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Patient Experience from an eHealth Perspective: A Scoping Review of Approaches and Recent Trends

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Summary

Objective: Patients' experiences are increasingly gaining interest in multiple research fields. Researchers have applied various approaches to studying patient experience (PX); however, there is no commonly agreed-upon definition of PX. This scoping review focuses on PX from an eHealth perspective. Our aim was to: 1) describe how PX has been defined, 2) investigate which factors influencing PX and components of PX have been identified and researched, 3) explore the methods used in studying PX, and 4) find out the recent trends in PX research from an eHealth perspective.

Methods: We selected six major journals covering the fields of health informatics, PX, and nursing informatics. Using the search terms "patient experience" and technology-related terms (e.g., digital, eHealth), we searched for articles published between 2019 and 2021. From 426 articles, 44 were included in the analysis.

Results: Multiple concepts and meanings are used to refer to PX. Few articles include vague descriptions of the concept. Numerous eHealth factors are influencing PX, as well as components considering PX. The influencing factors were related to eHealth solutions' type and quality, and care process, when the components of PX were related to communication, remote interaction, risks and concerns, and patients' attitudes towards telehealth. Surveys were the main method used to study PX, followed by interviews.

Conclusions: PX is a complex and multifaceted phenomenon, and it is described as a synonym for patient satisfaction and telehealth experiences. Further multidisciplinary research is needed to understand PX as a phenomenon and to outline a framework for the research.

Keywords

Review; patient experience; eHealth; digital health services; electronic health services

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1 Introduction

There is increasing interest in studying the experiences of patients in healthcare, and in developing eHealth services to improve the quality of care, support patients' wellbeing, and engage patients in care activities. This includes an attempt to understand patient experience (PX) as a phenomenon, to study patients' needs and the expectations of digital solutions, and to explore how eHealth services are used and perceived by patients.

However, healthcare as a research field and patients as customers of healthcare services have their own special characteristics to consider when researching the experiences of patients and when developing eHealth services. For example, Torpie [1] argues that "*applying a purely commercial business model to healthcare fails to recognize and respond appropriately to the clinical context, in which the relationship between the patient-as-'customer' and the hospital-as-'provider' takes place and to the deeply personal nature of the patient experience*". What distinguished patients from customers is that patients may need to make important and complex decisions in a short time frame, although their status is greatly reduced by illness or injury that renders them vulnerable, frightened, often in pain, medicated, and confused [1].

A review by Wolf *et al.,* [2] focusing on the healthcare literature suggests that there is no commonly used definition of PX. Nevertheless, the findings indicate several central themes critical to PX: it is more than satisfaction alone, it reflects events happening across the continuum of care, and the focus is on expectations, individualized care, and alignment with patient-centered care principles [2]. The updates of the review have been published in 2017 [3] and 2021 [4]. These articles discuss the definition of PX generally, but they do not include an eHealth perspective. PX is still an emerging concept, but one commonly cited definition is from the Beryl Institute [5]: "*The sum of all interactions, shaped by an organization's culture that influence patient perceptions across the continuum of care*". These interactions or events cannot be recognized in isolation; rather, they influence each other and are interconnected [5].

It seems that researchers in several disciplines are applying various approaches to study patients' experiences. PX is often used as a synonym for other terms, such as patient satisfaction, patient perceptions, and patient engagement [6-9]. Other related concepts include customer experience, user experience (UX), and quality of experience.

Customer experience has been described as a subjective experience of the customer when encountering a product or service either directly or indirectly [10]. In the field of human-computer interaction, UX has become an umbrella term for describing users' emotional experiences related to products and services. The ISO standard [11] defines UX as a "*person's perceptions and responses resulting from the use and/or anticipated use of a product, system or service*". According to Hassenzahl, UX can be deliberately designed, and it is not about technology but about "*creating a meaningful experience through a device*" [12]. Research on quality of experience has attempted to specify how service characteristics impact the ways users perceive those services [13]. The concept is described as "*the degree of delight or annoyance of the user of an application or service. Quality of experience results from the fulfillment of*

his or her expectations with respect to the utility and/or enjoyment of the application or service in the light of the user's personality and current state" [14].

PX seems to be closely related to these concepts, but the relationship between PX and these terms remains unclear. Understanding PX is important when researching and designing telehealth and eHealth services to support the care and wellbeing of patients. To support further research, this article presents a review of the current state of PX research from the viewpoint of eHealth research. We focused on all types of eHealth and mHealth services and systems that are used by patients. We aimed to conduct a scoping review of PX-related research from the selected viewpoints and include a group of relevant publication forums in the review.

