



Examining the adherence of simvastatin prescription in diabetic patients: a descriptive study at Hera General Hospital Makkah (HGH)

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General Note

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ABSTRACT

Introduction: Cardiovascular disease (CVD) is a leading cause of morbidity and mortality. In the gulf countries specially in Saudi Arabia Diabetes type 2 is becoming the highest in the world, affecting around 30% of adults. In fact, diabetes is associated with an increased risk of cardiovascular disease (CVD). The management of high lipid levels in diabetes is a key aspect within the multifactorial technique to save CVD in people with type 2 diabetes. Several meta-analysis studies have in reality validated the

effects of statin remedy. *Aims:* To look into the adherence of simvastatin in patients with type 2 diabetes. *Methods:* A descriptive case looking at 1680 diabetic patients conducted in Hera General Hospital. Data were retrieved from clinical files from January 2018 until December 2018. Data evaluation performed using the SPSS software. *Results:* Almost 95 percent of the population around was older than 45 years. Almost all patients (97%) were on statin therapy. Treatment goal for an LDL less than 2.5 mmol/l was found in (20%) patients. Diabetic men were more likely than diabetic women to receive a statin prescription ($P < 0.05$). *Conclusion:* Data from 2018 showed that diabetic HGH patients showed only a small proportion of patients with diabetes have met the LDL treatment goal this was mainly because of poor adherence. This underline the need for better monitoring, better use of available medicines and new treatment options for better quality of life.

Key Words: Simvastatin, Diabetes type 2, CVD, Dyslipidemia.

1. INTRODUCTION

It's a fact that cardiovascular disease (CVD) is a leading cause of both high rate of morbidity and mortality. Any increase in the levels of total cholesterol and low-density lipoprotein (LDL) are considered a high-risk factor for CVD events. Statins (HMG CoA reductase inhibitors) is classified as lipid-lowering drugs (Ibrahim et al., 2020) that are very effective in lowering cholesterol levels. Multiple large clinical trials such as the Scandinavian simvastatin survival study, cholesterol and recurrent events and West of Scotland coronary prevention study have elucidated that statin help in decreasing major risks of CVD by 30% and moreover, increasing the rate of survival and quality of life. The following statistics are very clear clarifying that there is a solid relationship between cardiovascular diseases (CVD) and diabetes: At least 68 percent of individuals age 65 or more diagnosed with diabetes die from some type of coronary illness; and 16% die from stroke (Ibrahim et al., 2020). In addition, adults with diabetes are two to four times more likely to die from coronary illness than grown-ups without diabetes. In general, people with diabetes may experience cardiovascular disease at a younger age than those without diabetes (Mosca et al., 2020). Needless to mention that the therapeutic effect of a medicine not only relate to patients having his medications prescribed but also on their adherence or compliance with the therapy. Past studies have elaborated the relationship between the low rate of statin prescribing and a lack of adherence to treatment by patients with CVD (McGill et al., 1998, Muhlestein et al., 2003, Kitabchi et al., 2009, Perk et al., 2012, William et al., 2020). In Saudi Arabia we found that simvastatin is one of the highest prescribed statins in general hospitals. Our main aim in this study was at investigating the adherence to simvastatin treatment by patients with type 2 diabetes.

2. METHODS

Study design and participants

This was a retrospective, single-center study; we recruited patients from January 2018 to December 2018 at Hera General Hospital in Makkah, Kingdom of Saudi Arabia. Hera General Hospital is a general governmental hospital. Figure 1 explains the methodology flow chart.

Procedures

We examined the following demographic data, lab results and outcome data from the clinical files. Sample size was calculated based on the formula ($n = Z_{1-\alpha/2} P(1P)/d^2$), where n = sample size = 1600, Z = standard normal variate = 1.96 (at 5% type I error, $P = 0.05$), P = the absolute proportion equals 50%, and D = error of precision equals 5%. Another 20 percent was used to cover any missing information's. The total sample obtained was approximately 1680 type 2 diabetic patients. Diabetics with type 2 both male and female patients (ages from 15 to >60) receiving simvastatin were included in this study. All other types of diabetes, children and other types of cholesterol lowering agents were excluded.

