ADHERENCE FACTORS TO PAPERLESS PRIMARY HEALTHCARE: A FOCUS GROUP STUDY

DEJAVNIKI ZA SPREJETJE BREZPAPIRNE OSKRBE V OSNOVNEM ZDRAVSTVU: ŠTUDIJA FOKUSNIH SKUPIN

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Abstract

Background: *Information and communication technology (ICT) and paperless practices have been shown to improve "existing processes in the workplace" "as well as being an important component of modern primary healthcare". The aim of our study was to analyse the attitudes of health-care professionals and patients with regard to paperless practice and the most frequently used information and communication technology tools in Slovenian primary healthcare.*
Methods and participants: *Qualitative methodology using focus groups of 22 primary care physicians, 14 nurses and 18 patients.*
Results: *The areas recognised by all participants as important for further information and communication technology development were: computer-supported decision making, accessibility and completeness of personal e-health data, emergency cases, support for chronic disease management, ICT related time savings, e-prescriptions and e-discharge letters. The most important identified barriers impeding the use of ICT were: the heavy workload of primary care physicians and nurses, health insurance reimbursement rules and duplication of work using both paper and electronic health records.*
Conclusions: *This study highlighted a number of strengths of ICT use in primary care as well as numerous areas where changes in procedures and improvement of ICT tools to support them are needed.*

Key words: information and communication technology, primary health care, focus groups, paperless health care

Izvirni znanstveni članek
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Izvleček

Izhodišča: *Informacijsko-komunikacijska tehnologija (IKT) in brezpapirno delo lahko izboljšata obstoječe delovne procese in so pomembna sestavina sodobnega osnovnega zdravstva. Namen študije je bil analizirati stališča zdravstvenega osebja in pacientov glede brezpapirne ambulante in najpogostejše uporabljene informacijsko-komunikacijske tehnologije v slovenskem osnovnem zdravstvu.*
Metode in preiskovanci: *Kvalitativna metodologija fokusnih skupin z 22 zdravniki iz osnovnega zdravstva, s 14 ambulantnimi sestrami in z 18 bolniki.*
Rezultati: *Področja, ki so jih vsi udeleženci prepoznali kot pomembna za nadaljnji razvoj IKT, so: računalniško podprto odločanje, dostopnost in popolnost osebnih zdravstvenih podatkov, nujni primeri, podpora pri obravnavi kroničnih bolezni, prihranki časa z uporabo IKT, e-recept in e-odpustno pismo. Najpomembnejše ovire za uporabo IKT so: velike delovne obremenitve zdravnikov in sester v osnovnem zdravstvu, pravila zdravstvene zavarovalnice, podvajanje dela z uporabo papirnatih in elektronskih zdravstvenih kartotek.*
Zaključki: *Študija je poudarila številne prednosti uporabe IKT v osnovnem zdravstvu in tudi številna področja, na katerih so potrebni spremembe v procesih in izboljšanje podpornih orodij IKT.*

Ključne besede: informacijsko-komunikacijska tehnologija, primarno zdravstveno varstvo, fokusne skupine, brezpapirna zdravstvena oskrba

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1 BACKGROUND

Information and communication technology (ICT), in particular electronic health records (EHRs), is increasingly viewed as a key means of improving the quality, safety and efficiency of health-care systems (1-6). ICT tools improve access to critically important clinical information, can reduce unnecessary repetitions of clinical procedures and provide real-time decision support to clinicians (5-8). It has been shown that their benefits also include: improved disease management and health outcome of patients, increased levels of preventive care, reduction of paper-based tasks and increased collaboration among members of health-care teams (7-11). ICT, which in medical informatics literature generally has the same meaning as "health information technology" (HIT), also has the potential to decrease medical errors (6, 12, 13).

To successfully implement and use various ICT solutions in providing health-care services, it is important to understand the attitudes, expectations and experiences of different user groups. Implementation of new ICT tools or upgrading existing ones has an impact on the workplace processes of medical staff, requiring significant efforts to be invested into managing this change. New types of medical errors or other detrimental outcomes could also result in reduced support for ICT implementation (4, 10, 13).

Patients' and primary care physicians' opinions concerning existing and upcoming ICT solutions have been sought in a number of studies (4, 5, 7-9, 11, 13-15). These studies have seldom analysed opinions and concerns of primary-care nurses, usually the first point of a patient's contact with the health system (4, 5, 16-19).

Primary care provides almost unlimited access to healthcare and deals with a wide array of health problems across a spectrum of age, sex and other characteristics. This diversity stresses the importance of careful planning and evaluation of ICT when it is implemented (14, 20-26).

