Survey of family doctors' attitudes towards statin treatment in patients with type 2 diabetes

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ABSTRACT

Aims: Clinical guidelines advocate that cardiovascular benefits of statin treatment overweigh the risk of impairment of glucose metabolism. The aim of the study was to examine the attitudes of family doctors towards statin treatment in patients with type 2 diabetes.
Methods: We disseminated a questionnaire examining doctors' attitudes to existing clinical guidelines and the factors leading to a doctor's decision to prescribe statins to diabetic patients.
Results: Clinical policy and guidelines were defined by doctors as having the greatest influence on the decision to prescribe statins for diabetic patients particularly by salaried doctors in comparison to self-employed doctors (χ^2 = 9.138, df = 3, $p \leq 0.01$). When considering the ways healthcare services can assist cholesterol control, monetary compensation yielded higher importance by young doctors compared to mature doctors (χ^2 = 8.15, df = 2, $p \leq 0.01$), while nursing services in the clinic yielded higher importance by mature doctors in comparison to younger doctors(χ^2 = 13.7, df = 2, p ≤ 0.01).
Conclusions: Doctors defined a list of priorities for organizational support mechanisms that are likely to lead to the formation of an intervention plan for increasing the percentage of balanced cholesterol levels in patients with diabetes.

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1. Introduction

According to Israel's Ministry of Health, diabetes is defined as a metabolic disorder that may be caused by a number of different pathophysiological processes. Diabetes is characterized by chronic hyperglycemia stemming from a lack of insulin, an insulin activity disorder, or both [1].

Diabetes is a common disease in Israel and places a heavy burden on the healthcare system. Around the world, and in Israel, the incidence of diabetes is on the rise. According to predictions, in 2030 the number of patients with diabetes worldwide will reach as much as 439 million. In 2016, diabetes was the fourth most common cause of death in Israel [1].

Uncontrolled diabetes may cause great damage to different systems of the body, particularly the nerves and blood vessels. In addition, diabetes raises the risk of coronary heart disease (CHD) and stroke. According to the World Health Organization (WHO), more than three million people around

the world have died from complications of diabetes since 2011. Furthermore, it is known that approximately 50% of patients with diabetes die from cardiovascular disease [2].

Arteriosclerosis is the main cause of morbidity and mortality among patients with diabetes. The United Kingdom Prospective Diabetes Study (UKPDS) found that the level of Low Density Lipoprotein cholesterol (LDL-C) and the level of High Density Lipoprotein cholesterol (HDL-C) are the factors with the greatest contribution to the risk of coronary morbidity among patients with diabetes [3]. It has been confirmed by the EAS (European Atherosclerosis Society) consensus statement [4] that LDL is not only a biomarker, but a causal factor for CHD. There is a consistent dose-dependent log-linear association between LDL- C levels and cardiovascular risk, thus it is of key importance to minimize the cumulative exposure to LDL. There are several classes of hypolipidemic therapies (Ezetimibe, PCSK9 inhibitors) which may differ in both their impact on the cholesterol profile and adverse effects. Clinically, the choice of an agent will depend on the patient's cholesterol profile, cardiovascular risk, and the liver and kidney functions of the patient, evaluated against the balancing of risks and benefits of the medications. In the United States, this is guided by the evidence-based guideline from the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATPIII) [5]. Established statins are particularly well suited for lowering LDL, the cholesterol with the strongest links to vascular diseases. In studies using standard doses, statins have been found to lower LDL-C by 18% to 55%, depending on the specific statin being used. The ACC/AHA [6] release guidelines on the treatment of LDL found extensive and consistent evidence supporting the use of statins for the prevention of CHD in four groups:(1) individuals with clinical CHD, (2) individuals with primary elevation of LDL-C of 190 mg/dl or greater, (3) individuals with diabetes mellitus aging 40–75, and (4) individuals with an estimated 10-years risk for CHD of 7.5% or greater. In line with international recommendations, current clinical guidelines in Israel recommend a target LDL-C of <130 mg/dl (3.4 mmol/l) for medium-risk patients, <100 mg/dl (2.6 mmol/l) for high risk patients (including patients with diabetes), and <70 mg/dl (1.8 mmol/l) for very high-risk patients (including patients with diabetes and additional risk factors) [7].

Patients with type 2 diabetes (T2D) are 2.4 times more likely to develop arteriosclerosis and myocardial infarction and have a higher risk of dying during or after a cardiac event. Approximately 80% of patients with diabetes die from arteriosclerosis and its complications. This fact accentuates the importance of treating risk factors and preventing morbidity and mortality of patients with diabetes [8]. The current study focuses on the use of statin rather than on LDL-C target in patients with T2D.

