

Experiences of Navigator, a Finnish patient-segmentation service, in primary care: A mixed-methods study

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Abstract

Aging and multimorbid populations burden health services worldwide. Segmenting patients with similar health service needs into different groups and guiding care providers to tailor services to these groups could reduce this burden. Methods of patient segmentation have been based on, e.g., databases. However, the Finnish patient-segmentation innovation Navigator (Suuntima) considers patients' perspectives on their coping in everyday life, as well as professionals' views of the patients' state of health. The segmentation is based on questions. The resulting care pathway related to the group helps professionals to coordinate patients' health care and patients to utilize appropriate services.

This first part of Navigator's validation study evaluates its feasibility and content and face validity. We assess the web-service's user experiences at nurses' appointments with diabetic patients, time consumption, and Navigator's question relevance, comprehensiveness, and comprehensibility.

This mixed-methods study uses user experience questionnaires for both patients and professionals, and semi-structured focus-group interviews for professionals. We used descriptive statistics in the quantitative data analysis of the questionnaire study and thematic analysis to identify the codes and themes in the interview data.

All 304 Navigator queries were completed at appointments. Most patients found Navigator easy to use. It helped in considering their situation better and from new perspectives. Most patients did not find it too time-consuming. Most professionals found it easy to use and suitable for appointments and patient segmentation. The questions were easy and unambiguous, and they assisted in discussing new or sensitive issues. Most queries were completed in less than 19 mins and less time was used if the patient was assigned to the nurse. Thematic analysis raised five main themes: 1) Well-functioning web-service, 2) Stimulus for conversation and action, 3) Rationale to complete Navigator with a professional, 4) Training and experience ease the use of Navigator, and 5) Navigator's room for improvement. Subthemes were identified for three main themes.

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We consider Navigator's feasibility and face validity to be favorable. We suggest user instructions and the clarification of concepts to support the questions' comprehensibility. Some patients may benefit from a nurse's presence when responding to Navigator's questions.

Keywords: patient navigation, ehealth, validation study, feasibility, primary health care

Introduction

The need for health services is increasing worldwide because of aging populations and increasing multimorbidity [1,2]. Patients' varied individual needs for services may be unmet, leading to complications in long-term conditions and rising medical care costs [3-6]. The vast care burden could be reduced with patient segmentation, i.e., recognizing and separating patients with similar health service needs into different groups and guiding care providers to tailor and offer targeted services to these groups [7,8]. Patient segmentation methods have been based on databases and, e.g., electronic health records [8,9], meaning that the patient's individual view of their coping in everyday life remains absent. However, patients' perspectives should be considered in mutually planning their individual health care.

Navigator (Suuntima) is a web-based, non-profit service for patient segmentation innovated in Finland. The service segregates patients into four customer-ship strategy (CS) groups, and each group has a separate care pathway. The pathways advise health care professionals to define the focus of the patient's care plan, the care coordinator, the methods of contacting health-care services and making appointments, alternatives to appointments, and services typically included in certain pathways. Patient segmentation is based on questions. While the patient's questions study the capability to manage in everyday life, the professional's questions study the patient's health state and complexity of care. The service then

proposes a care pathway related to the CS group. Questionnaires are completed during a conversation, e.g., at a health center. Therefore, the patient's individual perspective on coping in everyday life is considered. Navigator's development process in Finland, Navigator's questions, the response options on a Visual Analog Scale (VAS), and the description of the four care pathways related to the CS groups are described in detail in Navigator's validation study protocol article. [10]

This is the first scientific study to assess Navigator's feasibility, content, and face validity at nurses' appointments at a health center, and this study is one section of the complete validation study.

Definitions and outcomes of feasibility vary and include e.g., acceptability, usability, user experiences or satisfaction of eHealth interventions [11-16]. Content validity is defined as the questionnaire's ability to adequately reflect and measure the targeted construct, and the property of an existing measure can be assessed by studying patients' and professionals' views of the relevance, comprehensiveness, and comprehensibility of the items, response options, and instructions [17,18]. Face validity is the first impression of the instrument [18]. Mixed-methods research means assessing end-users' views of Navigator with qualitative and quantitative methods [19-22].

The aims of this study are to assess (1) what kinds of user experiences of Navigator did the patients with diabetes and nurses have at appointments at a health center, (2) if Navigator's questions are

suitable to use, as well as (3) Navigator's content and face validity.

