**Survey of family doctors' attitudes towards**

**treatment of patients with type 2 diabetes using statins**

Olga Avoros1, Victoria Perman1, Nava Simcha1, Yehudit Tzamir1, Ariela Fremder1, Michal Hochhauser2 1Maccabi Healthcare Services, 2Department of Health Management, Faculty of Health Sciences, Ariel University

**Abstract**

Diabetes is a common disease increasing in incidence around the world and in Israel, placing a heavy burden on the healthcare system. Patients with type 2 diabetes are at high risk of cardiovascular events. Similarly, arteriosclerosis is a primary cause of cardiovascular disease, resulting in morbidity and mortality. A risk factor for arteriosclerosis is high levels of cholesterol. Today, one of the most common medications for treating high levels of cholesterol is statins. According to data retrieved from Maccabi Healthcare Services Sharon Region, among approximately 20,000 patients with diabetes, approximately 56% have balanced cholesterol levels, compared to 61% among patients with heart disease. The aim of the survey was to examine the attitudes of family doctors in Maccabi Healthcare Services Sharon Region to the prescription of statins to patients with type 2 diabetes, with a view to formulating an improvement plan for increasing the percentage of diabetic patients with balanced cholesterol levels. 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. The survey results show that doctors defined a list of priorities for organizational support mechanisms that are likely to lead to an improvement in treatment processes for balanced cholesterol levels. The results of this study provide a basis for the formulation of a plan to increase the percentage of patients with type 2 diabetes exhibiting balanced cholesterol levels, in Maccabi Healthcare Services Sharon Region.

Key words: Type 2 diabetes, Clinical guidelines, Survey study, Cardiovascular disease prevention, Statins

**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 (Ministry of Health, 2013).

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 diabetic patients worldwide will reach as much as 439 million. In 2011, diabetes was the fourth most common cause of death in Israel (Ministry of Health, 2011).

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 heart disease 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. Therefore, diabetes more than doubles the risk of mortality compared to healthy people (WHO, 2016).

Arteriosclerosis is the main cause of morbidity and mortality among diabetic patients. 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 diabetic patients (Bitzur, Haratz and Rubinstein, 2005).

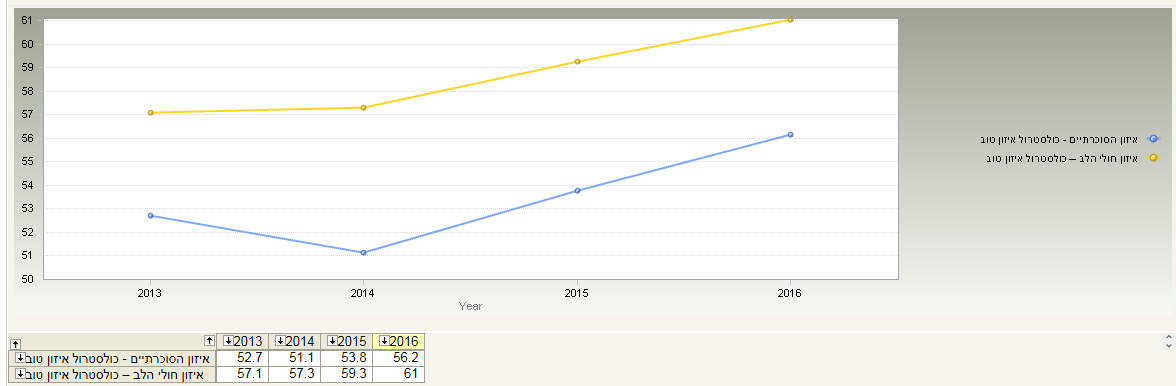
Patients with type 2 diabetes are 2.4 times more likely to develop arteriosclerosis and myocardial infarction and have a higher risk of dying during or after a cardiac event. Approximately 80% of diabetic patients die from arteriosclerosis and its complications. This fact accentuates the importance of treating risk factors and preventing morbidity and mortality of diabetic patients (Yitzhakov and Rubinstein, 2001).

