Access and Willingness of Patients with Diabetes to Use ICT: the Case of Romania

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ABSTRACT

The aim of this paper is to identify factors influencing access to Internet and Communication Technologies (ICT) as well as willingness of using an e-health application for patients with diabetes. The study has been carried out in two phases. Both phases have been conducted with the support of the National Institute of Diabetes, Nutrition and Metabolic Diseases Prof. Dr. N. Paulescu in Bucharest, Romania. Patients have been approached with the support of the physicians of the National Institute. The study revealed significant differences in terms of utilisation of ICT for disease management among patients with diabetes. Male respondents with higher revenues are more likely to both find information as well as to manage diabetes with the support of ICT. In what concerns utilisation of a specific e-health platform in the reference week, the significant variables are represented by marital status, age and type of diabetes. The respondents who are unmarried, rather young (under 40 years of age) and are type 1 diabetes patients are more likely to use the e-health solution for disease management. The study adds knowledge to understanding patients' need for ICT-based self-management tools. Yet, further research is needed in order to on the one hand, survey a sample representative for the entire population of patients with diabetes in Romania and on the other hand, complement the research with a study more focused on the clinical characteristics of the patients and conducted based on a longer trial period for the patients willing to use ICT.

Key words: diabetes, ICT-based self-management tool, Romania

INTRODUCTION

Latest data at European level on Patient Safety and Quality of Care (1) mention that respondents from Romania and Bulgaria are the most likely to use television as an information source for the quality of health care. In addition, respondents from UK, Romania, Italy and Spain are most likely to seek information information from hospital staff. At the same time, respondents from Sweden, Denmark and the Netherlands are much more likely to mention the Internet and social media than television as a source of information on healthcare.

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The aim of this paper is to identify factors influencing access to ICT as well as willingness of using an e-health application for patients with diabetes. The study has been carried out within a project focusing on an electronic application that would on the one hand, replace the classic paper diabetes and on the other hand, improve the communication between physician and patient. The theme of this paper is particularly relevant for both patients and healthcare staff as ICT is increasingly becoming an important tool for increased accessibility for patients with a chronic disease in a community setting (2-9). Its results are potentially relevant for particular profiles of the patients similar to the ones included in this study (i.e. rural residents of post-communist countries, urban residents of a large city, etc.).

METHODS

Study design and recruitment of participants

The study has been carried out in two phases. Both phases have been conducted with the support of the National Institute of Diabetes, Nutrition and Metabolic Diseases Prof. Dr. N. Paulescu in Bucharest, Romania. Patients have been approached with the support of the physicians of the National Institute. The physicians had been previously informed by the aim and activities of the project, research instruments and general approach of data analysis.

The baseline study has been conducted on a sample of 128 patients aged 18 years or older, diagnosed with type 1 and 2 diabetes between November 2015 – July 2016. The study has been conducted through face-to-face interviews carried out with the support of a specialized researcher from the Romanian Centre for Economic Modelling (CERME). The questionnaire included topics related to the patient's general health status, lifestyle, medical tests, management of diabetes, their relation with the physician and the need for support, diabetes and quality of life, access and use of ICT as well as socio-demographic characteristics.

The second stage of data collection included a follow-up study conducted on a cohort of 46 patients. These patients have been asked about their feedback on using an e-health platform, designed as a tool for disease self-management. The questionnaire has been applied by phone in December 2016 by specialized researchers from CERME. All the information collected in both studies has been introduced in one SPSS database.

Definition of terms

In this study, the willingness to use an e-health application as an ICT-based self-management tool was defined as 'self-management with such ICT devices as personal computers, smartphones, and mobile phones', in line with previous studies (10). In the baseline study, participants were asked whether they had access to ICT, and if yes, to which devices. Based on their responses, the group with various types of access to ICT has been asked in the follow-up study whether they were willing to use an e-health application, with a prior information on the devices on which it is available.

The socio-demographic variables used in this study are as follows: (i) gender; (ii) place of residence; (iii) education level categorized into three groups: primary school – overall duration of education below 12 years, secondary school – 12 years, university or college (in Romania also post-secondary) – above 12 years; (iv) marital status; (v) employment status – categorized into two groups: employed/ self-employed/ entrepreneur or pensioned due to disability/ retired/ student/ housewife/ unable to work; (vi) level of personal income and (vii) age. In addition, data on type of diabetes, duration of diabetes, whether there is another person with diabetes living within the household and about the patient's support network were used. All the variables used in this study were self-reported. The major study terms and corresponding categorizations are presented in *table 1*.

