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Chronic Patients – Persons with Diabetes Frequent Attenders in Croatian Family Practice

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ABSTRACT

Chronic diseases cause high frequency visits and generate the long-term frequent attenders (FAs). The connection between frequent attendance and specific morbidities in the health care systems in transitional Europe has been underestimated. We investigated whether frequent visits of chronic patients in primary care are related to characteristic of chronic disease (diabetes mellitus) and whether this is influenced by the family practice in the transitional health care. We analyzed the number of visits a day time work for 490 persons with diabetes in the period 1997 to 2000. As the cut-off points between frequent attenders and non frequent attenders (NFAs) we used the value of the third quartile (Q3) of visits determined for the sex and age groups in the parallel study in the whole population. The analysis was performed for 23 variables: demographic characteristics of patients, disease characteristic and variables of physician. Logistic regressions were employed to identify the predictors of FAs/NFAs. 56.9% (in 1997) to 62.4% (in 2000) persons with diabetes were FAs, compared to 22.4% to 24.3% FAs patients in the whole population. Logistic regression analysis significantly differentiated the two group of visits with 68% accuracy. 4 variables are significant predictors for FAs/NFAs: diabetes as the main disease ($p=0.0005$), diet-only-treatment ($p=0.0062$), treatment by secondary care ($p=0.0116$), and if glycosylated hemoglobin test (HbA1c) is determined ($p=0.0272$). Understanding the similarities and differences of FAs/NFAs persons with diabetes may be important in improving the care and management of chronic diseases in family medicine in transitional health care systems.

Key words: persons with diabetes, frequent attender, transition family medicine, Croatia

Introduction

During the last few decades the visits to family physician have been continuously studied. There is a growing need for the ongoing care of chronic illnesses by family physicians. Frequent attenders (FAs) accounts for a relatively large proportion of visits to family physician¹⁻³. It has been found that chronic diseases cause high frequency visits^{3,4}, and generate the long-term FAs⁵. The reason is partly clinical – chronic patients have more severe health problems, take more medications, and have related social and economic problems »case mix general

practice«⁶⁻⁸. Neal and Heywood claim that a management strategy should be developed for treating the high frequency long-term visitors⁹.

The connection between frequent attendance and specific morbidities in the health care systems in transitional Europe has been underestimated^{1,10}.

The transitional health care system in Croatia is characterized by inherited the wide, well educated and powerful secondary and hospital care. Contrarily, there

are inadequately and narrowly trained and the weaker position the family physician^{11,12}. There have been many debates about reforms in the health sector, which were focused on financing and management, but little attention was given to changing the organization in the treating health problems in transitional health care^{11–15}.

The goal of the study is to determine if the chronic patient (the research sample are persons with diabetes) is FAs according to the number of visits or a high frequency consulter in family medicine in Croatia^{4,16}. We wanted to find out the characteristics of chronic patients / persons with diabetes who are FAs, and compare them to the patients of the same age and sex who are not frequent attenders (NFAs). Understanding the similarities and differences of FAs/NFAs persons with diabetes may be important in improving the care and management of chronic diseases in family medicine in transitional health care systems.

Materials and Methods

Setting and study population

In the national health system in Croatia the family physicians are in principle door-keepers of the health system. They provide the health care for about 98% patients who choose their own family physician. The upper limit of registered patients per one family physician is 2,040. The study period lasted from 01.01. 1997 to 31.12. 2000. Fourteen physicians, 8 women and 6 men from six different towns from the northern Croatia, working in the Medical Center, participated in the study. Eleven were specialists in general practice and 3 were physicians without postgraduate education. They had a total of 23,000 patients registered on their lists. These 14 physicians were included in the project CroDiabGP, which has been monitoring the quality of care of diabetics in general practice in Croatia since 1997. In 1997 the patients were separated from the general register of chronic patients. There were 696 persons with diabetes (3.1%) aged 20 and over in this register. The data were collected with registered patients who survived the whole study period.