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 a diabetic patient requires visits longer than the accepted average in clinics (Box, Herman-Bahm, Weinstein, Tzur and Raz, 2005). 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 (Gross et al, 2005).

Data about the large number of patients that doctors receive during their workday do exist. In this context, the amount of time doctors dedicate to patients during their appointment at the clinic has been examined. According to the findings of a study conducted in Israel, doctors dedicate 13 minutes on average to each patient’s appointment. From these findings, the question of the doctors’ ability to dedicate time and attention to each patient arose (Nirel, Shirum and Ismail, 2003), in particular with respect to complex patients such as those with diabetes. 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 diabetic patients in Israel (Dagan, 2011).

Maccabi Healthcare Services Sharon Region detected a clear gap between patients with diabetes and those with heart disease in the percentage of people with balanced cholesterol levels, in favor of the former (Table 1). We can assume that this gap stems from doctors’ attitudes towards the importance of prescribing statins to control LDL-C in diabetic patients compared to the same treatment for patients with heart disease.

Table 1. Control of LDL-C among patients with diabetes compared to patients with heart disease, Maccabi Healthcare Services – Sharon Region, 2016.



**Different medical approaches to treatment by statins**

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 (Kamari, Bitzur, Cohen, Shaish & Haratz, 2009). 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 (Catapano, De Backer & Reiner, 2011).

Development of statin treatment in the late 20th century was a ground-breaking event in the promotion of a system to prevent and treat cardiovascular diseases. In 1994, the first ground-breaking clinical study (Pedersen, Kjekshus, Berg & Haghfelt, 1994) to prove the effectiveness of simvastatin in reducing mortality and morbidity among patients with coronary heart disease and high LDL-C (Barter et al., 2006) was published. 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 (Wolfovits, 2005). In contrast, other studies oppose the use of statins due to the side effects of the treatment.

The American Diabetes Association recommends using statins to treat diabetic patients 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 an LDL-C level below 70 mg/dL in diabetic patients diagnosed with cardiovascular disease (Eldor & Raz, 2007).

According to the 'Collaborative Atorvastatin Diabetes Study' (Colhoun, Betteridge, Durrington, Hitman & Livingstone, 2004), approximately half of all doctors are not aware of the importance of reducing LDL-C levels in diabetic patients without heart disease, 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 heart disease and stroke in patients with type 2 diabetes. 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 diabetic patients with balanced or slightly high LDL-C levels. The study examined the effectiveness of primary prevention by administering statins to diabetic patients. 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: a 48% decrease in strokes and a 37% reduction in cardiovascular events. Furthermore, many studies have demonstrated a 40-70% decrease in the risk of developing Alzheimer’s disease among patients treated with statins (Casserly & Topol, 2004). Moreover, there are studies in the literature that hypothesize an anti-cancer effect of statins (Wong, Dimitroulakos, Minden & Penn, 2002).

In contrast to the approach that supports administration of statins to patients with type 2 diabetes, 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 (Arora, 2006). Speculations have linked between the increased incidence of this side effect and an increase in treatment dose. This proportion reaches 10% at high doses (Harper & Jacobson, 2007) 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 (Dirks & Jones, 2005), where in extreme cases, this side effect is characterized by muscle damage. Among those who argue against statins, the claim is that the loss may outweigh the gain, if patients taking medications to prevent heart disease 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 (Alshekhlee & Katirji, 2007). Furthermore, some studies report that statin use damages brain function, since statins have a strong negative effect on memory and thought processes (Palomaki, 1997; Hope, 2005). Other studies have shown that in addition to the known side effects of statins, there is also an increased risk of developing cataracts (Sattar, Preiss & Murry, 2010; Leuschen, Mortensen & Frei, 2013). In addition, there are some less-common side effects that, while not causing health damage, induce headaches, insomnia and decreased concentration (Henkin, 2009).

When making 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 (Porat Goldstein, 2010). 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 (Ashkenazi, Gross, Elroi & Shechtroshoval, 2011).

