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## Health professionals' expectations of a national patient portal for self-management

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### ABSTRACT

**Objective:** Patient portals have the potential to support patient empowerment, self-care, and management, but their adoption and use have reported to be limited. Patients' more active role creates tension, as health professionals need to change their traditional expert role and share control with patients. Professionals may also have other expectations and concerns that influence the acceptance of patient portals supporting patient empowerment. This study explores the health professionals' expectations influencing their support for a new patient portal for self-management prior to implementation.

**Design:** The study empirically evaluates the impact of several variables on health professionals' support for a new patient portal for self-management. The study variables include 1) expected influences on professionals' work, 2) expected influences on patients, 3) usability, 4) professional autonomy, 5) informing, 6) implementation practices, and 7) user participation.

**Methods:** Data was collected through an online survey of 2943 health professionals working in 14 health organizations in Finland. The participating organizations run a joint Self-Care and Digital Value Services (ODA) project, developing a national patient portal for self-management. Three main services of the patient portal are well-being coaching, diagnostic tool, and a health care plan.

**Results and conclusions:** The results show that health professionals' positive expectations about the new patient portal, adequate informing of professionals ahead of time, and the organization's good implementation practices had a positive impact on their support for the patient portal. Perceived threat to professional autonomy had a negative impact on professionals' support for the portal. Age, gender, and user participation did not influence support. Professionals' concerns were related especially to patients' willingness and capability to use the patient portal. The findings can guide health care providers to facilitate professionals' support and remove obstacles to introduce patient portals already in the pre-implementation phase.

### 1. Introduction

Patient empowerment is one of the key goals of eHealth [1]. Patients are increasingly encouraged to take responsibility for their own health and be active players in self-care, self-management, and decision making [2–4]. Widespread patient web portals are often considered to have the potential to support patients with self-managing their health. Patient portals provide various self-management services such as access to personal health information, health metrics recording, educational materials, appointment scheduling, patient-provider communication tools, and self-management diaries [5–9].

While patient empowerment and activation is expected to have a positive impact on patient health and satisfaction [10–12], many

studies have reported limited adoption and use of patient portals supporting patient empowerment [8,13]. There are several different patient groups; reaching and engaging them to use new technical solutions for self-care and self-management is not self-evident or easy [14]. Health professionals are in a key role in supporting and engaging patients: Their attitudes and behaviors influence a patient's capacity to use services [9], and their endorsement, in particular, increases patients' trust towards a technical solution [15]. However, health professionals are not always willing to recommend new patient portals or support patients. For example, patient empowerment and self-management are changing the traditional expert role of professionals and creating a tension associated with sharing control with patients [16,17]. Like other attitudes, this tension can influence acceptance of

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professionals and efficient use of patient portals [18].

Health professionals may also have previous negative experiences with health information systems [19], which creates negative expectations and concerns towards new information-technology-assisted approaches to patient empowerment. User expectations are also known to influence later experiences and acceptance [20,21]. Health professionals may have many concerns, especially related to the changing provider-patient relationship. Earlier studies recommend that these concerns are proactively addressed as a mean to manage resistance [22]. For example, Kirkendal et al. [23] highlight the importance of adapting training and implementation to support users who have concerns.

The goal of this survey study was to identify the health care personnel's expectations about a national patient portal for self-management developed by a Self-Care and Digital Value Services (ODA) project. We performed the survey study in collaboration with the ODA management team, which wanted to collect information about health professionals' expectations in the pre-implementation phase of the project. The aim was to use the information for supporting the implementation of the ODA services in the participating 14 health care organizations. This study also tests the hypothesis that health professionals' expectations influence their support for the patient portal for self-management in a pre-implementation phase. Findings provide a better understanding of the professionals' views of patient portals and patient empowerment in their work as a first step in encouraging them in adopting the new services.

## 2. Research model

The attitudes of health care professionals are important as they reflect the acceptance and efficient use of the services [18]. Several studies have identified factors influencing the acceptance of information and communication technologies by health care professionals. We propose that professionals' expectations of these factors influence their attitudes prior to actual implementation. In their systematic literature review, Gagnon et al. [24] reported that the perceived benefits of the technology was the most common facilitating factor, followed by ease of use. In the case of the patient portal for self-management, the main expected benefits are targeted to patients, and patient benefits may be in conflict with the benefits of the health care professionals. Thus, we separated these two types of benefits and hypothesized the following:

**H1.** The expected positive influences on the work of professionals are positively associated with their support for a patient portal.

