

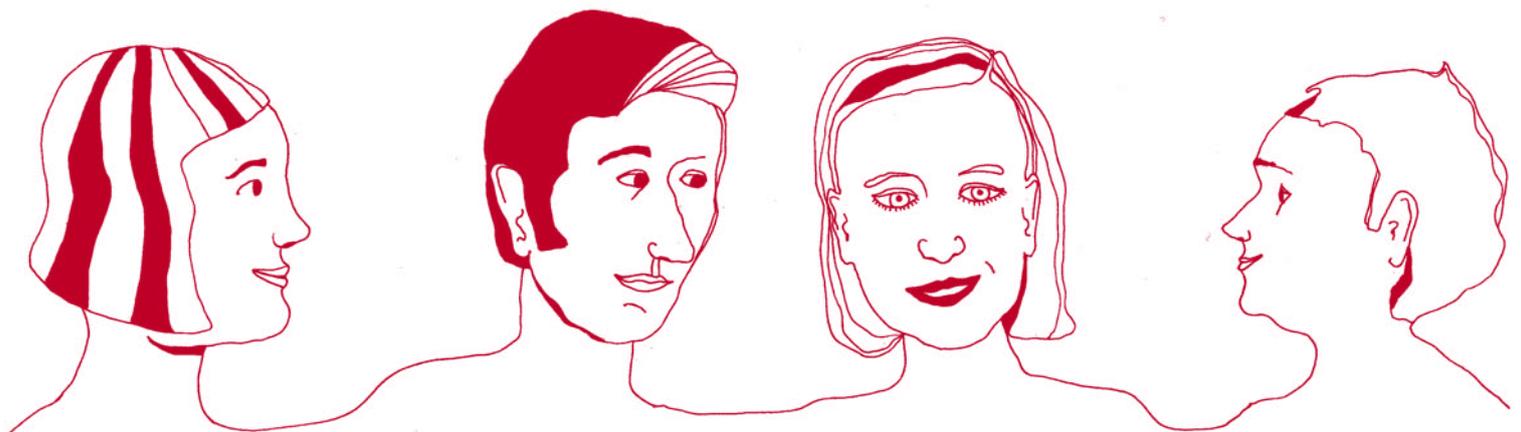
Guidelines for type 2 diabetes in Estonia: knowledge, attitudes and self-reported behaviour among general practitioners

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– Essay –

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Abstract

Introduction: The aim of this study was to assess the patient, practice and practice management related factors contributing to non-adherence of type 2 diabetes mellitus clinical practice guideline in Estonia.

Methods: Descriptive postal survey using a self-administered questionnaire.

Results: Of the 354 doctors who received the questionnaire 46% (n=163) responded. 76% of them have type 2 diabetes guidelines. Low awareness of diabetes and its complications among patients as well as their low motivation to change their lifestyle were considered to be the biggest difficulties in managing individual patients. In addition to the most often listed problems, non-compliance with medical regimen, patients' financial problems and their non-attendance were mentioned.

The greatest health care systems related barriers to practices providing desirable care were inadequate number of patients' educational materials, the lack of special diabetes education for nurses and underfunding. The patient related issues were regarded as problems in 96% of the cases and health care system related factors were mentioned in 79% of the cases.

Key words

diabetes mellitus , guideline, non-adherence, general practice

**GUIDELINES FOR TYPE 2 DIABETES IN
ESTONIA: KNOWLEDGE, ATTITUDES AND
SELF-REPORTED BEHAVIOUR AMONG
GENERAL PRACTITIONERS**

CONTENTS

INTRODUCTION.....	5
The objectives of the study.....	8
Specific questions addressed in the study.....	8
MATERIAL AND METHODS.....	9
RESULTS.....	10
1. General practitioners` personal and practice characteristics.....	10
2. Availability and self-reported use of the type 2 diabetes mellitus guidelines in GPs practices.....	11
3. An impact of the practice characteristics and accessibility of specialized endocrinological care on the availability of the guidelines and self-reported following of them in daily practice.....	12
4. Comparison of the GPs` knowledge about the treatment goals against the criteria in the guideline.....	14
5. The physicians` assessment on the patient and practice management related factors contributing to non-adherence of diabetes mellitus clinical practice guideline.....	16
DISCUSSION	18
CONCLUSIONS.....	21
ACKNOWLEDGEMENTS.....	22
REFERENCES.....	22
ANNEX A: LIST OF ABBREVIATIONS.....	26
ANNEX B: QUESTIONNAIRE.....	27

INTRODUCTION

Diabetes is a major growing health care problem. It is one of the most common chronic diseases seen in primary care, with a prevalence of 2% (1). It is expected that the number of people with diabetes will be redoubled by the year 2010 (2). At the present rate of increase in type 2 diabetes, it will be one of the world's commonest diseases and among the most serious problems of public health within a few decades (3). In Estonia, the prevalence of type 1 diabetes is approximately 1.7 per 1,000 inhabitants. However, not very much is known about the incidence and prevalence of type 2 diabetes here. It is estimated that all known diabetics make up approximately 1-2% of the population (4). Within the last five years (1998-2003) there has been a 54% increase in incidence of diabetes in Estonia (HFA-DB) (5).

The most important challenge in the care of diabetic patients is to avoid or postpone several complications of the disease. There is now clear evidence that an effective control of blood glucose and blood pressure significantly decreases the risk of complications in both type 1 and type 2 diabetes (6). There is also a growing body of evidence of effective interventions to improve the management of diabetes (7). A critical point of care is patients' adherence to it. Adherence to glucose monitoring and medication regime varies between 60-80% in different studies (8). Adherence to diet varies more, between 30-70%. Quality of care of diabetic patients can be influenced by health care system, practice organisation and by patients themselves (9, 10). Health care system has its impact on how care for patients is organised, funded, how the medicines are reimbursed, how the educational materials are prepared and distributed etc. Practice organisation requires adequate practice management, for example, by adequate organisation of medical practice by systematic delegation of health promotion activities to the ancillary staff. Written diabetes protocols and the degree to which the general practitioners and ancillary staff work as a team are also important, as these foster teamwork and provide a sense of direction (9). Waiting time, list size, practice type and location, record-keeping are just a few of the practice organisation factors important in quality of care. Background characteristics of general practitioners (GPs) and practices associated with diabetes guideline adherence may contribute substantially to variations in healthcare delivery and are associated with adherence to preventive guidelines. Quality improvement initiatives will be more efficient when we know which GPs or practices are most, or least, likely to comply with clinical prevention (9).

In most current health care systems GPs play an increasing role in the care of people with diabetes; however, the level of performance in primary care is variable (11). The challenges described in the Saint Vincent Joint Task Force Report on a European primary care network for diabetes care include achievement of a reduction in long-term complications by collecting key clinical information and by systematically organising the care of patients with diabetes (12). There is some evidence that primary care can be as effective as secondary care when judged by commonly used performance measures such as frequency of laboratory tests, frequency of measurement of glycated haemoglobin (HbA_{1c}) (11, 12). There are encouraging examples of the provision of diabetes care by GPs in the United Kingdom. Since 1970, increasing numbers of family doctors in the UK have assumed the responsibility for the routine review of their patients with diabetes, as well as for a variety of underlying reasons, although it is sometimes difficult to assess whether care has been shared or simply shifted.

Satisfactory follow-up in primary care has been far from universal and cannot be guaranteed; however, in certain circumstances general practitioners have achieved follow-up and control of metabolism at least as good as their hospital colleagues (13).

To achieve higher quality in taking care of patients with chronic diseases, clinical practice guidelines (CPG) are often developed and used as guidance. CPGs integrate generic recommendations for specific medical circumstances. They have been defined as systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific medical circumstances. They are designed to compile the best medical knowledge in order to provide physicians with a practical decisional aid. Clinical practice guidelines aim to eliminate clinician errors and promote best medical practice. Most CPGs are now easily accessible on specialized web sites. For instance, the National Guideline Clearinghouse (14) alone has almost 1,000 publicly accessible guidelines (15).