Diabetes is a chronic disease that requires continuous professional treatment, acquisition of knowledge and education concerning the patient in order to prevent complications of this disease. Treatment of diabetes is very complex, and caregivers require comprehensive knowledge in many fields. In this context, the main issue is not glycemic balance, which itself is not simple, but rather, due to disease complexity, the treatment of patients with diabetes requires visits longer than the accepted average in clinics [9]. In contrast, it is has

been found that doctors' workloads and the limited time allotted to treating chronic patients makes it difficult for them to act according to clinical guidelines and to provide the required explanations and instructions [10].

According to the findings of a study conducted in Israel [11], doctors dedicate 13 min on average to each patient's appointment. From these findings, the question of the doctors' ability to dedicate time and attention to each patient arises, in particular with respect to complex patients such as those with T2D. Despite all the difficulties concerning time management, family doctors have the ability to change the progress of the disease and improve the control of risk factors for diseases of the heart and blood vessels and to cause a decrease in the mortality of patients with diabetes [12].

Maccabi Healthcare Services Sharon Region detected a clear gap between patients with diabetes and those with CHD in the percentage of people with balanced cholesterol levels, in favor of the latter. We can assume that this gap partly stems from doctors' attitudes towards the importance of prescribing statins to control LDL-C in patients with diabetes compared to the same treatment for patients with CHD.

1.1.   Different medical approaches to statin treatment

Studies monitoring tens of thousands of subjects have found higher rates of heart failure and mortality among patients with diabetes who developed coronary disease compared to patients with coronary disease but without diabetes. This finding emphasizes the importance of primary prevention in patients with comorbidity [13]. Following these research results, different doctors' associations considered diabetes to be equivalent to coronary disease when calculating risks of morbidity and mortality from heart diseases [14].

Development of statin treatment in the late 20th century was a ground-breaking event in promoting prevention and treatment of cardiovascular diseases. In 1994, the first ground-breaking clinical study was published to prove the effectiveness of simvastatin in reducing mortality and morbidity among patients with CHD and high LDL-C [15] further strengthened by larger scale studies [16]. Since then many studies have examined the effect of different statins on morbidity and mortality among a wide range of subjects. Studies and evidence from recent years suggest that statins have a strong effect on the treatment and prevention of arteriosclerosis and an effect on the level of cholesterol in the blood [17,18]. In contrast, other studies oppose the use of statins due to the side effects of the treatment. According to [19], the evidence to support statin treatment in diabetes is inconclusive when analyzing randomized controlled trials specifically designed for diabetes with hard clinical endpoints such as mortality and CV events.

The American Diabetes Association [20] recommends using statins to treat patients with diabetes with additional risk factors for cardiovascular morbidity, where the target goal is an LDL-C level below 100 mg/dL. In addition, it is possible to aspire to reach an LDL-C level below 70 mg/dL in patients with diabetes diagnosed with cardiovascular disease [21].

According to the 'Collaborative Atorvastatin Diabetes Study' [22], approximately half of all doctors are not aware

of the importance of reducing LDL-C levels in patients with diabetes without CHD, and with balanced cholesterol levels. Treatment to reduce cholesterol levels is safe and effective and can significantly reduce the risk of stroke. The Collaborative Atorvastatin Diabetes Study proves that atorvastatin 10 mg reduces the risk of CHD and stroke in patients with T2D. The uniqueness of the study lies in the fact that it focused solely on patients with diabetes, and was funded by Diabetes UK and the British Government. The study was conducted in 132 medical centers in England and Ireland, and included 2,838 patients with diabetes with balanced or slightly high LDL-C levels. The study examined the effectiveness of primary prevention by administering statins to patients with diabetes. Within the three months of the study an improvement in cholesterol control was achieved. In addition, during the two-year monitoring period the effect on the risk of cardiovascular disease and stroke was dramatic: 48% decrease in strokes and 37% reduction in cardiovascular events.

In contrast to the approach that supports administration of statins to patients with T2D, other published studies have revealed a number of significant side effects. The most common side effect is related to the effect of statin treatment on skeletal muscles which is characterized mainly by muscle pain that may limit the patient's mobility. It has been shown that between 5% and 7% of statin users experience significant problems with their muscles [23–24]. Speculations have linked between the increased incidence of this side effect and an increase in treatment dose. This proportion reaches 10% at high doses [25] and up to 25% of statin users who exercise will experience muscle fatigue, general fatigue, weakness, pain and cramps as a result of statin treatment, where in extreme cases this side effect is characterized by muscle damage[26]. Among those who argue against statins, the claim is that the loss may outweigh the gain if patients taking medications to prevent CHD are unable to exercise as a result of taking the medication. In addition, a few studies have shown that treatment with statins may lead to muscle poisoning [27]. Furthermore, it has been debated that statins have a strong negative effect on memory, however a meta-analysis study showed that there is no increased risk of cognitive decline with statin use [28]. Other studies have shown that in addition to the known side effects of statins, there is also an increased risk of developing cataracts [29,30]. In addition, there are some less-common side effects that, while not causing health damage, induce headaches, insomnia and decreased concentration [31].

