Implementation study of a digital referral algorithm for patients with musculoskeletal complaints

Qualitative study to identify barriers and facilitators from multiple perspectives

THESIS

Master Health Economics, Policy & Law

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Erasmus University / Maasstad Hospital
Rotterdam, 4th of August, 2021

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Abstract

Rationale

Inadequate referrals cause unnecessary costs in healthcare, which can be diminished by using an improved referral strategy. Hence, an innovative digital referral algorithm was developed for patients with musculoskeletal complaints and has shown to be effective in improving adequacy of referrals. However, it has proven to be difficult to implement new innovations in healthcare, thus before implementation can take place, it is important to grasp the different perspectives on the broad support, barriers and facilitators of implementation from the intended users, namely healthcare professionals and patients

Objective

The aim of this research is to gain insight into the strengths and weaknesses of the proposed algorithm to be used by patients from home. Therefore, the barriers and facilitators affecting the practical implementation will be analysed. Specifically, this involves creating an overview of important aspects that could increase usability, awareness, availability, and acceptability of a digital algorithm from the perspective of healthcare professionals and patients with musculoskeletal complaints. These aspects can be used to improve the process of implementation.

Methods

A qualitative study was set up, because little is known about implementation of referral algorithms. This qualitative study consists of two different data collection methods. First, focus groups were conducted with patients with musculoskeletal complaints that visited the rheumatologist for the first time in 2020. Second, a survey was sent to rheumatologists, general practitioners, and physiotherapists as healthcare professionals. The transcripts of the focus groups and surveys were analysed using a thematic analysis and used to answer the research objective.

Results

Three focus groups were organised with a total of 26 participating patients. The survey was completed by 104 rheumatologists, 111 general practitioners, and 118 physiotherapists. Because of the high response rate of the survey and the three focus groups, a large quantity of qualitative data was collected. This led to a great understanding of the complications in current referral strategy of patients with musculoskeletal complaints and the strengths and weaknesses of the proposed algorithm. In total, 1240 codes were divided across five different main themes which show that all stakeholders have a support base for a new referral strategy. However, the main barriers are formed by the use of this algorithm by patients themselves and the allegedly limited outcome that is provided by the algorithm. The main themes identified are "experiences", "facilitators", "barriers", "implementation" and "adapted consultation".

Conclusion

The idea of using a digital algorithm in general is seen as a possible helpful innovation from out of all four perspectives. We conclude that this algorithm, as condition for implementation, needs to be integrated in the first line of care to use together with the general practitioner. This in contrast to the original plan to use the algorithm for patients from home. The outcome of the tool must not only consist of an indication of the risk of inflammatory rheumatic disease, but should also give a helpful advice to all patients with musculoskeletal complaints. These are some of the substantial discrepancies compared to the original plan, but are perceived as necessary improvements to overcome the greatest barriers. When the proposed adjustments are realised, the algorithm can be piloted to be tested and evaluated in practice.

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1. Introduction

Total healthcare expenditure is increasing as a result of a growing population, increasing life expectancy, and further developed medication (Mankiw, 2017). Therefore, it is important to provide care that is most valued for each patient. Within Value-Based Health Care (VBHC), value is calculated as patient outcomes divided by costs (Porter, 2010). VBHC also emphasizes the importance of integrated practice units and the cooperation between care providers to provide patient value. The Dutch project *Juiste Zorg Op de Juiste Plek* (JZOJP) is part of VBHC. One of the improvement strategies within JZOJP is optimizing collaboration between primary and secondary care (Taskforce rapport, 2018). A part of this strategy is preventing expensive outpatient specialist care if this is not necessary.

In the Netherlands, general practitioners (GPs) as primary care providers have an important function in gatekeeping towards secondary care and referring patients to the right care provider. However, recognizing those patients that should be referred to secondary care, is difficult. Especially GPs have difficulties in recognising patients at risk for IRD within all patients with musculoskeletal complaints (Ten Brinck et al., 2018). For patients with musculoskeletal complaints, GPs have to distinguish between inflammatory rheumatic diseases (IRD) and other non-inflammatory causes. Physiotherapists may also function as primary care provider for a patient with musculoskeletal complaints. Physiotherapists might be able to recognize IRD, but are not authorized to refer patients to the rheumatologist (Feldman et al., 2020).

