

Original article

Attitude of healthcare workers towards information technology

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Summary

Introduction. Digital literacy includes things like being able to use information systems and supporting infrastructure. With the increasing use of technology in healthcare, it is important for healthcare staff to be digitally literate. The aim of the paper is to determine the attitudes of primary and secondary health care workers towards the use of computers in health care and to examine the influence of sociodemographic factors on the information literacy of health care workers.

Methods. The research was conducted according to the principle of a cross-sectional study. The research included 80 respondents, healthcare workers. Data analysis included methods of descriptive and inferential statistics. The data will be presented in the form of a table.

Results. The results showed that certain socio-demographic factors influenced the attitude of health workers towards the use of computers. The most significant factors were the level of education and previous IT education, but the time the respondents spent working on the computer and whether they used the computer exclusively at work or at home also had an impact.

Conclusion. Healthcare workers showed a positive attitude towards the use of computers in healthcare. The most significant socio-demographic factors influencing knowledge of computer work are the level of education of the respondents and whether and where they received their education in information technology.

Keywords: digital literacy, attitudes and factors towards information technology, information technology education in healthcare

Introduction

Digital literacy is defined as the ability to use technology to participate and contribute to contemporary social, cultural and political life. This includes things like the ability to use an information system (IS) and supporting infrastructure, typing and keyboarding skills, and the ability to use a mouse [1].

The level of digital literacy affects staff engagement in IS, with poor computer literacy and low computer experience identified as influencing attitudes towards IS and information and

communication technologies (ICT), thus being one of the main barriers to Electronic health records (HER) adoption. It has been also found that for EHRs to have a positive impact on patient safety, clinicians must be able to effectively use these systems when they become available. Therefore, given the increasing use of technology in health care, it is important for health care staff to be digitally literate [1].

Also, it was determined that bad attitudes towards information systems had a negative impact on staff engagement in IS, along with poor staff involvement and use of IS. They also affected the safety and quality of patient care. Doctors, nurses, social workers, dietitians, ward staff and patients have positive attitudes towards IS. The information system helps healthcare professionals to do their jobs, improve safety and quality patient care, avoid duplication, increase ease of access, help make quick decisions and increase efficiency. However, some healthcare professionals identify frustrations with IS, with healthcare staff disagreeing that the information system improves patient care and does not increase efficiency, and some healthcare professionals report that it is technically difficult and time-consuming [1].

The aim of the work is to determine the attitudes of health workers (members of health care teams) of primary and secondary health care towards the use of computers in health care and to examine the influence of sociodemographic factors on the information technology (IT) literacy of health workers.

Method

The research was conducted according to the principle of a cross-sectional study. The research was conducted in the area of the municipality of Foča, at the University Hospital Foča and the Health Center Foča during 2022.

The research included 80 respondents, healthcare workers members of healthcare

teams. One part of the respondents, were medical workers 39 respondents (health workers) from the Health Center and 41 from the University Hospital Foča.

The basic criteria for inclusion in the study were that the respondents were health workers employed at one of the mentioned health institutions (Health Center Foča, University Hospital Foča) as the member of the health team, and that they agreed to participate in the study. The main criterion for exclusion from the study was the respondent's refusal to participate in the research.

The research was done on the basis of well-founded theories including written and oral research data that the respondents took by conducting a survey, i.e. by solving the appropriate questionnaires. The research used a general questionnaire on the basic sociodemographic characteristics of the respondents, the questionnaire on information literacy (knowledge of working with the computer and computer technology) and a scale for assessing attitudes towards computers in health care, version 3, for which we received the author's consent.

Statistical data processing was performed using the statistical software package SPSS. Data analysis included methods of descriptive and inferential statistics. Numerical characteristics were presented through mean values (arithmetic mean, median) and measures of variability (standard deviation), and attribute characteristics using frequencies and percentages. To compare means for two different groups, the χ^2 test was used for attributive characteristics, Student's t-test for numerical characteristics, and one-way analysis of variance (ANOVA) for comparison of three or more groups. Cronbach's alpha (α) reliability coefficient was used to analyze the reliability of the questionnaire. Values of significance level $p < 0.05$ were considered statistically significant. The results are shown in the table.

Results

The results of the conducted research were obtained on the basis of predetermined goals and the described methodology and were grouped into several parts: socio-demographic characteristics of respondents, knowledge of computer technology of health workers employed in primary and secondary health care, knowledge of working on the computer of health workers employed in primary and secondary health care, attitudes of healthcare workers (members of healthcare teams) from primary and secondary healthcare towards the use of computers in healthcare.