There are five ICT providers in Slovenia holding a significant market share of about 1,300 primary care practices. Health authority influence on ICT providers and consequently on improving ICT implementation is still minimal. National legislation regarding ICT is deficient – including a shortage of accepted standards, validation and certification processes. Consequently, adoption of modern ICT tools in primary care in Slovenia has been relatively slow (14, 15, 27). Despite the good quality of the ICT infrastructure, the use of computers and eHealth applications in Slovenian primary care was well below the EU average in 2008. The only exception was the storage of administrative patient data (15). Almost all primary care practices own a computer, but less than a quarter of general practitioners actually used it during a consultation with patients. In the same year, about 83% of GP practices were connected to the internet, but transfer and exchange of electronic patient data in primary care was minor (15, 26).

Despite numerous challenges, foreseen ICT benefits led to substantial interest - particularly from health policymakers - to speed up its adoption. In 2006, the Slovenian government created and promoted the National Strategy for eHealth. The national EHR system was planned to be implemented and accomplished by 2010 (15, 26, 29-31).

The aim of this qualitative study was to identify the ICT expectations and needs of its users, adherence factors and the most important obstacles and opportunities for adoption of paperless primary healthcare in Slovenia. Patients, primary health-care physicians and nursing staff were identified and included in the study as the three most relevant groups of ICT users in family medicine. The study was approved by the Slovenian National Board for Medical Ethics, document no. 80/06/07. The study lasted from June 2006 to May 2010.

2 METHODOLOGY

The methodology of the study used focus groups, and this design was chosen for several reasons (4, 8, 32-36). This method allows ideas to emerge from the group rather than the investigator and helps to identify barriers and incentives as they apply to the aims of the research. We used a sampling method that aimed at strategic selection and distribution of respondents. This ensured the collection of adequate material, which provided in-depth information to explore the research questions (34, 37-40).

We used the following inclusion criteria: 25 - 65 years old, no hearing disorders, absence of serious psychiatric illness and adequate communication skills in the Slovenian language. Homogenous groups were formed according to the profile of participants (physicians, nurses, patients).

Physicians and nurses had to fulfil additional criteria: at least five years of active working experience in primary care and basic knowledge of health information technologies. All nurses had to have at least 20 hours a week in ICT - enabled or "computerised" primary care practices (i.e. active use of ambulatory EHR) during the last three years.

Family physicians were chosen on a regional basis from an urban area with more than 100,000 inhabitants and from three semi-rural areas with less than 25,000 inhabitants.
Primary care nurses were recruited from two mid-sized community health centres (between 50 and 200 employees).
Patients were selected from 10 family medical practices in four different regions. We tried to include a diversity of patients as regards age, sex and educational level.

a) Focus groups, data collection and data analysis

After the introduction of participants and before leading the focus group, a 15-minute presentation of the topic was given by the moderator (general information about existing EHRs and paperless work in primary care practices).
The list of seven frame-setting questions, the same for all focus groups, is represented in Table 1. The questions were formed according to data from the literature (1, 4-8, 11, 13, 16-19, 29-33).
Each focus group lasted from 70 to 90 minutes. The moderator and the observer, who took notes in addition to audio-recordings, were present at all group interviews and discussed key topics that arose from conversations immediately after each session.

Table 1. *Main Questions for all Focus Groups.*
Tabela 1. *Glavna vprašanja za vse fokusne skupine.*

ICT experience and current HIT usage/ Izkušnje z IKT in trenutna uporaba IT v zdravstvu	What is your previous experience with computers, internet and other ICT tools?/ Kakšne so vaše predhodne izkušnje z računalniki, internetom in drugimi orodji IKT?
	What is your view on the current state of ICT use in Slovene primary healthcare? / Kaj menite o trenutnem stanju uporabe IKT v osnovnem zdravstvu v Sloveniji?
Internet and eHealth services/ Internet in e-storitve v zdravstvu	What are your attitudes towards the use of: internet health portals, e-prescription, e-appointment, e-referral, etc.?/ Kakšen je vaš odnos do uporabe: spletnih zdravstvenih portalov, e-receptov, e-naročanja, e-napotnic itn.?
	What is your view on e-consultation with primary care physicians, clinical specialists and other health-care professionals?/ Kaj menite o e-svetovanju splošnih zdravnikov, kliničnih specialistov ali drugih zdravstvenih delavcev?
Electronic health records/ Elektronski zdravstveni zapisi	What do you think about existing EHRs and the possible influence of ICT tools on primary health-care professionals' work?/ Kaj menite o obstoječih elektronskih zdravstvenih zapisih in možnih vplivih orodij IKT na delo zdravstvenih delavcev v osnovnem zdravstvu?
	What is your view on electronic personal health records and on accessing EHR online?/ Kakšno je vaše mnenje o elektronskih osebnih zdravstvenih zapisih in o spletnem dostopu elektronskih zdravstvenih zapisov?
Computer decision-making support/ Računalniška podpora procesu odločanja	What is your view on computerised follow-up of the most common chronic diseases and the use of ICT-based decision-making support tools in primary care?/ Kaj menite o računalniško podprti nadaljnji obravnavi najbolj razširjenih kroničnih bolezni in uporabi IKT orodij za računalniško podporo procesu odločanja v osnovnem zdravstvu?