Only 20-30% of patients being referred to a rheumatologist is diagnosed with IRD (Vanhoof et al., 2002). Thus, the majority of patients that are examined by a rheumatologist do not have IRD, and might be marked as inadequately referred. These inadequate referrals not only might cause burden on the patient level, but can also afflict the time of the rheumatologist that could be spend on care for IRD patients, increase the access time and subsequently increase societal costs (Gulati et al., 2012). On the other hand, especially for IRD, symptom recognition within three months is important for effective treatment of patients at risk of IRD (Feldman et al., 2020). Early diagnosis is important for preventing long term damage and maintaining quality of life (Pisetsky, Ward, 2012). Hence, a Cochrane review focusses on the improvement of appropriate referrals strategies towards the rheumatologist, in order to reduce financial burden without surrendering in the quality of delivered care (Akbari et al., 2008).

There are three potential strategies described in literature to improve appropriateness of referral. The first is education, which is proven to not be very effective if this education consists of distributing guidelines and providing feedback on referrals. Extensive education is likely to improve the referral process.(Akbari et al., 2008). Second is triage by a specialist, which is a complex and expensive intervention (Hazlewood et al., 2016). Third is using a digital algorithm tool (Akbari et al., 2008) to support GPs or this can be used by patients from home before visiting their GP, which is proven to effective in early recognition of axial spondylarthritis (Proft et al., 2020). However, information on the effect of implementation of diagnostic tools is scarce. In the Maasstad hospital in Rotterdam a referral algorithm has been developed and validated as an innovative referral strategy to support the decision-making process for patients with musculoskeletal complaints which can be used by patients from home. This algorithm will indicate if consulting a GP for referral to a rheumatologist is considered necessary (van Delft et al., 2020). In this specific case, it is assumed that a referral to a rheumatologist is only necessary if there is a high risk for IRD. The next step will be an implementation study to assess the support and aspects regarding implementing the algorithm for patients to use from home.

Healthcare innovations however, are difficult to implement and many new innovations fail at the implementation stage (Helfrich et al., 2007) (Fleuren et al., 2004). The normalization

process theory (NPT) can assist in comprehending the process of implementation and offers constructs to focus on what people do that influences the implementation of new interventions (May et al., 2018). This research uses the NPT to understand where the barriers and facilitators are for implementing a digital algorithm for patients. A major reason found for failure of implementation is a lack of support from healthcare professionals to change their way of care delivery (Williams et al., 2015). In line with this, it is interesting to investigate the support base of patients themselves to use such a digital algorithm before visiting their own GP.

The optimal strategy of implementing the digital algorithm for patients with musculoskeletal complaints depends on support of the healthcare professionals and the patients, who are the intended users. This algorithm being used by patients is consistent with healthcare becoming more patient-centered (Klecun, 2016) and with more care organized to be available from home (Patientenfederatie, 2018). However, a perspective from the intended users is not yet explored. The input of users on the digital referral algorithm will be necessary to increase acceptability (Patientenfederatie, 2018). Determining constraining and facilitating factors will guide and improve the development of an optimal implementation strategy (Bauer et al., 2015).

1.1 Objective and research question

Considering the aforementioned, the aim of this research is to gain insight in the aspects that are needed for implementing a digital algorithm used from home that helps in deciding whether a rheumatologist should be consulted for a patient with musculoskeletal complaints. A qualitative research on the perspective of patients and healthcare professionals will result in an advice for an optimal implementation strategy.

From this aim we conducted the main research question:

How to implement a digital algorithm for patients with musculoskeletal complaints from both the patients' and healthcare professionals' perspective?

In the next chapters, first the theoretical framework will be outlined. In this chapter, the current knowledge on implementation is summarized and the research question will be broken down into sub-questions. In chapter 3, the research methods and data collection will be explained. In chapter 4, the collected results from both the patients' and healthcare professionals' perspective are presented. In the final chapter 5, we will place our results in a broader academic perspective. Moreover, we will discuss the main strengths and limitations of our study and provide several recommendations that are relevant for parties involved in implementation of digital innovative referral strategies.

2. Theoretical framework

This chapter starts by briefly explaining why the VBHC theory is adapted in healthcare and the way in which this theory is applicable to the right care at the right place. This will be linked with the main relation of interest in this thesis, namely digital support used to optimize referral strategies. Referral issues in rheumatology are explained and how new strategies might influence referral behaviour and steer providers towards providing higher quality- and more cost-effective care. Special emphasis will be placed on digital support in referrals and how the process from development of referral strategy to the final implementation theoretically should be performed. Based on literature the theoretical advice for implementation strategies is discussed. Finally, we will discuss why this specific method fits our study.

