Assessment of the use of information technologies among patients with bronchial asthma and chronic obstructive pulmonary disease

Ocena wykorzystania technologii informacyjnych wśród pacjentów z astmą oskrzelową i przewlekłą obturacyjną chorobą płuc

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Pielęgniarstwo i Zdrowie Publiczne, ISSN 2082-9876 (print), ISSN 2451-1870 (online) *Piel Zdr Publ.* 2018;8(4):229–235

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Funding sources
This study was supported with the resources of the statutory project of Jagiellonian University Medical College, Kraków, Poland, No. K/ZDS/006112.

Conflict of interest
None declared

Acknowledgments
The authors acknowledge the assistance of the Kraków chapter of the Polish Society for Fighting Allergic Diseases in the process of the selection of respondents and distribution of questionnaires.

Received on November 22, 2017
Reviewed on January 12, 2018
Accepted on March 8, 2018

Cite as
Tubek A, Woźniak D, Duplaga M. Assessment of the use of information technologies among patients with bronchial asthma and chronic obstructive pulmonary disease. *Piel Zdr Publ.* 2018;8(4):229–235. doi:10.17219/pzp/86411

DOI
10.17219/pzp/86411

Abstract

Background. The Internet is commonly used for health-related purposes. For many patients, it is one of the most important sources of health information. Ability to use Internet resources is associated with the increasing role of active patient participation in the process of treatment and care. Correct identification, understanding and assessment of health-related information available on the internet may have an impact on patients' health and the quality of their interactions with healthcare professionals.

Objectives. The objective of this study was an assessment of the use of the Internet to search for health information by patients with bronchial asthma (BA) and chronic obstructive pulmonary disease (COPD).

Material and methods. The study was performed using a diagnostic survey based on a questionnaire addressing the burden of chronic disease, the use of information and communication technology (ICT), the use of the Internet for health purposes, and the assessment of the implementation of e-health services. Questionnaires were sent via post office to 1000 participants of training courses organized by the Kraków chapter of the Polish Society for Fighting Allergic Diseases.

Results. A total of 95 respondents sent back completed questionnaires. An analysis was performed only on the data obtained from the questionnaires of respondents who suffered from BA or COPD. Computer use was declared by 82.1% and use of the Internet by 90.6% of the participants. Age influenced the use of the computer ($p = 0.009$) and unaided use of the Internet ($p = 0.017$). For 50.9% of respondents, the Internet was one of the main sources of health information. The average level of e-health literacy (the eHealth Literacy Scale – eHEALS) was 28.74 ±6.17.

Conclusions. The Internet is one of the major sources of health information for patients with chronic respiratory diseases.

Key words: chronic diseases, Internet, e-health, e-health literacy

Streszczenie

Wprowadzenie. Posługiwanie się Internetem ma obecnie bardzo duże znaczenie w kontekście zdrowotnym. Dla wielu pacjentów jest to jedno z bardziej istotnych źródeł informacji dotyczących zdrowia. Zdolność korzystania z zasobów Internetu wiąże się ze zwiększeniem roli pacjenta w procesie leczenia i opieki. Prawidłowa identyfikacja, zrozumienie i ocena informacji na temat zdrowia dostępnych w Internecie może mieć wpływ na stan zdrowia pacjentów i jakość ich interakcji z pracownikami opieki zdrowotnej.

Cel pracy. Celem pracy była ocena wykorzystania Internetu do poszukiwania informacji medycznych przez pacjentów z astmą oskrzelową (AO) i przewlekłą obturacyjną chorobą płuc (POChP).

Materiał i metody. W pracy zastosowano metodę sondażu diagnostycznego. Narzędziem badawczym był kwestionariusz dotyczący obciążeń wynikających z przewlekłej choroby, korzystania z technologii informacyjno-komunikacyjnych (TIK), korzystania z Internetu w kontekście zdrowotnym oraz oceny wdrażania usług e-zdrowotnych. Kwestionariusz rozesłano pocztą do 1000 uczestników szkoleń organizowanych przez krakowski oddział Polskiego Towarzystwa Zwalczania Chorób Alergicznych.

