

Frequency of In-Hospital Mortality in Acute Myocardial Infarction Patients Having Stress Hyperglycemia

Mortality in Acute MI Patients Having Stress Hyperglycemia

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ABSTRACT

Objective: To determine the frequency of in-hospital mortality in acute myocardial infarction patients having stress hyperglycemia.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the medicine department of Nishtar hospital, Multan in six months duration from November 2021 to May 2022.

Materials and Methods: A total of 140 patients presented with acute myocardial infarction and stress hyperglycemia were enrolled. All baseline investigations were collected and patients were followed till discharge from hospital. Main variables of study were in hospital mortality, hypertension, smoking status and increased body mass index (BMI). SPSS was used for data entry and analysis.

Results: Among total 140 patients 35.7 % were living in rural areas and 64.3 % was living in urban areas. About 57.1% patients were having poor socioeconomic status 42.9% were having middle income in their resources. Similarly 26.4 % were smokers and 52.9 % were hypertensive of our study cases.

Conclusion: High frequency of in – hospital mortality was noted among patients with acute myocardial infarction and stress hyperglycemia which is significantly associated with male gender, increased age, urban residential status and hypertension.

Key Words: Stress hyperglycemia, In-hospital mortality, Myocardial infarction, Hypertension, Socioeconomic status

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INTRODUCTION

It is now proven that Ischemic heart disease (IHD) is the leading cause of morbidity and mortality world wide^{1,2}. The prevalence of Myocardial infarction (MI) is going to be increased in developing nations and males are more commonly affected than females before menopause³.

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The cardiovascular risk factors for ischemic heart disease and diabetes are increasing worldwide as well in our country due to life style changes including sedentary life style, altered eating habits increased body weight⁴.

Along cardiovascular diseases myocardial infarction is the leading cause of associated morbidity and in hospital mortality⁵. In a study on Turkish population reported that about 230,000 new cases of coronary artery diseases diagnosed every year among them men and women were 66000 and 61000 respectively⁶. It was also observed that stress hyperglycemia can cause increased blood sugar level even in non-diabetic peoples and ultimately myocardial infarction and death⁷.

Stress hyperglycemia has gained popularity among patients presenting with acute myocardial infarction even they do not have diabetes previously and associated with high morbidity and mortality, different stress mechanism are responsible for this in critically ill patients^{8,9}. The blood glucose varies in the range of 140–300 mg/dl¹⁰. We conducted this study to determine the frequency of stress hyperglycemia in patients presenting with acute myocardial infarction and its associated mortality in our patients and to collect local

data about it to estimate the burden of the problem and further gate way to research on it.

MATERIALS AND METHODS

Study was conducted at medicine department of Nishtar hospital, Multan in six months duration from November 2021 to May 2022. Study was started after ethical approval from hospital ethical board. Informed consent was taken from patients after detail description of study. Acute myocardial infarction was labeled when patients presenting with typical chest pain for more than 30 minutes, ST segment elevation on ECG and elevated cardiac enzymes (trop-I >0.03) on laboratory tests. Mortality was death of the patient during current hospitalization due to AMI. Non Diabetic Patients were defined as patient with HbA1C < 5.7 % at admission. Random Blood Sugar was taken as blood sugar level measured at any time regardless of meals. Stress Hyperglycemia was defined as blood sugar levels above 140 mg/dl on 3 times in 24 hours after admission of the patient with acute MI and not previously diagnosed with diabetes mellitus as determined by HbA1C below 5.7%.

Patients of both genders above 35 years of age who presented with typical chest pain having ECG changes and raised troponin levels were enrolled for the study. Patients with previous known case of DM and IHD, patients with other co-morbid like chronic renal failure, decompensate liver cirrhosis (on USG abdomen) and COPD and pregnant women were excluded from the study. Their blood sugars level monitored and who have blood sugars levels above 140mg/dl on 3 occasions in first 24 hours having HbA1C below 5.7% were included in the study after getting the consent of the patients describing the objectives of the study. ALL necessary lab tests including HbA1C, RBS, RPMS, LFTS, USG Abdomen and X-ray chest were done to include proper patients. Those who gave history or found to have CRF, COAD, cirrhosis and previous IHD were excluded from the study. All information about patient age, gender, weight, height (BMI), hypertension, DM, socioeconomic status including residence urban or rural and smoking habits were NOTED on described Performa. The patients were followed till discharge or death to observe mortality. Acute myocardial infarction was labeled when patients presenting with typical chest pain for more than 30 minutes, ST segment elevation on ECG and elevated cardiac enzymes (Trop-I >0.03) on laboratory tests. Mortality was death of the patient during current hospitalization due to AMI. Non Diabetic Patients were defined as patient with HbA1C < 5.7 % at admission. Random Blood Sugar was taken as blood sugar level measured at any time regardless of meals. Stress Hyperglycemia was defined as blood sugar levels above 140 mg/dl on 3 times in 24 hours after admission of the patient with acute MI and not previously

diagnosed with diabetes mellitus as determined by HbA1C below 5.7%. Sample size is determined by the formula; $n = z^2 p q / d^2$ Where $z=1.96$, $p= 10.1 \%$, $q= 89.9 \%$, (frequency of mortality) and $d= 5 \%$. Thus sample size $n = 140$ patients.

Data analysis was done by using SPSS version 24, frequency percentages and mean standard deviation were calculated for continuous and qualitative variables. Test of significance (t-test and chi square) were applied to see association among variables. P values were taken significant as it was below or equal to 0.05.