2 Objectives

The academic literature already contains some review articles on general PX, of which one of the most widely known was published in 2014 by Wolf *et al.* [2] in the first volume of the *Patient Experience Journal*. Given the rapidly evolving pandemic and the increasing use of telehealth and eHealth services for patients, a review on PX research from an eHealth perspective is necessary. In this review, we focus on the last three years—from 2019 to 2021.

By reviewing the recent PX research articles from an eHealth perspective, our aim was to answer to the following research questions:

1. How has PX been defined?
2. Which factors influencing PX and components of PX have been identified and researched?
3. Which research methods have been used to study PX?
4. What are the recent trends in PX research from an eHealth perspective?

3 Methodology: Scoping Review

The review was conducted following a scoping review method [15] which mainly followed the PRISMA protocol [16, 17]. First, we described the initial objectives for the review based on our previous experience with PX studies. For the purposes of this review, we focused on eHealth and digital service perspectives, acknowledging the multidisciplinary nature of PX and the ambitious use of the term in the literature.

Second, we began the initial search using the most common search engines: Google Scholar as well as Medline and its search engine PubMed. The search terms used were "patient experience", "eHealth", "digital services", and "technology". We observed that the results from Scholar were more comprehensive than those from Medline. For example, Scholar's results included articles published in specific PX forums: the Journal of Patient Experience (JPX) and the Patient Experience Journal (PXJ). However, we noticed that we needed to further limit our search to better fit the eHealth scope of this review. The initial literature search and literature search were conducted in December 2021.

Third, in order to focus our literature search further on PX related to eHealth but still maintain a broader view regarding the study area, we identified a group of key publication forums: the International Journal of Medical Informatics (IJMI), Applied Clinical Informatics (ACI), PXJ, JPX, Computer Informatics Nursing (CIN), and the Online Journal of Nursing Informatics (OJNI). The reasons for selecting the following six forums for our review were as follows:

- IJMI and ACI: Leading forums for publishing health informatics articles;
- PXJ and JPX: Forums focusing particularly on PX studies and publications;
- CIN and OJNI: Forums publishing nursing informatics articles. Studies on nursing, care, and quality of care often include considerations of patients' perceptions. Thus, PX is an important part of nursing and care, and these journals focus on technologies, which is the scope of our review.

Acknowledging the diversity of topics and themes in the selected publication forums, we applied the following search strategy and search terms:

- Informatics journals (IJMI, ACI, CIN, and OJNI): "patient experience";
- PX journals (PXJ and JPX): "technology" OR "mobile" OR "digital" OR "electronic" OR "informatics" OR "eHealth" OR "telemedicine" OR "telehealth".

Fourth, we defined the inclusion and exclusion criteria for searching and selecting the articles for the review. The criteria were defined during the scoping review process in collaboration with the six authors of this article. The criteria are presented in Table 1. Before the screening (see Table 2), the authors tested the search for each journal and compared the results between, for example, Google Scholar search and the journal's search.

The review strategy included the following three steps (see Table 2):

1. Identification: Articles published between 2019 and 2021 were identified on the six forums with the search terms (see above) appearing in the title, abstract, or keywords;
2. Screening: Articles relevant to PX and technology were initially selected based on abstract inspection. At this point, the focus was on the academic quality of the articles, excluding short papers, such as design briefs and short case studies;
3. Selection: Articles for review were selected based on their eligibility—namely, the relevance of the inclusion and exclusion criteria (see Table 1).

Articles from the selected six publication forums were searched using the above outlined strategy. In all, 426 articles were identified (see Table 2). Each of the titles and abstracts was reviewed. Each of the six researchers was responsible for reviewing articles from one or two publication forums. First, each researcher reviewed the titles and abstracts individually and, in case of "yes" or "maybe", marked the article in the researchers' shared worksheet, which was used to evaluate and report the search results. The sheet included the following information: link to the article, yes/maybe in the scoping review, publication year, definition of patient experience if available, theme/perspective of the article, research methods used, and other comments.

Table 1 The inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
The article is written in English	The article does not include the term "PX"
Published between 2019 and 2021	The article only mentions the term "patient experience", and does not discuss or describe PX in the context of eHealth research
Peer-reviewed, lengthy (more than two pages) academic article that includes academic references	PX is closely related to quality-improvement activities, which aim to improve patients' experiences on a general level, and the approach is from the perspective of a healthcare organization or provider
The focus of the article is on healthcare and eHealth used by patients	Technology aspects are only mentioned in the article and are not the focus of the study
The article discusses or describes the concept of PX or related concepts, such as "satisfaction" or "engagement"	
The article provides answers and insights relevant to our research questions: PX is researched or approached in relation to a use of technology	

Table 2 Review strategy and results (Yes = The article met the inclusion criteria, Maybe = The inclusion of the article required further discussion among researchers).