Eighty healthcare workers participated in the research, of which 41 respondents were employed at the University Hospital Foča, and 39 respondents were employed at the Health Center Foča. The largest number of respondents in the age category was younger than 31–30 of them; there were 27 people in the 31–41 age category, while there were 23 respondents in the over 41 age category. More women than men participated in the research. Half of the respondents had a secondary vocational education - 40 of them; 13 persons had a college professional qualification, and 27 persons had a higher professional qualification. Almost half of the respondents have less than 10 years of work experience.

The largest number of research participants acquired IT education during school, and a certain number did so independently or in the company where they worked. Less than 10% of respondents stated that they had no IT education at all.

Respondents most often used computers at work and at home; respondents using the computer exclusively at work or not using it at all were also registered. In terms of daily time spent on the computer, respondents using the computer less than one hour a day, respondents using the computer 1–3 hours a day and those using the computer more than three hours a day were relatively evenly represent-

ed. Respondents used the computer most often for business purposes, and the least for educational and entertainment purposes.

The attitudes of healthcare workers (from primary and secondary healthcare) towards the use of computers in healthcare were analyzed by statistical processing of the data obtained by filling out the questionnaire - Assessment scale Pretest for attitudes towards computers in healthcare (PATCH) version 3. Based on the results of the questionnaire and the number of points, healthcare workers were classified into one of six groups (Table 1).

The mean value of the score was 57.7, and the standard deviation was 16.5.

The largest number of respondents belonged to group III (28.7%) and group IV (42.5%), meaning that the majority of respondents (71.2%) had the positive attitude towards the use of computers and information technologies in the health system and communication. A smaller number of respondents (N=4) felt uncomfortable when using computers, and three cases of cyberphobia were registered. Confidence in their ability to use a computer in different situations was expressed by 20% of respondents, while no respondent fall into VI category (Table 1).

The values of the results of the PATCH scale in relation to the characteristics of the subjects are shown in table 2.

There was no statistically significant difference between male and female subjects in relation to the average PATCH score values ($t=0.395$, $df=78$, $p=0.694$).

Also, there was no statistically significant difference in relation to the values of the PATCH scale score ($H=0.218$, $df=2$, $p=0.897$) between the different age categories of the respondents.

In relation to the level of education, there was the statistically significant difference according to the medians of the total score of the PATCH questionnaire ($H=22.451$, $df=2$, $p\leq 0.001$). There was the statistically significant difference between higher professional

education and secondary and higher vocational-college education. Respondents with a university degree significantly more often had the positive attitude towards the use of computers in healthcare.

Table 1. Distribution of healthcare workers in relation to the average values of the PATCH scale

Points and groups	Interpretation	N	%
1–17 Group I	Positive finding of cyberphobia. Entry level knowledge of computer basics or computer applications. They may show ambivalence or anxiety about the use of computers in health care. Requires assistance in mastering basic computer skills.	3	3.8
18–34 Group II	It indicates discomfort when using the computer. Very basic knowledge of computer basics and its applications. Uncertainty about the usefulness of computers in healthcare.	4	5.0
35–52 Group III	Moderate comfort when using the computer. Basic knowledge about computers and their application. Limited awareness of the application of computer technology in healthcare.	23	28.7
53–69 Group IV	They feel comfortable using user computer applications. Awareness of the usefulness of computers in various situations. They have a realistic view of current computer capabilities in healthcare.	34	42.5
70–86 Group V	Confident in their ability to use computers in different situations. They see computers as a useful tool in the development of society. Enthusiastic about the use of computers in healthcare.	16	20
87–100 Group VI	Very confident that they can learn to use the computer to develop creativity, but also to perform routine tasks. They recognize the unique value of using information technologies in society. Idealistic positive opinion about the use of computers in healthcare.	0	0

Between respondents employed in primary health care (Health Center Foča) and those employed in secondary health care (University Hospital Foča) there was no statistically significant difference in relation to the values of the PATCH scale score ($U=732.5$, $p=0.519$).

In relation to years of work experience, there was no statistically significant difference according to the total score of the PATCH scale ($H=5.385$, $df=2$, $p=0.068$).

