BACHELOR THESIS

Development of a questionnaire to determine the factors of an eHealth application that supports patient empowerment for people with chronic pain

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Content

Abstract

Background; Chronic pain is a widespread problem for which there is no clear treatment. It has many negative effects on the lives of the persons diagnosed with it, such as the pain itself, financial consequences and social consequences. Patient empowerment can contribute to coping with chronic pain. To stimulate patient empowerment, eHealth can be used. However, it is not clear which factors of patient empowerment are suitable for people with chronic pain, nor is it clear how an eHealth system supports these factors.

Objective; The aim of this study was to investigate what factors contribute to patient empowerment for people with chronic pain and in which way eHealth can support a person with chronic pain in achieving patient empowerment.

Method; A literature review was conducted to identify factors of patient empowerment. This resulted in 4 factors: self-management, resources, self-efficacy and perceived usefulness. These factors and their subfactors were then used to create questions for an online survey. For a test, this survey was administered among people with chronic pain (n=12), from which 25% used an eHealth system. The data was analysed using descriptive statistics.

Results; In the questionnaire, the 4 factors of patient empowerment relevant for people with chronic pain were tested. As the number of participants using the eHealth system was really low, no statistical analysis were possible. Participants rated the influence of the eHealth system on the factors of patient empowerment mostly positive.

Conclusions; Patient empowerment seems the exist out of 4 factors: self-management, resources, self-efficacy and perceived usefulness. An eHealth program can contribute to patient empowerment by contributing to those factors.

1. Introduction

Chronic pain is a widespread condition which negatively affects people's lives. The definition of chronic pain is pain that recurs or lasts for more than 3 months (International Association for the Study of Pain, 2019). About 18% of the Dutch population suffers from moderate to severe chronic pain (Bekkering et al., 2011). Examples of issues that people with chronic pain encounter are difficulty with performing household chores or struggling with sleeping (Dureja et al., 2014). Patient empowerment can be useful in this situation, as it "involves patients to a greater extent in their own healthcare process and disease management becomes an integrated part of their daily life" (Lamprinos et al., 2016) . Thus, people with chronic pain become more involved in the management of their chronic pain. This is only one of many different definitions of patient empowerment. Numerous studies on patient empowerment have been performed, although there is no consensus on a definition of patient empowerment or on the factors to measure it. This makes it difficult to see which factors are important, let alone which factors are relevant for people with chronic pain. Therefore, the first research question this study will address is:

RQ1: Which factors contribute to patient empowerment for people with chronic pain?

There exist different ways to provide for patient empowerment. In this study there will be a focus on the role of eHealth to provide for patient empowerment. eHealth concerns "the use of digital technologies to monitor, track, and inform; the use of digital technologies to facilitate communicative encounters between health stakeholders; and the use of data to improve health and health services" (Shaw et al., 2017, p. 9). Also, eHealth can be seen as a sustainable manner of healthcare (Hollmark, Lefevre Skjöldebrand, Anderson, & Lindblad, 2015). According to Calvillo, Román and Roa (2013) almost all ICT initiatives can contribute to patient empowerment. For example, giving access to health information or being able to monitor chronic diseases are applications of eHealth that can contribute to patient empowerment. Although these examples are both applications of eHealth for patient empowerment, they are distinctly different from each other. As follows, the specific role of an eHealth system regarding patient empowerment is unclear. Currently, eHealth is applied more and more in chronic pain rehabilitation. Examples of eHealth programs already in use in the Netherlands are Reducept, ACT Guide, Grip op Pijn and SanaCoach. Additionally, many rehabilitation centres develop their own eHealth program to support people with chronic pain during or after their rehabilitation. In this manner, Roessingh, Centre for Rehabilitation developed 'NaDien' which is the eHealth program used in this research. Not surprisingly, the second research question will follow up on the eHealth programs and the lack of knowledge on their role in the patient empowerment process. This resulted in the following research question:

RQ2: How can the eHealth system NaDien contribute to patient empowerment for people with chronic pain?

From a practical viewpoint, the results of this study are relevant for multiple parties. Examples are creators of eHealth applications or people who research patient empowerment. Another party is Roessingh, Centre for Rehabilitation as it tells them more about their eHealth application and how it is perceived. The outcomes of this study could also help other developers with the creation of new eHealth systems or improvement of current eHealth systems to accommodate people with chronic pain in patient empowerment. Moreover, the results of this study could help to give practical pointers on how to support patient empowerment.

From a scientific point of view, this study is meaningful as ambiguity around the definition of patient empowerment and the way to measure it exists (Barr et al., 2015). Different studies use contrasting factors for patient empowerment: Barr et al. (2015) found already 38 distinctive constructs of patient empowerment in 30 articles. As they mention in their study, clarity and general agreement regarding the core constructs of patient empowerment is missing. This means that a general definition and general way to measure patient empowerment are still lacking.

In this report, the aim is to answer the two previously proposed research questions. First, a practical context description is provided as there was a collaboration with multiple parties. Second, a theoretical context description is provided regarding patient empowerment for people with chronic pain and the use of eHealth to stimulate it. Third, to answer the first research question, a literature review was done to identify factors of patient empowerment for people with chronic pain. Then, to answer the second research question, these factors of patient empowerment were used to develop a questionnaire which was tested on a small scale among people with chronic pain. Next, the results of this research are discussed, as well as the limitations encountered in this research. Lastly, conclusions regarding the factors of patient empowerment and the role of eHealth system NaDien in the process of patient empowerment among people with chronic pain are drawn.

2. Context Description: Collaboration with Roessingh, Centre for Rehabilitation & Roessingh Research and Development

For this research, there was a collaboration with Roessingh, Centre for Rehabilitation and with Roessingh Research and Development. The latter, Roessingh Research and Development, is an internationally recognized scientific research institute at which research is done regarding healthcare innovations for rehabilitation and chronic care. Roessingh, Centre for Rehabilitation is a multidisciplinary rehabilitation centre located in Enschede, the Netherlands. The collaboration with

Roessingh, Centre for Rehabilitation was with their pain rehabilitation department, as the target group for this study is people with chronic pain who followed their pain rehabilitation program.

2.1. NaDien

The eHealth system used, NaDien, is used by people with chronic pain who go through or went through pain rehabilitation at Roessingh, Centre for Rehabilitation. It has been developed as an eHealth system to prevent relapses for people with chronic pain. The program has been developed by Fledderus, Schreurs, Bohlmeijer, & Vollenbroek-Hutten (2015), who conducted a study into what functions the system should have, developed and tested the system. People with chronic pain get access to NaDien while in their treatment, in order for them to use it up until 3 months after their treatment ended. In NaDien, multiple features can be accessed. A screenshot of the starting page of NaDien can be seen in figure 1. The following features can be found in NaDien:

1. *Values and Actions*. This function allows the user to put in one's life values and what actions to take.
2. *How are you?* In this part, the user can indicate how one is living towards one's values on a scale of 1 to 10. This can be used to monitor how well one is living towards one's values.
3. *Exercises*. Users can find a wide range of exercises, as well as adding their own exercises for chronic pain.
4. *Tips*. The tips function can be used to find tips on implementing ACT in daily life, as well as sharing tips on implementing ACT in daily life.
5. *Coach*. In this part, users can set the program to send them motivational messages or reminders. Either via email or via SMS. They can also write these messages themselves.
6. *Frequently asked questions*. This last function holds the information on what the different icons in NaDien mean and can therefore be helpful when starting to use NaDien.

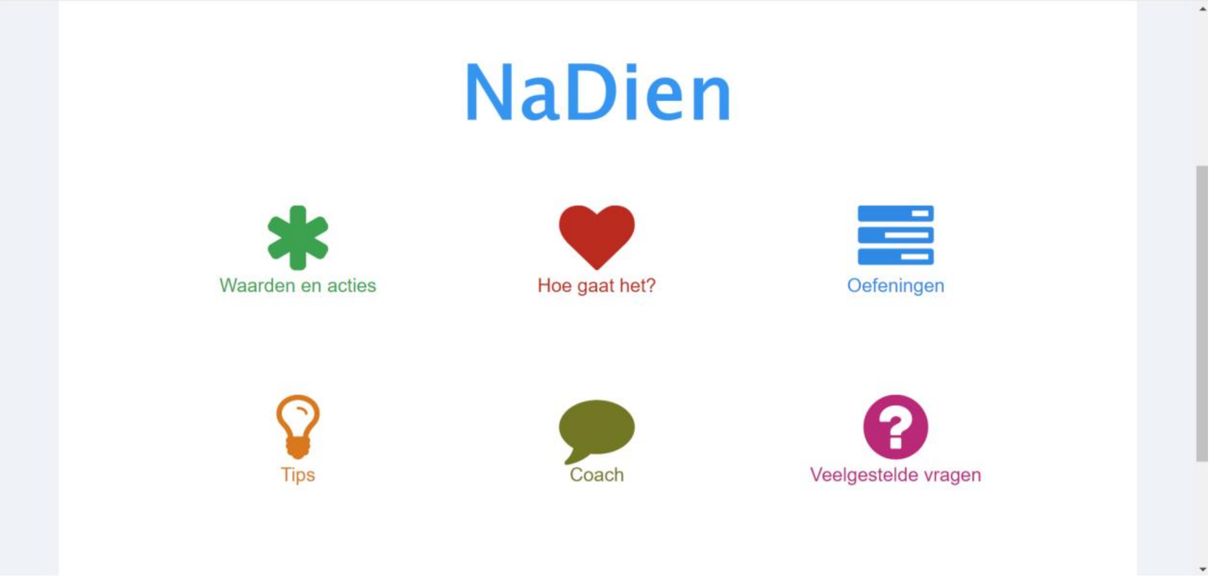

Figure 1. Screenshot of introduction page of NaDien. Adapted from “NaDien” by Roessingh, Centre for Rehabilitation, n.d..

2.2 ACT: Acceptance and Commitment Therapy

At Roessing, Centre for Rehabilitation the chronic pain rehabilitation, and thus NaDien too, are based upon Acceptance and Commitment Therapy (ACT). Other treatments that are presently available for people with chronic pain only rarely eliminate the pain in full (Turk, Wilson, & Cahana, 2011) so ACT works differently. ACT is based on acceptance and mindfulness (Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016) and makes use of methods to activate and change behaviour (McCracken & Vowles, 2014). According to McCracken and Vowles (2014), the problems in functioning caused by pain can be attended to without directly focussing on the pain or even resolving it. Psychological factors can influence how one experiences the chronic pain. Therapy based on acceptance also has positive effects on people with chronic pain (Veehof et al., 2016). Hence, ACT is a useful type of therapy for people with chronic pain.

The goal of ACT is psychological flexibility (McCracken & Vowles, 2014; Trompetter, Bohlmeijer, & Lamers, 2016), which is the changing or continuing one’s behaviour influenced by one’s goals (McCracken & Vowles, 2014). This in order for one to adopt a stance of being present in the moment and living towards one’s values (Trompetter et al., 2016). There are six therapeutic processes involved in ACT: acceptance, defusion, self-as-context, being present, values, and committed action (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Twohig, 2012). These core processes have the goal to increase psychological flexibility and so on lead to psychological flexibility (Hayes et al., 2006). The first process, acceptance, is rather important as it is needed to improve function of a subject (Veehof et al., 2016). This is a strategy that can be used instead of behaving in a manner of pain avoidance (Trompetter et al., 2016). With these processes, the focus of ACT is on functioning rather than reducing the pain (Twohig, 2012).

3. Theoretical Framework

In this section, there will be an examination of the context of patient empowerment for people with chronic pain and the use of eHealth systems for this. To begin, the effects of chronic pain on the patient who suffers it will be reviewed, after which it is discussed how patient empowerment can help people with chronic pain. Then, the role eHealth can have to provide for patient empowerment will be discussed.

3.1 The Effects of Chronic Pain on a Person

Chronic pain is pain that occurs for longer than 3 months (International Association for the Study of Pain, 2019). While it usually starts with an underlying condition, the pain exceeds the normal healing time and a new cause cannot be found anymore (Treede et al., 2019). This makes chronic pain difficult to treat.

Multiple aspects in the daily life of the person with chronic pain are negatively affected by the chronic pain. Examples of negatively affected activities are sleep (Breivik, Collett, Ventafridda, & Cohen, 2006; Dureja et al., 2014; Voerman & Chomrikh, 2015), being able to exercise and walk (Dureja et al., 2014), social activities (Dureja et al., 2014; Voerman & Chomrikh, 2015), tiredness (Voerman & Chomrikh, 2015), doing household chores (Breivik et al., 2006; Dureja et al., 2014; Voerman & Chomrikh, 2015) and having difficulty taking care of oneself (Breivik et al., 2006). Breivik et al. (2006) also mention people with chronic pain struggling with one’s mental state. This could result in a low self-esteem or even depression, which 21% of the people with chronic pain in their study had. Additionally, the ability of people to do their job can be affected by the chronic pain, thus making people lose their job or having to change their job (Breivik et al., 2006). Not only does pain have an effect, the severity of pain also can have an effect. When people with chronic pain experienced higher levels of pain, this caused them to be less satisfied with life (Walker & Esterhuyse, 2013). In short, chronic pain can cause multiple negative effects for the person who suffers from it as it affects quality of life as well as satisfaction with life.

In multiple ways, chronic pain can be a financial hardship. The medical costs for an individual are high (Gannon, Finn, O'Gorman, Ruane, & McGuire, 2013; Leadley, Armstrong, Lee, Allen, & Kleinen, 2012), and people with chronic pain might need to spend extra money due to expenses that are not covered by their insurance (Bekkering et al., 2011) such as travelling costs (Kemler & Furnée, 2002). Not to mention that chronic pain can cause the income of the person with chronic pain and their spouse to decrease (Bekkering et al., 2011). This is not surprising as the chronic pain can effect one’s job in the way of needing to stop working or change one’s job partly or in whole (Breivik et al., 2006). Also, people with chronic pain might not be working because of their concern of losing their disability benefits while only working for a small amount of time (Gannon et al., 2013). Therefore, chronic pain impacts one’s financial situation greatly.

3.2 Patient Empowerment for Coping with Chronic Pain

Many people with chronic pain are dissatisfied with the care given. People with chronic pain are not happy with the advice and treatment they got, as well as the treatment results being disappointing (Voerman & Chomrikh, 2015). Especially communication between the patient and doctor about treatment options could be improved, as well as communication between different caregivers for example by adding a fixed contact person (Voerman & Chomrikh, 2015). That the people with chronic pain are not satisfied with the given care also relates to the pain: people with chronic pain who have less pain are in general more satisfied with the healthcare (Voerman & Chomrikh, 2015). However, the dissatisfaction can also be caused by having too high expectations (Wong, Chow, Chen, Wong, & Fielding, 2015). Hence, introducing patient empowerment in the healthcare process for people with chronic pain could be useful as they would be more in control of their treatment.

Patient empowerment is putting patients in control of their condition and having them manage it. Calvillo et al., (2013) claim that patient empowerment refers to “situations where citizens are encouraged to take an active role in the management of their own health, transforming the traditional patient-doctor relationship and providing citizens with real management capabilities” (p. 644). Adding to this, patient empowerment can facilitate “patient independence, self-management, and self-efficacy” (Risling, Martinez, Young, & Thorp-Froslie, 2017, p. 1). Thus, patient empowerment enables people with chronic pain to handle their condition.

As curing the pain is usually not a possibility, people with chronic pain will need to learn to accept their pain. People with chronic pain usually have a hard time accepting their pain and acceptance becomes easier when the people with chronic pain gain more knowledge about their condition as well as learning how to manage it (Wong et al., 2015). This is a way in which patient empowerment can help people with chronic pain. According to Skuladottir and Halldorsdottir (2008), people with chronic pain can be demoralized when they lose a sense of control of oneself and of the pain, which can be countered with empowerment as it can help to gain or regain a sense of control. They suggest that this can be achieved by an empowering encounter with a healthcare professional. Furthermore, Breivik et al. (2006) mention that about 40% of the people with chronic pain feel helpless because of their pain. Patient empowerment can be applied because it is needed to improve patient autonomy, control and participation in benefits (Daruwalla et al., 2019). An example of how it could help is by getting people with chronic pain in control over their own data, which is what the Patient Empowerment Tool from Kuchinke (2013) provides. Three additional outcomes of patient empowerment can be cost reduction, better health outcomes, and greater system efficiency (Daruwalla et al., 2019). Not surprisingly, patient empowerment can be very useful for people with chronic pain.

Different ways are used to describe patient empowerment and various factors are used to examine it. For example, Skuladottir and Halldorsdottir (2008) researched chronic pain in women, and mentioned that patient empowerment shows through acknowledgement & confirmation, mutuality & connection, and engagement & involvement. However, Schulz and Nakamoto (2013) mention the scale from Thomas and Velthouse (1990) which Spreitzer (1995) operationalized, in which empowerment consists of meaningfulness, self-efficacy, impact and self-determination. This is just a grasp of the many different manners of defining and measuring patient empowerment.

