

# Survival Outcomes of Cardiopulmonary Resuscitation in the Patients Diagnosed with Chronic Kidney Disease

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## ABSTRACT

**Background:** The essential part of medical care for the patients diagnosed with the chronic kidney diseases (CKD) is resuscitation. The limited and sufficient knowledge about the outcomes of cardiopulmonary resuscitation is present.

**Objective:** The study aimed to measure the survival outcomes of the cardiopulmonary resuscitation in the patients diagnosed with CKD.

**Study design:** This observational study was conducted at the Al Nafees Medical College and Hospital Islamabad and Sahara Medical College, Narowal from March 2021 to March 2022.

**Material and Methods:** The study was conducted on 200 patients visited the cardiology department of our institute teaching hospital. The patients older than 18 years were included in the study. The demographic features with survival outcomes were recorded. The t-test and chi-square test was performed for the statistical analysis. The regression model was used to identify the relationship between CKD and in-hospital mortality cases. The model was also adjusted.

**Results:** It was noted that all the patients suffering from CKD were of old age and most of them belongs from those area that was not facilitate with proper medical care and other facilities. All these diseases were also present in the patients with CDK. Most of the patients had age more than 76 years but the mortality rate of the CDK patients was higher in the young patients suffering from CDK. But after justification of all the other symptoms it was predicted that the rate of mortality is 10 % higher in older patients.

**Conclusion:** it was concluded that the mortality rate is greater in the patients having some serious illness in the hospital like CPR. After receiving CPR, the conditions of older patients get worst. The purpose of this study was to provide information to the patients suffering from CKD and the medical staff treating them.

**Keywords:** Chronic kidney disease, mortality rates, cardiopulmonary resuscitation, advance care and cardiovascular disease.

## INTRODUCTION

The integral part of medical care in the patients diagnosed with CKD is advance care planning. The resuscitation status is highly affected by the patient quality of life, pulmonary resuscitation success personal goals and values<sup>1-2</sup>. There is no conclusive data on the CPR. The limited data is present on the survival outcomes associated with the CPR in CKD patients. To make the better decision for the medical care of the patients going for CPR the information is highly require.

The poor survival is reported in the person diagnosed with CKD undergoing CPR. CKD is prominent risk factor associated with poor survival in CKD patients<sup>3-4</sup>. The previous studies reported the elevated serum creatinine is the risk factors associated with poor outcomes. However the later studies confirmed that there is no association between the creatinine levels and survival outcomes of CPR<sup>5</sup>.

There is also limited information available on the success rate of CPR in the older patients diagnosed with CKD. Advance care planning has seems to play better role in management of the patient's with CKD. The 74% of the patients receiving dialysis died after receiving CPR, while survivor rate remain 11%. It was also observed that the mortality rates are higher in the patients receiving CPR and dialysis. With the increasing use of CPR the outcomes associated with it still remain questionable<sup>6-7</sup>. The substantial disabilities are observed in the patients survived after CPR. The cardiovascular diseases incidence increases with the decline in the glomerular filtration rates. The multi-vessel involvement of CAD and coronary calcification is observed.

The incidence of myocardial infraction is also higher in the patients with the chronic kidney diseases. The emergency department one of the essential part is resuscitation. The in-hospital cardiac arrest is observed in the every one out of five patients admitted in the emergency department. There is remarkable differences in the resuscitation procedures. The 80% of the death are reported in the cases of cardiac arrest<sup>8</sup>. The 0.77 is the odd ratio of in-hospital mortality. The studies have depicted that with the increase in the comorbidities the survival rates decrease to 30 days. The 27% of the patients out of 373 survived

after the cardiac arrest. The survival rates are highly observed in the patients with adjusted CCI as compared to those with higher CCI. There is a need to investigate the outcomes associated with CPR in the CKD patients especially in emergency department. The low income countries have higher prevalence of CAD and associated incidences<sup>9-10</sup>.

## MATERIAL AND METHODS

The study was conducted on 200 patients visited the cardiology department of our institute teaching hospital. The selected patients have the symptoms of CKD. The duration of study was from March 2021 to March 2022. These patients were compared with the patients from common population having no such symptoms. The patients older than 18 years were included in the study. The demographic features with survival outcomes were recorded. The study was send to ethical committee. The ethical and review board committee of the hospital approved the study. According to the exclusion criteria the patients with cardiopulmonary as primary diagnosis arrest were excluded. Such patients was excluded to get the better results.