When making clinical decisions, a doctor in his clinic needs to choose among a number of treatment options. Decisions are based on relevant knowledge related to clinical guidelines and medical information accumulated by Evidence-Based Medicine (EBM) while applying informed use of the most up-to-date knowledge and evidence for treatment [32,33]. Policy-makers put a lot of faith in doctors' professionalism and integrity. Therefore, the prevailing approach is that doctors should not be restricted and that their judgment is reliable. This faith also relies on the legal status of doctors, which according to the Doctors' Directive are allowed to prescribe any treatment. Similarly, since the

doctor is responsible for the treatment results from both the legal and insurance perspectives, he is motivated to apply professional, wise and cautious judgment [34].

In the present study the attitudes of family doctors towards prescribing the treatment of statins that contributes to controlling cholesterol in patients with T2D were examined at Maccabi Healthcare Services Sharon Region in order to understand the factors affecting doctors' attitudes. There are approximately 22,000 patients with diabetes in this region. Among them, 56% have balanced cholesterol levels. The expectation is that the study will lead to an action plan for improving cholesterol balance in patients with T2D in order to raise the proportion of patients with diabetes with balanced cholesterol levels above 60%.

2. Materials and methods

2.1. Participants

The sample was a convenience sample of 200 family doctors in the Sharon Region of Maccabi Healthcare Services. Among 200 doctors, 51 responded to the questionnaire. This response rate of 26% is considered relatively high for doctors (the average response rate for surveys in Maccabi Healthcare Services is approximately 15%).

The average age of respondents was 50.8 with a standard deviation of 10.17 (range 32–71), 23% up to the age of 40, 62% aged 41–60 and 15% above the age of 60. The average length of service in the field of medicine was 19.2 years with a standard deviation of 10.6 (range 1–45 years). Female doctors comprised 58.8% of respondents; 47% of respondents were salaried doctors, and the remaining self-employed. Among respondents, 92.2% had specialized in family or internal medicine, others had specialized in general medicine, and one had another specialization.

A large percentage of the respondents (47.1%) had studied medicine in Israel and a fairly large percentage (39.2%) had studied in Europe. The remaining respondents had studied in various other countries.

2.2. Questionnaire

During formulation of the questionnaire, discussions were held with the regional doctor's deputy, whose roles include managing both family medicine in the region and measures of clinical quality. Similarly, a discussion was held with the regional pharmacist, and meetings were held with the survey department manager at Maccabi Healthcare Services. The subjects for the survey were chosen from the discussions, and the questionnaire was formulated (Appendix A). The questionnaire included four closed questions (1, 2, 4, 5) and one open question (3) as well as demographic information. Three out of the four closed questions were based on a Likert scale (2, 4, 5). The doctors were required in questions 2 and 4 to answer on a scale of 1–5 to what extent they agree to a criterion/statement when selecting treatment with statins, where 1 represents "Very strongly agree" and 5 represents "Very strongly disagree". Cronbach's alpha for items 2 and 4 was 0.60. In question 5 the doctors were required to answer

on a scale of 1–5 the degree of importance they attribute to a number of factors in controlling cholesterol levels in patients with T2D where 1 represents "Extremely important" and 5 represents "Low importance". Cronbach's alpha for the factors in question 5 was 0.51. A pilot study was conducted among ten doctors prior to conducting the research.

2.3.   Procedure

After receiving authorization from the Ethics Board Committee of Ariel University and from the Helsinki Committee, anonymous structured questionnaires were sent via the organizational email to the group of family doctors in Maccabi Healthcare Services, Sharon Region. Return of completed questionnaires was done via email or an email fax designated for the study.

2.4.   Statistical analysis

Descriptive statistics were tabulated and examined. Associations in demographic variables (age, gender, location of studies), employment status, and factors influencing doctors' adherence to clinical guidelines were tested using the Chi-square test. Analyses was performed by SPSS (version 23) with statistical significance set at $p \leq 0.05$.

3.   Results

A demographic comparison between respondents and non-respondents is illustrated in Table 1. The results reveal that the respondents were significantly older (>40), salaried (than self- employed), and family doctors (than general practice/internal) compared to non-respondents.