In the present study the attitudes of family doctors at Maccabi Healthcare Services Sharon Region were examined in order to understand the factors affecting doctors’ attitudes to prescribing a treatment that contributes to controlling cholesterol among patients with type 2 diabetes. There are approximately 22,000 diabetic patients 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 among patients with type 2 diabetes, in order to raise the proportion of diabetic patients with balanced cholesterol levels above 60%.

**Methods**

*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). Women 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 (Figure 1). 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 distribution of the location of medical studies is presented in Table 1.

*Figure 1:* Distribution of specializations among survey respondents

Table 1. Location of medical studies by percentage

|  |  |
| --- | --- |
| Location of medical studies | Percentage of doctors |
| USA | 2.0 |
| South Africa | 5.9 |
| Western Europe | 21.6 |
| Eastern Europe | 17.6 |
| Israel | 47.1 |
| Other | 5.9 |

*Procedure*

After receiving authorization from the Ethics 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. The data were analyzed using IBM-SPSS 22 software.

*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. From the discussions, the subjects for the survey were chosen and the questionnaire was formulated (Appendix 1). The questionnaire, based on a Likert scale, included four closed questions and one open question. The doctors were required to answer on a scale of 1-5 to what degree the criterion/statement etc. is a consideration when selecting treatment with statins, where 1 represents “very highly likely” and 5 represents “very unlikely”. A pilot study was conducted among ten doctors prior to conducting the research.

**Results**

Regarding the considerations defined by doctors as having the greatest influence on the decision to prescribe statins for diabetic patients, it was found that clinical policy and guidelines comprised 76.5% of all considerations, far greater than evidence-based medicine (EBM), comprising 54.9%, patient complexity, comprising 45.1%, and patient complexity with multiple medications, comprising 9.8%. None of the respondents selected pharmaceutical companies as a factor influencing the decision (Figure 2).

Figure 2: Considerations defined by doctors as having the greatest influence on the prescription of statins to diabetic patients.

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 (Figure 3).

Figure 3: Sectors of the population for whom doctors do not prescribe statins (percentage)

Regarding general agreement about prescribing statins to diabetic patients, it was found that 96% of doctors strongly or very strongly agree to prescribing statins to diabetic patients. A minority of doctors answered that they slightly agree or have no opinion (Table 2).

Table 2: The general level of agreement by doctors regarding prescription of statins to diabetic patients

|  |  |
| --- | --- |
|  | Percentage of respondents |
| Strongly or very strongly agree | 96 |
| No firm opinion | 2 |
| Weakly agree | 2 |
| Very weakly agree | 0 |

Regarding the degree of agreement with clinical guidelines for maintaining LDL-C levels of diabetic patients below 100 ml/dL – even if this balance requires the highest level of statins, it was found that 78% of doctors strongly or very strongly agree with the clinical guideline to maintain LDL-C levels in diabetic patients below 100 ml/dL. Twenty-two percent only weakly agreed or did not have a firm opinion. There was no absolute opposition to the consideration of clinical guidelines (Table 3).

Table 3: Level of agreement with clinical guidelines for maintaining LDL-C levels of diabetic patients below 100 ml/dL

|  |  |
| --- | --- |
|  | Percentage of respondents |
| Strongly or very strongly agree | 77.6 |
| No firm opinion | 12.2 |
| Weakly agree | 10.2 |
| Very weakly agree | 0 |

It was found ;that most family doctors agree on principle with statin treatment for patients with type 2 diabetes (96.1%), however there was lower agreement with clinical guidelines (77.6%) – LDL-C levels below 100 ml/dL, with the aim of reducing LDL-C levels to below 70 ml/dL for patients diagnosed with cardiovascular disease (Figure 4).

Figure 4: The level of agreement in principle to prescribing statins compared to agreement with prescribing statins according to clinical guidelines.