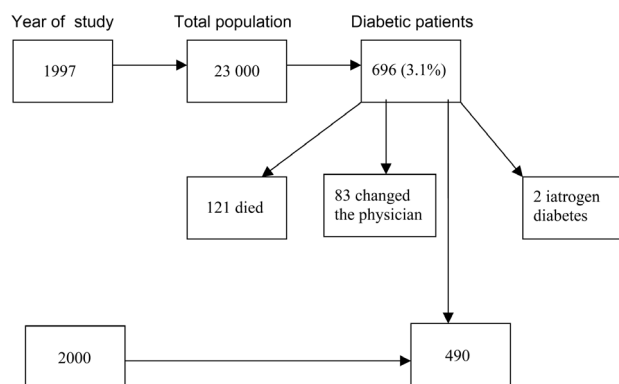


Fig. 1. Flow diagram shows selection of the sample group of persons with diabetes.

Out of 696 patients in 2000, there remained 490 registered persons with diabetes. The patients diagnosed with diabetes in the period 1997–2000 were not included in the study (Figure 1).

Contact counting

We analyzed the number of consultations a day (8 work hours, face-to-face contacts) for 490 persons with diabetes in the study period. Home visits and telephone contacts are not included in the study. The data were collected from patient files in the family practice offices.

Definition of frequent attenders and visit analysis

As the cut-off points between FAs and NFAs persons with diabetes we used the value of the third quartile of the total number of visits (Q3) determined for the sex and age groups in the parallel study in the whole population, aged 20 and over¹⁰. Separate cut-off points were defined for the following sex and age groups: 20–30, 31–40, 41–50, 51–60, 61–70, over 70, for each sex and each age in the assessment period, including non-attenders. The range of the cut off was from 3.4 (male patients younger than 30) to 12 (female patients older than 70).

This method included 22.4% to 24.3% patients FAs in the whole population subgroups¹⁰.

Persons with diabetes

In the second part of the study we determined the characteristics (variables) which characterize the persons with diabetes according to the dependent variable FAs/NFAs.

The control group for determining characteristics of the FAs persons with diabetes were the patients of the same sex and age, who did not qualify for the FAs group, according to the consultation rate of visits.

For every patient we determined the following independent variables:

1. Demographic variables:

age, gender, marital status, education, and number of family members. The demographic data were analyzed for 1997, the first year of the research.

2. Disease characteristics:

We examined the disease characteristics according the Questionnaire Croatian-European register^{17–20}. Family physicians were trained how to record and code their patients and visits. Diabetes is the main disease if it is the most often reason for the visits (compared to other comorbidity chronic diseases), or if diabetes is the only chronic disease⁴.

Other data provided by the physicians: diabetes type, duration of the disease, type of treatment, self-control of glycemia; whether the screening for diabetes complications has been done in the last year: glycated hemoglobin test (HbA1c), urinary albumin test, lipid profile, fundus examination, feet examination^{17,20,21}. The data were collected for the year 1999, which was randomly chosen among the 4 years we studied.

Comorbidity was determined according to the International Classification of Diseases-10 (ICD-10). To compare the severity of comorbidity with the status of FAs/NFAs, we used the additional ICD-10 classification with its clinical modification, the Comorbidity Disease-9 by Charlson Index (ICD-9/CI)¹⁶. We also analyzed the severity of diabetes complications: diabetic retinopathy (H36.0), neuropathy (G63.0), nephropathy (N08.3), and peripheral vascular disease^{17,18,22}.

The severity of diabetic complications was assessed according to the Index of Disease Severity (IDS) scale:

- level 0 – there is no documentation of complications nor clinical indicators of complications
- level 1 – there is documentation of complications, they are under control, no symptoms
- level 2 – there is documentation of complications with pronounced symptoms
- level 3 – there is documentation of complications, they cannot be controlled^{18,19,23}.

The medications were classified according to the Anatomical Therapeutic Chemical (ATC) classification index, Oslo 2000²⁴.

3. Physician and practice characteristics

We analyzed the following characteristics of the physicians: treating diabetes himself or with secondary care, the physician's gender, and the level of education.

All the data were written down and then entered into the computer program.

Statistical analysis

As the cut-off points between FAs and NFAs persons with diabetes we used the value of the third quartile of the total number of visits (Q3) determined for the sex and age groups in the parallel study in the whole population, aged 20 and over¹⁰.

The normality of distribution of quantitative variables was tested with the Kolmogorov-Smirnov test. The differences between the two groups of examinees were tested by the χ^2 test for categorical variables, and by Mann Whitney test for numerical variables.

To analyze the differences in comorbidity, multimorbidity, and taking medications between persons with diabetes FAs and NFAs we used the discriminant analysis. In the analysis of the prediction of the frequency of visits

of persons with diabetes to the family physician the logistic regression was performed. We used SAS System for Windows, release 8.12 for statistical analyses (SAS Institute Inc., Cary, NC, USA).

