Patient acceptance of a telemedicine service for rehabilitation care: A focus group study

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ABSTRACT

Background and purpose: Despite positive outcomes, widespread implementation of telemedicine services in rehabilitation care is lacking. This could, for a large part, be attributed to a lack of end-user acceptance. The aim of this article is to look beyond the common theoretical approaches towards end-user acceptance (like the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology), and to explore the factors that contribute to or hinder the acceptance of a telemedicine service for rehabilitation care by patients with a chronic disease.

Methods: A qualitative, exploratory focus group approach was applied. We involved 188 patients in 22 focus groups. A guide was developed to provoke a discussion among participants of a rehabilitation clinic on the topic of using an online portal with a wide range of telemedicine features (e.g., an exercise module and a tele-conference module). Three coders, using thematic analysis, coded the focus group transcripts simultaneously.

Results: The focus groups resulted in a wide range of factors that drive or hinder patient acceptance. Facilitators included the possibility to exercise from the comfort of home, the ability to work on one's recovery, irrespective of the time schedule of care professionals, and improved quality of exercise instruction, due to the provision of exercise videos on the portal. Barriers included a lack of intrinsically motivation, experiencing portal-mediated communication with care professionals as 'impersonal', and the lack of physical space and rest to properly exercise at home. Generally speaking, participants were enthusiastic about the idea to provide the telemedicine service as a follow-up treatment as they liked to be in contact with their therapist and to continue training.

Conclusion: Acceptance of telemedicine services depends on many factors that are not part of well-established theories that explain technology acceptance. These factors are more specific than general determinants, such as ease of use and usefulness, and focus mainly on contextual factors, such as a fit between the service configuration and daily life, personal motivation and the associated psychological burden.

1. Introduction

The added value of telemedicine services for healthcare has been addressed in various reviews [1–4]. Depending on the technology, clinical aim and service configuration, these services have the potential to increase the accessibility of healthcare, to increase the quality of healthcare, and to lower healthcare costs [5,6]. Despite these potential positive outcomes, the widespread implementation of telemedicine services in daily clinical practice is still lacking [1–4] and several promising services remain in an early adoption stage [7].

Telemedicine services accepted by end-users (healthcare professionals and patients) are more likely to be successfully implemented in daily clinical practice [8]. Acceptance can be defined as "the coming about of the decision if, how and when to use a specific telemedicine

service". In generally, the acceptance of technology is a personal decision-making process and occurs in various stages [7]. Considering the acceptance of a telemedicine service the end-users must first become familiar with the service. Then, the user can form an opinion about the service. During this second stage, end-users will develop an overview of advantages and disadvantages of the telemedicine service, which they use to accept or reject the telemedicine service.

A recent review of Ryan et al. [9] charted and discussed relevant theoretical approaches for the acceptance of telemedicine services from the fields of psychology, business, information technology and health care. In the result section eight theoretical approaches were discussed. These theoretical approaches are very valuable to understand the concept of acceptance and to design telemedicine services likely to be accepted by end-users. The Technology Acceptance Model (TAM) [10]

and the Unified Theory of Acceptance and Use of Technology (UTAUT) [11] are the most common theoretical approaches to study the acceptance of telemedicine service [12]. As TAM is adapted from the Theory of Reasoned Action [13], acceptance of telemedicine services is predicted on the attitude of the user towards the service. Following this model, the intention of end-users to use the telemedicine service (behavioral intention) is independently determined by the constructs "perceived usefulness" and "perceived ease of use". Next to the TAM, which is easy to understand, there is the more complicated UTAUT model. The aim of the UTAUT model is to explain individual intention to use a technology and use behavior, based on four constructs: Performance expectancy, effort expectancy, social influence, and facilitating conditions [11]. To varying extents, these constructs are moderated by age, gender and voluntariness of use. These three determinants also serve as direct determinants of acceptance and use behavior. Both the TAM and UTAUT model have been used in numerous studies to explain end-user acceptance of telemedicine, mostly using a quantitative approach and data collection via surveys. The percentage of variance explained of the dependent variable (mostly the intention to use or actual use) in the results of these studies is quite high (ranging from 29% to 70%) [14]. But despite these positive results, several authors [9,14,15] have indicated that these models lack healthcare specific technological, environmental and individual factors to properly explain end-user acceptance for this context.