Analysis of the transcribed texts from the focus groups, including the open coding and axial coding processes, was carried out using established standards for qualitative research and according to accepted study guidelines. The authors classified the cited statements by taking into account the connotation of the particular code as it applied to the corresponding theme (37-42). "Quantifying" of qualitative data was derived by counting citations by topics and categories and evaluating them as positive, neutral or negative. Each citation was assessed by two researchers. If the assessments were different, a third researcher was consulted. The results of the analysis were harmonised at meetings organised between researchers RI, MM, DP and TPS.

The most experienced researcher in qualitative analysis (MK) monitored the progress of the study, supervised the methodological accuracy and regularity of focus group analysis and took part in the final revision.

Internal validity of the study was assured by using the triangulation of participants, sources and researchers. Credibility was assessed by regular team debriefings and re-examinations of coding discrepancies (33, 40, 43, 44).

3 RESULTS

We invited 78 physicians, 36 nurses and 48 patients into the study. Seven focus groups with a total of 54 participants in three different Slovenian regions were held.

Each group had six to nine members. Participants' demographic characteristics are represented in Table 2. One of three physician groups consisted of those who had three years or more of active use of electronic health records during office consultation. Two physicians' groups were mixed and including physicians without any experiences in EHR usage.

Two primary care nurse focus groups were conducted. They were gender homogeneous. The first patient group consisted of participants 25 - 45 years of age and the second consisted of participants 45 - 65 years of age. The purpose of placing patients into two age groups was to encourage their active involvement and mutual interaction during sessions.

Table 2. *Characteristics of focus group participants.*
Tabela 2. *Značilnosti udeležencev fokusnih skupin.*

Participant demographics/ Demografija udeležencev	Physicians (σ)/ Zdravniki (σ)	Nurses (σ)/ Medicinske sestre (σ)	Patients (σ)/ Pacienti (σ)	Total (σ)/ Skupaj (σ)
Male/ Moški	7	/	8	15
Female/ Ženske	15	14	10	39
Age/Starost	46.4 (6.1)	43.1 (5.9)	48.7 (12,7)	46.3 (8.9)
Years of internet use/ Leta uporabe interneta	9.1 (3.7)	6.4 (3.0)	4.3 (4.11)	6.8 (4.1)
Primary school or less/ Osnova šola ali manj	/	/	4	4
Secondary school/ Srednja šola	/	10	8	18
Graduate degree/ Visoka dodiplomska izobrazba	2	4	4	10
Postgraduate degree/ Visoka podiplomska izobrazba	20	/	2	22

Legend: σ = standard deviation
Legenda: σ = standardni odklon

20 of 22 physicians were general practitioners/ family doctors; the other two were a paediatrician and a gynaecologist. Among nurses, 10 were from family practices, two from paediatrics and two from gynaecology practices. Practice characteristics are represented in Table 3.

Table 3. *Practice characteristics.*
Tabela 3. *Značilnosti ambulant.*

Practice/ Praksa	Physicians (σ)/ Zdravniki (σ)	Nurses (σ)/ Medicinske sestre (σ)	Total (σ)/ Skupaj (σ)
Average number of registered patients/ Povprečno število registriranih pacientov	1,730 (340.3)	1,240 (476.6)	1,539 (460)
Years of work in primary care/ Delo v osnovnem zdravstvu v letih	17.4 (7.6)	16.7 (7.6)	17.1 (7.5)
Years of EHR use/ Uporaba elektronskih zdravstvenih zapisov v letih	6.4 (3.0)	10.2 (2.5)	8.3
Primary health-care centres/ Zavodi osnovne zdravstvene dejavnosti	18	12	30
Individual contractors/ Zasebni izvajalci	4	2	6