There was the statistically significant difference between respondents having IT education (mean value = 61) and those not having it (mean value = 46.5) in relation to the values of the PATCH scale ($U=92.00$, $Z= -2.785$, $p=0.005$). Respondents who received the education in information technology significantly more often had the positive attitude towards the use of computers in healthcare.

In relation to whether the respondents use the computer “at home”, “at work” or “at work and at home”, there was the statistically significant difference according to the average values of the total score of the PATCH scale ($F=6.397$, $df=2$, $p=0.003$). Post hoc analysis showed that there was the difference between the mean values of the PATCH scale total score in respondents using computers “at work” and respondents using computers “at work and at home”, with the latter category being significantly more frequent, expressing the positive attitude towards the use of computers in healthcare. (To examine this attitude, we excluded five respondents, who answered that they did not use the computer.)

In relation to the length of computer use per day, there was the statistically significant difference regarding the total score of the

PATCH scale ($H=17.976$, $df=2$, $p\leq 0.001$). There was the difference in the mean total score of the PATCH scale of subjects using the computer less than one hour a day compared to subjects using the computer from one to three hours or more than three hours a day. Respondents using the computer less than one hour a day had lower results on the PATCH scale (Table 2).

Table 2. Score values of the PATCH scale in relation to the characteristics of the respondents

Variable	N	%	$\bar{X}\pm SD/\text{Med (min, max) score}$	valuation test	p valuation
Sex					
male	32	40.0	58.63±17.05	t=0.395	p=0.694
female	48	60.0	57.14±16.19		
Age					
<31	30	37.5	60.25 (46.5, 82)	H=0.218	p=0.897
31–43	27	33.8	57.5 (6, 84)		
>43	23	28.7	60 (13.84)		
Level of education					
Secondary education	40	50.0	52.25 (6, 77.5)	H=22.451	p≤0.001
College education	13	16.3	61 (35, 77)		
Higher professional education	27	33.8	68.5 (46.5, 84)		
The institution where the respondent is employed					
Health center	39	48.8	60 (25, 84)	U=732.5	p=0.519
University Hospital	41	51.2	58 (6, 83.5)		
Work experience					
<10 years	38	47.5	62.5 (21.5, 83.5)	H=5.385	p=0.068
10–21 years	23	28.7	60 (46.5, 84)		
>21 years	19	23.8	49.5 (6.84)		
Computer education					
Yes	73	91.3	61 (13, 84)	U=92.0	p=0.005
no	7	8.7	46.5 (6, 60)		
Place of computer use					
At work	32	31.3	50 (6, 81)	H=17.976	p≤0.001
At home	3	38.8	60.5 (25, 83.5)		
At work and at home	41	30.0	68 (49.5, 84)		
Computer use (daily)					
<1 hour	25	31.3	50 (6, 81)	H=17.976	p≤0.001
1–3 hours	31	38.8	60.5 (25, 83.5)		
>3 hours	24	30.0	68 (49.5, 84)		

Discussion

Knowledge of computer technologies and skills, as well as the positive attitude towards the use of information technologies in the healthcare system, are prerequisites for adequate communication between team members and between teams. Acceptance of technological innovations is one of the basic factors for the improvement and reform of the health system. Our research, conducted on the sample of 80 respondents, members of health teams within primary and secondary health care, aimed to determine their attitude towards the use of computers and information technologies in the health system.

Our research showed that, from the aspect of knowledge of computer technologies, half of the respondents had satisfactory knowledge. Most of the respondents stated that they were capable of connecting, installing and using peripheral devices. Also, half of the respondents stated that they could perform activities including recognizing file formats and converting files from one format to another. The analysis of our results showed that the main sociodemographic factor affecting this ability was the age of the respondents, with younger respondents showing better results compared to older colleagues.

A minority of our respondents indicated that they could locate and download files from different directories on their computer. We found that the most important factor determining this ability was the level of education, whereby respondents with a higher level of education showed better results.

The second part of the questionnaire, which was used to assess information literacy, consisted of questions related to computer work. Respondents answered six questions from different areas of computer skills (textual data processing, creating and presenting slides, numerical data processing, digital photo processing, connecting to the Internet and using a search engine, and working with e-mail).

Based on the achieved results, the knowledge of the respondents was characterized as insufficient, below average, average, very good and excellent. The analysis of the influence of sociodemographic factors on computer skills among our respondents showed that there was no significant difference between employees in primary and secondary health care. It was also determined that the sex, age of the respondents and years of work experience did not affect knowledge of computer work in any of the researched areas [2, 3].