STEP IN THE REVIEW STRATEGY	Journal name	IJMI	ACI	PXJ	JPX	CIN	OJNI	Total
1. Identification		27	31	39	309	18	2	**426**
2. Screening Included (Yes/Maybe)	2019	1 Yes 0 Maybe	1 Yes 0 Maybe	2 Yes 11 Maybe	1 Yes 0 Maybe	1 Yes 0 Maybe	0 Yes 0 Maybe	**37 Yes 23 Maybe**
	2020	1 Yes 0 Maybe	0 Yes 0 Maybe	3 Yes 3 Maybe	3 Yes 1 Maybe	1 Yes 0 Maybe	0 Yes 0 Maybe	
	2021	1 Yes 0 Maybe	0 Yes 0 Maybe	2 Yes 3 Maybe	19 Yes 3 Maybe	1 Yes 2 Maybe	0 Yes 0 Maybe	
Excluded		24	30	27	284	15	2	**382**
3. Selection		3	1	12	25	3	0	**44**

Based on the screening, 60 articles (including 23 requiring further review and discussion) were selected. In this selection (see Table 2), the individual screening decisions were discussed together between all six authors and the inclusion or exclusion of the "maybe" options were decided together. For instance, in the case of "maybe", the article's topic might be a digital survey to clinicians, but the patient perspective was missing in the paper. This case was then discussed between the authors and decided to be excluded. After the eligibility phase, 44 articles were included in the review (see Appendix 1), downloaded for further inspection and reviewed during the analysis. All six authors were involved in the review process and in discussions on solving the conflicting views. Further, data synthesis was performed among all authors based on the shared worksheet. The six authors met altogether 10 times during the screening and selection phases of the process.

4 Results

4.1 How Has PX Been Defined?

In the reviewed articles, precise definitions or descriptions for the concept of PX are not presented. Instead, PX is often used as a synonym for other related concepts, such as satisfaction [18-28], patient engagement [29-31], and patient perceptions [21, 22, 32]. Satisfaction studies report the use of patient satisfaction questionnaires resulting in patient satisfaction scores [18, 21, 22, 25] whereas "patient engagement" refers to the amount of engagement with eHealth solutions [30] or online patient engagement practices [31]. PX is also equated with the experiences of patients [20, 32-36], which is described as related to technology (e.g., "*virtual experience for patients with COVID-19 symptoms*" [33] and "*telemedicine experiences of individuals*" [34]). "Patient perception" refers to the "*perception of the interaction related to use of a telemedicine service*" [22] or to "*patient perceptions of the virtual rounding experience*" [32]. In six articles, the terms are used in parallel with various meanings [21, 22, 28, 31, 32, 34] and two articles even equate the terms UX and PX [37, 38].

However, PX has also been approached from a wider viewpoint, with references to the patient journey and the continuum of care. In her article, Meyer [31] refers to the description by Wolf *et al.,* [2] and states that PX consists of all interactions across the care continuum and influences patients' perceptions. By stating that PX includes many touchpoints, Meyer [31] provides the following description: "*The patient touchpoints—both to access health information and to support care processes—provide rich opportunities to enhance patient experiences*". Khairat *et al.* [33] refer to positive PX and how it is associated with illness recovery and adherence to medication. They mention that PX has been defined as patient-reported encounters and events that occur across the continuum of care. In their article, Philips *et al.* [28] approach PX from a quality perspective and argue that PX is a key feature of quality. They also refer to how PX has been shown to be correlated with improved patient adherence, potential health outcomes, and financial performance.

4.2 Which Factors Influencing PX and Components of PX Have Been Identified and Researched?

Regarding our second research question, concerning the aspects of PX, our approach included two viewpoints: factors influencing PX and components as part of PX. Further, the viewpoints were categorized into four thematic groups (see Figure 1). The factors influencing PX were related to the type and quality of the eHealth solution as well as the eHealth-supported care process. The components of PX related to communication, remote interaction, risks and concerns with telehealth, and patients' attitudes towards telehealth.

Types of eHealth Solutions for Patient Use

Numerous articles [18, 24, 29, 31-33, 37-47, 55, 58, 59] describe telehealth and eHealth solutions for patients, which are found to influence PX (Figure 1). The most frequently studied were the following:

- Technologies to support virtual visits—for example, in primary care [39] and virtual care, including video consults and remote monitoring of vitals—among patients with COVID-19 [40];
- Online tools and platforms for patients—for example, a self-management program for patients with scleroderma [41], an online prescription drug choice tool [38], and an online platform for patients undergoing primary hip and knee replacements [42];
- mHealth applications—for example, a mobile health solution to support people with heart disease [43] and heart failure [44], and a mobile biobehavioral regulation system for trauma patients [45].