Regarding the considerations defined by doctors as having the greatest influence on the decision to prescribe statins for patients with diabetes, it was found that clinical policy and guidelines comprised 76.5% of all considerations, far greater than evidence-based medicine (EBM) (54.9%), patient complexity (45.1%), or patient complexity with multiple medications (9.8%). None of the respondents selected pharmaceutical companies as a factor influencing the decision (Fig. 1).

With respect to population sectors for whom family doctors do not prescribe statins, it was found that 33% of doctors prefer not to prescribe statins to adults above the age of 70. Similarly, it was found that 15% of doctors do not prescribe statins to patients with liver diseases and another 15% of doctors to not prescribe statins to those suffering from side effects of the medication. Additional sectors of the population that were mentioned include: youth, patients with limited life expectancy, dementia patients and pregnant women. Fourteen percent of doctors responded that there is no obstacle to prescribing statins to the entire population (Fig. 2).

Regarding general agreement about prescribing statins to patients with diabetes, it was found that 96% of doctors strongly or very strongly agree on principal to prescribing statins to patients with diabetes, however there was lower agreement with clinical guidelines (77.6%) for reducing LDL-C levels to below 70 mg/dL for patients diagnosed with cardiovascular disease. A minority of doctors answered that they disagree or hold no firm opinion (22%). There was no absolute opposition to the consideration of clinical guidelines (Fig. 3).

Regarding doctors' attitudes towards the level of importance they place on the various support mechanisms Maccabi Healthcare Services provide to assist doctors in controlling cholesterol in patients with diabetes, dietetic services were reported most important (84.5%) The second most important support mechanism was nursing services (77.5%), clinical pharmacy support being the third (66.6%), while monthly reports and monetary compensation were ranked last (60.9% and 55%, respectively) (Fig. 4).

After completing the frequency analysis, the responses between the doctors were compared by pooling the categories "Extremely important" and "important" in contrast to "Slightly important", "Low importance" and "Neutral". Subsequently, the subjects the doctors were asked about were compared with the doctors' demographic variables. When divided into age groups, young doctors up to age 40 (23%) compared with mature doctors aged 41 and over (77%) revealed significant differences. We found that when considering the ways Maccabi Healthcare Services can assist cholesterol control, monetary compensation was indicated to be of high importance by 91% of young doctors compared to 40% of mature doctors (χ^2 test = 8.15, df = 2, $p \leq 0.01$), while nursing services

Table 1 – Demographic comparison of the respondents versus non respondents.			
	Responders (25.5%)	Non-Responders (74.5%)	Chi-Square (df)
Age >40	27.5%	72.5%	35.2(1)[*]
Age <40	20.7%	79.3%	
Employment: Salaried	28.5%	71.5%	5.12(1)[*]
Self-employed	23.3%	76.7%	
Doctors: Family	29.5%	70.5%	20.48(1)[**]
Other	17.6%	82.4%	
Gender: Female	58.8%	59.8%	

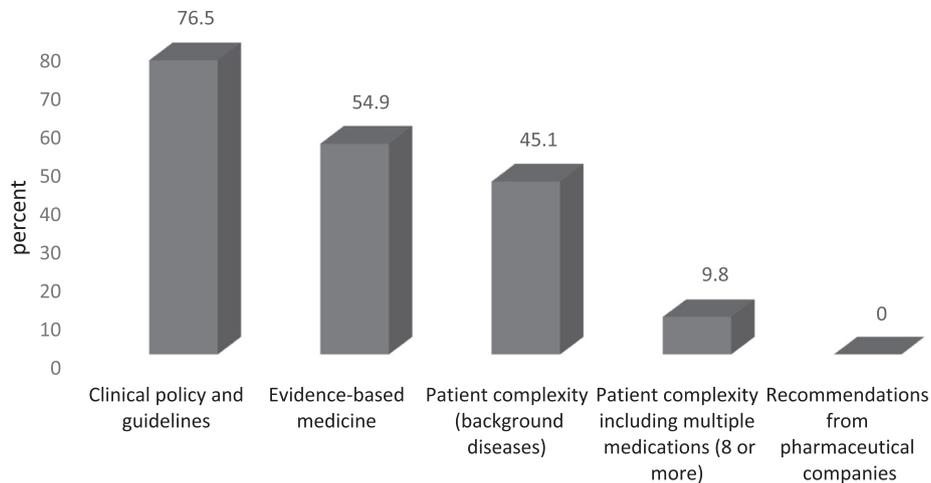[*] p < 0.05.
[**] p < 0.01.