Regarding doctors’ attitudes towards the level of importance they place on the way Maccabi Healthcare Services can assist doctors in controlling cholesterol among diabetic patients, it was found that among the various support mechanisms, dietetic services were required far more than any others (84.5%) (Figure 5). The second most-required mechanism was nursing services (77.5%), and in third place, clinical pharmacy support (66.6%), while monthly reports and monetary compensation were ranked last (60.9% and 55%, respectively).

Figure 5: Level of importance placed on the support mechanisms offered by Maccabi Healthcare Services to assist doctors in controlling cholesterol among diabetic patients

After completing the frequency analysis, we compared the responses with statistical information from the doctors, while pooling the categories “strongly agree” and “very strongly agree” against “no opinion” and “weakly agree”. Subsequently, the subjects the doctors were asked about were compared with the doctors’ demographic variables. First we divided them into age groups: young doctors up to age 40 (23%) compared with mature doctors aged 41 and over (77%). We found that when considering the ways Maccabi Healthcare Services can assist cholesterol control, 91% of young doctors request monetary compensation compared to 40% of mature doctors; 91% of mature doctors prefer nursing services in the clinic compared to 54% of young doctors (Table 4).

Table 4: Doctors’ selection of actions that the health fund can do to assist them in achieving cholesterol balance; percentage of doctors strongly agreeing or very strongly agreeing

|  |  |  |  |
| --- | --- | --- | --- |
|  | Young doctors (up to age 40) | Mature doctors (aged 41 and over) | Sig. |
| Monthly reports on your patients | 63.6% | 67.7% | 0.188 |
| Nursing services in the clinic | 54.5% | 91.2% | 0.001 |
| Clinical pharmacy support | 54.5% | 70.0% | 0.106 |
| Dietetic services | 90.9% | 80.0% | 0.616 |
| Monetary compensation | 90.9% | 40.0% | 0.017 |

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%). (χ2 test = 9.138, df = 3, sig = 0.028). 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 diabetic patients; however, this difference was not significant. Doctors who studied in South Africa did not choose this option.

**Discussion and recommendations**

According to previous studies, most doctors expressed 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 (Gross et al., 2005).

The findings of the current study indicate that most family doctors agree with statin treatment for diabetic patients. However, it is clear that agreement with clinical guidelines is noticeably lower than agreement in principle with prescription of statins to diabetic patients, 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 (Neker, Winkler, Bru-Aloni and Kitay, 2000).

Studies worldwide show that there are a number of obstacles 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 the guidelines (Gross et al., 2005). We concluded that it is important to identify obstacles 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 diabetic patients 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 (Yosef, Shur and Constantini, 2014). A literature survey found another study dealing with the choice of medicinal treatment of type 2 diabetes 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. Patient complexity will influence the process of choosing medicinal treatment, often in opposition to evidence-based treatment guidelines (Bitzur, Haratz & Rubinstein, 2005). With respect to the results of the attitude survey, it is true that balancing such diabetic patients is an acquired skill; we found general agreement with prescription of statins according to clinical guidelines, nevertheless, doctors have complete freedom to choose a medical treatment that is tailored to the patient’s complexity and treatment effects.

The present survey examined the issues affecting doctors’ decisions about prescribing statin treatment. A study examining the effect of the relationship between doctors and pharmaceutical companies with respect to patients found that most of the survey participants consider the relationship between doctors and pharmaceutical companies to be a factor influencing doctor’s behavior when writing prescriptions (Nissenholtz-Ganot, Shani and Schwartz, 2010). In contrast, the present study revealed a more significant effect of clinical policies and guidelines and studies on statins. An interesting point related to the present study is doctors’ complete disregard of the effect of pharmaceutical companies. This fact may represent a situation of “social desirability”. Similarly, we could hypothesize that the mechanism of responding via organizational email has an influence. We may be looking at a type of bias stemming from research limitations. Moreover, 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 no impact.