Results

Since 1997 in the registers of the 14 physicians with 23, 000 patients, we discovered 696 persons with diabetes. In 2000 there were 490 (70.4%) persons with diabetes still in the register, 121 (17.4%) patients died, and 83 (11.9%) changed the physician, and we had no access to their data. Two patients with iatrogenic diabetes were not included in the study (Figure 1). Out of 490 persons with diabetes 293 (59.7%) were women, 450 (92%) patients were older than 50 (age range 20–92, median 62.5).

Out of 490 persons with diabetes, according to the Q3 values in the general population, the number of FAs was 279 (56.9%) in 1999 and 306 (62.4%) in 2000. During the four years of study, the proportion of FAs varied by 4.2%.

The 490 persons with diabetes made a total of 22,861 visits, in the period between January 1, 1997 and December 31, 2000. The average number of visits made by FAs was 14.7 visits in 1998, and 16.2 visits in 2000. NFAs made 5.7 visits in 1997 and 6.2 in 2000. FAs visits made up 76.8% of all diabetics' visits in 1999, and 79.0% in 2000 (Table 1).

There were 16 (3.3%) patients with type 1 diabetes and 474 (96.7%) with type 2 diabetes.

There were 18.0% of the patients undergoing only diet treatment, 59.2% peroral treatment, and 22.8% insulin treatment.

General practitioners assessed diabetes as the main disease in 299 patients and other comorbidity diseases as the main disease in 191 patients. Besides diabetes, 84.3% of patients had 1–3 other chronic diseases, and 4.7% had more than 3 chronic diseases. On average, a persons with diabetes had 2.5 chronic diseases and was taking 3.2 group of medications.

There were 25.3% patients who were self-controlling diabetes by strips and self-control devices. The HbA1c test was performed on 74.3% patients, lipid profile on 64.3%, fundus examination on 68.0%, and feet examination on 59.2% patients. 12.7% of the patients were smokers.

TABLE 1
DISTRIBUTION VISITS TO THE FAMILY PHYSICIANS OF 490 PERSONS WITH DIABETES ACCORDING TO Q3

Year of study	No of total visits/year	Frequent visits according to Q3 N (%)	Visit per patients FAs/NFAs	Frequent attenders N (%)
1997	5.454	4.252 (77.9)	14.9 / 5.8	285 (58.2)
1998	5.625	4.519 (79.9)	14.7 / 6.0	306 (62.4)
1999	5.625	4.319 (76.8)	15.4 / 6.1	279 (56.9)
2000	6.130	4.984 (79.0)	16.2 / 6.2	306 (62.4)
Total	22.861	18.74 (79.0)		

FAs – frequent attenders, NFAs – non frequent attenders

TABLE 2
ATTRIBUTES OF PERSONS WITH DIABETES FREQUENT ATTENDERS AND CONTROL PATIENTS. BIVARIANT ANALYSIS

Patients' variable	FAs Mean (SD) N=279	NFAs Mean (SD) N=211	p
Gender: male	121	76	**0.100
female	158	135	
Age	65.8 (10.5)	67.4 (9.6)	***0.154
Education: primary	167	130	**0.437
secondary and high	112	81	
Marital status:	198	137	**0.265
married / single/ divorced	90	74	
Number of household members	3.5 (1.5)	3.3 (1.8)	***0.569
Diabetes variables			
Type of diabetes: Type 1	15	1	**0.002
Type 2	264	210	
Types of treatment: Diet only	36	52	**0.001
POH	162	128	
Insulin	81	31	
Diabetes as the main disease	159	140	**0.035
Other comorbid as main disease	120	71	
Duration of diabetes (years)	12.0 (7.3)	11.1 (7.4)	***0.044
Disease self-management (strips/device): Yes	83	41	**0.009
No	196	170	
HbA1c test: Yes	202	162	**0.079
No	76	50	
Albuminuria: Yes	192	123	**0.016
No	87	88	
Lipid profile: Yes	190	128	**0.088
No	89	83	
Fundus: Yes	204	129	**0.005
No	75	82	
Feet: Yes	182	108	**0.002
No	97	103	
Variables of clinical status			
Number of comorbid diseases	1.6 (6.0)	1.4 (5.0)	***0.322
ICD-9/CI	1.27 (1.0)	0.99 (0.6)	***0.002
IDS	1.37 (1.8)	2.62 (1.6)	*** <0.000
Number group of medications	3.46 (1.6)	2.62 (1.5)	***0.000
Diabetic's smoking: Yes	35	27	**0.934
No	244	184	
Variables of practice			
Physician's gender: Male	117	80	**0.873
Female	162	121	
Specialization: Yes	220	177	**0.159
No	59	34	
Secondary care: Yes	111	44	** < 0.001
No	168	167	