The total numbers of all appraised citations was 1,010, and they were classified into 66 themes and 25 subthemes. Citations were determined and classified by performing a combination of the open coding and the axial coding processes, described in the methodology section of this article. Finally, themes were grouped in 7 categories through the process of constant comparison until saturation was reached. The most cited categories identified through subsequent content analysis were: "User expectations regarding ICT" (n= 168) and "Electronic vs. paper health records" (n=167). The least cited categories were: "ICT influence on practice workflow" (n=116) and "e-consultation" (n=118). The most cited themes/subthemes determined through content analysis were: "e- appointment, e-referral letter" (n=25), "Phone consultation in primary care" (n=25) and "Health insurance reimbursement rules" (n= 23). The least cited themes were: "Experience with new EHR" (n=2) and "Patient education" (n=2). Defined categories with the most typical themes and citations are represented below.

Category: "Health-care system"

The majority of negative comments were related to the themes: "Health Insurance Institute rules" (n = 17) and the "Health insurance electronic card" (n = 11). Nurses were the most critical subset of participants in both cases. The following quotations were typical of the category "Health-care system":

Theme: Primary care office organisation. Subthemes: "ICT equipment", "Administrative tasks in primary care offices", "Number of consultations".

- MD: "I have a feeling that I spend half my time looking for what I wrote somewhere on paper."
- Nurse: "Administrative procedures are becoming more time consuming by the day."

Theme: Health-care system efficacy. Subthemes: "Supervision of National health insurance service", "Waiting list for clinical specialists", "Local vs. EU".

- MD: "Once we have the same number of consultations per day as the physicians in the western EU, we will be able to use e-consultation much more."
- Pt : "It's not right to pay for health insurance for 35 years and then be required to pay extra for a consultation with specialists."

Theme: Health insurance electronic card

- Nurse: "The health insurance cards should show immediately that a patient has been vaccinated against tetanus... "
- MD: "We could not reach agreement on which data to provide on the electronic insurance card. Should it be allergy information, vaccination data, donor status information or something else?"

Theme : Rules of National Health Insurance Institute

- MD: "On the one hand, the doctor is satisfied. On the other hand, he is annoyed because of the Insurance Institute rules. "

Theme: ICT costs

- Pt.: "An average computer costs about 800 euros plus internet and other equipment. It's not a small thing. "

Category: "User expectations regarding ICT"

In this category, the participants emphasised the potential benefits of the wider use of ICT in primary care. The most positive expectations were found in the areas of "Saving time with the use of ICT" (n = 19) and "The integrity and traceability of e-data" (n = 16). The most optimistic on both these issues were patients (respectively, 10 and 7 positive comments). Concerns were expressed primarily regarding "Protection of

electronic medical data" and the "Influence of ICT on the social component of healthcare". The following statements were characteristic of the "User expectations regarding HIT" category:

Theme: Data organisation

- MD: "The need for ICT seems to grow every year. I think the huge increase of diagnostic and treatment procedures caused medical data to become completely nontransparent in paper form. "
- Nurse: "We must get up, walk around and look for all those papers instead of having all the documents in the computer. "

Theme: Availability of e –medical information

- Nurse: "When patients have particular questions, it's easy for me to find related information on the internet."
- Nurse: "We often search information on the internet where a lot of useful options are available."
- MD: "The problem is that the search engines often show you too many relevant articles and you just get lost."

Theme: ICT evaluation and application upgrades

- Nurse: "I miss other EHRs to compare with my own and to say what should be improved."

Theme: Comparison to other professions

- MD: "The tax office also took a long time to deal with my income, despite all these computers... "

Theme: Patient and health-care professional trust in ICT

- MD: "Mistakes are more easily made by a human than a PC."

Theme: Social aspect, human contact

- Pt.: "From a social point of view, I am not convinced of the benefits the computer brings. Look at retail stores – they have become so impersonal – a doctor should not allow this to happen. "
- Nurse: "We would like to have a computer that would enable pressing a button and making the patient or doctor smile."

Category: "ICT influence on practice workflow"

The previous experience of the participants with the use of ICT in primary care was positive, mostly in the following areas: "Preventive tasks, diagnosis and therapy" (n = 16), "Office administration" (n=14) and "Physician and nurse professional tasks" (n=13). Doctors were most optimistic in the first two areas, while patients were the most optimistic in the third one. Most concerns in this category were expressed about the "Impact of ICT on communication with patients". The following statements were characteristic of the "ICT influence on practice workflow" category:

Theme: Control and organisation of medical data

- MD: "I have almost all data stored electronically on my computer!"