In the work environment of family doctors working in independent clinics and in medical centers belonging to Maccabi Healthcare Services, additional services, including paramedical services, are present. These services provide a supportive environment as part of the team effort to jointly guide patients towards balancing their cholesterol levels. Many studies reach the conclusion that multidisciplinary teams are important for ensuring intra-organizational effectiveness and improving the quality of treatment (Freunch & Derech-Zahavi, 2005). In the present attitude survey, participants were required to select a factor influencing team work. Doctors selected dietetic services as the most important support. 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 (Chima & Pollack, 2002). 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 (Lahad, Keinar & Brandon-Friedman, 2008). Additional research findings show that intervention by multi-disciplinary teams managed by a nurse significantly improve the LDL-C balance in diabetic patients. 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 (Watts & Sood, 2006).

In this attitude survey it was found that 55% of research participants agree to monetary compensation for improving the blood lipid balance in diabetic patients. Nevertheless, with respect to participant demographics, it was found that young doctors (up to age 40) selected monetary compensation as an organizational support mechanism for improving 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 (Gross et al, 2005). 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 two types of incentives is required; this approach is likely to lead to micro-economic effectiveness and better cost and quality outcomes (Vardi, Kayam and Kitay, 2008). In this light, it is important to express this aspect when formulating an intervention program for improving LDL-C balance.

The present study found a gap 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 explains the correlation between doctors’ employment status (salaried vs. self-employed) and their exposure or commitment to organizational aims, possibly due to the uniqueness of the employment model in Israel.

**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 balance in diabetic patients (Stern, 2002).

The research results provide a basis for continued formulation of a program to increase the percentage of patients with type 2 diabetes exhibiting balanced LDL-C levels in Maccabi Healthcare Services Sharon Region. In this program, it is important to create a suitable effect with respect to the factors influencing the doctor, in order to increase his readiness to uphold clinical guidelines. Similarly, within this program we recommend considering the issue of community team work to increase cooperation between the family doctor and the dietician, nurse and clinical pharmacist for chronic disease management. Regarding the attitudes of young doctors with respect to monetary compensation as an incentive, we recommend creating a system of incentives that influence the behavior and results of doctors in the community.

With respect to the research results, we recommend conducting a follow-up study to compare the attitudes of doctors working in Maccabi’s clinics and doctors working in independent clinics external to the clinics of Maccabi Healthcare Services.

**Bibliography**

Alsheklee, A. & Katirji, B. (2006). Clinical perspectives of statin –induced rhabdomyolysis. American Journal of Medicine, 120(12), 29-33.

Armitage, J. (2007). The safety of statins in clinical practice. The Lancet, 330 (9601), 1781-1990.

Arora, R. (2006).Statins, diet and low cholesterol. JAMA-Journal of the American Medical Association, 295(2), 2479-2479.

Barter, P.J., Ballantyne, C.M., Carmena, R., Castrom, M.,Chapman, M.J., Couture, P.,…Williams, K.M.S.(2006). Apo B virus cholesterol in estimating cardiovascular risk and guiding therapy: report of the thirty-person/ten country panel. Journal of Internal Medicine, 259(3), 247-258.

Bitzur, R., Haratz, D., & Rubinstein, A. (2005). Preventing arteriosclerosis and vascular diseases and the treatment of patients – treatment of diabetes, blood lipid disorders and stroke prevention. Medecine, 144 (9), 647-654. [In Hebrew]

Casserly, I.P. & Topol, E.(2004). Gonvergence of atherosclerosis and Alzheimer's disease. The Lancet, 363(9426), 2092.

Catapano, A.L., Reiner, Z., De Backer, G., Graham, I., Taskinen, M., Wiklund, O.,… Wood, D.(2011). Guidelines for Management of Dyslipidemias. European Journal of Cardiovascular Prevention Rehabilitation, 18(5), 724-727.

Chima, C., & Pollak, H., (2002). Position of the American Dietetic Association Nutrition services in managed care. American Dietetic Association*.* Journal of the American Dietetic Association, 102, 10, 1471 – 8.

Colhoun, H.M., Betteridge, D.J., Durrington, P.N., Hitman, G.A., Livingstone, S.J., Thomason, M.J., … Fuller, J.H.(2004). Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetes in the Collaborative Atorvastatin Diabetes Study.(CARDS): multicenter randomized placebo – control trail. The Lancet, 364, 685-696.