Fig. 1 – Considerations defined by doctors as having the greatest influence on the prescription of statins to diabetic patients.
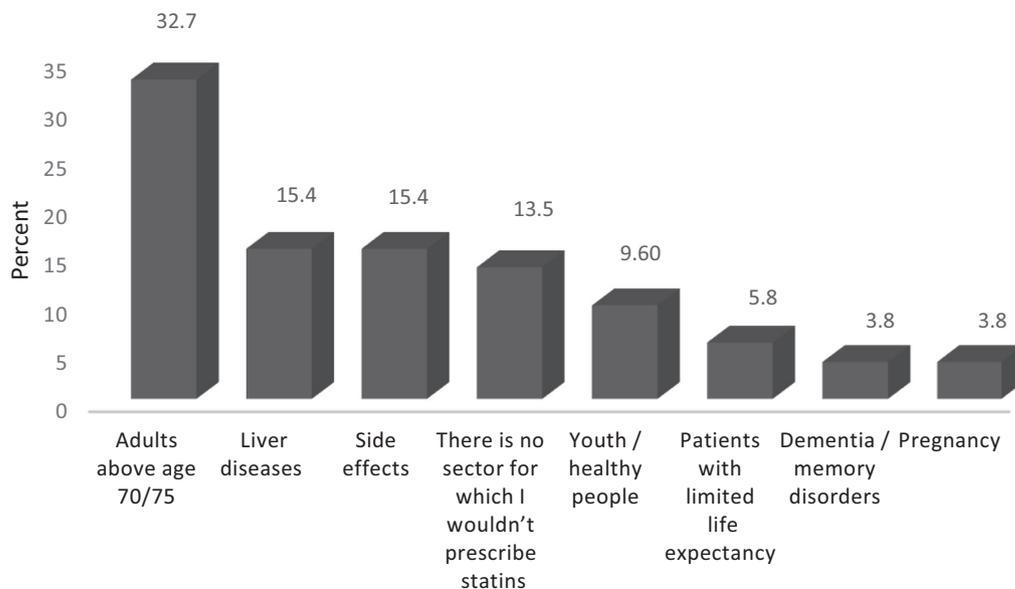

Fig. 2 – Sectors of the population for whom doctors do not prescribe statins (percentage).

in the clinic were indicated to be of high importance in 91% of mature doctors compared to 54% of young doctors (χ^2 test = 13.7, df = 2, $p \leq 0.01$) (Table 2).

A significant relationship was found between the doctor's employment status and agreement with clinical guidelines – salaried doctors (88%) are much more likely to consider following clinical guidelines for prescribing statins than self-employed doctors (63%) (χ^2 test = 9.138, df = 3, $p \leq 0.01$). Furthermore, salaried doctors (71%) are more interested in monthly reports on their patients than self-employed doctors (41%). Similarly, salaried doctors are more interested in clinical pharmacy services (75%) than self-employed doctors (44%). However these last two comparisons were not significant.