3.3 eHealth for patient empowerment

To provide for patient empowerment, eHealth could be used. A widely used definition of eHealth is Eysenbach's (2001): “e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology” (p. 1). eHealth offers different ways of patient care, which can be useful as people with chronic pain are not always satisfied with the given care.

According to Hollmark et al., (2015): “eHealth solutions can contribute to patient empowerment and a sustainable health care” (Abstract section, para. 1). For example in the manner of tracking and measuring data, in order to monitor chronic conditions. It is necessary to make use of technologies for eHealth. Nowadays, technologies have developed far enough and patients can work with them sufficiently (Kraan, Van de Mortel, & Reinold, 2016). Calvillo et al. (2013) stated that technology is crucial for empowering patients at home, which can be caused by the advancements in ICT lately or the rising awareness of patients needing to be involved in their healthcare process. Patient empowerment can be used to make people change their attitudes (Calvillo et al., 2013). Other ways of achieving patient empowerment are “Health literacy of patients, remote access to health services, and self-care mechanisms” all for which eHealth can be useful (Calvillo et al., 2013, p. 643). This supports the idea that e-Health can be useful in promoting patient empowerment.

4. Study 1: Literature Review

A literature review on ‘patient empowerment’ was conducted to answer the first research question: *“Which factors contribute to patient empowerment for people with chronic pain?”*. Barr et al. (2015) stated that there is no clear agreement upon the definition of patient empowerment and neither on the methods to measure it. Without a clear definition and clear constructs, measuring patient empowerment becomes nearly impossible. Additionally, it is important to bear in mind that patient empowerment and its factors in this research have to be applicable for people with chronic pain who followed ACT treatment. Thus, in order to create a questionnaire for measuring patient empowerment specified for people with chronic pain, a literature review was needed to identify the factors of patient empowerment.

4.1 Method and Analysis

When specifically searching for the literature review, the following search engines were used: PubMed, Web of Science, findUT and Scopus. In the early stages of this project, a search on the term ‘patient empowerment’ was done in Scopus. For the actual literature review, articles already found in the previous search were included if they were deemed relevant. Additional scoping was done by a search on the term ‘patient empowerment’ in the search engines PubMed, Web of Science and findUT. Furthermore, a search on the term “patient empowerment AND chronic pain” was done in the four search engines. Moreover, an additional search was done on the term “diabetes empowerment scale” in Scopus, as this term showed up in multiple articles. Other articles were found via snowballing. The different searches resulted in 31 included articles. Articles regarding patient empowerment and empowerment in general were included, when factors of patient empowerment or strategies to achieve patient empowerment were mentioned. The exclusion of articles took place when there was no mention of specific factors or strategies contributing to patient empowerment. An overview of all articles included in this literature review can be found in Appendix A. The search log for this entire research (so not only this literature review) can be found in Appendix B.

The 31 articles that were included were reviewed into dept. In all articles, constructs that contributed to (patient) empowerment were identified, or what contributed to the patient empowerment process. This was done by searching all articles for the mention of factors and strategies they either found or used to measure patient empowerment. All the constructs from all articles were documented as a title, after which the all articles that seconded that construct were placed under it in a post-it manner. Like this, an overview was created of how many articles supported each construct. An exception in this process was made for the constructs identified by

Barr et al. (2015). As they had many constructs, their article was reviewed last so no new constructs would be added in a title-manner, because it would result in a construct that was only supported by them. In total, 39 construct were found in the articles. An overview of this can be seen in Appendix C.

After all constructs were identified, the constructs supported by 3 or more articles were used for further analysis. This was done because the number of articles mentioning a factor could give an indication of its importance. Additionally, constructs that were only mentioned in 1 or 2 articles have little support, as many times it was mentioned in an article and seconded by Barr et al. (2015) who mentioned many constructs because of their own literature review. Out of the constructs found, 18 constructs were supported by 3 or more articles. These 18 constructs were then grouped together as much as possible, with some constructs becoming an overarching factor. This was done based on logical thinking, and grouping together constructs that contributed to the same thing. An overview of this initial grouping can be found in Appendix D.

4.2 Results

In total, 18 constructs that were supported by 3 or more articles were identified. Of these constructs, 16 were used literally with the same name in the eventual model. The model created had four factors: Self-management, Resources, Self-efficacy and Perceived Usefulness. Each factor had multiple subfactors, which came from the previously identified 18 constructs. An overview of all factors and subfactors of the created model can be seen in figure 2. Only 1 factor formulated was not included in the aforementioned 18 constructs: perceived usefulness. This because it was an overarching factor of two subfactors (meaningfulness and impact) that were clearly related, although an obvious overarching factor was not present yet. Out of the 18 construct, 2 were not included in the final construction of patient empowerment. These were ‘motivation’ and ‘participation’. This because ‘motivation’ was considered to be the outcome of perceived usefulness in the sense that if a person perceived the program as useful and relevant, the person would be motivated to use it. Therefore, it was already indirectly imbedded in Perceived Usefulness. Furthermore, the construct of ‘participation’ was considered to be the outcome of patient empowerment, because patient empowerment is for a person with chronic pain to manage his or her condition. This can only be achieved by participation and thus patient empowerment is a manner of participation. Hence that participation was therefore included in the factors contributing to patient empowerment.

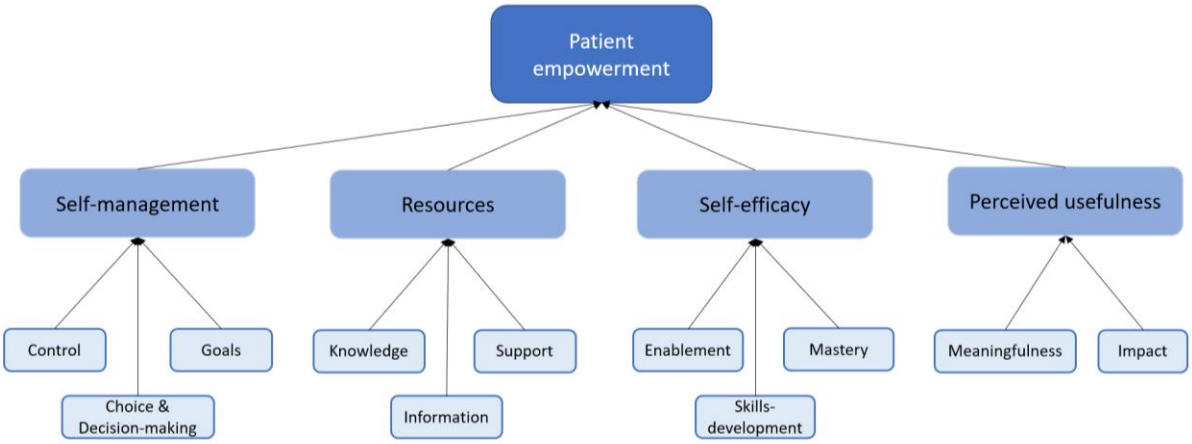

Figure 2. Patient empowerment and its factors with subfactors. The factor perceived usefulness has a direct application towards the eHealth program NaDien.

Below, a definition of patient empowerment in the context of this study will be given, based upon the factors. Then, the 4 main factors identified will be discussed, including their corresponding subfactors. The descriptions of the subfactors are shortened, the full versions which include references to their corresponding literature can be found in Appendix E.

4.2.1 Patient Empowerment

Patient empowerment is described differently by many authors. When looking at the viewpoint of the patient, it can be seen as a process or as an outcome. Aujoulat, D'Hoore and Deccache (2007) see it as a process of personal change. Castro, Van Regenmortel, Vanhaecht, Sermeus and Van Hecke (2016) define patient empowerment for individual or collective patient empowerment. The latter being a process to give a group more power, to enable them to articulate their needs and take action towards those as well as boosting their quality of life. The individual patient empowerment is relevant in this research, and is said to be: “a process that enables patients to exert more influence over their individual health by increasing their capacities to gain more control over issues they themselves define as important” (Castro et al., 2016, p. 1927). McAllister, Dunn, Payne, Davies and Todd (2012) summarize that most definitions of patient empowerment concentrate on the ability of people to make decisions and have or take control over aspects relating to one’s health. In a non-medical environment, empowerment is seen as intrinsic task motivation (Thomas & Velthouse, 1990), or as gaining mastery over one’s life (Rappaport, 1987). However, this is a medical environment, with patient empowerment being the idea of having authority over one’s life, the idea to which one can influence one’s life. In this research, the factors discovered that contribute to patient empowerment are self-management, resources, self-efficacy and perceived usefulness. An overview of this can be found in figure 3.

When patient empowerment is the idea of having authority over one's life, this includes health and treatment. The self-management part is about dealing with and taking action regarding symptoms, treatment, consequences of choices and life style changes caused by chronic pain in the manner of ACT. Then, the resources are the necessary attributes and information to be able to deal with and take action regarding the chronic pain. Additionally, self-efficacy is the ability of a person with chronic pain to take actions regarding and deal with chronic pain/take actions regarding reaching one's goals and living towards one's values in a good manner. This with a focus in it being done well. Lastly, perceived usefulness is how useful the people with chronic pain deem a task in helping them reach their goals and live towards their values. When taking these parts together, they are about one's ability to handle one's chronic pain, about the influence they exert on this.

For ACT and people with chronic pain, patient empowerment will then be the idea over having authority over one's life in the manner of ACT, by accepting one's pain. This means, the idea that one has authority over the manner in which one lives. When combining this with NaDien, patient empowerment is the perceived degree to which NaDien helps one to get authority over one's life. This results in the influence a person with chronic pain has in handling his or her condition, and so on his or her life.

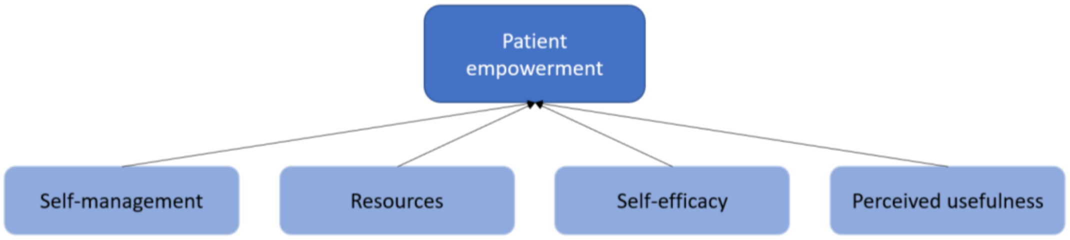

Figure 3. Patient empowerment and its factors.

4.2.2 Self-management

Self-management is the overarching factor of control, choice & decision-making and goals (see figure 4) and is mentioned frequently in literature in relation to patient empowerment. The way it is mentioned in literature is the self-management of the condition or disease (Daruwalla et al., 2019; Funnell, Nwankwo, Gillard, Anderson, Tang, 2005; Funnell & Anderson, 2004; McAllister et al., 2012) which translates into being in charge of one's condition. Yeh, Wu and Tung (2018) add to this self-management of the condition: "with knowledge and confidence"(p. 13). Additionally it is described as managing one's health (Alpay, Blanson Henkemans, Otten, Rövekamp, & Dumay, 2010;

Barr et al., 2015). Castro et al. (2016) define it as: “the individual’s ability to manage symptoms, treatment, physical and psychosocial consequences and life style changes inherent in living with a chronic condition and to affect the cognitive, behavioural and emotional responses necessary to maintain a satisfactory quality of life” (p. 1927). Shortening all these definitions and including the subfactors, this would mean that self-management refers to a person managing their health, which includes management of symptoms, treatment (including making well-informed choices and decisions regarding one’s health), consequences and life style changes in order to obtain a quality of life that one is satisfied with.

For people with chronic pain, self-management can have a different function than in other cases. It was already mentioned that self-management is one of the goals of ACT (Turk et al., 2011). Pain rehabilitation, which is the kind of treatment the people with chronic pain in this research had, aims for self-management of chronic pain (Turk & Okifuji, 2002). Additionally, increased commitment to self-management of one’s condition can influence the effect of the treatment positively (Turk & Okifuji, 2002). Fledderus et al. (2015) mention that support might even help with managing a relapse after therapy ended, which suggests that people with chronic pain need self-management in relapses. Moreover, acceptance based therapies affirm self-management (McCracken & Vowles, 2014; Turk et al., 2011). McCracken and Vowles (2014) even state: “If doctors cannot help, one must learn to manage without them” (p. 183). All these studies speak of self-management related to one’s chronic pain, although self-management relates in no manner to the management of pain. Therefore, self-management for people with chronic pain is the self-management of the chronic pain condition, which includes symptoms, treatment, consequences of the choices and life style changes, and it does not include managing the pain itself.

In the context of NaDien, self-management will be researched into the extent to which NaDien helps with self-management of chronic pain, which includes symptoms, consequences and life style changes, in order for the person with chronic pain to have a satisfactory quality of life. Treatment is not included here, as the people with chronic pain in this target group either already chose their treatment or completed the treatment. The self-management is focussed on one’s quality of life, and not on the pain itself. Thus, self-management for people with chronic pain using NaDien is about handling one’s chronic pain.

Figure 4. Self-management and its subfactors.

Control

When focussing specifically on NaDien, control can now be seen in 2 manners. The first being perceived control over one's own healthcare process when working with NaDien and the second being control over behaviour. Although, it was mentioned that the control over one's behaviour also contributes to one's healthcare process. Therefore, control in relation to NaDien will be perceived control over behaviour and healthcare process when working with NaDien. This translates into control over one's behaviour in the sense of handling chronic pain and control over the choices one makes in daily life, as this is part of one's healthcare process in ACT.

Choice & Decision-making

When taking NaDien into account for choice & decision-making, this will be the extent to which NaDien enables a person with chronic pain to make well-informed choices and decisions regarding how to adopt ACT and making well-informed choices regarding one's daily activities. The choices regarding daily activities and the choice to adopt ACT are direct applications of the ACT treatment, which is then a part of one's health and one's healthcare treatment.

Goals

The goals for people with chronic pain using NaDien are about one's values as well as regarding self-management. However, in the manner of ACT there is a focus on setting personal goals. Therefore, goals will be about the extent NaDien helps with setting and achieving goals the people with chronic pain set regarding their values.

4.2.3 Resources

Resources is the overarching factor of knowledge, information and support (see figure 5). Resources can refer to having access to resources, resources needed, getting resources and managing resources (Zimmerman, 1995). Again, there is access to resources to enable patients to improve their healthcare (Laschinger, Gilbert, Smith & Leslie, 2010). Then there is the definition from Boveldt et al. (2014): "A professional caregiver can induce external resources (e.g., information on pain management and pain treatment) and use strategies to empower the patient" (p. 1206). This demonstrates why resources can be seen as the overarching factor. Therefore, resources will be conceptualised here as having access to the necessary attributes, knowledge, information and support to successfully achieve patient empowerment.

For people with chronic pain specifically, the social and financial resources are mentioned. Socioeconomic resources can mediate and moderate the pain experience (Turk et al., 2011). While not specifically for people with chronic pain with ACT, the resources of physical exercises are acknowledged as well as educational, information, information on treatment and support resources (Marcus, 2009). These resources do not seem new, as they show similarities with the concepts defined earlier in the subfactors of resources. Accordingly, resources for people with chronic pain will be access to the necessary resources such as information, support and knowledge to successfully self-manage one's chronic pain condition.

In the context of NaDien, the program itself can be seen as a resource. As an eHealth application, it can contribute to the resources available to people with chronic pain. Additionally, it names the subfactors knowledge, information and support. Not surprisingly, this results in the degree to which people with chronic pain sense NaDien allows them to have access to relevant information, knowledge, support and other functionalities in the program.

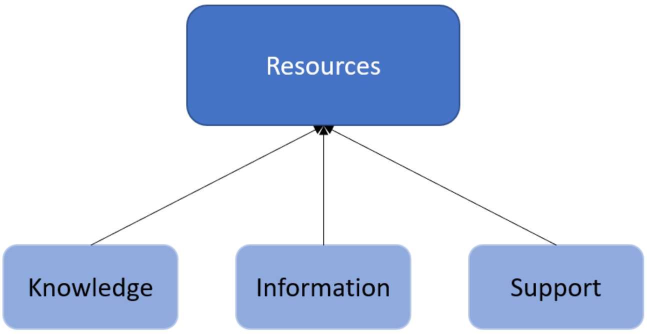

Figure 5. Resources and its subfactors.

Knowledge

In the context of NaDien, knowledge can be about gaining knowledge by the use of NaDien. All things considered, it is the degree to which NaDien helps a person with chronic pain gather information and thus create knowledge regarding chronic pain and ACT.

Information

For NaDien, the information it provides is important. It is important to keep in mind that NaDien is used as program after the rehabilitation process. When taking definitions of information in the context of people with chronic pain into account, there should be a focus on information regarding chronic pain and ACT and this being accessible in NaDien.

Support

NaDien could be seen as an platform to offer support. Especially with the idea in mind that NaDien already is an eHealth application that is in use also after pain rehabilitation, support to prevent relapses into old behaviour seems plausible. This is part of self-management. Additionally, arguments were given regarding social support, in NaDien this shows as people with chronic pain can share tips with each other. Therefore, support will be about the perceived support NaDien offers regarding handling one's chronic pain, support regarding treatment and social support.