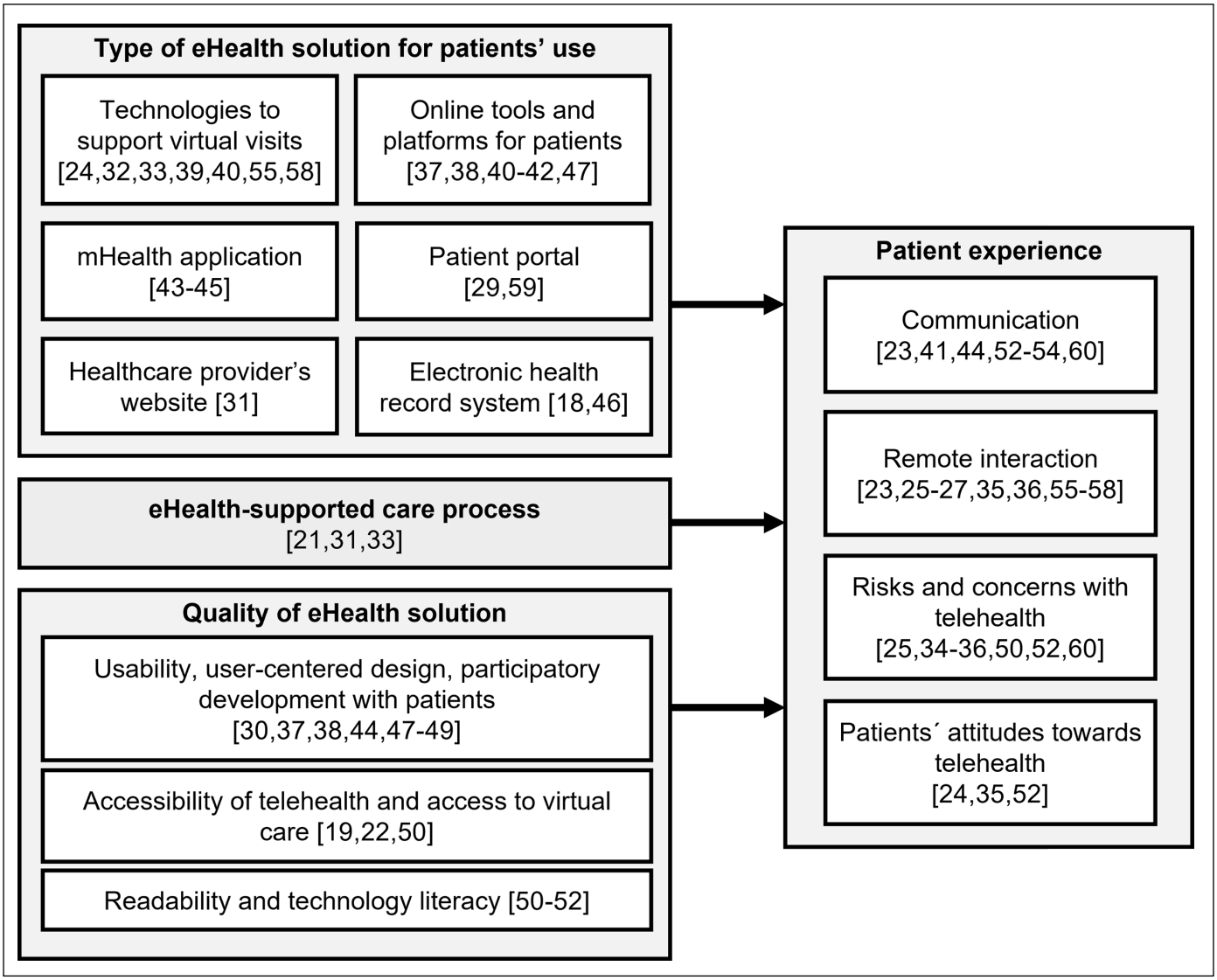

Fig. 1 The factors influencing PX and the components as part of PX.

The eHealth-supported Care Process

The articles describe various approaches to how eHealth can support care processes. Abbatemarco *et al.*, [21] illustrate a model for multidisciplinary clinics on how providing virtual care adds value to patients. Their model incorporates people, processes, and technology, and it aims to address the needs of patients [21]. In a study concerning the transition from the old electronic health record system to the new, the measured factors were communication with nurses and doctors, the responsiveness of hospital staff, communication about medication, discharge information, the care transition, and the hospital environment [46].