**H2.** The expected positive influences on patients are positively associated with professionals' support for a patient portal.

**H3.** The expected usability of the patient portal is positively associated with professionals' support for a patient portal.

Hart and colleagues, and Walter and Lopez [25,26] have also found that technical innovations change professionals' role and can threaten professional autonomy. Being a professional is commonly associated with power, prestige, and autonomy that, for example, an Electronic Medical Records (EMR) systems, the Clinical Decision Support (CDS) systems [25], and patients' internet use [26] have been found to threaten. Thus, our hypothesis is as follows:

**H4.** The perceived threat to professional autonomy is negatively associated with professionals' support for a patient portal.

The first step towards professionals' support for a new patient portal is that they are aware of it. For example, in Flynn and colleagues' [27] qualitative case study, many professionals had not heard about the new service to be implemented, and clinical and practice manager staff felt that they were only partially informed about its objectives. Several studies have shown that if professionals do not know about the new innovation and its benefits, adoption and implementation will not take

place [28]. Thus, informing professionals and communicating the benefits of the new patient portal is an important first step in implementation; therefore, we hypothesized the following:

**H5.** Informing professionals about the new patient portal and its benefits is positively associated with professionals' support for a patient portal.

In addition to the quality of the innovation, the organizational processes by which innovations are introduced to professionals are important for implementation success [29]. Organizations change slowly, so we can expect that professionals already have good or bad experiences in implementation practices that may influence their views on how well they are supported when a new patient portal is implemented.

**H6.** The expected good implementation practices are positively associated with professionals' support for a patient portal.

The on-going involvement of professionals as users at design stages has been found to support their acceptance of a new system [29]. User participation and involvement are important for ensuring good requirements, usability, and user satisfaction [30,31] as well as for building users' feelings of ownership toward the system [32]. Thus, we hypothesized the following:

**H7.** User participation in the planning of the patient portal is positively associated with professionals' support for the patient portal.

## 3. Methods

A survey study was designed to capture the health care personnel's expectations about a national patient portal for self-management developed by a Self-Care and Digital Value Services (ODA) project. This survey study focused on health professionals such as nurses, social workers, doctors, physiotherapists, and psychologists, as their work will be influenced by the new patient portal.

### 3.1. Study setting

At the time of the study, in spring 2017, the role of information and communication technology (ICT) was widening in Finnish public health care. The objective of the national eHealth and eSocial Strategy 2020 is to support the active role of citizens in promoting their own well-being by improving information management and implementing self-management and online services [33]. The aim of the strategy is to support the prevention of health problems, self-assessment of the need for services, and independent coping.

To build online services for citizens, the government funded the ODA project. ODA is run as a joint project of 14 of the largest cities and hospital districts in Finland – e.g. Helsinki, Espoo, Tampere, Turku, Oulu – with 1,766,334 inhabitants in 2014 (32.3% of the Finnish population). The ultimate aim is to provide a national patient portal for self-management and self-care in 2018. In addition to the technical development, a strong emphasis has been put on changing the operational processes using a participatory approach. The three main services are patient self-assessment and well-being coaching, diagnostic tool, and a health care plan.

The ODA project has trained lean approach to groups of health professionals representing each city and hospital district in 2016 and 2017. These groups have planned the operational processes to be supported by the technical solutions in individual services. At the time of the study, none of the organizations had yet started to pilot the services. The first pilots started in June 2017, and the whole patient portal entity is planned to start in the autumn of 2018.

### 3.2. Questionnaire

The questionnaire included three open questions and seven multiple-choice questions with a total of 43 statements using a five-point Likert scale (see Appendix A). Previously validated I-SEE survey items were applied for measuring professionals' support for a patient portal [23,34,35]. In addition, other validated survey items were applied for measuring subjective usability [21,36] and the expected influence of the new patient portal for the professional autonomy [25]. An essential part of the professional support for a patient portal is that professionals also inform their patients about the portal. Thus, in addition to the used five items of the professionals' support scale [23], one statement "I am willing to inform patients about the ODA portal" was added.