Corbin, J.H.(2005). A pragmatic health promotion in a globalized world: the rising generation comments on Bangkok. Promotion & Education, 12(2), 7-9.

Cvengros, J.A., Christensen, A.J., & Lawton, W.J. (2004) The role of perceived control and preferences for control in adherence to a chronic medical regimen. Annals of Behavioral Medicine, 27(3), 155-161.

Dagan, B. (2011). The state of diabetes in Israel at the beginning of the millennium: an increase in morbidity and a revolution in mortality trends. Medicine and Family, 163, 47-48. [In Hebrew]

Dora, J. (2008). Standards of Medical Care in diabetes – 2008. Diabetes Care 31(5), 12-54.

Eldor, R., & Raz, I. (2007). Statins for diabetics – is there evidence? Diabetes, 3, 29-33. [In Hebrew]

Evens, C.D., Eurish, D.T., Lamb, M.S., Taylor, J.G., Jorgenson, D.J., Semchuk, W.M., Mansell, K.D.& Blackburn, D.F. (2009). Retrospective observational assessment of statin adherence among subjects patronizing different types of community pharmacies in Canada. J Manag Care Farm, 15(6), 476-484.

Feldstein, A.C., Smith, D.H. & Perrin, N. (2006). Improved therapeutic monitoring with several interventions. A randomized trial. Arch Intern Med, 166, 1848-1854.

Freund, A., & Derech-Zahavi, A. (2005). Effectiveness of the interdisciplinary staff: myth or reality? Effects of personal and organizational factors on work in interdisciplinary teams in the community healthcare system. Social Security, 68, 70-101. [In Hebrew]

Grant, R. W.,Wexler, D.J., Watson, A.J., Lester, W.T., Cagliero, E., Campbell, E.G. & Nathan, D.M.(2007). How Doctors Choose Medications to Treat Type 2 Diabetes: A national survey of specials and academic generalists. Diabetes Care, 30(6), 1448.

Gross, R., Ashkenazi, Y., Elroi, I., Shechter, L., & Shoval, Y. (2011). Attitudes of doctors, patients and policy makers regarding integrated treatment in complementary and conventional medicine. Jerusalem, Myers – JDC – Brookdale Institute. [In Hebrew]

Gross, R., Greenstein, M., Matzliach, R., Tabankin, H., Porat, A., Heiman, A., & Partner, B. (2005). Assimilating clinical guidelines in primary medicine: changing doctors’ behavior. Jerusalem, Myers – JDC – Brookdale Institute. [In Hebrew]

Harper, C. & Jacobson, T. (2007). The broad spectrum of statin myopathy: From myalgia to rhabdomyolysis. LIPPINCOTT WILLIAMS & WILLINS 18(4), 408-409.

Henkin, Y. (2009). Statins: pharmacological and clinical aspects. Medical, 26, 46-52. [In Hebrew]

Jefferson, T (1998). Tight Blood Pressure Control and Risk of Macrovascular and Microvascular Complication in Type 2 Diabetes : UKPDS, JAMA, The Journal of The American Medical Association, 280(19), 1644.

Kaboli, P.J., Hoth, A.B. & McClimon, B.J. (2006). Clinical pharmacists and inpatient medical care: a systematic review. Arch Intern Med,166(9), 955-96.

Kamari, Y., Bitzur, R., Cohen, H., Shaish, A. & Haratz, D. (2009). Should all diabetic Patients be treated with a statin? Diabetes Care, 32(2), 378-383.

Krueger, K.P., Felkey, B.G., & Berger, B.A. (2003). Improving adherence and persistence: A review and assessment of interventions and description of steps toward a national adherence initiative. Journal of the American Pharmacists Association, 43(6), 668-79.