Within the last decade several guidelines for diabetes care have been compiled in different countries stating how to assess and treat patients with diabetes (14, 15, 16, 17, 18, 19). Optimal use of guidelines in general practice requires improved dissemination and an implementation strategy based not only on GPs' education but coupled also with systems to reduce barriers to implementation and to support better quality of GP care (12). In recent years great expectations have been placed upon the usefulness of various clinical guidelines, though with not so much evidence to support them. Several studies have found that despite generally positive attitudes toward guidelines, GPs do not use guidelines frequently in daily practice (20). It seems as if despite the relative support to guidelines expressed by physicians, there exist barriers that prevent the translation of this support into action at the clinic level (21).

The wide diffusion of CPGs does not however solve the problem of their effective use in daily practice. It has been showed that the compliance with guidelines increases if it is developed with the direct participation of clinician users (50% increase in relative compliance)(22, 23). Attaching guidelines to patients' records is a second important factor (24). Key barriers for use of guidelines for coronary heart disease reported by GPs in five European countries were lack of time, prescription costs and patient compliance. In order to improve the use of CPGs, it is necessary to inquire GPs about unmet critical needs and about their expectations regarding the existing guidelines. This information should serve to support effective development of guidelines, ultimately enhancing physicians' adherence to them (25). It has been demonstrated that guidelines had the greatest chance of changing clinical behaviour when they were developed by the clinicians for whom they were intended, disseminated through a specific educational programme and implemented via patient specific reminders during consultations (26).

Accessibility of CPGs is a crucial factor in their use. Disseminating CPGs in printed format has proved inefficient. The practitioner has to read several pages in order to find the appropriate care recommendation for a specific clinical circumstance. Their practical aspect rather than their content is at fault. Guidelines would prove much more efficient if they were available in the healthcare setting, integrated in the health care information system, easily adaptable to given clinical situations/scenarios and able to avoid overloading physicians with non-essential information. Minimizing the time spent consulting CPGs is crucial when attempting to improve their usage in everyday practice.

Physicians need both timely and pragmatic information to provide patients with the most appropriate care, and computerized CPGs have proved valuable in this respect (15).

Since the 1990s there has been considerable interest in implementation of clinical guidelines and changing clinical practice. Several large reviews as well as Cochrane reviews have been published (27, 28, 29), including a recent HTA report (30). Most studies have compared a single intervention strategy with no intervention, another intervention or combination of interventions. Some intervention strategies are more effective than others, but no single strategy is useful for all purposes. Multifaceted interventions combining several methods seemed to be more effective than single ones (29) but even this has proven to be less clear in most recent reviews (30).

In Estonia, the system of public health care is responsible for diabetes care, with primary health care bearing main responsibility. The care of people with type 2 diabetes requires natural and flexible opportunities for consultations both within the health care centre in question and within the specialized system of medical care. In principle, prevention of type 2 diabetes is also the responsibility of the primary health care system. However, since the primary health care system is vested with overall responsibility for population in each region, the other forms of basic care (e.g. for infections) for these diabetic groups are generally provided in health care centres. In development of care, the principal rule is to improve co-operation between primary health care and specialized medical care, an appropriate division of labour ("shared care model"), and straightforward consultation opportunities in both directions (31). In Estonia, the care of diabetic patients has been shifted from secondary care to the primary health care system through the changes of health care in 1990s.

In Estonia, GP is a new speciality functioning only since 1993 (32). Care provided by GPs is comprehensive, not limited by gender, age or diagnostic category and the defined practice population is based on list system. The new situation for GPs came about through retraining of the previous district doctors and district paediatricians acquiring comprehensive education. Even doctors from other specialties (emergency doctors, neurologists, endocrinologists etc.) who chose to respecialize to work in primary care participated in the retraining. Since 1993, new graduates from medical faculty enter the specialty of GP via full time 3-year postgraduate residency training. After health care reforms in Estonia, GPs have overtaken several tasks in diabetes care, which had mainly been provided by endocrinologists before. In 1998, a new financing scheme for GPs came into force, which foresaw establishment of patient lists and introduced a combined payment mechanism (basic practice allowance +capitation +fee-for-service element+ some extras) (32, 33). The aim of the primary health care reforms has been to establish accessible, high quality health care based on fully responsible physicians (33).

Currently, most patients with type 2 diabetes in Estonia receive care from GPs. The diabetes nurse and endocrinologist are available at the hospitals, and some health care centres have appointed a specially educated nurse to be responsible for diabetes care. The diabetes care of children, young people and pregnant women, as well as the treatment of severe complications, is concentrated in the specialized system of medical care.

To improve the quality of the care of diabetic patients, the Estonian Society of Family Doctors has developed a guideline for management of type 2 diabetes. It is one of the eight guidelines compiled by the Estonian GPs since 1998. A group including primary and secondary care doctors was set up for guideline development for management of diabetes, relying upon available evidence based guidelines (English Original Surveillance Group of European Diabetes Guidelines 1999) (16).

It is not known if diabetes care guidelines are incorporated into the daily practice of primary care and what the criteria for the treatment goals of diabetes patients are for Estonian GPs. In Estonia, information about general practitioners' attitudes towards guidelines, about their ability to adopt and interpret guidelines as well as about the need for additional support to implement guidelines into everyday general practice is very scanty. There is an increasing interest and belief, both nationally and internationally, that working out clinical practice guidelines has a major impact on quality of care. However, the research results demonstrate contradictory results on this issue. The patient-, practises-, and practice management-based barriers may prevent implementation of evidence based practices (34, 35). It has been found that attitudes, rather than knowledge, may impede primary care provider adherence to standards of care (36).

The objectives of this study were to determine the current use of diabetes guidelines, the knowledge of GPs and their attitude to these guidelines as well as to identify the barriers impeding the implementation of the guidelines into daily practice.

Specific questions addressed in the study:

1. To find out if practice characteristics (type of practice, working area, status before specialization as GP) have an impact on the fact whether the GPs have guidelines at their disposal.
2. To find out how often the guidelines are available at the GPs practices and how many GPs report following and using them in their daily practice.
3. An impact of the practice characteristics and accessibility of specialized endocrinological care on the availability of the guidelines and self-reported following of them in daily practice.
4. To compare the GPs knowledge about the treatment goals against the criteria in the guideline.
5. To describe the physicians' assessment on the patient-, practice- and practice management related factors contributing to non-adherence of diabetes mellitus clinical practice guidelines.

MATERIAL AND METHODS

A postal questionnaire was sent out to a random sample of GPs (n=354) all over Estonia in March 2003. Their names and addresses were obtained from the list of the Estonian Society of Family Doctors. Each questionnaire was coded with an identification number. A second mailing with a reminder letter and an additional questionnaire were sent to those who had not responded during three weeks after the initial mailing. Of the 354 doctors who received the questionnaire 46% (n=163) responded. The age and gender structure of the respondents corresponded to the general structure of GPs in Estonia.

Description of the instrument

A research group compiled the questionnaire, which had been piloted before its use for the study, in 2003.

The first section of the questionnaire was about the respondents' background characteristics: the year of graduation from the university, the year of specialization as a GP, practice type and location, practice size and the number of diabetes patients in their list. Also, doctors were asked whether they had type 2 diabetes CPG at their disposal, whether they used it and found it applicable. Additionally, the GPs were asked if their nurse had had a special education on diabetes care.

In the second section, the GPs were asked to assess whether they regarded the listed patient and practice management factors as problematic or not in taking care of patients with type 2 diabetes according to the guideline (on the Likert scale ranging from 1 = this is never a problem to 4 = this is a problem very often). The research team composed the list of factors based on a previous qualitative study conducted in the UK (26): according to this study, it was possible to distinguish six patients related factors and seven practice management related factors.

