Diabetes care and self-monitoring of type 2 diabetic patients in a rural district of West-Pomeranian Province

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Abstract: Introduction. Few surveys conducted in diabetic patients from rural regions show that in these subjects monitoring of diabetes is worse than in patients from urban areas. **Objectives.** To assess methods of diabetes care provided for type 2 diabetic patients residing in a rural region and methods of the patient self-monitoring of glycemia, blood pressure and foot self-care. **Patients and methods.** The survey was conducted in a rural district of West-Pomeranian province, in the primary health care center, where 279 type 2 diabetic patients were registered. Out of all patients invited to participate in a questionnaire survey, 168 were enrolled. The mean age of subjects was 67.2 ±9.9 years (range 46–91 years), diabetes duration of 8.2 ±6.6 years, and body mass index of 32.6 ±6.3 kg/m^2. Data concerning diabetes care and methods of the patient self-control of glycemia, blood pressure and foot self-care were collected. **Results.** The majority of patients (62%) were treated only by general practitioners, but 80% reported that they visited their doctors for diabetes treatment once a month. For 90% of subjects the term „HbA_{1c}" was unknown. Only 40% of patients performed self-monitoring of glycemia, 55% – of blood pressure and 34% examined their feet. **Conclusions.** The vast majority of patients from a rural region in West-Pomeranian province is treated only by general practitioners. Despite quite frequent medical visits related to diabetes, education of patients is still unsatisfactory, which was demonstrated by patients' lack of knowledge concerning the basic parameter of laboratory monitoring, HbA_{1c}, as well as insufficient self-management of glycemia, blood pressure and infrequent foot exam.

Key words: quality of diabetes care, rural area, self-management, type 2 diabetes

INTRODUCTION

The prevalence of diabetes and in consequence, of its complications increase rapidly worldwide; and so do costs related to the treatment of this disease [1,2]. At the same time it is well known that the vast majority of patients with diabetes are not adequately managed, which substantially affects the development of vascular complications in diabetes [3-6]. Studies report that patients from rural areas are less satisfactorily managed than patients from urban areas [7,8].

The guidelines for the management of diabetic patients issued by international Diabetes Associations and Diabetes Societies of particular countries are supposed to improve the management of diabetes [9-13]. Within the past several years, the Polish Diabetes Society (PDS) has also been publishing clinical guidelines on diabetes patients' management. These guidelines include not only target HbA_{1c}, glycemia, lipid levels, arterial blood pressure, but also indications regarding diabetic patients' management. [12,13]. According to the 2007 PDS guidelines, patients with newly diagnosed type 2 diabetes, should be referred to diabetes outpatient clinics or hospitalized in a diabetic ward. With longer duration of diabetes, diabetic care should be realized as a model of a combined care; the care of a General Practitioner (GP), with periodical consultations in a diabetes outpatient clinic. The diabetes control should be evaluated based on HbA_{1c} hemoglobin levels, obtained at least twice a year. The guidelines also specify how patients are to perform glycemia self-monitoring. According to PDA guidelines, insulin treated patients should obtain

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a full glycemia profile at least once a week, while type 2 diabetic patients not treated with insulin at least once a month. A full glycemia profile includes fasting glycemia assessment; in the morning (fasting), before each main meal, 2 hours postprandial, before sleep, at midnight and between 2:00 and 4:00 a.m. [13]. According to American Diabetes Association (ADA) patients treated with multiple insulin injections should monitor their glycemia at least 3 times a day. Regarding the rest of the patients ADA guidelines do not determine the frequency, and time of performing the test [12]. Blood pressure should be obtained during each medical visit; the guidelines do not however mention blood pressure self-monitoring [9-13]. According to the 2007 PDA guidelines, each medical visit should include foot examination, which is part of the management aimed at the prevention of diabetic foot syndrome [13].

The aim of the current survey was the assessment of methods of diabetes care provided for type 2 diabetic patients, residents of a rural area of the West-Pomeranian province and methods of the patient self-management of glycaemia, blood pressure and foot self-care.