Theme: Office administration

- Nurse: "We can't imagine working without a computer - there is just so much administrative work to be done."

Theme: Communication with patients

- Pt : "Perhaps once all these EHRs are further improved (from the point of view of usability), the doctor will be able to engage more with the patient and less with the computer."

Theme: Health-care personnel satisfaction

- Nurse: "My computer does not oppose me."
- MD: "Almost 12 years has passed since I started using a computer, but I still cannot see any substantial progress."
- Nurse: "I think that use of computers is very important for ambulatory teamwork."

Theme: Patient education

- MD: "Just upload the instructions on the screen and show the patient how to carry out spirometry."

Category: "User-centred design of actual ICT"

Participants gave a very bad evaluation to the user friendliness and adaptability of existing ICT, particularly: "Updates of existing EHRs" (n = 12), "Physician and nurse workloads" (n = 18), "Health-care user limitations - age, ICT equipment, acceptance and ability to use ICT" (n = 16), "Response time of ICT" (n = 10) and "Cooperation with software vendors" (n = 9). Most criticism came from the doctors.

The following statements were characteristic of the "User-centred design of actual ICT" category:

Theme: Friendliness of existing ICT. Subthemes: "International Code of Diseases and diagnosis browser", "User interfaces for data acquisition", "Instructions and education of health-care personnel for ICT usage".

- MD: "Why do we have computers if we must still learn the diagnosis codes by heart? This code list is a disaster."

Theme: Physician and nurse skills for ICT

- MD: "I send patients out of the office before taking notes so they don't see how badly I type when entering data into the computer."

Theme: Physician and nurse workloads

- Nurse: "Nurse work overload is the biggest problem. The computer helps, but it is also additional work."

Theme: EHR provider cooperation with health-care professionals

- MD: "We have problems with our EHR providers. They always seem to think they know better what we (physicians) need."

Category: "Electronic vs. paper health records"
Efficiency and transparency of EHRs were assessed positively, but much concern was expressed regarding the entry, availability and completeness of e-health information. The most disturbing for all participants were: "Repeating work with paper and electronic medical records" (n = 14), "Efficiency and reliability of paper records" (n=6) and "Storage, integrity and completeness of paper medical data" (n = 8).
The following statements were characteristic of the "Electronic vs. paper health records" category:
Theme: Storage, integrity and completeness of paper medical data
- Nurse: "The advantage of paper records is that if a computer doesn't work we still have access to all information."

Theme: EHR efficiency.
- MD: "I think that the EHR is fast enough and does not obstruct our work. Earlier, we were afraid it would be disturbing for patients."

Theme: Support for nurses' work
- Nurse: "I miss support for nurse-related tasks, e.g. height, weight, blood pressure and the rest. Since you can't enter these data into an EHR system, you need to write them down on a paper record. EHRs are still insufficient regarding nurse activities."

Theme: Legibility of EHRs
- Nurse: "Electronic notes from physicians are legible. Paper based ones are sometimes hard to read."

Theme: Repeating work with paper and electronic health records
- Nurse: "The use of paper records is intrusive. I like to have all medical data in the computer."
- MD: "We have to type the most important information once again. I need to store the data somewhere. "

Theme: Medical data, storage and updating
- MD: "Patients are very satisfied; the pharmacist as well. I only need one minute for all the administration of a patient. "
- MD: "I have typed all diagnoses and therapy information into my EHR since 2000, and I have these data in electronic format for all patients".

Category: "E-consultation"
In this category, "E-prescription and e-discharge letter" (n = 15) got high and uniform support from all participants, while "Phone consultation" (n = 22) and "E- consultation to family physician and nurse" (n = 18) received more concerns than support. Scepticism mainly came from doctors and nurses. Patients were the most optimistic regarding "E- appointment and e-referral letter", while nurses were the most critical of the same topic. "Physician availability" was identified by the patients as the biggest obstacle to the successful delivery of e-consultation in primary care.
The following statements were characteristic of the "E-consultation" category (theme numbers are in parentheses):
Theme: "E-consultation to family physician/ nurse"
- Nurse: "Responding to e-mails during office consultations seems impossible at a frequency of 60-70 patient visits per day in addition to phone calls."
- MD: "Once you spend an hour or two each day on this, it becomes a big problem."
- Pt.: "A doctor should be available 24 hours a day for e-consultation, which is difficult to provide."

Theme: E-prescription and e-discharge letter
- Pt : "We probably don't even need paper prescriptions."