The next part of the questionnaire dealt with the specialist accessibility: the possibility to consult an endocrinologist, the distance to the nearest endocrinologist and the opportunity to consult an endocrinologist by telephone.

In the third section, the GPs were asked to appraise importance of selected treatment goals, which were some clinical and laboratory aspects, drawn from the guideline (the elimination of symptoms, absence of glucosuria, keeping blood glucose in normal range, achieving and maintenance of body weight, absence of ketoses). Answer options were "very important", "important", "rather not important" and "not important".

In the questionnaire, the doctors were asked to affirm the level of blood glucose when they usually start treatment with medication, the level when they are content with treatment outcome, and the assumed amount of diabetic patients in their list whose blood glucose is compensated.

The survey responses were entered into a database and statistically analyzed in SPSS 10.0 (Statistical Package for the Social Science) for Windows. Respondents were analyzed by the indicators characterizing their work characteristics, such as the year of graduation from the university, year of specialization as a GP, practice type and location, practice size, number of partners, number of nurses, education experience,

number of diabetes patients. The statistical analysis of data included basic statistics (mean, SD, SE, minimum and maximum values etc.), the chi-square test for categorical variables and analysis of variance for continuous variables. All p-values calculated were two-tailed. P-values higher than 0.05 were considered non-significant.

The project was approved by the Ethics Committee of the University of Tartu.

RESULTS

1. General practitioners` personal and practice characteristics.

46% (163 out of 354) of the doctors responded. The average (\pm SD) time from the graduation of medical faculty was 22 ± 7.0 years. The majority of respondents had completed postgraduate specialization for GPs (mean time since specialization was 15 years).

Before specialization as GPs, most of the doctors have been working as district doctors for adults or district pediatricians (Table 1). Regarding their previous speciality, the majority of the respondents had been district doctors for adults. 53% of the GPs worked in solo practices and the rest in group practices (Table 1).

The mean size of the patient list was 1830 ± 407 . The average number of diabetes patients in the list was 48, ranging from a minimum of three to a maximum of 300; thus, the estimated prevalence of diabetes was 2.6%. Type of practice, location of practice and professional characteristics among the responding physicians are shown in Table 1.

GPs working before specialization as district doctors for adults had significantly more patients with type 2 diabetes in their list comparing with previous pediatricians, other specialists or GPs through residency ($p=0.000$).

Table 1. Distribution of the respondents according to type of practice, their places of practice and previous specialty.

	n	%
Type of practice		
Solo	86	53
Group practices	77	47
Working area		
City	30	19
Urban area	67	42
Rural area	63	39
Status before specialization as GPs		
District doctor for adults	109	68
District paediatrician	36	22
Other specialties	8	5
GP directly after residency training	9	5

2. Availability and self-reported use of the type 2 diabetes mellitus guidelines in GPs practices.

The survey showed that the majority of practices have the diabetes CPG (76%) and that the majority of GPs (79%) follows CPG in their daily practice always or mostly. Also, most of GPs rated the applicability of CPG as easy or very easy (83%) (Table 2).

Table 2. Availability, following and assessment of usability of the guideline

	n	%
Guideline is available in office	122	76
Follows guideline always or mostly	124	79
Finds guideline easily usable	132	83

3. An impact of the practice characteristics and accessibility of specialized endocrinological care on the availability of the guidelines and self-reported following of them in daily practice.

Availability and use of the guideline were not related to the working area, practice type and size, previous status before specialization as a GP, working experience nor waiting time or distance to an endocrinologist (Fig.1)

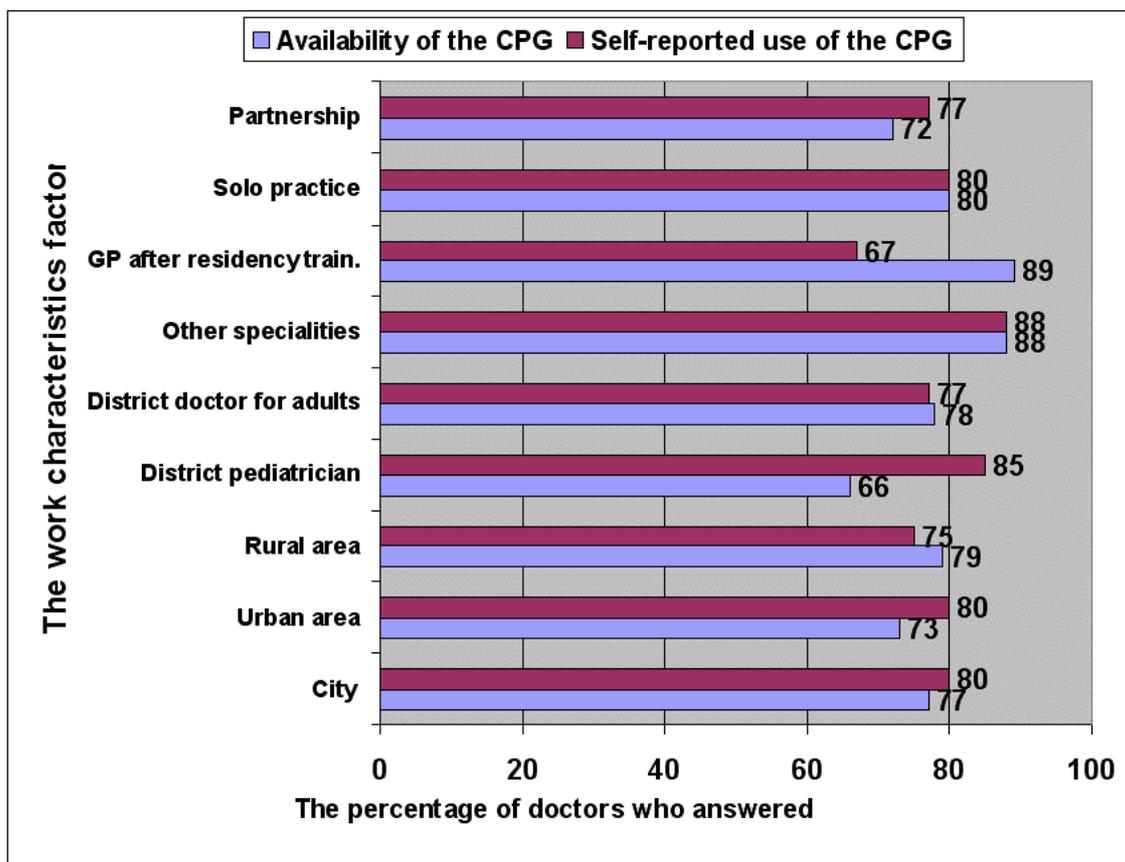


Figure 1. Availability and self-reported use of guidelines in different subgroups of doctors.