PATIENTS AND METHODS

The study was performed in the primary health care clinic NZOZ „Asklepios" in Bobolice (West-Pomeranian province, Koszalin district). The Bobolice municipality counts 10,000 inhabitants. The distance to the nearest diabetes outpatient clinic in Szczecinek and Koszalin is, respectively, 30 and 36 km. The NZOZ in Bobolice takes care of 8492 individuals (85% of district inhabitants) aged from 0 to 101 years. The register of the outpatient clinic includes 279 diabetic patients (3.3% of the total number of registered patients). All diabetic patients were invited to take part in the questionnaire assessing the way the diabetes care is being conducted and self-management. One hundred and sixty-eight individuals turned up for the examination (attendance rate, 60%). This was a group of 109 women (65%) and 59 men (35%). The age of the patients was 46–91 years (on average 67.2 ±9.9), mean diabetes duration, 8.2 ±6.6 years, body mass index (BMI), 32.6 ±6.3 kg/m^2. The vast majority (87%) of patients were retired or were pensioners, 8% were working individuals and 5 % were unemployed individuals. In the studied group, 6% of individuals were of partial primary education level, 58.5% of primary, 19% of elementary, 14% of secondary and 2.5% had a university degree. In the patient group 11 individuals were exclusively on a diet (7% of patients), 109 were treated with drugs (65%), 9 were on oral drugs and insulin (5%), while 39 were treated exclusively with insulin (23%). All patients underwent a questionnaire in order to collect demographic data, data on diabetes manangement and methods of control of blood glucose, blood pressure and foot condition.

Table. frequency of medical visits related to diabetes treatment.

Frequency of visits	Diabetes outpatient clinic Patients number (%)	General practitioners Patients number (%)
Once a month	16 (10)	134 (80)
Once every 3 months	23 (14)	28 (16)
Once every 6 months	10 (6)	3 (2)
Once every 12 months	21 (12)	–
No visits in the last 12 months	98 (58)	3 (2)

RESULTS

Among 168 patients who took part in the study, 104 patients were followed up by the general practitioners (62%), 16 by an outpatient diabetes clinic (9.5%), and 48 patients were followed up for diabetes, by the general practitioners and by an outpatient diabetes clinic (28.5%). Data regarding the frequency of medical visits for diabetes treatment are presented in Table.

To the question "When was your last HbA_{1c} test done?" 152 patients responded that the test was unknown to them (90%). In 8 patients the response was that such a test was not done during the last 3 months (5%), in 3 patients, during the last 3–6 months (2%), and in 5 patients, during the last 6–12 months (3%).

In the group under study, 66 patients did self-control of blood glucose levels (40%). Among individuals performing these tests, 34 patients (52%) obtained fasting and 2 hours postprandial glycemia several times a week. Blood glucose was assessed by 22 patients (33% patients performing self-monitoring), irregularly, irrespectively of the time of the day, of the postprandial glucose blood level. Figure 1 shows data on the mode of glycemia control.

In the questionnaire group of patients, blood pressure control was done by 93 patients (55%). Among them 38 did it at least once a day and 2 patients, less frequently than once a month. Data on the frequency of pressure measurements are given in Figure 2.

In the studied group, 57 patients performed foot examination (34%), including 41 individuals who did it every day and 12 patients at least once a week. Details of the method of foot examination by patients are shown in Figure 3.

DISCUSSION

The results of the performed questionnaire have demonstrated that the majority of patients (62%) are exclusively mananged by general practitioners. This result is almost identical with that of a survey of 120 inhabitants of Szczecin or of its environments, hospitalized in Szczecin hospitals, which demonstrated that 63% of diabetes patients were exclusively

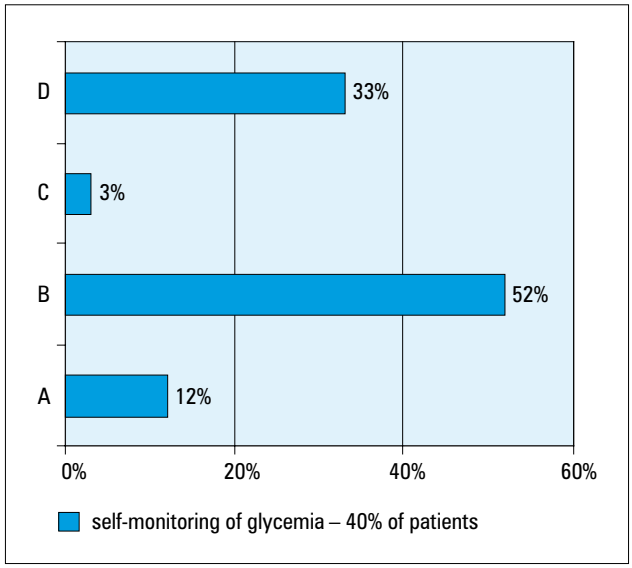

Fig. 1. The method of glycemia testing in patients performing self--monitoring : A – only in the morning, fasting, several times a week; B – fasting and 2 hours postprandial, several times a week; C – fasting and 2 hours postprandial, once a week; D – sometimes, at various times of the day, irrespective of a meal