Theme: E- appointment, e-referral letter
- MD: "I have tried to use the internet for e-referrals. Unfortunately, it took the other provider 14 days to respond. "
- MD: "Actually, we now send huge amounts of referrals, but no one knows what's going on with them or even if anyone reads them at all. "

Theme: E-network and e-communication among health-care personnel and health institutions
- MD: "You cannot browse the internet during the consultation. Patients must be examined correctly, and you cannot do all these tasks simultaneously."

Category: "Computer-supported decision making and accessibility of personal e-health data"
The most positive expectations in this category were related to: "Accessibility of personal e- health data by primary-care physicians and clinical specialists" (n = 25) and "Computer- supported decision making" (n = 25). The first theme was mostly supported by patients (n=13) and physicians (n=9). Computer-supported decision making was largely advocated by physicians.
The following statements were characteristic of the "Computer-supported decision making and accessibility of personal e- health data" category:
Theme: Accessibility of personal e- health data. Subthemes: "Accessibility of personal e- health data to primary-care physicians and clinical specialists" and "Accessibility of personal e- health data to other health-care professionals".
- Pt : "Physicians need to have as much data as possible to provide optimal care."

– MD: “We expected this to allow us to see when and to what specialist or institution each single patient was referred.”

Theme: Accessibility of personal health data for urgent care

– Pt.: “If you have a car accident, the hospital staff should have access to all your relevant medical data in two seconds…”

Theme: Patient summary

– MD: “Diagnoses, allergies, medication lists - that is of most importance. At the moment, no one can access it, not even the emergency room.”

Theme: Computer-supported decision making

– MD: “I am not against computerised decision support. However, I think there are more basic things that need to be implemented first.”
– Nurse: “Now there are no alerts on the computer. You have to remember everything yourself.”

Theme: Accessibility to one’s own personal e-health data

– Pt.: “I would want to have all my personal health data in one place and to have the possibility to access it from time to time.”

Theme: Patient’s consent to personal health data access

– Pt.: “It is difficult for patients to decide which medical information to hide from a specialist…”

Citation appraisal

In additional citation appraisal rounds, each citation was assessed on the three level scale: positive, negative or neutral. The evaluation results, sorted by category and participant subgroup, are represented in Table 4.

Table 4. *Citations by category and participant subgroup.*
Tabela 4. *Citati po kategorijah in podskupinah udeležencev.*

Category/ Kategorija	Physicians/ Zdravniki			Nurses/ Medicinske sestre			Patients/ Pacienti		
	Pos./ Poz.	Neut./ Nevt.	Neg.	Pos./ Poz.	Neut./ Nevt.	Neg.	Pos./ Poz.	Neut./ Nevt.	Neg.
Health-care system/ Sistem zdravstvene oskrbe	8	10	32	5	1	34	2	8	32
User expectations and needs regarding ICT/ Pričakovanja in potrebe uporabnikov v zvezi z IKT	48	7	8	34	5	10	36	6	16
ICT influence on practice workflow/ Vpliv IKT na potek dela v praksi	30	4	3	24	0	11	30	5	11
User-centred design of actual ICT/ Usmerjenost zasnove dejanskih IKT k uporabniku	6	6	56	14	9	41	4	9	20
Electronic vs. paper health records/ Elektronski zdravstveni zapisi v prim. s papirnatimi	44	0	49	31	2	20	13	1	9
E-consultation/ E-svetovanje	20	6	12	18	4	14	25	1	18
Computer-supported decision making and accessibility of personal e-health data/ Računalniško podprt proces odločanja in dostopnost do elektronskih osebnih zdravstvenih podatkov	47	5	3	21	1	4	49	1	7
Total/ Skupaj	203	38	163	147	22	134	159	31	113

Altogether, 404 quotes (40%) were from physician focus groups, 303 (30%) from nurse focus groups and the final 30% were from focus groups of patients. The percentage of positive or negative comments from the three participant subgroups varied by category. Dissatisfaction with the present health-care system was expressed in 64% of citations from physicians and in more than 80% of nurse and patient citations. Positive expectations regarding ICT were found in 76.2% of physician citations and "only" in 62% of citations from patients. A similar ratio between physician and patient positive citations (81.8% vs. 65.2%) was found in the result concerning "ICT influence on practice workflow". Physicians were the most pessimistic subgroup regarding the category "User centred design of actual ICT", with 82.35% having negative comments compared to 64.1% of nurses and 60.6% of patients who were negative. Electronic vs. paper health records was the only category that was supported by two subgroups (nurses had 58.5% positive comments; patients 56.5%) and rejected by the third (physicians had 52.7% negative comments). The category "E-consultation" got mild support, while the category "Computer-supported decision making and accessibility of personal e-health data" got strong support among all three participant subgroups.