Material and methods

Educating professionals to use Navigator

A researcher (RR) informed the professionals about the study and data collection process and educated them in using Navigator. The service was free to use. Navigator is not connected to electronic health records, so interoperability issues are not a concern.

Data collection

Data collection is based on the patients' and professionals' user experience questionnaires and semi-structured focus-group interviews with professionals. The patients' demographics were collected with a questionnaire as part of the whole study. The questionnaires and the interview's frame, as well as the data collection methods with diabetic patients and nurse professionals at the health center, are described in Navigator's validation study protocol [10].

Quantitative data

We used three self-generated questionnaires to assess end-users' experiences concerning Navigator. Professionals filled the first questionnaire after every patient with whom they used Navigator, and they filled the second one at the end of the whole data collection process. Professionals gave the study questionnaires to patients and advised them on returning the questionnaires.

Qualitative data

Open-ended questions for both nurses and patients assessed specific difficulties in responding to Navigator and opinions on the CS group allocation.

Four semi-structured focus-group interviews were carried out at Valkeakoski health center. At the time of the study, the professionals had used Navigator for five to six months. The interviewer (RR) was an employee of Valkeakoski health center and a colleague of the interviewed nurses. The nurse participants had signed an informed consent form for the entirety of the study. They were aware of the goals of the interview and RR's reasons for conducting interviews as part of her PhD studies. Topics for the interview and questions were provided by the interviewer. No field notes were made during or after the interviews. The interviews were audio-recorded with smartphones, and an official service provider transcribed them verbatim. The transcripts were not returned to the participants.

Data analysis

Quantitative data

We used descriptive statistics in assessing the quantitative data. We analyzed the data with IBM SPSS Statistics version 25.

Qualitative data

Responses to the open-ended questions of the questionnaire study were analyzed by researcher RR.

We analyzed the transcribed interviews and used six phases of thematic analysis to identify the codes and themes that derive from the data [20,23]. After familiarization with the data, the

authors (RR, TK, EK) separately coded relevant items in the text, and then collated them together. Thereafter, two authors (RR, TK) separately examined and clustered the codes into subthemes and themes. RR and TK collated and defined the themes together, and they were validated by EK. Then we all considered and discussed the themes and subthemes, and in consensus named and translated them into English.

The authors involved in analyzing the interviews are MDs and experienced general practitioners. EK and TK are professors of general practice at Tampere University and are active in primary care research and experienced in coding and thematic analysis. RR is a PhD student. She conducted the interviews as part of her PhD studies on Navigator's validation.

Results

A total of 16 professionals and 304 patients participated in the entirety of the study. All 304 Navigator queries (100%) were completed during data collection. Professionals returned all 304 patient-specific user experience questionnaires, and 14 (87.5%) professionals returned the second user experience questionnaire. The patients' questionnaire was among the other study questionnaires, and 272 (89.5%) patients returned these questionnaires.

A total of 14 professionals participated in the four focus-group interviews, each professional in one interview. Four professionals participated in the first two interviews, and three professionals in the following two interviews. The sessions lasted for 34 to 61 minutes (61, 59, 47, and 34 mins in this order).

The professionals' work experience in the health center and the patients' demographics are presented in Table 1.

Table 1. Characteristics of nurse professionals (n=14) and patients (n=304) participating in the study.

Characteristic	Range	N (valid %)	Mean	SD
Nurses		14		
Work experience in health center (years)				
	1 – 30		13.9	9.85
≤ 2		3 (21%)		
3 – 10		2 (14%)		
≥ 11		9 (64%)		
Patients		304		
Age				
	30 – 90		68.9	8.97
≤ 59		40 (13.2%)		
60 – 69		109 (35.9%)		
70 – 79		123 (40.5%)		
≥ 80		32 (10.5%)		
Gender				
Female		156 (51.3%)		
Male		148 (48.7%)		
Marital status				
Unmarried		9 (3.3%)		
Married (in relationship)		178 (65.9%)		
Divorced		40 (14.8%)		
Widowed		43 (15.9%)		
Missing		34		
School education				
Comprehensive		101 (37.4%)		
Secondary school graduate		4 (1.5%)		
Vocational		102 (37.8%)		
College		44 (16.3%)		
Academic		19 (7.0%)		
Missing		34		
Employment				
Employed (incl. self-employment)		28 (10.3%)		
Unemployed		11 (4.1%)		
Unable to work		3 (1.1%)		
Retired		229 (84.5%)		
Missing		33		

Principal results

Quantitative data

The patient’s user experience questionnaire assessed how easy it was to respond to Navigator (Figure 1). On a Likert scale, the patients’ combined answers rated responding as easy (completely agree – agree) in 90.4% of answers and disagreed that responding was difficult (disagree – completely disagree) in 79.0% of answers. Time consumption was considered not too excessive in 79.6% of responses.