According to Mayer [31], patients desire convenient, easily accessible care, which can be presented from three perspectives: location, access, and efficiency. Patient touchpoint processes during the patient journey need to be timely, reliable, flexible, and personalized [31]. Similar themes are incorporated into telehealth best practices [33], which highlights the importance of setting expectations prior to a virtual visit. To ensure a positive experience, the recommendations for patients are the following: (a) understand that symptoms may be better understood in person; (b) during registration, provide accurate and complete patient information; (c) when speaking, look directly into the camera; (d) ensure a private and quiet space; (e) when internet access is limited, consider a phone call instead of a video call; and (f) clearly communicate symptoms and complaints to convey the provider's decision [33].

Quality of eHealth Solutions

Usability, user-centered design, and participatory development of eHealth with patients: The articles on PX include studies with patient-centered design [44, 38, 47], usability evaluation [48], and research on users' experiences on acceptability of an intervention [37]. Study findings indicate that solutions designed with a patient-centered approach improved UX [38] and demonstrated high patient satisfaction scores [47]. Further, two articles [30, 49] describe a framework to inform the patient-oriented design technology solutions for improving PX. Werner *et al.* [30] propose a framework for personal health information management, which includes seven dimensions: privacy, engagement, guidance, documentation, physician distribution, flexibility, and external cues. Several of these dimensions are supported by a review article [49] on the development of technology used by patients.

Accessibility of telehealth and access to virtual care: Based on a national survey study in the United States of America, the researchers suggest that access to virtual care is a valuable aspect of PX [19]. Likewise, a stable internet connection to support access to telemedicine services and the type of medical specialty were found to significantly impact patient satisfaction [22]. A study of rheumatology patient satisfaction with telemedicine found that for senior patients, the challenges of using the services include a lack of appropriate skills, such as technology literacy, the type of internet connection, and a lack of digital devices to enable virtual visits [50].

Readability and technology literacy: Along with accessibility, one factor that may have a positive influence on PX includes readability, or more precisely, providing health information at an appropriate literacy level [50-52].

Components of PX Arising from the eHealth Perspective

Communication: Communication and information sharing between patients and caregivers are characterized by the following: trust and respect with the care team [44], comfort when talking with the professionals [53], easy access to reliable and accurate information [41], concerns about the security and confidentiality of patient information transferred between the professionals [54], and the ability to communicate nonverbally with the professionals [23]. Other important stakeholders for patients include family members and local support groups [41, 44]. Patients seek acceptance of their own situations and awareness through community engagement and interpersonal relationships [41, 44].

Remote interaction: Numerous (N=10) studies approach PX by comparing the remote experience with the in-person experience [23, 25-27, 35, 36, 55-57, 58]. These studies point out the following quality aspects of remote care: patient burden [55], access to information [55], the amount of information given to the patient by the provider [56], the experience of being heard [56, 57], trust towards the provider concerning care [56], the ease of contacting the clinic and scheduling the appointment [35, 56, 57], the experience of safety protection [35, 57, 58], and the decrease in nonverbal communication [36].

Risks and concerns with telehealth*:* The main concerns regarding the use of telehealth in care from the patient's perspective are related to quality of care [52], privacy [52], challenges with technology [34], a lack of physical contact [25], previsit instructions [34], and the patient's preference for in-person care and sustaining the humanistic, therapeutic aspects of care [36]. Challenges in using online resources include feeling sad or depressed, feeling anxious and uncertain about the future, and having a caregiver to speak to regarding all aspects of care [60]. In addition, senior patients were found to be concerned about a lack of video-enabled devices and internet connectivity, as well as limited technology literacy [50].

Patients' attitudes towards telehealth: Generally, virtual visits and consultations are considered acceptable and practical compared to in-person appointments [35, 52]; however, older patients prefer face-to-face appointments or access to video consultation facilities [24].

4.3 Which Research Methods Have Been Used to Study PX?

The aim of our third research question was to determine the research methods used in the articles to study PX. The reported methods are presented in Figure 2. We identified nine different higher-level research methods under four categories. For example, we grouped all interviews together, despite whether they were semi-structured or open, and we grouped all surveys together, although some included open-ended questions. In some of the research papers, a combination of two or more methods was applied. However, each study is included in only one category.

