

Period Prevalence of Acute Kidney Injury (AKI) Among the Hospitalized ST-Segment Elevation Myocardial Infarction (STEMI) Patients

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Abstract:

➤ Background:

Acute kidney injury (AKI) is a frequent and clinically significant complication of acute myocardial infarction (AMI) and is associated with adverse in-hospital outcomes. However, data regarding the early development and clinical correlates of AKI among patients with ST-segment elevation myocardial infarction (STEMI) remain limited in resource-constrained settings. This study aimed to determine the prevalence of early AKI and examine its association with selected demographic and clinical characteristics among patients hospitalized with STEMI.

➤ Methods:

A prospective observational study was conducted over six months in the Department of Cardiology, Chittagong Medical College Hospital, Bangladesh. Fifty consecutive patients with STEMI who fulfilled the predefined eligibility criteria and provided informed consent were enrolled. Demographic characteristics, cardiovascular risk factors, clinical variables, and serial serum creatinine measurements were recorded. The occurrence of AKI was assessed during the first 48 hours and again on the seventh day of hospitalization. Associations between AKI and selected clinical variables were evaluated using appropriate statistical tests, with a p -value <0.05 considered statistically significant.

➤ Results:

Among the 50 participants, 42 (84%) were male. Hypertension was the most prevalent comorbidity (54%), while hyperlipidemia was the most frequently reported cardiovascular risk factor (44%). AKI developed in 17 patients (34%) within the first 48 hours and in 22 patients (44%) by the seventh day of hospitalization. Anterior-wall STEMI accounted for 58% of cases and was significantly associated with the development of AKI within 48 hours compared with inferior-wall STEMI ($\chi^2 = 4.489$, $df = 1$; $p = 0.028$). No statistically significant association was observed between AKI and hypertension ($\chi^2 = 0.166$; $p = 0.684$) or diabetes mellitus ($\chi^2 = 0.540$; $p = 0.462$). Serum creatinine concentrations at 48 hours demonstrated a strong positive correlation with concentrations measured on the seventh day ($r = 0.825$; $p < 0.005$).

➤ Conclusion:

AKI occurred in a substantial proportion of patients with STEMI, with the prevalence increasing from 34% during the first 48 hours to 44% by the seventh day of hospitalization. Anterior-wall STEMI was significantly associated with early AKI, whereas hypertension and diabetes mellitus were not significantly associated with its development in this cohort. These

findings underscore the importance of serial renal-function monitoring and early recognition of renal impairment in patients presenting with STEMI, particularly those with anterior-wall involvement.

Keywords: STEMI, AKI, AMI.

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I. INTRODUCTION

Renal function frequently undergoes dynamic changes during the acute phase of acute myocardial infarction (AMI) and acute kidney injury (AKI) may develop early during hospitalization and subsequently resolve before discharge. Although transient AKI has traditionally been regarded as a reversible complication, accumulating evidence suggests that incomplete or persistent renal recovery may be associated with an increased risk of adverse cardiovascular outcomes. The bidirectional interaction between cardiac and renal dysfunction is particularly relevant in patients with acute coronary syndrome (ACS) in whom even modest deterioration in renal function may have important prognostic implications. Nevertheless, data characterizing the early trajectory of renal dysfunction and its clinical correlates among patients with ACS, particularly in resource-limited settings, remain limited. Further characterization of AKI during the early phase of AMI may therefore improve risk stratification and support timely recognition and management of patients at increased risk of adverse outcomes. Acute kidney injury affects roughly 13% to 20% of all hospitalized individuals and up to 67% of intensive care unit patients. It manifests in patients regardless of whether they have normal baseline kidney function or pre-existing chronic kidney disease. In hospital settings, AKI can quadruple the mortality rate, and even critically ill patients face a doubled risk of death upon developing this condition. Despite the substantial strain AKI places on both patients and healthcare systems, our understanding of the syndrome is incomplete, necessitating urgent, multidisciplinary research efforts. Hemodynamic shifts and the continuous release of endogenous vasoconstrictors—such as endothelin, vasopressin, renin-angiotensin, and norepinephrine—are common during an AMI and profoundly affect kidney function. This often leads to an early decline in renal performance post-infarction, which is strongly linked to adverse clinical outcomes. Furthermore, ischemic heart disease remains a primary cause of mortality globally across both developed and developing nations. Concurrently, AKI complicates 10% to 55% of AMI cases (with the highest rates seen in cardiogenic shock scenarios) and is consistently tied to increased mortality. The exact mechanisms are complex and multifactorial, involving impaired cardiac output, an imbalance of vasoconstrictors and vasodilators, contrast media administration, and inflammatory crosstalk between the heart and kidneys. While previous studies have defined AKI as a dichotomous event, renal function actually undergoes dynamic changes. Worsening renal function can lead to chronic kidney disease, heavily impacting

cardiovascular prognosis. Because most prior investigations focused on baseline renal function rather than acute exacerbations, critical questions regarding the prognostic implications of AKI remain unanswered. Currently, the prevalence of AKI among acute ST-segment elevation myocardial infarction (STEMI) patients in Bangladesh is undocumented. Therefore, this study aims to determine the prevalence and temporal trends of AKI in hospitalized STEMI patients, utilizing detailed in-hospital laboratory and medication data to address this crucial knowledge gap.

