

# The opinion of primary healthcare patients on the proposed solutions in e-Health in the light of selected social factors

(Opinia badanych pacjentów podstawowej opieki zdrowotnej dotycząca proponowanych rozwiązań w obszarze e-Zdrowia w świetle wybranych czynników społecznych)

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**Abstract** – High quality of healthcare and providing medical service that meets patients' requirements is a priority task set before healthcare facilities within the European Union. Accomplishing this task is becoming increasingly difficult, which is why healthcare institutions are under pressure to increase the quality and efficiency of the service provided.

The aim of the study was to find out the opinion of the studied primary healthcare patients on the proposed e-Health solutions in the Świętokrzyskie province.

**Materials and methods.** The study was conducted between June and December 2011. Patients from public and non-public healthcare facilities participated in the study. The two-stage cluster sampling with facility type stratification was applied. A total of 422 patients based in 20 healthcare facilities in the Świętokrzyskie province were included in the study.

The statistical analysis was performed using the STATISTICA software developed by StatSoft.

**Results and conclusions.** The analysis conducted has shown that the patients expected e-Health tools to be introduced, for example in the form of standardised IT system or the application of telemedicine in treatment. However, patients aged over 65 as well as widows and widowers who considered their own health poor see no advantage in e-Health solutions. The authors of the current paper claim that administrators and managers of primary healthcare facilities should put information on e-Health and proposed system solutions on display in their facilities. Such actions could increase patients' awareness of new technological solutions in healthcare.

**Key words** - e-Health, primary healthcare, patient.

**Streszczenie** – Wstęp. Wysoka jakość usług ochrony zdrowia oraz świadczenie usług medycznych spełniających oczekiwania pacjentów to priorytetowe zadanie, które stawia się placówkom medycznym w krajach Unii Europejskiej. Jest to

zadanie coraz trudniejsze do realizacji i zmusza placówki ochrony zdrowia do podnoszenia jakości i wydajności swoich usług.

Celem badań było poznanie opinii badanych pacjentów podstawowej opieki zdrowotnej na temat proponowanych rozwiązań w obszarze e-Zdrowia na terenie województwa świętokrzyskiego.

**Materiał i metody.** Badania przeprowadzono w okresie od czerwca do grudnia 2011 roku obejmując w reprezentatywnej próbie pacjentów publicznych i niepublicznych zakładów opieki zdrowotnej. Zastosowano metodę losowania dwustopniowego, zespołowego ze stratyfikacją na typ placówki. Łącznie przebadano 422 pacjentów podstawowej opieki zdrowotnej z 20 placówek na terenie województwa świętokrzyskiego.

Statystyczną analizę danych wykonano przy pomocy programu STATISTICA firmy StatSoft.

**Wyniki i wnioski.** W wyniku przeprowadzonych badań stwierdzono, że badani pacjenci oczekują wprowadzenia narzędzi e-Zdrowia w placówkach podstawowej opieki zdrowotnej w postaci wystandaryzowanego systemu informatycznego czy wykorzystania telemedycyny w procesie leczenia. Pacjenci w przedziale wiekowym 65 lat i więcej, wdowy/wdowcy określający swój stan zdrowia jako słaby nie widzą jednak korzyści dotyczących rozwiązań obszaru e-Zdrowia. Autorzy są zdania, że kierownicy badanych zakładów podstawowej opieki zdrowotnej powinni zamieszczać informacje w prowadzonych przez siebie placówkach na temat systemu e-Zdrowia oraz proponowanych założeń systemowych. Takie działania mogą przyczynić się do zwiększenia świadomości pacjentów dotyczącej nowych rozwiązań technologicznych w obszarze ochrony zdrowia.

**Słowa kluczowe** – e-Zdrowie, podstawowa opieka zdrowotna, pacjent.

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**Authors' contributions to the article:**

- A. The idea and the planning of the study
- B. Gathering and listing data
- C. The data analysis and interpretation
- D. Writing the article
- E. Critical review of the article
- F. Final approval of the article

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## I. INTRODUCTION

High quality of healthcare and providing medical service that meets patients' requirements is a priority task set before healthcare facilities within the European Union. Accomplishing this task is becoming increasingly difficult, which is why healthcare institutions are under pressure to increase the quality and efficiency of the service provided [1]. Modern IT technologies are becoming increasingly important as they facilitate the flow of healthcare-related information.