2.1 VBHC theory and its' relationship with the right care at the right place

In the Netherlands there is a coalition agreement about the organisation of medical specialist care which is in line with VBHC (Hoofdlijnenakkoord medisch-specialistische zorg 2019-2022). VBHC describes the main goal for all healthcare stakeholders as improving value for patients, which is calculated by health outcomes for patients divided by costs. To aid this movement, a value agenda was published to guide VBHC (Porter et al., 2013). Relevant for this research is the way Porter is organizing care into integrated practice units (IPUs). Within IPUs, the care is organized around the patient (group) with integrating care delivery systems. This means that there is an organized and coordinated network of care providers from primary care and medical specialists that work together to provide the appropriate care. This should be supported by an information technology platform that enables this integrated care (Porter et al., 2013).

The Dutch project that coincides with VBHC is JZOJP, with the mission to stop the increasing healthcare costs by organizing healthcare more efficiently (Taskforce, 2018). One of the main goals of JZOJP is a better cohesion of the primary, secondary and tertiary care organised around and together with the patient (Taskforce, 2018).The cooperation between primary and secondary care can improve different aspects, for example this cooperation between care providers might improve the adequacy of referrals. Inadequate referrals consume time of healthcare professionals and create unnecessary costs for society (Gulati et al., 2012). By decreasing inadequate referrals patients' health outcomes may improve, because there is less delay before seeing the right care provider. Also, by involving patients more in their own care it is shown that this improves their health outcomes (Hibbard & Greene 2013).

2.2 Inflammatory rheumatic disease and why early referrals are important

inflammatory rheumatic diseases (IRD) are a chronic life-long disabling disease and has a prevalence of five percent in the world-wide population. The three most common forms are rheumatoid arthritis, axial spondyloarthritis, and peripheral spondyloarthritis, such as psoriatic arthritis (Fautrel, Guillemin, 2002). Last decades has shown that the treatment of IRD has increased enormously, but its effect is most optimal when started as early as possible (Ten Brinck et al., 2018)(Redeker et al., 2019). Therefore, patients with IRD need to be seen by a rheumatologist as soon as possible to prevent avoidable complications in the future. Late referral and a diagnostic delay are common within rheumatology (Redeker et al., 2019), which increases the chance of complications. As a result, this can lead to decreased patient outcomes and increased healthcare - and societal cost (Houssien et al, 1998).

In the Netherlands and many other countries, early treatment needs early recognition in primary care since GPs have a function as gatekeeper for secondary care. This gatekeeper function should result in effective referrals and less unnecessary care given in expensive outpatient secondary care. However, recognizing IRD has proven to be difficult for primary care providers and around 70% of patients is inadequately referred to a rheumatologist (Gamez-Nava et al., 1998) (Kallikorm & Tender 2004).

2.3 Adequate referral strategies and specifically a digital referral algorithm

Referral of a patient has implications for the patient self, the healthcare system, and costs that accompany those (Shortell```` & Anderson, 1971). There is evidence suggesting that general referral processes from primary to secondary care can and need to be improved (Akbari et al., 2008). There are different strategies to improve adequacy of referrals. Since education can be difficult to perform effectively (Akbari et al., 2008) and triage is an expensive method (Hazlewood et al., 2016), we focus on a digital referral algorithm.

In the study by Moons et al. there is much empirical research done into the development of using a prediction model in the cardiovascular field. Such prediction models and digital tools are increasingly being used in clinical reasoning (Moons et al.,2012). Within rheumatology also a dysfunction is found in the current model of care and a referral algorithm could improve this (Graydon et al., 2008). The first step is the development of a tool which can provide adequate outcomes. These outcomes need to be validated and the prediction model must improve cost effectiveness (Moons et al., 2012).

The innovative referral algorithm developed in the Maasstad hospital is a standardised algorithm that consists of five to ten questions and is a combination of three already existing and validated questionnaires (van Delft et al., 2020). These questionnaires are a combination of those for axial spondyloarthritis (CaFaSpA) (van Hoeven et al.,2015), psoriatic arthritis (Pest) (Ibrahim et al., 2009), and early rheumatoid arthritis (CARE) (Ten Brinck et al., 2018). The next step will be an implementation study to assess the effect on quality and cost for patients to use the algorithm from home.

In line with the multi-year plan of the Dutch patient federation more care is organized for patients available from home (Patientenfederatie, 2018). Digital support for patients from home can support the early recognition of axial spondyloarthritis (Proft et al., 2020). Besides previous mentioned research there is little experience on the digital support for patients from home within rheumatology.