These theoretical approaches (TAM and UTAUT) are for various researchers, developers and clinicians a starting point to assess the acceptance of telemedicine services [16,14]. However, these approaches have little explanatory power for predicting the acceptance of telemedicine services [17] and their explanatory power varies across context, acceptance phase and user groups [18]. Therefore, to assess the acceptance of telemedicine services these models should also include determinants that are specific for a certain end-user group, clinical aim, technology and/or service configuration. TAM and UTAUT have their origin in research addressing the acceptance of software [19]. It is improbable that the determinants based on these theoretical approaches are sufficient to assess the acceptance of telemedicine services [14,20].

The aim of this article is to look beyond the standard theoretical approaches and to explore the acceptance of a telemedicine service for rehabilitation care by patients suffering of a chronic disease. As the acceptance of telemedicine service by end-users is mainly addressed in studies with a quantitative way [7] we will do so in a qualitative, exploratory way, by holding a large number of focus groups.

2. Materials and methods

A qualitative, exploratory focus group approach was applied in order to gather an in-depth understanding of patients' acceptance of telemedicine services for rehabilitation care. We report the study by means of the Consolidated criteria for reporting qualitative research (COREQ) criteria [21].

As a point of reference for the focus group participants, we introduced the concept of telemedicine services for rehabilitation care (Fig. 1) at the start of the focus group. The specific telemedicine service [22] that was demonstrated was an online portal that supports outpatient group rehabilitation for patients with a chronic disease. The portal provides an exercise module, through which patients can train at home, supported by a personalized training regime and exercise videos. It also facilitates teleconferencing between patient and healthcare professional. The portal was implemented into the outpatient rehabilitation program in two ways (service configuration):

1 A 3-day outpatient rehabilitation program for patients with Chronic Obstructive Pulmonary Disease (COPD) and chronic low back pain (CLBP), which, after implementation of the portal, became a 2-day program. During the first weeks of the program, patients received

three treatment days at the clinic and a training how to use the portal. After this period, the patients received two treatment days at the clinic and were expected to train at least one day at home with help of the portal.

2 A 2-day outpatient rehabilitation program for patients with COPD and whiplash associated disorder (WAD). During the first weeks of the program, patients received training on how to use the portal. After this period, they were expected to train at home, supported by the portal.

2.1. Study design

Based on TAM, UTAUT, and especially on our desire to look beyond these theories, a focus group guide was developed to provoke a discussion among participants of a rehabilitation clinic on the topic of using a telemedicine service (Table A1, see appendix). During a focus group, we addressed the following topics:

- First reaction – participants were given a short introduction of the service via a demo and a video, and asked to give their first reactions by mentioning the (dis)advantages of the service.
- Expected clinical effectiveness – as the service was implemented as part of an outpatient group rehabilitation program, participants were asked whether or not training at home facilitated by the service could be, in their eyes, as effective as training at the clinic.
- Learnability of the telemedicine service – it was unknown if participants had sufficient computer skills, therefore a part of the discussion focussed on the learnability of the service and the willingness of participants to learn how to use the service.
- Using the service at home – to train at home, sufficient space was needed, like a quiet place to put a fitness mat on the ground. We explored how this held for the participants.
- Intention to use – participants were asked whether they intended to use the service during their outpatient group rehabilitation program.
- Service configuration (the way a telemedicine service is implemented in daily clinical practice) – as a telemedicine service can be provided in various service configurations (as partial replacement of care, full replacement, as addition of care and follow-up), participants were questioned about the place they think telemedicine should take within their rehabilitation treatment.

The discussion guide was tested during two focus groups with COPD patients. The outcome of these focus groups were not included in the analysis of this article. Based on these first experiences, the discussion guide was finalized.

