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EVALUATE THE FEATURES OF OHCA PATIENTS LIVING IN PAKISTAN BOTH BEFORE AND AFTER THE COVID-19 EPIDEMIC IN ORDER TO DETERMINE THEIR OUTCOMES

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Abstract:

Aim: *Bystander cardiopulmonary resuscitation (CPR) combined with public-access defibrillation has been shown to enhance overall survival for out-of-hospital cardiac arrest. This is one of top reasons of mortality across the globe. The COVID-19 global epidemic has modeled numerous problems for emergency medical services, along with reference of compression-only resuscitation also guidelines for comprehensive protective equipment. These suggestions and advice have created shortcomings and protracted fast response. On the other hand, the risk variables that determine the results of OHCA while the pandemic is ongoing are not well established. The main aim of our research remained to explore medical features in addition results of OHCA individuals in Pakistan both before and after the COVID-19 epidemic.*

Methods: *The electronic medical records and paper records kept by EMS were utilized to compile the data for this single-center, retrospective observational analysis. The number of emergency hospital returns based on varying qualities in Pakistan institute of Medical Sciences (PIMS), Islamabad Hospitalized patients during and prior to the COVID-19 pandemic in Pakistan were collected. Patients with OHCA who went to the emergency department at PIMS, Islamabad before the COVID-19 pandemic (April 2019 to March 2020) were identified.*

Results: *Here were a total of 145 patients who participated in this study (80 males, or 58.2% of the total; mean [SD] age, 64.7 years); 64 among those individuals contributed in our current research during the COVID-19 era, and 75 among those individuals contributed in our current research before COVID-19 period. Bystander witnessing and method of chest compression was always the two general baseline features that were found to be substantially different between the two groups (p-values of less than 0.002 and less than 0.002, accordingly). During the COVID-19 era, the ED ROSC was substantially lower than it had been before the COVID-19 period (25.68 percent vs 45.04 percent; adjusted odds ratio of 0.22; p-value less than 0.002) Survival to admission remained suggestively inferior throughout COVID-19 phase compared to the previous time period (26.01 percent vs 41.78 percent, accustomed odds ratio of 0.27, p-value of 0.006). On the other hand, there was no important statistically substantial difference in the 28-day survival rates (4.5% throughout COVID-19 era also 11.54% earlier COVID-19 period).*

Conclusion: *Patients who had cardiac arrest outside of a hospital in Pakistan had a much lower chance of surviving long enough to be admitted during the COVID-19 epidemic that occurred there. In addition, the two groups' witness reactions and methods of cardiopulmonary resuscitation couldn't have been more different from one another.*

Keywords: *Bystander cardiopulmonary resuscitation, OHCA, Covid-19 pandemic, EMS.*

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INTRODUCTION:

Since the 1970s, an out-of-hospital cardiac arrest has consistently been among the most common reasons for death around the globe. Numerous research has shown the impacts of prehospital factors on OHCA results such as existence to release and one-year survival rate; these impacts include bystander CPR, observed arrest, and the use of an Artificial External Defibrillator [1]. Nonetheless, there have certain challenges associated with conducting chest densities prior to the first encounter with medical personnel [2]. A lack of awareness of the fundamentals of life support is one of the contributing reasons that lead to the low percentage of bystander CPR [3]. Very high degree of anxiety during event is another obstacle, as is the dread of contracting an infectious illness, anxieties about mouth-to-mouth breathing, and similar concerns [4-11]. The benefits, which examined the features of OHCA across the nations of Asia, the percentage of mortality to discharged ranged anywhere from 0.6% to 9.6%, and the probability of survival with excellent neurological function went anywhere from 2.7% to 4% [12]. This is probably due to inefficient or deferred cardiopulmonary resuscitation from bystander witness statements or prehospital medical teams since rate of effective ROSC declines through 8%–11% for every minute that is waited [13]. Those certain results remain noticeably low in contrast to the outcomes documented in research in Asian countries and UK. Consequently, the effectiveness of cardiopulmonary resuscitation (CPR) by emergency medical services is regarded as an important element in ensuring superior practices in the shortest response time [14]. This is because CPR has been shown to reduce the likelihood of patients dying and improve their chances of having favorable neurological outcomes. According to the findings of the research, the presence of emergency medical services before 5 minutes results in a 28.3% higher chance of survival. The recent epidemic of COVID-19 has presented difficulties for emergency medical services, particularly in the management of time-dependent response situations like OHCA [15]. Because of these obstacles, prehospital ROSC and OHCA patients' overall survival to admissions has been negatively impacted. The most recent set of OHCA suggestions from the American Heart Association suggests compression-only resuscitation and public-access defibrillation, that medical practitioners must wear personal protective clothing for aerosol-generating processes throughout resuscitation, and that medical professionals must recognize defibrillation before wearing aerosol-generating protective clothing in circumstances in which the provider examines that the advantages may outpace the danger. Several nations' management systems were modified after they embraced the recommendations [16]. As a consequence of this, the pandemic period was linked in many investigations to reduced rates of surviving hospital admission. In addition, current lessons have exposed an increasing tendency in the adult OHCA rate in Lahore, which is projected to increase from 27.5 in 2020 to 29.7 in 2021 for every 101,500 people. The number of cases reported each week per million people in Italy rose from 16.44 to 27.65 over this time period. A prehospital care system has been in operation in Pakistan for more than twenty years [17-19]. The approach used by the service is based on a paradigm that is an amalgamation of Anglo-American and Franco-German emergency medical systems [20]. Throughout COVID-19 pandemic, Pakistan was hit with a huge number of infectious cases, which required a significant amount of hospital and prehospital resources. Additionally, an elevated fatality rate was reported. As a response to the pandemic, health care services in Thailand modified important aspects of their standards in accordance with the suggestions of international organizations [21]. Researchers expected that survival rate would drop since of numerous protocol adjustments that might postpone operations; nonetheless, there is very little information available concerning OHCA, which is one of the primary causes of prehospital death, particularly during the epidemic [22]. As a result, the purpose of our current research remained to evaluate the qualities of OHCA sick people as well as their results in terms of return of spontaneous circulation at emergency room, survivorship to admission, and 28-day survival as well as good cerebral performance categorization; Category 1–2 before and after the COVID-19 pandemic in Pakistan [23-25].

METHODOLOGY:

Researchers conducted a single-center, observational prospective study at Pakistan institute of Medical Sciences (PIMS), Islamabad, which is a tertiary medical hospital in Islamabad that pays specialists in numerous medical occupations also makes use of modern equipment to treat difficult problems. The data for our research came from electronic medical records also paper records kept by the emergency medical services. For purpose of research, information was analyzed from all OHCA individuals who went to the emergency department of Pakistan institute of Medical Sciences (PIMS) between April 2019 and May 2020, which was before the COVID-19 period, and between May 2019 and May 2020, which was within COVID-19 phase. Altogether ED visits also individuals' data.

The emergency medical services in Isamabad are provided by hospital-based ambulances that report to independent national dispatching centers. The dispatch centers take calls from all across areas also send ambulances to different population groups at their locations based on calls they get. There are around 505,000 people living in the region surrounding Pakistan institute of Medical Sciences (PIMS), Islamabad, also one university hospital serves as the hub for processing altogether details from central dispatch. Afterward then, three university hospitals, private hospitals, also advanced ambulances provided through the local volunteer in region remain called upon in rotation, according to the availability of resources and the frequency with which the university hospital treats patients. The head of the team that operates the ambulances at the university is a physician who is currently doing emergency medicine residency, while the leaders of the other ambulances are all either nurses or paramedics. Individuals are taken to the emergency room of each hospital depending on their home registration, individual interests, or the region in which the hospital is responsible for providing care. However, in certain circumstances, individuals and their families have the opportunity to waive their rights to receive medical treatment and choose to be treated at a hospital of their choosing. Emergency medical services are funded by the government, but patients are responsible for paying their own bills when they travel directly to a private hospital.

The International Classification of Diseases, 10th Revision was used to identify the OHCA instances; records classified as having "cardiac arrest" or marked as having "death before arrival" have been analyzed for inclusion and exclusion criteria. Those OHCA participants who were at least 19 years old and were taken to the emergency department at Sir Ganga Ram Hospital received considered for inclusion in the research. Individuals might have arrived at the hospital by any means. EMS-preserved doctors whom CPR was launched for the short period of time but translated to Do Not Resuscitate have been excluded, were even clients who had the legal do-not-resuscitate order. The exclusion criteria have been traumatic out-of-hospital cardiac arrest, an indication of irreparable death (such as rigor mortis or relying on lividity), an indication of irrevocable death, and scientific proof of irreparable death.