4.2.4 Self-efficacy

Self-efficacy is the overarching factor of enablement, skills-development and mastery. An overview of this can be seen in figure 6. Mastery and self-efficacy were seen as equal by McAllister et al. (2012), although not in this research. Other studies viewed self-efficacy as empowerment (Anderson et al., 2000; Kravitz et al., 2011; Rui Sousa et al., 2019), which is also not as how this study considers it, it is used more as a component and result of empowerment (Galanakis et al., 2016) with a focus on the component part. Zimmerman (1995) described self-efficacy as similar to competence, self-esteem, mental health and power. Especially competence is named more often (Camerini & Schulz, 2015; Laschinger et al., 2001; Riva, Camerini, Allam, & Schulz, 2014; Schulz & Nakamoto, 2013; Spreitzer, 1995; Thomas & Velthouse, 1990). Camerini and Schulz (2015) define it as "the degree to which patients feel competent to perform self-management activities", which is in line with the definition of Thomas and Velthouse (1990): "to the degree to which a person can perform task activities skilfully when he or she tries". In the context of this research, self-efficacy will be described as the degree to which a person can perform activities or tasks regarding the self-management of his or her condition well.

Self-efficacy is related closely to ACT. Rehabilitation programs even focus partly on self-efficacy (Turk & Okifuji, 2002) and it is seen as a key concept in cognitive behavioural therapy (McCracken & Vowles, 2014). For people with chronic pain, people with high self-efficacy will use coping responses more often along with endure obstacles if necessary (Turk & Okifuji, 2002). Additionally, the previously mentioned subfactors of enablement, skill-development and mastery add to the concept of self-efficacy. They can be seen as following up on each other: enablement being necessary for skills-development, and skills-development being crucial for achieving mastery. By making use of enablement, skills-development and mastery, self-efficacy for people with chronic pain would be the degree to which a person is able to self-manage chronic pain in the manner of ACT.

When connecting the definition of self-efficacy to NaDien, it could be seen as a platform that enables self-efficacy. Hence, NaDien will be about the perceived self-efficacy gained by the use of NaDien. This means the degree to which NaDien helps a person with chronic pain with the ability to self-manage chronic pain in the manner of ACT.

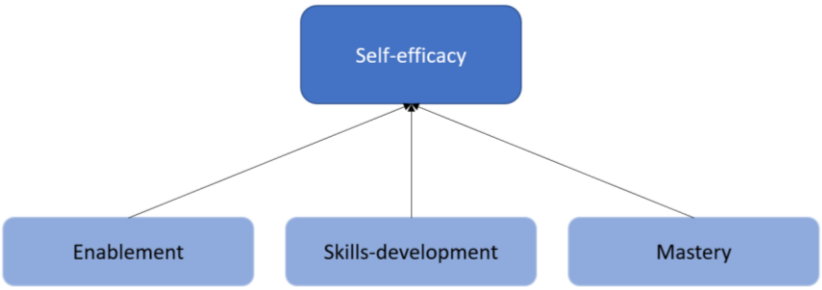

Figure 6. Self-efficacy and its subfactors.

Enablement

To link enablement to NaDien, it could be enabling people with chronic pain to gain self-efficacy. The indicated self-efficacy could then concern the self-efficacy regarding the ACT. Enablement would then be the degree to which NaDien enables people with chronic pain to successfully complete tasks, or do things. Examples of this would be NaDien enabling living towards one's value or handling difficult situations.

Skills-development

Skills-development in the context of NaDien focusses on skills people with chronic pain need, such as skills to practice ACT. Thus, skills-development will be about the perceived help NaDien offers in developing the necessary skills for practicing ACT, such as skills for living towards one's values.

Mastery

Mastery can be related to NaDien, which provides the user with some tools. However, it is hard to determine when someone can execute something perfectly. Hence, the focus of NaDien will be on helping someone to do things better. Thus, mastery will be how much NaDien helps a person with chronic pain in dealing with situations and living towards one's values in a better manner.

4.2.5 Perceived usefulness

Perceived usefulness is the overarching factor of meaningfulness and impact (see figure 7). Also, it is the only factor that has not been described on its own in literature related to patient empowerment. Due to meaningfulness and impact showing similarities although still being different, an overarching factor was necessary. Hence, in this situation perceived usefulness was derived from impact and meaningfulness, with a direct relation to the application of this research, the eHealth application

NaDien. As becomes clear from the Technology Acceptance Model, perceived usefulness is necessary to ensure people use the system (Davis, Bagozzi, & Warshaw, 1989). Also, perceived usefulness can be seen as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320) in the context of the Technology Acceptance Model (Davis et al., 1989). Perceived usefulness in the medical context therefore will be defined depending on meaningfulness and impact, resulting in it being: how important one thinks a task is for oneself, how much this task will influence their health.

When looking at perceived usefulness for people with chronic pain, Fledderus et al. (2015) mention the usefulness of a program that would support people with chronic pain in maintaining their altered behaviour gained by the ACT treatment. The perceived usefulness in this study is built upon meaningfulness and impact. Thus, it will be a combination of, while also overarching, how much a task or action enables a person with chronic pain to live according to his or her values and the degree to which one feels that his or her behaviour influences the outcomes of the ACT treatment. This results in the how much a person with chronic pain assumes that a task or action is regarding his or her values and how much this action will influence their ACT outcomes.

Now, this has to be defined for the research regarding NaDien as well. Hence, that this will be the perceived usefulness of NaDien in helping a person with chronic pain live towards one’s values and gain positive treatment outcomes.

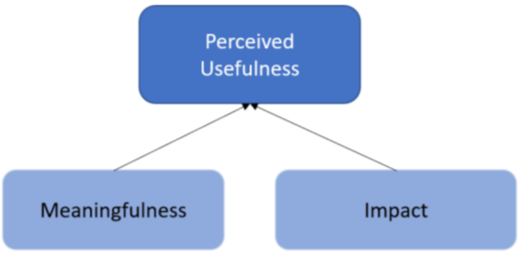

Figure 7. Perceived usefulness and its subfactors.

Meaningfulness

In the context of NaDien this has to be relatively similar. NaDien is built to help people with chronic pain from the pain rehabilitation with ACT and maintaining this mindset after the pain rehabilitation. So you could say that meaningfulness in this case is the perceived relevance of NaDien for a person with chronic pain, when trying to live according one’s values.

Impact

Although definitions regarding impact in general and impact regarding people with chronic pain who receive ACT exist, it should be specified in the situation of NaDien. As the treatment is technically finished, the focus will be on the degree to which NaDien helps the person with chronic pain influence their daily life. This can be found in the perceived impact NaDien has as well as the impact NaDien has in offering help with handling chronic pain.

5. Study 2: Survey testing

A survey on how much the eHealth program NaDien helps with patient empowerment among people with chronic pain was developed to answer the second research question: *"How can the eHealth system NaDien contribute to patient empowerment for people with chronic pain?"*. The development of the survey was based on the factors identified in the literature review, these were Self-management, Resources, Self-efficacy and Perceived usefulness. All have their own subfactors, which were used to create questions to measure patient empowerment in the users of NaDien.

5.1 Methods and Instruments

To research the role an eHealth system for people with chronic pain can have in patient empowerment, an online survey was issued with a descriptive research design. Through the literature review, patient empowerment was identified to have 4 factors: Self-management, Resources, Self-efficacy and Perceived usefulness. The questionnaire was based on the 4 factors found in the literature review, and was created to measure patient empowerment in NaDien, an eHealth program used by people with chronic pain. After issuing the questionnaire, analysis regarding the reliability and validity was done. It was filled out by 12 people with chronic pain fully, from which 3 people made use of NaDien. The full questionnaire can be found in Appendix F.

5.1.1 Participants

This research made use of an online questionnaire for which participants were selected on a voluntary base. The selection criteria were having gone through the pain rehabilitation program at Roessingh Rehabilitation Centre in Enschede, the Netherlands. Additionally, the participants would need access to the telerehabilitation portal of Roessingh Rehabilitation Centre which gives access to NaDien. An exclusion criterium was consequently not having access (anymore) to the telerehabilitation portal of Roessingh Rehabilitation Centre. Possible participants that fitted the selection criteria were emailed an invitiation to fill in this questionnaire. In said email, a link was given on which people could click to fill in the questionnaire. Although the participants were emailed about this, the researchers did not have any personal data due to the email contact being done by Roessingh, Centre for Rehabilitation.

In total, 11 people participated who filled out the questionnaire in full. One person filled out the questionnaire partly and having chosen the option that he or she did use NaDien but not anymore. However, the comment they left clarified that he or she in fact did not use NaDien. Therefore, this person will be included in the group of people that did not use NaDien. This makes for 12 participants in the study, from which 3 persons used NaDien. For this study, only the responses of people who used NaDien or still used NaDien were included in the statistical analysis. Of the three participants who used NaDien, one was male and two were female. The age of the participants ranged from 44 years old to 55 years old, with the average age being 49 years old. All of these three participants suffered longer than a year from chronic pain, 2 of them even longer than nine years. Moreover, all three participants followed an in-house treatment at Roessingh, Centre for Rehabilition.

5.1.2 Measurements

The questionnaire was created based on the previously completed literature review and the questions were made applicable for the situation of NaDien. Mostly close-ended questions were asked, however open-ended questions were added as well to give participants the chance to add remarks.

A 5-point Likert scale

The closed questions about patient empowerment, the factors and the subfactors made use of a 5-point Likert scale. Previous research into patient empowerment has made use of a 5-point Likert scale (Lewin & Piper, 2007) as well, while the Diabetes Empowerment Scale also made use of 5 items (Rui Sousa et al., 2019). For measuring psychological empowerment, Laschinger et al. (2001) used the scale of Spreitzer (1995), while also making use of a 5-point Likert scale. According to Sachdev and Verma (2004), 5-point Likert scales are recommended by researchers because they would cause the least frustration among participants although it would be beneficial for the response rate as well as the quality of the results. Therefore, the 5-point Likert scale seemed to be a well suited option for this research.

The questions

For this questionnaire, the questions were developed per factor or subfactor based upon the previously conducted literature review. This was done with a team of experts at Roessingh Research and Development. Various feedback moments were held and all questions were reviewed multiple times. For all factors, an overarching question was asked, an open ended question regarding all questions surrounding this factor and multiple specific questions per subfactor. Additionally, a question was created for patient empowerment and demographics were asked. All questions were specified for the context of NaDien and the ACT treatment the participants followed, in order for it to comply to their situation. An overview of the items and the corresponding factors and subfactors can be seen in Table 1.

Table 1

The questions used in the questionnaire with corresponding factors and subfactors

Theme	Construct	Factors	Questions
General question			Gebruikt u NaDien?
Patient Empowerment			Dankzij NaDien heb ik meer invloed op mijn leven
		Patient empowerment open question	Wilt u ons iets meer vertellen over uw antwoorden?
	Self-management		NaDien helpt mij in het omgaan met mijn chronische pijn
		Control	NaDien helpt mij regie te nemen over mijn leven
			NaDien helpt mij om te gaan met mijn symptomen (van chronische pijn)
			NaDien helpt mij met het aanpassen van mijn dagelijkse activiteiten
		Choice and decision-making	NaDien biedt mij andere manieren om met dagelijkse situaties om te gaan
			NaDien helpt mij te beslissen over de indeling van mijn dagelijkse activiteiten
			NaDien helpt mij om keuzes te maken omtrent mijn gezondheid
		Goals	NaDien helpt mij met het opstellen van mijn doelen
			NaDien helpt mij met het behalen van mijn doelen
		Self-management open question	U heeft net 9 stellingen beantwoord over het omgaan met chronische pijn. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder
	Resources		NaDien biedt mij relevante hulpmiddelen (zoals informatie, oefeningen etc.)
		Knowledge	Door NaDien weet ik meer over chronische pijn
			Door NaDien weet ik meer over ACT
			Door Nadien behoud ik mijn kennis vanuit mijn behandeling
		Information	NaDien geeft mij informatie over chronische pijn
			NaDien geeft mij informatie over het toepassen van ACT in mijn leven
			De informatie in NaDien is makkelijk te vinden

		Support	NaDien ondersteunt mij met het toepassen van ACT in mijn leven
			Ik ervaar steun door de tips die lotgenoten delen in NaDien
			Door NaDien voel ik mij gesterkt in het omgaan met chronische pijn
		Resources open question	U heeft net 10 stellingen beantwoord over hulpmiddelen die NaDien biedt. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder.
	Self-efficacy		Door NaDien leer ik beter om te gaan met mijn chronische pijn
		Enablement	NaDien stelt mij in staat om meer de regie te nemen over mijn leven
		Skills-development	Door NaDien leer ik meer de regie te nemen over mijn leven
		Mastery	Door NaDien neem ik meer de regie over mijn leven
		Enablement	NaDien stelt mij in staat beter om te gaan met dagelijkse situaties waar ik moeite mee heb
		Skills-development	Door NaDien leer ik beter omgaan met dagelijkse situaties waar ik moeite mee heb
		Mastery	Door NaDien kan ik beter omgaan met dagelijkse situaties waar ik moeite mee heb
		Enablement	NaDien stelt mij in staat om naar mijn waardes te leven
		Skills-development	Door NaDien leer ik vaardigheden om naar mijn waardes te leven
		Mastery	Door NaDien bezit ik vaardigheden om te leven naar mijn waardes
		Self-efficacy open question	U heeft net 10 stellingen beantwoord over het beter leren omgaan met chronische pijn. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder.
	Perceived usefulness		Ik vind NaDien nuttig
		Meaningfulness	Ik vind NaDien relevant
			NaDien is zinvol om te gebruiken om te leven naar mijn waardes
		Impact	NaDien heeft een impact op mijn leven
			NaDien geeft mij een nieuwe kijk op hoe ik om kan gaan met chronische pijn
		Perceived usefulness open question	U heeft net 5 stellingen beantwoord over of u NaDien nuttig vindt. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder.
Demographics			Wat is uw geslacht?
			Wat is uw leeftijd?
			Hoeveel jaar heeft u al last van chronische pijn?

	Welke behandeling heeft u recent gevolgd?
	Is er iets wat we niet gevraagd hebben maar wat u ons graag wilt vertellen?

Note. All questions are in Dutch so no information would be lost in translation. The original questionnaire was developed in Dutch because it was developed for a Dutch target audience.

Self-management

The construct of self-management (1 item and 1 open question) has the following subfactors: control (3 items), choice and decision-making (3 items) and goals (2 items). The questions for the subfactors were based upon the definition of the fitting subfactor that has been established in the literature review.

Resources

The concept of resources (1 item and 1 open question) exists of the following subfactors: knowledge (3 items), information (3 items) and support (3 items) so the questions were about those. In the context of NaDien, the subfactor information has a part of information accessibility. Therefore, one question specifically asked about the information accessibility in NaDien.

Self-efficacy

The factor of self-efficacy (1 item and 1 open question) had the following subfactors: enablement (3 items), skills-development (3 items) and mastery (3 items). The questions in this construct were not grouped per subfactor, rather per theme. The subfactors mastery, enablement and skills-development seemed to have a type of order. With enablement being necessary for skills-development, and skills-development in turn being necessary for mastery. Therefore, the items of the subfactors were asked in a different order, starting with all first items of all subfactors, then all second items and ending with all third items. This can also be seen in Table 1.

Perceived usefulness

The last factor identified for patient empowerment was perceived usefulness (1 item and 1 open question), which existed of the subfactors meaningfulness (2 items) and impact (2 items).

Patient empowerment

Whereas the literature review covers many articles on patient empowerment as well as empowerment, there is the slim chance of other articles being missed. This could result in some factors not being identified. On the other hand, it is also possible that the factors might not be as predictive of patient empowerment as thought with the literature review. Therefore, a general question regarding patient empowerment was also developed, which means that patient empowerment had 1 item and 1 open question.

Demographics

This questionnaire also made use of demographics, with the relevant demographics in this research being age, gender, the durations of one's chronic pain and which kind of treatment the participant followed. For the duration of the pain, a multiple choice question was used with the options: less than a year, 1-2 years, 3-5 years, 5-7 years, 7-9 years, more than 9 years. The choice was made to have more specified groups under 9 years of pain, and then the option of more than 9 years, as Flor, Fydrich and Turk (1992) found that 7 years of chronic pain was the average for people with chronic back pain. Moreover, the use of a multiple choice question provides more anonymity for the participants. Furthermore, an open ended question was asked at the very end of the questionnaire for participants who wanted to add anything.

5.1.3 Procedure

When people were interested to fill in the survey, they could click on a link to the questionnaire. When this happened, they got to see the first page of the questionnaire which was the page regarding informed consent. The participants got the option to agree to it, after which they would start the questionnaire, or to disagree after which the questionnaire would be ended.