II. MATERIALS AND METHODS

A prospective observational study was conducted in the Department of Cardiology, Chittagong Medical College Hospital, Bangladesh, over a period of six months. The study was designed to determine the prevalence and temporal pattern of acute kidney injury (AKI) among patients admitted with ST-segment elevation myocardial infarction (STEMI) and to assess the association of AKI with selected demographic and clinical characteristics. Consecutive patients admitted to the cardiology department with a diagnosis of STEMI during the study period were screened for eligibility. Patients who fulfilled the predefined inclusion criteria and provided informed consent were enrolled. A total of 50 patients were included in the final analysis. STEMI was diagnosed based on the clinical presentation, electrocardiographic findings, and cardiac biomarker results in accordance with contemporary diagnostic criteria.

Patients were eligible for inclusion if they: were aged ≥ 18 years; had a confirmed diagnosis of STEMI; were admitted to the cardiology department within the study period; and provided informed consent to participate. Patients were excluded if they had pre-existing end-stage renal disease or were receiving maintenance dialysis, had undergone renal transplantation, or had incomplete clinical or laboratory data necessary for assessment of renal function. Patients with other conditions likely to substantially influence serum creatinine during the observation period were also excluded where applicable.

Data were collected prospectively using a structured data-collection form. Baseline demographic characteristics included age, sex, educational status, and occupational activity. Relevant clinical information, including history of hypertension, diabetes mellitus, hyperlipidemia, and other cardiovascular risk factors or comorbidities, was obtained through direct patient interviews and review of medical records. Clinical examination and routine laboratory

investigations were performed as part of standard inpatient care. Particular emphasis was placed on serial assessment of renal function, including serum creatinine measurements obtained during hospitalization. Information regarding relevant medications and other therapeutic interventions administered during hospitalization was also recorded where available. Renal function was assessed using serial serum creatinine measurements obtained during the early hospitalization period and on the seventh day. AKI was defined according to the diagnostic criteria specified in the study protocol. Patients were categorized according to the presence or absence of AKI during the first 48 hours and by the seventh day of hospitalization. The temporal pattern of AKI was subsequently evaluated by comparing the proportion of patients meeting the criteria for AKI at these predefined time points. Changes in serum creatinine between the early assessment and the seventh day were also examined to characterize the trajectory of renal dysfunction. Patients were classified according to the anatomical territory of myocardial infarction, particularly anterior-wall and inferior-wall involvement, based on electrocardiographic findings. The relationship between infarct location and the development of AKI during the early hospitalization period was subsequently assessed.

All collected data were entered, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS). Continuous variables were summarized using means and standard deviations or medians and interquartile ranges, as appropriate, while categorical variables were expressed as frequencies and percentages. Associations between categorical variables, including infarct location and the

presence of AKI, were assessed using the chi-square test or Fisher's exact test where appropriate. The relationship between serial serum creatinine measurements was evaluated using correlation analysis. A two-sided p -value <0.05 was considered statistically significant. The study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants before enrollment. Patient confidentiality was maintained throughout data collection, analysis, and reporting, and identifying information was not included in the study database or manuscript.

III. RESULTS

➤ Socio-Demographic Characteristics of the Respondents

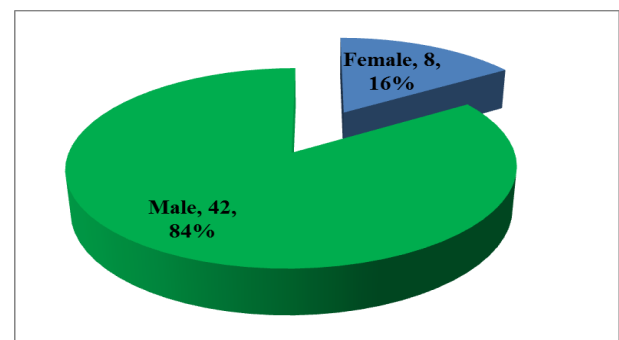


Fig 1 Distribution of the Respondents According to Sex (n=50)

Pie chart showing 3/4th of the respondents were male and rest of them were female.

Table 1 Comparison of Demographic, Co Morbid Condition and Risk Factors with AKI Development.

