QUALITY OF CARE FOR PATIENTS WITH DIABETES MELLITUS TYPE 2 IN 'MODEL PRACTICES' IN SLOVENIA – FIRST RESULTS

KAKOVOST OSKRBE BOLNIKOV S SLADKORNO BOLEZNIJO TIPA 2 V REFERENČNIH AMBULANTAH - PRVI REZULTATI

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ABSTRACT

Keywords:
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Background. A new organisation at the primary level, called model practices, introduces a 0.5 full-time equivalent nurse practitioner as a regular member of the team. Nurse practitioners are in charge of registers of chronic patients, and implement an active approach into medical care. Selected quality indicators define the quality of management. The majority of studies confirm the effectiveness of the extended team in the quality of care, which is similar or improved when compared to care performed by the physician alone. The aim of the study is to compare the quality of management of patients with diabetes mellitus type 2 before and after the introduction of model practices.

Methods. A cohort retrospective study was based on medical records from three practices. Process quality indicators, such as regularity of HbA1c measurement, blood pressure measurement, foot exam, referral to eye exam, performance of yearly laboratory tests and HbA1c level before and after the introduction of model practices were compared.

Results. The final sample consisted of 132 patients, whose diabetes care was exclusively performed at the primary care level. The process of care has significantly improved after the delivery of model practices. The most outstanding is the increase of foot exam and HbA1c testing. We could not prove better glycaemic control (p>0.1). Nevertheless, the proposed benchmark for the suggested quality process and outcome indicators were mostly exceeded in this cohort.

Conclusion. The introduction of a nurse into the team improves the process quality of care. Benchmarks for quality indicators are obtainable. Better outcomes of care need further confirmation.

IZVLEČEK

Ključne besede:
sladkorna bolezen tipa 2, referenčne ambulante, kakovost oskrbe, kazalniki kakovosti

Izhodišče. *Referenčne ambulante predstavljajo novo organizacijsko obliko dela na primarni ravni. V njihovem timu sodeluje diplomirana medicinska sestra s podiplomskimi znanji, ki skrbi za register kroničnih bolnikov in bolnike aktivno vabi na redne kontrole. Samostojno opravlja nekatere postopke, kot je npr. pregled nog, in po protokolu dela sodeluje pri drugih postopkih oskrbe. Kakovost obravnave bolnikov s sladkorno boleznijo tipa 2 (SB2) je opredeljena z izbranimi procesnimi in izidnimi kazalniki kakovosti. Standardi kakovosti so postavljeni na 80% za procesne in na 50% za izidne kazalnike kakovosti. Večina raziskav potrjuje, da razširitev tima in prevzem nekaterih nalog v oskrbi sladkornih bolnikov s strani diplomirane medicinske sestre ne poslabša kakovosti oskrbe ali pa jo izboljša, če jo primerjamo z oskrbo, ki jo vodi le zdravnik družinske medicine. V raziskavi smo želeli ugotoviti kakovost vodenja sladkornih bolnikov pred uvedbo referenčnih ambulant in po njej.*

Metode. *Izvedena je bila kohortna retrospektivna raziskava. Podatki so bili zbrani iz zdravstvenih kartotek bolnikov s SB2 iz treh ambulant družinske medicine. Primerjani so bili kazalniki kakovosti, med njimi meritve HbA1c, izveden je bil letni laboratorij (z določitvijo lipidov v plazmi, ocenjene glomerularne filtracije oz. kreatinina in urinske analize), opravljene so bile meritve krvnega tlaka, pregled nog in napotitev na pregled očesnega ozadja; ter ugotovljena je bila vrednost HbA1c pred uvedbo referenčnih ambulant in po njej.*

Rezultati. *V vzorec je bilo vključenih 132 bolnikov, pri katerih je oskrba SB2 potekala izključno na primarni ravni. Proces oskrbe se je značilno izboljšal po uvedbi referenčnih ambulant. Najbolj sta v izboljšanju kakovosti izstopala rednost pregleda nog in rednost testiranja HbA1c, čeprav pa nista dosegla priporočenega standarda kakovosti 80%. Kljub doseženemu standardu kakovosti izidnega kazalnika 50% v tej kohorti ni bilo dokazano statistično pomembno izboljšanje glikemije (p>0,1).*