2.4 Theory about implementation of innovations

Implementing new innovations can be difficult in any sector but can be extra challenging in the healthcare sector, this is caused by several factors (Fleuren et al., 2004). For example, the acceptance by healthcare professionals or the insufficient financial resources supporting the innovation. The success of an innovation depends on the technical success of the innovation and on the implementation of the innovation (Voss, 1992). Technical success can be measured by the effective outcome of the innovation and this will be true for all subsequent uses of the innovation.

To determine the success of an implementation, the concept of implementation needs to be explicit. Implementation of an innovation will be achieved if behavioural change is

accomplished in using the innovation (Fleuren et al., 2014). If the implementation phase of an innovation is completed, this can be seen as a successful innovation. However, it is difficult to understand the process of optimal implementation (Voss, 1992). The Normalization Process Theory (NPT) describes the implementation process of new health technologies and aims to understand the achievement of behavioural change (May et al., 2009). This sociological toolkit helps understanding, evaluating and organizing implementation processes to increase the rate of implementation success. Within this toolkit there are four core constructs that represent different work that needs to be accomplished before implementing the innovation. The four constructs are coherence, cognitive participation, collective action, and reflexive monitoring. In the following section we will explain these constructs.

Coherence can be explained as the logical reason why people want to implement a new innovation. Therefor the reason why an implementation is proposed, should be clear and logical for all stakeholders. Cognitive participation is about the acceptance by the stakeholders of using the innovation. Cognitive participation is more effective when the implementation is sustained by a community of participants that initiate the implementation. The user of the new practice needs to be sure it is an improvement to change the current practice and not a deterioration from the management. Collective action is the operational work that is needed to implement the innovation. This includes that the participants work together and share their skill set necessary to accomplish success. Also, the new set of practices should be incorporated in the existing structures. Finally, reflective monitoring, this incorporates the PDCA (plan do check act) process on how the innovation affects the stakeholders and continuously reflects on the process of implementation.
The NPT theory helps to understand possible barriers in designing appropriate intervention (Davies et al., 2010). In the current research NPT is used to interpret the results so that barriers and facilitators are placed in the constructs of NPT. By getting insight in the presence of these constructs among the stakeholders, it makes it possible to create an advice for the implementation of the innovation. For this study we will investigate these constructs in both healthcare professionals as well as patients

2.5 Qualitative research

For this study we used a qualitative research method since this is an effective method to provide a holistic understanding of complex mechanisms in healthcare. Qualitative research is based on the post-positive and constructivist set of beliefs that opposes the positivists beliefs that there exists only a singular reality(Teherani et al., 2015). On the contrary the reality within the post-positivist and constructivist paradigms is influenced by individual differences like culture, which can be difficult to comprehend. Qualitative research tries to develop theory and thoughts on the beliefs of the different realities of participants (Teherani et al., 2015). Within qualitative research different approaches can be used to frame the research: grounded theory, which focusses on developing a theory, ethnography, which focuses on the culture of a group, and phenomenology, which focusses on understanding a phenomenon (Teherani et al., 2015). The current research will use a phenomenological approach because it is important to understand the phenomenon of referral of patients with musculoskeletal complaints, the accompanying difficulties and in what way to solve these. This approach will enable to envision the perspective of the healthcare professionals and the people with musculoskeletal complaints necessary for implementing the algorithm. To clarify different perspectives in qualitative research a mix of data collection methods is helpful (Paradis et al., 2016). Surveys, for example, are ideal for asking questions to a predetermined sample of individuals (Paradis et al., 2016) such as is the case with healthcare professionals. In this research it is helpful to gather much responses from the different groups of healthcare professionals, because these play an important role in the recognition of IRD. Focus groups can be used to understand social

phenomena seen by a group of people and offer the possibility to capture similarities and differences of opinion within groups (Paradis et al., 2016). This is consistent with our goal to enable the patients to interact and discuss the similarities and differences of their perspective on referral. Focus groups with patients are helpful to generate first-hand knowledge which has high value to increase patient value (Beresford, 2007).

2.6 Theoretical informed sub-questions

The existing literature shows that implementation can be translated into behavioural change. To achieve behavioural change first the barriers and facilitators in using the algorithm must be known. Next, the barriers for using an algorithm need to be solved and the facilitators need to be empowered to stimulate this behavioural change.

Sub-questions:

- What are the barriers and facilitators in using a digital algorithm from a patient perspective?
- What are the barriers and facilitators in using a digital algorithm for the healthcare professional perspective?
- What actions could be taken to increase the usability, awareness, availability and acceptability of this referral algorithm among patients and healthcare professionals?