The history of e-Health is directly related to the e-Europe strategy which was to implement the provision of the Lisbon Strategy. According to the World Health Organization, e-Health is a term referring to the implementation of various electronic communication and information technologies to healthcare [2]. The role of e-Health can be defined as a "a set of initiatives aimed at facilitating the timely availability of correct, precise and complete information in an appropriate manner and form to the right person" [3].

The European Commission defined e-Health as healthcare services provided using computer software and digital tools. These include the interaction between patients and service providers, medical data transmission between healthcare facilities and direct communication among patients or between patients and medical staff. The aforementioned examples of interaction are dependent on medical information system, electronic medical documentation, telemedicine services, portable and personal medical devices and many other information and communication technologies (ICT) based on devices used in support, diagnostics, treatment and healthy lifestyle [4, 5].

The IT solutions implemented in e-Health include functions that allow patients obtain information on their condition via the Internet or are helpful in managing a given facility. The main tenets of e-Health are implemented by means of tools such as health-related websites, patient databases, electronic procedure reservation systems, on line health and treatment reporting systems for communicating between institutions, telemedical services and other types of tools and services based on ICT [6,7].

In Poland, few facilities use IT to communicate with patients. If websites of healthcare institutions exist at all, they tend to contain only basic information on the organization structure, staff and types of service provided. The lack of interactive platforms forces patients into a passive attitude [8].

The aim of the study was to find out the primary healthcare patients' opinion on the proposed e-Health solutions in the Świętokrzyskie province.

## II. MATERIALS AND METHODS

The study was conducted between June and December 2011. Patients from public and non-public healthcare facilities participated in the study. The two-stage cluster sampling with facility type stratification was applied. A total of 422 patients based in 20 healthcare facilities in the Świętokrzyskie province were included in the study. The basic criterion of method selection was the type of variables analysed. The types of variables taken into account were discrete and continuous variables. For quantitative variables, the basic statistical parameters related to central value (mean) as well as dispersion (standard deviation, confidence interval 95%, minimum and maximum) were calculated. For qualitative varia-

bles, the frequency distributions as related to categories (discrete values) of the variables were defined. The comparative analysis of variables of interval scale and ratio scale types was performed using a variance analysis – in case of main effects or interaction significance, the post hoc analysis was performed as a complementation. The statistical analysis was performed using the STATISTICA software developed by StatSoft.

### III. RESULTS

In order to perform an analysis of the studied patients' opinion on the matter, the *opinion on IT system* (W10) aggregate variable was defined. The elements listed below were normalised to the range of 0-1 in order to determine the intensity of each component. The components of the aggregate variable are listed in Table 1.

Table 1. The opinion on the IT system – the aggregate variable W10

| Components of aggregate variable W10   | Relevant N number | Mean  | Minimum | Maximum | Values normalized to the range of 0-1 |
|--|-------------------|-------|---------|---------|---------------------------------------|
| W10-opinion on the IT systems  | 422               | 0.469 | 0       | 0.95    | 0.494                                 |
| Patients should have an option to schedule an appointment at primary healthcare facilities via e-mail      | 422               | 0.498 | 0       | 2       | 0.249                                 |
| Primary healthcare facilities should have websites with up-to-date information on doctors' clinic schedule | 422               | 0.912 | 0       | 2       | 0.456                                 |
| Patients' opinion on the need of a uniform IT system in healthcare   | 422               | 1.491 | 0       | 2       | 0.745                                 |
| The patients' knowledge on e-Health strategy   | 422               | 0.469 | 0       | 2       | 0.235                                 |
| The need to implement uniform solutions in telemedicine in Poland  | 422               | 3.649 | 1       | 5       | 0.662                                 |

The resultant of the the *opinion on IT system* (W10) aggregate variable was 0.494 (Table 1). The highest components of the variable in primary healthcare facilities were related to the following fields: the need of a uniform IT system in Polish healthcare (0.745), the implementation of uniform solution in telemedicine (0.662), and the creation and update of healthcare facilities' websites (0.456) (Table 1).