The patients responded that Navigator helped them to consider their situation and coping from new perspectives in 57.4% of answers, while the professional’s questions were considered helpful in 60.9% of answers. Some 85% of patients agreed with Navigator’s proposed CS group and care pathway result.

All 14 professionals considered Navigator easy to use (Figure 2). Navigator’s suitability to be used in

an appointment was agreed with in 12 responses, and Navigator was considered plausible in nine answers. Nine professionals considered the questions unambiguous, and eight disagreed with the claim that the questions were too broad to be answered on a VAS. Most professionals (n=12) disagreed with the claim that questions were difficult to understand. Ten professionals agreed with the claim that the questions made it easier to raise difficult issues, and seven agreed with the claim that the questions raised new issues for conversation. Most professionals (n=11) considered that the questions helped them to extensively understand the patients’ general care. All professionals considered Navigator suitable for patient segmentation, and most professionals (n=11) considered the results usable in coordinating care for patients with long-term conditions. The professionals’ good prior knowledge of customer-ship strategies before using Navigator was agreed with in four answers and disagreed with in nine answers.

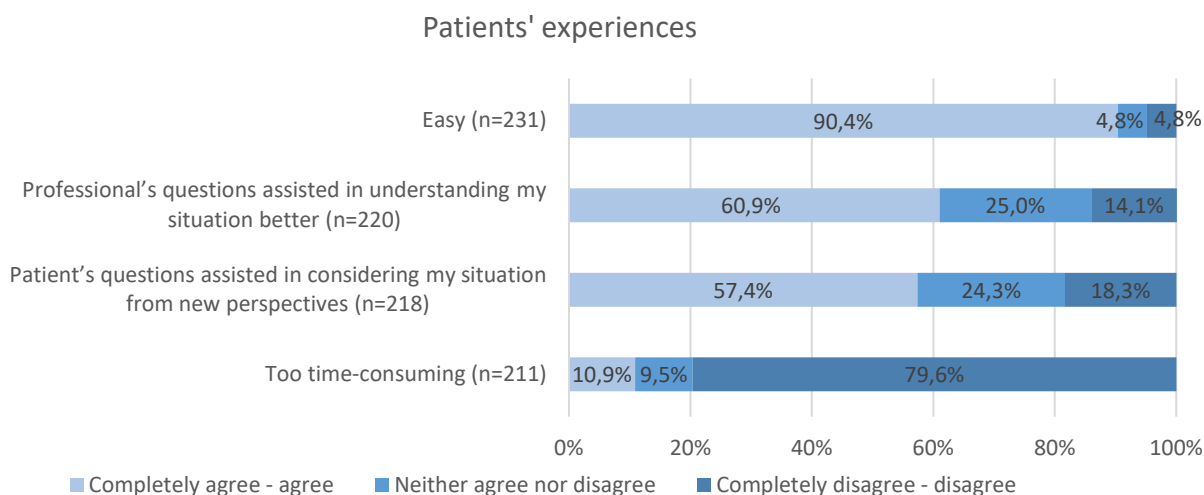


Figure 1. Patients’ experiences of Navigator based on the responses in the user experience questionnaires.

