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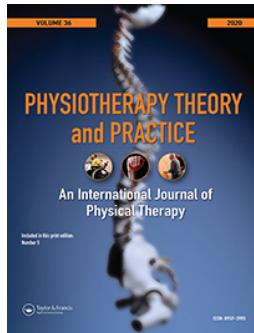
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# Physiotherapy Theory and Practice

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MIXED METHODS RESEARCH REPORT



## Physiotherapists' experiences with a blended osteoarthritis intervention: a mixed methods study

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### ABSTRACT

**Introduction:** E-Exercise is an effective 12-week blended intervention consisting of around five face-to-face physiotherapy sessions and a web-based application for patients with hip/knee osteoarthritis. In order to facilitate effective implementation of e-Exercise, this study aims to identify physiotherapists' experiences and determinants related to the usage of e-Exercise.

**Methods:** An explanatory sequential mixed methods design embedded in a randomized controlled trial comparing e-Exercise with usual physiotherapy in patients with hip/knee osteoarthritis. Usage of e-Exercise was based on recruitment rates of 123 physiotherapists allocated to e-Exercise and objective web-based application usage data. Experiences and determinants related to e-Exercise usage were investigated with a questionnaire and clarified with semi-structured interviews. **Results:** Of the 123 physiotherapists allocated to e-Exercise, 54 recruited more than one eligible patient, of whom 10 physiotherapists continued using e-Exercise after the study period. Physiotherapists had mixed experiences with e-Exercise. Determinants related to intervention usage were appropriateness, added value, time, workload, professional autonomy, environmental factors, and financial consequences. Physiotherapists recommended to improve the ability to tailor e-Exercise to the individual needs of the patient patients' individual needs. **Discussion:** Determinants related to the usage of e-Exercise provided valuable information for the implementation of e-Exercise on broader scale. Most importantly, the flexibility of e-Exercise needs to be improved. Next, there is a need for education on how to integrate an online program within physiotherapy.

### ARTICLE HISTORY

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implementation

## Introduction

In the last decade, a wide variety of digital technologies have been developed to improve and facilitate physiotherapy (Winstein and Requejo, 2015). Activity monitors, medical apps, and websites provide physiotherapists the ability to support patients in managing their health within their everyday life. The new definition of health by Huber and others mentions that this is 'the ability to adapt and to self-manage, in the face of social, physical and emotional challenges' (Huber et al., 2011; Jambroes et al., 2016). Therefore, supporting patients in coping with their chronic condition and adaptation to a healthy lifestyle is one of physiotherapists' responsibilities. In some patients, digital

technologies might even replace part of regular face-to-face sessions.

In order to complement face-to-face physiotherapy for patients with hip and knee osteoarthritis with the advantages of digital technology, we developed e-Exercise, a blended intervention that combines about five physiotherapeutic sessions with a web-based application (Bossen et al., 2016). The web-based application consists of information modules, strength and stability exercises, and a graded activity module to increase patients' level of physical activity. A recent randomized controlled trial (RCT) showed that e-Exercise and standard physiotherapy were similarly effective, with a substantial difference in the number of face-to-face sessions (i.e., 5 in the e-Exercise group

versus 12 in the standard physiotherapy group) (Kloek et al, 2018). Patients' adherence to the online part of e-Exercise was high and interviews revealed that the web-based application stimulated patients to take an active role within their treatment (De Vries et al, 2017). In order to benefit of e-Exercise' proven effectiveness, we aim to implement the intervention within the Dutch physiotherapy practice.

Implementation of a blended physiotherapy intervention might be challenging, since it requires behavior change of practice and e-Health related competencies of physiotherapists. In 2014, a survey in the Netherlands revealed that only 1% of patients who visited a physiotherapist was supported by a digital technology (Krijgsman, Peeters, and Burghouts 2015). Reasons for non-usage of e-Health among healthcare professionals include costs and liability issues, unwillingness to use technology and lack of trust in privacy and confidentiality (De Grood, Raissi, Kwon, and Santana, 2016; Peeters et al, 2016). Which specific determinants contribute to physiotherapists' usage or non-usage of a blended intervention such as e-Exercise, with a reduced number of face-to-face sessions, is unknown.