Researchers accumulated hospital information such as age, gender, chronic conditions, location of cardiac arrest, mode of transportation, EMS responsiveness, whether or not the tournament was seen by a bystander, whether or not bystander CPR was attempted, initial rhythm, the cause of cardiac arrest, and resuscitative involvement. The most important result was just a continuous return of spontaneous circulation (ROSC) in ED. In addition, as result variables, survival to treatment, 28-day survival, and 28-day good cerebral functioning subcategory ratings have been gathered and computed.

The determination of the appropriate size of the sample has been based on the results of the ED ROSC, which was 8.9% in during COVID-19 era and 29.3% even before COVID-19 period. With the use of the formula, researchers have been able to calculate the likelihood of type I error (= 0.06) and type II error (= 0.21), and the allocating ratio (N2/N1) came out to be 2.1. The needed overall sample size was 116 individuals, with 57 individuals coming from the COVID-19 era and 57 patients coming from the fiscal quarter (which occurred before the COVID-19 period).

All of the patient features and important variables were subjected to statistical analysis. Data on ongoing information remained tested using an independent t-test or a Mann–Whitney U test, also results remain displayed as means for variables that remain uniformly disseminated or medians for non-parametric tests. The results of the chi-square test or Fisher's exact test, whichever remained more applicable, were utilized to compute the categorical data, and the results are reported as percentages. A multivariate logistic regression assessment for binary outcomes was used to evaluate the findings of the ED ROSC, existence to admission, 28-day survival, also 28-day CPC score analyses. In furthermore, robust variance estimating was carried out using modified linear regression, which included a log link and Random variable. This was done in order to examine danger differential. Researchers looked through the available research to identify the factors that were responsible for the results.

RESULTS:

From May 2019 until April 2020, electronic medical records of 293 OHCA service users were utilized in this research. Of those 293 patients, 152 were removed from the research due to factors such as traumatic OHCA, irrevocable demise, conversion to Do Not Resuscitate, do-not-resuscitate sequence, or incomplete information. The research was carried out at an emergency department. The remainder of 138 patients who were evaluated satisfied all of the requirements for participation; 62 were assigned to COVID-19 phase unit, in addition 78 received assigned to the COVID-19 period group. Table 1 is a

comprehensive presentation of the sample characteristics. The average individual has been 65.97 years old, and young participants made up 57.08% of the total. Individuals who were treated during COVID-19 era had substantially less bystanders observed lower than those who were treated before the COVID-18 period (82.68 percent vs 100 percent, accordingly; p 0.002 for each comparison). In addition, the usage of mechanical chest compression seemed substantially higher during COVID-19 time in comparison to the time preceding the COVID-19 period (94.34 percent vs. 58.87 percent, p 0.002) There weren't statistically notable differences among two sets in rapports of comorbidities, the etiology of cardiac arrest, the location of the incidence of OHCA, bystander-CPR, EMS turnaround time, or the amount of those who established a beginning shockable rhythm, defibrillation, or endotracheal intubation.

Table 2 outlines univariable also multivariable breakdown variables of outcome, ED ROSC, both beforehand and after COVID-19 phase. These variables may be found in the table. Supplements 1, 2, and 3 provide the univariable and multivariable analytic components of various prognostic factors both during and before the COVID-19 period. The goodness-of-fit test was performed using the Hosmer–Lemme show and the multivariable logistic model for ED ROSC had a number of subgroups equal to 10 and a P-value of 0.86. The main and secondary results taken together are compiled and shown in Table 2. There must have been 53 total ED ROSC incidents, from which 17 occurred during the COVID-19 period and 38 were before the COVID-19 timeframe (25.68% vs. 47.45%, to between, crude odd ratio (OR) 0.46 [96% confidence interval (CI) 0.23– 0.89], p = 0.03, adjusted OR 0.22 [96% confidence interval (CI) 0.09–0.54], p 0.002; there were 53 total ED ROSC cases; of which 17 were in For prognostic factors, there had been variations in survival to admission that were statistically meaningful between COVID-19 period and before COVID-19 timeframe (26.01% vs. 41.78%, crude OR 0.47 [96% confidence interval (CI) 0.24–2.03], p = 0.07], and modified OR 0.27 [96% confidence interval (CI) 0.11–0.68], p = 0.006]. Nevertheless, the 28-day survival rate was 4.34% throughout COVID-19 timeframe and 11.54% beforehand COVID-19 phase, crude OR 0.27 [96% questionnaire. the questionnaire (CI) 0.07–2.46], p = 0.14), modified OR 0.16 [96% CI 0.03–2.29], p = 0.09), The overall couple of excellent CPC results was too tiny, crude OR 0.32 [96% CI 0.04–3.81], p = 0.28), adapted.