Study outcome

The main outcome of this study is to examine the LDL-c target. For each prescription for simvastatin we knew the strength of the tablet, the number of tablets dispensed, and the instructions on how these should be taken. Therefore, the usual dose of the day plus the length of the treatment could be calculated. To measure the adherence of statin by investigating the LDL-c results. Patients with levels more than 2.5 mmol/l were considered to have zero adherence. Patient with LDL-c less or equal to 2.5 mmol/l were classified as fully adhered.

Statistics

Analysis of the data was done using SPSS 24.0 software. All the values are expressed as mean \pm SD, unless specified. General linear models have been used in the analysis. T-test with Bonferroni correction for multiple comparisons was used as a post-hoc test. All tests are double-tailed with the significance level = $P < 0.05$.

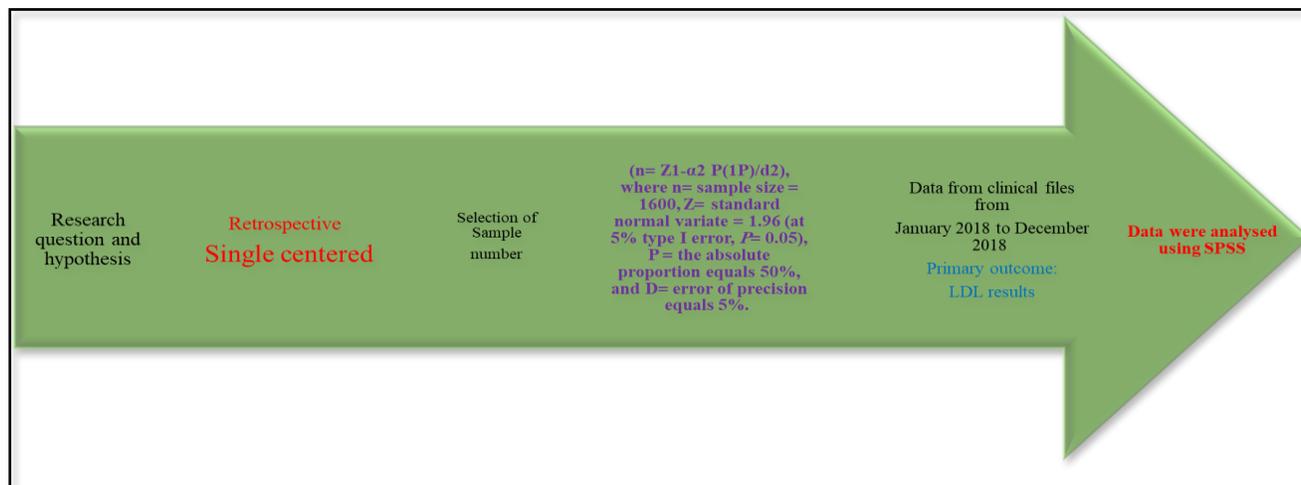


Figure 1. Methodology Flow Chart

3. RESULTS

Age data from the study population

Most of the sample population (95%) was older than 40 years old (Figure 2), the Groups in the study were 15-20 years around 2.5%, 21-30 years around 3%, 31-40 years around 23%, 41-50 years 31%, 51-60 years around 33% and > 60 years and older around 15%. However, nearly all patients (97%) were on simvastatin 20mg /day treatment.

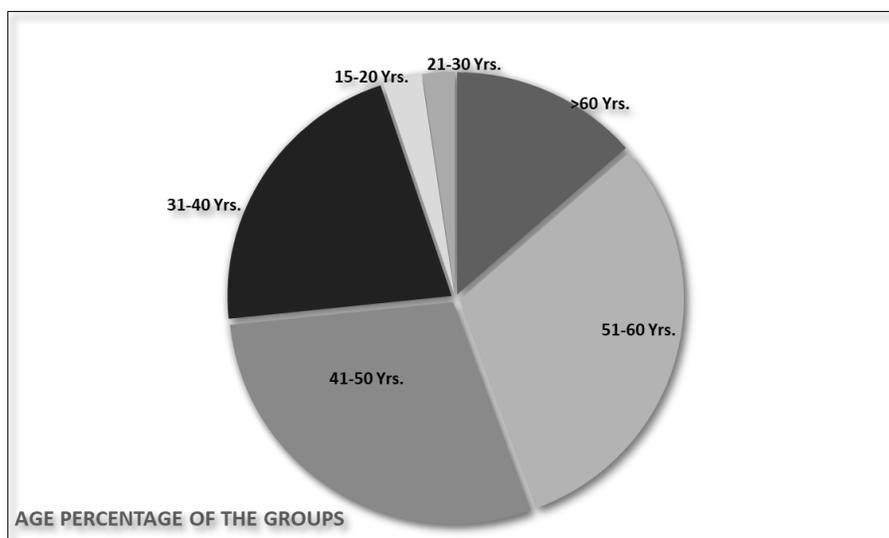


Figure 2. Pie-chart representing the percentage of all age-groups in the study population. ($n=1680$); Groups were: (15-20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years, >60 years) Yrs.: Years. t-test ($P < 0.05$); *95% > than 40 years old.