To ensure effective implementation of e-Exercise within the physiotherapy setting, physiotherapists' perspectives need to be considered. Users and nonusers can provide valuable insights and explanations for the usage of e-Exercise. Therefore, the aim of this mixed methods study was to explore the experiences of physiotherapists and identify determinants that facilitate and hinder the usage of the blended intervention e-Exercise.

## Methods

### Design

We used an explanatory sequential mixed methods design to clarify quantitative data about physiotherapists' experiences with qualitative research (Creswell and Plano Clark, 2011). This study was embedded within a cluster RCT (Bossen et al, 2016; Kloek et al, 2014). For qualitative analysis, semi-structured interviews were performed. The study was approved by the Medical Ethical Committee of the St. Elisabeth Hospital Tilburg, the Netherlands (Dutch Trial Register NTR4224).

### Procedure and participants

In order to recruit at least 200 physiotherapists for participation in the RCT, a random sample of 800

physiotherapists were invited by letter to participate in the study. In addition to this letter, a recruitment advertisement was placed in the magazine and online newsletter of the Dutch professional association for physiotherapists. Physiotherapists were eligible for participation if they: 1) worked in a primary care practice; and 2) provided services to at least six patients with osteoarthritis of hip and/or knee in 1 year. Physiotherapy practices could participate with either one or two physiotherapists. After screening for inclusion, cluster randomization was performed at the level of the physiotherapy practices. In total, a number of 248 physiotherapists, working in 143 physiotherapy practices, were randomly assigned either to the e-Exercise intervention (123 physiotherapists) or usual physiotherapy (125 physiotherapists). This study focused on the 123 physiotherapists allocated to the e-Exercise intervention. All physiotherapists received an e-Exercise account which had to be confirmed by clicking on a link and followed a half-day instruction course to get familiar with the e-Exercise intervention.

### **Intervention**

E-Exercise is a blended intervention for patients with hip and/or knee osteoarthritis, developed together with patients and physiotherapists (Bossen et al, 2016). Within e-Exercise, parts of regular face-to-face sessions are substituted by online modules, with the aim to create a cost-effective intervention for patients with osteoarthritis. The intervention consists about 5 physiotherapy sessions in combination with a web-based application. The web-based application contains a tailored 12-week behavioral graded activity program, videos with strength and mobility exercises and videos and texts with information about osteoarthritis related topics. The physiotherapist can also login to the web-based application, for example to change the type of exercises. The physiotherapist only needs to log in during the face-to-face physiotherapy sessions, in order to avoid extra workload. A video of e-Exercise is available via <https://www.youtube.com/watch?v=4l9GoQWWy58> (English subtitles can be switched on).

### **Quantitative data collection**

Demographic characteristics of the included physiotherapists were gathered at the start of the study. Objective usage data from the backend of the e-Exercise application were used to evaluate the number of physiotherapists that confirmed their account after receiving a signup confirmation email. Confirmation of the account was necessary to get access to the web-based

application and to generate patient accounts. The numbers of recruited patients were monitored throughout the study period. Physiotherapists could include patients for the trial from September 2014 until April 2015. In October 2015, an anonymous questionnaire was sent to all 123 physiotherapists in the intervention group to measure experiences with e-Exercise. This questionnaire was based on the Measurement Instrument for Determinants of Innovations (MIDI) (Fleuren, Paulussen, Van Dommelen, and Van Buuren, 2014). As recommended by De Veer, Fleuren, Bekkema, and Francke (2011), a selection of relevant determinants was made and subsequently included in the final questionnaire that covered: 1) characteristics of the innovation; 2) characteristics of the physiotherapist; 3) characteristics of the organization; and 4) characteristics of the sociopolitical context. Two researchers (DB and CV) and two physiotherapists pretested the questionnaire on completeness, clarity of questions, and time needed to fill out the questionnaire. Minor modifications were made after this expert review. The questionnaire consisted of 17 questions, both multiple choice and open-ended, as well as statements. See Table 1 for the final version of the statements in the questionnaire, the full version of the questionnaire is available on request. Time to fill out the questionnaire was about 10 minutes to enhance the number of responders, a reminder was sent after 2 and 6 weeks. Demographic characteristics of physiotherapists who used e-Exercise and physiotherapists who did not use e-Exercise were compared using *t*-tests and Chi-square tests. Results of the statements in the questionnaire were described per item. Answers to open-ended questions were analyzed using content analysis and converted into quantitative variables which were counted. All analyses were performed using SPSS version 23.0.