Variables	AKI within 48 hours		AKI within 7 days	
	No AKI	AKI	No AKI	AKI
Sex				
Male	29(87.9%)	13(76.5%)	25(89.3%)	5(22.7%)
Female	4(12.1%)	4(23.5%)	3(10.7%)	17(77.3%)
Occupation				
Business	6(18.2%)	4(23.5%)	6(21.4%)	4(18.2%)
Farmer	7(21.2%)	1(5.9%)	4(14.3%)	4(18.2%)
Housewife	4(12.1%)	4(23.5%)	3(10.7%)	5(22.7%)
Others	4(12.1%)	3(17.6%)	2(7.1%)	5(22.7%)
Service Socio-economic status	12(36.4%)	5(29.4%)	13(46.4%)	4(18.2%)
Lower Class	4(12.1%)	-	1(3.6%)	3(13.6%)
Lower middle class	28(84.1%)	16(94.1%)	26(92.9%)	18(81.8%)
Upper middle class	1(3%)	1(5.9%)	1(3.6%)	1(4.5%)
Education				
graduate and above	4(12.1%)	1(5.9%)	4(14.3%)	1(4.5%)
HSC	4	2(11.8%)	5(17.9%)	1(4.5%)
illiterate	12(36.4%)	5(29.4%)	8(28.6%)	9(40.9%)
primary	9(27.3%)	8(47.1%)	7(25%)	10(45.5%)
SSC	4(12.1%)	1(5.9%)	4(14.3%)	1(4.5%)
Diabetes melitus				
No	26(78.8%)	11(64.7%)	20(71.4%)	17(77.3%)
Yes	7(21.2%)	6(35.5%)	8(28.6%)	5(22.7%)
Hypertension				
No	14(42.4%)	9(52.9%)	10(35.7%)	13(59.1%)
Yes	19(57.6%)	8(47.1%)	18(64.3%)	9(40.9%)
Smoking				
No	6(18.2%)	6(35.3%)	7(25%)	5(22.7%)
Yes	27(81.8%)	11(64.7%)	21(75%)	17(77.3%)
Hyperlipidaemia				
No	21(63.6%)	7(41.2%)	18(64.3%)	10(45.5%)
Yes	12(36.4%)	10(58.8%)	10(35.7%)	12(54.5%)

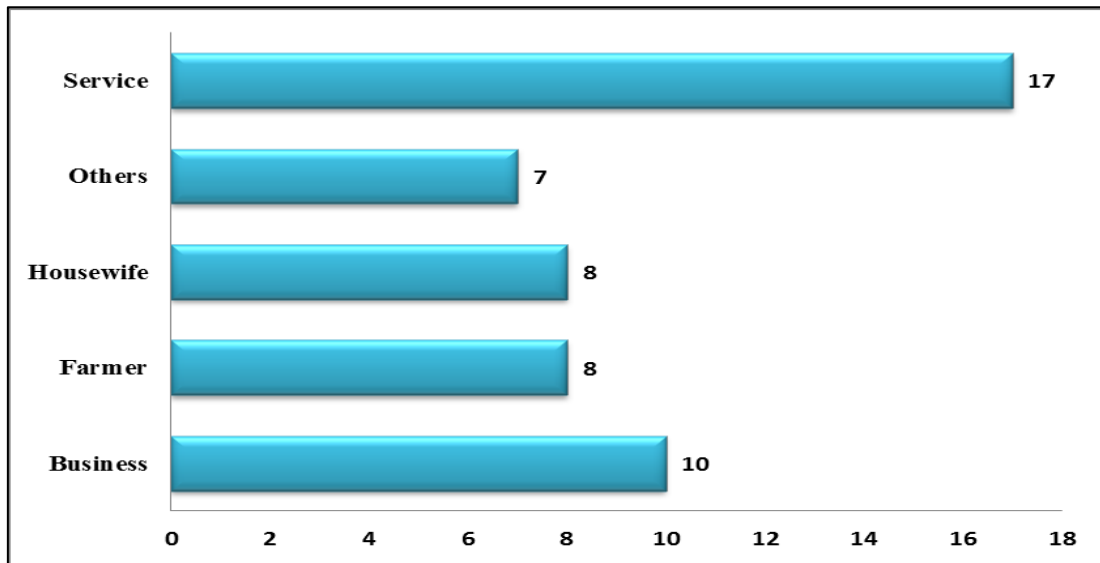


Fig 2 Distribution of the Respondents According to Occupation (n=50)

A Bar chart showing the distribution of the respondents according to their occupation. 1/3rd of the respondents were Service holder .