3. Methodology

3.1 Study design

To gain insight in the support for the referral strategy and what is needed to improve implementation, a qualitative study was set up. Focus groups were performed with patients and online surveys with healthcare professionals have been conducted. This study was approved and considered not to be subject to the full extent of the Medical Research Involving Human Subjects Act by the Medical research Ethics Committees United (MEC-U) situated in Utrecht, the Netherlands.

3.2 Study population

The participants in this study are patients in the focus groups and healthcare professionals who completed the survey.

Patients

Patients who visited the rheumatologist of the Maasstad hospital for the first time in 2020 were invited through a personal email to participate in this study. This led to the formation of three separate focus groups, with ten, six and ten participants per focus group respectively. In the third focus group there was selected on patients without an IRD, this to be able to compare patients with IRD and non-IRD diagnosis. Participation in the focus group sessions was voluntary and patients did not receive compensation. There were no consequences for their follow-up treatment based on their decision on whether to participate in the study. All patients were eighteen years or older and gave permission to audiotape the focus group.

Healthcare professionals

The group of healthcare professionals consists of three subgroups; rheumatologists, GPs, and physiotherapists. To gather sufficient response, the survey is distributed by email and by using formal networks. For the rheumatologists there was contact with the Nederlandse Vereniging voor Reumatologie (NVR). For the GPs there has been contact with Stichting KOEL, an organisation focused on improving primary care in the region of South-Holland; NGHDoc, a program integrated in information systems of the GPs; and with the Radboudumc affiliated GPs. For the physiotherapists, there was contact through the Koninklijke Nederlandse Genootschap voor Fysiotherapie (KNGF). Participation in the survey was voluntary and healthcare professionals did not receive compensation.

3.3 Study method

3.3.1 Focus groups

Focus groups were already performed before the start of this master thesis project; however, the transcripts are analysed by two independent researchers (ED, RB). The participation in the focus groups of respectively ten, six and ten patients fit into the ideal size of between six and twelve participants per focus group (Krueger, 1994). One focus group was performed in a real-life setting and because of Covid-19 regulations the latter two were performed digital. In the third focus group there is purposely selected on patients without IRD, to be able to compare between patients with and without IRD.

Each focus group was organised as follows: one person had the role of moderator (ED) and focussed on asking questions and stimulating discussion. Another person (MD) had the role of the observer and focussed on sticking to the topic, keeping track of the time and audio taping the session. Both ED and MD are researchers in the field of rheumatology. The focus groups were started by informal discussion during which participants and moderators introduced themselves. After that, the purpose of the study was discussed with the participants. The discussion was guided using a pre-designed question form, which usually results in a one-and-a-half to two-hour discussion (Supplementary file 1). Each focus group was audio recorded with permission from the participants using a Philips Voice Tracer DVT6110.

The audio recordings of the focus group sessions were transcribed verbatim. Transcripts were returned to participants to allow them to provide feedback, comments or corrections. The focus groups are not anonymous, but the transcripts are anonymized by using only using a number instead of a name for the patients.