LDL-C values before and after simvastatin treatment

The treatment goal for LDL-c to be around < 2.5 mmol/l was achieved in only 352 (21%) of the patients (Figure 3).

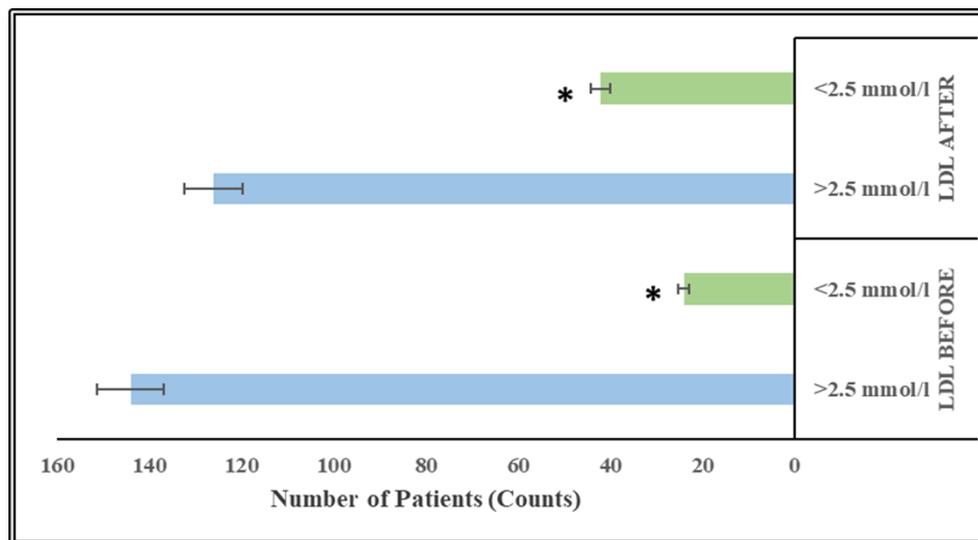


Figure 3. Bar chart representing the number of patients in counts for LDL levels before and after simvastatin therapy. (n=1680); t-test ($P < 0.05$); *LDL < 2.5 mmol/l vs. > 2.5 mmol/l. Blue bars coded for the > 2.5 mmol/l levels, the green bars coded for < 2.5 mmol/l levels.

Cholesterol values before and after simvastatin treatment

For Cholesterol levels around 756 (45%) patients reached the desirable level of < 5.0 mmol/l (Figure 4).

