DISCUSSION
The present study has been carried out in cardiology unit of medicine department. Patients were included in this present study who were attending OPD, emergency, cardiology OPD & WARDS. The study has been carried out on 53 freshly diagnosed Acute Myocardial Infarction patients. Care had been taken by method of detail history, clinical examination & laboratory investigations to exclude those patients from the study who showed confounding factors for Acute Myocardial Infarction. Informed consent was taken from each patient.

Table –1 shows distribution of patients according to age. As can be seen from the table, the majority of patients were more than 50 yrs. of age which include 32.08% (17 out of 53). I have found no patients below the 30 yrs. of age. In age group 40-49 yrs. and 60-69 yrs. there are 12 & 15 patients respectively.

A study by Mammi MV, Parvitharan Rehman A et al\textsuperscript{70}, 1990 at Calicut Medical college found that percentage of acute Myocardial Infarction patients below 40 yrs. were 17%. This figures has been 3.77% (2/53) in our study possibly because of small number of patients in our study. In this study they found out that 55% of the male patients of Acute Myocardial Infarction were below 50 yrs. This figure has been 22.64% in our study possibly because of the above reason. Percentage of patients below 55 yrs. in their study was 67% compared to 56.603% in our study.
In our study out of 53 patients of Acute Myocardial Infarction female patients were 12 i.e. 22.64%. This is a relatively low figure, the cause of which probably in small sample size of our patient population and also lower incidence and reporting of Myocardial Infarction in females of Bundelkhand region. The maximum number of female patients was in age group 60-69 that is in post menopausal age. The menopause was the probable cause of this.

In the present study out of 53 patients 41 were male and 12 were female. And mean age of patients were 55.32 SD ± 11.22. Mean age of the male patients were 54.25 SD ± 10.56 and female were having mean age was 59 SD ± 13.12.

In our study Hypertension as a risk factor was present in 35.84% (19/53) which was contributed by 32.07% male (17/53) & 3.77% female (2/53). Out of 19 patients; 17 patients were having both systolic and diastolic level more than normotensive range while two patients were having only systolic hypertension along with normal diastolic reading.

A study by J. Alasdair, Anthony F. Lever on pulse pressure as a predictor of cardiac risk in patients with Hypertension found that those with the greatest pulse pressure were at higher risk of coronary events across the range of systolic BP but the effect was most notable when systolic B.P. was high. In our study 19 patients were having high systolic BP out of which two have high pulse pressure.
Percentage of Smokers – of the 53 patients selected, 30.18% (16/53) were bidi/cigarette. Smoker (1-2 bundle/day for at least 10-12 yrs.) and 11.31% (6/53) were tobacco chewer. Studies conducted on Indian coronary artery disease patients who are settled in United State found that smoking is a less commoner risk factor for coronary artery disease in patients of Indian origin compared to whites.

Studies conducted on Indian population showed that the consumption of tobacco is 6.1% of the world's total unmanufactured tobacco, 20% is in the form of cigarettes, 40% is in the form at bidies and rest as smokeless tobacco products. Studies have shown that 40-50% at the males in India are smoker. Smoking increases the risk of coronary artery disease 3-5 times.

In our study smoking as a risk factor was present in 30.18% (16/53). In present study group there were no female having smoking habit probably this is due to relatively low figure of female patients in our study group. It also shows low incidence of smoking habit in females of Bundelkhand region.

A comparative study of smoking\textsuperscript{71} found out incidence of smoking to be 35.8% in urban male and 1.4% for urban female in North India. Corresponding figure for smoking for rural males and females was 54.7% and 34.3% respectively in the same study. In present study 11.31% (6/53) were having tobacco chewing habit. Out of them 9.43% (5/53) were male & 1.88% (1/53) was female. In our study 11.32% having alcohol as a coronary risk factor.

A study of H.S. Rissam et al shows that prevalence of diabetes mellitus in coronary artery disease is about 20% patients and
additional 20% may be having impaired glucose tolerance even
moderate elevation of glucose in Indian is associated with increased
risk of coronary artery disease while in our study 16.98% were
diabetic for at least 5-10 years.

Masaharre, Ishihare MD, Ph D et al, Hiroshima Japan, 199 were
studied 611 patients of Acute Myocardial Infarction, 20% (121/611)
patients were having NIDDM. In our study diabetes is present in
16.98% (9/53) patient.

In previous studies mortality after Acute Myocardial Infarction
was 50% greater in diabetic patients as compared with non diabetic
patients. In our study group mortality in diabetic was about 5.66%
(3/53). While in non diabetic group it was 7.55% (4/53).