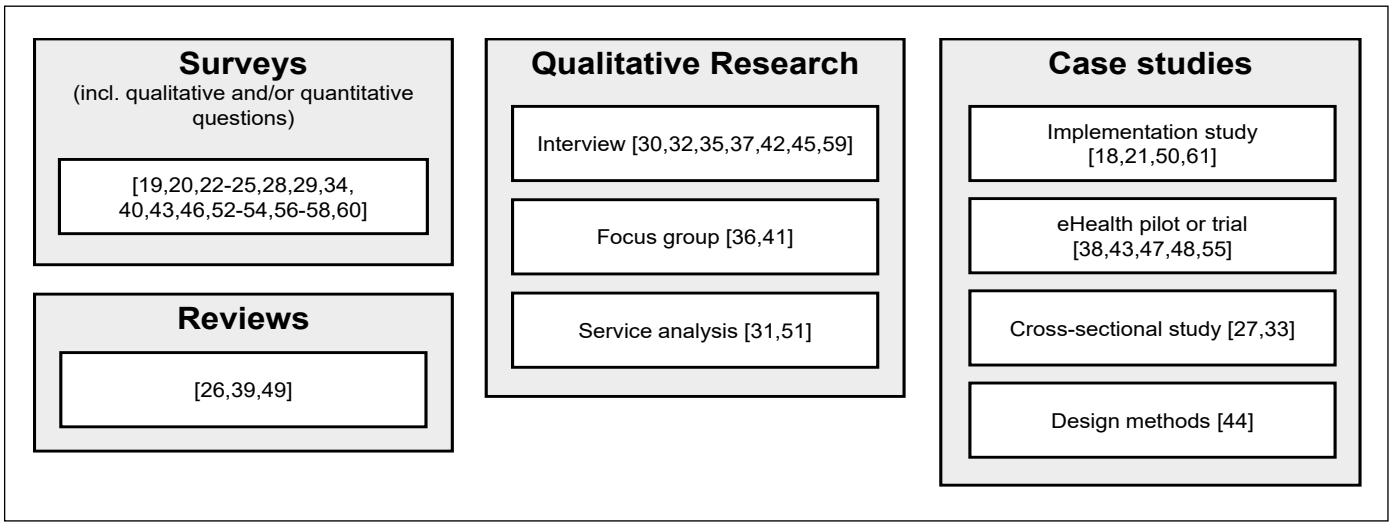

Fig. 2 Methods used in PX studies.

The most frequently used method (i.e., surveys) was applied in 18 papers (see Figure 2). As patient satisfaction was one of the most mentioned aspects affecting PX, patient satisfaction surveys were the most broadly applied. In addition to the papers listed under surveys, surveys have been applied in some of the implementation studies or trials as an evaluation method. In addition, three of the articles were based on reviews [26, 39, 49].

Interviews—most often semi-structured interviews—were the next most mentioned method, and the most commonly used qualitative research methods, with seven mentions [30, 32, 35, 37, 42, 45, 59]. Focus groups [36, 41] were used in two studies. There were also two articles grouped under "service analysis" in which the researchers analyzed different eHealth services and their contact points from the patient's point of view [31, 51]. These analyses were conducted without direct patient contact.

Varied case studies were also commonly used. In four articles, a new service or technological solution was implemented, and its effects on PX were evaluated by different means. These were grouped under "implementation study" [18, 21, 50, 61], and they often included another research method, such as questionnaires [50]. Similarly, the five papers that reported different pilots or trials [38, 43, 47, 48, 55] also included other methods, such as surveys or usability studies, to further evaluate the success of the trial. More rarely, used methods included and cross-sectional studies [27, 33]. One research paper applied different design methods, such as journey maps and stakeholder maps [44].

In conclusion, it seems that PX is evaluated with mainly quantitative patient satisfaction surveys and is supported by analyses of open-ended questions and qualitative interviews; however, at times, more UX and design-based methods have been applied.

4.4 What Are the Recent Trends in PX Research from an eHealth Perspective?

Based on our review, we were able to recognize several trends and emergent themes in PX research. First and foremost, it should be noted that this review was based on articles from 2019 to 2021, and thus the **effects of COVID-19** on the offering of eHealth services could clearly be observed. COVID-19 has forced healthcare providers to shift to remote service and virtual visits and to take advantage of eHealth. Eleven articles [19, 21, 24, 31, 33, 36, 40, 52, 56-58] report the use of telehealth and eHealth services during the COVID-19 pandemic, and as Bomher *et al.* [57] note, these services have been well received by patients.