When agreeing to the informed consent, the participants came to the first question of the questionnaire. The first question of the questionnaire was: “Do you use NaDien?”. For this question, the participant had three answering options: Yes, Not anymore or No. For participants who answered with yes, the questionnaire skips to the questions of self-management. When a participant answers not anymore, the open ended question “Can you tell us why you are not using NaDien anymore?” was asked. After this, the questionnaire would go on with the part about self-management. For the participant who answered no, the question “Can you tell us why you do not use NaDien?” appears, after which the questionnaire was ended.

After the participants did not gave consent and had not used NaDien were filtered out, the questions regarding patient empowerment would appear. First, the questions of self-management were asked. Second were the questions of resources, followed up by the questions of self-efficacy. Fourth, the questions of perceived usefulness were asked. After the questions of perceived usefulness, the question about patient empowerment would have to be answered. The questionnaire then followed up with the questions concerning the demographics. Lastly, participants were asked to give final remarks if they had any and were given a contact email address in case they wanted to know about the results of the study.

5.1.4 Analysis of the data

The data gathered in the questionnaire was analyzed in SPSS 19. For the demographics, descriptive statistics were used (means, standard deviations and frequencies). For the factors and subfactors descriptive statistics were also used (means and standard deviations). As the sample size of people who made use of NaDien was very small, other statistical analysis were not done. This because outcomes of these analysis (such as factor analysis, Cronbach's alpha and correlation analysis) would not be relevant due to the small sample size.

5.1.5 Ethics

The first page of the questionnaire was an informed consent, which each participant had to agree to. Otherwise the participant would not be able to fill in the rest of the survey. In the informed consent, the type of data gathered was stated, as well as the purpose of the data and that participants could withdraw at any given moment without giving up a reason why. While this study has a target group of people with chronic pain, the topic of the study is not a medical topic. Therefore, no medical ethical approval was asked. However, an appeal for ethical approval to the ethics committee from the Behavioural and Management Sciences faculty of the University of Twente was done. This ethical approval was granted for the request number 200673.

5.2 Results

This study made use of factors identified in literature which resulted in a model with multiple layers, for which multiple different means and standard deviations were necessary. Additionally, minimum and maximum given values on the 5-point scale were calculated. Every factor had multiple subfactors which all had their own items. Therefore, for each subfactor and factor, a variable was created. For a subfactor, this consisted of the mean of the items that correlated to this subfactor. For the factors, the mean was taken of all items concerning this factor which were all items of the subfactors and the overarching item of the factor. Here, the results of the analysis will be discussed per factor and then for patient empowerment itself. The results (means and standard deviations) per question can be found in Appendix G.

5.2.1 Self-management

The factor of self-management has a mean score of 3.48 (SD 0.45). The scores for the subfactors are displayed in Table 2 along with the scores for self-management. One remark given was that NaDien was something that the participant used at certain times to consciously think about where you were coming from and how you are doing.

Table 2

Descriptive statistics of the factor Self-management and its subfactors

(sub)factor	n	Minimum	Maximum	M	SD
Control	3	3.33	4.00	3.56	0.38
Choice & Decision-making	3	2.67	3.67	3.33	0.58
Goals	3	2.50	4.00	3.33	0.76
Self-management	3	3.00	3.89	3.48	0.45

5.2.2 Resources

For the factor resources, the mean score is 3.73 (SD 0.12). The scores for the subfactors knowledge, information and support can be seen along with the scores for resources in Table 3. Regarding resources in NaDien, when trying to explain the answers given one participant recommended a diary function. It was also mentioned that it is possible to add a lot in NaDien although it is not always easy to do.

Table 3

Descriptive statistics of the factor Resources and its subfactors

(sub)factor	n	Minimum	Maximum	M	SD
Knowledge	3	3.33	3.67	3.56	0.19
Information	3	3.00	3.67	3.44	0.38
Support	3	4.00	4.33	4.11	0.19
Resources	3	3.60	3.80	3.73	0.12

5.2.3 Self-efficacy

The mean of the factor self-efficacy is 3.53 (SD 0.64). These scores, along with the scores for the subfactors enablement, skills-development and mastery can be found in Table 4. When asking to elaborate on the questions regarding self-efficacy, which is worded in the questionnaire as handling chronic pain better, a participant mentioned that NaDien is more of a reminder or support of what he or she has learned in the treatment program.

Table 4

Descriptive statistics of the factor Self-efficacy and its subfactors

(sub)factor	n	Minimum	Maximum	M	SD
Enablement	3	3.00	4.00	3.56	0.51
Skills-development	3	2.33	4.00	3.44	0.96
Mastery	3	2.67	4.00	3.56	0.77
Self-efficacy	3	2.80	3.90	3.53	0.64

5.2.4 Perceived Usefulness

The last factor, perceived usefulness, has with 4.00 (SD 0.35) the highest mean of the factors. The scores of the subfactors impact and meaningfulness can be seen alongside the scores of perceived usefulness in Table 5. A comment given on the usefulness of NaDien was that it was perceived more as a type of guidance.

Table 5

Descriptive statistics of the factor Perceived usefulness and its subfactors

(sub)factors	n	Minimum	Maximum	M	SD
Meaningfulness	3	4.00	4.50	4.17	0.29
Impact	3	3.00	4.00	3.50	0.50
Perceived usefulness	3	3.80	4.40	4.00	0.35

5.2.5 Patient Empowerment

The construct of patient empowerment was measured with the previously mentioned factor. The mean was taken of all items used in the questionnaire to determine the value for patient empowerment. This resulted in having a mean of 3.65 (SD 0.37). Additionally, there was the overarching question of patient empowerment, which resulted in a mean score of 3.67 (SD 0.58). These scores can be seen in Table 6. On of the participants remarked that he or she reads things in NaDien, is made aware of what he or she learned in the ACT pain rehabilitation and tries to keep doing what he or she learned in daily life.

Table 6

Descriptive statistics of the question regarding Patient empowerment and Patient empowerment measured by the questionnaire

Patient empowerment measure	n	Minimum	Maximum	M	SD
Question on patient empowerment	3	3	4	3.67	0.58
Patient empowerment over the whole questionnaire	3	3.23	3.94	3.65	0.37

General remarks on the questionnaire and NaDien were given too. One participant mentioned that it would have been nice to have unlimited access to NaDien. Right now, participants only get access to NaDien up until 3 months. Another participant mentioned that even though he or she has not finished the pain rehabilitation yet, he or she did get exercises via NaDien already.

5.2.6 Participants not using NaDien

Only 25% of the participants made use of or still used NaDien. This means that 75% of the participants did not use NaDien. There were only 3 different reasons participants gave for this, which were all given more than once. The first reason given was that participants did not work with a computer or laptop often or did not like this. The second reason, and also the most given reason, was that participants did not know about NaDien. The third reason given was that participants had not finished the pain rehabilitation yet as it was stopped temporarily due to the coronavirus outbreak.

6. Discussion and Limitations

In the previous sections, the set-up and the results of this research have been elucidated. Therefore, it is important to now discuss the results as well as the limitations of this study.

6.1 Discussion of results

The results of the literature review showed that patient empowerment had 4 relevant factors for people with chronic pain: self-management, resources, self-efficacy and perceived usefulness. This was a new composition of factors of patient empowerment. While all subfactors were mentioned in literature already, not all factors were. Perceived usefulness was introduced as a new factor of patient empowerment. Although this seems to be a sound composition, it is always possible that an addition of another (sub)factor would make the model better, although this was not found nor testable due to the limited number of participants. Below, patient empowerment will be discussed regarding results from the questionnaire, as well as all factors.

To test the factors found in the literature review, a questionnaire was developed to specifically evaluate the patient empowerment for people who use the eHealth program NaDien. For all factors and subfactors, the mean scores are fairly positive which means that NaDien is helping with them. Additionally, the score for patient empowerment as a whole (including the factors and subfactors) matches the score of the overarching question of patient empowerment very well. This indicates that NaDien has some positive effects on the patient empowerment of people with chronic pain, as well as that the factors contribute to patient empowerment.

For the factor self-management, it could be said that NaDien helps most people with chronic pain with the self-management of their condition. The mean scores of the subfactors and the factor of self-management were quite similar to each other. This could be interpreted as the subfactors fitting together nicely. The subfactor of control scored the highest, which implies that NaDien helps to give participants a sense of control. The positive influence of choice & decision-making and goals could be debated, as the minimum scores could be interpreted as lightly negative. However, the overall score of self-management is still rather positive. It is not a surprise that NaDien helps participants with self-management, as eHealth is supposed to support patients in self-management according to Huygens et al. (2016). They also reported that the expectations and needs about the eHealth system and self-management from the users need to be kept in mind.

NaDien also has relevant resources for people with chronic pain, from which support can be seen as the most prominent one. The factor resources had a rather high mean score, so participants believed that NaDien had relevant resources for them. The minimum given value for all factors show that NaDien at the very least would have a neutral influence on patient empowerment. Especially the subfactor support was rated very high. This is matching the comment of a participant, who mentioned that NaDien supports the pain rehabilitation. Also, a comment a participant left under perceived usefulness referred a form of support, as it mentioned the guidance NaDien offers. This can actually be seen as a form of support that complements the way Fledderus et al. (2015) meant NaDien to be used: as a program to prevent relapses.

It could be said that NaDien does help with self-efficacy, as the mean scores for the factor self-efficacy and its subfactors were rather positive as well. The scores for the subfactors were also very close together in mean scores. For the subfactors skills-development and mastery, the minimum shows that there is a possibility that NaDien does not influence it. The most positively evaluated subfactor would be enablement. According to Laschinger et al. (2010), enablement in the context of patient empowerment is enabling patients to enhance their health. This is basically the goal of NaDien, therefore it is not strange to see the subfactor of enablement being evaluated positively, Additionally, participants who used NaDien considered it useful and relevant use. This because the factor perceived usefulness scored rather high. It is even the highest scoring factor. From the subfactors impact and meaningfulness, meaningfulness scored very high. The positive scores of perceived usefulness are in line with the technology acceptance model (Davis, 1989). According to this model, people would not use a program if they do not deem it useful. Therefore, it would contradicting for the participants who used NaDien to not consider NaDien useful.

In this study, patient empowerment is seen as something desirable which patient should want. However, Harris and Veinot (2004) mention that assumptions of patients wanting to be empowered and empowerment being good for patients among others are poorly supported. Also, doctors are not always keen on empowering patients, according to Calvillo et al. (2013) doctors being hesitant to give up their powers. Therefore, patient empowerment might not be the best solution in every case, although it does seem to give many benefits in the case of people with chronic pain. Participants commented multiple positive things about NaDien and all factors were rated positively.

6.2 Limitations of this Study

One of the limitations in this study was the limited number of participants. This was due to time constraints and a limited number of people fitting the target group. The statistical results are not fully reliable because of the small sample size. With more data, the validity and reliability of this research would go up. Therefore, the generalizability would also be improved. Moreover, the generalizability can be seen as a limitation in another manner. This research was done with people with chronic pain who followed the pain rehabilitation at Roessingh, Centre for Rehabilitation. The eHealth program used was also developed specifically for this group of people with chronic pain. Therefore, this study has a focus on a specific treatment for chronic pain. Additionally, the program NaDien is also used specifically at Roessingh, Centre for Rehabilitation. Therefore, this research might not be generalizable to eHealth programs used in other pain rehabilitation treatments as those might not have incorporated the same type of elements.

Not only did the sample size have an effect on direct generalizability, it also affected the possible statistical analysis. It was already mentioned that with more data the validity and reliability of the research would improve, however this would also allow for more conclusions to be drawn. In an ideal situation, factor analysis would be done to assess the validity of this questionnaire. This would have to be done for each factor to determine the subfactors, and then for patient empowerment to determine the factors. Then, to test the reliability, Cronbach’s alpha should be tested. This has to be done for each subfactor, each factor and for patient empowerment as a whole. To follow up, a multiple regression would have to be done with the established factors and subfactors. Once for each factor with the subfactors, and once for patient empowerment with the factors. This way, the relationship between the subfactors and factors could be determined as well as the relationship between the factors and patient empowerment. Such an analysis would give results that show if the questionnaire is reliable and valid, thus make it possible to draw distinct conclusions upon the results.

A practical limitation which could be connected to the sample size is the outbreak of the coronavirus. Multiple participants mentioned not using NaDien and giving the outbreak of the coronavirus as a reason as it interfered with their rehabilitation program. Therefore, it could have been possible that in normal circumstances, they would have used NaDien already and different types of analysis would have been possible. Additionally, the coronavirus outbreak could have put a strain on people with chronic pain which could have led to them not filling out the questionnaire.

As explained, the coronavirus outbreak can be connected with the small sample size, although there are also other reasons for the sample size being small. Reasons participants gave were not working a lot with the computer or not knowing about NaDien. Therefore, participants not using computers often can be seen as a limitation, as well as participants not knowing about NaDien.

Lastly, this research focussed specifically on patient empowerment in relation to the program NaDien. However, no research was done regarding the general patient empowerment among the participants so nothing can be said about the general feelings of empowerment a person with chronic pain already experienced. Although, the focus here is on the improvement of patient empowerment by using NaDien. In short, this means that while there is no way of knowing if the people with chronic pain already felt empowered before the use of NaDien or if NaDien is necessary for patient empowerment, it nevertheless answers the question in what way NaDien can contribute to patient empowerment.

7. Conclusion and Practical Implications

This research aimed to find out which factors contribute to patient empowerment for people with chronic pain and how the eHealth system NaDien can contribute to patient empowerment for people with chronic pain. To conclude, patient empowerment exists of the factors self-management, resources, self-efficacy and perceived usefulness. The eHealth system NaDien can contribute to patient empowerment by incorporating elements that assist users with those factors or processes. More specifically, NaDien can contribute greatly to the factor of perceived usefulness as it is considered meaningful as well as to the factor resources as it supports people with chronic pain. However, most participants did not make use of NaDien due to not knowing about it or not using computers often. Therefore, it is necessary to inform people about it and explain the program as well as the goal of it. Furthermore, this group of participants of this study was rather small, so more research is necessary regarding this assembly of factors and the developed questionnaire.

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Appendices

Appendix A: Overview articles of the Literature Review

Titel	Author	Patient empowerment consists of:	Specific for	Interesting results
Factors in Patient Empowerment: A Survey of an Online Patient Research Network.	Chiauzzi, E., DasMahapatra, P., Cochin, E., Bunce, M., Khoury, R., & Dave, P. (2016). (Chiauzzi et al., 2016)	2 domains; - Positive patient-provider interaction Included items related to patient satisfaction, comprehension & active involvement in treatment Also: even if it was not from their data: it seems evident that empowerment also includes a sense of self-efficacy in health-information seeking. And a positive communication style between patients and providers. (from aujoulat, d'Hoore, Deccache, 2007) - Knowledge & personal control Corresponds by factors from Small et al. (2010); knowledge and confidence in decision making, positive attitude and sense of control.	Empowerment in relation to health-information seeking. The participants had to at least have one chronic health condition.	Man had higher empowerment levels than women. The empowerment levels from patients with myalgic encephalomyelitis/chronic fatigue syndrome and fibromyalgia scored lower on both factors → less empowered. Can be due to: 1. Interventions (of self-management) might be underutilized due to lack of understanding, lack of qualified therapists, lack of medical coverage. 2. May carry a stigma that detracts from patient empowerment as patients perceive distrust and scepticism by their physicians. ➔ *These conditions can be seen as similar to chronic pain (as can be found on 'the mighty' and 'reddit' these terms are used next to each other and patients recognize a lot of each other's symptoms), therefore this could also be seen as empowerment in chronic pain patients being lower as there are too little interventions or the stigma around it.*
Patient empowerment: the role of technology.	(Daruwalla et al., 2019)	Mention problems regarding self-managing a chronic disease or participate in health care system, so: - Self-management - Participating in healthcare system *Areas in which technology can support empowerment:* - Access and control	Patient empowerment in general Chronic diseases	5 problems with 'patient empowerment'; patients have: 1. Little influence on the system for their own needs 2. Limited access or control over own medical information. 3. knowledge and information disadvantage when interacting or negotiating with payers and providers.

		Possession of ones own health care data. - Knowledge and information Knowledge, education and information on how to best use your own medical data is necessary. - Shareholding All organizations that benefit from the patients data pay a ‘divident’ to the patient		4. Little say in how the main value creating activity in healthcare, research, is conducted. 5. Do not receive any benefits including monetization of data from use of their data. Why empowerment: cost reduction, better health outcomes, greater system efficiency, improving patient autonomy.
E-health applications and services for patient empowerment: directions for best practices in the Netherlands.	(Alpay et al., 2010)	Empowerment can cause patients can make them take more responsibility for managing heir health and encouraging self-management activities. Patient empowerment is achieved when: 1. Patiens have access to relevant information 2. Patients develop skills for problem-solving and self-efficacy 3. Patients are motivated to manage their health	Partly diabetes patients, patient empowerment in general.	To achieve the three points, different mechanisms are tried such as education and health literacy, decision making aids and self-care support, as solution to achieve empowerment. To get empowerment: - Insight into one’s own health condition - Making informed choices - Engaging self-care activities and developing self-care habits Living independently.
Assessment of patient empowerment – A systematic review of measures	(Barr et al., 2015)	4 domains: - Patient states, experiences and capabilities *Self-efficacy; self-esteem; self-confidence; satisfaction; Stigma; commitment and engagement; self-monitoring; self-knowledge & insight/awareness; Optimism/hope; Perceived (sense of) control; Righteous anger; acceptance; enablement; readiness to change; power/powerlessness; tolerance for uncertainty; sense of affinity with the family; motivation to advocate for oneself; having knowledge / information / being informed;*	Included studies that measured with psychometric assessment. Only with adult patients in a healthcare setting. General patient empowerment.	Self-care interventions for long-term conditions, sometimes called patient empowerment programmes, have been shown to improve mental health, doctor-patient communication, healthy eating and patient self-efficacy (with 2 sources). Related constructs to patient empowerment: enablement, activation, perceived control, capability, independence When measuring patient empowerment, all studies use different measures. There is no consensus on the core constructs of empowerment.