FAs – frequent attenders, NFAs – non-frequent attenders, *p – level of significance <0.05, ** χ^2 , ***Mann-Whitney, Peroral hypoglycemic (POH), Glycated hemoglobin (HbA1c), Index Comorbidity Disease-9 by Charlson Index (ICD-9/CI), Index of Disease Severity (IDS).

The two groups of participants were formed according to the frequency of attendance in the year 1999:

1. group – 279 FAs
2. group – 211 NFAs

Bivariant analysis was performed for 23 variables related to patients and to physician/practice for 279 FAs and 211 NFAs in 1999 (Table 2).

The related diseases with the higher disease severity index, and more medications taken, were statistically more often present with FAs. Duration of the disease, insulin therapy, self-control by strips, urinary albumin test, feet examination, fundus examination are more present with FAs. The severity of disease complication index was inversely proportional to FAs. The frequent attendance values of the persons with diabetes supervised by secondary care were inversely proportional (Table 2).

Discriminant Analysis

The discriminant analysis was applied for the additional analysis of the differences in the severity of comorbidity and multimorbidity, and taking medications between the groups of FAs and NFAs.

The discriminant function was statistically significant ($\chi^2=41.313$; $df=6$) ($p<0.001$).

The discriminant function was predominantly described by positive projections of the variables »total number prescribed of group medications« and »comorbidity-score«. It was predominantly described by negative projections of the variable »multimorbidity-score« (Figure 2).

Persons with diabetes FAs received more prescriptions and had higher severity index of comorbidity diseases than NFAs. There was a lower proportion of FAs among patients with higher severity index of disease complications than among those with lower severity index of disease complications.

Logistic regression

The criterion variable »frequent attendance in 1999« was a binary variable (FAs/NFAs). Logistic regression was applied in the analysis of the possible prediction to determine the impact of each independent variable on

	Function 1
Comorbidity - score	0.338
K – retinopathy - score	0.201
K – nephropathy - score	0.166
K – neuropathy - score	0.088
K – feet - score	- 0.001
Medications – total	0.737

	Function 1
Medications – Total	0.893
Comorbidity	0.549
K – retinopathy - score	0.385
K – nephropathy - score	0.338
K – neuropathy - score	0.262
K – feet - score	0.113

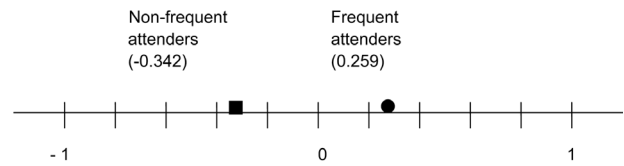


Fig. 2. Group centroids of frequent and non-frequent attenders in two-dimensional discriminant function space.

the dependent variable FAs/NFAs in the group of persons with diabetes.

Twenty-three variables were taken as predictors: 5 demographic characteristics of patients, 15 disease characteristics, and 3 characteristics of the practice.

Statistically significant predictors were yielded ($\chi^2=78.568$; $df=28$; $p<0.0001$).

Logistic regression analysis significantly differentiated the two groups of visitors with 68.16% accuracy.

Correctly predicted were 212 (75.99%) FAs and 122 (57.82%) NFAs, where the predicted result of FAs was equal to the observed result. Incorrectly predicted were 67 (24.00%) FAs who were classified according to predictors as NFAs and 89 (42.19%) NFAs who were classified as FAs. The overall percent of incorrectly predicted results was 31.84%.

