# ACUTE STEMI;
## PREVALENCE OF HYPERTENSION AND DIABETES IN PATIENTS OF ACUTE STEMI ADMITTED IN CCU GHULAM MUHAMMAD TEACHING HOSPITAL, SUKUUR SINDH PAKISTAN

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**ABSTRACT… Objectives:** To find a relationship between acute ST elevation myocardial infarction (STEMI) and two major risk factors i.e. diabetes type 2 and hypertension in adult patients admitted in cardiology department of Ghulam Muhammad Mahar Medical College Sukkur. **Study Design:** Cross-sectional study. **Study Setting:** Department of Cardiology, Ghulam Muhammad Mahar Medical College Sukkur. **Period:** October 2016 to March 2017. 6 months. **Material and Methods:** Total of 764 patients aged 18-80 years were included in the study population on bases of history of chest discomfort and sudden ST elevation MI (STEMI). Those patients with unstable angina and those cases which presented with Q waves were excluded from study population. Blood pressure and blood sample were taken and analyzed in the institution laboratory. **Results:** Off 764 anterior wall Myocardial infarction (including extensive) was seen in 367(48%) while inferior wall Myocardial infarction (including RV and posterior) was recorded in 397(52%) of the study population. 118 (15.44%) were hypertensive and also had diabetes off which 8.11% were female and chi square test reveals a relationship between sex and diabetes and hypertension in the study population. **Conclusion:** A relationship of hypertension and diabetes with STEMI is there. Primary prevention and proper screen program needs to be in place to identify the submerge part of the iceberg.

**Key words:** Hypertension, Diabetes, STEMI.

## INTRODUCTION

Coronary diseases present with non-ST segment elevation myocardial infarction (NSTEMI) and ST segment elevation MI (STEMI)[1] and about 7 million world population is effected by coronary disease.[2] STEMI is a medical emergency and needs secondary prevention promptly in order to not only improve the survival but also long-term prognosis of the patient.[3]

Diabetes mellitus and hypertension are the major risk factors for cardiovascular diseases world wide[4]. there is considerable evidence that the prevalence of hypertension is approximately twice as high in diabetic patients as in the non-diabetic population.[5] Also, DM continues to be associated with considerably increased long-term mortality after an acute myocardial infarction (MI).[6] These risk factors are on increase in an alarming rate[7] in cardiac patients admitted in primary health care hospitals each day and is posing huge health and economic burden on already strained health system. In STEMI previously diabetes alone was consider as independent risk factor but later on hypertension was also associated with poor prognosis.[8] Despite this little is known about the combine impact of these two major non communicable disease on outcome of STEMI. Due to lack of use of the screening facilities the patients reaches the health facility when they have developed the sign and symptoms of STEMI which increases the morbidity and mortality in patients and also has immediate poor outcome in admitted cases.

Also there is lack of data regarding hypertension and diabetes type 2 in patients with STEMI in Sukkar Sindh hence this study was conducted to provide baseline for future research and also to make aware the policy makers of the burden of

disease. The aim of our study was to determine prevalence and relationship of diabetes type2 and hypertension in patients admitted in cardiac care unit of Ghulam Muhammad Mahar Medical College Sukkur Sindh Pakistan

## METHODOLOGY

An cross sectional study of adult patients who were admitted with STEMI at cardiology department of Ghulam Muhammad Mahar Medical College Sukkur between 1st October 2016 to 31st March 2017. The sample size was 764. Patients aged 18-80 years were included in the study population.

## Inclusion Criteria

On history patients having any one or more symptoms of fatigue, chest discomfort, or malaise in the days preceding the event or typical sudden ST-elevation MI (STEMI) without warning were categorized as Acute myocardial infarction.

## Exclusion Criteria

Those patients with unstable angina and those cases which presented with Q waves in their ECGs and after 06 hours of chest pain were not included in the population. The patients were approached by a member of the research team a resident doctor or the nurse in charge within 3 days of admission and baseline information and blood samples were obtained. The study was approved by the Ethical review board of the institute.

