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جامعة بابل / كلية الطب

The impact of diabetes mellitus on morbidity and mortality in patients with acute coronary syndrome

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The impact of diabetes mellitus on morbidity and mortality in patients with acute coronary syndrome

BY medical student of Babylon university\4th stage 2024

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INTRODUCTION:

Diabetes mellitus is a disorder marked by elevated blood sugar or glucose levels, (hyperglycemia) It has to do with either an insufficient amount of insulin or resistance to its effects. Living with diabetes is a chronic illness. Diabetes is very common, affecting millions of individuals worldwide. If diabetes is identified early and appropriately controlled, you can avoid problems and enhance your quality of life. [1]

Normally, the beta cells in your pancreas release a hormone known as insulin. The Langerhans Islands. Insulin operates by transporting blood glucose into your cells. the key that allows the cells' glucose channels to open. The basal level of insulin is the quantity that the pancreas continuously secretes. Your blood sugar starts to increase as you eat. [1]

The pancreas notices the spike, and responds by releasing additional insulin, known as bolus, that will prevent an excessive increase in blood sugar. The specific cause of diabetes is unknown. It occurs when the pancreas fails to secrete insulin, secretes insufficient insulin, or the body fails to use insulin appropriately. [1]

The most common types of diabetes are :

Type 1 diabetes: an autoimmune condition where the pancreas does not secrete

- insulin at all (your immune system attacks the beta cells). It is generally diagnosed [1] before the age of 30, but it can occur at any age. **Type 2 diabetes:** a condition where the pancreas does not secrete enough insulin

- or your body does not use insulin properly (known as insulin resistance). It is the most common type of diabetes. It can occur at any age, but usually above the age of 40.[1]

symptoms of diabetes (.Frequent urination ,Increased thirst, Fatigue, A rapid weight loss (unintentional),Increased appetite, Blurred vision ,Tingling, numbness, or burning sensation in your extremities, especially in your feet and legs, Frequent infections mainly in skin and urine.) : **risk factors for diabetes**:(family history of diabetes, being age 45years and above, smoking, obesity, getting no or little exercise ,following unhealthy diet).[1]

He/she will diagnose diabetic patients if have one of following:

- HbA1C equal to or greater than 6.5%. HbA1C is a blood test that measures the amount of sugar that attaches to protein in the red blood cells.
- Fasting blood glucose level equal to or greater than 126 mg/dl at two or more occasions. You shouldn't eat or drink at average 8-12hours before test
- Oral glucose tolerance test (OGTT) equal to or greater than 200 mg/dl
- Random blood glucose level greater than or equal to 200 mg/dl along with symptoms of diabetes. And all the criteria confirmed by repeated tests or patients with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose !200 mg/dl (11.1 mmol/l).[1]

The complication of diabetes mellitus includes:

1. Acute complications :hypoglycaemia or hyperglycaemia

2. *Chronic complications: If not properly managed, diabetes might cause serious complications due to the damage caused by glucose to blood vessels. The most common complications include :coronary heart disease (narrowing of the coronary arteries that carry blood filled with oxygen to your heart), Stroke, Retinopathy (damage to the tiny blood vessels that supply blood to the retina; a thin tissue layer located in the back of your eye), Neuropathy (damage to the nerves, especially in the legs), Kidney disease.[1]*

The Coronary artery disease is the commonest cause of angina and acute coronary syndrome and the leading cause of death worldwide. It also has a devastating effect on quality of life. It has been estimated that CAD is responsible for 10% of disability-adjusted life years in low-income countries and 18% in high-income ones. In the UK, 1 in 3 men and 1 in 4 women die from CAD, an estimated 188000 people have a myocardial infarct each year, and approximately 2.3 million people are living with CAD.. . Signs and symptoms of coronary artery disease occur when the heart doesn't get enough oxygen-rich blood .cholesterol deposits (plaques) in the heart arteries and inflammation are usually the cause of coronary artery disease.. If you have CAD, reduced blood flow to the heart can cause chest pain (angina) and shortness of breath. A complete blockage of blood flow can cause a heart attack.[2]

CAD often develops over decades. Symptoms may go unnoticed until a significant blockage causes problems or a heart attack occurs. Following a heart-healthy lifestyle can help prevent coronary artery disease.[2]

Symptoms

Symptoms may go unrecognized at first, or they may only occur when the heart is beating hard like during exercise. As the coronary arteries

continue to narrow, less and less blood gets to the heart and symptoms can become more severe or frequent.[2]

Coronary artery disease signs and symptoms can include:

Chest pain : *the patient feel pressure or tightness in your chest. Some people say it feels like someone is standing on their chest. The chest pain usually occurs on the middle or left side of the chest. Activity or strong emotions can trigger angina. In some people radiate to arms, back, or neck.[2]*

Shortness of breath

Fatigue

Heart attack: *The classic signs and symptoms of a heart attack include crushing chest pain or pressure, shoulder or arm pain, shortness of breath, and sweating. Women may have less typical symptoms, such as neck or jaw pain, nausea and fatigue. Some heart attacks don't cause any noticeable signs or symptoms.[2]*

Pathogenesis:

CAD *is caused by atherosclerosis but rarely*

it can occur as the result of aortitis ,vasculitis

and autoimmune connective tissue diseases.

Atherosclerosis is a progressive inflammatory

disorder of the arterial wall that is characterized

by focal lipid-rich deposits of atheroma that

remain clinically silent until they become

large enough to impair tissue perfusion, or until ulceration and disruption of the lesion occurs resulting in thrombotic occlusion or distal embolisation of the vessel. Atherosclerosis begins early in life with deposits of lipids in the vessel wall, which tend to occur at sites of altered arterial shear stress, such as bifurcations, and are associated with abnormalities of endothelial function at that site. Abnormalities of arterial function have been detected among high-risk children and adolescents, such as cigarette smokers and those with familial hyperlipidaemia or hypertension.[2]

Risk factors

Age . Sex .Family history .Smoking. High blood pressure. High cholesterol. **Diabetes mellitus**. obesity. Not getting enough exercise. Unhealthy diet. Alcohol use.[2]

Complications

Coronary artery disease can lead to:

Chest pain (angina): When the coronary arteries narrow, the heart may not get enough blood when it needs it most — like when exercising. This can cause chest pain (angina) or shortness of breath.[2]

heart attack: can happen if a cholesterol plaque breaks open and causes a blood clot to form. A clot can block blood flow. The lack of blood can damage the heart muscle. The amount of damage depends in part on how quickly you are treated. [2]

Heart failure: Narrowed arteries in the heart or high blood pressure can slowly make the heart weak or stiff so it's harder to pump blood.[2]

Irregular heart rhythms (arrhythmias): Not enough blood to the heart can alter normal heart signaling, causing irregular heartbeats.[2]

***Diabetes mellitus (DM) is a significant risk factor for cardiovascular disease**, particularly ischemic heart disease (IHD). Some diabetic patients have coronary stenosis that prevents blood flow to the heart, whereas others have coronary microvascular disease with no plaques in the epicardial arteries.[3]*

*Acute Coronary Syndrome spans a range of diseases, from unstable angina to myocardial infarction (MI). Diabetes Mellitus, particularly **Type 2 Diabetes**, is a well-documented risk factor for coronary artery disease and is frequently found in patients presenting with ACS. The coexistence of diabetes and ACS creates unique therapeutic challenges and is associated with poorer clinical outcomes than non-diabetic ACS patients. Diabetes mellitus affects **180 million** people globally occurs in up to **25% to 30%** of all patients receiving percutaneous coronary intervention (PCI).[3]*