Professionals' experiences

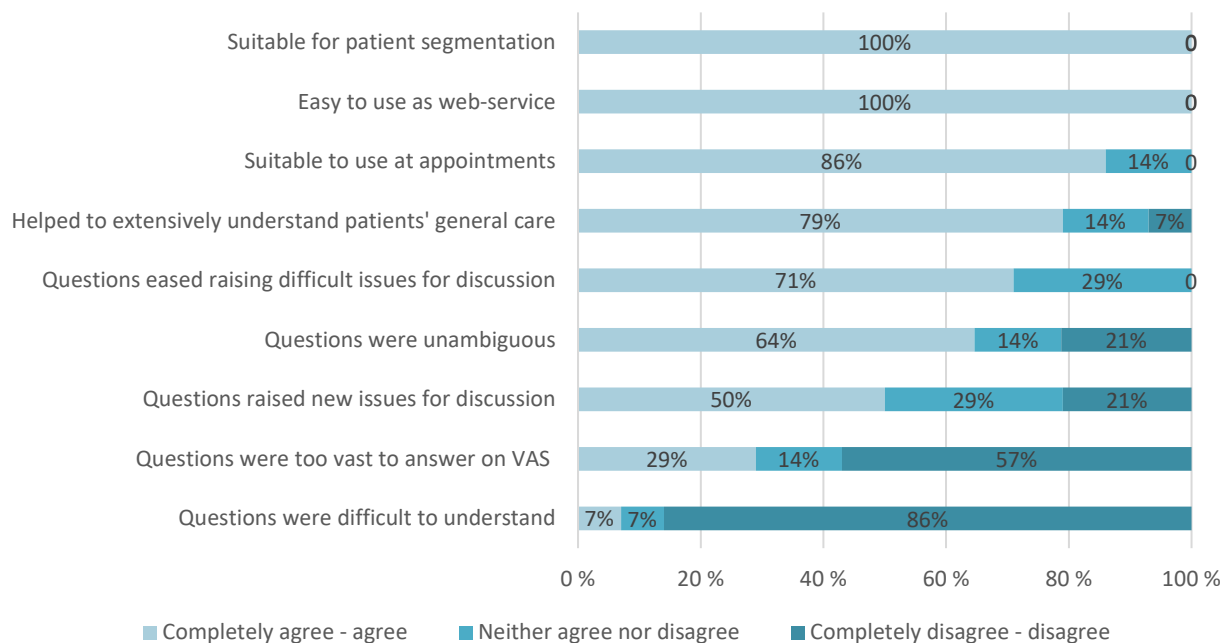


Figure 2. Professionals' (n=14) experiences of Navigator based on the responses in the user experience questionnaires.

Time consumption in using Navigator

The question of time consumption was responded to in 301 (99.0%) of the professionals' patient-specific questionnaires. During the 60-minute appointments, less than 20 minutes was used with 88.4% of patients (n=267) and less than 25 minutes was used with 96% of patients (n=290).

We examined the influence of the patient-nurse relationship on time consumption using Navigator. There was a statistically significant difference in time consumption (classified in categories less than 10 minutes, less than 19 minutes, and 20 minutes or more). Nurses and patients used less time with Navigator if the patients (n=177) were assigned to the nurses as their own patients compared to those who were not (Pearson Chi-Square test, $df = 2$; $\chi^2(2) = 26.067$, $p = 0.000$). The patients' gender, age, school education, and employment

status did not have a significant impact on time consumption.

Qualitative data

The open-ended questions for professionals generated a few responses concerning difficulties in using Navigator. For example, not all patients knew the meaning of "self-care," and the question "how to seek professional help if needed?" was difficult to understand. Using Navigator was time-consuming, with old and talkative patients describing their issues widely. However, in these situations, Navigator helped in returning to the subject. In addition, it was time-consuming when the patients and their relatives disagreed on responses. Some patients were poor in making decisions between response options. Disagreement between the professionals' views of the patients' real life

and the patients' responses in Navigator were described in a few responses.

"Technically, Navigator has been functioning well."

Thematic analysis of focus-group interviews

"It is simple and does not take a long time to answer."

We identified five main themes describing the interview's content concerning Navigator's feasibility and content and face validity. The themes are: 1) Well-functioning web-service, 2) Stimulus for conversation and action, 3) Rationale to complete Navigator with a professional, 4) Training and experience ease the use of Navigator, and 5) Navigator's room for improvement. Subthemes were identified for three main themes (Figure 3). The themes and subthemes with professionals' quotations are described below.

Stimulus for conversations and action

The subthemes describe Navigator's impacts on conversation at the appointment. Professionals found that with some questions, the discussion deepened as the patients considered their situation:

"The question of coping in everyday life raises the discussion of difficulties in coping and the patient's means of managing."

Well-functioning web-service

"The question of other worries raises conversation easily: why are you worried or what kind of worry do you have?"