2.2. Participants

Participants were recruited via a Center for Rehabilitation in The Netherlands. Patients (n = 142), referred by their rehabilitation physician to the outpatient group rehabilitation program for CLBP, WAD or COPD, were invited for a focus group, prior to the start of their outpatient rehabilitation program. Participants needed to have sufficient understanding of the Dutch language and an age of 18 years or over. In total, 118 patients participated in 22 focus groups (7 CLPB focus groups, 8 WAD focus groups and 7 COPD focus groups) which makes a response rate of 83.1%. Demographic characteristics of the focus group participants were not obtained. However, the CLBP patient population mainly consists of working people, with a wide range of demographics [23]. The population of persons with WAD is also very broad, as the disorder is mostly the result of a (traffic) collision [24] Patients with COPD, finally, are mainly older individuals with a low socioeconomic status [25]. The heterogeneity of two of the patient groups, as well as our desire to create an exhaustive overview of factors that affect end-user acceptance made us decide to hold a large number of focus groups,
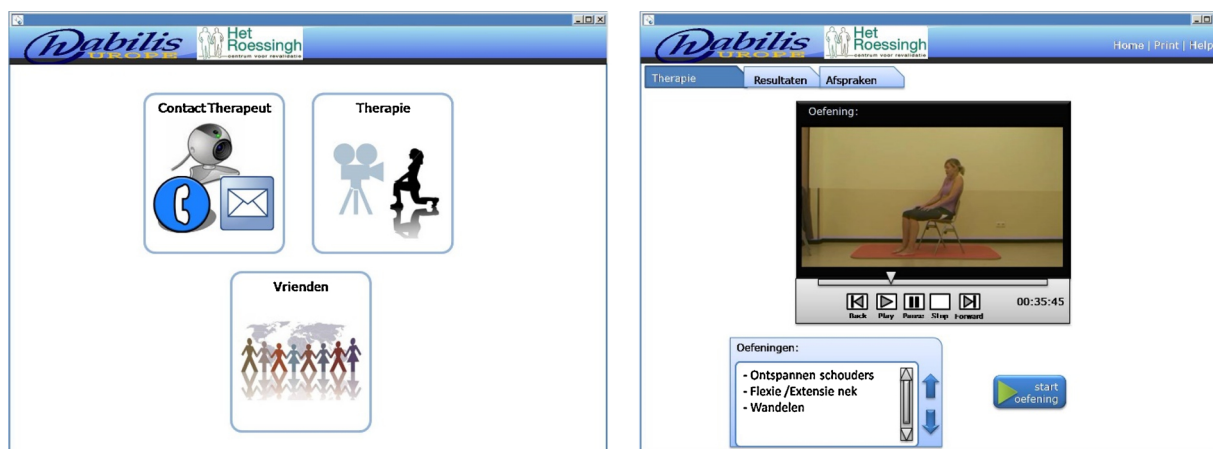
Fig. 1. Screenshots of the portal for rehabilitation care.

evenly spread over the different diagnoses.

Main reasons for not wanting to participate were a lack of interest or time. The focus groups were held at the Center for Rehabilitation. To provide additional information on the rehabilitation program, members of the care team were present during the focus groups. All focus groups were audio-recorded and observational notes were made during the focus groups by the researchers. The average duration of a focus group was 32 minutes. After the focus groups, transcripts were not returned to the participants.

Written informed consent was obtained from each respondent for publication of this report. The nature of this general focus group survey among voluntary patients did not require formal medical ethical approval, according to Dutch law.

2.3. Research team

Two female researchers (SJK & KC) with a background in human movement science (Msc) and communication science (Msc), and both trained in conducting focus groups, conducted the focus groups independently. Where KC had ample experience in moderating these sessions, SJK had limited experience. During the focus groups, these researchers were occupied as junior researchers at a research facility in the Netherlands: Roessingh Research and Development. There were no relationships between the researchers and the participants of the focus groups. At the start of each focus group, the researchers introduced themselves and explained that they were gathering data on the added value of telemedicine service for their PhD theses.