The survey items were translated into Finnish and reworded to suit the context of the current study. In addition, the professionals were asked whether they agree with the planned benefits of the new patient portal for work practices and patients. They were also asked how they expected the future implementation of a new patient portal to happen by rating whether they agreed that six good implementation practices will be used in their organizations. The six good implementation practices were identified from the literature [22,27,29,37–40]. Thus, the content validity of these survey items was established through a literature review [41].

Questions on the questionnaire were validated by the group of three researchers in the field and the ODA management team. In addition, as recommended [42–44], we tested the reliability of the questionnaire with five professionals who filled in the questionnaire and talked aloud at the same time about how they understood the questions. Based on the iterative pilot testing, the questionnaire was revised by clarifying wording and slightly modifying some items.

### 3.3. Data gathering

The data was gathered from February to April 2017 by using a web-based questionnaire tool. The ODA project manager of each of the 14 organizations sent the link to the questionnaire via e-mail to their health professionals. Two project managers reported that they did not have the email addresses of all professionals, so they sent the survey invitation to the supervisors and asked them to resend it to their subordinates.

The invitation letter included a description of the target group, health professionals, the goals of the ODA project, and the future ODA portal and its benefits. The starting page of the questionnaire also included a screenshot of one ODA page for illustrating the professionals' view to the patient portal. To encourage participation, ten pairs of movie tickets were raffled off among the respondents. The study protocol was reviewed and approved by the Ethical Review Board of the Aalto University.

### 3.4. Analysis

Statistical analysis was performed for the quantitative data. Descriptive statistics and reliability analyses were performed and mean sum scores were computed for all study variables (see Table 2). Cronbach's alpha scores were all well above 0.70, indicating acceptable internal consistency [45]. A multi-collinearity analysis of the study variables was performed. The variance inflation factors (VIF) associated with the significantly correlated variables were all below 2.85, showing that multi-collinearity is not a concern in this study [46]. Linear regression analyses were conducted to examine the study hypotheses. The analyses were conducted in one step including professionals' support for the patient portal as a dependent variable and age, gender, expected influences on professionals' work, expected influences on patients, usability, threat to professional autonomy, informing, implementation practices, and user participation as independent variables.

**Table 1**  
Respondents' demographics.

Characteristic	N	Percent	
Gender	Male	313	11.3
	Female	2461	88.7
Age	19–29	308	11.0
	30–39	640	23.0
	40–49	702	25.1
	50–59	901	32.3
	60–	240	8.6
Profession	Hospital nurse	757	26.6
	Assistant/other nurse	527	18.5
	Health nurse	340	11.9
	Social worker	310	10.9
	Doctor/dentist	211	7.4
	Physio and other therapists	151	5.3
	Administrator	104	3.7
	Dental nurse	86	3.0
	Midwife	31	1.1
	Psychologist	30	1.1
	Maintenance and cleaning	24	0.9
	X-ray nurse	21	0.8
	Other	250	8.8
	Total	2852	100

## 4. Results

First, we present the results about the respondents' demographics and expectations influencing professionals' support for a patient portal for self-management. Next, the professionals' responses to expectation statements are reported in two sections: 1) health professionals' expectations about the effects of a patient portal on work and patients, and 2) their expectations related to the implementation.

### 4.1. Respondents

A total of 2943 health professionals agreed to participate and filled in the questionnaire. Based on the estimations of the local project managers, the respondents represented around 6.1% of the health professionals working in the 14 organizations participating in the ODA project. We were not able to calculate the exact response rate as we did not know how many of the professionals received the survey invitation from the ODA project managers. In the final analysis, 2852 responses were included, and 91 responses from professionals who responded to test version of the survey were excluded as an "I don't know" option was added to the scales based on the given feedback. Table 1 shows the demographics of the respondents. The respondents well represented the Finnish health professionals in terms of age, gender, and profession [47]. For example, the mean age in our sample was 44.8 years (43.0 in eligible population in Finland) and the proportion of females was 88.7% (88.0% in Finland) respectively.

**Table 2**  
Mean and S.D. of the key study variables.

Variables	Cronbach's Alpha	Mean	S.D.
Professionals' support	.91	3.7	.89
Expected influences on professionals' work	.95	3.5	.94
Expected influences on patients	.92	3.5	.85
Usability	.86	3.4	.79
Threat to professional autonomy	.88	2.6	.91
Informing	.85	1.8	1.1
Implementation practices	.88	3.2	.93

The scales of the variables were ranging from 1 (fully disagree) to 5 (fully agree) and included also option 6 (I don't know) that was removed from the analysis.