The next trend, observed in eight papers, concerned **the effects of eHealth technologies on PX** [24, 30, 33, 36, 40, 50, 53, 58]. The studies were focusing on how a traditionally in-person provided service is experienced online, especially when patients have conditions that require direct contact with the caregiver (such as rheumatism, cancer, and musculoskeletal problems). In these cases, some problems related to PX were reported, especially for elderly patients [24, 50], although, in general, eHealth services increased patients' feelings of safety [24, 50] and confidence [40]. The need for training was noted [33], as well as for further research on PX's effects, barriers, and enablers [50] from both patients' and caregivers' points of view [53].

Regarding the **research methods applied while studying PX** in relation to eHealth services, PX has been reviewed especially from a patient satisfaction perspective, e.g., [23, 26, 53]. This viewpoint can be seen as slightly narrow when considering PX as a complex and broad concept, as suggested by Wolf *et al.* [2, 3]. This viewpoint could be broadened by exploring the relationships between PX and related concepts at a conceptual level, or by researching how different

service design methods and visualizations (e.g., journey maps and stakeholder maps) could add value to PX research [44].

Finally, one forward-looking theme involves the possibilities provided by **new technologies**, such as artificial intelligence and machine learning, in eHealth, and research on how they can enhance treatment. Artificial intelligence can be used, for example, in physiotherapy to analyze patients' movements and can thus provide additional information to caregivers [52]. Machine learning can be applied in tailoring instructions and can be used to guide patients based on their personal health information [30]. Different types of data gathered by eHealth services could be analyzed and further utilized in newer and more accurate types of services [49]. Technology can also enable support and contact points that are nondependent on time and place [37], which adds value for patients and improves PX.

5 Discussion

5.1 Main Contribution

We have described a review of recent PX research from an eHealth perspective. The identification phase resulted in 426 candidates for the review, of which 44 were selected for analysis after an eligibility check. Most of the selected articles were from the *Journal of Patient Experience* (n=25) and the *Patient Experience Journal* (n=12). The following sections discuss the implications of the review's findings with regards to the four research questions:

1. How has PX been defined?
2. Which factors influencing PX and components of PX have been identified and researched?
3. Which research methods have been used to study PX?
4. What are the recent trends in PX research from an eHealth perspective?

Definitions for PX are Lacking

Precise definitions for the concept were not presented, and only some articles, e.g., [31, 33], referred to definitions presented by others—for example, Wolf et al. [2]. These articles [28, 31, 33] were published in the *Journal of Patient Experience*. The articles published in the informatics journals (IJMI, ACI, CIN, and OJNI) did not include any definitions or references to definitions by others, and the descriptions given of PX were vague. The articles published in the *Patient Experience Journal* did not include definitions or references, even though the article "Defining Patient Experience" was published in the forum in 2014 [2] and was followed by other closely related articles elaborating on the concept of PX, e.g., [1, 3]. Instead of defining PX, most of the articles describe the objectives of the study with reference to PX, how the research was conducted, and how the results relate to or impact PX. Further, the concepts "patient satisfaction", "patient perceptions", and "telehealth experiences" are inconsistently used in varying meanings in parallel with PX.

Numerous Factors Influencing PX as Well as Components of PX Were Identified

We categorized the observed themes into two viewpoints: (a) factors influencing PX via eHealth and (b) components being part of PX (see Figure 1). When comparing our findings with the six dimensions described by Wolf et al. [2], there seem to be few similarities (e.g., related to communication and the continuity of care aspects). Wolf *et al.* [2] suggest in 2014 that PX should be studied beyond the results of surveys focusing on patient satisfaction because PX involves more than satisfaction alone. This same focus on satisfaction surveys was also identified in our review.

The Most Applied Research Methods Were Surveys

The methods described in the articles focused strongly on surveys. Surveys provide information in a systematic and comprehensive way; because patient satisfaction was often the focus of the studies, surveys suited this purpose well. However, patient satisfaction surveys were often the only measure used to draw conclusions on the experiences of patients; as several of the studies focused on comparing patients' experiences with in-office and virtual visits, surveys were a natural choice for gathering comparative data. In addition, at times, the surveys did include open questions for qualitative responses, and surveys were also applied together with other research methods. Further, one reason for the increased popularity of surveys is that during the COVID-19 pandemic, surveys were easy to conduct and did not require personal contact with the patients. Regarding other methods used for studying PX, interviews and focus groups were applied quite commonly, clearly bringing more qualitative viewpoints to the research.

Future Trends: From the COVID-19 Era Towards New Technologies

We observed that the effects of COVID-19 on eHealth services were a very popular theme. The pandemic has forced many services online, which has also naturally increased the popularity of eHealth services. The effects of eHealth technologies on PX are a timely topic that requires further research. Further, the possibilities offered by new technologies (such as artificial intelligence, machine learning and utilizing gathered data on a more general level) and how they can provide additional value for patients and improve PX is another future trend and a topic for further research.