2.4. Data analysis

The transcripts of the 22 focus groups were coded simultaneously by three coders (SJK, MDW, LvV), using thematic analysis [26]. Prior to coding, an initial coding scheme was prepared, based on the interview guide. After coding the first three focus groups, this coding scheme was revised and finalized (see Table B1) and all focus groups were coded with this final coding scheme (including the first three, which were recoded). Disagreements among coders were discussed until unanimous agreement was reached. For coding and analysing the transcripts of the focus groups, software for qualitative data analysis (atlas.ti version 7.5.12) was used. Afterwards, participants were not able to provide feedback on the analysis.

3. Results

In this section, we present the results of our thematic analysis and an overview of factors that, we found, affect patient acceptance of telemedicine. To maximize understandability, the discussion of these

factors is structured in accordance to the different topics we addressed during a focus group. A summarized overview of the factors can be found at the beginning of Section 4.

3.1. Advantage vs disadvantage of use

After the introduction of the portal, the first reactions among the participants were discussed. The advantages they mentioned were:

- No travelling: Most participants liked the ideas to exercise at home and were happy about the fact that they did not need to travel to the clinic for every training session.
- Flexibility: The use of the portal gave the majority of the participants the ability to plan their own training session independently, independent from therapists and training facilities. Especially those with irregular working hours and entrepreneurs were enthusiastic about this.
- Proper instructions: The majority of the participants was enthusiastic about the videos explaining the exercises. *"The feature to see the exercise on video. Then you know how to execute the exercise properly. On paper, it is sometimes not clear. (FG 7, 8:2)"*
- Online mentoring: The participants were enthusiastic about the possibilities of online mentoring. Several of the participants appreciated the online contact with the therapist by means of video-conferencing, but there was a preference for ad hoc contact. Next to the face-to-face contacts during the rehabilitation days at the clinic, the portal gave participants the possibility to contact their therapist on a non-rehabilitation day.
- Saving healthcare costs: Especially the participants who would receive the service as a partial replacement (one day at the clinic was replace by one day training at home) noted that the replacement of on-site care by out-site care could save (further) health care costs. Participants also mentioned advantages that were not directly related to them. Implementation of the service as partial replacement of on-site care could increase patient capacity of the clinic.
- Gaining digital skills: Not all participants had sufficient digital skills and gaining these skills, by learning who to use the service, was also seen as an advantage.
- Increased treatment intensity: Participants had the idea that it was feasible to train more and to increase the intensity of the treatment in a safe manner, resulting in a more effective treatment.
- No sick leave: Fewer days at the clinic also meant, for some participants, shorter periods of sick leave.
- Recording oneself on video: The option to record oneself on video was seen as a positive point by some of the participants so as to receive feedback from the therapist on the execution of the exercises, resulting in personalized care. *"If you suffer from something,*

the therapist can look for the cause on the recording and point it out. (FG 7, 8:8) "

- Lower physical burden: As a consequence of no traveling, the participants mentioned lower physical burden, as for some participants, traveling was experienced as exhausting.
- Visuals: Most participants were positive about the aesthetics and expected ease of use of the portal.
- Sharing experiences: Training at home with the portal gave participants the opportunity to share their experiences with others outside the clinic, like their partner. *"That you can show in your home situation what you are doing. Perhaps that's nice, a bit of understanding. (FG 20, 16:4)"*

Next to these advantages, the participants mentioned the following disadvantages:

- Lack of intrinsic motivation: The lack of intrinsic motivation to use the portal to train at home was a disadvantage mentioned by several participants. Some participants were not motivated to start at all. Others were demotivated by one of the disadvantages mentioned or feared that their motivation would drop during the period of use.
- Impersonal communication: Some participants claimed that there is too much physical distance between them and the healthcare professional by communication by videoconference. This distance limits the communication and makes the contact between patient and therapist impersonal.
- Lack of self-discipline: Some participants anticipated a lack of self-discipline.
- Need for extrinsic motivators: Multiple participants claimed that they would need extrinsic motivations, such as training in a group, peer contact, or the presence of a therapist.
- Need for direct contact and feedback: Some participants preferred direct instruction and monitoring by a therapist. These participants thought that online mentoring was not sufficient; they needed the direct correction of the therapist while executing exercises.
- Time issues: Some participants thought it would be hard to plan the training sessions at home due to time issues.
- Technical problems: Several participants noted technical problems as a disadvantage. The technology or the necessary internet connection for videoconferencing could hamper or fail.
- Lack of computer skills: A *lack of digital literacy* and *computer anxiety* were the reasons some participants did not like to use the portal and to train at home.
- Recording oneself on video: Some of the participants experienced recording and seeing oneself on video as difficult. *"I cannot imagine seeing myself on video; I already have trouble seeing myself in a picture. (FG 16, 1:12)"*
- Privacy infringement: Some participants experienced training at home as a privacy infringement. As during the videoconference, the therapist could see their home environment and relatives.
- Additional complaints: The use of a computer could lead to additional complaints, such as headaches. Especially for those participants suffering from a whiplash associated disorder.
- Lower treatment intensity: several participants had the idea that training at home with the portal could decrease the intensity of the treatment, resulting in a less effective treatment. Especially those participants who received the service as a partial replacement thought that the effectiveness of the treatment would decrease.
- No up-to-date content: Some participants mentioned that it would be hard to guarantee up-to-date exercise videos on the portal.
- Insufficient space and peace at home: Some participants mentioned insufficient space at home and peace at home as disadvantages. *"Another disadvantage is that, unintentionally, your family is involved;*

they have to be quiet and children have to go upstairs. It is not just yourself, but your family too. (FG 26, 21:22)"

3.2. Expected clinical effectiveness

Most participants expected that the rehabilitation program with training at home by using the portal would be less effective than the traditional rehabilitation program. *"If I compare this (exercising at home) with an hour of physical therapy, it can never be the same (FG 2, 5:25)"*. According to the participants, the decreased effectiveness was due to a lack of intrinsic motivation and self-discipline, decreased intensity of the treatment, physical burden, lack of extrinsic motivation, absence of group therapy, insufficient mentoring and safety. There were also some participants, who thought the rehabilitation program with training at home using the portal would be as effective as the former rehabilitation program. *"If you do the same at home as here (at the clinic), I think it has the same effect. (FG 8, 14:16)"*

3.3. Learnability

Most participants thought it would be easy to learn how to use the portal. Besides, the majority of the participants claimed to have sufficient digital literacy to use the portal after a short training. Others thought that people near them (such as a partner or children) were able to help them out. Most of the participants were willing to learn how to use the portal. They had no problem with the on-site instruction sessions (2–4 h). However, some participants did, due to the fact that the training was perceived as an additional session on top of their rehabilitation program. These participants were not willing to invest time to learn how to use the portal and experience this additional session as a psychological burden.

3.4. Using the service at home

To train at home, physical space and peace at home were needed to perform exercises. The majority of the participants thought there was sufficient space at home for this. Others said they could make some place by replacing furniture. However, peace at home was problematic for several participants. For some participants it was hard to find a solitary spot at home to exercise; they did not want to bother their family. Some even thought this could lead to stress and irritation for them and/or their family. Especially the presence of young children was seen as a problem, as these children claim attention. *"I have three kids. Maybe after 8.00 PM I have time to exercise, but I always fall asleep within half an hour. (FG 11, 12:21)"*

While training at home, participants would like to have to the opportunity to contact someone, especially for technical issues. A short manual was experienced as handy, but when this manual would turn out to be insufficient, they indicated to like to have the option to call someone.

Most participants were enthusiastic about the option to have contact with their therapist(s) via the portal. This contact was provided by appointment. However, the participants preferred an ad hoc approach. Some participants would like to be able to call a therapist when they experienced complaints, such as dizziness or pain, while exercising at home.

Some participants struggled with the videoconference service, as it was experienced as impersonal and an infringement on their privacy. Another option, contact via email, was appreciated by most participants, as no appointment was needed in this case. Several participants indicated to like to have contact with their therapist by email after they finished their outpatient rehabilitation program, as follow-up treatment. However, some also experienced email as impersonal, and some

participants claimed that it is sometimes hard to explain their problem properly in writing. Other options to contact their therapists, such as via text messaging and online chat were discussed by participants, but they had no clear opinion about these options. *"When I have a problem, I would like to contact my therapist. When I have pain or an exercise has been performed incorrectly. (FG6, 7:34)"*.