Data analysis

The data has been analysed with the support of the Statistical Package for Social Sciences (SPSS), with $p < 0.05$ considered as statistical significant. Descriptive statistics are presented regarding socio-demographic and clinical characteristics of the patients. Inferential statistics were performed to evaluate associations between study variables. The Kruskal–Wallis test for nonparametric variables was used to test the significance of differences between more than two groups and the Mann–Whitney U test to test significant differences between two groups.

RESULTS

Socio-demographic and clinical characteristics of patients

The cohort of respondents was comprised of 128 patients, out of which 78 men and 50 women, with 15% of them under the age of 40 years and almost the same share (15.6%) above the age of 65 years. The patients

Table 1 - Characteristics of the patients (N=128)

Variables	Frequency	%
Gender		
Male	78	60.9
Female	50	39.1
Place of residence		
Urban	92	71.9
Rural	36	28.1
Age, years (mean $\pm$ SD =54.55, 12.65)		
Less than $\leq$ 40 years	19	14.8
41-65 years	89	69.5
> 65 years	20	15.6
Marital status		
Married	99	77.3
Not married	28	21.9
NR	1	0.8
Employment status		
Employed/ self-employed/ entrepreneur	55	43
Pensioned due to disability/ retired/ student/ housewife/ unable to work	72	56.3
NR	1	0.8
Educational level		
Primary	43	33.6
Secondary	39	30.5
Post-secondary	46	35.9
Personal Income level (mean $\pm$ SD =1407.32, 1142.72)		
$\leq$ 1000 RON	51	39.8
1001 – 2000 RON	31	24.2
Above 2000 RON	17	13.3
Non-response	29	22.7
Duration of diabetes (mean $\pm$ SD =10.78, 8.58)		
More than 15 years	26	20.3
Between 10 and 15 years ($\leq$ 15)	36	28.1
Between 5 and 10 years ($\leq$ 10)	26	20.3
Less than 5 years ($\leq$ 5)	39	30.5
Non-response	1	0.8
Methods used for managing diabetes		
Insulin	72	56.3
Other non-insulin medication	86	67.2
Diet	98	76.6
Physical activity	55	43
Type of diabetes		
Type 1	24	18.8
Type 2	108	78.9
NR	3	2.3
Other household member with diabetes		
Yes	20	15.6
No	106	82.8
NR	2	1.6
Support network (family or friends offering support in diabetes' management)		
Yes	97	75.8
No	31	24.2

were predominantly from urban areas (72%). Most patients were married and didn't have in the household a child under the age of 18 years, while most of the households had 3 members. About one third of respondents graduated primary school and slightly more than one third graduated post-secondary school.

In regards to employment status, 43% were

employed, while the rest of them were retired/ students/ housewives/ disabled / unable to work. Most of the respondents have a personal income level below 2000 RON. The average income per household member is under 1000 RON.

Participants to the study had a rather long duration of diabetes, computed based on the self-reported diagnosis year. Most of them record a duration of diabetes of more than 10 years, and type 2 diabetes tends to be more frequent. Diet and medication represent the most widely used methods of managing diabetes. Only a small share of the patients live in households with other member with diabetes and most of them actually have a support network (family or friends offering support in diabetes' management).

The set of patients included in the follow-up survey included 46 participants, mostly males (31 respondents) from urban areas. Most of the respondents were aged between 41 and 65 years old and were married. Patients from this cohort were distributed across various levels of education, with the greatest part having graduated from post-secondary schools.

Access to ICT of patients with diabetes

Most participants to the study had access to at least one ICT device. About three quarters of them had access to both mobile devices as well as to a computer, while 11% of them only had access to a computer. Out of the patients who had access to at least one ICT device, over 90% of them also had access to Internet. Still, the study identified 49 patients (38%) lacking access to any ICT at all.

Patients with diabetes participating to this study had used at least an ICT tool in the previous 3 months. Yet, the frequency of access decreased when reporting the weekly usage of ICT. For this item, less than half of patients (42%) used ICT tools daily or at least once a week in order to find information on diabetes and only 38% of them used this information for diabetes' management. Approximately the same share of respondents never used or have rarely used ICT tools in order to find out information about the clinical features or the management of diabetes.

Willingness to use ICT as a self-management tool for patients with diabetes

The follow-up survey conducted on a cohort of 46 patients with ICT access at the time when the baseline study had been conducted revealed that only 19 patients had used an e-health platform in a reference

week. Distribution of patients using ICT as a self-management tool had been balanced concerning the utilised devices – 9 patients accessed the web-based platform from their computer, while 10 patients accessed the mobile version of the same platform.