Unanimously, professionals considered Navigator a clear, simple, and technically well-functioning service:

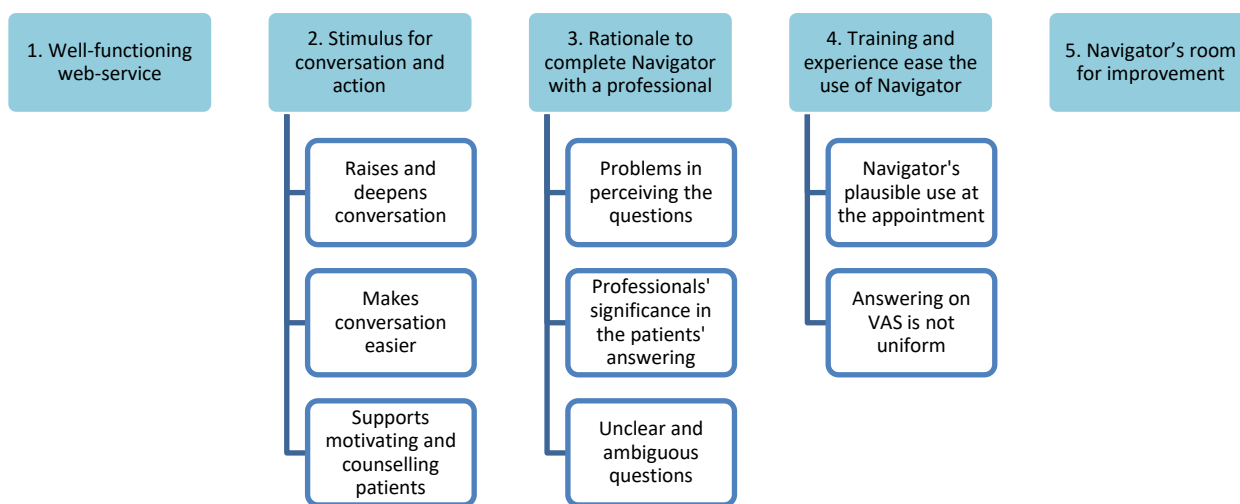


Figure 3. Five main themes and the subthemes for three main themes of professionals' semi-structured focus-group interviews concerning Navigator's use during nurses' appointments.

Some questions are considered quite sensitive. However, they are easier to raise in discussions with Navigator. In addition, sensitive issues appear in conversation:

“Somehow, I have learned to discuss those thresholds more, and this makes using Navigator more plausible in an appointment.”

By pointing out their answers on the VAS, professionals could sometimes motivate patients to improve their health state.

“I also explain and encourage patients; your care is well-balanced though you have serious illnesses. Excellent, you have done well!”

Questions enable the counselling of patients about, e.g., self-care, including its meaning and content. This was not clear for every patient.

“I have explained the meaning of self-care to some patients, because issues related to self-care are not obvious for everyone.”

Rationale to complete Navigator with a professional

It is not easy for all patients to use computers or read questions on a screen. Therefore, professionals made patient-specific decisions to help patients respond.

“I have noticed that people read and answer the question under the VAS, and I have to check if they are answering the right question.”

“I read the questions aloud, because I feel that they [the patients] cannot, or they bounce up and down... When I read the question, they realize which is the right one.”

We noticed that many of Navigator’s questions and concepts were unclear. Patients needed professionals’ help in interpretation.

The question concerning professionals needed in patients care:

“This is difficult – how to define ‘few or many’? I have answered ‘few’ if it was just me and the physician (at the health center) and no one else... but if there is care in the mental health center, specialist care in hospital... but if the visits (in hospital) are once in a year... how does it go?”

“Patients consider the meaning of ‘feeling fearful’ – does it mean fears related to these illnesses or the whole life situation?”

Training and experience ease the use of Navigator

The professionals discussed Navigator’s use, including the most natural way of using it and the most appropriate time for its use. There was person-specific variation in the views, but the consensus was that experience makes using Navigator easier.

“Always at the end of the appointment when it is most plausible. However, with a familiar patient, Navigator could be used at the beginning.”

Navigator was regarded as easier with familiar patients, and in particular, sensitive questions with unfamiliar patients were considered uncomfortable.