Diabetes mellitus (DM) is linked to increased cardiovascular risk and mortality, and it has long been recognized as an independent risk factor for cardiovascular disease (CVD), as well as an independent predictor of poor clinical outcomes following PCI. Diabetes mellitus is considered a coronary heart disease risk equivalent and an essential component in developing treatment strategies for coronary artery disease as well as assessing clinical outcomes following PCI. Diabetes significantly reduced myocardial microvascular perfusion, which is considered a clinically relevant prognostic marker of plaque progression in coronary artery disease.[3]

Diabetes mellitus significantly reduced myocardial microvascular perfusion, which is considered a clinically relevant prognostic marker of plaque progression in coronary artery disease. Epidemiological statistics indicate a consistent association between glycosylated hemoglobin (HbA1c) levels and the risk of cardiovascular morbidity and mortality. The risk of cardiovascular morbidity increases by 10% for every 1% increase in HbA1c levels. Hyperinsulinemia and insulin resistance have an impact on blood coagulation mechanisms, which contribute to the development of atherosclerosis. Hypercoagulation and decreased fibrinolysis are observed, which may contribute to intracoronary thrombosis. Damage to the endothelium and its dysfunction are found in DM type II patients, which is an additional risk factor for developing CAD.[3]

The long-term consequence of both type 1 and type 2 diabetes that has the biggest influence on prognosis in terms of mortality and morbidity is cardiovascular disease (CVD). Compared to non-diabetic patients, diabetic patients have larger atherosclerotic plaque burdens and wider calcium deposits in their coronary arteries, which increases their chance of dying.[3]

REVIEW OF LITERATURE:

Several cardiovascular risk factors are involved in the pathogenesis of IHD. Diabetes mellitus is considered one of the strongest risk factors for cardiovascular disease, including IHD, cerebrovascular disease, and peripheral arterial disease. Patients with DM are at double the risk of cardiovascular disease .

The most common cause of death among diabetic patients is cardiovascular disease, and IHD is responsible for the majority of deaths. The risk of increased cardiovascular morbidity and mortality has been well described and, because of this, diabetes has been named a “cardiovascular disease equivalent” .

Long-term risk of myocardial infarction in patients with diabetes was similar to that of patients with a previous myocardial infarction .

Moreover, one-year mortality in patients with myocardial infarction is higher in diabetic patients compared with in those without it . It has been noted that patients who develop DM at a younger age present more cardiovascular complications .

Cardiovascular disease is the long-term complication of T1DM—as well as of T2DM—with the greatest impact prognosis both in terms of mortality and morbidity. T1DM is associated with a markedly increased risk for IHD compared with the general population , similar to the increased risk associated with T2DM.

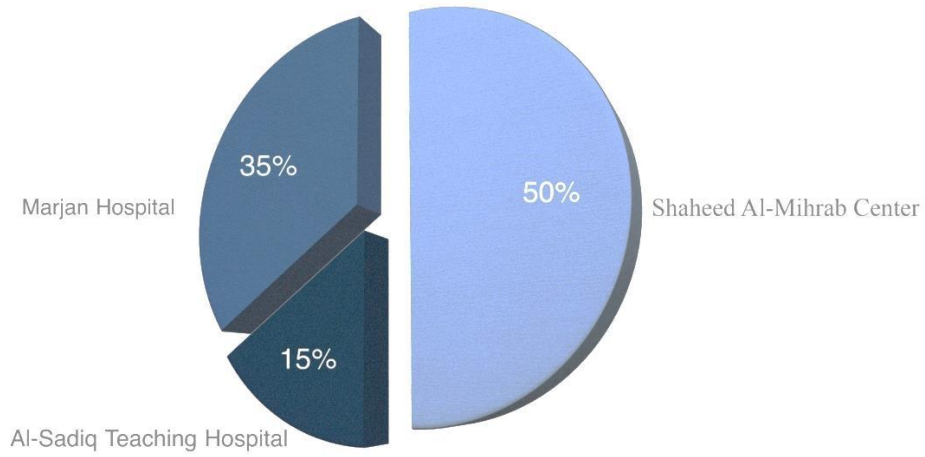
Cardiovascular disease in T1DM differs from in T2DM, mostly in terms of age and gender difference. Risk factors have different influences in T1DM versus in T2DM on susceptibility to cardiovascular disease. There are several potential pathophysiological mechanisms through which diabetes causes cardiovascular disease. Usually, subjects with T2DM have other risk factors, such as hypertension as well as dyslipidemia, that are linked with increased cardiovascular risk.

PATIENT AND METHOD:

*At the beginning of our research, we worked to obtain approval from the Department of Health to conduct the research. After that, we divided into three main groups in order to cover the largest number of hospitals within the governorate, which included Marjan Hospital, ALSadiq Teaching Hospital, and Shaheed Al-Mihrab Center. The study was conducted with a sample of **515** patients who had **acute coronary syndrome** selected randomly from various hospitals located in the Hilla , Babylon.*

*The number of men was **328** and the number of women was **187** and their ages ranged from **17 to 90** years on average .*

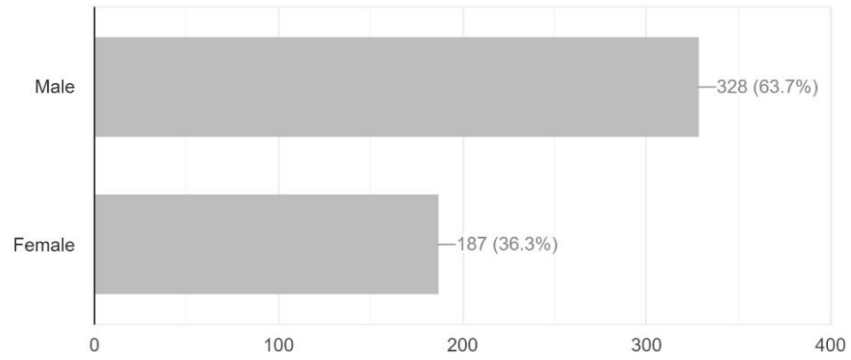
Hospitals of research



THE RESULT:

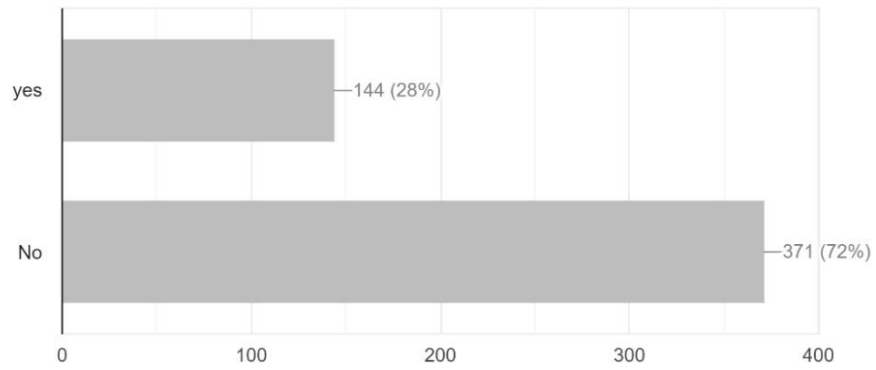
Sex

0 / 515 correct responses



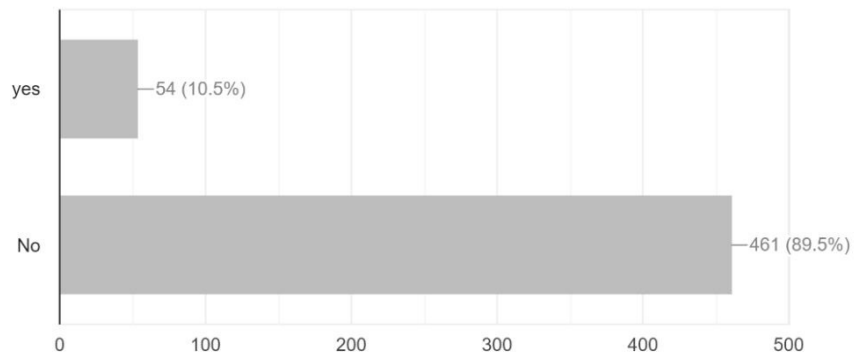
Previous History of IHD

0 / 515 correct responses



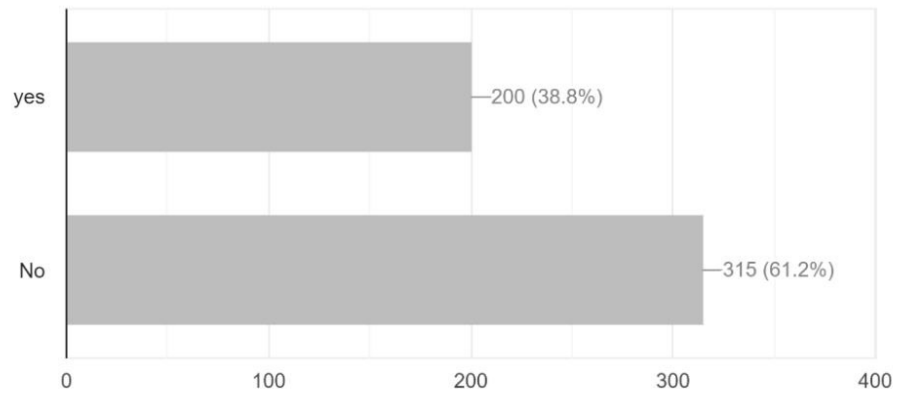
Previous History of HF

0 / 515 correct responses



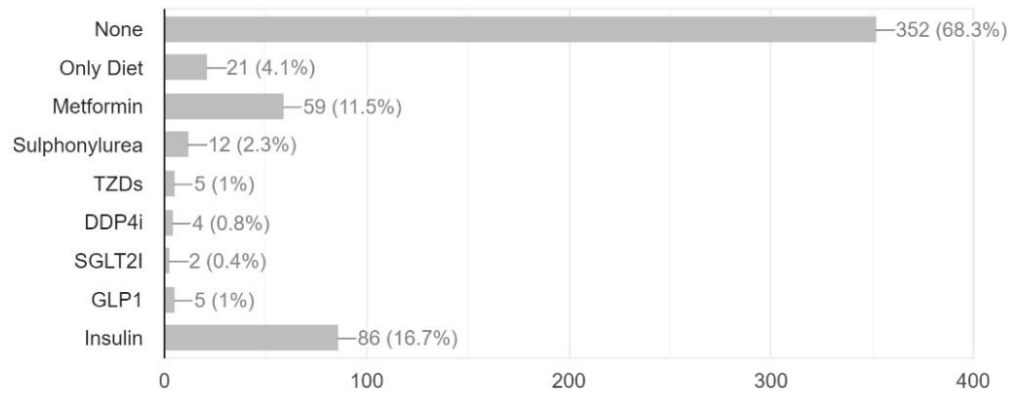
Previous History of DM

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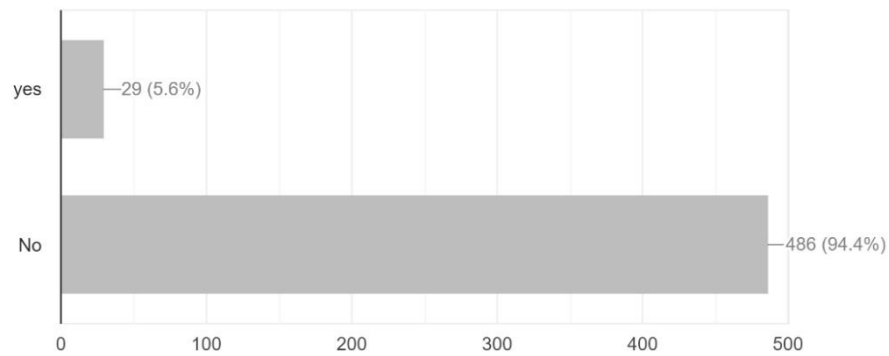
DM treatment before admission