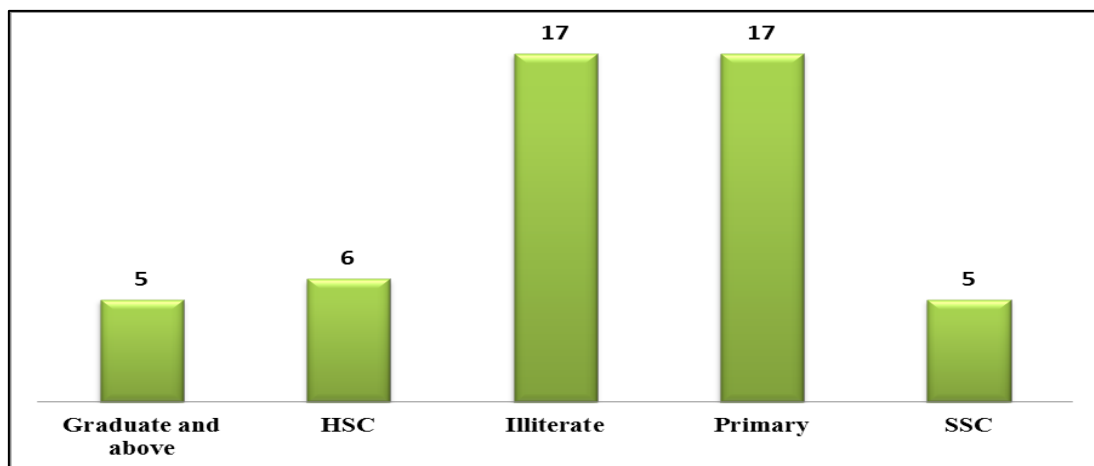


Fig 3 Distribution of the Respondents According to Education (n=50)

A Bar chart showing the distribution of the respondents according to their educational status. 1/3rd of the respondents were from either Illiterate or primary educational background.

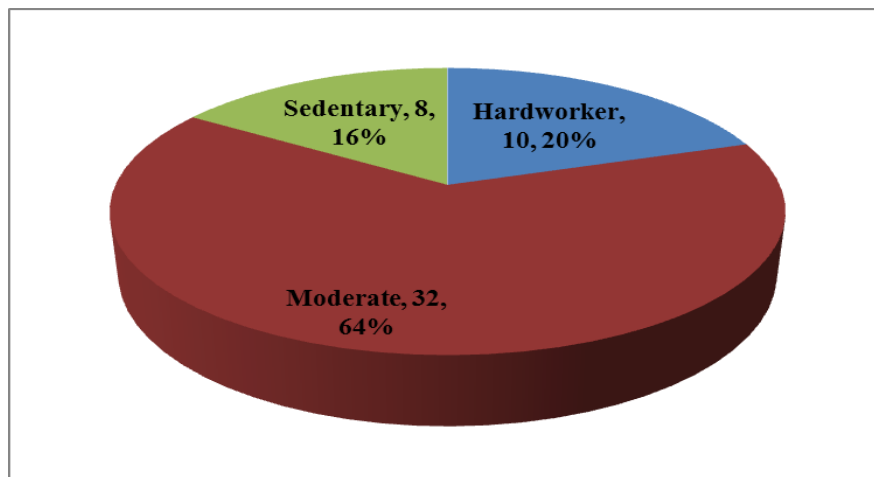


Fig 4 Distribution of the Respondents According to Activity (n=50)

Pie chart showing more than half of the respondents were moderate worker followed by hard worker and sedentary worker

➤ *Distribution of the Respondents According to Co Morbid Condition and Risk Factors*

Table 1 Showing Distribution of the Respondents According to co Morbid Condition (n=50)

Morbid condition	Yes	No
Diabetes Mellitus	13(26%)	37(74%)
Hypertension	27(54%)	23(46%)
CKD	-	50(100%)
Prior MI	3(6%)	47(94%)

Risk factors	Yes	No
Smoking	12(24%)	38(76%)
Hyperlipidemia	22(44%)	28(56%)

The table shows that more than half of the respondents had hypertension and diabetes mellitus was present in 1/3rd of the respondents and none of them had a history of suffering from CKD. respondents with positive history regarding MI was very low. About half of the respondents had

hyperlipidemia, where 1/3rd of the respondents had positive history of smoking.