3.5. Intention to use

At the end of each focus group, most participants indicated that they were willing to use the portal to train at home during their outpatient rehabilitation program. *"Yes. I am waiting already three years to start with physical rehabilitation, I do everything what can help (FG 23, 18:36)"*. There were also some participants who were not sure yet and participants who did not want to use the service due to psychological burden and computer anxiety. *"No, it is too complicated; it is too much for me. I would like to leave it here (at the clinic), and not take it back home, it is too much. (FG 6, 7:42)"*.

3.6. Service configuration

As the telemedicine service was planned to be provided in various service configurations, as partial replacement of care and as additional care, participants were also asked about their opinion concerning various service configurations. Opinions concerning the partial replacement option were mixed. Various participants brought forth the idea to start with the use of the service after making some progression with the

outpatient rehabilitation program. *"I think you can reduce the amount of onsite sessions during the program, first more supervision at the clinic and later more training at home, then you become more self-confident. (FG 7, 8:35)"*. The opinion about using the portal as additional care was more positive. However, some participants did not like this option due to time issues. The participants were very enthusiastic about the follow-up option. The idea to remain in contact with their therapist after the outpatient rehabilitation program and to have an ability to continue the supervised training at home was liked the most by participants. *"As a follow-up treatment, as a backup. Because, seven weeks are going fast, I think. (FG 20, 16:39)"*

4. Discussion

In this qualitative study, we evaluated the acceptance of a telemedicine service for rehabilitation care by patients suffering from a chronic disease. We looked beyond common theoretical approaches to gain information about determinants that could influence the acceptance of a telemedicine service. The participants mentioned various advantage and disadvantage (Table 1).

Participants did not agree on whether or not the telemedicine service motivates them to train at home. Therefore, we advise to consider determinants of engagement and persuasion in future acceptance studies. Next to this, participants disagreed with whether or not the use of the telemedicine service was a benefit or a burden. Especially the expected burden for participants' family members was a surprise and not anticipated by us or the literature. Therefore, next to the consequences

Table 1
Overview of the various advantages and disadvantages.

	Advantages of use	Disadvantages of use
mentioned 5 times or more	• No *need to travel* to the clinic to receive treatment. Participants can train at home using the portal. • Able to plan treatment *independent from treatment facility and care professionals*. • Instruction videos on the portal make it easier to *correctly execute the exercises* at home. • It is an *extrinsic motivator* to train at home and to perform exercises. • It *enables online mentoring* by care professionals.	• Participants are not *intrinsically motivated* to train at home and need extrinsic motivators such as a healthcare professionals or a group. • Mentoring by the portal (videoconference) may be experienced as *impersonal communication*. • Participants expect insufficient *self-discipline* to continue the treatment at home with help of telemedicine and to perform the exercises at home. • No or insufficient *digital skills* to use the telemedicine at home. • Training at home is individual and *group therapy is preferred*. • Participants prefer feedback from a healthcare professional while exercising. The *online mentoring* facilities of telemedicine are viewed as insufficient.
mentioned 2 to 4 times	• Participants are *intrinsic motivation* to train at home due to complaints and desire to improve their health • By replacing care at the clinical by care at home using the portal *health care costs can be saved* • Learning how to use the portal can be a first experience with a computer and therefor to *gain digital skills* • It enables a personalized training regimen, which leads to *personalized care*.	• There is a *lack of time* of use telemedicine and train at home. • Telemedicine or internet connection for videoconferencing could *hamper or fail*. • Participants are *anxious to use a computer*, due to no/little experience. • The *quality of instruction* provided by telemedicine is subordinate to the instructions provided by a therapist. • Training at home, means training alone. There is no *social context*. • As additional care, the training at home using telemedicine is experienced as a *psychological burden* • As partially replaced care, there are *fewer treatment* days at the clinic. • Participants do not like *to record oneself on video* • Participants experienced training at home as a *privacy* infringement
mentioned 1 time	• *Fewer sick leave days* for working participants, as care at the clinic is replaced by care at home • Participants can see their self on video and *check the execution of the exercise* • When exercising at home and something goes wrong, participants can contact your healthcare professionals. This provides a *sense of safety*. • After the program, telemedicine could provide *aftercare*, as a follow-up treatment. • By replacing care at the clinic by care at home using telemedicine more patients can be helped, *increasing care capacity*. • By training at home using telemedicine, participants can *share their experience* with family members.	• No energy to train at home. Training at home is experienced as a *physical burden*. • The use of a computer leads to *additional complaints*, such as headaches. • When participants train at home using telemedicine, they have no *contact with peers* with the same complaints. • There is insufficient *space at the participant's home* to train. • By training at home using telemedicine, *family members* will be involved. • Participants feel uncomfortable, *viewing themselves on video*. • Hard to guarantee *up-to-date exercise instructions*.