## Assessments

Face to face interviews were conducted and history of medications, past medical history, history of hypertension, diabetes, nature of the cardiac event, treatment received and outcome of underlying cardiac conditions were recorded by trained enumerators. Other data HbA1c and blood pressure (BP) were recorded. Average of two readings of BP were taken at 10 minutes apart with patient at rest for at least 30 minutes. BP

was measured by a Digital BP Apparatus Citizen 308B. Hypertension was defined by chronic use of antihypertensive drugs or a previously documented blood pressure $\geq 140/90$ mmHg at stable condition.

## Blood Sampling

Glucose and HbA1c as well as basic biochemistry were carried out on fresh samples. The tests were carried out in the pathology department of the institute. The diagnosis of DM was also based on one of four abnormalities: (1) glycosylated hemoglobin $\geq 6.5\%$; (2) fasting plasma glucose $\geq 126$ mg/dl; (3) classic symptoms of hyperglycemia or hyperglycemic crisis with random plasma glucose $\geq 200$ mg/dl; or (4) abnormal oral glucose tolerance test: 2 hour postprandial plasma glucose $\geq 200$ mg/dl.

The data was analyzed in Microsoft Excel and chi square test was applied. Results were presented in the form of text and in tables.

## RESULTS

A total of 764 patients of STEMI were included in study population off which 468 (61.25%) were male 296 (38.74%) were female. Anterior wall Myocardial infarction (including extensive) was seen in 367(48%) while inferior wall Myocardial infarction (including RV and posterior) was recorded in 397(52%) of the study population. Out of 210(27.48%) who were hypertensive 142(67.61%) were male and 68(32.38%) were female. see Table-I.

Among STEMI patients, diabetes was present in 168(21.98%), out of these 72(42.85%) were males while females were 96(57.14%). see Table-II.

The combined risk factors hypertension and diabetes in STEMI patients were present in 118(15.44%) of STEMI which included 56(7.32%) males and 62(8.11%) females. see Table-III.

| Variables | Male | Female | Total (764) | Chi Square Value |
|-----------|------|--------|-------------|------------------|
| HTN | 142 | 68 | 210 | |
| No HTN | 326 | 228 | 554 | 3.23* |
| | 468 | 296 | 764 | |

Table-I. Showing relationship between hypertension & gender among the study population (n= 764)
* The Chi Square Test Value (3.23) is less than the table value (3.84); thus will fail to reject the null hypothesis.

| Variables | Male | Female | Total (764) | Chi Square Value |
|---|---|---|---|---|
| DM | 72 | 96 | 168 | |
| No DM | 396 | 200 | 596 | 20.10* |
| | 468 | 296 | 764 | |

**Table-II. Showing relationship between diabetes mellitus & gender among the study population (n= 764)**
\* The Chi Square Test Value (20.10) is more than the table value (3.84); thus will reject the null hypothesis.

| Variables | Male | Female | Total (764) | Chi Square Value |
|---|---|---|---|---|
| HTN+DM | 56 | 62 | 118 | |
| No HTN+DM | 412 | 234 | 646 | 7.32* |
| | 468 | 296 | 764 | |

**Table-III. Showing relationship between hypertension+ diabetes mellitus & gender among the study population (n= 764)**
\* The Chi Square Test Value (7.32) is more than the table value (3.84); thus will reject the null hypothesis.

## DISCUSSION

The prevalence of hypertension in our study population was 27.48% which was low as compared to other researchers where hypertension was seen in 30–33%[10] of patients admitted with STEMI may be selection criteria of the patients was different than ours. Although our findings are not significant but still hypertension increases the risk of adverse outcome like stroke, cardiac failure and death.[11] Also female sex is associated with a worse outcome because of advanced age, diabetes and hypertension as they are more prevalent in them as compared to their male counterpart in addition to longer ischemia time and small caliber of the vessels[12] and delay in utilization of the health services which make them more prone to poor outcome. Also very limited studies are done to assess the risk factors in the two sex.[13]