0 / 515 correct responses



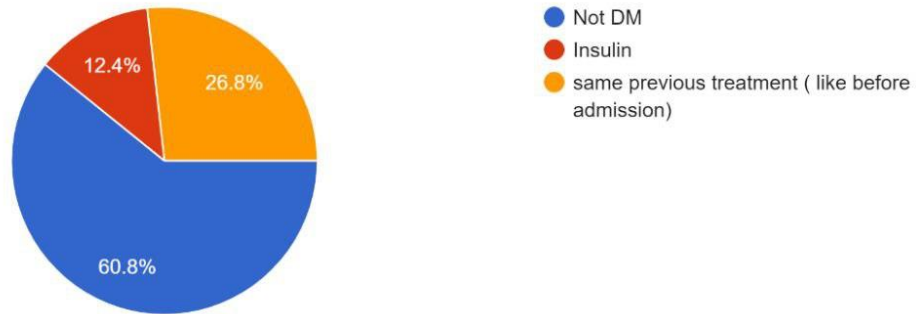
Newly Diagnosed with DM

0 / 515 correct responses



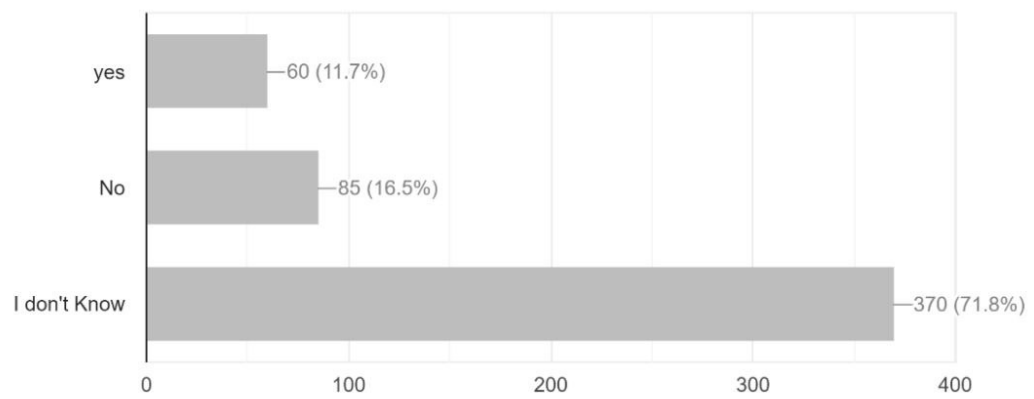
Treatment of DM in hospital

515 responses



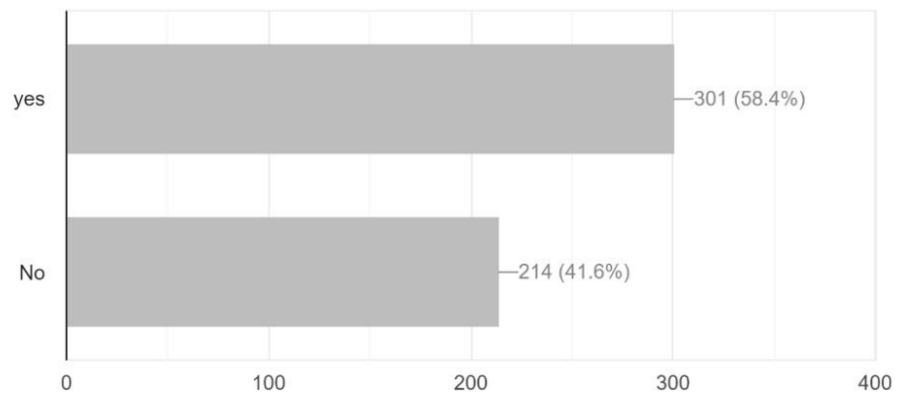
Previous History of obesity

0 / 515 correct responses



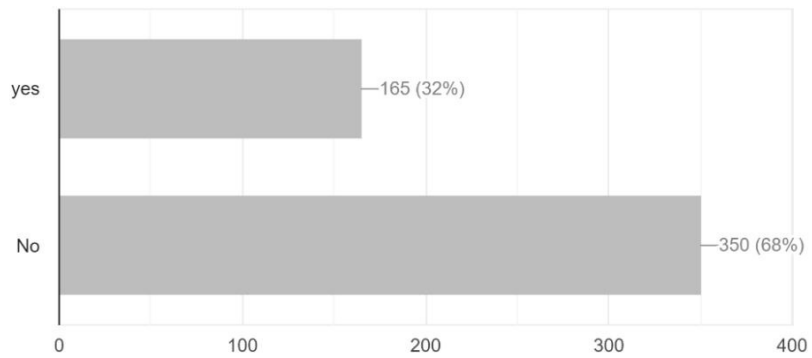
Previous History of Hypertension

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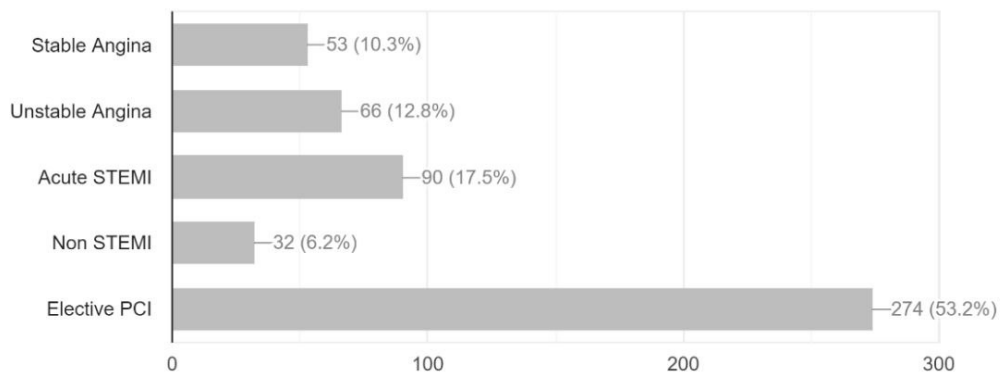
Previous History of Smoking