➤ *Distribution of STEMI Patients According Change in ECG Leads*

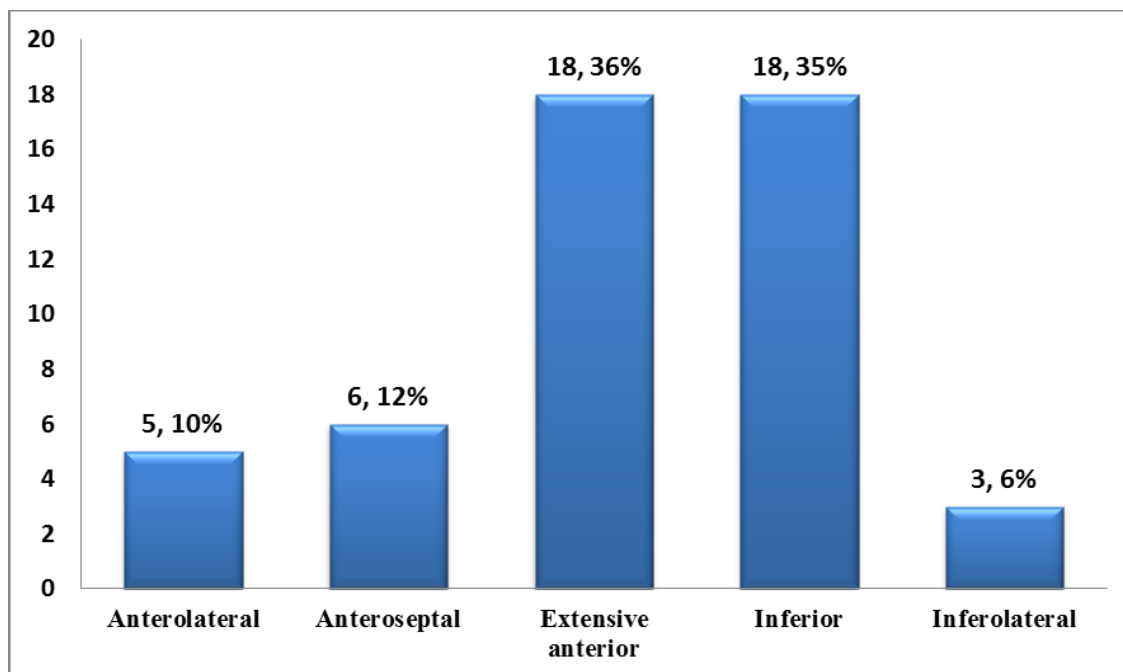


Fig 5 Distribution of STEMI Patients According Change in ECG leads (n=50)

The bar chart shows the Distribution of STEMI patients according change in ECG leads. Among the respondents Inferior and Extensive anterior MI prevalence were same, about 1/3rd of the respondents were suffering from either of

these two types. Followed by Anteroseptal, Anterolateral and inferior

➤ *Descriptive Statistics of Serum Creatinine Changes in Different Times of the Respondents.*

Table 2 Descriptive Statistics of Serum Creatinine Changes in different times of the respondents (n=50).

	Mean	Std. Deviation	Minimum	Maximum
S. creatinine (initial)mg/dl	1.018	.2017	.7	1.7
S.creatinine (after 48hour)	1.246	.4210	.8	2.8
S.creatinine after 7 days)	1.632	.8170	.8	3.6

The table showing the Distribution of Serum creatinine changes in different times of the respondents. Among the respondents mean serum creatinine was highest on seventh

day of admission (1.632±SD 0.8170), followed by at 48 hours (1.246± SD 0.4210) and initial (1.018±SD 0.2017).

➤ *Comparison of S. Creatinine Level at Different Time.*

Table 3 Descriptive Statistics of Serum Creatinine Changes in Different Times of the Respondents (n=50)

Time of S. creatinine investigation(mg/dl)	N	Mean	Std. Deviation
Time 1(initial)	50	1.018	.2017
Time 2(after 48hour)	50	1.246	.4210
Time 3(after 7days)	50	1.632	.8170

A one way repeated measures ANOVA was conducted to compare the S. creatinine level of the respondents at Time 1(initial), Time 2(after 48hour) and Time 3(after 7days). The

means and SD are presented at table 4. There was a significant effect for time, Wilks Lambda =.60, F (2, 48)=15.576, $p < 0.0005$, multivariate partial eta squared=.394.

Table 4 Distribution of AKI According to 1st KDIGO Criteria (Increase SCr by ≥ 0.3 mg/dl within 48 hrs)

AKI or not	Frequency	Percent
No AKI	33	66.0
AKI	17	34.0
Total	50	100.0

The table shows that than 1/3rd of the total respondents (17, 34%) developed AKI within 48 hrs when it is based to 1st KDIGO criteria (increase SCr by ≥ 0.3 mg/dl within 48 hrs)

Table 5 Distribution of AKI According to 2nd KDIGO Criteria (Increase SCr by ≥ 1.5 times baseline)

AKI or not	Frequency	Percent
No AKI	28	56.0
AKI	22	44.0
Total	50	100.0

The table shows that almost half (22, 44%) of the respondents developed AKI within 7 days when it is based to 2nd KDIGO criteria (increase SCr by ≥ 1.5 times baseline).

➤ *Relation between Development of AKI (According to 1st KDIGO Criteria) and Different Risk Factors*Table 6 Relation between development of AKI (according to 1st KDIGO criteria) and Smoking (n=50)

Smoking	Classification of AKI According to 1st KDIGO Criteria		X^2	P Value
	No AKI	AKI		
No	6	6	$X^2=.985$ df=1	P=.321
	50.0%	50.0%		
Yes	27	11		
	71.1%	28.9%		
Total	33	17		
	66.0%	34.0%		

The table shows that among the smokers most of the participants 27 (71.1%) did not develop AKI, on the other hand developing AKI in nonsmokers were equal with smokers (in both groups 6,50%). To see the statistical significance of this difference we did a Chisquare test for

independence (with Continuity Correction). That indicated no significant association between Smoking and AKI in respondents (according to KDIGO 1st criteria), χ^2 (df=1,n=50) =.985, $p=.321$.