Statistically significant predictors for the frequent attender were: diabetes as the main disease ($p=0.0005$),

TABLE 3
LOGISTIC REGRESSION – PERSONS WITH DIABETES FREQUENT ATTENDERS IN 1999

Variables	*Sig	Exp (B)	**95 % CI for Exp(B)	
			Lower	Upper
Diet only treatment (yes/no)	0.0062	4.645	1.546	13.956
Main disease (diabetes/other)	0.0005	2.462	1.487	4.075
HbA1c (yes/no)	0.0272	2.059	1.084	3.908
Treatment by internist (yes/no)	0.0116	0.471	0.262	0.845

Glycated hemoglobin (HbA1c)
* level of significance 0.05
**95% confidence interval

diet treatment ($p=0.0062$), treatment by secondary care ($p=0.0116$), and determined HbA1c test in 1999 ($p=0.0272$) (Table 3).

According to the logistic regression analysis we could say that mainly 4 variables are significant for the prediction: a patient undergoing only the diet treatment had 4.6 times higher odds of being a FAs, a patient with diabetes as the main disease had 2.5 times higher odds, and the patient who had been HbA1c tested had 2 times higher odds, whereas the patient who was treated by secondary care had 2 times lower odds of being a FAs.

Discussion

The consultation rate and cut-off in the whole population defined the persons with diabetes as FAs or very high-frequency consulters in Croatia during all four years with oscillations of 4.2% between years^{4,10,16}. What makes the difference in the range of visits between FAs/NFAs diabetic patients in Croatia? Are these the patients who would be FAs according to the previously known factors (individual characteristics, chronic disease, the physician characteristics)^{3–5}?

Out of the 23 analyzed variables 4 of them predicted 68% of the variations among the two group of attenders: diabetes as main diseases, taking only the diet treatment, treating the patient with secondary care, and whether the HbA1c was determined.

Taking care of diabetes requires high number of review visits and specialist consultations, prescribing more medications^{4,6,17–19}. Furthermore, diabetes requires the highest number of treatments: education about diet treatment, self-control and self monitoring, peroral therapy, insulin therapy^{25–27}. A visit of the patient with diabetes is the longest, and the physician does the largest number of procedures of all chronic patients²⁸.

There are not enough research data about the influence of the severity of comorbidity and multimorbidity chronic patients with diabetes on FAs. Because of the discrimination analysis was applied for the additional analysis of the severity indexes of comorbidity, multimorbidity, and taking medications, between the groups of FAs/NFAs. The number of comorbidity diseases the persons with diabetes was not associated with frequent attendance, but with the severity index of comorbidity and multimorbidity diseases. Diabetic patients with the higher index comorbidity disease has more review visits and referrals and also takes more medications^{4,6,1}. Contrarily, the patients with lower severity index of complications are more often FAs. The clinical logic is that the higher severity index disease causes the lower functional condition of the patient. The number of face-to-face visits got smaller, while the hospital and home care increased. This can partly explain why a number of FAs chronic patients stop being FAs after some time⁵. The limitation of this statement is that according to the agreed-on methodology we did not analyse the home visits which may have influenced the results.

Treating diabetes mellitus only by diet is very specific. It requires a continuous encouraging of the patients to change life-style, explaining the protocol of diet treatment, and achieving optimal goals of treatment only by change the life-style^{25–26}. This will temporarily increase the number of visits until the stabilization of the disease¹⁹. The costs of treatment of newly-diagnosed diabetics (including visits to the physician) increase a few years before (undifferentiated symptom) and after making the diagnosis²⁷. However, not all patients on diet therapy are newly-diagnosed. It is interesting that diet-only-treatment requires self-engagement of the patient. The number of prescriptions and referrals is smaller compared to peroral and insulin therapy. Why does diet-only-treatment account for the high number of visits to family physician in Croatia? Answers to these questions are important for understanding of FAs in Croatia.

It is probably due to the inadequate self-management of the patients (problems of rights and duties of the patients in transition), unrealistic expectations of the patients and physicians^{13,14}. There are not encouraged the other members of the primary care team who may be able to play larger role in the management of this type of disease treatment^{4,11,19}.

The number of FAs treated by secondary care is significantly smaller than those treated by general practitioner. The reason for this is that in Croatia, in secondary care, only one referral for getting laboratory and clinic results is needed, while if the same procedure is initiated by the family physician, several referrals are needed^{11,12,20}. The same is true for the glycated hemoglobin test, which is done only in the secondary care laboratories. Also, the internist has bigger and better educated team for patients' education about diet, physical activity, self-control blood glucose, and self-monitoring therapy²⁰. If we assume that the results of both cares should be the same for the same characteristics patients, the patient has to visit his family physician more times in order to get the necessary level of health care in transition systems²⁹.