0 / 515 correct responses



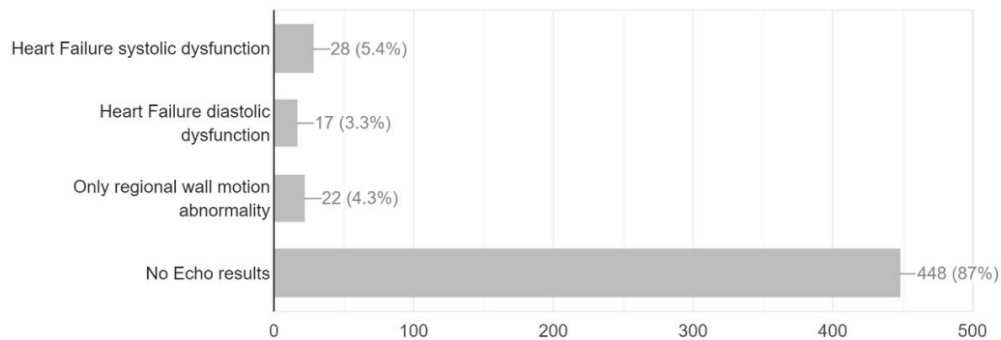
This Admission for

0 / 515 correct responses



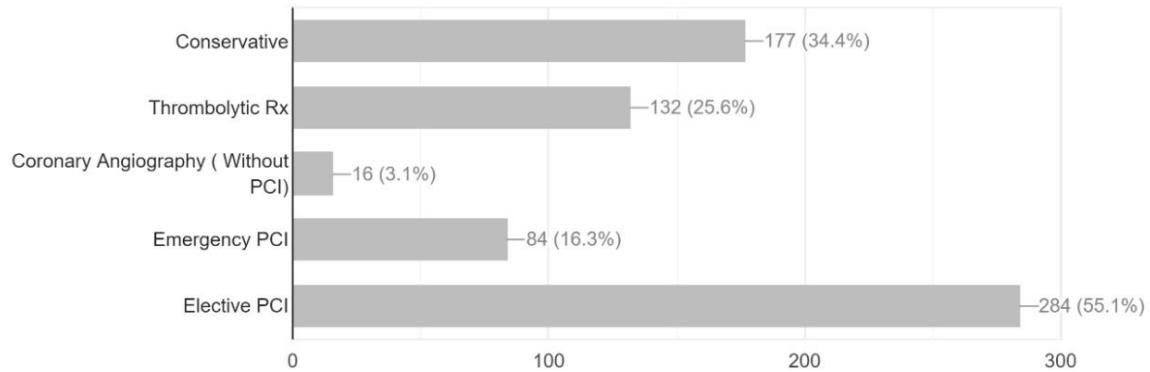
Echo finding

0 / 515 correct responses



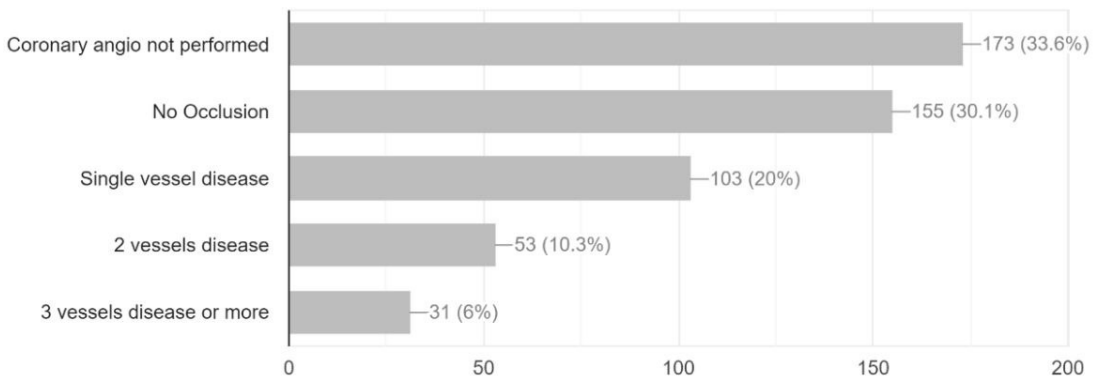
Therapeutic option in this admission

0 / 515 correct responses



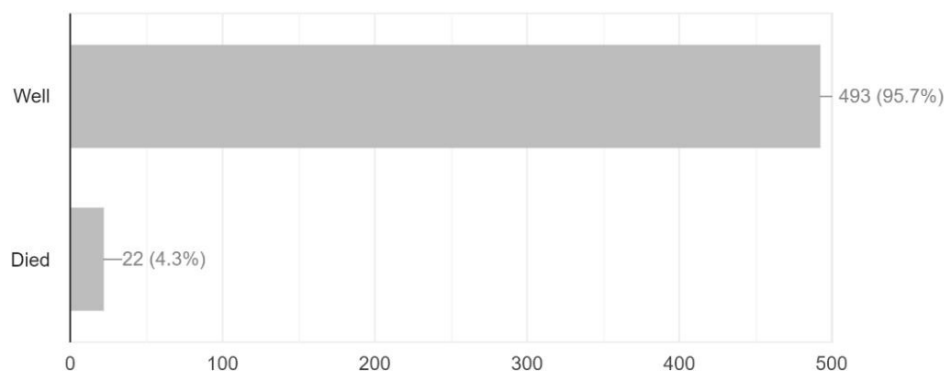
Coronary angio results

0 / 515 correct responses

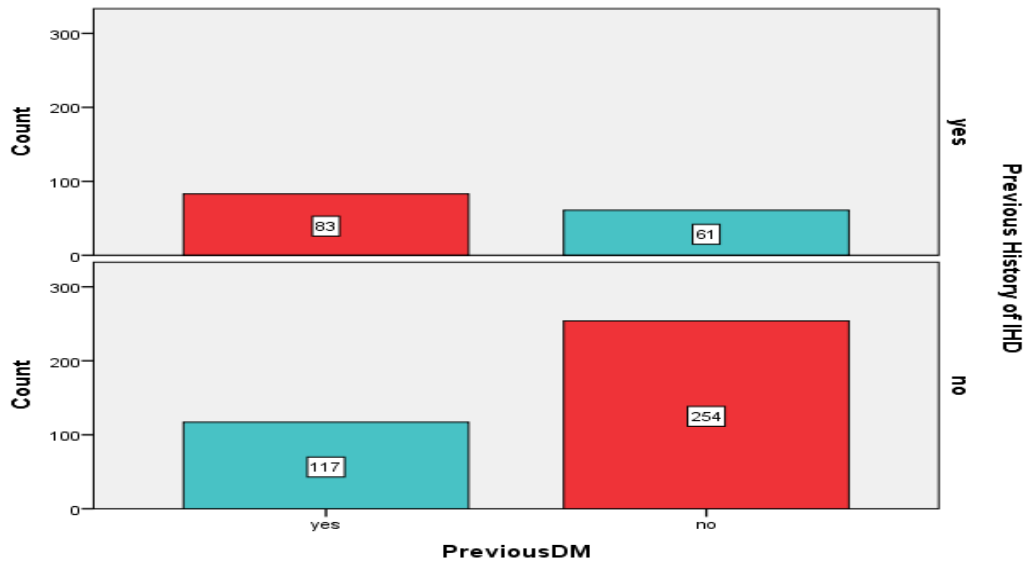


Fate of his admission

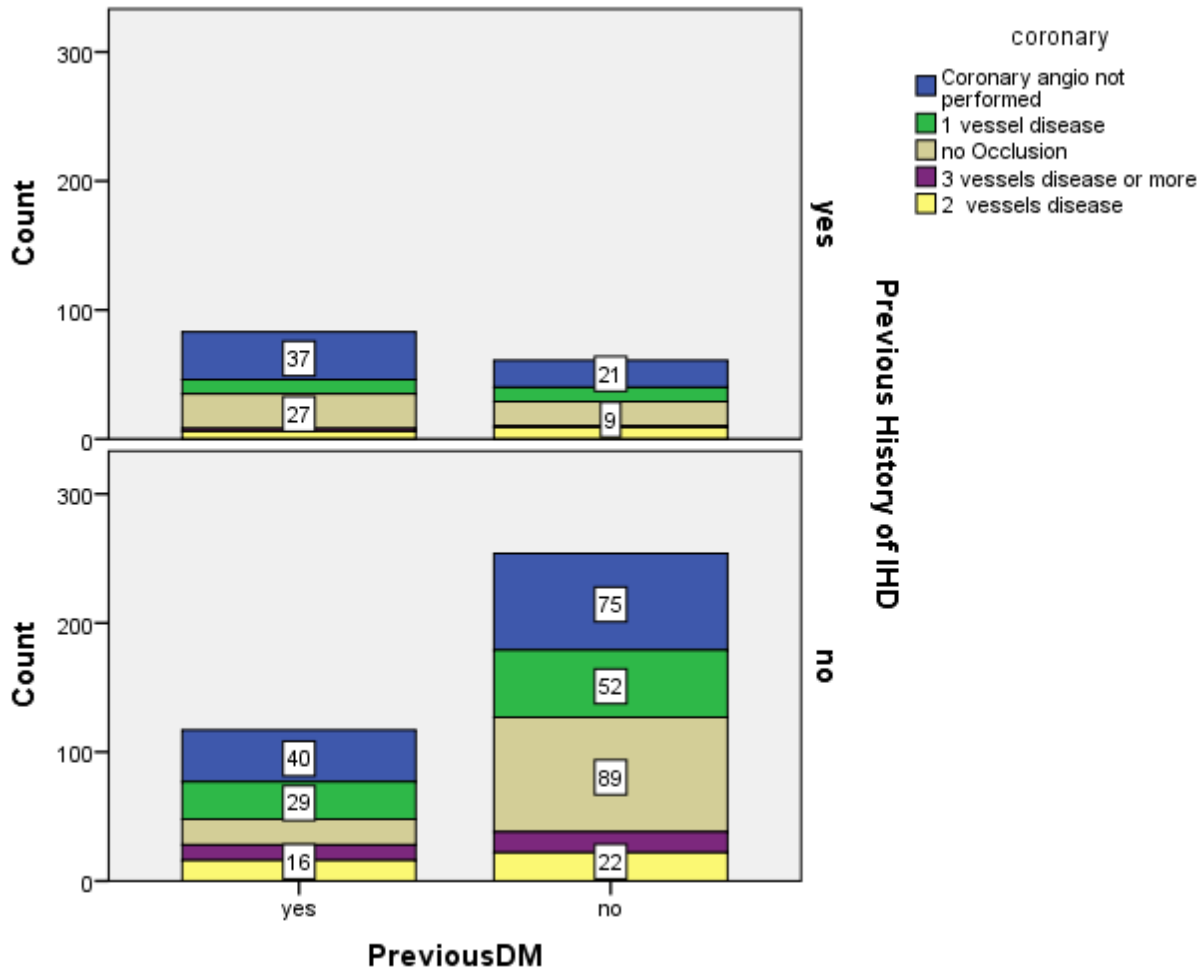
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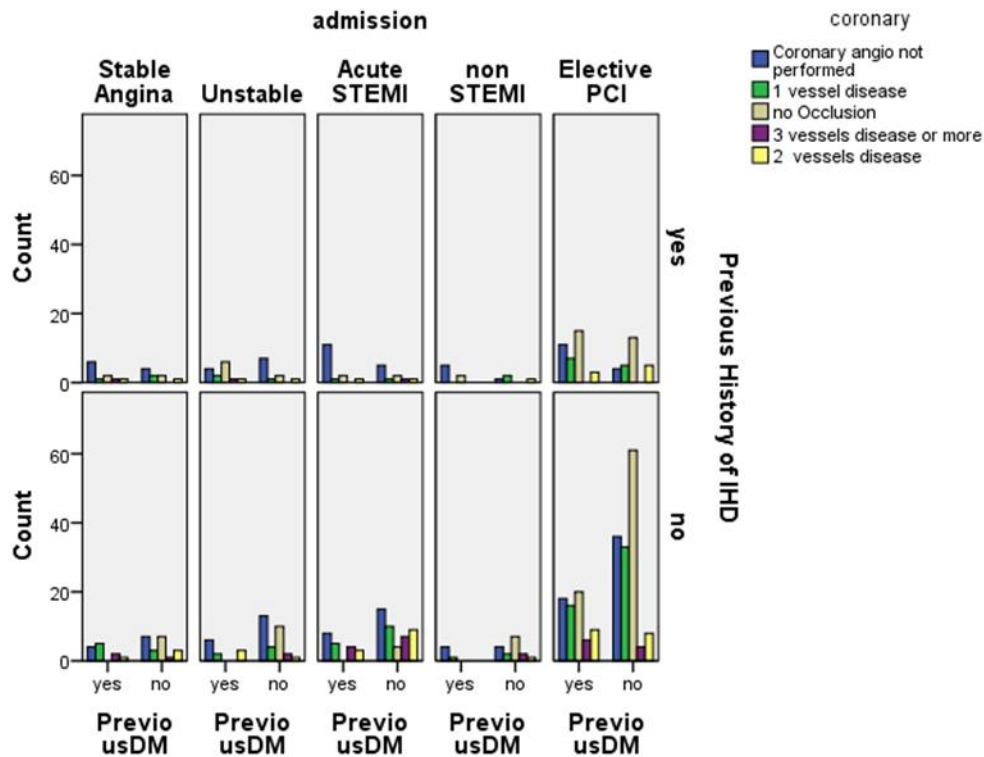
| | | Previous History of IHD | |
|------------|-----|-------------------------|-------|
| | | yes | no |
| | | Count | Count |
| PreviousDM | yes | 83 | 117 |
| | no | 61 | 254 |