Table 2. The opinion on the IT system (W10) of the participating primary healthcare patients

| Border-line | Number | Total number | % of the relevant | Total % of the relevant | % of all cases | Total % of all |
|-------------|--------|--------------|-------------------|-------------------------|----------------|----------------|
| 0           | 1      | 1            | 0.24              | 0.24                    | 0.23697        | 0.237          |
| 0<x<=.2     | 32     | 33           | 7.58              | 7.82                    | 7.58294        | 7.8199         |
| .2<x<=.4    | 166    | 199          | 39.34             | 47.16                   | 39.33649       | 47.1564        |
| .4<x<=.6    | 156    | 355          | 36.97             | 84.12                   | 36.96682       | 84.1232        |
| .6<x<=.8    | 65     | 420          | 15.40             | 99.53                   | 15.40284       | 99.5261        |
| .8<x<=1.    | 2      | 422          | 0.47              | 100.00                  | 0.47393        | 100            |
| Remaining   | 0      | 422          | 0.00              |                         | 0              | 100            |

Shapiro-Wilk W=.97732, p=.00000

The dispersion is quite wide in the range of (.2<x<=.4), in which 166 responses are located, amounting to 39.34% of all indications. At the same time, there were 156 responses in the range of (.4<x<=.6), which amounted to 36.97% (Table 2).

No significant correlation was observed between the opinion on IT system and type of a facility (p=0.862948) (Fig. 1). This factor (diversity between types of institu-

tions) was excluded from further analyses on the opinions about IT system (W10).

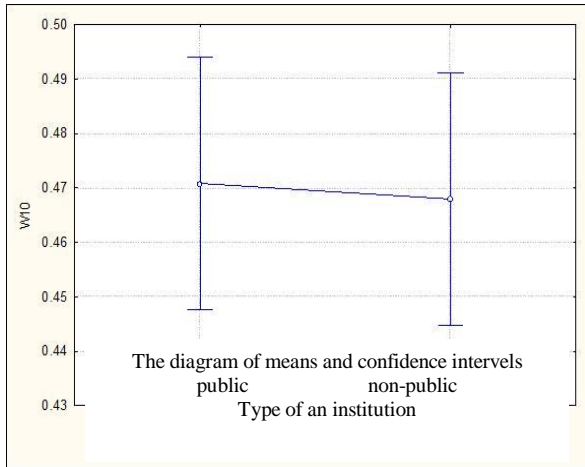


Figure 1. Opinions on IT system (W10) and the type of facility

No correlation between the opinions on IT system and the sex of the patients was observed ( $p=0.80010$ ). The variance analysis showed a significant effect of age ( $p=0.00000$ ), education ( $p=0.00013$ ), professional activity ( $p=0.00000$ ), marital status ( $p=0.00012$ ) and condition of patients ( $0.00000$ ) (Table 3).

Table 3. The opinion on IT system correlated to selected social factors – variance analysis

| W10 variable/social factors | SS Effect | df Effect | MS Effect | SS Error | df Error | MS Error | F      | p            |
|-----------------------------|-----------|-----------|-----------|----------|----------|----------|--------|--------------|
| Sex                         | 0.001     | 1         | 0.001     | 12.243   | 420      | 0.029    | 0.064  | 0.800        |
| Age                         | 0.950     | 4         | 0.237     | 11.294   | 417      | 0.027    | 8.775  | <b>0.000</b> |
| Education                   | 0.654     | 4         | 0.163     | 11.590   | 417      | 0.027    | 5.888  | <b>0.000</b> |
| Professional activity       | 1.170     | 4         | 0.292     | 11.075   | 417      | 0.026    | 11.017 | <b>0.000</b> |
| Marital status              | 0.516     | 2         | 0.258     | 11.729   | 419      | 0.027    | 9.219  | <b>0.000</b> |
| Condition                   | 0.939     | 4         | 0.234     | 11.306   | 417      | 0.027    | 8.662  | <b>0.000</b> |