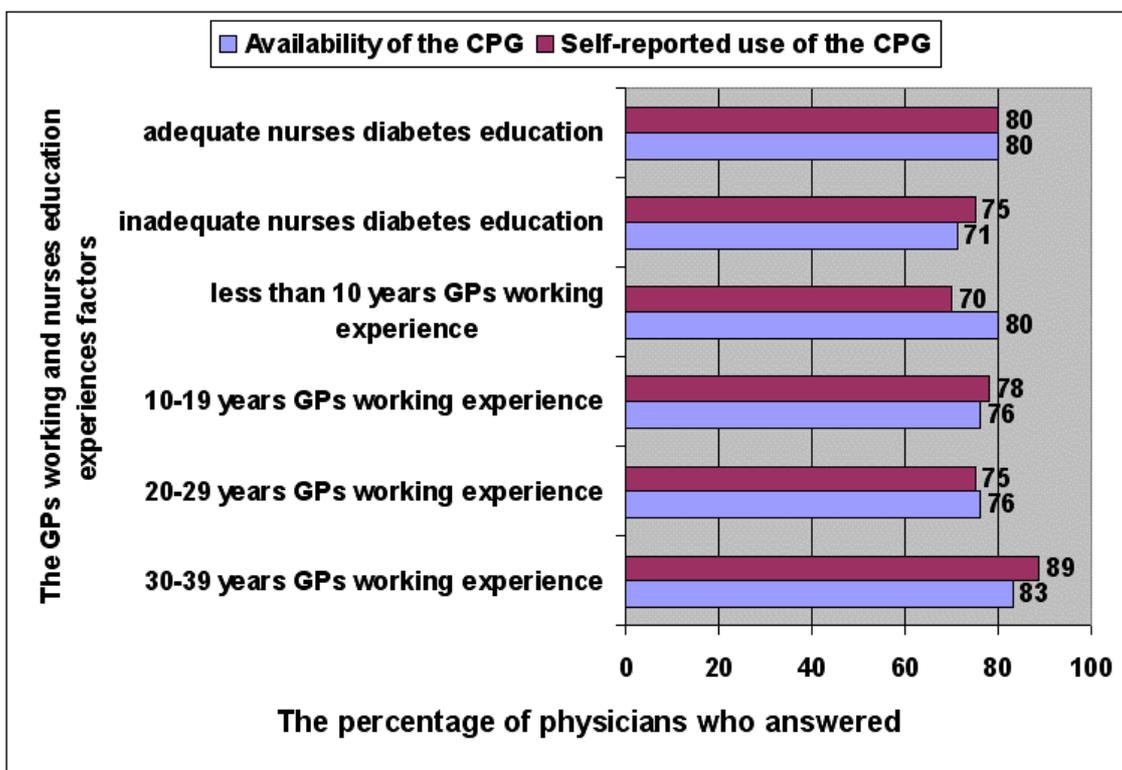


Figure 2. Availability and self-reported use of guidelines among physicians with different working experience and nurses diabetic education.

Doctors with the longest experience (30-39 years) had the greatest percentage of physicians reporting availability and regular use of the guideline. Of the GPs, 35% (n=56) said that their nurse had special education on diabetes care while 65% pointed out that their nurse had no special training. However, there were no statistical differences between the groups.

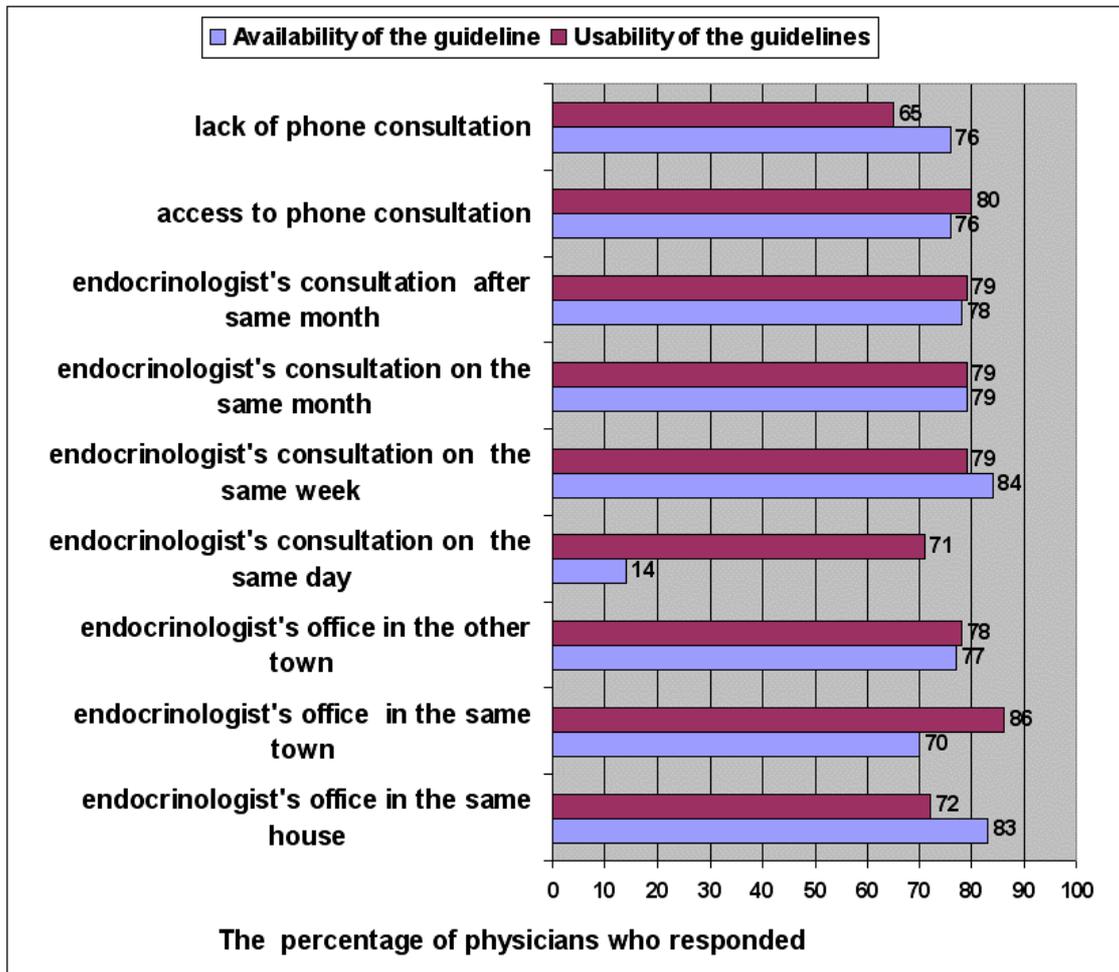


Figure 3. Impact of access to endocrinologist on the availability and usability of CPG.

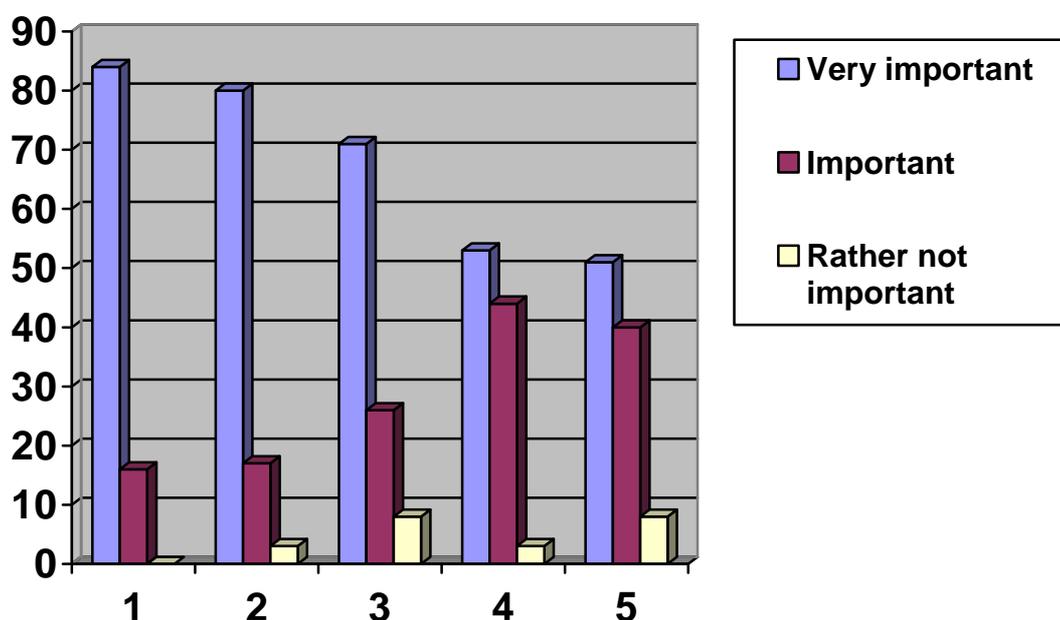
A statistically significant difference was observed between the usability of CPG and how fast one could obtain access to endocrinologist consultation. The 4.3% of GPs who could send their patients to an endocrinologist consultation on the same day reported the availability of CPG in practice in 14% of cases and the usability of CPG in 33% of cases. The distance from an endocrinologist’s office and the possibility of phone consultations with an endocrinologist had no direct relation with the availability of CPG and usability of CPG (Fig.3).