Our research showed that the most significant socio-demographic factors influencing computer skills were the respondents' level of education and whether and where they received information technology education. Analysis of the impact of the length of work experience on computer literacy showed that there was no significant difference in the level of literacy in relation to the length of clinical experience. These results are consistent with the findings of other researchers.

Our research confirmed that the level of education of healthcare workers, as well as previously acquired formal IT education, affected the level of IT literacy. This is in line with numerous other studies indicating that people with a higher degree of education and acquired IT education (during schooling) have a higher level of IT literacy compared to people with lower education and those who did not acquire IT education during schooling. It was found that the degree of computer literacy differed significantly in relation to the place and length of computer use. Respondents using the computer both at home and at work showed better results compared to those using the computer exclusively at home. In addition, a correlation was established between the time spent on the computer and knowledge of computer work, whereby respondents spending more time with the computer showed a higher level of computer literacy. This is expected and in accordance with other research on this topic [4, 5, 6].

The development of information technologies has become an indispensable part of the health system and has changed the approach to communication with patients and within the health system itself [7].

We found that there was the correlation between the amount of daily computer use and computer skills achieved. The subjects using the computer for more than three hours a day achieved better results compared to the subjects using the computer for less than one hour a day.

Our research showed that there was no statistically significant difference in information literacy depending on the sex and age of the respondents. However, this result contradicts the findings of Kuo and Gebhardt et al., who concluded that men showed the higher level of computer literacy than women [8, 9].

However, extensive research conducted by Qazi et al. and Hallewell Haslwanter et al. suggests that this issue is complex and that the results are highly dependent on the questions and tasks (what kind of technology and devices are addressed, as well as what skills and programs). Accordingly, our research showed that younger individuals were better able to recognize a file type and convert it to another type [10, 11].

Summers reviewed more than 10 studies on the behavior and anxiety of health care workers towards the use of computers in health care and concluded that the main problems of health care workers were insufficient computer training, fear of losing work or data, and fear of spending more time with the computer instead of with patients. These studies, together with ours, emphasize the importance of revision of educational plans and programs for health workers, as well as their continuing education [12].

It is clear from numerous studies that a positive attitude towards the use of computers in healthcare and the possession of appropriate skills are the basic prerequisites for the application of computers and information technologies in healthcare [13, 14].

According to McBride and Nagle's research, as well as Lee's, promoting a positive attitude towards computer use among healthcare professionals is critical if they are to optimally use computers for education and daily practice. Their subjects completed the standardized questionnaire, the Pretest Assessment Scale for Attitudes toward Computers in Healthcare (PATCH) version 3. Based on the questionnaire results and scores, healthcare professionals were classified into one of six groups, as described in Research Methodology [15].

This research showed that the majority of respondents had the positive attitude towards the use of computers in healthcare. A smaller number of respondents expressed discomfort with using computers, and three cases of cyberphobia were registered. These results indicate that there is a need to additionally point out to healthcare workers the importance and advantages of using computers and information technologies in the healthcare system.

The results showed that certain sociodemographic factors influenced the attitude of healthcare workers towards the use of computers. The most significant factors were the level of education and previous IT education, but the time the respondents spent working on the computer and whether they used the computer exclusively at work or at home also had the impact. From the above, it can be concluded that there is a need to put more emphasis on IT education of the staff during schooling. The results showed that there was no difference between respondents employed in primary and secondary health care regarding the attitude towards the use of computers in health care.

Conclusion

It can be concluded that our healthcare workers have the positive attitude towards IT. Our results showed that there was no difference between respondents employed in primary and secondary health care, and the most significant

socio-demographic factors influencing knowledge of computer work were the level of education of the respondents and whether and where they received information.

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There is the need to pay more attention to IT education of health staff during their education, as well as the need for continuous education of existing staff.

sent was obtained from all individual respondents. The research was conducted according to the Declaration of Helsinki.

Conflicts of interest. The authors declare no conflict of interest.