Lahad, A., Keinar, T., & Stewart-Freidman, B. (2008). Is the transfer of treatment authority to nurses and pharmacists desirable and possible? Medicine, 147(12), 1021-1025. [In Hebrew]

Leushen, J., Mortensen, E., Frei,C., Mansi, E.,Panday, V.& Mansi, I.(2013). Association of statin use with cataracts: A propensity score matched analysis. JAMA Ophthalmology, 131(11),1427-1434.

Ministry of Health (2011). [In Hebrew]

Ministry of Health (2013). [In Hebrew]

Nakar, S., Winker, S., Bru-Aloni, T., & Kitay, E. (2000). Attitudes of family doctors in Israel with respect to clinical guidelines for treating diabetes patients. Medicine, 138(5), 351-353. [In Hebrew]

Nirel, N., Shirom, A., & Ismail, S. (2004). The relationship between feeling overworked, exhaustion and work satisfaction and the number of workplaces of consulting doctors in secondary medicine in Israel. Medicine, 143(7), 482-488. [In Hebrew]

Nissenholtz-Ganot, R., Segev, S., & Schwartz, S. (2010). Effects of the relationship between doctors and pharmaceutical companies on patients from the viewpoint of policy makers in Israel. Medicine, 149(11), 688-692. [In Hebrew]

Palomaki, M. (1997). The System of European Decision-Making Centres Revisited. Colloquium Geographicum , 24,189-206.

Pedan, A., Verasteh, L.T. & Schneeweiss, S. (2007). Analysis of factors associated with statin adherence in a hierarchical model considering physician, pharmacy, patient, and prescription characteristics. Journal of Managed Care Pharmacy, 13(6), 487-496.

Pedersen, T.,Kjekshus, J., Berg, K., & Haghfelt, T. (1994). Randomised trial of cholesterol lowering in 4444 patients with coronary heart disease :The Scandinavian Simvastatin Survival (4S*).* The Lancet, 344, 8934, 1383.

Porat, A., & Goldstein H. (2010). Decision-making in medicine – are doctors affected by “irrelevant” information? The Faculty of Social Sciences, University of Haifa. Final research paper for the M.Sc. degree. [In Hebrew]

Sattar, N., Preiss, D., Murray, H., Welsh, P., Buckley, B., Craen, A., … Ford, I. (2010). Statins and risk of incident diabetes: a collaborative misanalysis of randomized statin trials. The Lancet, 375, 735-742.

Segev, S. (2003). Electronic trading of medications. Medicine, 142(5), 372-376. [In Hebrew]

Steiner, .J.F. & Earnest, M.A. (2000). The language of medication- taking. Annals of Internal Medicine, 132(11), 926-930.

Tzur, A., Herman-Baham, I., Buchs, A., Raz, I., & Weinstein, J. (2006). Following 2005 guidelines for treatment of type 2 diabetes. Medicine, 145(8), 583-586. [In Hebrew]

Vardi, D., Kayam, R., & Kitay, E. (2008). Medicine in the community: how do we incentivize doctors? Medicine, 147(12), 999-1003. [In Hebrew]

Watts, S., & Sood, A.(2016). Diabetes nurse case management: Improving glucose control: 10 years of quality improvement follow-up data. Applied Nursing Research.  29, 202-205

Wells, R.J., Arthur, D.C., Srivastava, N.A., Heerema, M., LE Beau, T.A., Alonzo, A.B., … Lampkin, B.C.(2002). Prognostic variables in newly diagnosed children and adolescents with acute myeloid leukemia: Children's Cancer Group Study 213. Leukemia, 16(4), 508-519.

Wolfowitz, E. (2005). The varied effects of statins. Medicine, 14(8), 577-582. [In Hebrew]

World Health Organization. Diabetes. (2016) <https://www.health.gov.il>

Yosef, Y., Shur, D., & Constantini, N. (2014). Statins and muscle pain. Medicine, 153(7), 423-426. [In Hebrew]

Yitzhakov, A., & Rubinstein, A. (2001). Treatment of dyslipidemia in diabetes patients. Medicine, 140(8), 632-633. [In Hebrew]