4. Comparison of the GPs knowledge about the treatment goals against the criteria in the guideline.

As an average, doctors tend to start treatment with medication at higher FBG levels (7.2 ±1.3 mmol/l) if to compare with the guideline (6.1 mmol/l). More than a half of doctors make a decision of treatment on FBG above 7 mmol/l. Five percent of respondents stated they start treatment with medication while FBG value is below 5.9 mmol/l, 34% in range 6.0–6.9 mmol/l and 61% when the FBG is above 7.0 mmol/l. Decision when to start treatment with medication was not related to whether the doctors were having

guidelines at their disposal, finding them usable and using them. Doctors having different numbers of diabetes patients had the same behaviour towards treatment.

The GPs are content with treatment at the fasting blood sugar values of 6.8 ± 1.4 in average, compared with the standard at the guideline 5.5 mmol/l. To ascertain the GPs treatment goals, the most important indicator was to keep blood glucose in normal range (Fig. 4). By importance the next indicators for doctors were laboratory tests: absence of ketones and absence of glucosuria. Laboratory indicators got higher values than maintaining weight or elimination of symptoms. Nobody stated any of those indicators to be not important.



1 – keeping blood glucose in normal range; 2 – absence of ketones; 3 – absence of glucosuria; 4 – maintaining and keeping normal weight; 5 – the elimination of symptoms

Figure 4. Proportion of doctors evaluating treatment indicators by importance (%).

Having and using guidelines did not make respondents evaluate treatment indicators in another way than those who did not have them. This was neither different compared to their work characteristics (working area, practice type, list size, and graduation of the medical university) and specialist accessibility (distance from endocrinologist, patient waiting time for endocrinologist and possibility to consult with specialist by telephone). Those who start treatment at the lower FBG levels appreciate treatment indicators the same way, as those starting treatment above 7 mmol/l. Having smaller or bigger number of diabetes patients in the list did not make GPs apprise treatment indicators differently.

5. The physicians` assessment on the patient- and practice management related factors contributing to non-adherence of diabetes mellitus clinical practice guideline.

The most important patient related factors pointed out by doctors were patients` low awareness of diabetes and its complications, the lack of motivation to change the lifestyle, non-following of their treatment schemes, patients` limited financial means, lack of interest and irregular consumption of medicaments (Fig. 5).

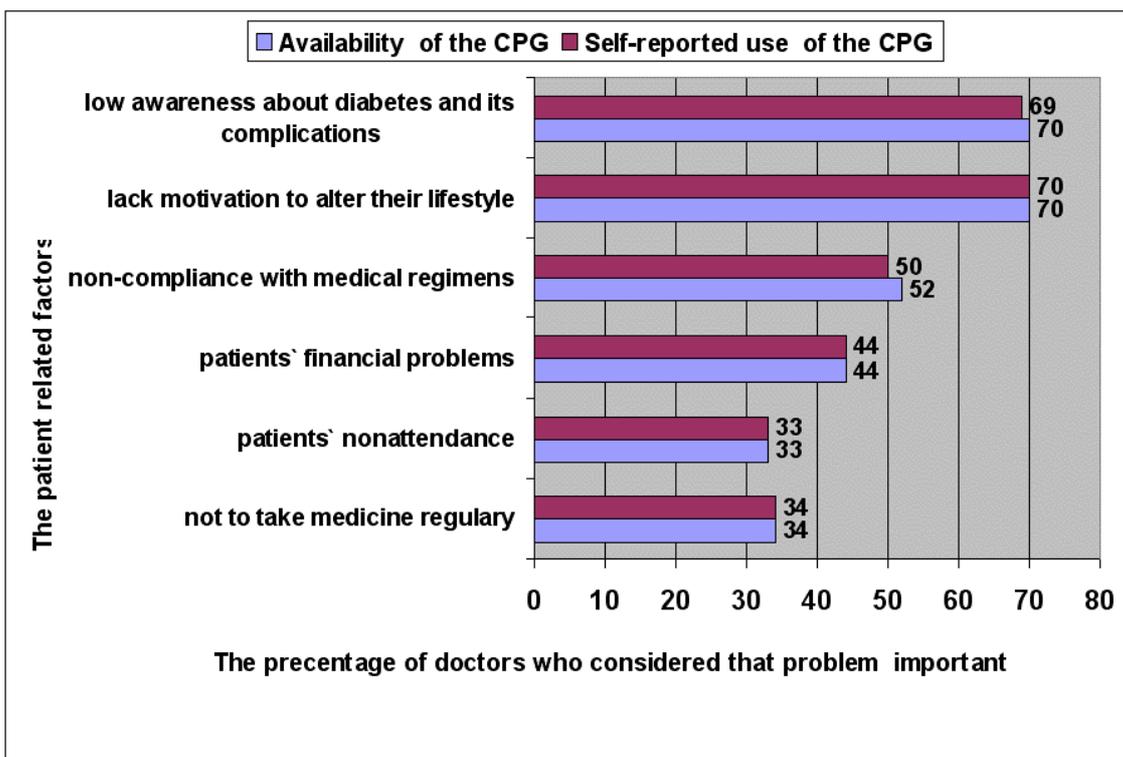


Figure 5. Doctors` assessment on different patient related factors, which might have an impact on the availability and self-reported use of guidelines.

This opinion had no connection with the availability of CPG for doctors, doctors being guided from CPG or the doctors' opinion of CPG. There was no difference between groups of doctors according to the availability of CPG or self-reported use of CPG.

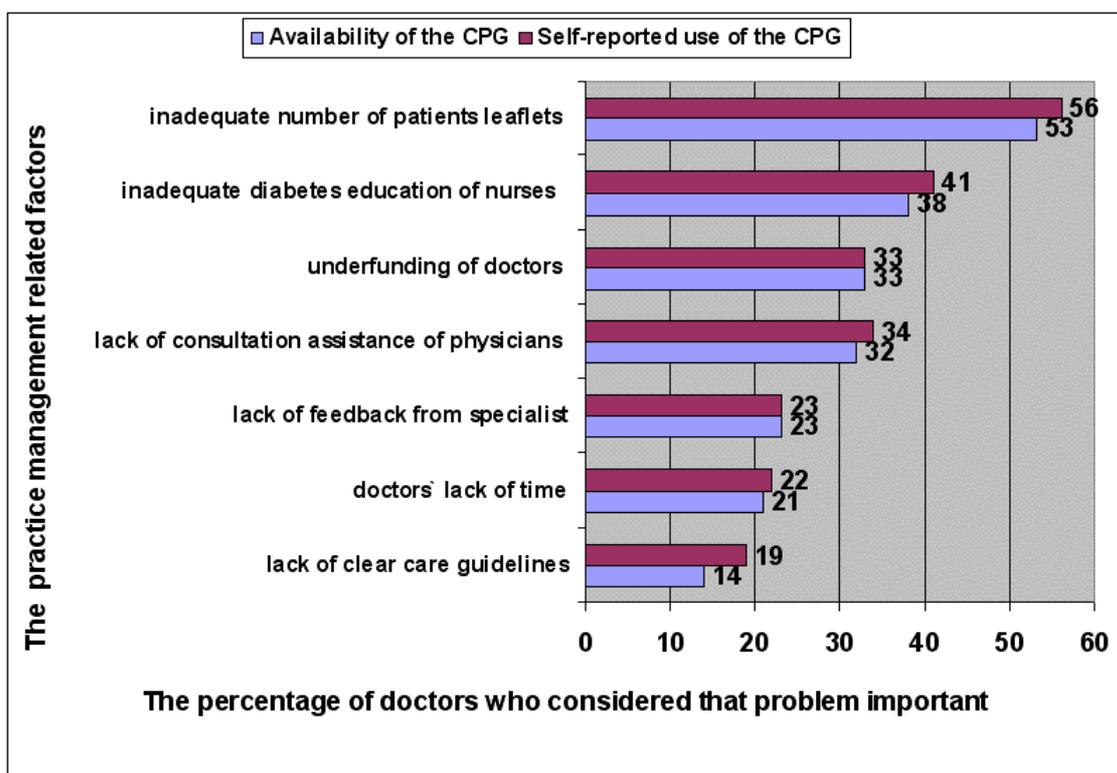


Figure 6. Doctors' assessment on different practice management related factors, might have an impact on the availability and self-reported use of CPG.