We have not found socio-demographic variables of diabetics as the factor of FAs. Also, other studies that standardized the number of visits according to the specific needs of sex and age did not find any influence of these variables on the FAs³⁰. This study supports the claim that chronic disease rather than the patient is responsible for FAs. Or, with increase in age, disease and its severity gain more importance compared with other patients' characteristics⁵. Sex and education of the family physician are not factors which significantly influence the number of FAs. First reason is because the main roles of family physicians is to acting signposts on delivery to secondary care in transition health systems. Second reason is often mentioned, the poorly motivated and the passive attitude of the physician towards rights and duties of users and also the family physicians in transition health system^{12,14}. And the last, more important are the affinity for treating diabetes and the organizational abilities than education and sex of the physician, according to the literature^{9,21}.

Conclusion

In the transition health care systems the previous has not yet been well-known about the FAs chronic patient with diabetes.

If one proportion patients with the same characteristics does not visit often, then the characteristics of this proportion should be encouraged to reduce the number of visits. In order to achieve this, taking care of diabetes requires a well-defined and educated team with good organizational skills^{31,32}.

For future research: analyse the content of the procedures during the visits in transition system, and motivation or lack of motivation with doctors and nurses in treating diabetes^{31,33}.

Limitation factors

The strength of this study is based upon the analysis of visits of the selected group from the population of dia-

betics, which was compared to the parallel study of the national standard of the number of visits in all age and sex groups¹⁰. The 48-months-long monitoring of the patients also contributed to the value of this study. To define the cut-off we took the value of the third quartile, since the aim of the research was not to analyze the most FAs but the position of the chronic persons with diabetes in the population according to the number of visits. According to the agreed-on methodology we did not analyse the home visits which might have influenced the face-to-face contacts.

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KRONIČNI BOLESNICI – OSOBE S ŠEĆERNOM BOLESTI KAO UČESTALI POSJETIOCI U OBITELJSKOJ MEDICINI U HRVATSKOJ

SAŽETAK

Kronične bolesti su čimbenik za veliki broj dugotrajnih učestalih posjetioca u obiteljskoj medicini. Nije dovoljno istražen učestali posjetilac – kronični bolesnik u tranzicijskim zdravstvenim sustavima u Europi. Istražili smo osobine kroničnog bolesnika-učestalog posjetioca, osobu s šećernom bolesti u uvjetima tranzicijskog zdravstvenog sustava. Ana-

lizirali smo ukupni broj posjeta: 490 osoba s šećernom bolesti, obiteljskom liječniku u razdoblju od 1997. do 2000. godine. Kao točku razgraničenja između učestalog-neučestalog posjetioca uzeli smo broj posjeta – vrijednost treće kvartile (Q3), određenu u paralelnoj studiji u općoj populaciji za šest dobno spolnih skupina. Ispitane su 23 nezavisne varijable: demografske karakteristike pacijenta, varijable dijabetesa i pridruženih bolesti i varijable prakse. Primijenjena je logistička regresija za određivanje prediktornih čimbenika za obilježje učestali-neučestali posjetilac između nezavisnih varijabli. Prema vrijednosti (Q3) u općoj populaciji, od 56,9% (u 1997.) do 62,4% (u 2000.) osoba s šećernom bolesti su učestali posjetioci, u usporedbi s 22,4% do 24,3% učestalih u općoj populaciji u istim dobno-spolnim skupinama. Logistička regresijska analiza grupira bolesnike u dvije grupe: učestali-neučestali posjetilac, s 68% točnosti. 4 varijable imaju statistički značajnu predikciju za obilježje učestali-neučestali posjetilac: dijabetes kao glavna bolest ($p=0,0005$), ako je bolesnik samo na osnovnim principima liječenja ($p=0,0062$), ako se bolesnik liječi u sekundarnoj zdravstvenoj zaštiti, ($p=0,0116$), i ako u provođenju zaštite za promatranu godinu ima određen HbA1c ($p=0,0272$). Prema nađenim čimbenicima koji razlikuju dijabetičkog bolesnika učestalog od neučestalog posjetioca, pružanje zdravstvene zaštite kroničnom bolesniku u uvjetima tranzicijske obiteljske medicine može biti bitan čimbenik za učestalog posjetioca kroničnog bolesnika.