“When the patient has visited me for the first time, and if Navigator has been used at the beginning, it has been kind of a mistake... You do not know the issues that are

about to come up. Different answers could have been given (in a question concerning 'social or mental factors, drug or alcohol abuse, dementia or sense disorders affecting care') if Navigator was used at the end of the appointment."

Numerous aspects indicate the uncertainty in responding to questions, and it seems that a person-specific interpretation has been made when considering how to answer on the VAS:

"If I cannot decide how to answer, I put the point on the middle of the VAS."

Professionals made individual and sometimes opposite interpretations in evaluating the patient's medical status:

"If their care is well-balanced, I have considered the medical status of multimorbid patients with diabetes, hypertension, etc. as simple."

"I think that medical status cannot be considered simple if the patient has diabetes even if the care is well-balanced."

The responses on the medication regimen or issues concerning active self-care were also interpreted individually:

"Medication dosing via several routes, at different times, something special to consider when dosing medication – I think these issues are burdening."

"I compare to a non-diabetic person who does not need to pay attention to diet or to measure blood pressure or sugar."

Navigator's room for improvement

Many questions or terms were unclear either to patients or professionals, therefore professionals suggested criteria, instructions, and definitions to make the answering uniform. In addition, professionals considered issues affecting coping in everyday life that are not part of Navigator.

"How to define the ability to move – how much is good? Some patients consider their ability to exercise and some their ability to move at home without tools."

"Loneliness affects the patients' coping and may have an impact on their mood. Do patients have friends, personal relationships, daily, or how often...?"

Discussion

In this study, we assessed the feasibility and content and face validity of the Navigator service, a web-based patient segmentation method that considers the patient's individual view of coping in everyday life and the professional's perspective of the patient's health state. Our study was the first to assess these properties in primary health care in diabetic patients and nurse professionals.

Principal findings

Feasibility

Both the quantitative and qualitative results suggest that Navigator's feasibility is favorable. Most patients considered answering Navigator's questions easy and not too time-consuming. Both properties are widely mentioned as important factors when evaluating eHealth usability or acceptance [24-26]. With most patients, Navigator

was completed in less than 20 minutes. However, the interpretation of time consumption as “less is good” in this case may be questionable; with some questions, the conversation broadens or deepens to patients’ means of managing in everyday life. Discussing these issues may take time but improve the patient’s knowledge.

Professionals positively evaluated Navigator’s feasibility as a web-service both in the questionnaire study and in the focus-group interviews. The web-service was easy to complete and technically well-functioning, and all 304 queries were completed during the data collection. We regard these results as positive, as the technical usability, feasibility, and system reliability have an impact on the acceptance and implementation of eHealth systems [24,26,27].

Factors determining the failure of eHealth interventions are workflow disruption, increased workload, and efforts needed in use [24,25,28]. Navigator was considered well-functioning and fluent to complete. The service’s suitability at appointments was good. Furthermore, the professionals considered Navigator plausible to use, and it was even easier and quicker with familiar patients. This is compatible with the result of less time consumption with familiar patients. With unfamiliar patients, it may be more plausible to use Navigator at the end of appointment. This reflects the service’s flexible use and the professionals’ capability to be adaptive with Navigator when dealing with different patients.

Impaired senses affecting usability have been reported when developing telemedicine systems for geriatric patients. Patients also reported feeling more comfortable when a nurse was present [29]. Our findings of some patients’ not perceiving the right question above the VAS, as well as their inexperience in reading onscreen, were similar. There-

fore, some patients did benefit from responding to the questions with a nurse.

Content and face validity

The content validity of an existing instrument includes an evaluation of its items’ relevance, comprehensiveness, and comprehensibility [18]. Navigator’s items and questions were developed in workshops with professionals and patients [10]. Patients are the primary experts in evaluating coping in everyday life, and their participation in the development process suggests the favorable relevance of the items.

Almost two out of three patients judged the questions to have assisted them in considering their situation from new perspectives. The professionals’ questions assisted patients in understanding their situation better. These results may indicate the adequate comprehensiveness of the patient’s items. However, the significance of conversation and the professionals’ explanations may impact the results. Additionally, the professionals considered the patient’s loneliness and managing with shopping as issues affecting coping in everyday life. This is reasonable, as loneliness and social isolation may have a negative effect on health [30].