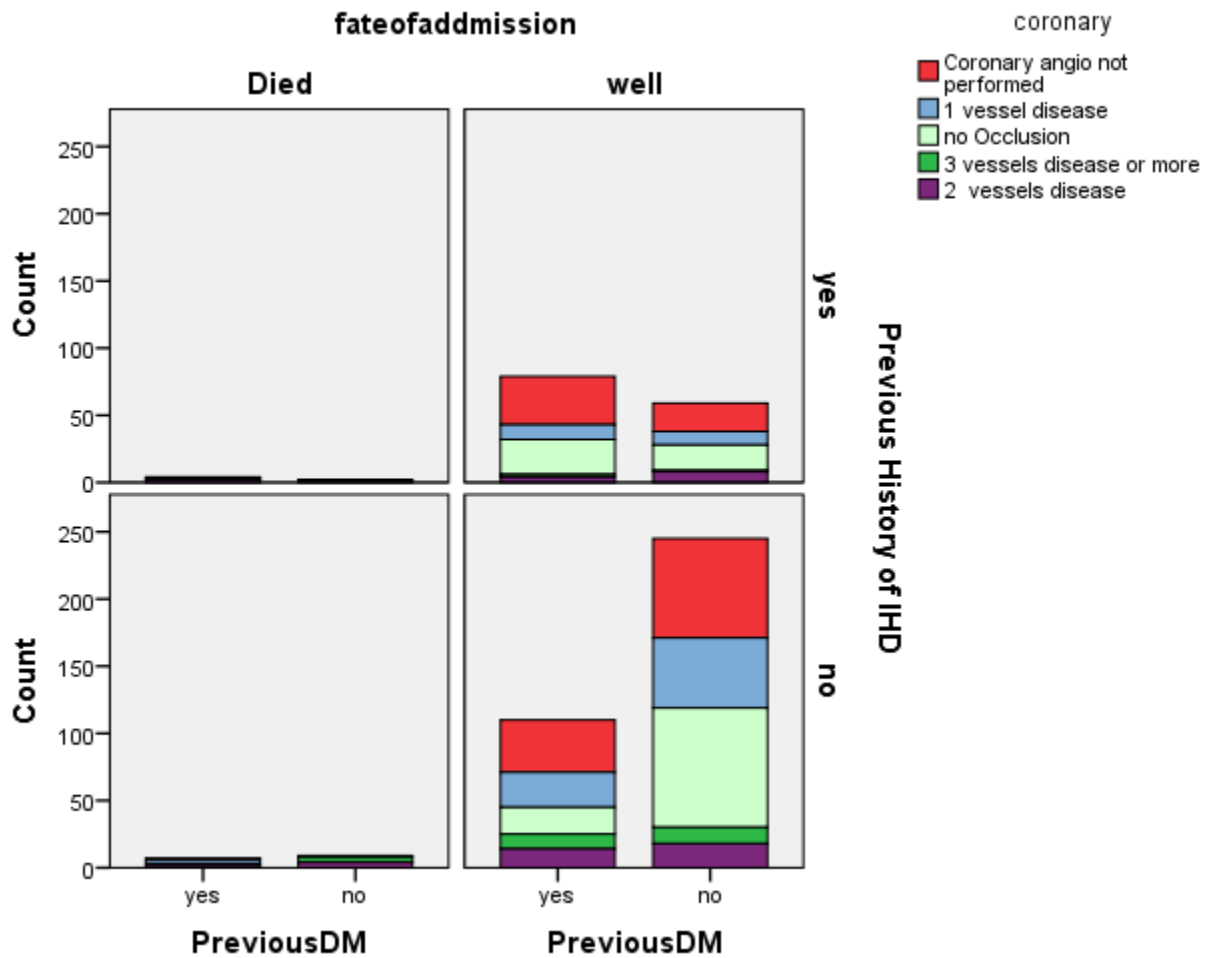
| | | Previous History of IHD | | coronary | | | | |
|------------|-----|-------------------------|-------|------------------------------|------------------|--------------|---------------------------|-------------------|
| | | yes | no | Coronary angio not performed | 1 vessel disease | no Occlusion | 3 vessels disease or more | 2 vessels disease |
| | | Count | Count | Count | Count | Count | Count | Count |
| PreviousDM | yes | 83 | 117 | 77 | 40 | 47 | 14 | 22 |
| | no | 61 | 254 | 96 | 63 | 108 | 17 | 31 |