		Emotional regulation/wellbeing; constructive attitudes and approaches; autonomy - Patient actions and behaviours *Learn from past experience; Positive active engagement with life; Health directed behaviour/manage and improve own health; Health service navigation; social integration; effective change; community activism; coping (strategies including obtaining support); managing psychosocial aspects of disease; setting & achieving disease-related goals (including determining suitable methods and overcoming barriers); Stress management* - Patient self-determination within the healthcare relationship *Power-sharing/collaboration/mutual participation; Mutual / Patient decision-making; Patient choice / self-determination self; communication* - Developing patient skills *Developing skills / skills acquisition; sense of healthcare providers empowering behaviour*		Patient-centeredness is related to patient empowerment, patient empowerment is broader. (+ source) Patient empowerment can be conceptualised as a process achieved through patient-centered care, or as an outcome, and includes elements relating to both patient and healthcare professional roles, shared decision-making, patient self-efficacy and coping. (+2 sources) Overlap with patient empowerment but not patient empowerment: enablement, activation, shared decision-making and capability.
Interactive sections of an Internet-Based Intervention Increase Empowerment of Chronic Back Pain Patients: Randomized Controlled Trial	(Riva et al., 2014)	Made use of the psychological empowerment scale from Thomas & velthouse. Empowerment consists of 4 cognitive dimensions: - Impact (or the degree to which behaviour is seen as ‘making a difference) - Competence	Chronic back pain patients	Other mentioned patient empowerment definitions: (all with references in text) - Empowerment goes beyond self-esteem, self-efficacy, competency, locus of control and other traditional psychological constructs and can be considered a multilevel and multidimensional construct closely linked to self-determination and self-efficacy.

		(or to the degree to which a person can perform task activities skilfully) - Meaningfulness (or the individuals intrinsic caring about a given task) - Choice (or whether a person’s behaviour is perceived as self-determined) From thomas & velthouse: Empowerment defined as increased intrinsic task motivation. Task motivation involves positively valued experiences that individuals derive directly from a task. Empowerment can refer to feelings of power, control and self-esteem that lead to patient to value autonomy and thus interest in and desire to participate in health care decisions. Patient empowerment is considered a predictor of self-management behaviours.		
Health Literacy and Patient Empowerment : Separating Con-joined Twins in the Context of Chronic Low Back Pain	(Camerini & Schulz, 2015)	Took definition of Schulz & Nakamoto, patient empowerment has 4 distinct dimensions: - Meaning To the degree to which patients think that what they do with respect to their health is meaningful and important. - Competence Or the degree to which patients feel competent to perform self-management activities - Self-determination	Chronic lower back pain patients	Health literacy and patient empowerment were not significantly correlated. Health literacy might not be an empowerment tool. ➔ *Then what is health literacy in relation to empowerment? Is it a prerequisite for empowerment?* Low empowered patients leave medical expertise and decisions to their healthcare provider. High empowered patients prefer a mutual relation ship with healthcare providers negotiating their treatment plan (with high

		Or the degree to which patients think that what they do about their health is determined by themselves - Impact Or the degree to which patients feel that self-management activities make a difference in their health status *Patient empowerment shows similarities with performing self-management.*		health literacy) or challenge the advisory role of healthcare providers (low health literacy)
Cognitive Elements of Empowerment: An " Interpretive " Model of Intrinsic Task Motivation	(Thomas & Velthouse, 1990)	2 types: task assessments and global assessments. The global assessments are about the believes about task assessments. The task assessments provide a framework for evaluating the probable effectiveness of empowerment interventions; - Impact - Competence - Meaningfulness - choice	People in organizational environments, it is a managerial article.	Managerial article, involves a whole model: the cognitive model of empowerment.
Patient Education and Counseling Health literacy and patient empowerment in health communication : The importance of separating conjoined twins	(Schulz & Nakamoto, 2013)	Adapted the four constructs from (Spreitzer, 1995) - meaningfulness (or relevance) "I feel that doing this is relevant for me" - Self-efficacy (or competence) "I am able to do this" - Impact "I can make a difference" - Self-determination "I can choose between different ways"		All with sources in text Patient empowerment is empowerment in the health care setting. Empowerment: 'a process by which people gain mastery over their lives' Empowerment is about improving quality of life, people should be able and motivated to bring about changes, not only in their personal behaviour, but also in their social situations and the organizations that influence their lives.

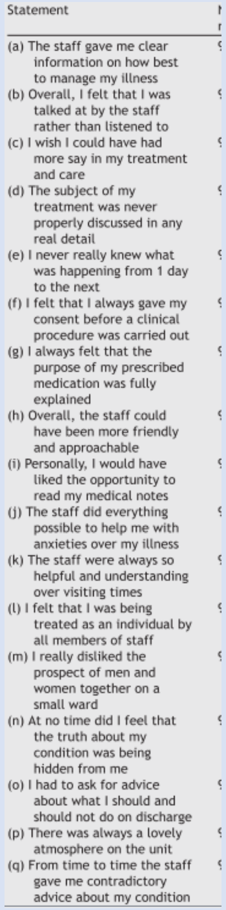
				Empowerment is associated with power, equity and control of situations: the capacity to solve problems and get a fair share or resources. Powerlessness has a negative effect: ill health.
Women in Chronic Pain : Sense of Control and Encounters With Health Professionals	(Skuladottir & Halldorsdottir, 2008)	Empowerment: the subjective experience of an interpersonal process whereby a person, who has power over another, is genuinely concerned for the other and gives the power to the other. It is manifested through acknowledgement and confirmation of the personhood of the other in true dialogue, mutuality and connection, and engagement and involvement. Empowerment increases the other's sense of control over oneself and situation, relieves the sense of vulnerability, and gives the other full voice. Empowering encounter with the healthcare professional; when the healthcare professional is perceived as wise, competent and caring. This results in a connection and mutual trust. In short: - Wise - Competent - Caring - Connection	Chronic pain in women Literature review	Woman in chronic pain have the challenge of keeping a sense of control of self and not giving up. This has the following subchallenges: 1. Learning to live with the pain, for example, by accept- ing one's own limitations and keeping the pain tolerable 2. Coping with the unpredictability of the pain 3. Managing to be self-protective and creating a per- sonal space, for example, by negotiating with the environment 4. Accepting the incurability of the pain—involves, for example, grieving "life without pain" the woman once had, as well as former ways of life 5. Finding meaning in her suffering and retaining a pos- itive self-image and self-esteem in spite of the pain 6. Trying to live a "normal" life in dignity in spite of the pain 7. Keeping active and fit, physically, for well-being and healthy appearance, and, socially, to avoid isolation In short: To retain a sense of control in chronic pain, we pos- tulate that women are challenged to learn to live with the pain and cope with the unpredictability and incur- ability of the pain. → *very in line with ACT*
Patient empowerment in cancer pain management : an integrative literature review	(Boveldt et al., 2014)	Self-efficacy is important for empowerment, having resources is important, the patient needs to be involved and strategies to empower patients are essential. Patient empowerment is used to get pain control.	Cancer patients with pain	Many different empowerment definitions from others are included. - Kravitz, Tancredi, Street, et al. 2009 - Kravitz, Tancredi, Grennan et al. 2011 - Lasch, Wilkes, Montuori et al. 2000

		Self-efficacy is a factor for patient empowerment.		- Thomas, Weiss, 2000 - Tse, Wong, Ng et al. 2012 - McNeill, Reynolds, Ney, 2007 - González Barón, Lacasta Reverte, Ordóñez Gallego et al. 2006
Cancer Health Empowerment for Living without Pain (Ca-HELP): effects of a tailored education and coaching intervention on pain and impairment	(Kravitz et al., 2011)	Empowerment is self-efficacy. This is normal empowerment, not specifically patient empowerment.	Cancer patients	Empowerment in the title, the rest is all about self-efficacy
Effectiveness of Web-based Interventions on Patient Empowerment: A Systematic Review and Meta-analysis	(Samoocha et al., 2010)	Use others definitions of empowerment; - Enhanced ability of patients to actively understand and influence their own health status. (Bruegel, 1998) - Focusses on control in individuals' experience of health, disease, and illness, as well as the roles of health care organizations, communities and the broader health care system. (Harris, Veinot, 2004) - Strategies to enhance empowerment: 1. Disease management 2. Relationship with the providers of the health care. (Ajoulat, d'Hoore, Deccache, 2007) Included studies that measured empowerment with: - DES (Diabetes empowerment scale). Measures diabetes related empowerment.	Patients with a medical problem. Examples: infertility patients, patients with a post-traumatic stress disorder, patients with diabetes, or back pain patients.	Impact factor: 4.945 Included some articles that show effectiveness of the internet to improve health outcomes. Also, 'it is believe that the real opportunities for patient empowerment started with the rise of the internet and eHealth' (see source).

		Study of Hill et al. show that DES can be adapted to other conditions. - Self-efficacy with disease-specific self-efficacy instruments. Or just self-efficacy. - Mastery with the pearlin mastery scale. Mastery is an outcome often linked to empowerment. - Self-esteem is measured as an empowerment-related outcome. ➔ *Self-efficacy is measured as empowerment, as well as mastery and self-esteem*		
Trends that Matter – Patient Empowerment	(Bruegel, 1998)	Patient empowerment 'can be defined in this context as the increasing ability of patients to actively understand, participate in, and influence their health status.' Core of patient empowerment: health information. Aspects of empowerment: - Easy access to health information - Patients expect more of a customer service idea - Transparency → sharing patient information across systems. The relevant people have access. - Consistency in information that the health care organization provides, from the point of care until the internet home page. - The possibilities of electronic interactions. This with health care providers and electronic records and patients files.	Patient empowerment in general	The main focus of electronic health information is to provide communication when you have patient empowerment as viewpoint. Possible communications: - Provider to provider - Provider to patient/family - Patients to providers/ families to providers - Patients/families to patients/families What leads to empowerment: - consumer empowerment increased - More chronic diseases - Costs need to lower - Health information is more widely and easily accessible. - Motivation for patient education with managed care - The health care systems became bigger - Legal exposure of the health care organizations increased.

		- Remote monitoring: monitoring from a distance. - Community linkage: a link between the health facility and community members.		
The Empowerment Model and Using E-Health to Distribute Information	(Harris & Veinot, 2004) *Check reference details!*	Patient empowerment has a focus on control in the experience of health, disease and illness. Also, the roles of health care organizations, communities and the whole health care system.	General patient empowerment, There is also a part on HIV/AIDS information exchange	Article talks about assumptions on which patient empowerment is build; - Patients want to be in control - It's good for patients to have a choice and be in control - Healthcare providers support patients in getting in control - Providing information empowers patients - Patients that are informed and empowered will take a better care of their health. However, they discuss if these assumptions are really true and are very sceptical about them.
The Effects of Patient Empowerment Scale in Chronic Diseases	(Galanakis et al., 2016)	The studies included measured empowerment, or empowerment related concepts such as self-efficacy, self-esteem, decision making and quality of life. One measure used was the diabetes empowerment scale (DES). Say that empowerment can not be measured as a general concept, you need to examine it through other concepts, including self-efficiency, self-esteem, perceived control, quality of life and decision-making. This comes from Zimmerman (1995). 4 fundamental empowerment factors: - Chronic care of disease - Choices - Control	Patients with a chronic condition such as cancer, diabetes type 2 fibromyalgia, arthritis-osteoporosis, multiple hardening, asthma	Diabetes empowerment scale is mentioned, DES Patient Perceptions of Empowerment Scale (PPES) is mentioned

		- Consequences - → defined as 4 fundamental empowerment factors, but came partly from Funnell & Anderson 2010 they define only 3 factors (not chronic care of disease) Increase empowerment through: - Self-control - Self-governing		
Implementing an Empowerment- Based Diabetes Self-management Education Program.	(Funnell et al., 2005)	Empowerment is used to gain mastery over diabetes. Empowerment approach strategies: - Support person with being responsible and in control - Educate patients so they can make informed decisions instead of compliance - Patients need to learn to set behavioural goals so they can choose what to change - Integrating clinical, psychosocial and behavioural aspects of (diabetes) self-management - Supporting the patient in knowing their learning needs - Support the patient in choosing an self-management approach that is useful for them. - Supporting the patient in discovering and learning to solve their own issues. - Respecting culture and believes, and ethnicity of the target group. - Creating opportunities for the patient to get social support	Diabetes Type 2 patients	No clear definition of patient empowerment, does give strategies to achieve it. The empowerment-based intervention is focussed on self-management. Here, they compare self-management with empowerment in a way.

		- Support the patient in getting self-management support.		
Patient empowerment within a coronary care unit : Insights for health professionals drawn from a patient satisfaction survey	(Lewin & Piper, 2007)	PPES: patients' perceptions of empowerment scale. Table 4. 17 constructs to measure the perception of empowerment.  Statement (a) The staff gave me clear information on how best to manage my illness (b) Overall, I felt that I was talked at by the staff rather than listened to (c) I wish I could have had more say in my treatment and care (d) The subject of my treatment was never properly discussed in any real detail (e) I never really knew what was happening from 1 day to the next (f) I felt that I always gave my consent before a clinical procedure was carried out (g) I always felt that the purpose of my prescribed medication was fully explained (h) Overall, the staff could have been more friendly and approachable (i) Personally, I would have liked the opportunity to read my medical notes (j) The staff did everything possible to help me with anxieties over my illness (k) The staff were always so helpful and understanding over visiting times (l) I felt that I was being treated as an individual by all members of staff (m) I really disliked the prospect of men and women together on a small ward (n) At no time did I feel that the truth about my condition was being hidden from me (o) I had to ask for advice about what I should and should not do on discharge (p) There was always a lovely atmosphere on the unit (q) From time to time the staff gave me contradictory advice about my condition	Coronary care patients	Four dimensions of empowerment are frequently described: - Patient's believes in having power, influence and control - Willingness and commitment of health professional to empower the patient - Perceived change in power or control - Equality of opportunity & freedom from discrimination Not all patients want to have patient empowerment. 87% here was happy to give control to the staff. This related to the confidence in their clinical expertise, friendliness and approachability.

		Empowerment is bottom-up decision making, patient led decision making.		
Patient empowerment in theory and practice: Polysemy or cacophony?	(Aujoulat et al., 2007)	Empowerment in the field of healthcare is an alternative to compliance. There are 2 dimensions to empowerment: an inter-personal one and an intra-personal one. Key features of empowerment-based approach: - (ideology driven and concern)Choice and responsibility - Skills-development (to be able to relate more to oneself and others, to be able to cope with disease, life and environment better) The features show that humans want to experience self-growth (self-actualisation) Empowerment is a complex experience of personal change. *Self-determination & a patient-centered approach used by health-care providers enable empowerment*. The therapeutic education activities for the patients should be based upon self-reflection, experimentation and negotiation. Outcomes of empowerment can be greater sense of self-efficacy, and changes in life priorities and values. The empowerment process should enable patients to better self-manage their disease and life.	Empowerment in (physical) chronic conditions	This contributes to the empowerment process: - A positive atmosphere - Paying attention to patients' priorities: active listening with a self-reflective dialogue - Support autonomy, encouraging patient to participate in their health-care process. - Individualised information & advice - Letting patients express their emotions & emotional support - Giving patients time to make decisions or practice tasks - Evaluate changes in the representation of self

Empowerment and Self-Management of Diabetes	(Funnell & Anderson, 2004)	Self-management education is necessary for empowerment approach. Empowerment is NOT self-management Patient empowerment: "Helping patients discover and develop the inherent capacity to be responsible for one's own life" – old definition of Funnell et al., 1991 Empowerment is a vision: the patient needs to be well informed and active collaborators in their own health care process. Health professionals need to support patients in making well-informed decisions so they can reach their goals; this by education, expert advice and support.	Diabetes patients	Patients need education, to know about their goals, values, motivation, how to care safely for diabetes, different treatment options, benefits and costs of the options, how to change behaviour and how to solve problems
Psychological Empowerment: Issues and Illustrations	(Zimmerman, 1995)	Fundamentals of empowerment process: - Efforts to gain control - Access to resources - Critical understanding of the socio-political context one is in. Empowerment processes might include: - Development and practice of skills - Learning about resource development and management - Working towards a common goal with others - Expanding one's social support network - Developing leadership skills	Psychological empowerment in general	From article Galanakis, Zimmerman said that you need to measure empowerment with other concepts: self-efficiency, self-esteem, perceived control, quality of life and decision-making.