5.2 Evaluation of the Study

A limitation of this review is that it focused only on six journals and covered articles published in recent years (2019–2021). Our literature search using the search terms "patient experience" and "eHealth" or similar technology led to the identification of more than 400 articles. Had we extended the search to cover "patient satisfaction", that number would have increased significantly because of the inconsistent and vague terminology in PX. On the other hand, it is possible that this could have enabled us to find more eligible articles for our analysis. Further, extending the review to cover more than six selected publication forums would have enabled us to find more relevant articles; however, due to the multidisciplinary nature of PX research and the

diversity of experience-related terminology, the amount of work in screening the articles would have expanded greatly.

We found surprisingly few relevant articles from informatics journals. Only four articles from IJMI and ACI were included in our review. The focus on PX in these articles was very limited, and based on our search, there does not seem to have been a growing interest in the topic between 2019 and 2021. The same observations apply to nursing informatics journals (OJNI and CIN), from which only three articles were included in the review. Most of the articles in our review were published in PXJ and JPX, which specifically focus on patient experience. These journals are relatively new and include various types of articles of varying academic quality. In these forums, interest in the eHealth perspective seems to be a rapidly increasing trend. As an example, in JPX, the most recent themes of the published special collection are "COVID-19: Patient and Clinician Experiences" and "Telemedicine/Telehealth: Patient and Clinician Experience" [62]. In our review, 17 of the 25 articles from JPX came from these collections.

Our scoping review did not strictly follow the PRISMA protocol [16, 17] due to the large number of articles and the request to perform a limited review on a selected topic. For example, we did not produce a PRISMA flow diagram, but instead explained the process with a narrative and showed the search strategy in Table 2. The exclusion of articles was based on commonly agreed exclusion criteria, and thus, the single reason for excluding a certain article was not recorded. Furthermore, in cases of the slightest ambiguity of an article it was examined together among the all six authors. In addition, due to the quality of the research questions and the objectives of the study, no critical evidence-based assessment in accordance with the PRISMA protocol was performed in this review. Also, the PRISMA data map for synthesis is missing, as we wanted to simplify the findings and divide them into themes according to the research questions.

The review was conducted by six researchers working on eHealth research projects with backgrounds in nursing, human-computer interaction, user-centered design, and UX research. Considering these backgrounds, the focus on the eHealth perspective in the review is well justified; however, due to the multidisciplinary nature of PX research, a more comprehensive review of the topic would be facilitated by involving researchers from various research fields.

5.3 Relevance of the Topic

The theme of the review is highly relevant and timely, considering the COVID-19 pandemic and the increasing interest in PX in several research fields. Unexpectedly, it seems that the concept of PX has not been described, and that definitions have not been presented in the academic literature, despite the considerable amount of research on PX. These findings outline the need for further research to describe and elaborate on the concept. Similar challenges and a similar trend emerged in recent decades in UX research [63, 64].

COVID-19 has prompted research on virtual visits and telehealth experiences, which is clearly shown in the reviewed articles. As such, the pandemic may have increased research interest in the experiences of virtual visits and the impacts of virtual visits on PX compared to in-person appointments. On the other hand, it is possible that the pandemic has forced the postponement of some PX studies involving patients as participants, and it may have shifted the focus from more basic research towards telehealth usage and related experiences.

5.4. Future Research

This paper presents a rather focused scoping review on PX. Thus, we see that it would be beneficial to conduct a broader systematic literature review on PX, its definitions, and factors influencing the PX, without the focus on eHealth alone. It would be important to study the topic further so that it would be possible to describe the framework and different components and aspects of PX, what is included, and what is not. For example, research by Wolf *et al.* [2-4] provides a good starting point that combines the understanding of the topic as it has evolved over several years. Furthermore, a future study in a collaborative setting could define what PX is and how it is defined (similarly to the work that aimed to define UX [63]). In addition, the relation between the methods used to study PX and how they fit the different aspects of PX as well as how different technologies and processes affect PX would also be suggested future research areas.

6 Conclusions

There is increasing interest in research on patients' experiences of care and satisfaction in several disciplines; however, in research papers, the concept of PX remains vague. COVID-19 has prompted the development of eHealth services and the use of telehealth to enable virtual visits and support self-care. PX is a complex phenomenon and in eHealth studies, PX is used as a synonym for patient satisfaction and the telehealth experience. Based on this review, a commonly agreed-upon definition of the concept is lacking. Further multidisciplinary research is needed to understand PX as a phenomenon, outline a framework for the research, and propose a conceptualization of PX.

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