Table 1:

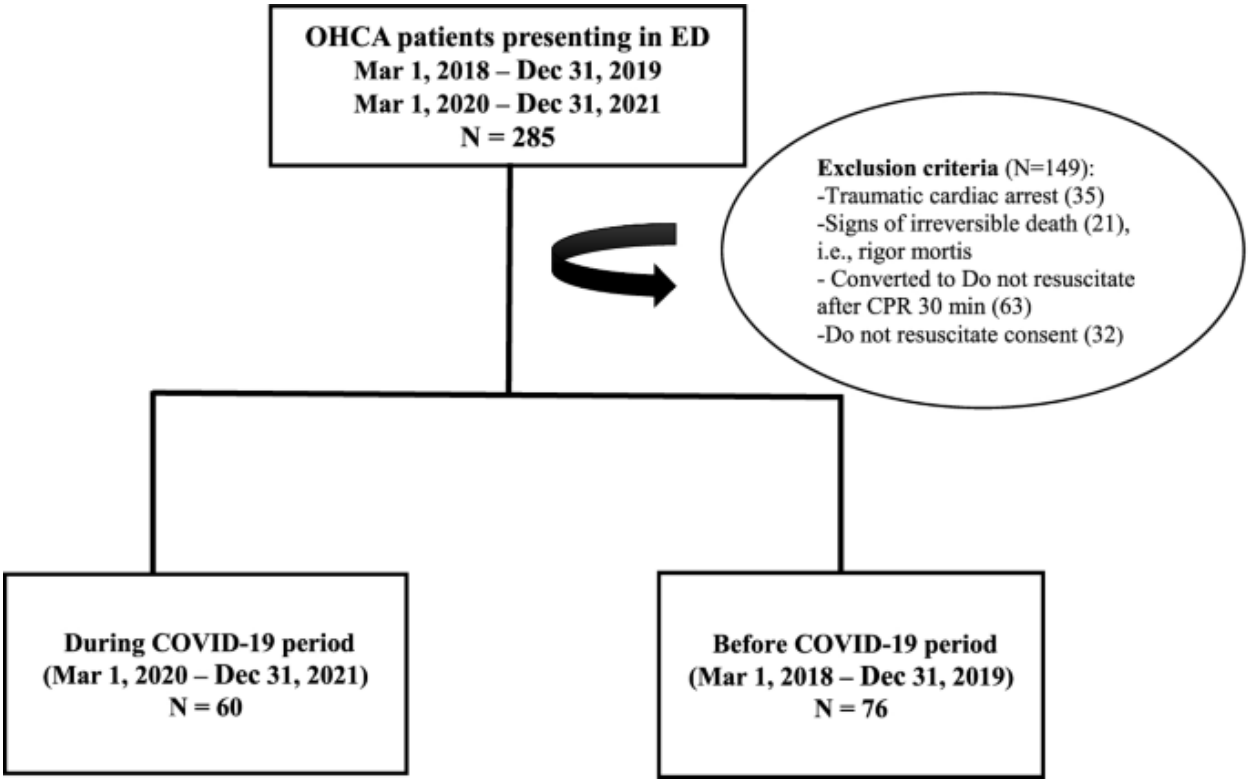
Features	During COVID-19 period (N = 37)	Before COVID-19 period (N = 38)	All (N = 66)	p-value
Male sex, N (%)	24 (72.73)	23 (69.70)	47 (71.21)	2.01
Age, years (mean ± SD)	61.21 ± 19.32	65.24 ± 19.45	63.23 ± 19.34	0.41
Hypertension	14 (42.42)	17 (51.52)	31 (46.97)	0.63
Comorbidity status, N (%)	16 (48.48)	22 (66.67)	38 (57.58)	0.24
Dyslipidemia	7 (21.21)	10 (30.30)	17 (25.76)	0.56
Diabetes mellitus	9 (27.27)	8 (24.24)	17 (25.76)	2.01
Ischemic heart disease	7 (17.17)	3 (9.09)	10 (15.15)	2.001
Chronic kidney disease	6 (16.16)	4 (12.12)	7 (10.61)	2.01
Asthma/COPD	0(0)	3 (9.09)	3 (4.55)	0.25
Cerebrovascular disease	3 (9.09)	4 (12.12)	7 (10.61)	2.001
Public location, N (%)	12 (36.36)	9 (27.27)	21 (31.82)	0.61
Cardiac etiology, N (%)	15 (43.45)	15 (43.45)	28 (43.45)	2.01