		Empowerment has 3 components; intrapersonal, interactional & behavioural. In the intrapersonal component refers to: - Perceived control (domain specific) - Self-efficacy - Motivation to control - Perceived competence - Mastery The intrapersonal component includes: - Perceived control - Competence - Efficacy Interpersonal & behavioural: lot's of may Interpersonal: - Awareness of options - Critical awareness of environment (resources needed, getting the resources, skill to manage resources) - Decision-making, problem-solving & leadership skills Behavioural: - Actions taken to directly influence outcomes: stress management, adapting to change.		
Patient Education and Counseling Patient empowerment , patient participation and patient-centeredness in hospital care : A concept analysis	(Castro et al., 2016)	Empirical referents of patient empowerment (when these are present, empowerment is usually present): - Enablement - Process of growth - Coping and decision making - Control and hope - Self-management	Publications about patient empowerment, patient participation or patient centeredness.	The Domains that (Barr et al., 2015) found are mentioned in the article. From literature studies: (combination of multiple sources done by castro et al.) Antecedents of patient empowerment: - Dialogue between health-care providers and patients

based on a literature review		- Self-efficacy - Patient education - Patient Knowledge, patient control, patient participation - Activation		- Patient-centered approach - Enhancement of patients competences so they can develop skills and knowledge for making choices on aspects that are important to them. - Active participation Attributes of patient empowerment: - Providing tools, techniques & support - Achieving personal change - Self-determination Patient empowerment is distinct from patient participation and patient centeredness
The relation between patient education , patient empowerment and patient satisfaction : A cross-sectional-comparison study	(Yeh et al., 2018)	Used a Chinese PPES, with 11 items in 4 factors. The 4 factors: - Information - Decision-making - Individualization - Self-management	Patients hospitalized for 3 or more days. Excluded: pediatrics, psychiatry and the intensive care patients.	“Sufficient patient education and patient satisfaction can significantly predict patient empowerment.”
The Diabetes Empowerment Scale	(Anderson et al., 2000)	The Diabetes empowerment scale measures self-efficacy. Empowerment = self-efficacy To measure it; subscales: - Managing the psychosocial aspects of diabetes - Assessing dissatisfaction and readiness to change - Setting and achieving diabetes goals	Diabetes patients	

Study of the Psychometric Properties of the Diabetes Empowerment Scale Short Form (DES-SF)	(Rui Sousa et al., 2019)	Used the Diabetes Empowerment Scale short form; They say empowerment but talk about self-efficacy. So Empowerment = self-efficacy. Subscales; - Managing the psychosocial aspects of diabetes - Assessing dissatisfaction and readiness to change - Setting and achieving diabetes goals	Diabetes patients	
Psychological empowerment in the workplace: Dimensions, measurement, and validation.	(Spreitzer, 1995)	4 dimensions of empowerment, from (Thomas & Velthouse, 1990): - Meaning - Competence - Self-determination - Impact	Empowerment in work context	
(26) Empowering dialogues - the patients' perspective	(Tveiten & Knutsen, 2011)	Empowerment: seeing the patient as equal and autonomous and part of the health care team. The empowerment process is moral and needs to make people feel in control. It is important to recognize power as a part of empowerment process	Chronic pain patients	Power as an aspect of empowerment
Empowerment and health: The theory and practice of community change	(Wallerstein, 1993)	Empowerment is defined by powerlessness; This comes from Wallerstein 1992; Community empowerment is a social process, it promotes participation of people in order to enhance individual and also community decision-making and	Community empowerment	Empowerment happens when people are powerless, for empowerment; - participation - increased decision making skills - increased control

<table>
<tr><td></td><td></td><td>control. It should help with equity of resources and make the quality of life better.</td><td></td><td></td></tr>
<tr><td>Web-based interventions for chronic back pain: A systematic review</td><td>(Garg et al., 2016)</td><td>“It is possible that Web-based interventions may lead to patient empowerment by supporting ownership over their health thereby encouraging patients to be more proactive about the treatment, maintenance, and follow-up of their condition”</td><td>Interventions for Chronic low back pain patients</td><td>In short; empowerment could be achieved by:
- ownership over health by the patient
- proactivity about treatment, maintenance and follow-up on the condition by the patient</td></tr>
<tr><td>Patient empowerment : The need to consider it as a measurable patient-reported outcome for chronic conditions</td><td>(McAllister et al., 2012)</td><td>Patient empowerment is defined differently by everyone, and also measured differently. In a brief summary they made they saw some similarities;
- dimensions of decision-making
- control
- self-efficacy (also; mastery)
- self-management of the disease
These can be found in table 1 (see details column)</td><td>Patient empowerment in general</td><td>Table with examples of validated examples of empowerment

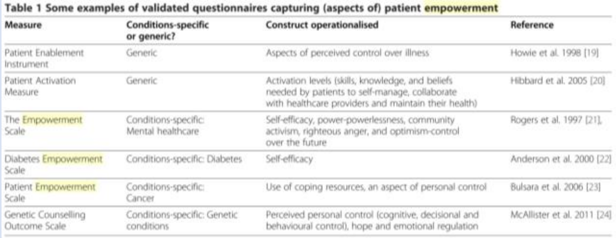
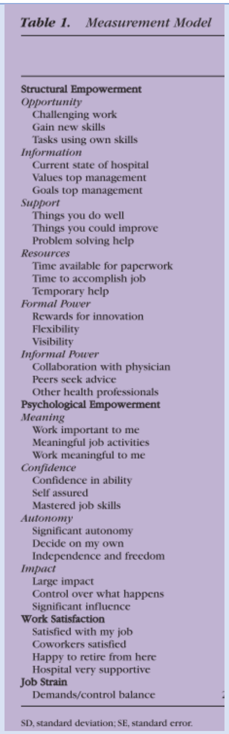



Table 1 Some examples of validated questionnaires capturing (aspects of) patient empowerment
<table>
<tr><th>Measure</th><th>Conditions-specific or generic?</th><th>Construct operationalised</th><th>Reference</th></tr>
<tr><td>Patient Enablement Instrument</td><td>Generic</td><td>Aspects of perceived control over illness</td><td>Howie et al. 1998 [19]</td></tr>
<tr><td>Patient Activation Measure</td><td>Generic</td><td>Activation levels (skills, knowledge, and beliefs needed by patients to self-manage, collaborate with healthcare providers and maintain their health)</td><td>Hibbard et al. 2005 [20]</td></tr>
<tr><td>The Empowerment Scale</td><td>Conditions-specific: Mental healthcare</td><td>Self-efficacy, power-powerlessness, community activism, righteous anger, and optimism-control over the future</td><td>Rogers et al. 1997 [21],</td></tr>
<tr><td>Diabetes Empowerment Scale</td><td>Conditions-specific: Diabetes</td><td>Self-efficacy</td><td>Anderson et al. 2000 [22]</td></tr>
<tr><td>Patient Empowerment Scale</td><td>Conditions-specific: Cancer</td><td>Use of coping resources, an aspect of personal control</td><td>Bulsara et al. 2006 [23]</td></tr>
<tr><td>Genetic Counselling Outcome Scale</td><td>Conditions-specific: Genetic conditions</td><td>Perceived personal control (cognitive, decisional and behavioural control), hope and emotional regulation</td><td>McAllister et al. 2011 [24]</td></tr>
</table></td></tr>
<tr><td>Towards a comprehensive theory of nurse / patient empowerment : applying Kanter's empowerment theory to patient care</td><td>(Laschinger et al., 2010)</td><td>“Patient empowerment is thus conceptualized as patient perceptions of access to information, support, resources and opportunities to learn and grow that enable them to optimize their health and gain a sense of meaningfulness, self-determination, competency and impact on their lives”</td><td>Nurse and Patient empowerment</td><td>In short:
- access to information
- support
- resources
- opportunities to learn and grow</td></tr>
<tr><td>Impact of Structural and Psychological Empowerment on Job Strain in Nursing Work Settings</td><td>(Laschinger et al., 2001)</td><td>Used the scale of Spreitzer;
Empowerment consists of:
- meaningful work
- competence
- autonomy
- impact</td><td>Psychological empowerment</td><td>Scale from Spreitzer:</td></tr>
</table>

				 *Table 1. Measurement Model* **Structural Empowerment** *Opportunity* Challenging work Gain new skills Tasks using own skills *Information* Current state of hospital Values top management Goals top management *Support* Things you do well Things you could improve Problem solving help *Resources* Time available for paperwork Time to accomplish job Temporary help *Formal Power* Rewards for innovation Flexibility Visibility *Informal Power* Collaboration with physician Peers seek advice Other health professionals **Psychological Empowerment** *Meaning* Work important to me Meaningful job activities Work meaningful to me *Confidence* Confidence in ability Self assured Mastered job skills *Autonomy* Significant autonomy Decide on my own Independence and freedom *Impact* Large impact Control over what happens Significant influence **Work Satisfaction** Satisfied with my job Coworkers satisfied Happy to retire from here Hospital very supportive **Job Strain** Demands/control balance SD, standard deviation; SE, standard error.	

Appendix B: Search Log

Date	Source?	Search terms and strategies (Search profile incl. Boolean operators)	How many hits (how many relevant)	Related terms/authors	Notes
24-2-2020	Scopus	Patient empowerment	8363, sorted on relevance.	technology,	Too broad, however can help to give an overview of patient empowerment. Make sure to search on relevance. First hit was interesting.
24-2-2020	Scopus	eHealth AND empowerment	193, sorted on relevance	Many descriptive researches.	Good size of results. However, this means that it can be tricky to find a lot of information as this quite broad search term only delivers a few results. First hit was interesting.
24-2-2020	Scopus	Usability AND patient empowerment	93, sorted on relevance	UX, self-management, eHealth, mHealth	Small selection, however with interesting articles.
24-2-2020	Scopus	Usability AND eHealth	432, sorted on relevance	Usability testing	Can be useful for the method section, found an article from the company I am doing my bachelor thesis at.
9-3-2020	PubMed	(Patient empowerment) AND (chronic pain)	789, sorted on best match	Chronic conditions	Not too useful.
9-3-2020	Scopus	(Patient empowerment) AND (chronic pain)	112, sorted on relevance	Pain, chronic conditions, health literacy, empowerment	Very useful
11-3-2020	findUT	Patient Empowerment	14581, sorted on only articles		Not defined enough, the results came up with many reactions and not articles
11-3-2020	findUT	Patient Empowerment AND chronic pain	822	Cancer pain, pain management	Some useful results

19-3-2020	PubMed	Patient empowerment	2884	eHealth, technology,	Quite some useful sources
24-3-2020	Scopus	Diabetes empowerment scale	180	Empowerment, Diabetes	Searched for this because found more about it in different articles.
30-3-2020	Web of Science	Patient empowerment AND chronic pain	87	Self-management	
31-3-2020	Web of Science	Patient Empowerment	4747		

Appendix C: Overview of the constructs identified

The yellow boxes are articles in which identified factor was found, the blue boxes were articles in which the factor was named as a strategy and the orange box was an article with a different view on patient empowerment which still mentioned factors.

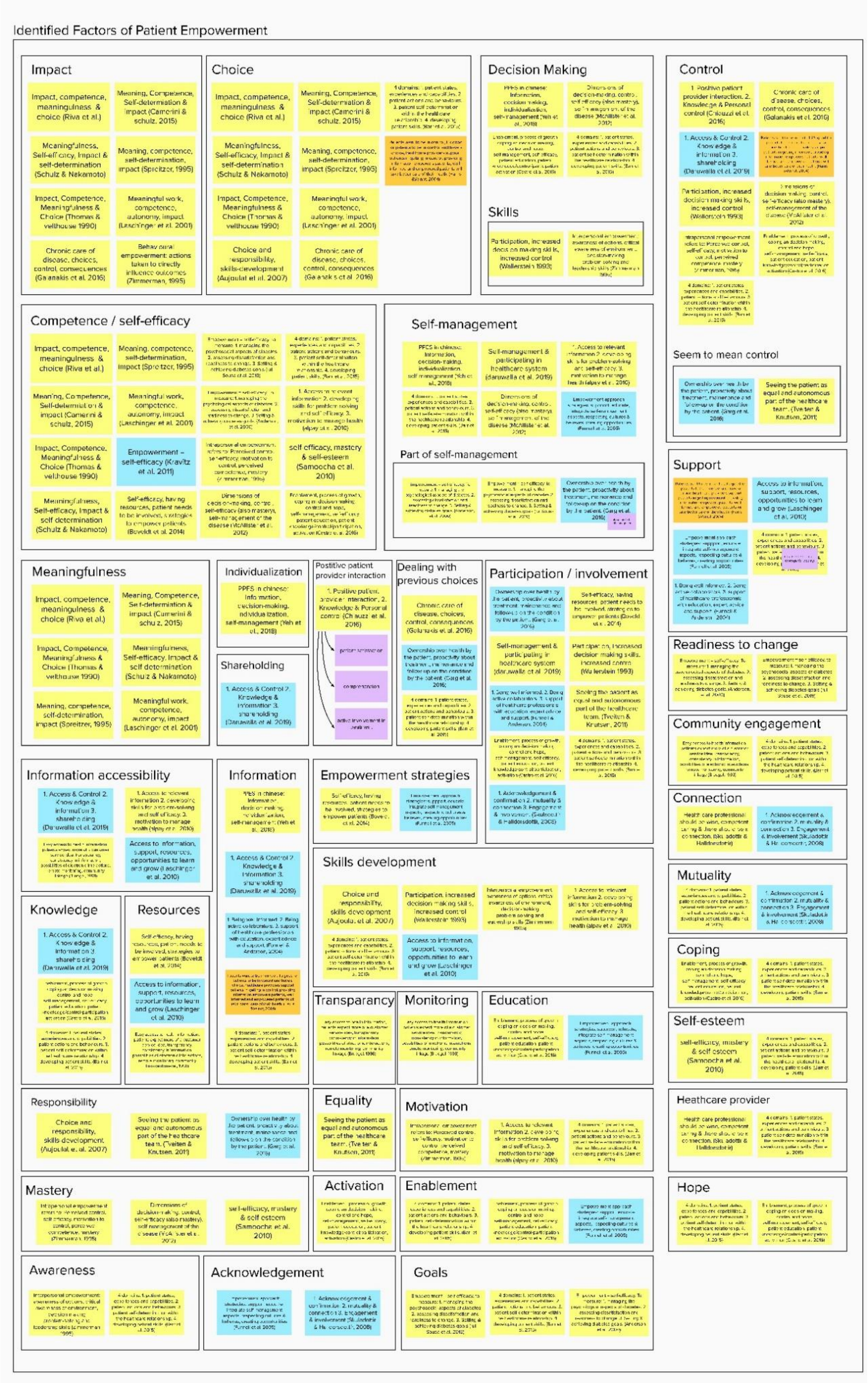


Figure C1. Overview of the factors found in articles and the articles that support these factors.

Appendix D: Overview of the grouping of constructs

As can be seen in figure D1, the box around support was green. This because it was unsure in the beginning if support would count as factor. Additionally, enablement can be seen under resources as well as self-efficacy. Later on when defining the factors and subfactors the choice was made to put it under self-efficacy as it was most logical in this context.

Figure D1. Overview of the factors supported by 3 or more articles and the groups made.

Appendix E: Full descriptions of the subfactors

The full descriptions of the subfactors identified in the literature review are written down in this appendix. This also includes the descriptions given in the report already.

Self-management

Self-management is the overarching factor of control, choice & decision-making and goals.

Control

In the literature reviewed, control is described in different ways. One of these is as a sense of control (Chiauzzi, Dasmahapatra, Cochin, & Bunce, 2016) or perceived control (Barr et al., 2015; Lewin & Piper, 2007; Zimmerman, 1995), which is backed up by Riva et al. (2014), who considered it to be feelings of control, which in turn could help with interest to participation in decision-making. It could be seen as control in the experience of health, disease and illness(Harris & Veinot, 2004; Samoocha, Bruinvels, Elbers, Anema, & Van der Beek, 2010). The control can be over one's own life (Galanakis, Tsoli, & Darviri, 2016; Wallerstein, 1993; Zimmerman, 1995), which could also include control over the healthcare one is participating in (Lewin & Piper, 2007; McAllister et al., 2012) or even one's own health (McAllister et al., 2012). Additionally, there is control over medical information (Daruwalla et al., 2019) and control over the decisions one makes (Castro et al., 2016; Zimmerman, 1995) and taking responsibility over those decisions (Funnell et al., 2005). Therefore, in this research when taking the health care environment into account, control will be about the perceived control over one's own health care and healthcare processes.