Zaključek. *Pred uvedbo referenčnih ambulant je bilo vodenje sladkornih bolnikov daleč od priporočenega. Vključitev diplomirane medicinske sestre v tim izboljša postopke kakovostne oskrbe. Priporočeni standardi za kazalnike kakovosti so dosegljivi. Boljšo urejenost glikemije in druge kakovostne izide oskrbe bolnikov bo treba še dokazati.*

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1 INTRODUCTION

Ageing of the population, increasing prevalence of diabetes mellitus 2 (DM2) and costs of diabetes care stress the need for effective and quality care that should be at least partly managed at the primary level, because it is cost effective and more accessible than at the secondary level (1). Several studies found that the recommended clinical practice guidelines were not adequately followed in diabetes patients (2-4), although the process of care and intermediate outcomes have improved in the past decade (4). Thereafter, a range of interventions has been designed to improve the management and outcome of diabetes care. Several interventions targeted healthcare professionals. Many studies focused on the education of health care professionals, showing an improved provision of diabetes care, but conflicting results of patient outcomes; other studies researched the organisational aspects, the effect of a multidisciplinary team and nurses providing a part of diabetes care, and showed some improvements in patient outcomes (5). The inclusion of a nurse into the team and nurse-led care showed many beneficial results of diabetes management, but several issues remain unsolved, such as the scope of nurse interventions and the training needs of the nurses (6).

1.1 Development of Model Practices (MP)

Due to a very high workload, family physicians in Slovenia face difficulties in providing quality care for their chronic patients in several aspects, including education and support. Studies in other countries show that despite the clinical guidelines for the management of DM2, it too often fails to achieve the recommended results (7, 8).

Traditionally, Slovenian family practices work with a small team consisting of a physician and practice nurse who holds a bachelor's degree, but is not trained in the management of chronic patients. In 2011, a national project called »model practices« (MP) was introduced as a new concept of work in family medicine. Publicly and privately founded practices have gradually adopted this new organisational form: a 0.5 fulltime equivalent nurse practitioner was introduced into the team, and protocols (based on guidelines) for chronic care with a detailed description of the professional responsibilities of physicians, practice nurses and nurse practitioners were developed (9). Nurse practitioners created or completed previously existing registers of chronic patients (10). A register of patients with DM2, for example, enables an overview of patient morbidity, follow-up examinations, and an active approach to the care of these patients. They plan regular check-ups, educate, provide advice and increase skills of self-management in patients (11).

In traditional practices, there were several obstacles to quality diabetes care: the National Insurance Company did not fully cover regular laboratory testing according to the guidelines, and the education of patients was not available within the primary practice team. According to this, only a smaller part of diabetes patients, those with simple oral treatment and no complications, were not referred to the diabetologist. The quality of care for patients with DM2 managed at the primary level was not followed.

The quality of diabetes care in model practices is evaluated by the quality indicators based on diabetes guidelines (12). Accordingly, HbA1c, laboratory tests (serum glucose, creatinine, glomerular filtration rate, complete serum lipids with total cholesterol, HDL and LDL cholesterol and triglycerides, urine dip-stick analysis), measurement of blood pressure, foot exam and referral to the eye exam have to be performed at least once per year. The level of HbA1c is set below 7.0%. The benchmark for quality indicators is agreed upon by a project council and set at 80% for process indicators and at 50% for outcome indicators.

In this research, we compared the quality of care through quality indicators before and after the introduction of model practices. The objectives were to compare the proportion of patients with DM2 who achieved quality indicators before and after the introduction of model practices. Our assumption was that, after the introduction of model practices, the quality of care, according to chosen quality indicators, was better than in standard practices.

2 METHODS

This was a cohort retrospective analysis of the medical records of patients with DM2, whose management of DM2 was performed only in family practice. We compared the quality of care one year before and after the introduction of model practices. As the practices entered the new organisational form at different times, the total observational period was from 1 April 2010 to 31 March 2013.

2.1 Participants

The sample consisted of 132 adults with DM2 from the register of diabetes patients, who were diagnosed before 1 April 2010 in three model practices, established between April 2011 and March 2012 at one location in the Primary care centre in the city of Maribor. There were 10 family medicine practices at this location - four of them were eligible for inclusion, out of which we included three. On 1 Oct 2014, the three included practices had 6745 patients

altogether on their patient lists. A total of 526 patients with DM2 were in the registers (7.7%). We excluded 88 patients who had been diagnosed after 1 April 2010, 21 patients who had changed their physician and 10 who had died. Altogether, 407 medical records were available. 275 patients, who regularly visited a diabetologist, were also excluded from the analysis.