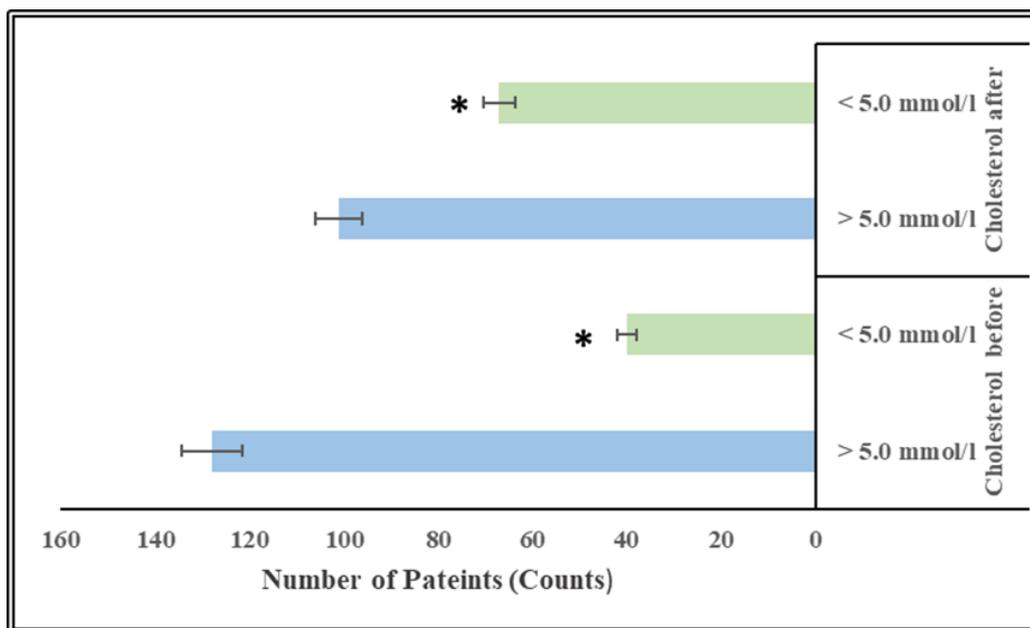


Figure 4. Bar chart representing the number of patients in counts for cholesterol levels before and after simvastatin therapy. (n=1680); t-test ($P < 0.05$); * Cholesterol before < 5.0 mmol/l vs. Cholesterol after < 5.0 mmol/l. Blue bars coded for the > 5.0 mmol/l levels, the green bars coded for < 5.0 mmol/l levels.

Male to female ratio using simvastatin

Diabetic men were more likely than diabetic women to be given a prescription for a simvastatin ($P < 0.05$).

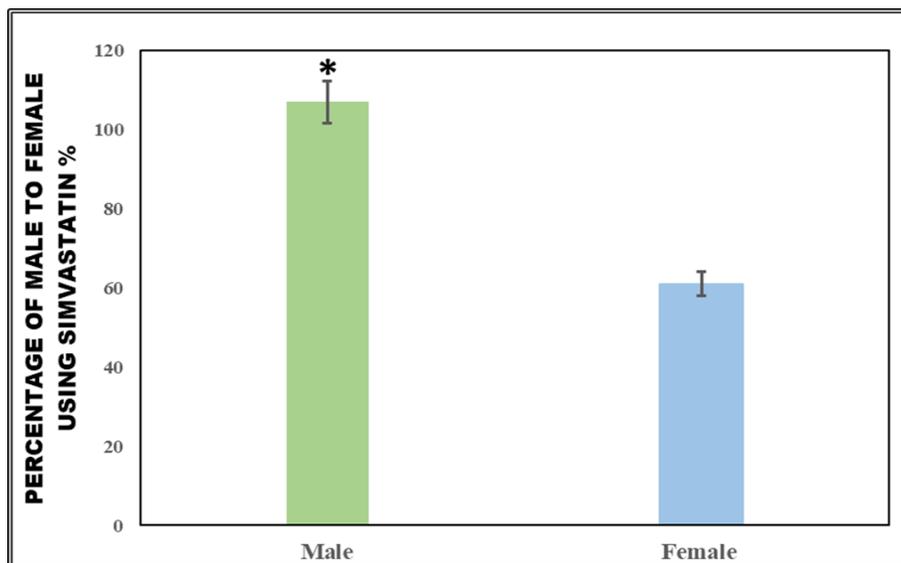


Figure 5. Bar chart representing percentage of Male to female patients using simvastatin 20 mg/day. (n=1680); t-test ($P<0.05$); *Male vs. Female.