For people with chronic pain, control can be specified further, especially when combined with the ACT treatment. Veehof et al. (2016) already mention that pain control is not the goal of treatment based on acceptance, as behaviour that aims to control pain is seen as something that should be avoided (Fledderus et al., 2015). An example of control in the ACT treatment perceived behavioural control (Brooks et al., 2017). Furthermore, there is self-control and one's ability to exert control (Turk & Okifuji, 2002). When summing all this up, control for people with chronic pain is not control over pain, but can be seen as control over behaviour. This is in line with ACT, as people with chronic pain can control their behaviour towards accepting the pain. Although this interpretation does not necessarily align with the previous definition of control, Turk and Okifuji (2002) do mention that one's ability to exert control could lead to a responsible role in pain management. According to the previous literature review, a responsible role in pain management would be part of control over one's healthcare process.

When focussing specifically on NaDien, control can now be seen in 2 manners. The first being perceived control over one's own healthcare process when working with NaDien and the second being control over behaviour. Although, it was mentioned in the previous paragraph that the control over one’s behaviour also contributes to one’s healthcare process. Therefore, control in relation to NaDien will be perceived control over behaviour and healthcare process when working with NaDien. This translates into control over one’s behaviour in the sense of handling chronic pain and control over the choices one makes in daily life, as this is part of one’s healthcare process in ACT.

Choice & Decision-making

Another subfactor of self-management was choice, which seemed to have many similarities with the subfactor decision-making. In literature, choice was mentioned in the sense of having the possibility to make one’s own choice (Barr et al., 2015; Riva et al., 2014; Schulz & Nakamoto, 2013; Spreitzer, 1995). To add, with choice comes taking responsibility for the choices one makes (Schulz & Nakamoto, 2013; Thomas & Velthouse, 1990). Making it more specific, Camerini & Schulz (2015) specified self-determination, which is seen as closely related to choice in this literature review, as a degree to which patients think their actions about their health are driven by themselves. Additionally, making informed choices is mentioned as a type of choice (Alpay et al., 2010). As said before, decision-making is similar to choice which makes it no surprise that making informed decisions is mentioned in the sense of needing education for it (Funnell et al., 2005) or needing support to make informed decisions (Funnell & Anderson, 2004). Furthermore, the literature mentions participation in healthcare decisions (Riva et al., 2014), with opportunities to become involved in decision-making (Zimmerman, 1995) or shared decision making with the healthcare professional (McAllister et al., 2012). According to Yeh et al. (2018), decision-making can be seen as informed consent to treatment, which is part of making decisions about health (McAllister et al., 2012) and making decisions about healthcare (Lewin & Piper, 2007; McAllister et al., 2012). Combining choice and decision-making results in the possibility of patients to make their own informed choices and decisions regarding their health and healthcare.

Regarding people with chronic pain, choosing life directions is mentioned (Fledderus et al., 2015; Hayes et al., 2006), these should be in line with ones values (Fledderus et al., 2015). Additionally, there is a choice in what a person with chronic pain decides to do when he or she feels pain (Turk & Okifuji, 2002). In ACT, the acceptance can be seen as a choice, as behaviour is a choice (Twohig, 2012). While not totally connected to ACT, choice of therapy is mentioned (Marcus, 2009) which can result in choosing ACT. This comes with choosing the life directions and what behaviour to show when one feels pain. As it was concluded that decision-making and choice go together, it could be seen for people with chronic pain as being able to make their own choices in which how to adopt ACT, as well as to which treatment to commit.

When taking NaDien into account, this will be the extent to which NaDien enables a person with chronic pain to make well-informed choices and decisions regarding how to adopt ACT and making well-informed choices regarding one's daily activities. The choices regarding daily activities and the choice to adopt ACT are direct applications of the ACT treatment, which is then a part of one's health and one's healthcare treatment.

Goals

The last subfactor of self-management is goals. In relation to patients with diabetes, goals are defined as setting and achieving goals in diabetes care (Anderson, Funnell, Fitzgerald, & Marrero, 2000; Rui Sousa, Almeida, & Martins, 2019). This included the competence to set achievable goals and overcoming obstacles to ensure achieving them (Anderson et al., 2000). The goals we are talking about are regarding self-management (Anderson et al., 2000) or self-care (Rui Sousa et al., 2019) which explains why goals are conceptualised here as a subfactor of self-management. To summarize, it would be to set and achieve goals regarding one's condition in terms of self-management.

Seeing this in the light of people with chronic pain, goals are set in combination with ACT. This means that there is goal setting for short, medium and long term goals which are formulated regarding behavioural change (Hayes et al., 2006). With, for example, long term goals being desired quality of life and short term goals being looking good. One ultimate goal of ACT is psychological flexibility (Veehof et al., 2016) which is the ability to adapt or keep a behaviour as is to reach life goals (Hayes et al., 2006). Moreover, McCracken and Vowles (2014) recognize patients' goals and values, and actions to achieve those goals, whereas there is also the defining of personal goals and acting upon those (Twohig, 2012). On the other hand, the goals of acceptance-based therapy are considered to be adaptation, patient coping, self-management and a reduction of disability (Turk et al., 2011). Taking the previous definition into account, as well as what goals mean to people with chronic pain, it results in setting and achieving one's personal goals depending on one's values, as well as setting and achieving goals regarding one's self-management of chronic pain.

The goals for people with chronic pain using NaDien are about one's values as well as regarding self-management. However, in the manner of ACT there is a focus on setting personal goals. Therefore, goals will be about the extent NaDien helps with setting and achieving goals the people with chronic pain set regarding their values.

Resources

Resources is the overarching factor of knowledge, information and support.

Knowledge

Knowledge is one of the subfactors of resources. It is described in multiple ways, such as patient knowledge (Castro et al., 2016) or knowledge in decision making (Chiauzzi et al., 2016). Furthermore, Barr et al. (2015) mention self-knowledge as well as having knowledge, information or being informed. This shows a link between knowledge and information. Additionally, there is knowledge for making choices on issues one considers important (Castro et al., 2016) and knowledge on how to best use your medical data (Daruwalla et al., 2019). Taking into account the medical context, knowledge will be regarded as the necessary medical knowledge to make informed decisions for medical care.

Whereas knowledge is not defined a lot regarding ACT for people with chronic pain, it is mentioned that ACT has a realistic attitude towards knowledge (McCracken & Vowles, 2014). However, to know more about this the definition of knowledge might be useful: “the sum of what is known: the body of truth, information, and principles acquired by humankind” (Merriam-Webster, n.d.). Hence, knowledge could be seen as information acquired by a person with chronic pain. For people with chronic pain, this would mean that knowledge will be about the necessary knowledge about chronic pain to make informed decisions over their treatment.

For NaDien, this would mean that it can be used as a means to gain knowledge. All things considered, it is the degree to which NaDien helps a person with chronic pain gather information and thus create knowledge regarding chronic pain and ACT.

Information

Another subfactor is information, which relates closely to knowledge as information is necessary to create knowledge. Barr et al. (2015) mention information and knowledge in a single breath. Daruwalla et al. (2019) seem to agree with this, as they see information in a sense of how to best use your own medical data. Moreover, it is explained as being informed and having health information while there should be a consistency in the information a healthcare organization provides (Bruegel, 1998). On the provision of information, there is provision of information about treatment and care (Yeh et al., 2018). Although, Laschinger et al. (2010) see it as information for optimizing one’s health. A part of information is information accessibility. It can be seen as having access to information (Laschinger et al., 2010) or the applicable information (Alpay et al., 2010) as well as smooth access to health information (Bruegel, 1998). These three interpretations are backed up by Zimmerman (1995), while adding access to resources. Another explanation can be access to one’s own healthcare data (Daruwalla et al., 2019). Thus, easy access to information relevant to one’s health and condition is important. In the end, it seems information is about one’s health and the healthcare options one has and this being accessible.

For people with chronic pain, information might even be crucial. People with chronic pain who avoid certain activities might never get the information that an activities will not have drastic consequences for them when they execute it (Turk & Okifuji, 2002). When looking specifically at ACT, information can be useful to adjust pre-treatment beliefs that are not in line with ACT (Turk & Okifuji, 2002). However, information processing can be seen as a cognitive process which can influence behaviour (McCracken & Vowles, 2014). All these types of information have to be accessible as well. Additionally, Fledderus et al. (2015) describe access to internet and to descriptions of exercises. In short, the information a person with chronic pain has regarding their condition influences his or her believes, which in its turn then influences one's behaviour. Therefore, information for people with chronic pain is information about chronic pain and about treatment of chronic pain and this being accessible.

For NaDien this means the information it provides is important. It is important to keep in mind that NaDien is used as program after the rehabilitation process. When taking the previous definitions into account, for NaDien there should be a focus on information regarding chronic pain and ACT and this being accessible.

Support

The last subfactor under resources is support, which can relate to support for coping (Barr et al., 2015) or emotional support (Aujoulat et al., 2007). It is also specified as support with being or getting in control (Funnell et al., 2005; Harris & Veinot, 2004). Additionally, there is support in being responsible (Funnell et al., 2005) or support on ownership over one's health (Garg, Garg, Turin, & Chowdhury, 2016). There is also support for making well-informed decisions and reaching goals (Funnell & Anderson, 2004) and support in autonomy and encouraging people to participate in making decisions related to their health (Aujoulat et al., 2007). Moreover, support with self-management is mentioned (Funnell et al., 2005). Laschinger et al. (2010) see support as something that enables a patient in improving their health. In conclusion, this would make support the support patients experience to achieve or obtain the factors of empowerment: self-management, resources, self-efficacy and perceived usefulness.

Support for people with chronic pain in pain rehabilitation regarding ACT is more specific. Fledderus et al. (2015) found that an important need for support can be found in preventing relapses due to support after treatment, which can make use of an eHealth system. With the help of motivational messages and exercises people with chronic pain are supported to maintain their changed behaviours of the ACT treatment. Moreover, there is the perceived support in autonomy for people with chronic pain (Brooks et al., 2017), in which autonomy can be described as part of self-management as Laschinger, Finegan and Wilk (2001) used autonomy in the scale of Spreitzer (1995) who called it self-determination. Additionally, a game can support people with chronic pain in self-management and pain rehabilitation (Schonauer, Pintaric, Kaufmann, Jansen-Kosterink, & Vollenbroek-Hutten, 2011). Moreover, there is social support. A lack of social support even would have negative effects while good social support is beneficial for treatment outcomes (Turk & Okifuji, 2002). These types of support all contribute to good outcomes of the ACT treatment. Therefore, it seems that support for people with chronic pain is based upon support of the self-management of chronic pain in the manner of ACT, as well as social support.

Combining this with NaDien, NaDien could be seen as an platform to offer support. Especially with the idea in mind that NaDien already is an eHealth application that is in use also after pain rehabilitation, support to prevent relapses into old behaviour seems plausible. This is part of self-management. Additionally, arguments were given regarding social support, in NaDien this shows as people with chronic pain can share tips with each other. Therefore, support will be about the perceived support NaDien offers regarding handling one’s chronic pain, support regarding treatment and social support.

Self-efficacy

Self-efficacy is the overarching factor of enablement, skills-development and mastery.

Enablement

The subfactor of enablement is mentioned by Barr et al. (2015) and Castro et al. (2016). It was mentioned to be creating opportunities for social support (Funnell et al., 2005). Or as enabling patients to enhance their health (Laschinger et al., 2010). Whereas enablement is mentioned multiple times, there are little definitions given. When relating it specifically to patient empowerment, in this research it will be defined as enabling patients to participate in patient empowerment.

When looking at enabling people with chronic pain, Schonauer et al. (2011) mention a system for the enablement of people with chronic pain to train motor skills. This shows that enablement can be used for people with chronic pain to participate in training skills, which is part of skills development. Enablement for people with chronic pain can therefore be enabling them in being able to perform tasks successfully.

To link enablement to NaDien, it could be enabling people with chronic pain to gain self-efficacy. The indicated self-efficacy could then concern the self-efficacy regarding the ACT. Enablement would then be the degree to which NaDien enables people with chronic pain to successfully complete tasks, or do things. Examples of this would be NaDien enabling living towards one’s value or handling difficult situations.

Skills-development

Skills-development is the second subfactor which is relevant on different levels. One point of view is needing skills for problem-solving and self-efficacy (Alpay et al., 2010), as well as decision-making, problem-solving and leadership skills (Zimmerman, 1995). Another definition of skills for empowerment was seen as being able to relate more to oneself and others, to be able to cope with disease, life and environment better (Aujoulat et al., 2007). Barr et al. (2015) compile it as “developing patient skills”. Skills can be useful on different aspects, however they do need to be developed in order to obtain them. The skills-development here will represent the development of skills necessary for successful self-management. This by reason of self-management including decision-making while also overarching most of the other named skills.

People with chronic pain have some specific skills they need, especially when ACT is involved. ACT approves of obtaining and training skills (Hayes et al., 2006; McCracken & Vowles, 2014). Examples of skills useful in ACT, when practicing committed action, are acceptance, defusion and being present (Twohig, 2012). Moreover, ACT makes use of psychological skills (Hayes et al., 2006) and the skill of averting and handling relapses is mentioned, just as coping skills for when one might relapse (Fledderus et al., 2015). Although Turk and Okifuji (2002) notice the coping skills, they see an inability in coping with pain not necessarily as a skill deficiency as they state the use of the skill can obstructed. The cause for this obstruction should be found then, instead of updating one’s skills. Another interesting skill is the skill of mindfulness, as it is a principle ACT is based upon although it can also give some pain relief (Zeidan et al., 2011). In short, skills-development for people with chronic pain in ACT is related to the skills necessary to practice ACT and skills for the self-management of chronic pain in the manner of ACT.

Hence, skills-development in the context of NaDien focusses on skills people with chronic pain need, such as skills to practice ACT. Thus, skills-development will be about the perceived help NaDien offers in developing the necessary skills for practicing ACT, such as skills for living towards one’s values.

Mastery

Sometimes, mastery is mentioned as equal to self-efficacy (McAllister et al., 2012). Furthermore, it is described as mastery over one’s life (Schulz & Nakamoto, 2013; Zimmerman, 1995) and health management (Schulz & Nakamoto, 2013). Additionally, it is seen as gaining mastery over one’s condition (Funnell et al., 2005) or a sense of mastery and control (Castro et al., 2016). Lastly, mentioned views of mastery over issues that concern one, or environmental mastery which is shown when one is able to assemble resources (Zimmerman, 1995). Therefore, mastery will here be defined as having the necessary knowledge or skills to influence a situation in a desirable manner.

For people with chronic pain in particular, mastery can be seen as a powerful concept. According to Turk and Okifuji (2002) the experience of mastery is useful for behavioural change. As follows, this is useful for ACT, in which behaviour should be changed towards acceptance and commitment of pain. On the topic of mastery, the experience of mastery could lead to a sense of efficacy (Bandura, 1977). Additionally, environmental mastery is said to be relevant for people with chronic pain (Trompetter et al., 2016) which is the management of complex environments as well as being able to pick, form and attain settings and situations that are in line with one's values and goals (Stafford, Deeg, & Kuh, 2016). The values and goals are again very in line with the ACT philosophy. It seems that mastery for people with chronic pain can be viewed as being able to deal with situations and attributes in order to reach one's goals and values.

Mastery can also be related to NaDien, which provides the user with some tools. However, it is hard to determine when someone can execute something perfectly. Hence, the focus of NaDien will be on helping someone to do things better. Thus, mastery will be how much NaDien helps a person with chronic pain in dealing with situations and living towards one's values in a better manner.

Perceived usefulness

Perceived usefulness is the overarching factor of meaningfulness and impact.

Meaningfulness

In literature, meaningfulness is described as the intrinsic care one has about a specific task (Riva et al., 2014; Thomas & Velthouse, 1990). This is in line with the idea that meaningfulness refers to activities one deems relevant for oneself (Camerini & Schulz, 2015; Schulz & Nakamoto, 2013). It is said that meaning is the value of an intention or purpose, and how someone feels about this in relation to his or her standards and ideals (Laschinger et al., 2001; Spreitzer, 1995; Thomas & Velthouse, 1990). Additionally, gaining a sense of meaningfulness in one's life is mentioned (McAllister et al., 2012). In relation to all the aforementioned definitions, meaningfulness will be described as how relevant a task or thing seems to an individual, regarding his or her standards and ideals.

Meaningfulness for people with chronic pain relates to the meaning of an action. A value can give meaning to an action a person executes (Twohig, 2012). As ACT focusses on living towards one's values, the actions with meaning are the ones dedicated to living towards one's values. Trompetter et al. (2016) also acknowledge meaningful values, which ACT tries to achieve. Additionally, a meaningful direction in life is mentioned, which means that the pain would be noticed a there would not be sought for a clinical solution (Twohig, 2012). Here, the part of ACT focussing on going on with life is highlighted. To conclude, meaningfulness for people with chronic pain making use of ACT relates to their values. Therefore, the meaningfulness is how much an action or task is perceived to help the person with chronic pain to live according his or her values.

In the context of NaDien this has to be relatively similar. NaDien is built to help people with chronic pain from the pain rehabilitation with ACT and maintaining this mindset after the pain rehabilitation. So you could say that meaningfulness in this case is the perceived relevance of NaDien for a person with chronic pain, when trying to live according one's values.