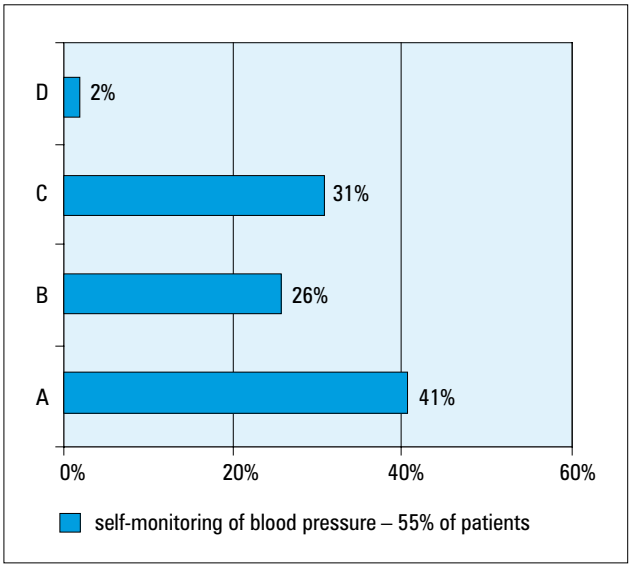

Fig. 2. The frequency of performing blood pressure measurements in the study: A – at least once a day; B – at least once a week; C – at least once a month; D – rarer than once a month

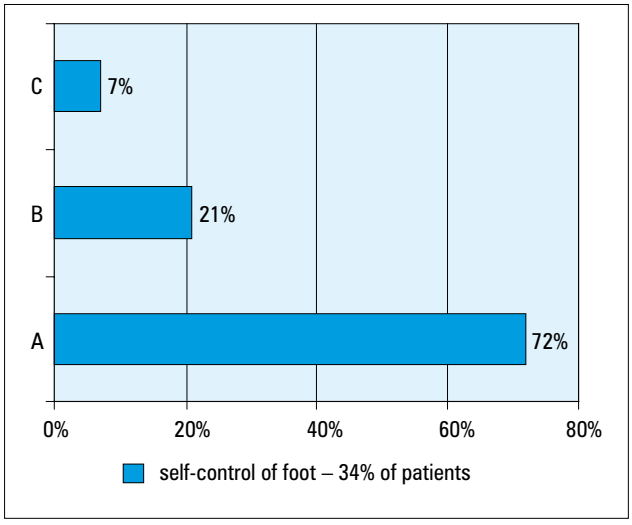

Fig. 3. The frequency of foot examination by the patients themselves: A – once a day; B – at least once a week; C – at least once a month

under control of general practitioners [14]. It seems possible that the situation is similar in the whole country although there is lack of evidence from other regions of Poland that could confirm this observation. Similarly, in Great Britain the majority of patients (63%) are under control of general practitioners [15]. According to reports from other countries, the percentage of such patients is much higher, 81% in Germany, 90% in Denmark [17].

It is worth stressing that in the studies conducted by authors in a rural district of the West-Pomeranian province the frequency of medical visits for diabetes treatment was very high, because as much as 80% of respondents claimed that they took place once a month. It is however difficult to determine what was the actual cause of visits at the GPs' consulting rooms and what type of examinations where performed, however the frequency of the visits was surprising.

At the same time a low percentage of patients were under the diabetes outpatient clinic care and over a half of those patients have not visited the diabetes outpatient clinic during the last 12 months. The results presented in this paper may indicate a limited access to the diabetes outpatient clinics or the fact that patients do not appreciate benefits of frequent specialist consultations.

In the current study it has been demonstrated that as much as 90% of patients were not familiar with the term of HbA_{1c}. This result is similar to that obtained in the already mentioned survey performed in Szczecin, in which it has been demonstrated that 81% of patients were not familiar with what kind of test this was. [14]. This percentage indicates that patients under GPs' care as well as those under diabetes outpatient clinics are not familiar with the main criteria for well-controlled diabetes. As long as in the first instance, the explanation may be the fact that the HbA_{1c} test is not included in the primary care physician's "examination package" in Poland, the second however, reveals an unsatisfactory patient education.