Wyniki. Spośród 95 respondentów, którzy odesłali wypełnione ankiety, wyodrębniono grupę chorych na AO lub POChP. Korzystanie z komputera zadeklarowało 82,1%, a z Internetu 90,6% uczestników badania. Wiek miał wpływ na używanie komputera ($p = 0{,}009$) oraz samodzielne korzystanie z Internetu ($p = 0{,}017$). Dla 50,9% respondentów Internet był jednym z głównych źródeł informacji o zdrowiu. Średni poziom kompetencji e-zdrowotnych (skala eHEALS – eHealth Literacy Scale) wynosił 28,74 ±6,17.

Wnioski. Internet jest jednym z głównych źródeł informacji dotyczących zdrowia dla pacjentów z przewlekłymi chorobami układu oddechowego.

Słowa kluczowe: choroby przewlekłe, Internet, e-zdrowie, kompetencje e-zdrowotne

Background

Use of the Internet has become an integral part of the daily routines of a considerable part of the world population. Estimations indicate that in August 2017, 26.4 million Poles were Internet users.[1] Unlimited access to information has made the Internet one of the most important sources of health information. Nowadays, the Internet is not only a source of information but also an environment for providing e-health services.[2,3] Additionally, the Internet is now an attractive platform of communication for patients using it for obtaining and offering support and exchanging experiences.[4]

The Internet allows for access to extensive resources of health information; therefore, it may support patients with chronic diseases in disease management on a daily basis. Chronic diseases, including bronchial asthma (BA) and chronic obstructive pulmonary disease (COPD), cause a great burden for modern healthcare systems. Both BA and COPD require regular contact with healthcare providers and influence the everyday life of patients.[5] It is also clear that chronic patients usually require some type of monitoring of their symptoms. The solutions provided by the e-health domain may be particularly useful in supporting them in this challenge.

Undoubtedly, the importance of the Internet in accessing health-related information is growing. The ability to use Internet-based health resources is related to general patient empowerment and to an increasing role of active patient participation in the care process. Empowered patients take responsibility for their health and assume an active attitude in relations with healthcare providers.[6,7] It should be noted that information available on the Internet, particularly that related to medical issues, is frequently unreliable or may be improperly interpreted by an unprepared audience. Potentially, access to such information may lead to unfavorable health consequences. One should also remember that the enormous amount of health information available on the Internet may be overwhelming for unprepared users. The ability to use the health resources available online has become an important element of health literacy.[8,9]

E-health literacy or digital health literacy are skills and abilities necessary to search, select and use online health information.[10,11] It has been shown that e-health literacy may impact the health status and the quality of interactions with healthcare providers among patients.[12] High e-health literacy is associated with improved identification, understanding and assessment of the health information available on the Internet.[13]

The main objective of this study was an assessment of the use of the Internet in the search for health information by patients with BA and COPD. Additionally, the ability to use online health resources was evaluated.

Material and methods

The diagnostic survey was based on a questionnaire consisting of 49 items. The questionnaire explored 5 domains: the burden of chronic illness, the use of information and communication technology (ICT), the use of the Internet for health purposes, the attitude to the implementation of e-health services, and metrics.

In this paper, the responses to the items inquiring about the use of ICT and e-health literacy were analyzed.

The eHealth Literacy Scale (eHEALS) is used to assess the ability to use ICT for health purposes. The scale was proposed by Norman and Skinner on the basis of their e-health literacy model. The e-health literacy model consists of 6 components: traditional literacy, information literacy, media literacy, health literacy, computer literacy, and scientific literacy. All 6 types of literacy create the basic skills needed to effectively use e-health resources. The eHEALS is a general assessment of the ability to use e-health services, including the use of electronic health information for addressing health problems. It consists of 8 items inquiring about opinions and experiences related to using Internet health resources. The responses to the items included in the eHEALS are based on a 5-point Likert scale (from "strongly disagree" to "strongly agree" with a neutral response in the middle position).[11,14]

Questionnaires were sent via post office to 1000 potential respondents between November and December 2012. The invitation to join the survey was distributed to patients suffering from allergic and respiratory diseases who had taken part in training organized by the Kraków chapter of the Polish Society for Fighting Allergic Diseases. The study was approved by the Bioethics Committee at the Jagiellonian University in Kraków, Poland (decision No. KBET/107/b/2011 dated June 30, 2011).