### **Qualitative data collection**

In order to gain more in-depth understanding of determinants that promote or hinder physiotherapists' usage of e-Exercise, respondents of the questionnaire were asked to participate in an interview. To increase external validity, purposeful sampling was performed in order to obtain heterogeneity in age, specialization, geographic location, numbers of patients included, and survey answers. New physiotherapists were approached based on theoretical sampling until data redundancy appeared. One researcher (HdV), who was not involved in the development and evaluation of e-Exercise, conducted all individual semi-structured interviews in the physiotherapists' work environment. HdV is an

experienced physiotherapist, a junior researcher and trained in qualitative research methods. During the interviews, HdV used a topic list which was based on the answers from the questionnaire, on Fleuren, Paulussen, Van Dommelen, and Van Buuren (2014) MIDI and on Li et al. (2013) (Appendix). All interviews were audiotaped and transcribed using NVivo for Mac version 10.2.1. Interview data were analyzed by using grounded theory methodology. Two researchers (HdV and CK) independently deconstructed the interviews. Assigned codes were compared (both within and between interviews) and axial and selective coding were performed in cooperation between HdV and CK. Codes expressing related concepts were grouped together to create broader categories. Data redundancy was reached when the last two interviews revealed no new concepts and/or categories. Respondent validation was applied by verifying the determinants for usage of e-Exercise with all participating physiotherapists.

### **Results**

Within 2 months, a number of 248 eligible physiotherapists were recruited and randomized. The 123 e-Exercise physiotherapists were on average: 42 ( $\pm 13$ ) years of age; 65 (53%) were male; and 42 (34%) had a master physiotherapy-specialization. Of the 123 physiotherapists who were assigned to e-Exercise, 35 (29%) never activated an account. Of the 88 physiotherapists with an activated account, 54 physiotherapists (61%) recruited one or more eligible patients (in total 109 patients) and 34 physiotherapists (39%) did not include any patients during the 7-month inclusion period. Only 10 physiotherapists (11%) continued using the web-based application after the study period. No significant differences in demographics were found between physiotherapists who used the e-Exercise intervention compared to physiotherapists who never used e-Exercise (results not presented, all statistics had a *p*-value  $\geq 0.05$ ).

### **Quantitative results**

A total of 49 physiotherapists completed the questionnaire. Answers to the statements are presented in Table 1. Of the 49 physiotherapists, 11 (22%) included no patients, 31 (63%) physiotherapists used e-Exercise in one to three patients with osteoarthritis, and 7 (14%) physiotherapists recruited more than four patients for the e-Exercise treatment. Of the 49 respondents, 34 (69%) indicated that the user instruction course and