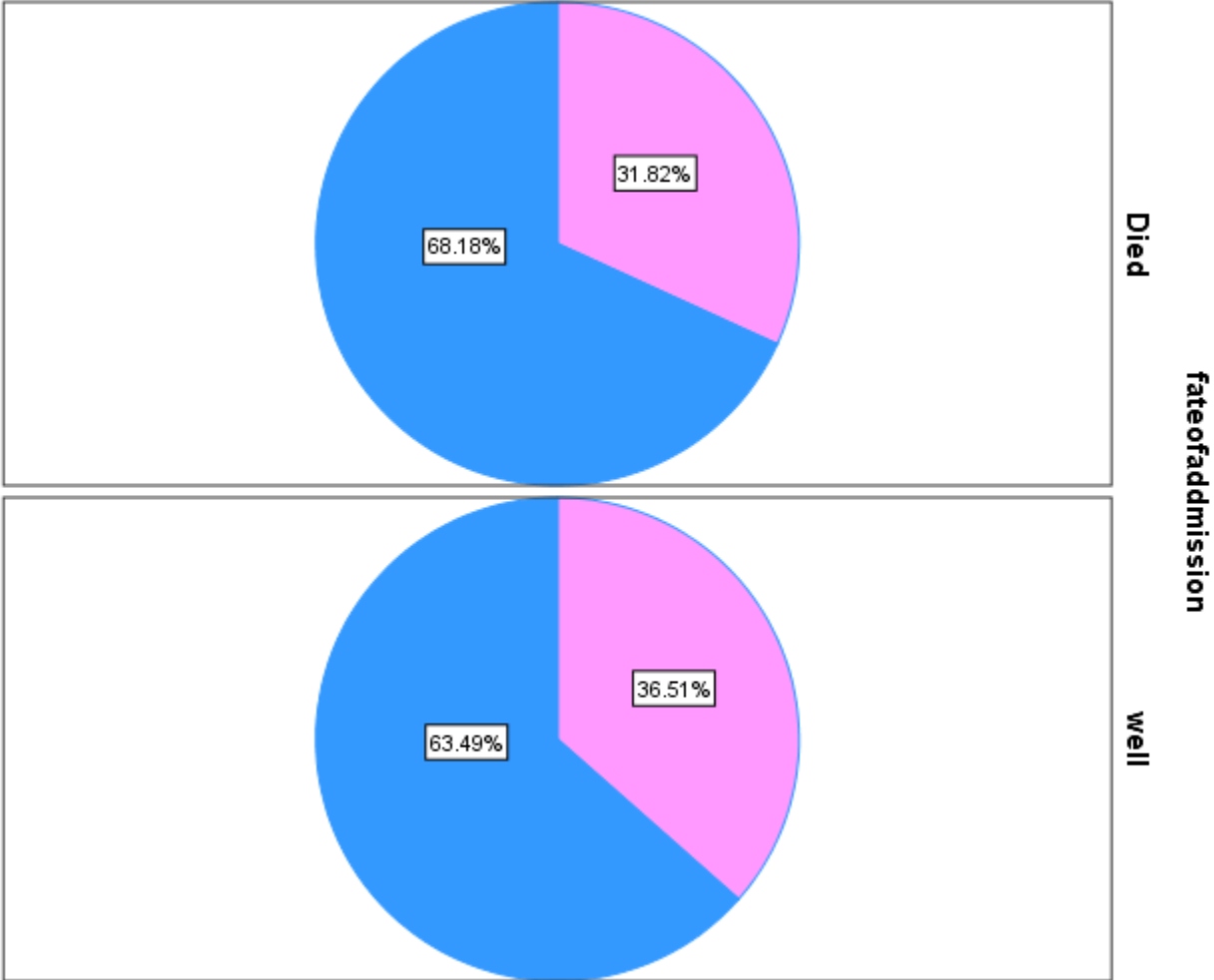
| | | fateofadmission | |
|------------|------------------------------|-----------------|-------|
| | | Died | well |
| | | Count | Count |
| PreviousDM | yes | 11 | 189 |
| | no | 11 | 304 |
| admission | Stable Angina | 5 | 48 |
| | Unstable | 8 | 58 |
| | Acute STEMI | 4 | 86 |
| | non STEMI | 1 | 31 |
| | Elective PCI | 4 | 270 |
| smoke | yes | 10 | 155 |
| | no | 12 | 338 |
| coronary | Coronary angio not performed | 3 | 170 |
| | 1 vessel disease | 4 | 99 |
| | no Occlusion | 1 | 154 |
| | 3 vessels disease or more | 5 | 26 |
| | 2 vessels disease | 9 | 44 |



| | | PreviousDM | |
|-------------------------|------------------------------|------------|-------|
| | | yes | no |
| | | Count | Count |
| Previous History of IHD | yes | 83 | 61 |
| | no | 117 | 254 |
| coronary | Coronary angio not performed | 77 | 96 |
| | 1 vessel disease | 40 | 63 |
| | no Occlusion | 47 | 108 |
| | 3 vessels disease or more | 14 | 17 |
| | 2 vessels disease | 22 | 31 |
| fateofadmission | Died | 11 | 11 |
| | well | 189 | 304 |



| | | gender | |
|-----------------|------|--------|-------|
| | | female | male |
| | | Count | Count |
| fateofadmission | Died | 7 | 15 |
| | well | 180 | 313 |



DISCUSSION:

the number of people worldwide with diabetes is rising. while many may not realize it, having diabetes comes with a higher risk for heart disease. Diabetes can damage blood vessels and make the heart muscle stiffer. This eventually leads to problems with fluid retention and heart failure. People with diabetes also have a risk of premature accelerated coronary artery disease. This means that compared to those patients who don't have diabetes, the walls of arteries have more fatty deposits and begin to harden earlier and without many warnings, making treatment more difficult and causing the condition to progress faster. Subsequently, people with diabetes have an increased risk of recurrent heart attacks and scarring of the heart muscle, which increases the risk of sudden cardiac death. After a heart attack, the heart muscle does not heal as well as in people who don't have diabetes. Also, the risk of complications, such as developing heart failure, is significantly higher.[4] Due to nerve damage caused by diabetes, patients may not feel chest pain or other types of chest discomfort that may signal something is wrong with the heart, so heart disease may not be detected until it is advanced and fewer treatment options are available.[4] They also may suffer from **silent heart attacks** because of lack of warning signs. They may not know that they already have an advanced stage of the disease.[5]The cause of death in those with diabetes is dominated by coronary heart disease, accompanied by increased rates of stroke and peripheral vascular disease, so called macrovascular complications.[5] Patients with diabetes have more multi vessel diffuse and distal coronary disease, smaller reference vessels, poor coronary collateral circulation and more left main stem disease, and more plaque ulceration and intracoronary thrombus was observed in diabetic arteries than in those without diabetes. These features in combination with upregulated glycoprotein IIb/IIIa receptors, inflammation and endothelial dysfunction, make these

patients particularly vulnerable to the atherosclerotic process and its sequel.[5] Diabetes mellitus is a well known risk factor for acute coronary syndrome but the hypothesis that patients with acute phase hyperglycaemia, regardless of the previous diagnosis of diabetes, have worse prognosis than those with normal glucose values is controversial. This search aims to estimate the prevalence of admission hyperglycaemia, its effect on in-hospital prognosis of diabetic and non-diabetic patients with acute coronary syndrome .[4]

The main findings of our study:

The present study of 516 cases from different hospitals in Babylon. Diabetes mellitus and coronary heart disease together represent high risk factors in the population of patients. Patients with DM type 2 already have a cardiovascular risk. The Framingham study found a significant increase in several cardiovascular diseases in DM. American heart association marked DM as the most important risk factor for cardiovascular disease, in the same category as smoking, hypertension and hyperlipidaemia. The present study of 200 cases (38.8%) diabetic patients and 315 cases (61.2%) non-diabetic patients with CAD were analyzed with special emphasis laid on the coronary syndrome (ACS). Our results were compared with similar studies done earlier. In our study the incidence of ACS in males was 328 cases (63.7%), in females the incidence of ACS was 187 cases (36%). The risk of developing ACS in males was more compared to females. Our results compared with studies done in 2014 shows the incidence of ACS in males was (68%) and in females the incidence of ACS was (32%) in our country. Based on residence, our sample size (515 cases) shows that 286 (55.5%) were living in urban areas and about 229 (44.5%) were living in rural areas. Based on marital status, the majority of subjects were married 470 cases (91%) and about 32 cases (6.2%) were single and the remainder 12 cases (2.3%) were widows. There were 144 cases (28%) of subjects

with a history of IHD and 371 cases (72%) without IHD and about 54 of cases (10.5%) with heart failure and 461 cases (89%) without heart failure. The majority of subjects 352 of them (68%) have not treated before admission, 86 of cases (16%) with insulin, 59 of cases (11.5%) with metformin, 21 of cases (4.1%) with only diet, 12 of cases (2.3%) sulphonurea, (0.4%) SGLT21, and (1%) of cases GLP1. The majority of subjects in our study show that about (94.4%) don't diagnose newly with DM and the remainder (5.6%) newly diagnosed with DM.