References:

1. Kuek A, Hakkennes S. Healthcare staff digital literacy levels and their attitudes towards information systems. *Health Informatics J* 2020;26(1):592–612.
2. Kipturgo MK, Kivuti-Bitok LW, Karani AK, Muiva MM. Attitudes of nursing staff towards computerisation: A case of two hospitals in Nairobi, Kenya. *BMC Med Informatics Decis Mak* 2014;14:35.
3. Kaya N. Factors affecting nurses' attitudes toward computers in healthcare. *Comput Inform Nurs* 2011;29(2):121–9.
4. Mirković D, Ćirić E, Simić D. Stavovi medicinskih sestara o upotrebi računara u zdravstvenoj zaštiti i kompjuterska pismenost. *PONS Med C* 2018;15(1):21–7.
5. Czaja SJ, Sharit J. Age differences in attitudes toward computers. *J Gerontol B Psychol Sci Soc Sci* 1998;53(5):P329–40.
6. Rouleau G, Gagnon MP, Côté J, Payne-Gagnon J, Hudson E, Dubois CA. Impact of Information and Communication Technologies on Nursing Care: Results of an Overview of Systematic Reviews. *J Med Internet Res* 2017;19(4):e122.
7. Stevanović Ranko, Pristaš I. Nove informacijsko-komunikacijske tehnologije i komunikacija u medicini i zdravstvu. *Komunikacija i komunikacijske vještine u medicine* 2011;17(92Suppl 1):32–7.
8. Kuo YS. Gender Differences in Computer Literacy among Students in the Computer Introduction Course of the Department of Technology Management, Open University of Kaohsiung. *Education Journal* 2020;3(3):52–71.
9. Gebhardt E, Thomson S, Ainley J, Hillman K. Introduction to Gender Differences in Computer and Information Literacy. In: *Gender Differences in Computer and Information Literacy: An In-depth Analysis of Data from ICILS*; 2019. p. 1–12.
10. Qazi A, Hasan N, Abayomi-Alli O, Hardaker G, Scherer R, Sarker Y, et al. Gender differences in information and communication technology use & skills: a systematic review and meta-analysis. *Educ Inf Technol (Dordr)* 2022;27(3):4225–58.
11. Hallewell Haslwanter JD, Takacs C, Gaisch M. How Age and Gender Affect the Opinions of Computing Students Regarding Computer Usage and Design Needs. *Informatics* 2022;9(3):52.
12. Summers S. Attitudes of nurses toward hospital computerization: brain dominance model for learning. *Proc Annu Symp Comput Appl Med Care* 1990;7:902–5.
13. André B, Inger Ringdal G, Loge JH, Rannestad T, Laerum H, Kaasa S. Experiences with the implementation of computerized tools in health care units: a review article. *Int J Hum Comput Interact* 2008;24(8):753–75.
14. Moody LE, Slocumb E, Berg B, Jackson D. Electronic health records documentation in nursing: nurses' perceptions, attitudes, and preferences. *Comput Inform Nurs* 2004;22(6):337–44.
15. Atay S, Arikan D, Yilmaz F, Aslantürk N, Uzun A. Nursing and midwifery students' attitudes to computer use in healthcare. *Nurs Pract Today* 2014;1(3):147–54.

Odnos zdravstvenih radnika prema informacionim tehnologijama

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Uvod. Digitalna pismenost podrazumeva stvari poput sposobnosti korišćenja informacionog sistema i prateće infrastrukture. Sa sve većom primenom tehnologije u zdravstvu, za osoblje u zdravstvenoj zaštiti je važno da bude digitalno pismeno. Cilj rada je da se utvrde stavovi radnika primarne i sekundarne zdravstvene zaštite prema upotrebi računara u zdravstvu i da se ispita uticaj sociodemografskih faktora na IT pismenost zdravstvenih radnika.

Metode. Istraživanje je sprovedeno prema principu poprečne presečne studije. U studiji je učestvovalo 80 ispitanika, zdravstvenih radnika. Analiza podataka uključuje metode deskriptivne i inferencijalne statistike. Podaci će biti prikazani u tabelarnom obliku.

Rezultati. Rezultati su pokazali da određeni sociodemografski faktori utiču na stav prema korišćenju računara kod zdravstvenih radnika. Najznačajniji faktori bili su nivo obrazovanja i prethodno IT obrazovanje, ali i vreme koje su ispitanici provodili radeći na računaru i da li su računar koristili isključivo na poslu ili i kod kuće.

Zaključak. Zdravstveni radnici su pokazali pozitivan stav prema upotrebi računara u zdravstvu. Najznačajniji sociodemografski faktori koji su uticali na znanje računarskih veština su nivo obrazovanja ispitanika i da li i gde su primili IT obrazovanje.

Ključne reči: digitalna pismenost, stavovi i faktori prema informacionoj tehnologiji, računarsko obrazovanje u zdravstvu