When examining demographic information about the study participants with respect to their agreement to use of statins compared to their agreement with clinical guidelines, no significant relationships were found with any of the participating doctors' demographic characteristics. With respect to gender, it was found that female doctors (73%) are more interested in clinical pharmacy services than male doctors (38%) however this result was not significant. Similarly, it was found that internal doctors placed greater importance on clinical pharmacy services (88%) than family doctors (56%) while no general practitioners selected this option. Here too, the relationship was not significant. Finally it was found that all those who studied in Eastern Europe (17.3%) and the USA (1.9%) were more likely than those who studied in Western Europe to indicate dietetic services as a mechanism that may assist controlling cholesterol in patients with diabetes; however, this difference was not significant. Doctors who studied in South Africa did not choose this option.
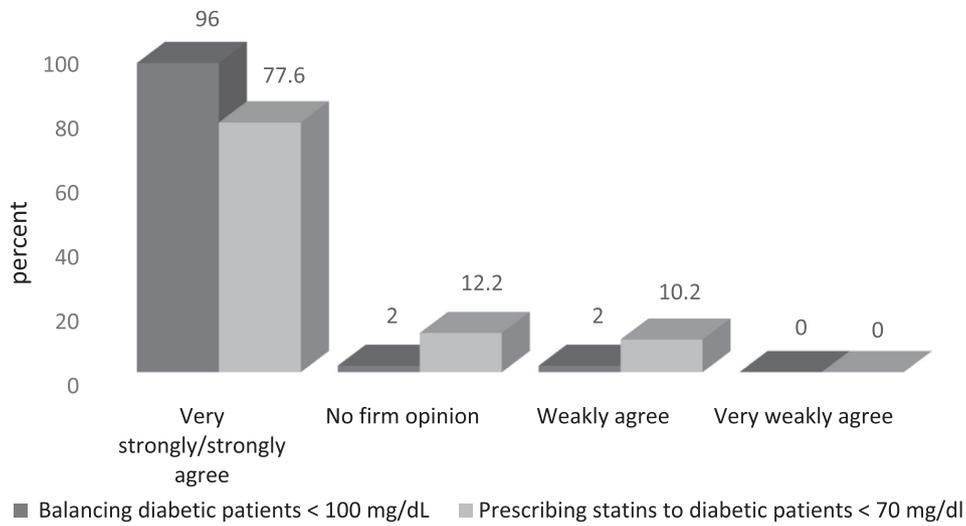
Fig. 3 – The level of agreement in principle to prescribing statins compared to agreement with prescribing statins according to clinical guidelines (reducing LDL-C levels to below 70 ml/dl for patients diagnosed with cardiovascular disease).
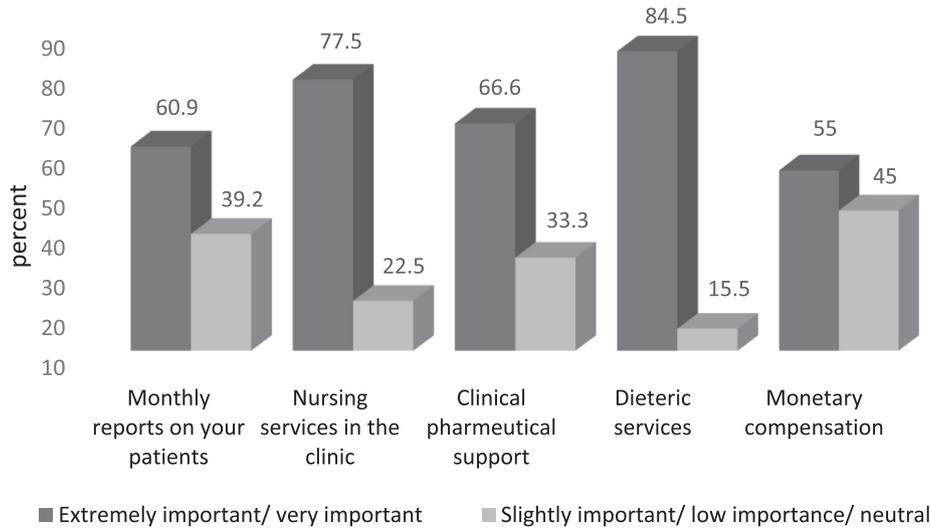

Fig. 4 – Level of importance placed on the support mechanisms offered by Maccabi Healthcare Services to assist doctors in controlling cholesterol among diabetic patients.

Table 2 – Doctors' selection of actions that the healthcare service can do to assist them in achieving cholesterol balance; percentage of level of importance.			
	Yong doctors (23%)	Mature doctors (77%)	Chi-Square (df)
Monthly reports on your patients	63.6%	67.7%	3.346 (2)
Nursing services in the clinic	54.5%	91.2%	13.7 (2)**
Clinical pharmacy support	54.5%	70.0%	4.49 (2)
Dietetic services	90.9%	80.0%	0.96 (2)
Monetary compensation	90.9%	40.0%	8.15 (2)**

* $p < 0.05$.
** $p < 0.01$.

4.   Discussion and recommendations

According to clinical guidelines statins are recommended as first line treatment for various patient groups. In 2013 ACC guidelines [6] found no supporting evidence for routine use of non-statin drugs in combination with statins. In 2017 [35] the revised recommendations proposed the addition of non-stain therapy in combination with statin therapy to maximally tolerate statin therapy among patient with CVD. When combining either Ezetimibe or PCSK9 inhibitor, patient preference, cost and route of administration should be considered as well as the LDL level desired. For <25% of additional lowering, Ezetimibe may be preferred, while in patient that require >25%, a PCSQ9 inhibitor may be preferred. The findings of the current study indicate that most family doctors agree with statin treatment for patients with diabetes. However, it is clear that agreement with clinical guidelines for reducing LDL-C levels to below 70 ml/dL for patients diagnosed with cardiovascular disease is noticeably lower than agreement in principle with prescription of statins to patients with diabetes, although there is consensus that clinical guidelines are designed to help doctors improve the medical quality of life by defining guidelines and determining treatment standards [36]. Moreover, most doctors usually express positive attitudes to clinical guidelines. However studies that deal with assimilation of clinical guidelines report that in practice it is difficult for doctors to implement guidelines and for healthcare organizations to convince doctors to use the guidelines in their routine treatment [10].