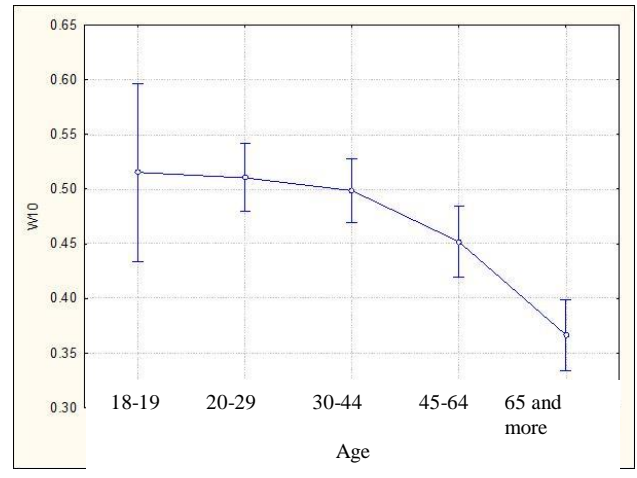


Figure 2. The opinion on IT system (W10) correlated to the age of the patients

The analysis of the *opinion on IT system* (W10) aggregate variable variance correlated to the age of the respondent showed a significant effect ( $p=0.0000$ ). Older patients of 65 or more were the least interested in implementing IT solutions in healthcare (Figure 2).

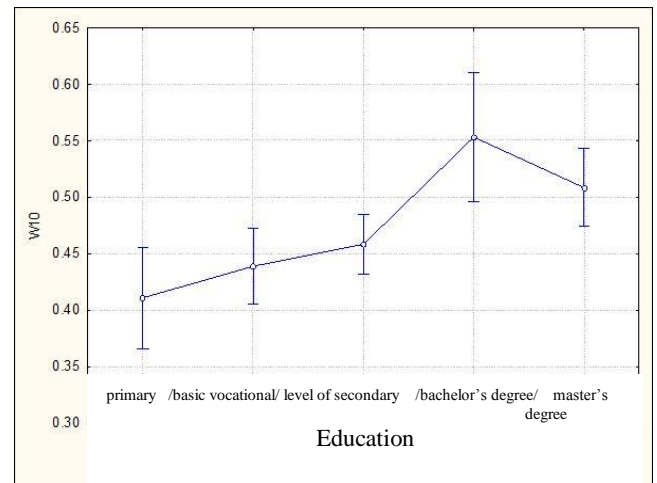


Figure 3. The opinion on IT system (W10) and the patients' education

The participating patient with primary and vocational education were the least interested in the use of e-Health tools in healthcare. The higher their education, the higher the patients' expectations towards the W10 issue were (Figure 3).

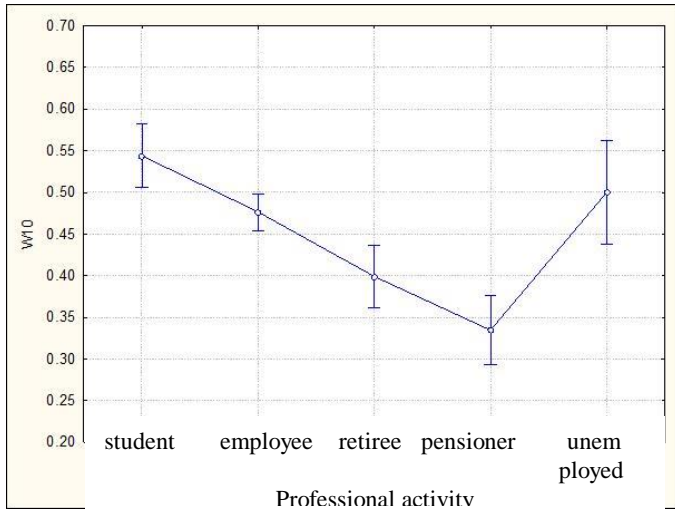


Figure 4. The opinion on IT system (W10) and professional activity of the patients

The analysis of the professional activity of the patients and their opinion on the IT system in healthcare showed that pensioners and retirees are the groups least interested in IT solutions and e-Health tools in primary healthcare facilities (Figure 4).