Regarding the practice management related factors, about half of the respondents consider that lack of special educational material for patients as well as lack of special education of the nurses have been the most important problems in management DM2 patients according to the guideline (Fig. 6). About one third of the GPs reported that lack of financing and lack of support from the specialists were also problems in taking care of DM2 patients.

The patient related issues being a problem "often" or "very often" were mentioned in 96% of the cases; practice management related factors were mentioned in 79% of the cases.

Compared to previous paediatricians, doctors who had before specialization been working as district doctors for adults significantly less considered patients' low awareness of diabetes to be a factor hindering implementation of the DM2 guideline (Fig.6). Considering low awareness of patients was also related to the number of diabetic patients in the list. The more patients with diabetes type 2 the GP had in the list, the more problematic they considered patients' low awareness to be. Lack of patients' motivation to change their lifestyle and lack of patients' interest in their own health tended to be more often the problem of GPs working in urban areas. No special training of nurses and lack of feedback from specialists were mostly the problems of doctors who had previously been district doctors for adults (Fig. 6).

DISCUSSION

The current study was the first one to look at the implementation of the CPGs in diabetes care in Estonia. It was a survey of doctors working in the primary care. The list of doctors was drawn from the list of the Estonian Society of Family Doctors. The age and gender distribution of the respondents corresponded to that of the complete list of GPs. The list structure corresponded to the geographical distribution of GPs in Estonia. Thus the response rate of 46 % still permits, with a certain amount of caution, to generalize the results to all GPs in Estonia.

1. General practitioners` personal and practice characteristics.

The present study assessed whether having DM2 guideline has an impact on GPs' daily decisions taking care of type 2 diabetes patients and whether it can be related with practice organizational factors as a GPs previous specialty, working characteristics and important health management factors as accessibility to a specialist. This is the first time when CPG utilization has been studied in Estonia.

No fundamental connections between the availability of CPG and the self-reported use of CPG were revealed with the professional and practice characteristics (type of working area, list size, specialty, number of partners, number of nurses, number of years of work experience after graduation, nurses diabetes training experience). Corresponding results have been found in Dutch primary care, in which relations between practice characteristics, practice management and preventive services are unclear (9).

2. Availability and self-reported use of DM2 guidelines in GPs practices.

The survey demonstrated that the majority of practices had the guideline for the treatment of patients with diabetes (76%) and that the majority of GPs (79%) are also guided by the guideline in the treatment of patients with diabetes, with no significant difference based on their use of a CPG for DM2 and the location of practice (rural or urban) or whether the practice was solo or group.

According to the American data, only 34% of practices have the CPG for the treatment of patients with diabetes (37). In our study, respondents reported the guidelines being available in 76% of cases, which is about 3 times higher than reported by Wolfe et al. (38). The same trend is seen in other studies performed in the United States. Feldman et al. found that only 13% of GPs have a copy of guidelines in practice (39). Also Wolff et al. found that 44% use guidelines but only 27% of respondents knew where to find it (40). Contrary to the US, in the UK 92% of practices have the CPGs and 74% of their practices have used the CPG during the last three years (41). In an Israeliian study, general practitioners generally support the use of CPGs, 82 % have a copy of at least one guideline in their practice, and 85% have already used it; only 39% found them difficult to adapt in their daily clinical practice but 55% are doubtful about clinical decision-making freedom using CPGs.

In our study, the more experienced doctors reported better availability and better use of the DM2 CPG compared with their younger colleagues, which is the opposite of the results in the study of American doctors. The same trend has been reported by the American GPs where physicians who had practiced longer reported performing selected tests more frequently (37).

3. The impact of practice characteristics and accessibility of specialized endocrinological care on the availability of the guidelines and self-reported following of them in daily practice.

Availability and use of the guideline were not related to the working area, practice type and size, previous status before specialization as a GP, working experience and waiting time nor distance to an endocrinologist. A very good availability of specialized aid (an endocrinologist in the same building) essentially decreased the direct application of CPG by GPs. Accordingly, GPs prefer to send their patients with diabetes at the first possibility to an endocrinologist's observance and treatment.

4. Comparison of the GPs knowledge about the treatment goals against the criteria in the guideline.

In our guideline for management of type 2 diabetes, the recommended level for commence treatment with medication is FBG value 6.1 mmol/l. A tendency was observed to start treatment on a higher level and the amount of patients who were compensated was low. Doctors having and using guidelines acted the same way as those who did not. That might purport that the doctors' knowledge about treatment is not derived so much from CPGs but other recourses despite they are aware of and report using them. This is even more evident since it was not affected by GPs previous specialty. It has also been studied by Hansen (42) that the doctors' characteristics such as practice location, practice type, list size, years of experience do not predict the development of glucemic control of type 2 diabetic patients. There were no differences in working characteristics and glucemic control in our study as well. In an Italian physicians' self-reported study performed by The QuED Study Group, the same trend was found where 14% of the respondents used target FBG levels <6.1 mmol/l, whereas 38% pursued values >7.8 mmol/l, with no statistically significant difference between diabetologists and general practitioners (43).

When rating the treatment goals of the doctors, the laboratory aspects got higher importance than elimination of symptoms and reducing the weight. In a 1997 survey conducted by Drass, the achievement of normal blood glucose level was rated as most important, followed by elimination of symptoms and achievement of ideal body weight (37). Achievement of negative urine ketone results and negative urine glucose test were rated considerably lower, being opposite to our results (37). It might refer to predilection of the doctors to laboratory tests that are easy to perform whereas other aspects need more patient involvement and provision of dietary counseling, and are more difficult to achieve. Beliefs of the doctors were common and no differences appeared in different groups whether they had guidelines or not.

5. The physicians' assessment of the patient and practice management related factors contributing to non-adherence of diabetes mellitus clinical practice guideline.

Although most of the GPs said that they had as well as followed the diabetes guideline, they also reported several problems concerning adherence to the guideline. Problems that GPs had at the level of the patients were similar to the other surveys: low awareness of diabetes and its complications, patients' low motivation to change their lifestyle and non-compliance with medical regimen (10, 34, 44).

It is widely known that it is the most difficult to change the patients' behaviour and motivation, because it needs special skills, time and commitment from care providers and depends on the overall attitude of the patients to their treatment, their emotional and social status (26, 43, 44) as well as the physicians' time limit (10, 37). Our survey showed that low motivation of the patients to change their lifestyle was a problem for 70% of GPs and that every third GP worried about their patients' low interest in their own health. It is difficult to explain why low awareness of the patients of their illness was considered to be more problematic by GPs working as pediatricians before specialization. One reason may be that they are less experienced in working with such patients. Non-compliance with treatment scheme was in 52% of cases considered by Estonian GPs as an important patient factor hindering the application of CPG, which is similar to the literature data (10, 32, 45).

According to general practitioners, one of the most important reasons impeding the application of CPG (44%) was the limited finances of Estonian patients with diabetes. According to literature (10, 37, 44, 45), it means essential limitations in quality treatment: in case of limited finances, the patients' possibility to assess their sugar levels at home on regular basis, to make regular visits to their physicians, allow themselves necessary medicaments, diabetes related training or a specialist's aid is decreased. In the case of patients' limited finances, the use of transportation also decreases; patients do not visit health center (10, 45), which again hinder the continuity and supervision of treatment.

