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RESEARCH ARTICLE

ACHIEVEMENT OF TARGET LDL-C IN TYPE 2 DM PATIENTS IN SAUDI ARABIA

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Abstract

Background: Diabetes mellitus (DM) is one of the most common diseases in the world and Cardiovascular diseases (CVD) is among the most common preventable complication of DM. Low-density lipoprotein cholesterol (LDL-C) is known to be a major risk factor for developing CVD. Many guidelines have suggested that controlling LDL-C can contribute to lower the mortality among CVD patients. Aim: To assess Achievement of Target LDL-C in type 2 DM patients in Saudi Arabia, and the prevalence of Lipid lowering agents use among these patients. Data sources: PubMed, Cochrane Library, Science Direct, Embase, and Google Scholar.

Methods: Non interventional retrospective cross sectional study.

Results: The study included 100 patients, age range was between 25 – 82 years old with a Mean age of 51,60. 51% of the participants were males, while 49% were females. 23% of the patients had optimal LDL cholesterol levels below 1,8 mmol/L, while 77% of had suboptimal levels above 1,8 mmol/L. Spearman' s rank correlation was computed to assess the relationship between LDL and BMI. There was a positive correlation between the two variables, $r = 0,071$, $p = 0,484$. The correlation was not significant at the 0,05 level of significance. Spearman' s rank correlation was computed to assess the relationship between LDL and A1C. There was a positive correlation between the two variables, $r = 0,051$, $p = 0,612$. The correlation was not significant at the 0,05 level of significance. The most used medication for lowering cholesterol was atorvastatin, which was taken by 64% of the patients, followed by rosuvastatin, 23% of the patients, 4% of the patients used simvastatin, and 9% of the patients did not receive any treatment and was not offered to them in their follow up visit. 54% of patients who were receiving Lipid lowering therapy did not had dose adjustments during their regular follow up.

Conclusion: It is extremely important to achieve targeted LDL-C in diabetic patients. Physicians should always aim to reach the targeted level by following the latest guidelines and encouraging patients' compliance to medications and lifestyle modifications hence preventing the complications.

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Introduction:-

Diabetes mellitus (DM) is one of the most common diseases around the world. Over the past few years, the prevalence of DM has been increasing (1). As a consequence of the rapid increase of the prevalence of DM, the complications of DM have also increased. Cardiovascular diseases (CVD) is among the most common preventable complication of DM (2).

Diabetes mellitus is a strong risk factor for mortality among CVD patients. A study done in South Korea compared the mortality rate among CVD patients with and without DM. They concluded that patients with CVD and DM have a higher mortality rate compared to CVD patients without DM (3).

Low-density lipoprotein cholesterol (LDL-C) is known to be a major risk factor for developing CVD. Many guidelines have suggested that controlling LDL-C can contribute to lower the mortality among CVD patients.

European Society of Cardiology (ESC)/European Atherosclerosis Society (EAS), and American Diabetes Association (ADA), stressed on importance of primary and secondary prevention of CVD in patients with diabetes (4, 5). ADA guideline suggested "the use of high-intensity statin therapy in individuals with diabetes aged 40–75 years at higher risk, including those with one or more atherosclerotic cardiovascular disease risk factors, to reduce the LDL cholesterol by 50% of baseline and to target an LDL cholesterol goal of <70 mg/dL". It also recommended the use of ezetimibe or a PCSK9 inhibitor to maximum tolerated statin therapy in patients who can't reach the target LDL-C by statin alone (4).

Despite the importance of reaching the goal of LDL-C in DM patients to prevent mortality, many patients still did not reach the target LDL-C. In a study done in China found that only 11.3% of type 2 DM patients hospitalized for ACS achieved the LDL-C goal of < 1.4 mmol/L (6). Hwang et al. looked at the percentage of DM patients who reached the target goal of LDL-C. They concluded that only 35.9% reached the actual LDL-C target value (7).

Up to our knowledge, no study was done in Saudi Arabia to look at the achievement of Target LDL-C among Saudi population. The aim of this study is to assess achievement of Target LDL-C in type 2 DM patients in Saudi Arabia, and the prevalence of lipid lowering agents use among these patients.

Methods:-

Study design:

This is a non-interventional retrospective cross-sectional study. 100 adult patients who visited NGH hospital in 2023 with type 2 DM were included in the study. Sampled patients were selected according to the following criteria: 1- adult with type 2 DM between the age of 18-65. 2- duration of diabetes (5 years and more) 3- regular follow up (every 3 months) in the past year. 4- all patients should be reported as "complaint to follow up and medications" in the chart review.

The electronic chart review included the following: demographic data (age and gender). Hgb A1c readings, BMI readings and LDL-C, Statin use (type and dose). The average readings of Hgb A1c, BMI and LDL-C were calculated and then patients were categorized to (controlled and uncontrolled).

Ethical approval was obtained from the Institutional Review Board (IRB) of King Abdullah International Medical Research Center (KAIMRC).

Statistical analysis:

Data were collected from electronic charts and were entered in a data collection sheet later entered into SPSS. Data management and statistical analysis was carried out using the latest available version of Statistical Package for the Social Sciences (IBM-SPSS) software (Version 23). Descriptive statistical analysis was used to present data. For continuous variables, mean and standard deviations were obtained as for the categorical variables data were presented as frequencies and percentages.

Student t test was used for comparison of mean for continuous variables for subgroup.

Analysis. Chi square (2) was used for comparison of clinical outcomes among any categorical predictor variables. For continuous variables, simple and multiple linear regression models were used to establish any relationship between potential predictor variables and the clinical outcomes.