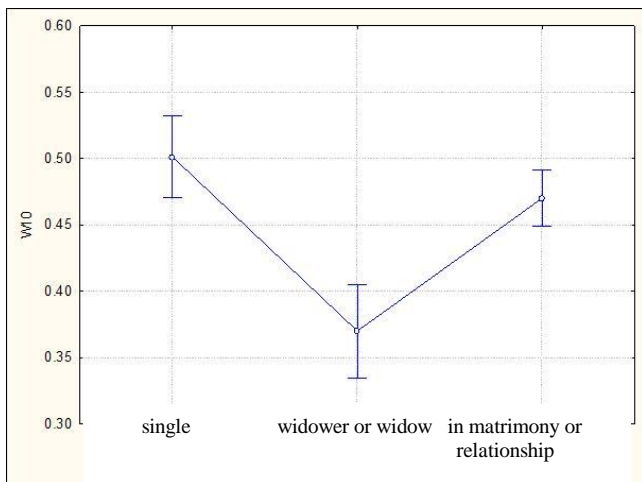


Figure 5. The opinion on IT system (W10) and marital status of the patients

The analysis of the patients' opinion on IT system depending on their marital status showed that widowers and widows are the group least interested in introducing IT solutions to healthcare facilities (Figure 5).

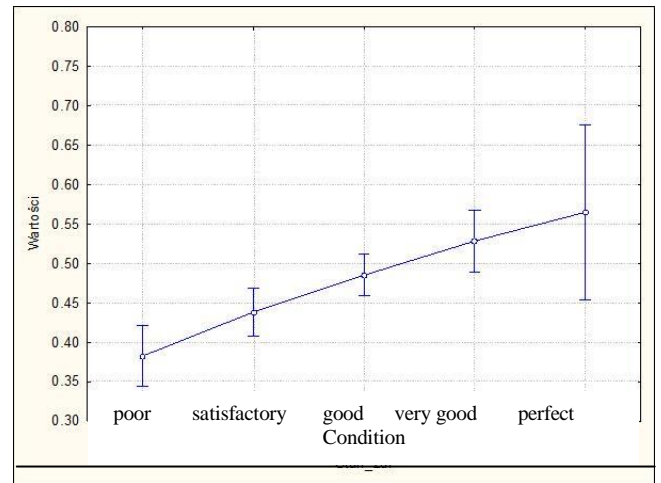


Figure 6. The opinion on IT system (W10) and the condition of the studied patients

The better the condition of a patient was, the higher he or she estimated the value of the IT system in healthcare (Figure 6).

#### IV. DISCUSSION

In Świętokrzyskie province, e-Health initiatives are being implemented, including the development of regional IT infrastructure and the promotion of ICT in specialised healthcare organisations [9]. The project brings into existence the main systematic e-Health tents in specialised institutions excluding primary healthcare facilities.

What has to be emphasised is that primary healthcare institutions are the first point of a patient's contact with health care. As Pędziński noted, "the lack of computerisation of primary healthcare is dangerous because in every well-developed country, primary healthcare physicians are the first and most frequent point of contact with healthcare system. What is also problematic is the fact that primary healthcare service providers were overlooked in the distribution of funds and they are underrepresented on the beneficiary lists of EU funding programmes" [10].

The study was conducted in public and non-public primary healthcare institutions. All of the institutions participating in the study are located in the Świętokrzyskie province. The authors observed that the

IT systems implemented at the studied institutions have no patient-oriented modules and are based on internal modules supporting only accounting, human resources or National Health Service administration.

According to Furtak et al., the use of new technologies related to e-Health, such as tools and solutions including medical information networks, patient databases, medical websites and telemedical service [7], may be an effective way to satisfy patients' needs.

The studied patients indicated that the possibility of scheduling a visit in primary healthcare facilities online would allow them to make appointments at a time convenient for them. Patients and doctors might ask to what extent the implementation and development of e-Health systems is vital. The system discussed here involves governments and non-governmental organisations for both economic and praxeological reasons. The solution presented means a decrease in healthcare costs and an increase in its effectiveness [11,12].

## V. CONCLUSIONS

1. The participating patients expect e-Health tools to be introduced in primary healthcare facilities in the form of a standardised IT system or the application of telemedicine in treatment.
2. The studied patients aged 65 or more as well as widows and widowers who considered their health as poor see no advantage in e-Health solutions.
3. The directors and managers of primary healthcare facilities should put e-Health information related to proposed solutions on display at the premises. Such actions may contribute to patients' increased awareness of new technological solutions related to healthcare.

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