for the patient, the consequences for family members should be taken into account when training sessions are moved from the clinic to the home environment of the patient. Participants do not like the idea that training days at the clinic were replaced by days training at home. It is their opinion that training at home is less effective than training at the clinic. When training at clinic facilities, they are more motivated, due to the presence of peers and therapists. So in order to avoid disappointment among patients the preference for training on site for some people should take into account, or the explanation of the care program to the patient should make clear that training at home is an essential part of their recovery. Alternatively, new technology design should facilitate the group component when creating self-service training programs. The acceptance of a technology also depends on the previous exposure to technology [27] therefore it is no surprise that "no or insufficient digital skills to use the telemedicine at home" and "the anxiety of patient to use a computer, due to no/little experience" are seen as a disadvantage of use. Next to this, when introducing a rehabilitation program to a new patient that includes a telemedicine aspect, it is important to stress its advantages, such as an increase in patient empowerment, personalized training regimes, close online monitoring and mentoring, and the additional benefit of gaining digital skills. This will promote the use of a telemedicine service and will contribute to realistic expectations. Participants were enthusiastic about the idea to provide the telemedicine service as a follow-up treatment (based for instance on the progression they made) as they liked to stay in contact with their therapist and to continue training. Therefore, this service configuration is considered as promising for the acceptance of telemedicine service by patients.

Theoretical approaches such as TAM and UTAUT can be very helpful for pinpointing which determinants need to be considered when designing a telemedicine service (implementation plan). These theoretical approaches are used increasingly to assess the acceptance of technology in a healthcare setting by end-users [14]. As these approaches are not developed specifically in or for the healthcare context, it is important to consider that by using these approaches in its generic form, some of the unique contextual features are not captured. The constructs of TAM and UTAUT (such as perceived usefulness, perceived ease of use, performance expectancy, effort expectancy, social influence, and facilitating conditions) were hardly mentioned during the focus groups. Maybe these constructs are not really an issue for the participants or are too broad, which might leave too much room for interpretation. Given the outcome of this study, researches, developers and clinicians should not only focus on the constructs of the various theoretical approaches for the acceptance of telemedicine services but also keep an open mind to healthcare specific constructs, such as additional physical or psychological burden, intrinsic or extrinsic motivators, the level of digital skills and the service configuration.

For this study, the following limitations should be taken into account. First, participants of this study were patients suffering from chronic pain (CLBP and WAD) and COPD. Of this sample, a complete demographic profile of each participant was not obtained and therefore not reported for this study. In the results, the outcomes were not allocated per patient group while the outcome per patient group could differ and be colored by their limitations. Second, participants of this study were patients at the start of an outpatient rehabilitation program. Therefore, the outcome of this study may not be generalizable to all care settings. Third, the patients' acceptance toward telemedicine was assessed based on the participants' opinions after a short introduction of an online portal. This opinion can change after actual use. Some of the advantages were also mentioned as disadvantage. Such as, "recording oneself on video" in further research a quantitative survey could be used to answer the question whether participants like or dislike this feature.