Impact

The other subfactor of perceived usefulness is impact, which is understood as the sense of 'making a difference' (Riva et al., 2014; Schulz & Nakamoto, 2013), and making a difference in terms of achieving the goal of a task (Spreitzer, 1995; Thomas & Velthouse, 1990). Laschinger et al. (2001) state that it is about influencing critical results in an organization. However, to put it more in a healthcare environment, the definition of Camerini and Schulz (2015) could be useful: "the degree to which patients feel that self-management activities make a difference in their health status" (p. 3). Impact can viewed as the impact on one's life too (Laschinger et al., 2010). Therefore, impact will be stated as the degree that people feel that their actions influence the outcomes of their treatment.

Whereas the first kind of impact mentioned regarding people with chronic pain is the impact of pain on their lives (Turk & Okifuji, 2002), this is not the kind of impact in this research. As reported by Turk and Okifuji (2002) the beliefs and expectations that a one has regarding his or her treatment, affect the outcomes. Moreover, the experiences a person with chronic pain had can influence one's behaviour (Twohig, 2012). In ACT, the behaviour is dependent. The desirable behaviour can be achieved when a person with chronic pain influences behaviour according to ACT (McCracken & Vowles, 2014). This implies that the person with chronic pain impacts his or her behaviour, which then would result in influencing their treatment. Also, Twohig (2012) suggests that thoughts can have an effect on behaviour, as well as feelings and personal values. While taking the general definition of impact regarding patient empowerment into account, impact for people with chronic pain would be the degree to which they feel that their behaviour influences the outcomes of their treatment.

Although definitions regarding impact in general and impact regarding people with chronic pain who receive ACT are given, it should be specified in the situation of NaDien. As the treatment is technically finished, the focus will be on the degree to which NaDien helps the person with chronic pain influence their daily life. This can be found in the perceived impact NaDien has as well as the impact NaDien has in offering help with handling chronic pain.

Appendix F: Full questionnaire

Start of Block: Informed consent

Q1 Beste meneer, mevrouw,   Vanuit Roessingh, Centrum voor Revalidatie en Roessingh Research and Development willen we u graag uitnodigen om mee te doen aan een onderzoek over NaDien. Deze vragenlijst gaat over uw ervaring met NaDien en duurt ongeveer 10 tot 15 minuten. Met deze vragenlijst wordt onderzocht hoe het gebruik van NaDien invloed heeft op u en hoe u NaDien ervaart. Door op 'ik ga akkoord' te klikken geeft u toestemming om deel te nemen aan dit onderzoek. U geeft toestemming voor het gebruik van uw data voor onderzoek over NaDien. U gaat ermee akkoord dat de volgende data wordt verzameld en anoniem verwerkt:

- Persoonlijke gegevens: leeftijd, geslacht, hoelang u al chronische pijn ervaart en de type behandeling dat u heeft gevolgd.
- Uw meningen over stellingen omtrent NaDien en de ervaringen die u heeft met NaDien.

De gegevens zullen anoniem opgeslagen worden in de elektronische administratie van Roessingh Research and Development in Enschede, Nederland. De resultaten worden anoniem verwerkt en zullen dus niet terug te leiden zijn naar individuele deelnemers. De geanonimiseerde resultaten van deze studie mogen gebruikt worden voor dit onderzoek, wetenschappelijke publicaties en presentaties.   Dit onderzoek is op vrijwillige basis, u mag dus op elk moment stoppen, zonder opgaaf van reden.

Mocht u nog vragen hebben, dan kunt u contact opnemen met Maud Pfeijffer. Dit kan via het e-mailadres m.pfeijffer@rrd.nl

Wanneer u niet akkoord gaat, zal uw data niet verzameld en verwerkt kunnen worden. Daarom zal de vragenlijst dan automatisch stoppen.

○ Ik ga akkoord (1)

○ Ik ga niet akkoord (2)

End of Block: Informed consent

Start of Block: Gebruik van NaDien

Q3 Gebruikt u NaDien?

○ Ja (1)

○ Ik heb NaDien gebruikt, maar nu niet meer (2)

○ Nee (3)

Display This Question:

If Gebruikt u NaDien? = Ik heb NaDien gebruikt, maar nu niet meer

Q28 Hoelang gebruikt u NaDien al niet meer?

○ 1 week (1)

○ 2 weken (2)

○ 1 maand (3)

○ 1.5 maand (4)

○ 2 maanden (5)

○ 3 maanden (6)

Display This Question:

If Gebruikt u NaDien? = Ik heb NaDien gebruikt, maar nu niet meer

Q4 Kunt u toelichten waarom u NaDien niet meer gebruikt?

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Display This Question:

If Gebruikt u NaDien? = Nee

Q5 Kunt u toelichten waarom u NaDien niet gebruikt?

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Display This Question:

If Gebruikt u NaDien? != Nee

Q23 In het volgende deel van de vragenlijst worden 4 thema's besproken. Bij elk thema krijgt u stelling te zien over NaDien en geeft u aan in hoeverre u het ermee eens bent. Daarna wordt gevraagd of u toelichting wilt geven op uw antwoorden. De vragenlijst eindigt met een aantal persoonlijke vragen.

End of Block: Gebruik van NaDien

Start of Block: Self-management

Q8 In de 2 tabellen hieronder ziet u 9 stellingen over het omgaan met chronische pijn. Geef bij elke stelling aan in hoeverre u het ermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
NaDien helpt mij in het omgaan met mijn chronische pijn (1)	○	○	○	○	○
NaDien helpt mij regie te nemen over mijn leven (2)	○	○	○	○	○
NaDien helpt mij om te gaan met mijn symptomen van chronische pijn (3)	○	○	○	○	○
NaDien helpt mij met het aanpassen van mijn dagelijkse activiteiten (4)	○	○	○	○	○

Q30 Geef bij elke stelling aan in hoeverre u het ermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
NaDien biedt mij andere manieren om met dagelijkse situaties om te gaan (1)	○	○	○	○	○
NaDien helpt mij te beslissen over de indeling van mijn dagelijkse activiteiten (2)	○	○	○	○	○
NaDien helpt mij om keuzes te maken omtrent mijn gezondheid (3)	○	○	○	○	○
NaDien helpt mij met het opstellen van mijn doelen (4)	○	○	○	○	○
NaDien helpt mij met het behalen van mijn doelen (5)	○	○	○	○	○

Q10 U heeft net 9 stellingen beantwoord over het omgaan met chronische pijn. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder.

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End of Block: Self-management

Start of Block: Resources

Q12 In de 2 tabellen hieronder ziet u 10 stellingen over de hulpmiddelen die NaDien biedt. Geef bij elke stelling aan in hoeverre u het ermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
NaDien biedt mij relevante hulpmiddelen (zoals informatie, oefeningen etc.) (1)	○	○	○	○	○
Door NaDien weet ik meer over chronische pijn (2)	○	○	○	○	○
Door NaDien weet ik meer over ACT (3)	○	○	○	○	○
Door Nadien behoud ik mijn kennis vanuit mijn behandeling (4)	○	○	○	○	○

Q26 Geef bij elke stelling aan in hoeverre u het ermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
NaDien geeft mij informatie over chronische pijn (1)	○	○	○	○	○
NaDien geeft mij informatie over het toepassen van ACT in mijn leven (2)	○	○	○	○	○
De informatie in NaDien is makkelijk te vinden (3)	○	○	○	○	○
NaDien ondersteunt mij met het toepassen van ACT in mijn leven (4)	○	○	○	○	○
Ik ervaar steun door de tips die lotgenoten delen in NaDien (5)	○	○	○	○	○
Door NaDien voel ik mij gesterkt in het omgaan met chronische pijn (6)	○	○	○	○	○

Q13 U heeft net 10 stellingen beantwoord over hulpmiddelen die NaDien biedt. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder.

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End of Block: Resources

Start of Block: Self-efficacy

Q14 In de 2 tabellen hieronder ziet u 10 stellingen over het leren omgaan met chronische pijn. Geef bij elke stelling aan in hoeverre u het ermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
Door NaDien leer ik beter om te gaan met mijn chronische pijn (1)	○	○	○	○	○
NaDien stelt mij in staat om meer de regie te nemen over mijn leven (2)	○	○	○	○	○
Door NaDien leer ik meer de regie te nemen over mijn leven (3)	○	○	○	○	○
Door NaDien neem ik meer de regie over mijn leven (4)	○	○	○	○	○

Q28 Geef bij elke stelling aan in hoeverre u het ermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
NaDien stelt mij in staat beter om te gaan met dagelijkse situaties waar ik moeite mee heb (1)	○	○	○	○	○
Door NaDien leer ik beter omgaan met dagelijkse situaties waar ik moeite mee heb (2)	○	○	○	○	○
Door NaDien kan ik beter omgaan met dagelijkse situaties waar ik moeite mee heb (3)	○	○	○	○	○
NaDien stelt mij in staat om naar mijn waardes te leven (4)	○	○	○	○	○
Door NaDien leer ik vaardigheden om naar mijn waardes te leven (5)	○	○	○	○	○
Door NaDien bezit ik vaardigheden om te leven naar mijn waardes (6)	○	○	○	○	○

Q16 U heeft net 10 stellingen beantwoord over het beter leren omgaan met chronische pijn. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder.

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End of Block: Self-efficacy

Start of Block: Perceived Usefulness

Q11 In de volgende tabel staan 5 stellingen over in hoeverre u NaDien nuttig vindt. Geef bij elke stelling aan in hoeverre u het ermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
Ik vind NaDien nuttig (1)	○	○	○	○	○
Ik vind NaDien relevant (2)	○	○	○	○	○
NaDien is zinvol om te gebruiken om te leven naar mijn waardes (3)	○	○	○	○	○
NaDien heeft een impact op mijn leven (4)	○	○	○	○	○
NaDien geeft mij een nieuwe kijk op hoe ik om kan gaan met chronische pijn (5)	○	○	○	○	○

Q12 U heeft net 5 stellingen beantwoord over of u NaDien nuttig vindt. Wilt u iets meer vertellen over uw antwoorden? Dan kunt u dat opschrijven in het tekstvak hieronder.

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End of Block: Perceived Usefulness

Start of Block: Patient Empowerment

Q20 De laatste stelling gaat over invloed hebben op uw leven. Geef bij deze stelling aan in hoeverre u het hiermee eens bent.

	Helemaal niet mee eens (1)	Niet mee eens (2)	Niet mee eens maar ook niet mee oneens (3)	Mee eens (4)	Helemaal mee eens (5)
Dankzij NaDien heb ik meer invloed op mijn leven (1)	○	○	○	○	○

Q22 U heeft net een stelling beantwoord over invloed hebben op uw leven. Wilt u iets meer vertellen over uw antwoord? Dan kunt u dat opschrijven in het tekstvak hieronder.

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End of Block: Patient Empowerment

Start of Block: Demographics

Q31 Hieronder volgen nog 4 vragen over uzelf.

Q13 Wat is uw geslacht?

○ Man (1)

○ Vrouw (2)

○ Anders (3)

Q14 Wat is uw leeftijd?

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Q15 Hoeveel jaar heeft u al last van chronische pijn?

○ Minder dan 1 jaar (1)

○ 1 tot 2 jaar (2)

○ 3 tot 5 jaar (3)

○ 5 tot 7 jaar (4)

○ 7 tot 9 jaar (5)

○ Meer dan 9 jaar (6)

Q17 Welke behandeling heeft u recent gevolgd?

○ Klinisch (u bent opgenomen geweest) (1)

○ Poliklinische behandeling (u kwam enkele dagdelen per week naar het centrum) (2)

End of Block: Demographics

Start of Block: Laatste open vraag

Q21 Is er iets wat we niet gevraagd hebben maar wat u ons graag wilt vertellen?

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Q32 Mocht u de resultaten van dit onderzoek willen ontvangen, dan kunt u hieronder uw e-mailadres opgeven. Wanneer u dit doet, geeft u toestemming om u e-mailadres te gebruiken om de resultaten van het onderzoek te sturen. Als u dit niet wilt, kunt u het veld leeg laten.

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End of Block: Laatste open vraag

Appendix G: Results per question

In this appendix, the results for all questions of the factors can be found. These results consist of the number of people who answered the question, the minimum score, the maximum score, the mean score and the standard deviation of the question. In Table G1 the results of questions regarding self-management are displayed. In Table G2 the results of the questions regarding the factor resources can be seen. Then, in Table G3 the results of the questions regarding self-efficacy can be found. Lastly, in Table G4 the results of the questions regarding perceived usefulness are displayed.

Table G1

Descriptive statistics of the questions regarding the factor Self-management and its subfactors

Questions	n	Minimum	Maximum	M	SD
NaDien helpt mij in het omgaan met mijn chronische pijn	3	4	4	4.00	0.00
NaDien helpt mij regie te nemen over mijn leven	3	3	4	3.33	0.58
NaDien helpt mij om te gaan met mijn symptomen van chronische pijn	3	3	4	3.67	0.58
NaDien helpt mij met het aanpassen van mijn dagelijkse activiteiten	3	3	4	3.67	0.58
NaDien biedt mij andere manieren om met dagelijkse situaties om te gaan	3	2	4	3.33	1.16
NaDien helpt mij te beslissen over de indeling van mijn dagelijkse activiteiten	3	2	3	2.67	0.58
NaDien helpt mij om keuzes te maken omtrent mijn gezondheid	3	4	4	4.00	0.00
NaDien helpt mij met het opstellen van mijn doelen	3	2	4	3.33	1.16
NaDien helpt mij met het behalen van mijn doelen	3	3	4	3.33	0.58

Note. All questions are in Dutch so no information would be lost in translation. The original questionnaire was developed in Dutch because it was developed for a Dutch target audience.

Table G2

Descriptive statistics of the questions regarding the factor Resources and its subfactors

Questions	n	Minimum	Maximum	M	SD
NaDien biedt mij relevante hulpmiddelen (zoals informatie, oefeningen etc.)	3	4	4	4.00	0.00
Door NaDien weet ik meer over chronische pijn	3	2	3	2.67	0.58
Door NaDien weet ik meer over ACT	3	3	4	3.67	0.58
Door Nadien behoud ik mijn kennis vanuit mijn behandeling	3	4	5	4.33	0.58
NaDien geeft mij informatie over chronische pijn	3	2	4	3.00	1.00
NaDien geeft mij informatie over het toepassen van ACT in mijn leven	3	3	4	3.67	0.58
De informatie in NaDien is makkelijk te vinden	3	3	4	3.67	0.58
NaDien ondersteunt mij met het toepassen van ACT in mijn leven	3	4	4	4.00	0.00
Ik ervaar steun door de tips die lotgenoten delen in NaDien	3	4	5	4.33	0.58
Door NaDien voel ik mij gesterkt in het omgaan met chronische pijn	3	4	4	4.00	0.00

Note. All questions are in Dutch so no information would be lost in translation. The original questionnaire was developed in Dutch because it was developed for a Dutch target audience.

Table G3

Descriptive statistics of the questions regarding the factor Self-efficacy and its subfactors

Questions	n	Minimum	Maximum	M	SD
Door NaDien leer ik beter om te gaan met mijn chronische pijn	3	3	4	3.67	0.58
NaDien stelt mij in staat om meer de regie te nemen over mijn leven	3	3	4	3.67	0.58
NaDien stelt mij in staat beter om te gaan met dagelijkse situaties waar ik moeite mee heb	3	3	4	3.67	0.58
NaDien stelt mij in staat om naar mijn waardes te leven	3	3	4	3.33	0.58
Door NaDien leer ik meer de regie te nemen over mijn leven	3	2	4	3.33	1.16
Door NaDien leer ik beter omgaan met dagelijkse situaties waar ik moeite mee heb	3	2	4	3.33	1.16
Door NaDien leer ik vaardigheden om naar mijn waardes te leven	3	3	4	3.67	0.58
Door NaDien neem ik meer de regie over mijn leven	3	2	4	3.33	1.16
Door NaDien kan ik beter omgaan met dagelijkse situaties waar ik moeite mee heb	3	2	4	3.33	1.16

Door NaDien bezit ik vaardigheden om te leven naar mijn waardes	3	4	4	4.00	0.00

Note. All questions are in Dutch so no information would be lost in translation. The original questionnaire was developed in Dutch because it was developed for a Dutch target audience.

Table G4

Descriptive statistics of the questions regarding the factor Perceived usefulness and its subfactors

Questions	n	Minimum	Maximum	M	SD
Ik vind NaDien nuttig	3	4	5	4.67	0.58
Ik vind NaDien relevant	3	4	5	4.33	0.58
NaDien is zinvol om te gebruiken om te leven naar mijn waardes	3	4	4	4.00	0.00
NaDien heeft een impact op mijn leven	3	2	4	3.33	1.16
NaDien geeft mij een nieuwe kijk op hoe ik om kan gaan met chronische pijn	3	3	4	3.67	0.58

Note. All questions are in Dutch so no information would be lost in translation. The original questionnaire was developed in Dutch because it was developed for a Dutch target audience.