**Table 3**  
Regression results – impact of independent variables on professionals' support.

Variables	$\beta$	Std. Error	Sig.
Age	-.04	.00	.053
Gender	-.02	.05	.269
Expected influences on professionals' work	.26	.03	< .001
Expected influences on patients	.23	.03	< .001
Usability	.20	.03	< .001
Threat to professional autonomy	-.11	.02	< .001
Informing	.16	.02	< .001
Implementation practices	.06	.02	.024
User participation	.03	.06	.152
$R^2 = .56$			

#### 4.2. Factors influencing professionals' support for a new patient portal

Table 2 presents the mean and standard deviation of the study variables. User participation was categorical variable, showing whether a respondent had participated in planning of the services of the patient portal. Of the respondents, 129 (4.5%) had participated; 2723 of the respondents (95.5%) had not participated in the planning. Table 3 presents the results of the linear regression analyses, testing the associations of independent variables on the professional support for the patient portal. Hypotheses H1-H6 were supported. The results show that professionals' positive expectations about a future patient portal, its usability and influences on professionals' work and patients, are positively associated with their support for the patient portal. Moreover, the organization's good informing and implementation practices had a positive association with professionals' support for the patient portal. On the other hand, perceived threat to professional autonomy had a negative association with their support for the patient portal. Hypothesis H7 was not supported – user participation in planning of the patient portal did not have a statistically significant impact on the support of professionals. Age and gender did not have an association with professionals' support either.

#### 4.3. Expectations about the influences on work and patients

Majority of the respondents agreed that the patient portal will have at least one of the suggested positive influences on their work (64%). Most of the respondents (74%) expected benefits for patients and agreed to the statement that the patient portal will support individual care or service. However, only about one-third of the respondents believed that over half of the patients are willing (37%) and capable of using the new patient portal (33%). Also, 16% of the respondents were not willing to tell about the patient portal to patients and 13% rated that the patient portal will reduce their professional autonomy. In open-question responses related to the challenges of the patient portal, the use of the patient portal was suspected to take too much working time, especially at the expense of care. Some users commented that they are not willing to spend more time on computers rather than taking care of patients.

#### 4.4. Expectations related to the implementation

Only 13% of the respondents agreed that they have received enough information about the patient portal, and 12% had heard about the aims of the patient portal in their unit. A minority of the respondents believed that good practices will be used in their organization, although most of them believed that there will be a person who is responsible for the implementation, and there is also a lead professional or champion who will encourage others to use the patient portal. In open-question responses, health professionals were concerned that the adoption of the new patient portal and changing the work culture will be burdening, and that learning to use the patient portal is laborious or time

demanding. Participating in the development was seen important, and it was hoped that the voice of the personnel, different specialities, and patient groups would be heard. The respondents also requested for more informing, training, and guidance.

## 5. Discussion

The results indicate that several factors influence health professionals' support for a patient portal for self-management prior to implementation. Consistent with earlier studies focused on professionals' attitudes in the context of implementation [24,48,49], expected utility and usability of the patient portal were the most important factors that seemed to impact support by professionals. In the context of a patient portal for self-management, the expected positive influences on the work of professionals and the patients were seen as benefits. In addition, adequate informing and expected good implementation practices of the organization had a positive association with professionals' support. On the other hand, perceived threat to professional autonomy had a negative association with professionals' support.

Our findings provide new insights to the pre-implementation phase that is considered critical as the successes and risks cumulate over time [39,50]. Generally, good communication and active involvement is recommended from early phases to ensure a widespread 'buy in' from health professionals [24,49,50]. We suggest that implementers inform health professionals especially about the benefits of a patient portal both for patients and professionals' work to strengthen professionals' support. Moreover, it would be important to promote the dialogue between the implementers and health professionals, so that professionals' views are also heard in the planning and implementation. While in this pre-implementation phase study, user participation was not statistically significantly associated with the support of health professionals, in open replies professionals considered participation important. In the early pre-implementation phase, the planning of the patient portal was not finished; the positive effects of user participation such as better usability of the portal may concretize along with the implementation.

