populates (70.3%).[16] The high propensity of coronavirus infection among males is an aspect that is under research to determine the logic behind it. The mean age of COVID-19 related mortalities in our research is 55.66 ± 13.97 years. A higher proportion of males and females in our study were 41-70 years and 41-60 years old respectively. In comparison with COVID-19 associated deaths in Italy, the mean age was determined to be 79.5 ± 8.1 years. Similarly, the highest percentage (30.5%) of COVID-19 deaths was reported among Chinese[17] and Korean populates 70-79 years age group.[18] Although middle-aged people in Pakistan are also found to be suffering from COVID-19 more or less old age people from any race or population might be at higher risk of dying from coronavirus infection. The underlying factor might be poor immunity among senior citizens of a nation. Therefore precautionary measures should be religiously adopted by elders to avoid grave health consequences.

Of the total 216 study subjects, the majority (60.8%) of COVID-19 related mortalities in our study had hypertension, followed by diabetes (53.8%), Ischemic Heart Disease (17.5%), and respiratory disorders (12.3%). Also, 4.7% were smokers and 2.3% were obese. On the other hand, research among 355 Italians who died of COVID-19 revealed that their highest proportion (35.5%) had diabetes followed by Ischemic Heart Disease (30%), atrial fibrillation (24.5%) and active cancer (20.3).[17] About 20.8% of our study subjects dying from COVID-19 and 0.8% from Italy[17] did not have any comorbidity. On analysis of COVID-19 related fatalities of America, it became evident that the majority of them had hypertension (56.6%) followed by obesity (41.7%) and diabetes (33.8%).[15] This diversity in the pattern of comorbidity among various nations might be due to differences in their geographic regions or culture that entails qualitative research to explore the root cause of this variance. Reviewing the medical record of these patients perhaps can also help scrutinize the reason for this dissimilarity.

The mean length of hospital stay among COVID-19 related fatalities was reported to be 6.54 ± 6.04 days. Similarly, the duration of hospital stay among Chinese COVID-19 patients admitted in the Intensive care unit is computed to be 5-13 days. However, those who died had shorter hospital stays than those who survived[19]. Most of the males dying of COVID-19 in our research were 41-70 years old while the majority of females were 41-60 years old. On the other hand, mostly aged people among Chinese populates suffering from COVID-19 succumbed to death.[20] In contrast to Chinese research, middle-aged people affected by COVID-19 in Pakistan were also determined to have poor health outcomes. This age difference calls for further research to scrutinize the rationale.

About 175 (75%) of the study subjects out of a total of 216 in the current research were critically ill and approximately 101 of these were on ventilators for survival. All those puts on ventilators had one or more comorbid states. However, 30 study subjects in our research despite having comorbidity did not need a ventilator and just received oxygen supply. Likewise, critically ill COVID-19 cases of the United States had a 30.9% death rate. About 35.7% of the critically ill needed ventilators and higher mortality seemed to be primarily associated with diabetes (46.8%), followed by cardiac problems (42%) and chronic renal disorder (38.7%)[21]. The dependency of COVID-19 cases on respiratory support might be attributed to their comorbidity. However, this facet should be rigorously studied to get out the truth.

Conclusion

Elders with comorbidity are more prone to coronavirus infection. More researches among different nations would be supportive to pinpoint the association of comorbidity with COVID-19 related fatalities.

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