Table 7 Relation between Development of AKI (According to 1st KDIGO Criteria) and Hyperlipidemia

Hyperlipidemia	Classification of AKI According to 1st KDIGO Criteria		X^2	P Value
	No AKI	AKI		
No	21	7	$X^2=1.467$ df=1	P=.224
	75.0%	25.0%		
Yes	12	10		
	54.5%	45.5%		
Total	33	17		
	66.0%	34.0%		

The table shows that those respondents who were suffering from hyperlipidemia among them 12 (54.5%) developed AKI and 10(45%) dint. On the other hand among those not suffering from hyperlipidemia most of them 21(75%) did not develop AKI. To see the statistical

significance of this difference we did a Chi-square test for independence (with Continuity Correction). The test indicated no significant association between Hyperlipidemia and AKI in respondents (according to KDIGO 1st criteria), χ^2 (df=1,n=50) = 1.476, $p=.224$.

Table 8 Showing Distribution of AKI Among Different Types of STEMI Respondents According to 1st KDIGO Criteria (Increase SCr by ≥ 0.3 mg/dl within 48 hrs)

Grouping of STEMI patients	Classification of AKI According to 1st KDIGO Criteria		Total
	No AKI	AKI	
anterolateral	2(40%)	3(60%)	5
anteroseptal	3(50%)	3(50%)	6
extensive anterior	10(56%)	8(44%)	18
inferior	15(83%)	3(17%)	18
inferolateral	3(100%)	0	3
Total	33(64%)	17(34%)	50

The table shows that among the respondents the proportion of developing AKI according to 1st KDIGO

criteria (increase SCr by ≥ 0.3 mg/dl within 48 hrs) was higher in patients with anteroseptal or extensive anterior MI.

Table 9 Showing Distribution of AKI Among Different Types of STEMI Respondents According to 2nd KDIGO Criteria (Increase SCr by ≥ 1.5 Times Baseline)

Grouping of STEMI Patients	Classification of AKI According to 2nd KDIGO Criteria		Total
	No AKI	AKI	
anterolateral	3(60%)	2(40%)	5
anteroseptal	2(34%)	4(66%)	6
extensive anterior	8(45%)	10(55%)	18
inferior	12(71%)	6(29%)	18
inferolateral	3(100%)	0	3
Total	28	22	50

The table shows that among the respondents the proportion of developing AKI according to 2nd KDIGO

criteria (increase SCr by ≥ 1.5 times baseline) was higher in patients with anteroseptal or extensive anterior MI.

Table 10 Relation between Development of AKI (According to 1st KDIGO Criteria) and Ejection Fraction (n=50)

Ejection fraction	Classification of AKI According to 1 st KDIGO Criteria		χ^2	P Value
	No AKI	AKI		
Less than 45%	8	7	$\chi^2=.832$ df=1	P=.224
	53.3%	46.7%		
More than 45%	25	10		
	71.4%	28.6%		
Total	33	17		
	66.0%	34.0%		

The table shows that those respondents who had ejection fraction less than 45% among them 8 (53.3%) not developed AKI and 7(46.7%) dint, on the other hand those who had ejection fraction more than 45% among them 10(28.6%) developed AKI rest 25(71.4%) dint develop. To see the statistical significance of this difference we did a Chi-square test for independence (with Continuity Correction).

That indicated no significant association between ejection fraction and AKI in respondents (according to KDIGO 1st criteria), χ^2 (df=1,n=50) = .832, $p=.362$.

➤ *Relation between Development of AKI (According to 1st KDIGO Criteria) and Different Co-Morbid Factors.*

Table 11 Relation between Development of AKI (According to 1st KDIGO Criteria) and Different Co-Morbid Factors (HTN and DM)

Variables	Present or Absent	Classification of AKI According to 1st KDIGO Criteria		X ²	P Value
		No AKI	AKI		
HTN	Absent	14(60.9%)	9(39.1%)	X ² = .166 df=1	P= .684
	Present	19(70.4%)	8(29.6%)		
	Total	33(66%)	17(34%)		
DM	Absent	26(70.3%)	11(29.7%)	X ² = .540 df=1	P= .462
	Present	7(53.8%)	6(46.2%)		
	Total	33(66%)	17(34%)		

The table shows the Relation between development of AKI (according to 1st KDIGO criteria) and different co-morbid factors (HTN and DM). To explore this relationship we did a Chi-square test for independence (with Continuity

Correction). That indicated no significant association between AKI in respondents and HTN χ^2 (df=1,n=50) = .166,p=.684 or DM χ^2 (df=1,n=50)=.540,p=.462.