**Table 1.** Physiotherapists' evaluation of e-Exercise. Results of statement (*n* = 49).

Statement	Totally disagree, <i>n</i> (%)	Disagree, <i>n</i> (%)	Neutral, <i>n</i> (%)	Agree, <i>n</i> (%)	Totally agree, <i>n</i> (%)
The instruction course and manual assisted me so that I knew how to work with e-Exercise	1 (2.0)	4 (8.2)	10 (20.4)	26 (53.1)	8 (16.3)
E-Exercise contains all essential elements for the treatment of hip/knee osteoarthritis	4 (8.2)	19 (38.8)	15 (30.6)	10 (20.4)	1 (2.0)
I have enough influence on the content of patients' individual e-Exercise program	-	10 (20.4)	22 (44.9)	14 (28.6)	3 (6.1)
The content of e-Exercise is aligned with my opinion about treating patients with osteoarthritis	2 (4.1)	11 (22.4)	16 (32.7)	18 (36.7)	2 (4.1)
The intervention provided through e-Exercise is appropriate for the average patient with osteoarthritis	5 (10.2)	13 (26.5)	16 (32.7)	15 (30.6)	-
I experience that e-Exercise supports patients in doing their exercises at home	1 (4.1)	7 (14.3)	25 (51.0)	16 (32.7)	-
A major disadvantage of e-Exercise is that it results in less income	10 (20.4)	14 (28.6)	14 (28.6)	10 (20.4)	1 (4.1)
Patients who were treated with e-Exercise were generally positive about the intervention	2 (4.1)	9 (18.4)	23 (46.9)	13 (26.5)	2 (4.1)
Our physiotherapy practice has the intention to use e-Health innovations	2 (4.1)	2 (4.1)	12 (24.5)	28 (57.1)	5 (10.2)
I do not have enough time available to get familiar with e-Exercise and to use the web-application	7 (14.3)	13 (26.5)	10 (20.4)	17 (34.7)	2 (4.1)
I believe that patient data gathered at the e-Exercise web-application is stored safely	-	3 (6.1)	19 (38.8)	22 (44.9)	5 (10.2)

manual were clear and easy to understand which facilitated the use of the web-based application. A total of 20 (41%) physiotherapists reported that the content of the web-based application matched their thoughts about treating patients with osteoarthritis. In the open fields of the questionnaire, 14 (29%) physiotherapists suggested to provide more flexibility in the web-based application in terms of intervention duration and the number of sets, repetitions and type of exercises. According to a minority of the physiotherapists (*n* = 11, 22%) it was as a major disadvantage that e-Exercise resulted in less income, since the protocol recommends to minimize the number of face-to-face sessions to five. Less than half of the physiotherapists (*n* = 18, 37%) intended to use e-Exercise in the future. Physiotherapist were less satisfied about the applicability of e-Exercise for only one diagnosis and the time needed to get use to e-Exercise during times of high work pressure and administrative burden. Most of the physiotherapists (*n* = 33, 67%) reported that they would recommend e-Exercise to their colleagues. The most important reason for being positive about e-Exercise was the completeness of the web-based application which consisted of exercises, assignments, and information, which supported patients in managing their osteoarthritis in their daily situation.

### Qualitative results

After nine interviews, data saturation was reached. The physiotherapists' age ranged from 24–59 with a median of 52 years, six were male and three were female. Four

of the physiotherapists were self-employed. Two physiotherapists had a master physiotherapy-specialization. The median of recruitment was one patient (0–3). After the data analyses, seven main themes emerged which influenced the extent to which physiotherapists used the e-Exercise intervention. These themes are displayed in Figure 1. All nine physiotherapists confirmed the determinants for usage of e-Exercise.

### Appropriateness

According to physiotherapists, e-Exercise is an appropriate treatment options for subgroup of OA patients. As one physiotherapist (P1) reported:

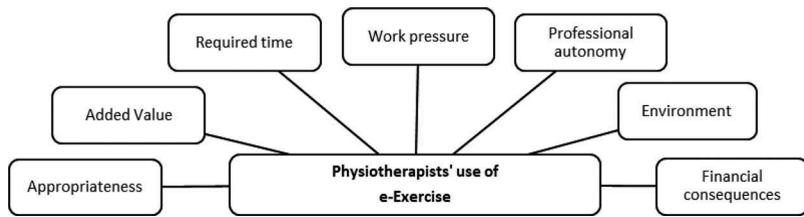
“The intervention is highly appropriate. To be honest, for me it was an eye-opener that so many patients can benefit from an intervention with less face-to-face guidance.”

On the other hand, physiotherapists explained that not all eligible patients were willing to participate. Reasons for patients' non-willingness were a lack of technology affinity or because they preferred regular face-to-face contact.