All patients received information necessary for using the platform, but most part of them (27 patients) did not access the platform. Asked about the reasons, their explanations included lack of time, lack of the necessary digital skills, as well as lack of ICT access (compared with the baseline study, some of the patients no longer had access to a computer, or Internet access). At the same time, for part of the patients, the household composition changed, and therefore the patients lacked the necessary digital skills, as the younger household members helped the elderly patients with diabetes in using the e-health platform. This finding is partly in line with the results from other studies stating that a share of only 14% of patients with type 2 diabetes who were invited to an intervention study using a Web application agreed to participate (11). The main refusal reason was a lack of access to the internet (*ibid.*)

Nevertheless, there have also been potential benefits perceived by the patients as well as suggestions for improving the platform. The benefits are related to using the platform as an electronic diary for diet management as well as for monitoring the levels of blood glucose. The platform was viewed by the patients as a constraint to weight the food and thus, keeping a better track of their diet. At the same time, the e-health application was viewed a useful replacement of their paper-based diary. There were also patients who declared that their current life-style did not allow a periodic monitoring of their blood sugar and therefore, this group of patients was not able to introduce the necessary data into the platform.

The negative aspects associated with using the platform were related to its current stage of development. Consequently, the patients requested a better performance of the platform in order to be useful in their disease management. There also appeared to be a suboptimal communication relationship with their physician.

Hence, patients suggested a more complete list of the individual variables relevant for the management of this chronic disease, for instance considering snacks, which are not in the list (e.g. falafel, humus, etc.). They also gave technical suggestions for an improved performance of the e-health application.

DISCUSSION

Gender and respondent's personal income are significantly associated with utilisation of ICT for disease management in the case of the cohort of patients with diabetes surveyed in Romania. Male respondents with higher revenues (above 2000 RON) are more likely to both find information as well as to manage diabetes with the support of ICT (the questionnaire asked "how frequent in the last three months have you used the mobile phone, tablet or computer to find information/for diabetes management").

Concerning usage of a specific e-health platform in the reference week, the significant variables were represented by marital status, age and type of diabetes. The respondents who were not married, rather young (under 40 years of age) and had type 1 diabetes were more likely to use the e-health solution for disease management.

In conclusion, it might prove beneficial in the long-run to improve access to ICT for patients with diabetes based on the general policy recommendation for increasing the share of regular internet users in the general population. These policy recommendations refer to improving the digital skills and awareness among non-users as well as support in overcoming the financial constraints for the low-income non-user households (12). Policy recommendations should also be adapted to the particular context of each country, as an enabling environment for development of e-health services is crucial to an increased ICT utilisation in support of patients with chronic disease*.

Limitations

The study's major limitation resides in a potential sampling bias. The overall project's aim was to study the impact of ICT on patients with diabetes and the sampling purposely also selected a group of patients with access to ICT. Therefore, the selected respondents who accepted to participate might have different characteristics than the ones not selected or who refused to participate. Consequently, a large scale study representative for the population of people with diabetes in Romania is needed in order to re-test the results presented here.

CONCLUSIONS

The aim of this paper is to identify factors influencing access to ICT as well as willingness of using an e-health

* For an overview of e-health country profiles (13).

application for patients with diabetes. The study has been carried out in two phases. Both phases have been conducted with the support of the National Institute of Diabetes, Nutrition and Metabolic Diseases Prof. Dr. N. Paulescu from Romania. Patients have been approached with the support of the physicians of the National Institute.

The study highlighted that most participants to the study have access to at least one ICT device. About three quarters of them have access to both mobile devices as well as to a computer, while 11% of them only have access to a computer.

The study also revealed significant differences in terms of utilisation of ICT for disease management among patients with diabetes. Gender and respondent's personal income are significantly associated with utilisation of ICT for disease management in the case of the cohort of patients with diabetes surveyed in Romania. Male respondents with higher revenues seemed to be more likely to both find information as well as to manage diabetes with the support of ICT. The significant variables associated with utilisation of a specific e-health platform in the reference week were represented by marital status, age and type of diabetes. The respondents who were single, rather young (under 40 years of age) and had type 1 diabetes patients were more likely to use the e-health solution for disease management.

The study adds knowledge to understanding patients' need for ICT-based self-management tools. Yet, further research is needed in order to survey a sample which is representative for the entire population of patients with diabetes in Romania. Also, a future study will potentially complement the research with a more focused approach on the clinical characteristics of the patients and will be conducted on a longer trial period.

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