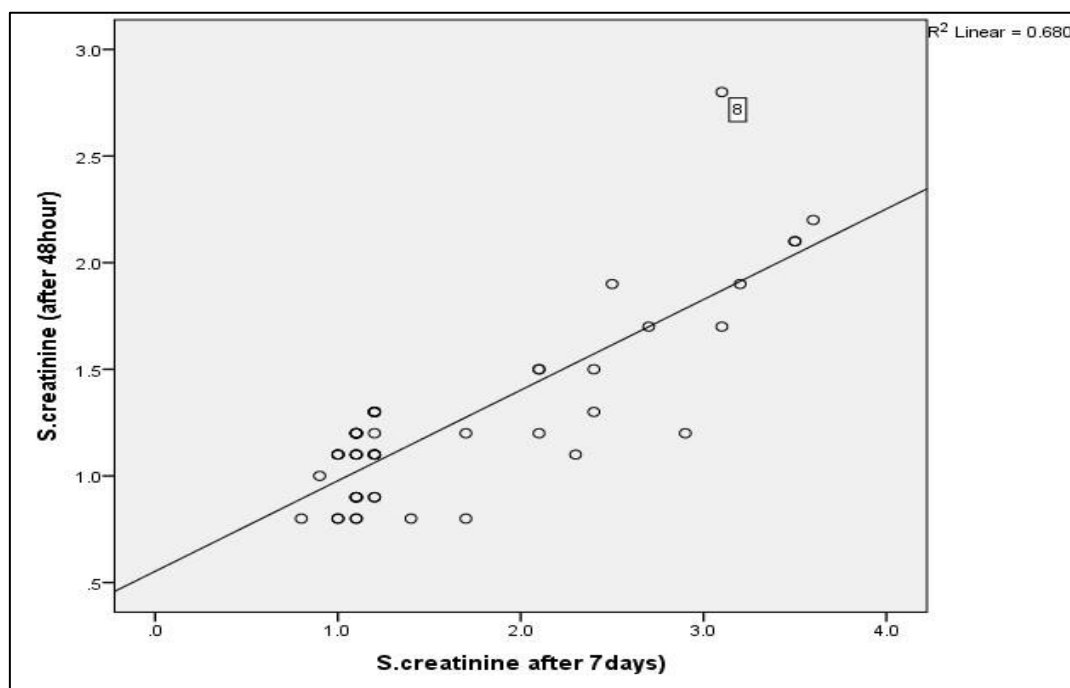


Fig 5 Relation between S.Creatinine of Patients Measured at the End of 48 hrs and at End of 7 Days. Correlations

The relationship between S.creatinine of patients measured at the end of 48 hrs and at end of 7 days was investigated using Pearson product-moment correlation coefficient. Preliminary analysis were performed to ensure no violation of the assumptions of Normality, linearity and homoscedasticity. There was a Strong positive correlation between these two variables, $r=.825$, $n=50$, $p<.005$, Patients

with higher measure of Serum creatinine within 48 hours were associated with elevation of serum creatinine at the end of seventh day also.

➤ Relationship of Proportion of Respondents Diagnosed as AKI within 48 Hours and at 7th Day.

Table 12 Relation between Development of AKI within 48 hrs and Seventh Day

Classification of AKI According to 1st KDIGO Criteria (An Increase in SCr by ≥ 0.3 mg/dl within 48 hrs)	Classification of AKI According to 2nd KDIGO Criteria (An increase in SCr by ≥ 1.5 times baseline within 7 days)		Total	P Value
	No AKI	AKI		
No AKI	26	7	33	p= .180
	78.8%	21.2%	100.0%	
AKI	2	15	17	
	11.8%	88.2%	100.0%	
Total	28	22	50	
	56.0%	44.0%	100.0%	

The relationship of proportion of patients diagnosed as AKI within 48 hrs and at seventh day was investigated by McNemar's test. It shows that the $p=0.180$ which is not less than $P<0.05$. This suggests that there was no significant change in the proportion of patient's diagnosis of AKI according to

2nd KDIGO criteria (44%) when compared with the proportion of AKI according to 1st KDIGO criteria (34%).

➤ *Relation between STMI Patients Surface of Heart Affected and AKI Development within 48 Hours*

Table 13 Relation between STMI Patients Surface of Heart Affected and AKI Development within 48 Hours

Side Affected	Classification of AKI According to 1 st KDIGO Criteria		χ^2	P Value
	No AKI	AKI		
Anterior	15(51.7%)	14(48.3%)	$\chi^2 = df=1$	P=0.028
Inferior	18(85.7%)	3(14.3%)		
Total	33(66%)	17(34%)		

The table shows that among the patients who had an STEMI in their anterior wall 14(48%) of them developed AKI within 1st 48 hours. Again who had STMI in their posterior wall among them 3 (14.3%) developed AKI. To see the statistical significance of this difference we did a Chi-square test for independence (with Continuity Correction). That indicated significant association between STMI patients

surface of heart affected and AKI development within 48 hours (according to KDIGO 1st criteria), χ^2 (df=1,n=50) =4.489 , $p=0.028$, $\phi=-0.354$.