The statistical analysis was carried out with STATISTICA software v. 12.5 PL (StatSoft Inc., Tulsa, USA). In the responses to the items which inquired about opinions, attitudes or frequencies, the response options were converted into values according to the appropriate ordinal scales. The responses to the eHEALS items were transformed as follows: the strong disagreement option was assigned a value of 1 and the strong agreement option – a value of 5. Higher results in the eHEALS indicate higher e-health literacy (total score range: 8–40). eHEALS score was calculated only for the Internet users. Quantitative variables were shown as the number of individual responses (n) and the percentage of all valid responses (%), without taking into account missing data. In the case of contingency tables with expected values violating the assumptions of a χ^2 test, the response options were pooled together. The initial 5 categories of the "place of residence" variable were collapsed into 2 categories: population centers with <100,000 residents and ≥100,000 residents. The "level of education" variable was transformed from 6 into 2 categories: secondary or lower and higher than secondary. The response options for "the number of persons in the household" were transformed from 6 to 4 categories: 1, 2, 3, or >3 persons. The associations between qualitative variables were analyzed with a χ^2 or Fisher's exact test. The level of statistical significance was assumed to be 0.05.

Results

Sociodemographic characteristics of the study group

Completed questionnaires were returned by 95 respondents. In this group, there were 62 people afflicted with BA or COPD. After quality control, 57 questionnaires were included in the analysis. Women constituted 70.2% (n = 40) of the respondents. The mean age of the respondents (± standard deviation (*SD*)) was 44.7 ±18.9 years; 40.8 ±17.8 years among women and 53.7 ±18.7 years among men. The sociodemographic characteristics of the respondents are provided in Table 1.

Table 1. Sociodemographic characteristics of patients with BA or COPD

Tabela 1. Charakterystyka społeczno-demograficzna pacjentów z AO lub POChP

Variable	*n*	%
Sex		
women	40	70.2
men	17	29.8
Age		
≤35 years	21	37.5
>35 years	35	62.5
Place of residence		
<100,000 residents	27	47.4
≥100,000 residents	30	52.6
Education		
secondary or lower	30	52.6
higher than secondary	27	47.4
Family status		
unmarried	21	36.8
married	30	52.6
widow/widower	5	8.8
partnership	1	1.8
The number of persons in the household		
1	8	14.0
2	13	22.8
3	13	22.8
>3	23	40.4

The use of ICT

The use of a computer was declared by 82.1% (n = 46) of the respondents. The unassisted use of the Internet was reported by 84.9% (n = 45) and with the help of other people by 5.7% (n = 3) of the respondents. The non-users made up 9.4% (n = 5) of the study group. Duration of Internet use shorter than 2 years was declared by 6.4% (n = 3), 2 to 5 years by 14.9% (n = 7), 5 to 10 years by 42.6% (n = 20), and longer than 10 years by 36.2% (n = 17) of Internet users. Daily use of the Internet was confirmed by 78.7% (n = 37); several times a week but not every day by 14.9% (n = 7); several times a month but not every week by 4.3% (n = 2) and about once a month by 2.1% (n = 1) of the respondents. The respondents most frequently used the Internet at home (78.9%; n = 45) and at work (31.6%; n = 18). Only

17.5% (n = 10) of the respondents were using wireless Internet access.

The reasons for using the Internet are summarized in Table 2. The respondents most often searched for information (77.2%; n = 44) and least frequently participated in discussion forums (10.5%; n = 6).