As diabetes is a metabolic disorder it require diligent assessment of blood glucose in relationship with other investigation and complications. Raised blood glucose level may accelerate the process of atherosclerosis.[14] Because of this the patients may higher risk of STEMI and mortality due to myocardial infarction is increased two fold in contrast to non-diabetic subjects of particular age, particularly in females, as they lose the protective effect our their sex.[15] In our study both diabetic and non diabetic subjects had an increased risk of STEMI but as our focus was on diabetic subjects who may have much higher mortality as compared to their counter parts and this has been proven by other researches also.[16] The increase in number of STEMI in hypertensive patients can be correlated to diabetes mellitus type 2, endothelial damage or atherosclerosis.[17]

The combination of diabetes type 2 and hypertension is an important predictor for mortality and morbidity than DM or hypertension[18] alone. Our data indicated that both diabetes and hypertension has a relationship with STEMI but in depth research needs to be done after adjustment for demographic variables like age and other risk factors for STEMI like smoking, LDL, HDL, total cholesterol, and triglyceride levels.[19] The number of diabetic and hypertensive subjects in this study was small, and our study was hospital based, which does not reflect the true scenario of the disease in the community. The best way to get the positive correlation a clinical trial is needed to compare the effect of different levels of lipid-lowering therapy[20] on coronary heart disease in diabetic and hypertensive subjects.

## CONCLUSION

In our study we found a relationship between hypertension and diabetes with cardiovascular diseases especially with life threatening conditions of Acute STEMI. Since both these conditions can be brought under control by primary prevention like effective lifestyle modification specially regular exercise, use of prudent diet and compliance with the prescribed medications in those who are sick. Also proper screening program should be in place to identify the disease in the community

and to improve the quality of life.
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## REFERENCES

1. **ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: The Task Force for the management of acute coronary syndromes (ACS) in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC).** European heart journal.2011. 32(23)2999-3054

2. Gregory P, Drossinos.V, Dafni C, Altsitzoglou P, Antoniadis A, Antonios S. Manolis, Tsioufis C, Ioannis Goudevenos, Kochiadakis G, AlexopoulosD. **Current Management and Quality of Life of Patients with Acute Coronary Syndrome Undergoing Percutaneous Coronary Intervention in Greece: 12-Month Results from Antiplatelet Therapy Observational Study II (APTOR II).** Hellenic J Cardiol 2013; 54: 255-263.

3. Giuseppe Mancia, Robert Fagard, Krzysztof Narkiewicz, Josep Redon, Alberto Zanchetti, Michael Böhm, Thierry Christiaens, Renata Cifkova, Guy De Backer, Anna Dominiczak, Maurizio Galderisi, Diederick E. Grobbee, Tiny Jaarsma, Paulus Kirchhof, Sverre E. Kjeldsen, Stéphane Laurent, Athanasios J. Manolis, Peter M. Nilsson, Luis Miguel Ruilope, Roland E. **Schmieder, Per Anton Sirnes, Peter Sleight, Margus Viigimaa, Bernard Waeber & Faiez Zannad 2013 ESH/ESC Guidelines for the management of arterial hypertension.** Blood Pressure 22 (4).

4. Lars Rydén, Standl E, Bartnik M, Van den G, Berghe Betteridge J, Menko-Jan de Boer, Cosentino F, Jönsson B, Laakso M, Malmberg K. **Guidelines on diabetes, pre-diabetes, and cardiovascular diseases: executive summary: The Task Force on Diabetes and Cardiovascular Diseases of the European Society of Cardiology (ESC) and of the European Association for the Study of Diabetes (EASD).** European Heart Journal. 2007, 28(1), 88–136.

5. Roger VL, Go AS, Lloyd-Jones DM, et al. **Heart disease and stroke statistics—2011 update: A report from the American Heart Association.** Circulation. 2011; 123(4):e18-e209. doi:10.1161/CIR.0b013e3182009701.