In the assessed group, less than half of the patients (40%) performed blood glucose testing. It is likely that financial constraints were the reason for such a result (need for purchasing a glucometer and strips), on the other hand different limitations such as insufficient education, unawareness of measurement necessity, the inability to interpret the results, or psychological barriers associated with finger pricking [18]. The results pre-

sented in the current study are better than those in the study performed in Szczecin, where only 31% of patients performed blood glucose self-control [14]. It has, however, to be stressed that the Szczecin study was performed several years ago at the time that the use of glucometers and of self-control was definitely less popular. A result which corresponds with the present study was obtained in a study performed in the Silesia region in which the quality of the GP's outpatient clinic care in agricultural communities was assessed. In the assessed group of 216 diabetes patients, 44% of patients performed blood glucose self-control [19]. Two models of the diabetes patient care were compared in the primary health care setting in Sweden. In one of the groups the care was formalized (i.e. a determined number of clinic visits during the year, of appointments with education nurse), in the second group; the care principles were not determined. In the first group, blood glucose self-control was being performed by 50% of patients, in the second, only by 8% [20]. It seems that the introduction and of strict recommendation how to do self-control conduct frameworks, which should be determined by guidelines for diabetes care, may play a significant role in the process of diabetes self-management. The way of doing measurements is important as well as performing them at the right time in order to determine the largest postprandial glycemia increase. As the current study has demonstrated, a great number of patients performed the measurement in an inappropriate way and occasionally.

The relevance of glycemia self-control in type 2 diabetes patients is not however as obvious as it may seem. A metaanalysis in which data from 12 studies have been assessed brought an interesting result [21]. The efficacy of treatment in patients who perform and not perform self-control of blood glucose, has been assessed. In the former group, in comparison with the latter one the HbA_{1c} reduction was greater by 0.4 %. In a study performed in England by Farmer et al. [22], it has been demonstrated that glycemia self-control does not affect the improvement of diabetes control in type 2 diabetes patients, not treated with insulin. A multicenter study was performed in Germany and Austria, in which the influence of the frequency of glycemia assessment in type 2 diabetes patients on long-term diabetes monitoring, based on the HbA_{1c} values, was assessed [23]. It has been demonstrated that in type 2 diabetes patients treated with insulin, a more frequent assessment influenced the decrease in the HbA_{1c} level (reduction by 0.16% per each additional measurement a day). In diet-treated patients or those taking oral hypoglycemic drugs, a greater number of performed measurements correlated with an HbA_{1c} increase (increase by 0.14% per each additional measurement a day). It cannot be excluded that the influence of self-control on glycaemia improvement could be higher if the measurements would take into account postprandial glycemia.

The blood pressure self-monitoring in the assessed agricultural province was better than was the glycaemia self-monitoring. Among the respondents over half of the patients performed blood pressure measurements at home. This result is much better than in a study from Szczecin, where the blood pressure self-monitoring was performed by 40% of patients [14]. It is worth mentioning that individual blood pressure measurements were conducted by patients in very different ways, from measurements done several times a day to measurements done less than once a month. A relatively large group of patients performed daily measurements.

A small number of patients (35%) performed foot examination by themselves which may indicate an insufficient education. It may well be that patients are not aware of the fact that one of diabetes complications is the diabetic foot syndrome. Among patients who performed self-control a vast majority did it every day. Studies performed in other countries demonstrate that the percentage of patients performing foot control is much greater than that in the previous studies published by authors [24-26]. In a large study including 3564 patients, performed in Italy, the foot self-care was done by 67% patients and 20% did it every day [24]. Even more patients (81%), performed foot self-examination in Bosnia and Herzegovina [25]. A study performed in a rural area in the USA demonstrates data demonstrating that foot self-control was performed by 77% of patients [26].

The current results indicate that the vast majority of patients residing in the rural district of the West-Pomeranian province in Poland are exclusively under control of general practitioners. Despite frequent clinic visits related to diabetes these patients as well as those under control of diabetes outpatients clinics are not sufficiently educated and their knowledge on diabetes is limited, which is proved by the unfamiliarity with the HbA_{1c} level test, insufficient glycemia, blood pressure and foot control, self management.

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