3.3.2 Surveys

Between 19 March and 20 April, surveys were sent out. This was done by email and by publishing on websites and in newsletters. A copy of the proposed referral algorithm (figure 1) was included along with the survey. Figure 1 is a schematic model of the referral algorithm that determines the advice of referral .
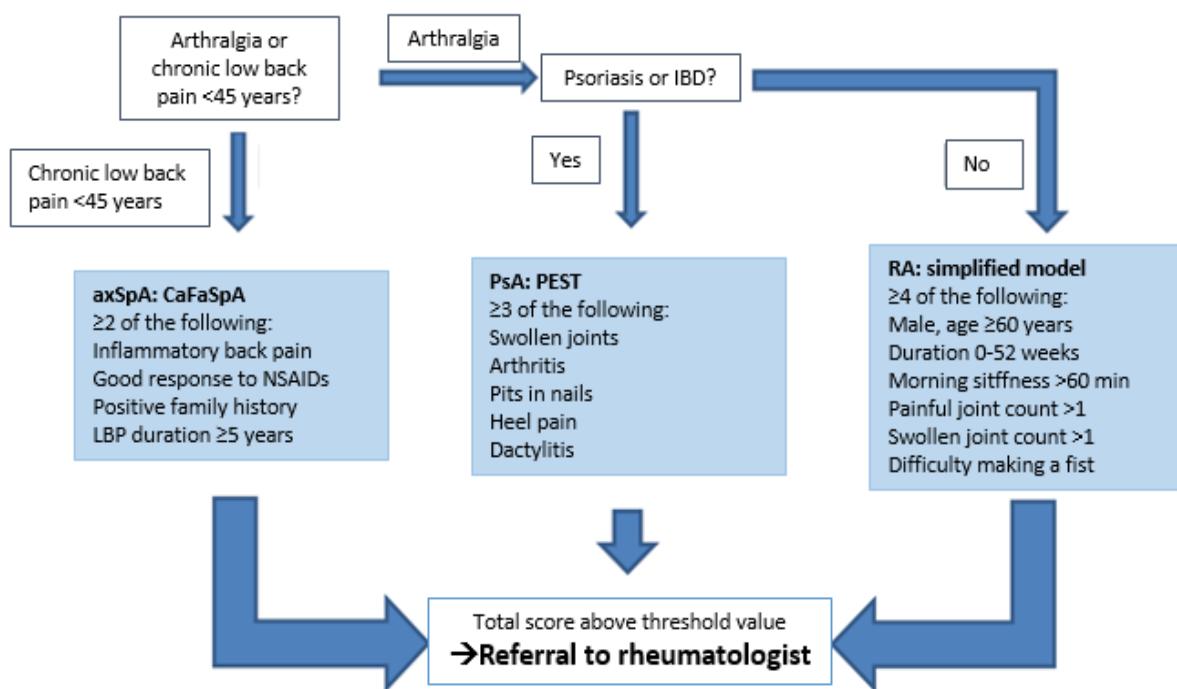
Figure 1: A simplified model of the digital referral algorithm

The online survey consisted of closed ended questions with a 5-point Likert scale and questions with a slider to give a percentage. Open-ended questions were used to obtain qualitative data. These questions focused on issues related to implementation of the algorithm like usability, awareness, availability, acceptability, and trustworthiness (Appendix supplementary file 2). There is a question added for the rheumatologist concerning their thoughts of online consultations, because this could be a possible suggestion to decrease cost of consult when treating non-IRD patients. To create and test the survey, the software programme Qualtrics was used. Evaluation of response was done in order to follow the response rate, and reminders were sent out two weeks after the first email. To collect enough and reliable data from the surveys, the principle of data saturation was used, which is defined as the point when no new information is provided (Safdar et al., 2016). For open-ended interview questions the median sample size found for saturation is 75 (Weller et al., 2018).

There is not a certain number of themes for inductive thematic saturation, but the principal focus is on the analysis and saturation can be described as the point where new data does not lead to the emergence of new themes (Saunders et al., 2017).

3.4 Data analysis of focus groups and surveys

Since the respondents of the focus groups and the open-ended survey questions were Dutch, these are both conducted and transcribed verbatim in Dutch. The coding and analysis were also both done in Dutch to decrease errors and biases caused by language barriers (Tsai et al., 2004). Quotes mentioned in the text are translated after coding. The closed survey questions are analysed, but only presented in the results if it is supplementary to the open-ended questions.

The verbatim transcribed focus groups and the open-ended survey questions were both analysed following a thematic analysis (TA) approach (Braun & Clarke., 2006). TA is a qualitative method that can be used in an inductive, bottom-up, and deductive, top-down approach. In this research an inductive approach was chosen, because the goal is to explore and give a description of all the barriers and facilitators regarding implementation of a digital referral algorithm. Inductive research can be described as bottom-up, meaning that from observations in the real world we move to theory. Inductive methods are commonly used in health and social science to give a detailed description of phenomena (Thomas., 2006). TA can be used for identifying, analysing, organizing, describing, and reporting themes found within our data set (Braun & Clarke., 2006). The six steps regarding TA are not unique and also used in other qualitative methods, but these six phases can be used as guidelines to perform an extensive analysis. It needs to be mentioned that the phases are not linear, but can also be seen as recursive steps. The six steps are summarized in table 1 (Braun & Clarke., 2006).

Table 1 : The six phases of thematic analysis

Phases of thematic analysis	
Phase	**Description of the process**
1. Familiarizing yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis. Using thematic analysis in psychology.

(Copied from; Virginia Braun & Victoria Clarke (2006) Using thematic analysis in psychology, Qualitative Research in Psychology, 3:2, 77-101, DOI: 10.1191/1478088706qp063oa. Page 87)

By following these six steps of TA, including immersion in the data, labelling relevant phrases, sorting the labelled data, forming themes, elaborating on content of themes and finally providing a concise, coherent, logical, non-repetitive and interesting account of the data within and across themes will lead to trustworthy findings (Nowell, 2017) (Braun & Clarke., 2006). We will manually compare the identified themes with the NPT constructs to see if they are attributable to one of the proposed constructs. In TA the aim is to reflect the bulk of the data and not to focus on examples of text segments or on the prevalence of a given theme (Joffe., 2012).