Table 2:

Features	During COVID-19 period (N = 37)	Before COVID-19 period (N = 38)	All (N = 66)	p-value
Male Gender,	33 (55.00)	46 (60.53)	78 (59.09)	0.61
Age, years	65.42 ± 19.43	70.00 ± 17.48	67.98 ± 18.43	0.16
Hypertension	28 (46.67)	39 (51.32)	67 (49.26)	0.62
Comorbidity status	33 (55.00)	54 (71.05)	87 (63.97)	0.08
Dyslipidemia	14 (23.33)	21 (27.63)	35 (25.74)	0.68

Diabetes mellitus	15 (25.00)	21 (27.63)	36 (26.47)	0.86
Ischemic heart disease	7 (11.67)	13 (17.11)	20 (14.71)	0.48
Chronic kidney disease	7 (11.67)	12 (15.79)	19 (13.97)	0.63
Asthma	3 (5.00)	6 (7.89)	9 (6.62)	0.74
Cerebrovascular disease	7 (11.67)	12 (15.79)	19 (13.97)	0.63

Figure 1:



DISCUSSION:

In this research, we evaluated by comparing the features of OHCA people in Pakistan before in addition throughout the COVID-19 pandemic to see if here was the significant change [26]. The primary results were consistent with those of previous research conducted in industrialized nations. In line with the findings of a number of earlier research, most notably those conducted in the UK, the amount of ED ROSC in OHCA sick people remained considerably lower during COVID-19 period compared to time before the COVID-19 period [27-30]. This might remain result of Lahore prehospital management that remained taken from UK, Anglo-American model, that offered treatment will depend on the ED. Since the philosophy of "scoops and runs" is followed by EMS, it is believed that there would be parallels in the results of ED ROSC [31]. In addition, as compared to the reference time, the percentage of OHCA individuals who lived long enough to be admitted was considerably lower during the COVID-19 period [32]. This finding is consistent with prior data from another research. During COVID-19 era, there were a variety of factors that contributed to little rates of ED ROSC and patients who lived until hospital admission [33]. However, they are most likely attributable to stay-at-home directives, the anxiety of illness transmission throughout hospital direct connections, in addition deferred first medical interaction from congestion of public emergency contact, particularly in EMS set [34]. This decelerated the preliminary healthcare-seeking behaviors, as well as unknown threats also illnesses of serious diseases at residence through families of patients [35]. Stay-at-home directives are a form of client's self that encourages clients to remain in their homes rather than seek medical Despite this, the results of our research did not reveal any statistically significant difference in 28-day survival or very good 28-day CPC score when comparing the COVID-19 period to the phases that came before it [35-38].

The overloading of health care resources is probably a contributing factor to the unsatisfactory results that occur throughout epidemics [39]. This is particularly true in nations in which the epidemic has accentuated imbalances in the availability of healthcare. In addition, the intensity of the consequences, such as increased OHCA and mortality, may be affected by controlled comorbidity brought on by a lack of health care services, COVID-19–imposed diseases, and pandemic-related ecological, emotional, and financial stresses [40]. In addition, the variation of cardiac arrest regulations to suggest deferred intubation, covering patients' mouths and noses before compression, and pure personal protective clothing all resulted in a postponement at the beginning of CPR, which in turn impacted the consequences that could not be changed [41]. The two groups had significantly different baseline features, the most notable of which were the presence or absence of a witness to cardiac arrest and the kind of cardiopulmonary resuscitation used [42]. Somatic symptoms, most especially diabetes and hypertension, were shown to have a substantial connection with OHCA over the COVID-19 era, according to the findings of prior research [43]. In a similar vein, our study discovered a simultaneous increase in the total incidence of morbidities across the two time periods. These conditions include hypertension, diabetes mellitus, dyslipidemia, chronic renal disease, myocardial infarction, vascular diseases, and asthma [44].

CONCLUSION:

Individuals who have a cardiac arrest outside of a hospital in Pakistan have a much lower chance of regaining consciousness in the emergency department (ED) and surviving long enough to be admitted. In particular, the pandemic Protocol and the method of doing cardiopulmonary resuscitation have been significantly modified, underscoring the necessity of prehospital measures and public health education programs. Therefore, more examination of the determinants' correlations through ED ROSC also survivability to admission results over Covid-19 period is required.

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