In our study the average total cholesterol of patients was
208.88. Maximum patients 47.17% (25/53) were having total
cholesterol value > 240 mg/dl and 2nd highest group of patients were
having total cholesterol level > 220 mg/dl.

The range of total cholesterol seen was 156-266 mg%. Krishnaswamy et al in his study of lipid profile of 877 CAD patients
found mean total cholesterol in CAD patients to be 209.54 compared
to 208.88 in our study.

A study by Gupta R, Kaul V, Prakash H, Sarna M, Singhal S,
Gupta72 UP at Monilek Hospital and research Centre, Jaipur in 200 of
lipid abnormalities in coronary heart disease patients found that
levels of total cholesterol was not significantly higher in coronary
artery disease patients compared to healthy population who were
not having Acute Myocardial Infarction. In present study 88.67% (47/53) patients having total cholesterol level significantly higher i.e. > 200 mg/dl the cause behind this may be that these patients had hypertension and diabetes as associated coronary risk factor.

In the present study 53 patients of Acute Myocardial Infarction were taken. Chest pain was a common & predominant symptom reported by the subjects in the present study i.e. 79.25% (42/53). In remaining number of patients chest pain was absent but main symptoms were nausea, vomiting, palpitation, sense of impending doom or hemiplegia/hemiparesis and on ECG recording Acute Myocardial Infarction was diagnosed.

In our study group maximum patients 33.96% (18/53) belonged to antero-lateral Myocardial Infarction group while 16.98% (9/53) were having extensive anterior wall Myocardial Infarction. Antero septal Myocardial Infarction was present in 15.09% patients & 16.98% presented as having extensive anterior & inferior wall Myocardial Infarction. Inferior wall Myocardial Infarction and inferopost wall Myocardial Infarction present in each 5.66% patient. In this study 3.7% patients had no ECG abnormality but they were Trop T +ve cases.

The study by M Schofield et al (1986) shows that in patient of coronary artery disease the evidence of isolated systolic dysfunction was 25%.

The study done by SH Poulsen et al17 1997. This study was done on group of 63 patients of Acute Myocardial Infarction and showed that the evidence of ventricular dysfunction was present in 83% (53/63). Out of them 21% (13/63) had isolated systolic
dysfunction, 24% (15/63) had isolated diastolic dysfunction, while 38% (24/63) showed both systolic as well as diastolic dysfunction and 17% (11/63) were showing no systolic or diastolic dysfunction. Another study which is also preformed by SH Poulсен et al in 2001, on 183 consecutive patients of acute Myocardial Infarction Preserved left ventricular systolic & diastolic function was present in 39.89% (73/183), Isolated left ventricle systolic dysfunction was present in 5.45% (10/183), left ventricle diastolic dysfunction with preserved systolic function was present in 32.79% (60/183) and combined left ventricle systolic & diastolic dysfunction was present in 21.86% (40/183).

In our study isolated systolic dysfunction was present in 3.77% (2/53) and isolated diastolic dysfunction was present in 22.64% (12/53) while 39.63% (21/53) developed both systolic and diastolic dysfunction. The result of our study in almost same as the study performed by SH Poulсен 2001, in our study percentage of systolic & diastolic dysfunction is higher in comparison to this study while the incidence of isolated diastolic dysfunction was more in Poulсен's study as compared to my study. The presence of left ventricle diastolic dysfunction with preserved systolic dysfunction is associated with increased morbidity & mortality.

AV Goldersis M et al (1992) in their study showed that in coronary artery disease, evidence of reduced fractional shorting in men & women was 18.9% & 10.9% respectively.

Gheorghide M et al 1988 reported that cardiogenic shock occurred in 6% - 20% of patients with Acute Myocardial Infarction. Cardiogenic shock occurs when more than 40% left ventricle get damaged by infarction. Cardiogenic shock occurs in 80% due to
damage of left ventricle & 20% due to ventricular septum defect + mitral regurgitation. Recent large randomized trials of thrombolytic therapy and observational data basis report an incidence rate in the range of 7% about 10% of patients with cardiogenic shock present with this condition at the time of admission whereas 90% develop it during hospitalisation (This low output state is characterized by elevated ventricular filling pressure, low cardiac output, systemic hypotension & evidence of vital organ hypoperfusion). The course of this would more likely be old age, history of a prior Myocardial Infarction, or congestive heart failure, and to have sustained an anterior infarction at the time of development of shock. When shock develops in the course of Acute Myocardial Infarction, it usually due to infarct extension. Mortality rates of about 70 percent. In our study cardiogenic shock was present in 20% (11/53) patients. 63.64% patients were presented with cardiogenic shock (7/11). While 36.36% (4/11) were developed it during hospital stay. The incidence of cardiogenic shock was high in our study as compared to above study the reason may be the ignorance of chest pain due to confusion of myocardial infarction pain, to pain due to gastritis. Most of the time patients were ignored chest pain as they thought that it was due to indigestion or other gastrointestinal trouble. Another cause is large percentage of antero-lateral and extensive anterior wall Myocardial Infarction in our study group. Mortality rate due to cardiogenic shock in our study was 18.18% (2/11) which is very low in compared to above study possibly because of small group of patients in our study. Another reason may be that because of ignorance, some patients had died before reaching the hospital.