➤ *Relation between STMI Patients Surface of Heart Affected and AKI Development within 7 Days*

Table 14 Relation between STMI Patients Surface of Heart Affected and AKI Development within 7 Days

Side Affected	Classification of AKI According to 2 nd KDIGO Criteria		χ^2	P Value
	No AKI	AKI		
Anterior	13(44.8%)	16(55.2%)	$\chi^2 = 2.50$ df=1	P=0.114
Inferior	15(71.4%)	6(28.6%)		
Total	28(56%)	22(44%)		

The table shows that among the patients who had an STEMI in their anterior wall 16(55.2%) of them developed AKI within 7 days. Again who had STMI in their inferior wall among them 6 (28.6%) developed AKI. To see the statistical significance of this difference we did a Chi-square test for independence (with Continuity Correction). That indicated no significant association between STMI patients surface of heart affected and AKI development within 7 dys (according to KDIGO 2nd criteria), χ^2 (df=1,n=50) =2.50 , $p=0.114$.

documented a substantial drop in creatinine clearance—from 120 ± 36 to 79 ± 23 mL/min—immediately after the cardiac event and persisting three weeks later in ten patients with uncomplicated MI.

Applying the KDIGO guidelines to stratify AKI severity, the study found that over two-thirds of the subjects experienced an absolute serum creatinine rise of ≥ 0.3 mg/dL within the initial 48 hours. Furthermore, by the seventh day, more than half of the patients were diagnosed with AKI based on a relative creatinine surge reaching ≥ 1.5 times their baseline. Historical data indicates that the incidence of AMI-induced AKI varies widely, spanning from 5% to 55%, heavily depending on the clinical environment and the specific diagnostic criteria applied. In this cohort, an early spike in serum creatinine at 48 hours was strongly predictive of persistently elevated levels on day seven ($r = 0.825$, $n = 50$, $p < 0.005$).

While extensive evidence links preexisting renal impairment to adverse outcomes in acute coronary syndrome, specific data focusing on the prognostic impact of actively worsening renal function post-AMI remains limited. Existing literature does, however, associate acute renal decline with elevated mortality in AMI patients who suffer from cardiogenic shock or require mechanical ventilation.

IV. DISCUSSION

The findings of this investigation reveal that the majority of the participants were male professionals, with over two-thirds engaged in moderate physical labor. Regarding the distribution of STEMI classifications, more than a third of the cohort experienced either extensive anterior or inferior myocardial infarctions. In contrast, anterolateral and anteroapical infarctions each accounted for approximately 10% of the study population.

When evaluating fluctuations in renal function, the data demonstrated a statistically significant escalation in mean serum creatinine levels at both the 48-hour and 7-day marks compared to baseline measurements (Wilks Lambda = 0.60, $F(2, 48) = 15.576$, $p < 0.0005$). This aligns with earlier research highlighting renal decline following an acute myocardial infarction. For instance, Efendigil et al.

This study observed no statistically significant difference when comparing the overall proportion of AKI diagnoses under the first KDIGO criteria at 48 hours (34%) against the second KDIGO criteria at day seven (44%). This dynamic shift occurred because some patients' creatinine levels normalized after the first 48 hours, whereas others who initially lacked a significant ≥ 0.3 mg/dL increase eventually experienced a ≥ 1.5 -fold baseline jump by the seventh day.

General consensus marks AKI as a frequent complication during the acute phase of MI, with prevalence rates typically clustering between 9.6% and 19.4%, where even minor creatinine increments can trigger adverse clinical events. Notably, the present research did not establish a significant correlation between AKI onset and underlying hypertension ($\chi^2 = 0.166$, $p = 0.684$) or diabetes mellitus ($\chi^2 = 0.540$, $p = 0.462$). This contrasts with certain prior studies that reported strong statistical interactions for both hypertension ($p = 0.01$) and diabetes ($p < 0.001$).

Additionally, having a history of smoking or hyperlipidemia did not show any definitive correlation with AKI development in this participant pool. This is an interesting deviation from previous evidence that links mild renal dysfunction to atherosclerosis, which subsequently exacerbates cardiac mortality.

V. LIMITATIONS

This study is limited by its small sample size, single-center observational design, and recruitment from a single cardiology ward, which may restrict statistical power and generalizability. The multiple statistical comparisons without adjustment for multiplicity may have increased the risk of type I and type II errors. Additionally, the absence of routine coronary angiography limited assessment of coronary anatomical characteristics and their potential association with AKI.

VI. CONCLUSION

AKI was a frequent early complication of STEMI in this cohort, occurring in 34% of patients within 48 hours and in 44% by the seventh day of hospitalization. Anterior-wall STEMI was significantly associated with the development of AKI within 48 hours, whereas hypertension and diabetes mellitus were not significantly associated with AKI. These findings support the importance of serial renal-function assessment during the early hospitalization of patients with STEMI, particularly those with anterior-wall infarction.

RECOMMENDATION

Larger prospective studies with longer follow-up are needed to determine the predictors of AKI, patterns of renal recovery, and its subsequent association with chronic kidney disease and long-term cardiovascular outcomes.

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