In the results the processes by how findings are developed will be described and direct verbatim quotations from participants will be mentioned as a component of the final results. The verbatim quotations will be used to illustrate the process of the analysis and of the findings and this can improve the readability. In addition, a description of the substantive content of discussion, interaction between focus group participants or discrepancies in the survey response will be described.

The themes used in the research questions will be used to guide the coding process. An iterative process of data collection and analysis using a constant comparative method will be used, which leads to a more conceptual coding framework (Charmaz, 2014). The identified emergent recurring and/or salient themes and the inconsistencies will form the basis for recommendations for further development and implementation of the digital referral algorithm.

The qualitative analysis software MAXQDA Analytics Pro 2020 (Release 20.3.0) was used to organize and support the coding process. In the results a visual model of the relevant themes found will be shown for patients and healthcare professionals separately (figure 2 and figure 3).

The open texts from the different data sources (focus groups and surveys) were analysed by two independent data coders (ED, RB) following a TA and consensus on codes and themes is achieved. This improves the validity and reliability of the findings, because of triangulation of data and investigators (Golafshani., 2003).

3.5 Statistical method

Baseline characteristics of participants will be compared using an unpaired t-test for numerical data and a chi-square test for categorical data to identify differences between groups. Age and gender are included as baseline characteristics for all participants, and proportion of participating patients with an IRD is included particularly for the focus groups. To identify whether there were differences between frequency of mentioned themes between groups, also chi-square tests are used. A p-value of 0.05 indicates significance. In case there are any significant differences to be found, these will be considered during interpretation of results and mentioned in the discussion.

4. Results

In this chapter, the analysed results from the different perspectives, namely the patients' and healthcare professionals' perspective will be presented. First, the results of the focus groups will show the patient perspective. In the second section, the results from the healthcare professionals' perspective are presented. Within the different perspectives first a description about the respondents is given and second the open text questions are described and analysed. The closed ended questions are analysed but only mentioned if this is an addition to the open-ended question.

4.1 Patient perspective

4.1.1 Baseline characteristics

The baseline characteristics of the participants in the focus groups are shown in table 2. The mean age of the total group of patients was 52 years and ranged between 25 and 73 years; 69% was of female gender. These baseline characteristics were comparable between the groups (age: p=0.448; gender: p=0.077). Overall, significantly more patients with IRD were included in group 1 compared to the other groups (p<0.001). This was expected because for the third focus group there was a selection for non-IRD patients. The IRD diagnosed patients are patients with rheumatoid arthritis, psoriatic arthritis, and axial spondyloarthritis. The non-IRD diagnoses are fibromyalgia, arthrosis, and hypermobility.

Table 2: Baseline characteristics of patients in the focus groups

Focus groups			
	Focus group 1 (n=10)	**Focus group 2 (n=6)**	**Focus group 3 (n=10)**
Age in years, mean (sd)	58.0 (16.6)	45.0 (18.4)	49.9 (13.7)
Female, n (%)	6 (60)	5 (83)	7 (70)
IRD, n (%)	10 (100)	5 (83)	4 (40)

Note. The differences in diagnosis between the groups are not a problem, because all patients were referred to the rheumatologist and in the last group on purpose people without IRD were selected.

4.1.2 Themes

Four overarching themes were identified in the coded focus groups. 343 codes were made across three focus groups, with the themes "experiences", "facilitators", "barriers", and "implementation". In table 3 the distribution of codes between the focus groups is shown. The most codes are made in group three and the least in group two, which had the least participants. In focus group three also less facilitators and more barriers were identified, which shows this was a more critical focus group. No notable discrepancies were identified caused by the difference in real-life and digital setting. It is believed that data saturation is achieved, because no new themes were found when analysing the second and third focus group. Also, consensus is achieved between both researchers.