RESULTS

Table No.1: Demographics of Patients

Gender	Frequency	Percentage
Male	87	62.1
Female	53	37.9
Up to 50 Years	48	34.3
More than 50 Years	92	65.7
Residential status		
Rural	50	35.7
Urban	90	64.3
Socioeconomic status		
Poor	80	57.1
Middle Income	60	42.9
Smoking Status		
Yes	37	26.4
No	103	73.6

Table No.2: Association between in hospital mortality and study variables

Gender	In Hospital Mortality		P-Value
	Yes (n=21)	No (n= 119)	
Male (n=87)	18	69	0.016
Female (n= 53)	03	50	
Up to 50 years (n=48)	14	34	0.002
More than 50 years (n= 92)	07	85	
Rural (n=50)	13	37	0.012
Urban (n=90)	08	82	
Smoking			
Yes (n=37)	09	28	0.104
No (n=103)	12	91	
Hypertension			
Yes (n=74)	04	70	0.001
No (n=66)	17	49	
Obesity			
Yes (n= 26)	03	23	0.765
No (n= 114)	18	96	

In this study 140 patients were enrolled after analysis it was observed that male were higher in proportion as compare to female 87 (62.1 %) and 53 (37.9 %)

respectively. Mean age of patients was observed 55.27 ± 10.07 years with age range 35-70 years. Among male gender mean age of patients was 51.82 ± 10.60 years and female gender was having 60.94 ± 5.70 years which is significant observation statistically ($p=0.001$). Mostly patients of our study 92 (65.07 %) were having age above 50 years (Table-1).

Among total 140 patients 35.7 % were living in rural areas and 64.3 % was living in urban areas. About 57.1% patients were having poor socioeconomic status 42.9% were having middle income in their resources. Similarly 26.4 % were smokers and 52.9 % were hypertensive of our study cases (Table-2).

DISCUSSION

Our study included total 140 patients 62.1 % were male patients while 37.9 % were female patients, as international data suggests that male are more commonly suffered from MI than females. Same findings were observed by Umar et al¹¹ from Abbottabad who reported 65.9 % male patients with AMI vs 34.1 % female patients with MI admissions. Few other studies like one from Multan by Malik et al¹² showed approximately 80% of male patients with myocardial infarction due to stress hyperglycemia. Difference in proportion of male gender and MI could be due to different inclusion and exclusion criteria of selected patients. Another study by Jaffery et al¹³ from Jamsoro showed 77% of male patients having AMI and this ratio is increasing day by day, these numbers are even higher from the result of our study. A study conducted by Shahzad et al¹⁴ reported 67 % male patients have MI event that is may be due to stress hyperglycemia in diabetics or non-diabetics. Ahmed A et al¹⁵ from Bahawalpur also reported 64 % patients with AMI and in another study Cinar et al¹⁶ in their study showed that mortality of 10.1% in patients having AMI and stress hyperglycemia vs 1.3% in those do not have hyperglycemia.

Mean age of patients was observed 55.27 ± 10.07 years with age range 35-70 years. Among male gender mean age of patients was 51.82 ± 10.60 years and female gender was having 60.94 ± 5.70 years which is significant observation statistically ($p=0.001$). These results are clearly showing that females with AMI present in latter ages as compared to male patients already proven by different literature. A study conducted by Atta et al¹⁷ which is close to our study results. Similar results were also shown by Malik et al¹² in their study where mean age of the patients with AMI was 54.99 ± 11.25 years. Shahzad¹⁴ and Jeffery et al¹³ reported 54.78 ± 8.82 years mean age of the male patients and 53.64 ± 10.82 years mean age of the female patients in their studies which is close to the results of our study.

In our study hypertension was observed in 52.9% of patients and incidence of in hospital mortality was 15%

in our study. Umar et al¹¹ reported frequency of hypertension in 34.1 % patients who were presented with acute myocardial infarction, these findings are much lower as compare to our study results. Ahmed S et al¹⁸ from Bahawalpur 86 reported 46 % frequency of hypertension in patients with AMI, these findings are much close to our results. Cinar et al¹⁶ conducted a study on 259 patients with 80.3 % male and 19.7% females having mean age 60 years (32 – 104 years) has reported 10.1 % mortality in AMI patients having stress hyperglycemia compared with 1.3% without stress hyperglycemia.

A study was conducted by Chen et al¹⁹ in 2021 and reported that there was strong association between stress hyperglycemia and worse in hospital outcomes like in hospital mortality, as increased glycemic values were observed in all 341 patients who were presented with acute myocardial infarction ($P < 0.001$). Gao et al²⁰ in a study reported that stress hyperglycemia is positively associated with worse clinical conditions even that it is responsible for in hospital mortality.

CONCLUSION

High frequency of in – hospital mortality was noted among patients with acute myocardial infarction which is significantly associated with male gender, increased age, urban residential status and hypertension. Stress hyperglycemia should always be considered and treated among patients presenting with acute myocardial infarctions, which is associated with prolonged hospital stays and increased in-hospital mortality.

Author's Contribution:

Concept & Design of Study:	Muhammad Tahir
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Revisiting Critically:	Muhammad Tahir, Gohar Ali Arshad
Final Approval of version:	Muhammad Tahir

Conflict of Interest: The study has no conflict of interest to declare by any author.

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