### Added value

Physiotherapists' perceived added value in terms of exercise adherence. This appeared to be an important factor to use the web-based application:

“Patients need guidance in changing their behavior, also in their home-environment. E-Exercise is a valuable tool to support patients in doing their exercises.” (P2)



**Figure 1.** Determinants for the use of e-Exercise among physiotherapists.

### Required time

Some physiotherapists perceived the web-based application as time-saving whereas others perceived it as an additional burden. A physiotherapist (P3) explained:

"I did not have enough time to use the web-based application. It is an extra step in the treatment of patients."

Closely linked aspects to these time-constraints were technical skills, clarity of the instruction manual and course and the adaptive capacity to change treatment routines.

### Work pressure

Busy work schedules and administrative burden hindered a part of the physiotherapists to test and use the e-Exercise in their practice. A physiotherapist (P6) who perceived increased workload due to an external audit said:

"We had to cancel everything that took extra work."

### Professional autonomy

Reduced face-to-face contact due to the substitution of several face-to-face sessions interfered with the professional autonomy of some physiotherapists. One physiotherapist commented:

"I prefer face-to-face guidance because of the ability of providing continuous feedback. You don't know how patients execute their exercises at home." (P2)

As a solution, one physiotherapist (P4) recommended to provide more flexibility in the intervention:

"I would prefer to have more possibilities to personalize the intervention to patients' individual needs."

### Environment

Support from colleagues and the absence of a national e-Health guideline or standard influenced the use of e-Exercise. One physiotherapist (P5) said:

"It would be easier when there would be a national e-Health policy."

### Financial consequences

Although physiotherapists appeared to acknowledge the societal importance of limiting healthcare costs, the loss of income due to the substitution of face-to-face session prohibited the implementation of e-Exercise. As one physiotherapist (P5) commented:

"I believe this intervention is good for everyone, but especially for the healthcare insurers."

On the other hand, some physiotherapists mentioned the advantage of reducing the number of treatments and mentioned that offering an innovative intervention attracted new patients:

"We published an article about e-Exercise in the local newspaper and received about 80 phone calls of interested patients." (P1)

### Discussion

Digital technologies provide huge opportunities for physiotherapists since they can act as an extension to face-to-face sessions. The aim of this mixed methods study was to explore physiotherapists' experiences with e-Exercise and to identify determinants that facilitate and hinder the usage of a blended intervention in order to identify recommendations for future implementation.

Physiotherapists had mixed opinions about e-Exercise. Results from the questionnaire and interviews revealed seven determinants for the usage of the blended intervention: 1) appropriateness; 2) added value; 3) required time; 4) work pressure; 5) professional autonomy; 6) environmental factors; and 7) financial consequences. These determinants are partly in line with the results from Fleuren, Paulussen, Van Dommelen, and Van Buuren (2014) and De Veer, Fleuren, Bekkema, and Francke (2011), which distinguishes characteristics regarding the innovation, the user, the organization and the sociopolitical context. This study provides specific information about the use of a blended intervention within the physiotherapy setting. One

of the main conclusions is that physiotherapists' professional autonomy plays an important role in the integration of e-Health in the daily practice of physiotherapists. Blended care is a new mode of delivering physiotherapy which requires that physiotherapists have to release their usual control.

### **Embedding blended care**

Physiotherapists that participated in our trial were not only asked to use a web-based application, but also to reduce their number of billable face-to-face treatment sessions. In contrast to our expectation, most responders to the questionnaire reported no financial concerns. Yet, the interviews showed that some physiotherapists are seriously concerned about the financial consequences of e-Health. Cooperation with health insurance companies and the investigation of new e-Health business models should be the cornerstones for future implementation. Next, physiotherapists reported difficulty in changing their treatment routines. Embedding blended care requires that physiotherapists admit online care as a substantial element of the physiotherapy treatment (Christensen, Bohmer, and Kenagy, 2000; Wentzel, van der Vaart, Bohlmeijer, and Van Gemert-Pijnen, 2016). As for all new procedures and innovations, it takes time to get used to it (De Veer, Fleuren, Bekkema, and Francke, 2011). Half of the physiotherapists used the intervention only once or twice during the study period, which also had to do with high workload and a lack of time. Irregular use is not enough to make blended care part of daily routine. Therefore, we recommend to expand the instruction course and complement this training with implementation lessons and optional refreshing meetups.