The patients were divided into two groups, with CKD and without CKD. The age, race and sex of the patients were included in the study variables. The SPSS was used for the statistical analysis. The t-test and chi-square test was performed for the statistical analysis. The regression model was used to identify the relationship between CKD and in-hospital mortality cases.

The model were also adjusted. The multivariate and univariate analysis were performed. The models provided with the results with 82% sensitivity. We also recorded the percentage of the patients who underwent percutaneous coronary angiography, cardiac catheterization and cerebral angiography, intubation and gastrostomy. The sensitivity and specificity value remain 82% and 97% for the analysis performed.

## RESULTS

For this study, 200 patients were selected having symptoms of CKD. The duration of study was from March 2021 to March 2022. These patients were compared with the patients from

common population having no such symptoms. All the related data to a particular patients is given in the table listed below. The missing information about the patients and disease related issues is not mentioned in this table. It was noted that all the patients suffering from CKD were of old age and most of them belongs from those area that was not facilitate with proper medical care and other facilities. While the patients included in the general population were had some other comorbidities like tumor in metastasis state, alcohol usage, smoking, dyslipidemia, and diabetes. All these diseases were also present in the patients with CDK. In this study patients with some liver diseases were also included and kept in general population group without CDK disease. The demographic studies were also done.

Table 1: Different parameters of the patients suffering from CDK and general population;

Parameters	Patients With CKD, n=200	Patients Without CKD disease, n= 900	Value of P
Overall Number			
Age of the patients in year, average ± Standard deviation	72 ±28	67 ± 38	<0.0012
Total number of women	78 (39.0)	423 (47.0)	<0.0012
Conditions of comorbidities			
Score of comorbidity			<0.0012
0 – 3.0	5 (2.30)	246 (27.4)	
4.0 – 6.0	56 (28.0)	507 (56.30)	
≥ 7.0	139.4 (69.70)	147 (16.40)	
having Hypertension	134 (67.0)	414 (46.0)	<0.0012
having Diabetes	58 (29.0)	189 (21.0)	<0.0012
having Dyslipidemia disorder	7 (3.71)	41 (4.60)	<0.0012
having fibrillation in atria	54 (27.0)	180 (20.0)	<0.0012
Having heart failure	68 (34.0)	163 (18.0)	<0.0012
anemic and iron deficiency	64 (32.0)	144 (16.0)	<0.0012
heart disease of valvular region	16 (8.0)	45 (5.0)	<0.0012
vascular disease of peripheral region	30 (15.0)	72 (8.0)	<0.0012
lung disorders	60 (30.0)	234 (26.0)	<0.0012

Table 2: Association of CDK by regression model.

Results	Unjustified		Justified for gender and Potent Confounders <sup>a</sup>	
	OR value (95 % of CI)	Value of P	OR value (95 % of CI)	Value of P
Mortality rate at hospital: 77.0% (154) of patients suffering from CKD vs 77.0% (693) of patients not suffering from CKD; P=0.201	1.03 (0.95 to 1.11)	0.201	1.11 (1.03 to 1.16)	0.010
Having medical facilities: 14.0% (28) of patients suffering from CKD vs 14.0% (126) of patients not suffering from CKD; P=0.51	1.02 (0.91 to 1.15)	0.51	0.96 (0.83 to 1.10)	0.71

**DISCUSSION**

After this study, it was predicted that the death rate was higher in the patients having CKD disease and also undergo CPR as compared to those patients having no such kidney issues. However, after CPR state the treatment method is quite risky in the patients of older age more than 76 years<sup>11</sup>. This study showed some variations from previously mentioned studies. A similar type of study was performed in Canada, the 11.7 % of the patients suffering from CKD were successfully treated, along with CPR, and these patients were suffering from CKD stage III. However, 6 % of the patients in this study was at CKD stage IV and no patient was suffering from disease level V. Majority of the patients included in the study were died after CPR state, but few left. These alive patients were also died in neurovegetative situation. However the 6 % of the patients were survived<sup>12</sup>.