Results:-

1/ Gender and age:

The present study included 100 patients. The sample's age range was between 25 – 82 years old with a Mean age of 51,60 (Std. Deviation = 11,039) and 51% of the participants were males, while 49% were females.

2/ LDL level:

Our results showed that 23% of the patients in this study had optimal LDL cholesterol levels below 1,8 mmol/L, while 77% had suboptimal levels above 1,8 mmol/L.

3/ Correlation between LDL and BMI and A1C:

Spearman's rank correlation was computed to assess the relationship between LDL and BMI. There was a positive correlation between the two variables, $r = 0,071$, $p = 0,484$. The correlation was not significant at the 0,05 level of significance.

Spearman's rank correlation was computed to assess the relationship between LDL and A1C. There was a positive correlation between the two variables, $r = 0,051$, $p = 0,612$. The correlation was not significant at the 0,05 level of significance.

4/ lipid lowering therapy:

The most used medication for lowering cholesterol was atorvastatin, which was taken by 64% of the patients, followed by rosuvastatin, which was taken by 23% of the patients, 4% of the patients used simvastatin, and 9% of the patients did not receive any treatment and was not offered to them in their follow up visit (graph 1). Our results also showed that 54% of patients who were receiving Lipid lowering therapy did not have dose adjustments during their regular follow up.

Discussion:-

According to ADA Recommendation, Diabetic patients should achieve an LDL-C level of less than 1.8 mmol/L (70 mg/dL) (4). Despite that 91% of patients in our study were on lipid lowering agent, only 23% of those patients reached the target level, while 77% had suboptimal level of LDL-C. The percentage of patients reaching target LDL-C in our study was less than other published studies worldwide. A study done in Korea found that targeted LDL-C level was achieved in 47.4% of diabetic patients (7). Another study done in South Africa by Pisto et al. Reported that 41.3% of the patients included in their study had LDL-C on target (8).

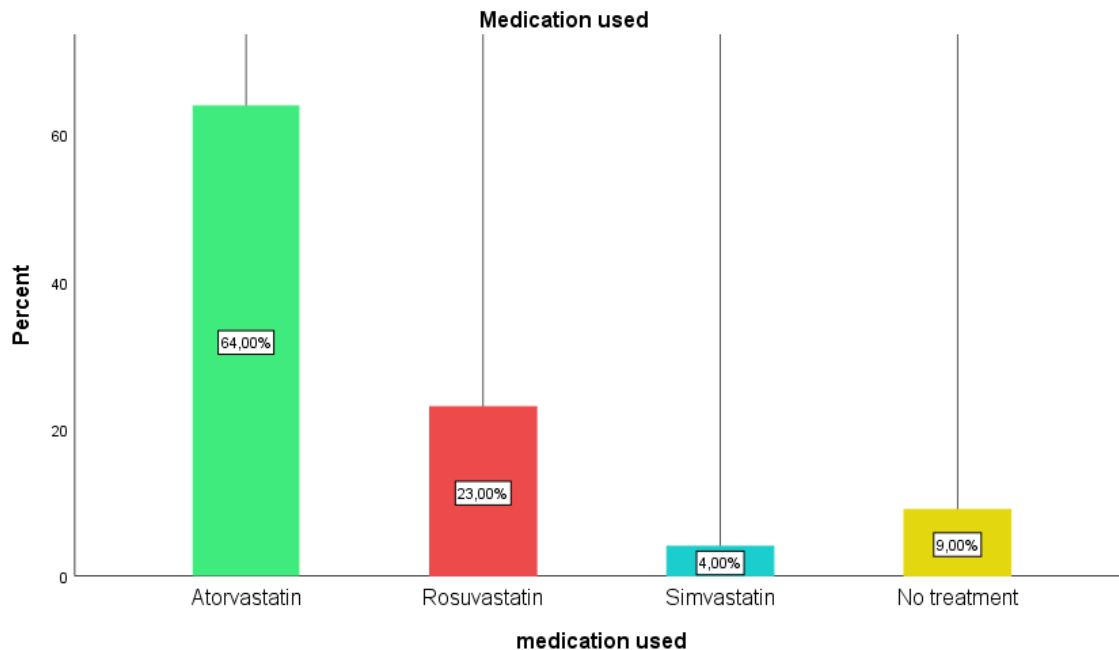
We observed that over the last 4 follow up visits, 54% of patients were not offered lipid lowering therapy dose adjustment by their physicians. Suboptimal treatment of LDL-C has been proven to increase the risk of coronary artery disease, atherosclerosis cardiovascular and strokes (9,10,11). Due to suboptimal treatment of LDL-C, our patients might be at increased risk of these reported complications.

We observed that only 7% of our patients were in high intensity statins despite the availability of high intensity statins in our institutions. Physicians should always aim to reach the optimal level of LDL-C in diabetic patients to prevent complications.

The limitation of our study is that we didn't study other factors that may contribute to not achieving targeted LDL-C. Possible causes include lack of physicians' knowledge about latest updates in management of dyslipidemia in diabetic patients. We also observed that the physicians' main focus during follow up was to control diabetes and adjust its treatment. Another limitation of our study is that we did not look for possible cause that prevented physicians from using high intensity statins examples (side-effects from medication, contraindications and hypersensitivity).

Conclusion:-

Our study looked at very important aspects in achieving targeted LDL-C in diabetic patients. Physicians should always aim to reach the targeted level by following the latest guidelines and encouraging patients' compliance to medications and lifestyle modifications. Special attention should be given to prevent complications.



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