Amongst American doctors, the lack of patients' interest in treatment is a problem for 76% of GPs (37). Our survey showed that, according to GPs, only 34-35 % of patients lack interest in the treatment of their disease. Every third patient with diabetes is not interested in his/her disease, which is, according to literature (10, 44), related to a low level of knowledge about diabetes and a low income. What the most important factors are that hinder the treatment of diabetes in Estonia, according to patients with diabetes, and whether their opinions coincide with those of GPs, should be established in the course of future surveys.

The most important problems of practice management listed by GPs were related to the training of the nurses and the existence of educational materials for patients. In Netherlands, diabetes leaflets were available for diabetes mellitus in 82% and written protocols in 26% of the practices (9). Patient education materials are crucially important in order to take the co-operation between nurses and patients on a level where patients knowingly regulate their treatment (32). There have been several corresponding studies of attempts to modify professional behaviour and attitudes in ways that might lead to improved patient outcomes (8).

It is evident that special training materials as well as training of nurses are very important factors that have an impact on the application of CPG (10). It has been shown that nurse interest in diabetes care influenced the provision of systematic care to patients (6). Possibly, in a situation where there is lack of educational materials for patients and special education of the nurses, there may exist problems with patients' low awareness of their own disease and thereof also low motivation to change their own lifestyle.

Another finding of our study was that our GPs, as the GPs of the US or the UK, regarded insufficient funding as an important hindering factor from the side of the health system (10, 44). Systematic diabetes care needs good practice organization and co-operation between the members of the primary health care team and the specialist. Also, adequate financing is needed in order to obtain all needed equipment, make all necessary analyses, and have an effective electronic recall system (10).

This is the first such a study to have been carried out in Estonia. Although there is only little evidence that the use of CPGs improves patients' outcomes in primary medical care, the guidelines themselves are one possible way to transfer evidence based medical information to doctors. The barriers related to the adherence with guidelines are also related to the management of diabetic patients.

CONCLUSIONS

1. The great majority of practices had the guidelines for treatment of patients with type 2 diabetes. The majority of GPs self-reported to be guided by the guideline in the treatment of patients with type 2 diabetes. The more experienced doctors had more often guideline available and reported to use the guideline more, compared with their younger colleagues.

2. The availability of the type 2 diabetes guideline and its self-reported use were not related to the professional and practice characteristics such as type of working area, list size, specialty, number of partners in practice, number of nurses, and number of years of work experience after graduation. A very good accessibility of specialized aid (an endocrinologist in the same building) was adversely related to the direct application of the guideline by GPs.

3. As an average, doctors tend to start treatment with medication at higher FBG levels if to compare with the guideline. In rating doctors' treatment goals the laboratory aspects got higher importance than elimination of symptoms and reducing the weight.

4. The two main patient related factors, most hindering the application of guidelines, were low awareness of diabetes and its complications and patients' refusal to change their lifestyle. Availability of type 2 diabetes guidelines in practice did not improve neither process nor outcome of diabetes patient care. Doctors' self-reported care of diabetic patients did not depend on whether they had as well as used the guidelines or not.

5. There is a need to test whether specific interventions together with working out and distributing guidelines improve doctors' adherence to the guidelines and patient outcomes.

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REFERENCES

1. Khunti K, Ganguli S, Lowy A. Inequalities in provision of systematic care for patients with diabetes. *Fam Pract* 2001; 18: 27-32.
2. Amos AF, McCarty DJ, Zimmet P. The rising Global burden of diabetes and its complications: estimates and projections to the year 2010 *Diab Med* 1997; 14: 1–85.
3. Diamond J. Why is the prevalence of type 2 diabetes mellitus now exploding in most populations, but not in Europeans? The genetic and evolutionary consequences of geographical differences in food history may provide the answer. *Nature* 2003; 423: 599-602.
4. Vides H, Nilsson PM, Sarapuu V, Podar T, Isacson A, Schersten BF. Diabetes and social conditions in Estonia. A population-based study. *Eur J Public Health* 2001;11:60-64.
5. European health for all database (HFA-DB). Annual provision of data to WHO/EURO September.2003.[http://www.sm.ee/eng/HtmlPages/Data_03_EST/\\$file/WHOee03-SM_kodulehele.xls](http://www.sm.ee/eng/HtmlPages/Data_03_EST/$file/WHOee03-SM_kodulehele.xls)

6. Khunti K, Ganguli S, Baker R, Lowy A. Features of primary care associated with variations in process and outcome of care of people with diabetes. *Brit Gen Practice* 2001; 51: 356-360.
7. Renders CM, Valk GD, Griffin S, Wagner EH, Eijk JthM, Assendelft WJJ. Intervention to improve the management of diabetes mellitus in primary care, outpatient and community settings. *The Cochrane Database of Systematic Reviews* 2000; 4 Art.No: CD001481.
8. WHO 2003. Adherence to long-term therapies. Evidence for action. Chapter 10. Diabetes.
9. Lobo CM, Frijling BD, Hulscher MEJL, Bernsen RMD, Braspenning JC, Grol RPTM, Ad Wouden P & Wouden JC. Organisational determinants of cardiovascular prevention in general practice. *Scand J Prim Health Care* 2003; 21: 99-105.
10. Khunti K. Use of multiple methods to determine factors affecting quality of care of patients with diabetes. *Fam Pract* 1999; 16: 489-494.
11. Greenhalgh PM. Shared care for diabetes: A systematic review. *Occas Pap R Coll Gen Pract* 1994; 67: 1-35.
12. Khunti K, Baker R, Rumsey M, Lakhani M. Quality of care of patients with diabetes: collation of data from multi-practice audits of diabetes in primary care. *Fam Pract* 1999; 1: 54-59.
13. Faruqi N, Frith J, Colagiuri S, Harris M. The use and perceived value of diabetes clinical management guidelines in general practice. *Aust Fam Physician* 2000; 29: 173-176.
14. National Guidelines Clearinghouse. <http://www.guideline.gov>
15. Dufour JC, Fieschi D, Fieschi M. Coupling computer-interpretable guidelines with a drug-database through a web-based system. The PRESQUID project. *BMC Med Inform Decis Mak* 2004; 4:2.
16. A desktop guide to Type 2 diabetes mellitus. European Diabetes Policy Group 1999 *Diab Med* 1999; 16: 716-730.
17. Sheffield Local Diabetes Service Advisory Group. Diabetes in general practice. <http://www.shef.ac.uk/seek/recentCPG/>
18. The Royal College of General Practitioners Effective Clinical Practice Unit, University of Sheffield. Clinical Guidelines for Type 2 Diabetes. <http://www.shef.ac.uk/guidelines/mgtofbloodglucose/mgtofbloodglucose.pdf>
19. Recommendations for the management of diabetes in primary care. Diabetes UK 2000; 10. [http:// www.diabetes.org.uk/infocentre/carerec/primary.doc](http://www.diabetes.org.uk/infocentre/carerec/primary.doc)