Comprehensibility was evaluated by assessing the understandability of a measure’s instructions and questions, as well as the response options matching the questions [18]. Instructions were not written during data collection. Therefore, professionals probably directly proposed instructions and criteria to assist in using Navigator. Providing instructional information for users may help them to better understand the content of the intervention and have an impact on its usage in the future [24,31].

The quantitative and qualitative results concerning comprehensibility are complementary. In the thematic analysis, there arose views of unclear, ambiguous questions and concepts for both professionals and patients, and answering on a VAS was not uniform. However, in the questionnaire study, most professionals disagreed with the claim that the questions were difficult to understand, and they agreed that the questions were unambiguous. The option to respond on a VAS was considered acceptable. The probable explanation for the complementary results may be that during the interviews, the professionals did not have as much experience of using Navigator as they did at the time of questionnaire-based data collection, which was at the end of the data collection process. The theme “Training and experience ease the use of Navigator” supports this view.

Face validity is described as the first impression the user receives of the instrument. Navigator was considered visually clear and simple by professionals, and the colors – yellow and blue – of the Visual Analog Scale did not guide the patients’ answers in any way.

Strengths and weaknesses of the study

Navigator is general and suitable to be used with patients with any long-term condition in primary or hospital care. The feasibility and content validity evaluated in this study with diabetic patients and professionals in primary care is therefore justified.

Mixed methods – questionnaires and e.g., focus-group interviews – have been used separately and together in evaluating the design, user experience, feasibility, usability, and acceptability of different eHealth systems [11-16,21,22,24,31,32]. We studied both end-user groups’ experiences of Navigator with both quantitative and qualitative methods

in the data collection and analysis. Semi-structured focus-group interviews are justified for the purpose of studying the novel knowledge of user’s experiences and the views of several participants in a real environment [20]. Therefore, the design is one of the strengths of this study.

Navigator was 100% completed at the appointments, and most patients participating in the study also completed the study questionnaires. Altogether, 538 patients were recruited to the study, and 56.5% of them participated. Thus, the participants were volunteers, which may reflect their general motivation to accept invitations to studies. This may also lead to self-selection bias in the results.

The results additionally suggest that a user’s manual and more guidance were needed. Therefore, the lack of instructions and insufficient education may have confusing impacts to our results.

This study has a few weaknesses. Navigator has been widely introduced and trialed in health care in Pirkanmaa, but the service has not yet been properly implemented. Therefore, the data collection was carried out only in one health center, and the results of this study cannot be generalized.

Impact of this study

Our study concerning Navigator’s feasibility and content validity is the first, and all results are new and hypothesis-generating. Based on our results, Navigator is feasible at nurses’ appointments at a health center with diabetic patients. These feasibility results may be the basis for studies of the instrument’s further properties, as usability has been regarded as critical to the effectiveness of eHealth: If high-utility applications have poor usability, they may not be accepted [25].

Additionally, the specific results of the thematic analysis will benefit the development of the user's instructions for Navigator. Clarifying the questions and defining concepts reduces the need for the end users' interpretation, and thus standardizes the responses. Furthermore, some patients benefit from the professional's presence when using the service, though this study does not identify these patients. This result could be noted in the development of Navigator's mobile application.

Further research

This study is the first part of Navigator's total validation study. Further results of the service's validity and reliability, patient segmentation, and the description of patients in different groups will follow. The use of Navigator over time, the attrition rate, specific barriers or facilitators in the service's acceptability, and properties mentioned in the literature concerning the evaluation of eHealth [33] could also be defined when the service is properly implemented in different health care settings. In addition, the effectiveness and efficacy of the Navigator service has not been proven in the entirety of this study. However, they are important properties to study in the future, along with perceived usefulness and the improvement in patient-centered care.

Conclusion

These first results are favorable for Navigator, as it seems to be feasible at nurses' appointments at a health center. We suggest some improvements, e.g., developing user's instructions and clarifying certain concepts to improve the comprehensibility of the service. Some patients may benefit from a nurse's presence when responding to the questions.

Conflicts of interest

Tuomas Koskela is a part-time salaried employee and Elise Kosunen a former part-time salaried employee of the Unit of General Practice at Pirkanmaa Hospital District. They were not involved in the development process of Navigator.

Ethical approval

The Tampere University Hospital Ethics Committee approved this study's ethical aspects in October 2018 (ETL R18070). Data collection at Valkeakoski Health Center was approved by head physician Myllynen in September 2018.

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