In the Worcester heart attach study over a period of thirteen years (from 1975 to 1988) the incidence of cardiogenic shock ranged from 6.7% to 9.1% in a sample of 4762 patients with a mortality rate
of 74%-82%. In comparison our study shows incidence of cardiogenic shock 20% and morality was 18.18%. This is may be due to small sample size of our study group and due to shorter duration of study time. This also shows large incidence of cardiogenic shock in Bundelkhand region.

Bengtson et al\textsuperscript{23} showed that most important independent predictor of in hospital and long term mortality rates was patency of the infarct related artery which we could not assess in our study group due to unavailability of angiography study facilities in our department.

In present study cardiogenic shock was present in 20% of Acute Myocardial Infarction. In our study maximum incidence was present in (40-49yrs) and (60-69yrs) age group. Cardiogenic shock was usually present in those who had multiple risk factors predominantly, diabetes mellitus, hypertension or increased serum cholesterol level and they were also having associated moderate to severe ventricular dysfunction i.e. ejection fraction below 40%.

Right ventricular infarction has been frequently accompanied in inferior left ventricular infarction or rarely occurs in isolated form. Various pathological studies reveal that right ventricular infarction is present in 14% to 34% of patients with transmural left ventricular infarction. In approximately 30% of the patients (20% - 45%) with inferior left ventricular wall myocardial infarction there is some evidence of right ventricular necrosis. In present study right ventricular infarction present in 3.77% (2/53). One patient had infero-posterior Myocardial Infarction + Right Ventricular Infarction the other one had infero-posterior Myocardial Infarction + Right Ventricular Infarction along with ant wall Myocardial Infarction. Smoking was the common risk factor in both and one patient had
serum cholesterol level > 200mg/dl out of the two patients one had died who was having systolic as well as diastolic dysfunction and belonged to age group 60-69 years.

Mechanical causes of congestive heart failure following myocardial infarction includes ventricular septal defect, mitral regurgitation & free wall rupture. As a group they are responsible for 15% mortality after Myocardial Infarction.

The incidence of rupture of the interventricular septum is probably in the range of 2% of Acute Myocardial Infarction patients Biventricular failure generally ensures within hours to day.

Di Suname et al 1997 had reviewed 34 patients of Acute Myocardial Infarction out of them 1-2% represented ventricular septal defect as a serious complication. In our study 1.88% patients presented ventricular septal defect as a mechanical complication of Acute Myocardial Infarction. The result of our study is the same as above.

Cooley DA40, 1998 reported that the post infarction ventricular septal rupture is an uncommon but serious complication of Acute Myocardial Infarction.

Mesa Garcia JM et al36 1998 reported that in Acute Myocardial Infarction patients the most frequent mechanical complication is ventricular rupture which is the cause of death in 26% of cases of Acute Myocardial Infarction. In present study the mortality is 100% in the cases of ventricular septal defect. But ventricular septum defect was not the sole cause of death but there were other associated complications, which had led to mortality of the patients of this group. As on echocardiographic examination there is large defect in ventricular septum due to massive infarction.
Partial or total rupture of a papillary muscle is rare but often fatal complication of transmural myocardial infarction.

Honma et al13 1997, Tokyo Japan evaluated 223 patients of Acute Myocardial Infarction, mitral regurgitation was present in 21% of the patients at the onset & developed in 18% of the patients during followup. Benico Barzilia et al in their study documented that 43% of the total patients were having mitral regurgitation. In present study the incidence of mitral regurgitation was 7.58% (4/53).