### **Non-usage**

Less than half of the physiotherapists allocated to e-Exercise actually recruited patients. However, this recruitment rate was comparable with the group of physiotherapists treating their patients with traditional physiotherapy (Kloek et al, 2018) and shows that physiotherapists' actual involvement in research remains challenging, independently of their allocated type of intervention. To illustrate, the usual physiotherapy group consisted of 125 physiotherapists, of whom 50 (40%) recruited one or more eligible patients. More concerning was the fact only 10 physiotherapists continued using the web-based application after the study period. A frequently mentioned reason for non-usage was the inappropriateness of the intervention. First of all, online interventions

are only suitable for patients with access to internet and adequate ICT skills. Next to this, e-Exercise was only developed for inactive patients with OA. The specificity of e-Exercise Osteoarthritis makes the intervention less applicable for physiotherapists. However, the effectiveness of e-Exercise in this specific group underlines the potential of blended care for the entire physiotherapy setting (Slater et al, 2016). Physiotherapists also suggested to extend the website with e-Exercise programs for other disorders. This recommendation has led to the development of interventions for patients with low back pain and medically unexplained physical symptoms, which are currently being studied for effectiveness by our research group. Physiotherapists also mentioned that the program should be more flexible in terms of intervention duration and the number of sets, repetitions, and type of exercises. Creating extra functionalities to tailor e-Exercise even more to patients' individual needs would probably increase the appropriateness and added value of the intervention. Moreover, more flexibility in composing individual programs for the individual patient could increase the professional autonomy of physiotherapists.

### **Methodological considerations**

This explanatory sequential mixed methods study is executed within the daily physiotherapy setting and is useful for further understanding of integrating e-Health within practice. Since the questionnaire was anonymous, we were unable to compare the characteristics of the responders and nonresponders. Less than half of the physiotherapists allocated to e-Exercise filled out the questionnaire, which hampers its generalizability. The questionnaire was sent 6 months after finishing the inclusion period, which might explain the low response rate. It could be that the interest in the intervention was higher among responders compared to nonresponders. Although we expect that the seven determinants for the use of a blended intervention are applicable for other physiotherapeutic blended interventions as well, we recommend validation of these results in a bigger sample of physiotherapists.

### **Implications and conclusion**

The seven determinants related to the usage of e-Exercise highlight the broad scope of factors that should be taken in account during the implementation of e-Health interventions. Previous studies have already shown the effectiveness of e-Exercise (Kloek et al, 2018), patients enthusiasm and high usage of the online

application (De Vries et al, 2017). Future steps in the implementation phase should focus on cooperation with health insurance companies, investigation of e-Health business models and providing education about optimally integrating online and face-to-face physiotherapy. Next to this, we need to extend our website with e-Exercise programs for other diseases and integrate more flexibility in order to tailor the intervention on patients' and physiotherapists' needs.

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## Declaration of Interest

The authors report no declaration of interest.