Table 2. Online activities among patients with BA or COPD

Tabela 2. Aktywności realizowane w Internecie wśród pacjentów z AO lub POChP

Activity type	N = 57	%
Searching for information	44	77.2
Browsing daily news	36	63.2
Electronic banking	35	61.4
Contacting family and friends	32	56.1
Using social media	27	47.4
Entertainment	24	42.1
Searching for job opportunities	10	17.5
Contacting with the authorities	8	14.0
Promoting oneself or own company	7	12.3
Participating in discussion forums	6	10.5

Health-related use of the Internet

The respondents were also asked about the frequency of searches for health information, diseases or treatments on the Internet; 42.6% of them (n = 20) used the Internet for this purpose frequently, 31.9% (n = 15) uncommonly, 12.8% (n = 6) always, and 8.5% (n = 4) rarely. Only 4.3% (n = 2) indicated that they never use the Internet when looking for health information. The majority of respondents declared that they were searching for information about diseases on the Internet. The least popular category of resources sought on the Internet was information about drugs and fighting addictions. The distribution of responses to the item asking about categories of resources used online is shown in Fig. 1. The study also revealed that only 8.5% (n = 4) of the respondents used the Internet to provide advice to other patients with BA and COPD.

Impact of sociodemographic factors on the use of ICT

Age of the respondents had a significant impact on computer use (Fisher's exact test, p = 0.009). Among respondents in the younger age category (≤35 years), 100.0% declared using a computer, and in the category >35 years, this percentage fell to 70.6. Age of the respondents also influenced the percentage of unassisted use of the Internet (Fisher's exact test, p = 0.017) – 100.0% for the respondents ≤35 years and 75.0% for persons >35 years. There was no significant impact of gender, place of residence or education on the use of ICT by the respondents. The results of the analysis of the impact of sociodemographic factors on the use of ICT are provided in Table 3.

E-health literacy

The eHEALS was used to assess e-health literacy. The structure of the answers to these questions is shown in Table 4. The respondents claimed that they were competent at finding useful online health resources – 61.70% (n = 29) for the "agree" answer option and 12.77% (n = 6) for the "strongly agree" option. On the other hand, 25.54% (n = 12) of the respondents said that they did not feel confident using information available on the Internet in making health-related decisions. The average level of e-health literacy (eHEALS score) was 28.74 ±6.17.

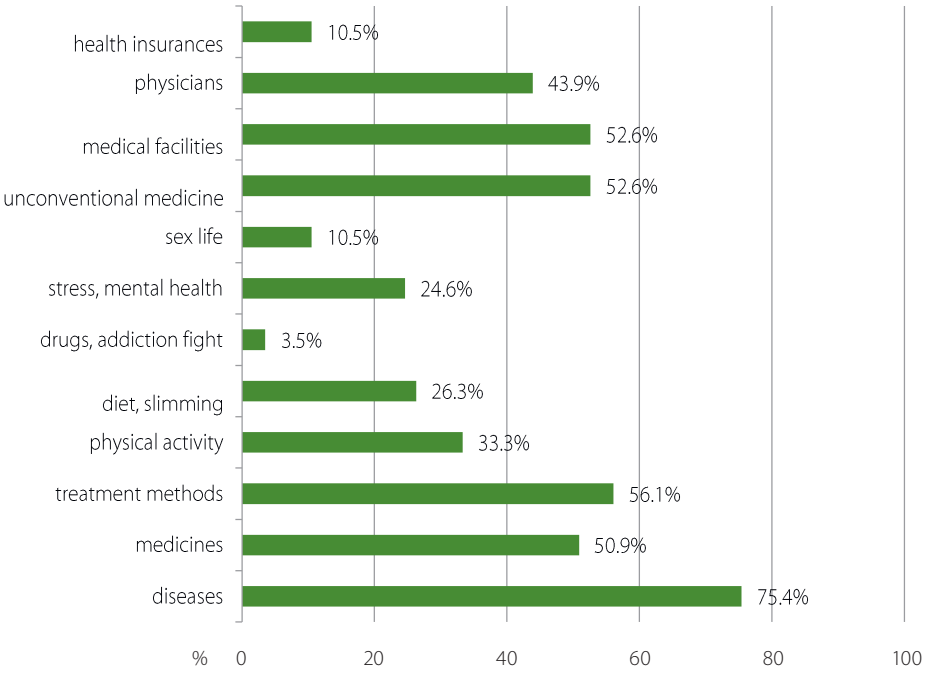

Fig. 1. Type of health-related information sought online by patients with BA or COPD