4. DISCUSSION

Saudi Arabia is taken into consideration one of the gulf countries with the highest rate of diabetes in addition to high chance for CVD activities (Ibrahim et al., 2020). Despite the importance of the impact of statin therapy on the fulfillment of therapeutic objectives, there are constrained reviews on the adherence of statin remedy in patients with diabetes. Thus, our investigation turned into the primary of its type to be carried out in Makkah, Kingdom of Saudi Arabia. Since simvastatin is one of the highest lowering cholesterol agents to be prescribed in Saudi Arabia, our major goal in this study was to research the adherence of simvastatin in patients with diabetes at Hera General Hospital (HGH) in Makkah Al-Mukarramah. Indeed, the blessings of statin remedy for the secondary prevention of CVD have been properly documented (Singer et al., 1989, Rainer et al., 2011). The present look at discovered that best 21% of patients after taking statin remedy reached the LDL-c purpose. Our consequences from this examine found that more than three-fourths of patients round 1,328 sufferers with diabetes did not adhere to their statin therapy based on information received from their scientific case files. To our knowledge, the affiliation among adherence to statin medicines and LDL-c values has now not been widely studied. We located only one observe confirmed that adherence changed into strongly related to LDL-c goal attainment and LDL-c values (Chi et al., 2014). Any improper adherence can be due to many motives. Poly-pharmacy is commonplace amongst sufferers with type 2 diabetes, which includes prescribing oral hypoglycemic, antihypertensive, and lipid-reducing medications to the person (Kitabchi, 2009), (Mosca et al., 2020). In addition, the restrained time spent throughout medical visits contributes to a loss of attention to multiple elements of this care (Farrokhian et al., 2020), (Mosca et al., 2020). It is important to pay greater interest to the most critical motives for non-compliance (Farrokhian et al., 2020), (Hajian-Tilaki et al., 2020). Along these lines, to improve adherence, for example, by using requesting a survey, can be precious in enhancing compliance and decreasing the share of cholesterol by clarifying the meaning of treatment and way of life changes. There become one take a look at that established an improvement in cholesterol levels that helped in reducing heart disorder and its associated consequences in sufferers with kind 2 diabetes by means of together with a scientific drug specialist in a multidisciplinary institution (Hajian-Tilaki et al., 2020). Endorsing first-rate measure of statins among doctors' visits is every other answer for enhancing adherence and personal pleasure. This makes patients positive about having enough available prescriptions to use before doctor's visit. In addition, tolerant instruction and better communications of affected person and human health services group will have the large impact on improving personal delight. Another aspect could impact on personal satisfaction is the economic function together with affected person's salary. Despite the fact that because of our culture, we could not assess this thing yet but a recent cohort look at established a diminished personal delight with diminishing salary in patients with high chance of CVD specifically among guys aged 40-64 years (McGill, 1998), (Ramezankhani et al., 2020). There is evidence that remarkable medication adherence is related to decreased social insurance fees particularly at some stage in the years quickly following the start of diabetes (Brezinka, 1994), (Ramezankhani et al., 2020). In the present examine we located also that diabetic men had been much more likely than diabetic women to be prescribed simvastatin. The hazard of developing cardiovascular ailment (CVD) after a type 2 diabetes analysis is comparable among men and women, but it in a couple of studies it become located that girls have been less probable to be prescribed medicines which include

statins and antihypertension tablets (Zhang et al., 2014). They found that after seven to ten years observe up, girls with CVD at analysis or identified during observe up have been less possibly than men to be prescribed cardioprotective tablets consisting of statins (Zhang et al., 2014). Further studies are now wanted to understand the motives for these prescribing variations among women and men and to find ways to shut and explained this gap. We had a couple of boundaries in this have a look at we had been now not able to calculate or examine the danger rating by the Framingham score which is utilized to evaluate every year cardiovascular risks. Evidence from a comparable study who carried out Framingham rating to their results and found it useful for each the character patient and for the clinician in helping determine whether life-style modification and preventive medical treatment, and for affected person education, via recognizing males and females at elevated risk for future cardiovascular events (Ramezankhani et al., 2020). Unfortunately, some other limitation become that we could not know the values of HDL-c and triglycerides as they have been lacking from the data. Finally, our take a look at changed into carried out in one sanatorium putting in Makkah and cannot be generalized to the whole Kingdom. Therefore, greater extended investigations are recommended.

5. CONCLUSION

To sum up, information from 2018 indicated that type 2 diabetics at HGH the usage of simvastatin most effective a small percentage of the patients reached their LDL-c treatment target. The reason for that was mainly poor adherence to simvastatin. This underline the need for higher monitoring, higher use of available medicines and new remedy alternatives for higher quality of life.

List of Abbreviations

LDL: Low-density lipoprotein
HDL: High-density lipoprotein
HGH: Hera general hospital
CVD: Cardiovascular diseases

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Author Contributions

MA¹ and YA are responsible for the study research conception and design concept, NA and HA for Data acquisition, RF and RQ for Drafting of the manuscript, Critical revision of the manuscript, Administrative, technical, or material support and Approval of the final manuscript.

YA, MA², MA³, RA and AA were responsible for the Statistical analysis, Data analysis and interpretation and Supervision.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Ethical approval

The study was approved by the Medical Ethics Committee of Umm Alqura University (ethical approval code: UQU-COP-EA# 143913).

Data and materials availability

All data associated with this study are present in the paper.

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