When Meta data analysis of the patients was done from different states like US, UK, Canada, Australia, Japan, and Israel. A huge data of patients were selected by the collaboration of these

disorder of electrolyte imbalance	112 (56.0)	342 (38.0)	<0.0012
Hepatic disease	7 (3.40)	31 (3.40)	0.91
having Coagulopathy	24 (12.0)	81 (9.0)	<0.0012
suffering from Obesity	22 (11.0)	72 (8.0)	<0.0012
tumor (without metastasis)	4 (2.0)	27 (3.0)	<0.0012
Metastatic state cancer	4 (2.0)	45 (5.0)	<0.0012
Low nutrition	18 (9.0)	76 (8.40)	0.040
Alcohol usage	6 (3.0)	54 (6.0)	<0.0012
state of Hyperkalemia	29 (14.50)	32 (3.60)	<0.0012
smokers	6 (3.0)	81 (9.0)	<0.0012
bed size for patients			
(Small)	20 (10.0)	90 (10.0)	0.070
(Medium)	48 (24.0)	225 (25.0)	
(Large)	130 (65.0)	576 (64.0)	
Insurance			
Medicare of the patients	166 (83.0)	630 (70.0)	<0.0012
HMO (Private)	26 (13.0)	180 (20.0)	
No insurance at all	8.0 (4.0)	81 (9.0)	
Location of hospitals			
North-east	38 (19.0)	180 (20.0)	0.100
Mid-west	38 (19.0)	162 (18.0)	
South side	78 (39.0)	342 (38.0)	
West side	44 (22.0)	198 (22.0)	
Non-teaching hospital	114 (57.0)	513 (57.0)	0.600
Teaching hospital	84 (42.0)	387 (43)	

Several different analysis of these patients were done by comparing all the above mentioned attributes of CDK patients with the patients without CDK but other diseases. After comparison different statistical tests were performed to evaluate the final results. Most of the patients had age more than 76 years but the mortality rate of the CDK patients was higher in the young patients suffering from CDK. But after justification of all the other symptoms it was predicted that the rate of mortality is 10 % higher in older patients. Here the severity of the disease was also considered. The statistical calculations are given in the table below

countries and survival rate of the patients were noted after CPR. No linkage was available between CPR and kidney issues. However the level of creatinine increased in the patients suffering from CKD. For the Meta data analysis, still appropriate numbers of patients were not selected. They also did another analysis, in which the level of creatinine was estimated<sup>13-14</sup>. The study done by our research group show variable results due to number of reasons. The exact reason is not confirmed however, it may be due the population size variation, or the population differences. Our study showed the current research with new CPR prognosis.

There are number of factors involved in the enhancement of death rate in the patients suffering from CKD. The patient may have some cardiac issues, or some issues related to liver. All these increase the rate of output of the disease. These is a relation between kidney issues and heart diseases. When the CKD state become serious<sup>15-16</sup>, a number of cardiac issues emerged but some patients may not develop such issues. Further analysis was done to find out the exact link between kidney diseases and heart diseases, it was predicted that the fear of dialysis procedure is

responsible for the heart issues or the death of the CKD patients due to number of other issues.

Then the age wise comparison of the patients were done, it was noted that the patients of age more than 75 years may have a number of other medical issues. A number of serious medical issues also reinforce the effect of the disease<sup>17</sup>. For complete analysis age, gender, and medical states of the patients were measured and compared to find out the mortality rate. Some patients develop a number of other complications after CPR state, the information related to the prognosis of CPR is mentioned in the literature. However, still work is being done on the modification and reviving of CPR patients and its prognosis and it is emphasized that all the information including drawbacks should be shared with the patient as well as with the family. However, a part from statically calculated data, the mortality rate is little bit higher than calculated one<sup>18-19</sup>.

Patients suffering from CKD spends a lot in hospital and it is a complicated process as well. The CPR level starts in the patients when the CKD level enhanced much higher level. As in this study, the CKD patients were compared with the group of other patients having other chronic diseases. The other symptoms like fracturing of ribs is observed in the common population as compared to the population with CKD. The CPR may terminate initially but there is a need of further studies<sup>20</sup>.

The health of the patient also differ in different zones, it totally depends upon the medical facilities available for the patients, the disease rate is much higher in the patients living in backward areas and treated in non-academic hospitals. The disease rate is higher in the patients above 75 years due to the number of other chronic diseases synergically increases the effect of CKD and lead to CPR and ultimately death of the patients. However, the younger patients are expected to have less prognosis of CPR<sup>21-22</sup>.

## CONCLUSION

From the above research, it was concluded that the mortality rate is greater in the patients having some serious illness in the hospital like CPR. After receiving CPR, the condition of older patients get worst. The purpose of this study was to provide information to the patients suffering from CKD and the medical staff treating them. However, more studies are required in this area for the better understanding of the treatment of CKD.

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