Ryc. 1. Rodzaj informacji dotyczących zdrowia poszukiwanych w Internecie przez pacjentów z AO lub POChP

Table 3. Use of ICT by patients with BA or COPD depending on sociodemographic factors

Tabela 3. Wykorzystanie technologii informacyjnych przez pacjentów z AO lub POChP w zależności od czynników społeczno-demograficznych

Variable	Using a computer *n* (%)	Unassisted use of the Internet *n* (%)	Daily use of the Internet *n* (%)	The Internet as a source of health information *n* (%)	Frequent searching for information about health online *n* (%)
Sex					
*p**	1.00	0.70	0.70	0.84	0.06
women	32 (82.1)	31 (86.1)	25 (75.8)	20 (50.0)	17 (51.5)
men	14 (82.4)	14 (82.4)	12 (85.7)	9 (52.9)	3 (21.4)
Age					
*p**	0.009	0.017	0.31	0.24	0.60
≤35 years	21 (100.0)	20 (100.0)	18 (85.7)	13 (61.9)	10 (47.6)
>35 years	24 (70.6)	24 (75.0)	18 (72.0)	16 (45.7)	10 (40.0)
Place of residence					
*p**	1.00	0.47	0.30	0.23	0.53
<100,000 residents	22 (81.5)	21 (80.8)	19 (86.4)	16 (59.3)	10 (47.6)
≥100,000 residents	24 (82.8)	24 (88.9)	18 (72.0)	13 (43.3)	10 (38.5)
Education					
*p**	0.73	1.00	0.29	0.36	0.64
secondary or lower	23 (79.3)	22 (84.6)	20 (87.0)	17 (56.7)	11 (45.8)
higher than secondary	23 (85.2)	23 (85.2)	17 (70.8)	12 (44.4)	9 (39.1)

* *p* for χ^2 test or Fisher's exact test.

Table 4. Assessment of ability to use online health resources by patients with BA and COPD

Tabela 4. Ocena umiejętności korzystania z internetowych zasobów zdrowotnych przez pacjentów z AO lub POChP

Statement	Strongly disagree *n* (%)	Disagree *n* (%)	Undecided *n* (%)	Agree *n* (%)	Strongly agree *n* (%)
I know what health resources are available on the Internet	2 (4.3)	3 (6.4)	13 (27.7)	24 (51.1)	5 (10.6)
I know where to find helpful health resources on the Internet	2 (4.3)	3 (6.4)	12 (25.5)	25 (53.2)	5 (10.6)
I know how to find helpful health resources on the Internet	1 (2.1)	2 (4.3)	9 (19.2)	29 (61.7)	6 (12.8)
I know how to use the Internet to answer my questions about health	1 (2.1)	3 (6.4)	12 (25.5)	24 (51.1)	7 (14.9)
I know how to use the health information I find on the Internet to help myself	1 (2.1)	6 (12.8)	14 (29.8)	22 (46.8)	4 (8.5)
I have the skills I need to evaluate the health resources I find on the Internet	1 (2.1)	5 (10.6)	11 (23.4)	23 (48.9)	7 (14.9)
I can distinguish high quality health resources from low quality health resources on the Internet	1 (2.1)	5 (10.6)	11 (23.4)	23 (48.9)	7 (14.9)
I feel confident in using information from the Internet while make health-related decisions	2 (4.3)	10 (21.3)	8 (17.0)	24 (51.1)	3 (6.4)