2.2 Data Collection

We collected the data with the instrument that was developed for this study. It contained basic demographic data of the patients and quality indicators for the management of DM2. The following quality indicators were used to assess the quality of care: process indicators (yearly assessed HbA1c, laboratory tests according to guidelines: creatinine/glomerular filtration rate, serum lipids, urine dipstick test and serum glucose, measurement of blood pressure, referral for eye exam, foot exam) and one outcome indicator (HbA1c<7.0%). Foot exams consisted of palpation of foot pulses and sensibility testing. All process indicators were assessed as carried out in the case of patient management performed by a registered nurse or physician. We evaluated the defined quality of care within the whole team without differentiating procedures performed by nurses or by GPs. We observed care in the period of 1 year before and after the introduction of model practices. The quality of care was defined as good if the quality indicators were performed at least once in a 12-month period.

2.3 Statistical Analysis

We used the statistical package IBM SPSS Statistics version 20.0 for Windows (IBM Corp., Armonk, NY). Demographic data and quality indicators for diabetes care were presented by frequencies and percentages for categorical variables, or by mean values and standard deviations for continuous variables. The chi -square test was used to compare the frequencies of quality indicators, and t-test for dependent samples was used to compare HbA1c levels (both before and after the introduction of model practices). Statistical significance was set at p<0.05.

The study was approved by the Republic of Slovenia National Medical Ethics Committee, on 11 November 2014, under the number 70/11/14.

3 RESULTS

The final sample consisted of 132 patients with DM2, which represents an average of 2.1% of all patients on the patient list per practice. 54 were men (41%) and 78 women (59%). The mean age was 69.5 years (SD=12.0), range 39-86 years.

3.1 The Quality of Care for Patients with DM2

The quality of care was assessed by the achievement of benchmark for selected quality indicators, which were compared before and after the introduction of model practices. The % of performed actions in diabetes management is presented in Table 1.

Table 1.　The share of patents with DM2 according to process quality indicators before and after the introduction of model practices.

Quality indicators	Before model practices No (%)	After model practices No (%)	χ^2	P
Measured HbA1c	33 (25)	108 (82)	43.32	<0.01
Laboratory tests[1]	51 (39)	99 (75)	40.50	<0.01
Foot exam	9 (7)	90 (68)	75.00	<0.01
Eye exam	59 (45)	120 (91)	51.57	<0.01
Measured blood pressure	117 (89)	125 (95)	3.030	n.s.
Annual examination	59 (45)	119 (90)	49.73	<0.01

Legend: n.s. - non significant
[1] if all lab tests (except HbA1c) were performed at least once per year (creatinine, oGFR, serum lipids, urine dip-sticks, serum glucose)

3.2 Glycaemic Control in Patients with DM2

1.5 years before model practices, only 33 patients had their HbA1c levels measured at least once per year, but after the introduction of model practices, 109 patients had their HbA1c levels measured. Results in Table 2 were calculated for these 33 patients: 15 men (45%) and 19 women (54%) with the mean age of 70.5 years (SD=11.6). The 33 patient sample did not differ statistically from the total sample in gender and age.

Table 2.   HbA1c levels in DM2 patients before and after the introduction of model practices (N=33).

HbA1c (%) before model practices		HbA1c (%) after model practices		t (df)	P
M	SD	M	SD		
7.60	1.32	7.33	1.21	1.08 (33)	n.s.

Legend: M – mean, SD – standard deviation, t – t test, df – degree of freedom, p - significance level of the test

After the introduction of model practices, 108 patients had a determined HbA1c at least once per year, out of which 72 (66.7%) had its value in the target area (below 7.0%).