Treatment of DM in hospital was (26.8%) same as previous treatment before admission and about (12.4%) with insulin. DM appears to contribute directly to the development of CMP, rather than solely via coronary atherosclerosis and hypertension. This diabetic CMP has been described in many noninvasive studies and includes changes that occur in LV structure and cardiac function of diabetics. Specifically, diabetics tend to have greater cardiac mass, particularly LV mass, than those without DM. This may be related to an increased adipocyte release of cytokines such as leptin and resistin which have hypertrophic effects on cardiomyocytes. One study looking at a multi-ethnic population found that the likelihood of having LV mass that exceeds the 75th percentile is greater in patients with T2DM, even after adjusting for covariates.^{[5][6]} Patients with DM also tend to have a slightly diminished diastolic function compared to nondiabetics. One possible mechanism could be that increased triglyceride synthesis in patients with DM leads to increased myocardial triglyceride content.^{[5][6]} Increased cardiac triglyceride accumulation is associated with lipotoxicity and altered calcium hemostasis in myocardium, both of which negatively impact diastolic function. This could help explain the finding that 40%-75% of individuals with DM and no signs of overt coronary artery disease (CAD) suffer from diastolic dysfunction. ^{[5] [6]}

The incidence rate of hypertension among subjects in our study was 301 of cases (58.4%) and about 214 of cases (41.6%) were without hypertension. Hypertension is very common among patients with T1DM and T2DM, with prevalence rates of 30% and 60%, respectively.

Hypertension among diabetic patients is closely tied to the development of diabetic nephropathy (DN).^{[7][8]} With DN, renal cells are stimulated by hyperglycemia, leading to the production of humoral mediators, cytokines, and growth factors. The production of these factors is often responsible for structural alterations seen in the glomeruli of diabetic patients including hyaline arteriosclerosis (primarily of the efferent arteriole), increased collagen deposition of the extracellular matrix, and increased permeability of the glomerular basement membrane. These structural changes increase filtration pressure and often lead to microalbuminemia with a compensatory activation of the renin-angiotensin system (RAAS).^{[7][8]} Chronic activation of the RAAS often progresses to hypertension, placing added stress on the glomeruli and causing additional damage to the nephrons of diabetic patients. If left untreated, DN can progress to a nephrotic syndrome, characterized by proteinuria, a hypercoagulable state (due to loss of ATIII) and hyperlipidemia, which may contribute to the increased risk of CVD seen in diabetic patients with renal dysfunction. Since hypertension is a common comorbidity of patients with DM and a major risk factor for CVD, the current treatment recommendations strongly encourage providers to lower BP in hypertensive diabetics. There are many studies that have investigated the effect of lowering blood pressure in patients with diabetes on CV outcomes. The UKPDS 38 trial examined the effect of tight control of blood pressure control (< 150/85) compared to less tight control (< 180/105) on macrovascular and microvascular complications in patients with T2DM.^{[7][8]} After 9 years of follow-up, mean blood pressure was significantly lower in the tightly controlled BP group (144/82 mmHg) compared to the patients in the less tightly controlled group (154/87 mmHg). In addition, the group with tighter BP control had a **34%** reduction in macrovascular disease risk (myocardial infarction, sudden death, stroke, and peripheral vascular disease) and a **(37%)** reduction in risk of microvascular disease (retinopathy requiring photocoagulation, vitreous hemorrhage, and

fatal or non-fatal renal failure) compared with the less tightly controlled BP group.[7] [8]

Majority of cases were smokers 165 of cases (32%) and about 350 of cases (68%) nonsmokers. The majority of patients were admitted for elective 66 of cases (12.8%) PCI 274 of cases (53.2%), 90 of cases (17%) for acute STEMI, for unstable angina, 53 of cases (10.3%) for stable angina, and 32 of cases (6.2%) for non-STEMI. AND ECHO findings show (87%) no results and about (5.4%) was heart failure with systolic dysfunction , and about (3.3%) heart failure with diastolic dysfunction and (4.3%) only regional wall motion abnormality .

Therapeutic options in each admission was about 284 of cases (55.1%) with elective PCI , and 177 of cases (34.4%) with conservative therapy with about 132 of cases (25.6%) was received thrombolytic treatment, about 84 of cases (16%) undergo emergency PCI , and about (3.1%) of them undergo coronary angiogram without PCI .Coronary angiogram results showed 155 of cases (30%) no occlusion vessels , and about 103 of cases (20%) single vessels disease and 53 of cases (10.3%) with 2 vessels disease and about 31 of cases (6%) with 3 vessels disease and more. Fate of the admission, the results of This work shows that fatal outcomes are about 22 of cases (4.3%) and majority discharge from hospital well 493 of cases (95.7%) .

CONCLUSION:

In our study the incidence of ACS in males was 63.7% (328 cases) . In females the incidence of ACS was 36% (187 cases) .The risk of developing ACS in male was more compared to female. Our results was compared with studies done in 2014 shows the incidence of ACS in males was 68% and In females the incidence of ACS was 32%. Based on residence our sample size (515 cases) shows that 286(55.5%) were living in urban area and about 229(44.5%) were living in rural areas Based on marital status Majority of subjects were married

91%(470cases) and about 6.2% (32 cases) were single and the remainder 2.3%(12cases) were widow. There were 144(28%) of subjects has history of IHD and 371(72%) without IHD And about 10.5% (54 cases) with heart failure and 89% (461 cases) without heart failure. The majority of subjects, 68% (352 of them) Have no treated before admission , 16% (86 cases) with insulin, 11.5% (59 cases) with metformin , 4.1% (21 cases) with only diet , 2.3%(12) sulphonulurea , 1% with TZDs , 0.8% DDP4i , 0.4% SGLT21 , 1% GLP1. Majority of subjects in our study show that 94.4% don't diagnose newly with DM and the remainder 5.6% newly diagnosed with DM The majority of patients were admitted for elective PCI 53.2% (274 case) , 17%(90 case) for acute STEMI , 12.8% (66 case) for unstable angina , 10.3% (53 case) for stable angina , and 6.2% (32 case) for non STEMI . AND ECHO findings show 87% no results and about 5.4% was heart failure with systolic dysfunction , and about 3.3 % heart failure with diastolic dysfunction and 4.3 % only regional wall motion abnormality . Therapeutic options in each admission was about 55.1 % (284 cases) of cases with elective PCI , and 34.4% (177 cases) with conservative therapy with about 25.6% (132 cases) was received thrombolytic treatment, about 16% (84 case) undergo emergency PCI , and about 3.1% of them under go coronary angiogram without PCI . Coronary angiogram results shows 30% (155 case) no occlusion in vessels ,and about 20% (103 case) single vessel's disease and 10.3 (53 case) with 2 vessels disease and about 6% (31 case) with 3 vessels disease and more. Fate of the admission, the results of this work show that fatal outcome is about 4.3% (22case) and majority discharge from hospital well 95.7 % (493 case).

Recommendations and Limitations:

1-Diet:

- Carbohydrate intake from whole grains, vegetables, and others,

especially foods high in fiber and low in glycemic load, drink more water, fewer sugary drinks, and less alcohol. [10][9]

2-Physical Activity:

Try to get at least 150 minutes per week of moderate-intensity physical activity, such as brisk walking. [11][12]

3-Weight:

If the patient is overweight, losing even a modest amount of weight ,and don't have to lose a lot to improve the patient health—even losing 10–15 pounds can make a big difference. [10][13][14]

4-Smoking:

•*The patient should quite smoking or don't smoke.* [14][15]

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