Discussion

Our study found that the vast majority of patients with chronic respiratory diseases use a computer (82.1%) and the Internet (90.6%). In the case of using a computer, this percentage is similar for the entire population. According to Statistics Poland, in 2013 74.7% of Polish households had a computer. In 2016 this percentage has already risen to 80.1%.[15] When it comes to using the Internet, the percentage of users is much higher than in the whole population. According to the Public Opinion Research Center, in 2013 Internet access was declared by 60% and in 2016 by 65% of adult respondents in Poland.[16]

In our study, the Internet has been identified as one of the main sources of health information by 50.9% of respondents. The popularity of using the Internet in the context of health has been evidenced by numerous studies. In a study published in 2007, the percentage of people using the Internet in search of health information for 7 European countries, including Poland, was 44%. This rate for Poland was 42%. It is worth mentioning that among the Internet users in that study, those using it for health-related purposes constituted 71% of the population studied.[17] A study performed by Ulatowska-Szostak et al. in 2008 in Poland revealed that more than half of Internet users considered the Internet as a primary source of health information. This study also found that for 43.9% of respondents, the Internet was the only source of information about diseases.[18] A study published by Fox et al. in 2013 showed that 73% of Internet users from the USA declared that over the past year they had searched for health information on the Internet.[19]

In our study, patients with BA and COPD most commonly searched for information about diseases (75.4%). Treatment methods were the second most popular category of health-related information sought on the Internet (56.1%). Similar results regarding the types of health information searched for on the Internet can be deduced from a Statistics Poland report from 2015. According to this report, persons using the Internet for health-related purposes most frequently searched for health information (38.9%), including information on diseases and their treatment.[20] In turn, the results of Polish Internet Research from 2012 showed that the Internet is the first source of information for 43% of Internet users when experiencing health problems.[21]

Some studies have reported that the Internet is not a popular tool for accessing health-related information. For example, López-Gómez et al. demonstrated that a majority (73%) of cancer patients did not use the Internet to seek health information. However, in this group, 20% of persons did not have a computer.[22]

As the Internet is often the first source when searching for health-related information, even before contacting a physician or other healthcare professional, e-health competencies become more and more important. We found that the average level of e-health literacy of patients with chronic respiratory diseases is 28.74. Congruous findings have been reported by other authors. Richtering et al. assessed e-health literacy in subjects with moderate to high cardiovascular risk. The average level of e-health literacy was 27.1 in this group.[23] According to Hogan et al., the level of e-health literacy among veterans who suffered from spinal cord injuries and their consequences was 27.3.[24]

In this study, the highest level of uncertainty was found for the item asking about confidence related to the use of online information in making health-related decisions. However, the respondents were convinced that they are able to find helpful health resources on the Internet.[24] The findings from our study follow the same pattern of self-assessment of competencies. The results of the study performed by Tennant el al. showed that the average level of e-health literacy among baby boomers and older adults was 29.1. As in the previous study, respondents made similar declaration about their competencies. They felt quite confident about their ability to find helpful resources on the Internet, yet they were less confident about their ability to use information from the Internet to make health-related decisions.[25]

Conclusions

The study showed that the vast majority of patients suffering from BA and COPD used a computer and the Internet on their own on a daily basis. Among the sociodemographic factors, only age of the respondents had a significant impact on the use of ICT. Older patients used a computer and the Internet less frequently than younger groups. The Internet was one of the main sources of health information for most of the chronic patients. Most of them were looking for information about the diseases they were suffering from. These findings prove that the Internet plays a significant role in accessing health-related information among chronically ill patients. It seems that this effect is related to a trend toward patient empowerment and developing partnership relations between patients and healthcare professionals. Commonly, patients access information about their diseases and available treatment modes, but also undertake other activities on the Internet. Under such circumstances, the ability to assess the reliability of Internet health-related sources remains of key importance for patients and all citizens. It is obvious now that e-health literacy is inherently associated with health literacy and both areas of competency should be developed among patients in parallel. This statement is also supported by the results of our study. Most respondents were able to find useful health resources online; however, some of them declared a lack of confidence in using information available on the Internet in making health-related decisions.

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