Studies worldwide show that there are a number of barriers affecting the behavior of doctors when implementing clinical guidelines, for example, professional agreement with guideline content, the effect of the work environment, staff composition, remuneration and work conditions. A study conducted in Israel found that the factors affecting the behavior of doctors when implementing clinical guidelines are doctors' positive attitudes towards their employer and the presence of professional quality control in the healthcare organization. Similarly, the study found that patient behavior and the doctor's communication with him/her have a strong influence on medical treatment according to clinical guidelines [10]. We concluded that it is important to identify barriers and strengths among doctors and formulate a program tailored by Maccabi Healthcare Services that relates to the factors influencing doctors, in order to increase their readiness to uphold clinical guidelines.

Treatment of complex patients with diabetes requires much skill from the doctor to achieve results. In the current survey, this fact was evident in the choice of population sectors that family doctors were not prepared to treat with statins. Doctors indicated that they usually do not prescribe statin treatment or high intensity treatment to patients aged 70 and over, patients with liver diseases and other complex diseases, and patients suffering or liable to suffer from side effects of the medication. Examination of studies on this issue teaches that the risk of complications and side effects, including muscle pain – increases with age together with the presence of other background diseases and concurrent use of other medications [37]. A literature survey found another study dealing with the choice of medicinal treatment of T2D by doctors. It was found that doctors are assisted by a wide range of qualitative and quantitative factors when making decisions about administering medications for treating hyperglycemia [38]. Patient complexity will influence the process of choosing medicinal treatment, often in opposition to evidence-based treatment guidelines [3]. Indeed, the results of the current survey demonstrated that balancing cholesterol levels in patients with diabetes requires skill; doctors have complete freedom to choose a medical treatment that is tailored to the patient's complexity and treatment effects, at the same time we found general agreement with the prescription of statins according to clinical guidelines.

Additionally, we found that the present study revealed a larger effect of clinical policies and guidelines on statin treatment than the effect of pharmaceutical companies which was completely disregarded by the doctors. In contrast, a study examining the effect of the relationship between doctors and pharmaceutical companies found that most of the survey participants consider the relationship between doctors and pharmaceutical companies to be a factor influencing doctors' behavior when prescribing medication [39]. This discordance may represent a type of bias of "social desirability" stemming from research limitations. Similarly, we could hypothesize that the mechanism of responding via organizational email has an influence. Furthermore, it is possible that the statin group of medications is not in the spotlight of pharmaceutical companies, since it is an accepted, established medication in the market; therefore, pharmaceutical companies do not invest in intensive advertising and there is less impact.

An additional finding was that doctors selected dietetic services as the most important support mechanism for cholesterol level control. Other studies corroborate this and show that the intervention of a dietician was found to be effective in the management of chronic diseases such as blood lipid disorders, heart failure and diabetes [40]. In this study doctors also selected nursing services and pharmacy services as important partners in team work. Additional studies examined the effect of transferring treatment authority to nurses. This step was found to increase patient satisfaction and provided an advantage for achieving goals in the treatment of chronic diseases. With respect to pharmacists it was found that intervention by a pharmacist lead to improved balance in patients with chronic diseases [41]. Additional research findings show that intervention by multi-disciplinary teams managed by a nurse significantly improve the LDL-C balance in patients with diabetes. Furthermore, this type of work model improves not only balance of LDL-C levels, but also the patients' ability to be responsible for the management of their disease [42]. Many studies reach the conclusion that multidisciplinary teams are important for ensuring intra-organizational effectiveness and improving the quality of treatment [43].

We also found that 55% of research participants agree to monetary compensation for improving the blood lipid balance in patients with diabetes. Young doctors in particular (up to age 40) selected monetary compensation as an organizational support mechanism for improving cholesterol balance (91%). In a study dealing with assimilation of clinical

guidelines in primary medicine and in changing doctors' behavior, it was found that an increase in the quality of medical treatment can lead to long-term savings in medical expenses. Therefore, the study suggested the option of legislation on this issue, which would include incentives for healthcare organizations, to encourage an improvement in clinical quality together with effective assimilation of clinical guidelines [10]. Another study discussed incentives that influence the behavior and results of doctors in the community. The study showed that there are three types of incentives – ethical, social and material incentives. Material incentives were considered to be a positive incentive that reinforces desired behavior, and also a negative incentive that reduces undesirable behavior. The material compensation influences doctors' professional behavior. Nonetheless, this incentive is not sufficient for achieving goals. For a long-term impact a reasonable balance between all three types of incentives is required; this approach is likely to lead to micro-economic effectiveness and better cost and quality outcomes [44]. In this light, it is important to express this aspect when formulating an intervention program for improving LDL-C balance.