6. L.O. Jensen, M. Maeng, P. Thayssen, H.H. Tilsted, C.J. Terkelsen, A. Kaltoft, J.F. Lassen, K.N. Hansen, J. Ravki de, E.H. Christiansen, M. Madsen, H.T. Sørensen, L. **ThuesenInfluence of diabetes mellitus on clinical outcomes following primary percutaneous coronary intervention in patients with ST-segment elevation myocardial infarction.** Am J Cardiol, 109 (2012), pp. 629-635.

7. Gholap N, Davies M, Patel K, Sattar N, Khunti K. **Type 2 diabetes and cardiovascular disease in South Asians.** Primary Care Diabetes. 2011.5 (1) 45-56.

8. Goff DC Jr, Gerstein HC, Ginsberg HN, et al. **Prevention of cardiovascular disease in persons with type 2 diabetes mellitus: current knowledge and rationale for the Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial.** Am J Cardiol 2007; 99:4i-20i.

9. A. El-Menyar, M. Zubaid, A. Shehab et al., **"Prevalence and impact of cardiovascular risk factors among patients presenting with acute coronary syndrome in the middle east,"** Clinical Cardiology, vol. 34, no. 1, pp. 51–58, 2011.

10. A. M. Richards, M. G. Nicholls, R. W. Troughton et al., **"Antecedent hypertension and heart failure after myocardial infarction,"** Journal of the American College of Cardiology, vol. 39, no. 7, pp. 1182–1188, 2002.

11. Shetye A, Nazir SA, Squire IB, McCann GP. **Global myocardial strain assessment by different imaging modalities to predict outcomes after ST-elevation myocardial infarction: A systematic review.** World Journal of Cardiology. 2015; 7(12):948-960.

12. Giuseppe L, SuryapranataH, Dambrink JH, Ottervanger JP, van't Hof A, **Sex-related differences in outcome after ST-segment elevation myocardial infarction treated by primary angioplasty: Data from the Zwolle Myocardial Infarction study.** American Heart Journal 2004. 148(5) 852-856.

13. E.C. Leifheit-Limson, J.A. Spertus, K.J. Reid, et al. **Prevalence of traditional cardiac risk factors and secondary prevention among patients hospitalized for acute myocardial infarction (AMI): variation by age, sex, and race** J Womens Health, 2013. 22 659-666.

14. Yamagishi S. **Cardiovascular disease in recent onset diabetes mellitus.** J Cardiol, 2011. 57. 257-262.

15. Laakso M, Lehto S. **Epidemiology of macrovascular disease in diabetes.** Diabetes Rev 1997, 5. 294-315.

16. Giuseppe M, Guy De Backer, Dominiczak A, Cifkova R,Fagard R, Germano G, Grassi G, **Anthony M. Heagerty E, Stephane K Guidelines for the management of arterial hypertension: The Task Force for the Management of Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC**) European Heart Journal, 2007, 28, 12(1), 1462–1536.

17. Giannella, A., Radu, C. M., Franco, L., Campello, E., Simioni, P., Avogaro, A. Ceolotto, G. **Circulating levels and characterization of microparticles in patients with different degrees of glucose tolerance 2017.** Cardiovascular Diabetology, 16, 118.

18. Chobanian AV, Bakris GL, Black HR, Cushman WC. **The**

seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. JAMA. 2003; 289(19):2560-2571.
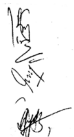
19. Shojaie M, Sotoodah A. **Annexin V and anti-Annexin V antibodies: two interesting aspects in acute myocardial infarction.** Thrombosis Journal2009**7**:13.

20. Putnam K, Shoemaker R. Yiannikouris F, Lisa A. Cassis. **The renin-angiotensin system: a target of and contributor to dyslipidemias, altered glucose homeostasis, and hypertension of the metabolic syndrome.** American Journal of Physiology - Heart and Circulatory Physiology 2012. 302(6) H1219–H1230.

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*Reality is a product of our dreams decisions & actions.*

**– Unknown –**

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## AUTHORSHIP AND CONTRIBUTION DECLARATION

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