4 DISCUSSION

Before introducing model practices (MP), provided laboratory resources did not include regular laboratory tests, necessary for diabetes care, and the lack of a team approach hindered good diabetes care in Slovenian family practices. Education about diabetes was performed by a physician or other persons as offered by locally-specific education options (for example, registered nurses in the preventive centre at the primary level), because no registered nurse with specialist knowledge was available within the team of the primary care practice. Our results showed a low rate of HbA1c control: the lipid status was checked only partly and the foot exam was almost never performed. The referral for an eye exam was not systematic. Despite regular blood glucose control, we could not talk about a good follow-up of the glycaemic status and of patients with DM2 in general.

After the introduction of model practices, nurse practitioners have actively been inviting patients for regular check-ups, which are performed both by them and the family doctor. Principles of structured care have been developed for model practices. The analysis of data shows a significantly increased rate of HbA1c testing, biochemical lab tests, and foot and eye exams. The rates of most process quality indicators exceed the 80% benchmark, with the exemption of foot exams and annual laboratory controls of lipids and creatinine levels. This is probably due to the fact that nurses follow the protocol more consistently than family doctors (13). The biggest change was observed in the number of foot exams. Although not reaching the benchmark, they had not been implemented at all by family physicians.

The improvement of process indicators was shown also in other studies, and it is probably attributable to active contacts with patients performed by nurses (5), and to detailed protocols, which are also available to the nurses in model practices. Via these protocols, they can assume some of the physician's responsibilities (5). What

we could not prove in this study was better metabolic control, although the trend of lower HbA1c was noticed in model practices. The small sample (only 33 patients for comparison) is a result of a small number of patients who had HbA1c previously checked in regular practices. This differs from the study that evaluated cardiovascular risk factors and showed improvement in the level of blood pressure, cholesterol and physical activity in model practices, compared to regular practices (8).

Similar results of diabetes management have been found in other studies.

Several countries have introduced specialised nurses into the primary care team (14-16). The quality of care was similar if the patient was managed by a nurse or family doctor (15, 17-18), or glycaemic control and some process indicators (such as foot exam and eye exam referral) were better (16, 18-19), and therefore even less cases of hospitalisation and acute deterioration occurred (19). Our study showed better results for process indicators of diabetes care, when compared to the Suija study in several European countries, where a proportion of patients with a yearly measured lipid profile ranged from 23% to 69%, and a proportion of patients screened for HbA1c ranged from 57% to 91% of patients (20). Our study showed comparable or slightly worse results to another international study that found a very high proportion of achieved process indicators (more than 80%) with the exemption of foot exam, which was yearly performed only in 73% of patients with DM2 (foot pulses) and 67% of patients with DM2 (foot sensation checked).

The defined benchmark level for outcome indicators in model practices is set at 50% at the moment, which does not seem a very ambitious goal, but it is a realistic one, according to the presented data. Good glycaemic control in our study was achieved in more than 50% of the cases. Altogether, 66.7% of patients had HbA1c <7.0%. The proportion of patients with adequate metabolic control in the Suija study ranged from 50% to 68% (20). HbA1c<7.0% was achieved in 54% of patients with DM2 in the Guidance study, but we have to be careful when comparing the results with our study, because the samples might not be comparable in important characteristics (21). The Canadian primary care study of diabetes care showed that 49% of patients were not targeted for glycaemic control (22). Achieved glycaemic control in general is

not very high, and it also points to the importance of patient self-management, which interferes with diabetes management on the practice level (23). Another option to improve the immediate outcome of diabetes care is extended competencies of registered nurses, who can, in some countries, not only advise and check, but also help with patient medication, including a timely start of insulin administration (24).

This is a local study that included 3 model practices with all eligible patients according to the inclusion criteria. Due to the small sample, we cannot generalise the results to all Slovenian practices. As such, it has an important limitation and we would need a larger random sample for possible generalisation. Presented are the first results in the project that is still ongoing and gradually including more and more practices (as of today, 52% of all Slovenian practices are working by the new model).

5 CONCLUSION

Model practices allow the achievement of modern standards of diabetes care with the inclusion of a nurse practitioner in the team. We achieved the aim of the study and showed that the process of care, measured by chosen quality indicators, has increased in the included model practices. With the inclusion of an adequate number of the practices in the project, the quality of care can be evaluated across the country by random sampling of the practices. In the future, we have to re-evaluate the benchmark for outcome indicators, especially for glycaemic control.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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ETHICAL APPROVAL

The study was approved by the Republic of Slovenia National Medical Ethics Committee, on 11 November 2014, under the number 70/11/14.

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