20. Grimshaw and Russell. Implementing clinical practice guidelines: can guidelines be used to improve clinical practice? *Eff Health Care* 1994; 8: 1-12.
21. Lawler FH, Viviani N. Patient and physician perspectives regarding treatment of diabetes: compliance with practice guidelines. *J Fam Pract* 1997; 44:369-373.
22. Benjamin EM, Schneider MS, Hinchey KT. Implementing practice guidelines for diabetes care using problem-based learning. A prospective controlled trial using firm systems. *Diab Care* 1999; 22: 1672-8.
23. Feder G, Griffiths C, Highton C, Eldridge S, Spence M, Southgate L. Do clinical guidelines introduced with practice based education improve care of asthmatic and diabetic patients? A randomised controlled trial in general practices in east London. *BMJ* 1995; 311: 1473-8.
24. Davis DA, Taylor-Vaisey A. Translating guidelines into practice. A systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines. *CMAJ* 1997; 157: 408-416.
25. Vinker S, Nakar S, Rosenberg E, Bero-Aloni T, Kitai E. Attitudes of Israeli family physicians toward clinical guidelines. *Arch Fam Med* 2000; 9: 835-840.
26. Feder G, Griffiths C, Highton C, Eldridge S, Spence M, Southgate L. Do clinical guidelines introduced with practice based education improve care of asthmatic and diabetic patients? A randomised controlled trial in general practices in east London. *BMJ* 1995; 311: 1473-1478.
27. Davis DA, Taylor-Vaisey A. Translating guidelines into practice. *Can Med Assoc J* 1997; 157: 408-415.
28. Thomson O`B MA, Freemantle N, Oxman AD, Wolf F, Davis DA, Herrin J. The Cochrane database of systematic reviews .The Cochrane Library 2001; 3.
29. Grimshaw JM, Eccles MP, Walker A E, Thomas RE. Changing physicians` behavior: what works and thoughts on getting more things to work. *Cont Edu Health Professions* 2002; 22: 237-243.
30. Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L, Whitty P, Eccles MP, Matowe L, Shirran L, Wensing M, Dijkstra R & Donaldson C. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment* 2004; 8: 6.
31. DEHKO Development Programme for the Prevention and Care of Diabetes in Finland 2000-2010. <http://www.diabetes.fi/en/CPGish/programme/programme/index.html>
32. Lember M. Implementing modern general practice in Estonia. Academic Dissertation. *Acta Universitatis Tamperensis* 603. Tampere, 1998.

33. Kalda R. Structure and outcome of family practice quality in the changing health care system of Estonia. (Doctoral dissertation) Tartu: Department of Polyclinic and Family Medicine, University of Tartu 2001: 68.
34. Larme AC, Pugh JA. Evidence-based guidelines meet the real world:the case of diabetes care. *Diab Care* 2001; 24: 1728-1733.
35. Zgibor JC & Songer TJ. External Barriers to Diabetes Care: Addressing Personal and Health Systems Issues. *Diabetes Spectr* 2001; 14: 23-28.
36. Kirkman MS, Williams SR, Caffrey HH, Marrero DG. Impact of a program to improve adherence to diabetes guidelines by primary care physicians. *Diab Care* 2002; 25: 1946-1951.
37. Drass J, Kell S, Osborn M, Bausell B. Diabetes Care for Medicare Beneficiaries. *Diab Care* 1998; 8: 1282-1287.
- 38 .Wolfe RM, Sharp LK, Wang RM. Family physicians` opinions and attitudes to three clinical practice guidelines. *J Am Board Fam Pract* 2004; 17: 150-7
39. Feldman EL, Jaffe A. Clinical practice guidelines on depression. *Ach Fam Med* 1998; 7: 58-62.
40. Wolff M, Bower DJ. US Family physicians' experiences with practice guideline. *Fam Med* 1998; 30: 117-21.
41. Khunti K, Baker R, Ganguli S. Clinical governance for diabetes in primary care: use of practice guidelines and participation in multi-practice audit. *Brit Gen Pract* 2000; 50: 877-881.
42. Hansen LJ, Olivarius N, Siersma V. Doctors' characteristics do not predict long-term glycaemic control in type 2 diabetic patients. *Brit Gen Pract* 2003; 53: 47-9.
43. Belfiglio M, De Berardis G, Franciosi M et al. The relationship between physicians' self-reported target fasting blood glucose levels and metabolic control in type 2 diabetes. The QuED Study Group--quality of care and outcomes in type 2 diabetes. *Diabetes Care* 2001; 24: 423-29.
44. Agarwal G, Pierce M. The GP perspective: problems experienced in providing diabetes care in UK general practice. *Diab Med* 2002; 19. Suppl 4: 13–20.
45. Larme AC, Pugh JA. Attitudes of Primary Care Providers Toward Diabetes. *Diabetes Care* 1998; 21:9.

ANNEX A: LIST OF ABBREVIATIONS

GP	General Practitioner
CPG	Clinical Practice Guideline
DM2	Type 2 Diabetes Mellitus
FBG	Fasting Blood Glycose
HbAc1	Glycosylated Hemoglobin

ANNEX B: QUESTIONNAIRE

1. The location of your practice:
 1. city (Tartu, Tallinn)
 2. town
 3. urban area
 4. rural area
2. Please indicate the year of graduation from the University of Tartu?
3. Please indicate the year of specialization as a general practitioner?
4. What was your previous specialty before specialization as general practitioner?
 1. paediatrician
 2. district doctor for adults
 3. other specialty (specify)
 4. GP directly after residency training
5. What type of practice do you have?
 1. Solo practice
 2. Group practice, no. of partner GPs
6. What is the size of your patient list?
7. What is the number of diabetes patients in the list?
8. How many nurses work in your family health centre?
9. Had any nurses in your family health centre had special education on diabetes care during last 3 years?
 1. Yes
 2. No
10. What is the distance from your practice to endocrinologist's office?
 1. in the same house (street)
 2. in the same town
 3. in the other town km from my town
11. How fast can your patient obtain access to endocrinologist consultation?
 1. at the same day
 2. at the same week
 3. at the same month
 4. after months
12. Is it possible for you to use phone consultation with an endocrinologist?
 1. Yes
 2. No
13. Based on your experience you decide to start treatment with medication when change of lifestyle, dietary counselling and increase of physical activity has not provided satisfying results and when fasting blood glucose value is above mmol/l.
14. In your daily work you are generally content with treatment when the fasting blood glucose value of the diabetes patient is below mmol/l.
15. Please indicate assumed amount of diabetes patients in your list, whose blood glucose is compensated with treatment, i.e. at fasting blood glucose value mostly under 5.5 mmol/l?%.
16. Please describe the situations where after first detection of type 2 diabetes you:
 - a) mostly start treatment by yourself:
.....

-
 b) immediately send the patient to the endocrinologist:

17. How would you appraise the importance of the following selected treatment goals in assessing the efficiency of treatment of the diabetes patient?

	Very important	Important	Rather not important	Not important
Elimination of symptoms	1	2	3	4
Absence of glucosuria	1	2	3	4
Keeping blood glucose in normal range	1	2	3	4
Achieving and maintenance of body weight	1	2	3	4
Absence of ketoses in urine	1	2	3	4

18. How often do you assess the following indicators in type 2 diabetes patient in your daily practice?

Indicators	Once a month	At least once a quarter	At least once a year	Less often	Not necessary
a) complications/ symptoms	1	2	3	4	5
b) managing the diabetes	1	2	3	4	5
c) blood glucose value	1	2	3	4	5
d) blood pressure	1	2	3	4	5
e) glycosylated haemoglobin (HbA1c)	1	2	3	4	5
f) lipids profile (LDL, HDL, TG)	1	2	3	4	5
g) thorax X-ray	1	2	3	4	5
h) smoking	1	2	3	4	5
i) proteinuria	1	2	3	4	5
j) albuminuria	1	2	3	4	5
k) body weight / BMI	1	2	3	4	5
l) examination of feet (skin, sensitivity)	1	2	3	4	5
m) examination of eye-ground / vision	1	2	3	4	5
n) serum creatinine	1	2	3	4	5

19. Which of the following factors are regarded as problematic in adherence to the guidelines for type 2 diabetes?

Problems	Never	Seldom	Often	Very often
a) lack of clear care guidelines	1	2	3	4
b) patients' low awareness about diabetes and its complications	1	2	3	4
c) lack of patients' motivation to change their lifestyle	1	2	3	4
d) irregular consumption of medicaments	1	2	3	4
e) patients' limited financial means	1	2	3	4
f) patients' lack of interest in their disease	1	2	3	4
g) patients' non-following of their treatment schemes prescribed by the doctor	1	2	3	4
h) physician's lack of time	1	2	3	4
i) lack of special diabetes education of the nurses	1	2	3	4
j) lack of support/ recommendations from specialists	1	2	3	4