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## References

- Bossen D, Kloek CJ, Snippe HW, Dekker J, De Bakker DH, Veenhof C 2016 A blended intervention for patients with knee and hip osteoarthritis in the physical therapy practice: Development and a pilot study. *JMIR Research Protocols* 5: e32.
- Christensen CM, Bohmer R, Kenagy J 2000 Will disruptive innovations cure health care? *Harvard Business Review* 78:102–112.
- Creswell JW, Plano Clark VL 2011 Designing and Conducting Mixed Methods Research. Los Angeles: SAGE.
- De Grood C, Raissi A, Kwon Y, Santana MJ 2016 Adoption of e-health technology by physicians: A scoping review. *Journal of Multidisciplinary Healthcare* 9:335–344.
- De Veer AJ, Fleuren MA, Bekkema N, Francke AL 2011 Successful implementation of new technologies in nursing care: A questionnaire survey of nurse-users. *BMC Medical Informatics and Decision Making* 11:67.
- De Vries H, Kloek C, De Bakker D, Dekker J, Bossen D, Veenhof C 2017 Determinants of adherence to the online component of a blended intervention for patients with hip- and/or knee osteoarthritis: A mixed methods study embedded in the e-Exercise trial. *Telemedicine and e-Health* 23:1002–1010.
- Fleuren MA, Paulussen TG, Van Dommelen P, Van Buuren S 2014 Towards a measurement instrument for determinants of innovations. *International Journal for Quality in Health Care* 26:501–510.
- Huber M, Knottnerus JA, Green L, van der Horst H, Jadad AR, Kromhout D, Leonard B, Lorig K, Loureiro MI, van der Meer JW, Schnabel P, Smith R, Van Weel C, Smid H 2011 How should we define health? *BMJ* 343:d4163.
- Jambroes M, Nederland T, Kaljouw M, Van Vliet K, Essink-Bot ML, Ruwaard D 2016 Implications of health as 'the ability to adapt and self-manage' for public health policy: A qualitative study. *European Journal of Public Health* 26:412–416.
- Kloek CJ, Bossen D, De Bakker DH, Dekker J, Veenhof C 2018 Effectiveness of a blended physical therapy intervention in patients with hip and/or knee osteoarthritis: A randomized controlled trial. *Physical Therapy*. Epub ahead of print. doi:[10.1093/ptj/pzy045](https://doi.org/10.1093/ptj/pzy045).
- Kloek CJ, Bossen D, Veenhof C, Van Dongen JM, Dekker J, De Bakker DH 2014 Effectiveness and cost-effectiveness of a blended exercise intervention for patients with hip and/or knee osteoarthritis: Study protocol of a randomized controlled trial. *BMC Musculoskeletal Disorders* 15:269.
- Krijgsman J, Peeters J, Burghouts A 2015 Op naar meerwaarde – eHealth-monitor 2014 [On to added value – eHealth Monitor 2014]. *Tijdschrift Voor Gezondheidswetenschappen* 93:58–59.
- Li J, Talaei-Khoei A, Seale H, Ray P, Macintyre CR 2013 Health care provider adoption of eHealth: Systematic literature review. *Interactive Journal of Medical Research* 2: e7.
- Peeters JM, Krijgsman JW, Brabers AE, Jong JD, Friele RD 2016 Use and uptake of eHealth in general practice: A cross-sectional survey and focus group study among health care users and general practitioners. *JMIR Medical Informatics* 4:e11.
- Slater H, Dear BF, Merolli MA, Li LC, Briggs AM 2016 Use of eHealth technologies to enable the implementation of musculoskeletal Models of Care: Evidence and practice. *Best Practice and Research Clinical Rheumatology* 30:483–502.
- Wentzel J, van der Vaart R, Bohlmeijer ET, Van Gemert-Pijnen JE 2016 Mixing online and face-to-face therapy: How to benefit from blended care in mental health care. *JMIR Mental Health* 3:e9.
- Winstein C, Requejo P 2015 Innovative technologies for rehabilitation and health promotion: What is the evidence? *Physical Therapy* 95:294–298.

## Appendix

### Initial topic list

Physiotherapist	Patient
<ul style="list-style-type: none"> <li>- Motivation to participate</li> <li>- Outcome expectations and experiences</li> <li>- Attitude about e-Health in general</li> <li>- ICT skills</li> </ul>	<ul style="list-style-type: none"> <li>- Recruitment</li> <li>- Patient satisfaction</li> <li>- Additional value</li> </ul>
Organization	Rules and financial topics
<ul style="list-style-type: none"> <li>- Compatibility</li> <li>- Social support</li> <li>- Workload</li> </ul>	<ul style="list-style-type: none"> <li>- Income</li> <li>- Number of face-to-face contact</li> <li>- Ideas about physiotherapy in the future</li> </ul>
e-Exercise	Implementation
<ul style="list-style-type: none"> <li>- Complexity</li> <li>- Completeness</li> <li>- e-Exercise for other patient groups</li> </ul>	<ul style="list-style-type: none"> <li>- Procedural clarity</li> <li>- Time available</li> <li>- Study-load</li> </ul>