4 DISCUSSION

This evaluation of attitudes by the key user subgroups regarding the use of ICT and paperless records in primary healthcare included the qualitative method, which is becoming increasingly popular in health informatics research (1, 4, 8, 13, 31, 45-50).

The methodology applied to the analysis and the additional citation appraisal rounds enabled a more accurate evaluation of the data and consequently improved the quality and validity of the results.

The three-level process (positive, negative, neutral) of appraising citations allowed the researchers to determine participant support for the themes and categories.

The most important areas for further e-Health development identified by all participants were: "Accessibility and completeness of personal e-health data", "Computer-supported decision making" and "E-prescription and e-discharge letter". Through the process of content analysis, these three themes got the highest number of positively-assessed citations in all participants' subgroups.

Physicians also strongly supported "Structured medical data entry", while nurses pointed to "Nurse service support". Patients gave strong support to "Time savings with ICT" and "E- appointment, e-referral letter".

The benefits of patient accessibility to data are clear and got the strongest support by participants in all three subgroups. In other words, there was strong support for access to personal health information by patients and health professionals at various levels within the health-care system. The most important current challenges regarding access to personal health information in Slovenia are related to: lack of an appropriate legislative framework, data storage method (centralised or decentralised) and patient summary architecture (26, 51).

Access to personal health information by others also implies clear rules concerning access and explicit consent of the patient, who is the owner of the data (8, 51, 52, 53, 54). The highest level of support for this theme comes from health authorities and decision makers (26). However, even in large European countries, national or system-wide sharing of patient data was deficient until recently (51).

A standard EHR or EHR-like system usually incorporates an overall patient summary as a fundamental condition for prompt and broad access to the patients' medical data. A summary was defined by the epSOS project as a: "minimum set of a patient's data that would provide a health professional with essential information needed in case of unexpected or unscheduled care (e.g. emergency, accident) but also in case of planned care (e.g. after a relocation, cross-organisational care path)" (52).

Accessibility to the EHR also offers both physicians and patients a sense of seamless communication over time and location (3-5, 15, 32, 48).

Safety of medical data in electronic format was mainly assessed negatively by patients in our study. Some other research papers have indicated that many patients are unprepared to allow distribution of their personal health data for purposes other than clinical care (54-56). This finding implies that the issue of patient consent must be seriously considered in all cases of personal e-health information exchange.

E-prescribing is usually defined as "the process of the electronic capture and transfer of a prescription by a health-care provider to a pharmacy for retrieval of the medicine by the patient and the recording of dispensation in the patient's record" (51). The epSOS project defines ePrescription as a service "made up of electronic prescribing and electronic dispensing" (57). The automation of medication prescriptions provides big benefits to general practitioners, as it addresses

legibility concerns, can be a significant time saver (particularly for repeat prescriptions) and offers the potential to make use of decision-support capabilities (8, 13, 57-59).

E-prescription, as well as the patient summary, have been identified as top e-Health priorities in all EU states since 2006. However, full implementation of these two services at national levels is slow and Slovenia is not an exception (14, 15, 51). E-prescription, e-discharge letter and patient summary were almost equally supported by all three subgroups of participants in our study. Together these three areas got the highest support of all themes that were identified. It seems that the electronic transfer of prescription-related information is acceptable to all eHealth users -- if concerns about patient confidentiality are taken into account and the role of pharmacists in prescription management is extended (55).

"Time savings with ICT" got the fourth highest level of support in our study and was another area highly ranked by all participant subgroups. Patients were the most optimistic subgroup regarding the potential time benefits from ICT.

There are advantages of EHRs over traditional paper-based records as regards legibility, accessibility and automation of repeated tasks. Consequently, there is the potential to increase time spent on direct patient care (1, 53, 55, 58, 60-63). However, some time studies have failed to demonstrate any noticeable increase of the time spent on clinician–patient encounters (64-67).

Computer-supported decision making, which got the third highest support, was most supported by physicians and least by nurses. Based on the literature, physicians want existing computer decision support systems to enhance physician–patient relationships, redirect work among staff, adjust to individual patients and provide time-saving tools (12, 13, 56, 64, 68-73).

The most important recognised barriers impeding the wider use of ICT among physicians are:

"EHR provider cooperation with health-care professionals," "Updates of existing EHRs" (both got 13 negative comments), "Friendliness of existing ICT" (11 negative comments), "Heavy workload and number of consultations" (11 negative comments), "Accessibility and completeness of current e-medical data" (8 negative comments) "Clearness and comprehensiveness of paper medical records" (7 negative comments) and "Repeating work with paper and electronic health records" (7 negative comments).