Free wall rupture of the infarcted ventricle occurs in upto 10% of the patients due to thinness of the apical wall and usually leads to hemopericardium. It is a very rare finding. Tikiz H et al38 had done study on 350 patients of Acute Myocardial Infarction. The over all incidence of left ventricular aneurysm was 11.7% (41/300). In our study only one patient had developed left ventricular aneurysm i.e. 1.88% (1/53). The patient was having extensive anterior wall myocardial infarction along with inferior wall myocardial infarction Obesity and increased S. Cholesterol level (>200 mg/dl) were the risk factors.

Arrhythmias following Myocardial Infarction can be ventricular or atrial. Prevalence of non-sustained ventricular tachycardia varies in relation to timing of myocardial infarction. Non-sustained paroxysms of monomorphic or polymorphic ventricular tachycardia may be seen in up to 67% of patients. These non sustained ventricular tachycardia do not appear to be associated with an increased mortality risk either during hospitalization or over the first year. Episodes of sustained ventricular tachycardia during the first 48 hours following Acute Myocardial Infarction are associated with hospital mortality of about 20 percent. Now the incidence of ventricular fibrillation following myocardial infarction <10% out of
which 60% developed within 4 hrs. of myocardial infarction while 80% within 12 hours of the onset of symptoms.

*Bobrov VA et al*⁶⁸ studied on a group of 85 patients of acute myocardial infarction admitted within 12 hrs. of the myocardial infarction. Ventricular tachycardia developed in 50% of the patients with acute large size infarct. In present study ventricular arrhythmias present in 3.77% (2/53) which was 28.57% (2/7) of total arrhythmias developed in our study group.

*Eldar M et al*⁶⁰ 1998 had observed that paroxysmal atrial fibrillation was a frequent complication of Acute Myocardial Infarction. The incidence was (8.9% 9.9%) at the time of admission. While in present study the incidence of atrial arrhythmias was 9.43% (5/53) which is 71.43% of total arrhythmias developed in study group. Incidence of total arrhythmias developed following myocardial infarction was 13.21% (7/53).

25% to 40% of patients with Acute Myocardial Infarction have electrocardiographic evidence of sinus bradycardia within the first hour of the onset of symptoms.

A-V block present in patients of Acute Myocardial Infarction due to block on the following level eg A-V node, intraventricular node and bundle of His. In our study group A-V block was present in 9.4% (5/53) patients. In various studies first degree A-V block was present in < 15% patients, 2nd degree in upto 10 percent of patients of Acute Myocardial Infarction while complete AV block develops in 5-15% of patients. The incidence may be even higher in patients with right ventricular infarction.

*Altun A et al*⁶², 1988 reported that A-V block is a frequent complication of inf wall Myocardial Infarction, study done by
Kosuzue M et al 2001 found out the same results. In our study out of 5 patients of A-V block, 3 patients were having inferior wall Myocardial Infarction i.e. 60% (3/5).

The incidence of pericardial effusion following Acute Myocardial Infarction is approximately 25% of patients. In present study pericardial effusion developed in 18.86% (10/53) of patients following Acute Myocardial Infarction. Out of 10 patients of pericardial effusion one had died because of massive pericardial effusion. In our study group pericarditis (alone) is present in 1.88% (1/53) of patient.

Recurrent chest pain after Acute Myocardial Infarction is another common complication of Acute Myocardial Infarction. The incidence of post infarction angina without reinfarction is between 20% and 30%. This complication may occur due to recurrent infarction the incidence of this complication of Acute Myocardial Infarction is 5%-20% within the first 6 weeks and may be somewhat higher in patients who have received thrombolytic therapy. In our study recurrent chest pain was present in 3.77% (2/53) patients Marmor reported that recurrent infarction occurs more in obese, females & patient with non transmural myocardial infarction, & patients with diabetes mellitus those with a previous myocardial infarction. In present study both patients were male this is may be because of low percentage of female patients in our study group both were obese and one had increased serum cholesterol level.

Cerebrovascular accident as a complication of Acute Myocardial Infarction occur in < 10% of cases. Most important contributor of this is left ventricular mural thrombus. In our study this complication was present in 3.77% (2/53) both patient had CT-scan proved large sized infarction. Both were having ventricular
fibrillation and both were got deteriorated & died in hospital. Both were having extensive anterior wall Myocardial Infarction on ECG.

In our study 7.54% (4/53) patients had developed no complications.

About 50% of the deaths associated with acute myocardial infarction occur within 1 hour of the event. In present study of group of 53 patients of Acute Myocardial Infarction the total mortality was 13.21% (7/53). Mortality in our study group maximally contributed by ventricular dysfunction. Though single mortality was contributed by more than one complication.