The results demonstrate that the used survey study approach is good for identifying implementation obstacles already in the pre-implementation phase. Although most professionals were willing to support the new patient portal, they also had many concerns and there was evidence of resistance. Health professionals work is known to be hectic, and changing work culture and learning were suspected to be too time demanding. Even if the patient portal supported professionals' work, the early adoption phase can be burdening as professionals need to learn the new work practices and the use of the portal. More wide utilization of the good implementation practices such as making additional time available to users by proactively reducing workloads [29] could support health professionals in this transformation phase.

The health professionals had also concerns related to the patients' readiness and the changing relationship between professionals and patients. It was believed that patients are not capable and willing to use the new patient portal, although citizens' readiness to use e-services is considered very high in Finland [51]. This creates a risk that health professionals do not encourage patients to use the service although their endorsement is known to contribute to patients' ability to use a patient portal [9]. Therefore, it is important to inform professionals about the benefits to patients. Also, 13% of the respondents evaluated that the patient portal will reduce their professional autonomy. This may refer to general concerns about a more active role taken by patients when they receive health information from the patient portal. For example, in the Hart's et al. [26] interview study, health practitioners felt that the Internet information encourage patients to challenge their medical authority. As the expected threat to professional autonomy was related to lower support for the patient portal, it is an important topic to deal with in informing and training of health professionals. Also, bringing out the positive outcomes of patient empowerment may

relieve the experienced threat.

In the pre-implementation phase, health professionals did not yet have experience with the quality of the patient portal. Still, the subjective usability evaluations influenced health professionals' support for the portal. Thus, it is possible that they formed their expectations based on their previous experiences as in a previous study of O'Connell et al. [52]. Finnish physicians have had relatively bad experiences in the usability of their EHR system [19], which may have influenced their usability expectations related to the patient portal. Health professionals did not yet know about the implementation practices either, but they had an idea how implementations are generally organized in their organization.

The findings can guide health care providers to facilitate professionals' support and to remove obstacles to introduce self-management. The results imply that even in the early pre-implementation phase, adequate informing of professionals about the future patient portal is essential. The expected benefits regarding a more active role by patients and improved work practices should be communicated in a realistic manner, and evidence regarding them should be collected and shared early on in the process. Information helps professionals to prepare and adjust to the new situation. In the case of a patient portal, professionals' attitudes towards patients' willingness and capability of using a patient portal was identified as essential. Thus, informing and training of the positive influences on patients is also relevant. Professionals themselves requested for more informing, training, and guidance. Training, and providing evidence on the benefits of patient activation, could also be a key to helping professionals not to feel their autonomy threatened and understand the importance of patient empowerment. Especially in contexts similar to the patient portal, early informing and training is beneficial, as reaching thousands of professionals in several organizations takes time. Low expectations about usability may be difficult to change if they are based on earlier bad experiences. Training, super users' support and adequate technical support could create confidence and alleviate concerns.

In this study, we focused on the pre-implementation phase and a specific application, patient portal for self-management. Future studies should clarify the role of pre-implementation phase and health professionals' expectations on the later success of the patient portal, service, or system. Several studies have shown that professionals' perceptions and the level of resistance can vary during an implementation [23,34,53]. Thus, better understanding of best practices for timing and alleviating initial resistance is needed. Future qualitative studies are also needed to better understand how health professionals form their perceptions of the future patient portal and its implementation. In addition, it would be interesting for future research to explore how patient portals change the provider-patient relationship and how the potential feelings of threat to professional autonomy could be alleviated, so that health professionals can fully support patient empowerment.

## 6. Conclusions

Most of the surveyed health professionals had positive expectations about the patient portal for self-management in the pre-implementation phase. Health professionals' positive expectations about the patient portal's influences on professionals' work and patients and its good usability were positively associated with their support for the patient portal. Moreover, the results suggest that health organizations should invest in informing health professionals about the benefits of a patient portal already in the pre-implementation phase, as good informing increased health professionals' support for the portal. Utilizing good implementation practices could also support building professionals' support. Health professionals had also many concerns related to the patient portal such as the changing provider-patient relationship and perceived threat to professional autonomy that should be considered in implementation, informing, and training.

## Author contributions

All authors made contributions to revisions and approval of the manuscript. Sari Kujala, Iris Hörhammer and Johanna Kaipio contributed to study design and literature review. Sari Kujala had the main responsibility for questionnaire development, data collection, and drafting the manuscript. Tarja Heponiemi and Sari Kujala contributed to the statistical analysis.

## Conflicts of interests

All authors declare that they have no conflict of interest.

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## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ijmedinf.2018.06.005>.

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