The acceptance of telemedicine services depends on many factors. Factors that are not always included in well-established theories that explain technology acceptance. These factors are mainly contextual, such as a fit between the service configuration and daily life, personal motivation, or the psychological burden induced by the technology. Therefore, it is important for successful implementation of telemedicine services into daily clinical practice to keep an open mind and take into account contextual factors such as engagement, persuasion, additional physical or psychological burden, intrinsic or extrinsic motivators, the level of digital skills and service configuration, whenever developing an implementation plan.

Authors' contribution

The focus groups were prepared and executed by SJK. All authors were involved in transcription of the focus groups and coding of the transcripts. All authors participate in drafting the article and revising it critically for important intellectual content.

Ethics

Written informed consent was obtained from each respondent for publication of this report. According to Dutch law, the nature of this general focus group survey among voluntary patients did not require formal medical ethical approval.

Conflicts of interest

None.

Summary points

What was already known on the topic:

- Despite positive outcomes, the widespread implementation of telemedicine services in daily clinical practice is lacking.
- Theoretical approaches facilitate an efficient synthesis of existing evidence and enable to identify targeted and refine factors of acceptance.
- In the field of telemedicine, the acceptance by end-users of telemedicine service is mainly addressed in studies with a quantitative approach.

What this study added to our knowledge:

- Telemedicine serviced implemented in daily clinical practice give patients a sense of autonomy.
- Some participants experienced the telemedicine service as a motivator, but others claimed to need a therapist or group as motivation to train.
- Theoretical approaches (TAM and UTAUT) are not developed for the healthcare context, it is important to consider that some unique contextual features are not captured.
- There are other contextual determinants that we need to keep in mind by developing and implementing telemedicine services.

Acknowledgements

Appendix A

Table A1
Interview guide.

Part 1 – First reaction towards the telemedicine service
1.1 – What is your first reaction towards the telemedicine service?
1.2 – What are the advantage of this telemedicine service compared with the tradition healthcare service (without technology)?
1.3 - What are the disadvantage of this telemedicine service compared with the tradition healthcare service (without technology)?
Part 2 – Perceive clinical effectiveness of the telemedicine service?
2.1. – Do you think that training at home with the telemedicine service is as effective as training at the clinic?
2.2 – Do you think you can motivate yourself to train at home using the telemedicine service?
2.3 – Do you think you can train at home using the telemedicine service is a safe manner?
Part 3 – Learnability of the telemedicine service
3.1 – Does it seem easy to learn to use the telemedicine service?
3.2 – Are you willing to invest time to learn to use the telemedicine service?
Part 4 – at home
4.1 – Are you able to use the telemedicine service at home?
Part 5 – Intention to use
5.1 – At this moment, are you willing to use the telemedicine service at home?
Part 6 – Service configuration
6.1 – What is in your opinion the best way to provide the telemedicine service to the patients?
  a as partial replacement of care
  b as addition to care
  c as follow-up care

Appendix B

Table B1
The coding scheme.

Coding scheme (in alphabetical order)

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ad hoc; addition care; additional complaints; advantages of use; aesthetics; all; alone; behavioral change; behavioral intention; by appointment; care capacity; chat; company doctor; computer anxiety; consultation; digital literacy; disadvantage of use; doctor/care team; ease of use; effectiveness of CLEAR ; services; email; extrinsic motivation; facilitation conditions; first reaction; flexibility; follow up; frequency of training; fully replaced care; gaining digital skills; group training; healthcare costs; helpdesk; integrated care; intensity of treatment; intrinsic motivation; kiosk; learnability of system; manual; mentoring; monitoring; neutral/ambiguous; no/negative; on site; online; outside working hours; partial replaced care; partner/family; peace at home; peer contact; personalized care; phone; physical burden; privacy; progress; psychological burden; quality of instruction; recording oneself on video; safety; seeing oneself on video; self discipline; self efficacy; service configuration; sharing experiences; sick leave; sms; social norm; space @ home; technical isseus; time issues; training; traveling; trialability; trust; impersonal communication; up to date content; videoconference; video exercising; videoconference; willingness to learn system; yes/positive

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