An additional finding was a distinction between the attitudes of salaried doctors and self-employed doctors in their selection of mechanisms for increasing prescription of statins. Salaried doctors are more interested than self-employed doctors in monthly reports on their patients. Similarly, salaried doctors are more interested in receiving support from clinical pharmacy than self-employed doctors. This might explain the correlation between doctors' employment status (salaried vs. self-employed) and their commitment to clinical policy and guidelines (i.e. organizational aims), also possibly due to the uniqueness of the employment model in Israel.

Another issue relates to the demographics of the respondents. We found that the respondents were older (>40), family doctors (vs general practitioner/internal), and salaried (vs self-employed). These characteristics suggest that organizational fidelity often depends on the organizational identity that physicians feels towards their organization, and can be motivated by factors of seniority, type of income and professional expertise[43].

4.1.   Conclusions

Diabetes carries a heavy economical and personal price. The increase in diabetes morbidity, and its treatment costs and complications, increase the need and emphasis of understanding the different aspects involved in treating the disease and the range of factors influencing cholesterol balance in patients with diabetes.

Results should be interpreted cautiously in light of the relatively small sample size which may limit generalization of the findings. Nonetheless, the research results provide a basis for continued formulation of a program to increase the percent of patients with T2D with balanced LDL-C levels in Maccabi Healthcare Services Sharon Region. It would be important to develop a customized targeting of factors affecting statin treatment for LDL-C levels in patients with diabetes in order to increase the doctors' readiness to uphold clinical guidelines. Additionally, we recommend considering the issue of community team work to increase cooperation between the family doctor and the dietician, nurse and clinical pharmacist for cholesterol level management. Last, regarding the attitudes of young doctors in respect to monetary compensation as an incentive, we recommend creating a system of incentives that influence the behaviors and adherence to clinical guidelines of doctors in the community for statin treatment in patients with T2D.

5.   Contributions

Michal Hochhauser: Conception of the study, academic advisor, interpretation of the results, preparation of the manuscript.
Olga Avoros: Data collection, interpretation of the results, drafting of the paper.
Victoria Perman: Data collection, interpretation of the results, drafting of the paper.
Nava Simcha: Data collection, interpretation of the results, drafting of the paper.
Judith Tsamir: Statistical analysis, interpretation of the results, drafting of the paper.
Ariela Fremder: Conception of the study, clinical supervision, interpretation of the results.

Acknowledgments

Appendix A

Dear doctor,

This questionnaire is part of a research project at Ariel University. It is important for us to hear your opinion regarding the treatment of dyslipidemia in diabetic patients and how Maccabi can help you for care these patients.

The questionnaires are anonymous and the results will be presented to all doctors. Please choose the most appropriate option. Contact us for any questions.   Thank you for your kind cooperation

1. What affects your decision to prescribe statins for your diabetic patients? (you may choose more than one answer)
    1. Policy and clinical guidelines
    2. Evidence-based medicine
    3. Patient complexity (background diseases)
    4. Patient complexity including multiple medications (8 or more)
    5. Recommendations from pharmaceutical companies

2. To what extent do you agree to prescribe statins for diabetics?
    1. Strongly agree
    2. Agree
    3. I hold no firm opinion
    4. Disagree
    5. Strongly disagree

    > **If you agree with little or very little, please specify the two main reasons for your objection:**
    > 1. There is no agreement in the medical professional literature regarding the provision of statins
    > 2. Side effects
    > 3. LDL target
    > 4. Pharmaceutical companies pressure
    > 5. Complexity of patients
    > 6. Age of the patient

3. Based on studies you have read, for which populations you prefer not to register statins? please write down which populations:

    _____

4. To what extent do you agree with clinical guidelines for maintaining LDL-C levels of diabetic patients below 70 ml/dL for patients diagnosed with cardiovascular disease even if this requires a higher dose of statins?
    1. Strongly agree
    2. Agree
    3. Neither agree or disagree
    4. Disagree
    5. Strongly disagree

5. Please select the importance of the following factors in how Maccabi can help you in controlling cholesterol levels in patients with diabetes?

	Extremely important	Very important	Neutral	Slightly important	Low importance
Monthly reports on your patients					
Nurse services in the clinic					
Clinical pharmeutical support					
Dieteric services					
Monetary compensation					

Please complete some background data for statistical purposes

6. Date of Birth: _____

7. Gender:
   1. male
   2. female
8. Place of your medical education:
   1. USA
   2. South Africa
   3. Western Europe
   4. Eastern Europe
   5. Israel
   6. Other
9. Your specialization:
   1. Family
   2. Internal
   3. General
   4. Other

10. Your seniority in medicine as a family doctor / internist / general practitioner: ___

11. Are you:
   1. Salaried
   2. Self employed

Thank you for participating in the survey.

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