The biggest obstacles to wider use of ICT, as recognised by nurses, are: "Health insurance service rules" (10 negative comments), "Heavy workload and number of consultations" (10 negative comments), "Administrative tasks in offices" (6 negative comments), "Phone consultation in primary care" (6 negative comments), "Health insurance electronic card" (5 negative comments) and "Repeating work with paper and electronic health records" (5 negative comments).

The major barriers identified by patients are: "Age of the e-Health-care user" (7 negative comments), "Capabilities for e-consultation" (7 negative comments), "Waiting lists for clinical specialists" (6 negative comments), "Safety of medical data in electronic format" (5 negative comments), "Social aspect, human contact" (4 negative comments), "Trust in the health-care system" (4 negative comments) and "ICT costs" (4 negative comments).

The vast majority of recognised obstacles are organisational in nature, which is also confirmed by the highest percentage of negative quotations in the category "Health-care system". This was cited mostly by nurses. Doctors also highlighted user friendliness of existing ICT, while patients also expressed concern about the so-called "Social aspects of ICT usage".

At the aggregate level, organisational issues are critical in national strategies and action plans that ultimately influence the adoption of ICT (4, 14, 16, 51, 63-66, 74-77). These obstacles could be removed or transformed through systematic, well-planned changes in the health-care system, including health insurance and its rules for service reimbursement. Modification of current primary care practice workflow and reduction of the usual physician and nurse workloads should also be a necessary part of these systemic changes. Successful development of eHealth in northern European countries suggests that ICT adoption on a national level depends largely on the maturity and sophistication of eHealth strategies and legislations (51, 78).

Physician and nurse scepticism about user-driven eHealth applications is confirmed by the second lowest rating received by the category "User-centred design of existing ICT". This should be a serious alert for relevant policymakers and not be overlooked.

Patient-centred applications are defined as systems that enable a partnership between practitioners, patients and their families (when appropriate), which ensures that procedures and decisions respect patient needs and preferences. It seems that redistributing ICT tasks between professionals, as well as adapting ICT tools to the needs of users, is crucial for ICT to effectively be used in clinical work (2, 58, 75-82). Therefore, it makes sense to increase the involvement of end-users in the implementation process (2, 17, 41, 62, 79-82). The category "User expectations regarding HIT" could provide a basic list of priorities for ICT implementation in primary care.

The patients highlighted at least four social and demographic themes relevant to full exploitation of ICT. These influences are well known in the literature (4, 8, 31, 70, 83 –86). The proportion of older adults in the population of all EU countries is steadily increasing. Older people generally have less knowledge about health issues and a lower computer literacy, consequently lagging behind in ICT adoption. Some believe the lower level of ICT adoption in this subpopulation will soon change (85, 86). Introduction of patient accessible, location-independent electronic medical records and the promotion of tele-health solutions for chronic diseases could accelerate the process of ICT adoption (17, 84). Lack of human contact or of IT/internet experience and inadequate promotion of primary care eHealth services have been recognised as important barriers in some studies (2, 8, 32, 83, 84). Some environmental factors could also play an important role in the use of ICT by patients. An example might be patient location when using this technology (4). The concepts of patient empowerment and shared decision making could probably offer efficient methods to help solve the social and demographic eHealth barriers and need further exploration (62, 87).

5 CONCLUSIONS

In-depth focus group analysis highlighted the following concerns of key eHealth users in Slovenian primary care:

- high expectations regarding ICT in general, computer-supported decision making and accessibility of personal e- health data;
- Positive attitudes toward the influence of ICT on primary healthcare as well as expected benefits from e-consultation and e-appointments;
- Strong dissatisfaction with the inefficiency of the existed health-care system and with current user-centred design of available ICT in Slovenian primary care.

Recognised barriers, opportunities and organisational weakness require quick and efficient systemic measures aimed at improving cooperation among all groups using eHealth.

The internet and computers are recognised as important social determinants of health in Slovenia (87).

Generalisation comparing different countries is more challenging and requires other evidence-based data.

Authors' contributions

RI: the principle investigator who conducted this research including the study design, data collection and interpretation; manuscript preparation.

MM: study design, data collection and interpretation; manuscript preparation

DP: data interpretation and validation, codes assessment; manuscript preparation

TPS: data interpretation and validation, codes assessment

MK: data validation and study supervision

Conflicts of interests

There are no competing interests.

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