Table 3: Total set of patient codes separated between themes and groups

Patient codes					
	Total codes	**Individuals**	**Group 1(n=10)**	**Group 2(n=6)**	**Group 3(n=10)**
Total codes	(n=343)	(n=26)	(n=105)	(n=81)	(n=157)

Experiences, n (%)	146 (43)	23 (88)	20 (19)	28 (35)	50 (32)
Facilitators, n (%)	93 (27)	23 (88)	52 (50)	36 (44)	55 (35)
Barriers, n (%)	17 (5)	12 (46)	2 (2)	4 (5)	11 (7)
Implementation, n (%)	87 (25)	23 (88)	31 (30)	13 (16)	41 (26)

Note. This table shows all the codes found in the three focus groups divided by theme and focus group. The third column (vertical) represents the individual respondents mentioning a theme at least once.

All the codes and subcodes within the themes that are deducted from the focus groups are shown in figure 2. The definition of all the themes found in the analysis is given in table 4.
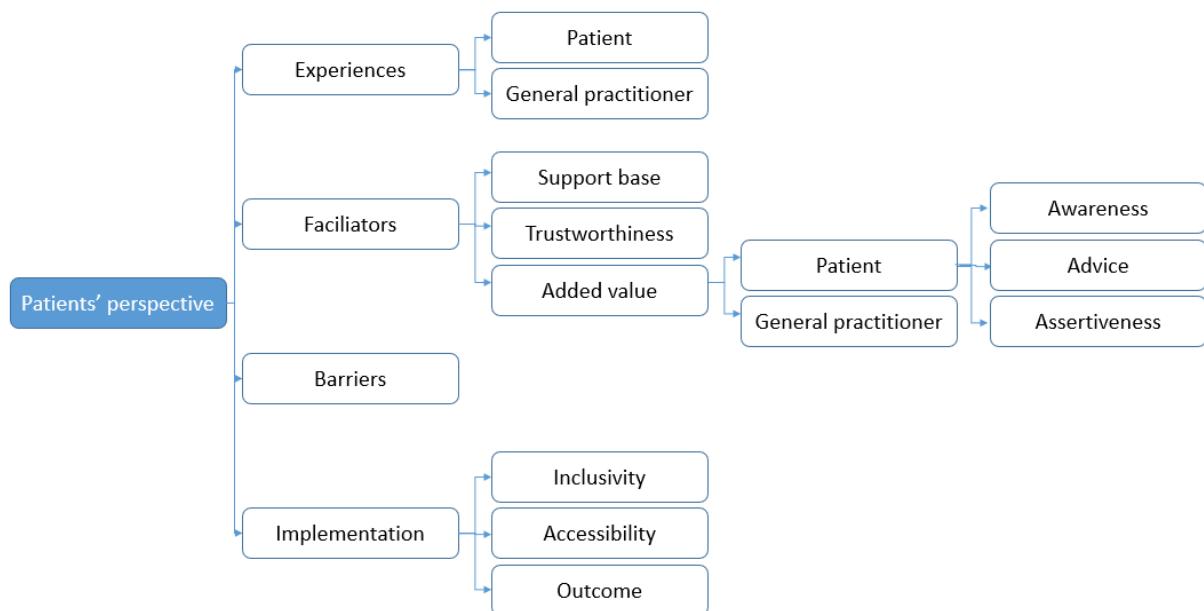
Figure 2: Overview of the overarching themes and subcodes from the patients' perspective
This figure gives an overview of all the themes and subcodes that are deducted from the focus groups, this is the result from the six phases of TA by two independent researchers (ED, RB).

Table 4: The definition of the five themes.

Definition of themes	
Theme	**Definition**
1. Experiences	The past experiences of the patients involving start of musculoskeletal complaints and experience with consulting a general practitioner for it. influenced by the general practitioner and their selves.
2. Implementation	Necessary changes that are expected to be realisable within or in addition to the original plan.
3. Barriers	Foreseen problems to the original plan, which are not solvable.
4. Facilitators	Reasons why the algorithm is seen as a possible helpful and maybe even necessary improvement.
5. Adapted consultation	The perspectives on changing a regular consultation into an online consult if risk on IRD is low.

4.1.3 Experiences

This theme does not consist of aspects of the digital algorithm as technical innovation directly, but contains fragments of text that describe experiences of patients with musculoskeletal complaints, from first signs to diagnosis. This theme is divided by two subcodes, Patients, and General practitioner, which are also shown in figure 2.

Patients

The patients describe that it is difficult to comprehend what rheumatism means, also the different medical specialists are confusing to differentiate. The first thing they noticed at the start of the complaints are too much pain, which causes stress and costs a lot of energy. Almost all patients mention that they google their complaints, mainly to know how they could alleviate the pain. However, the information they found is very broad or complex to understand.

"Many people google their symptoms. That may not always be a smart choice, but I think it is relatable to many people. You want to have something that can explain your pain."
(Respondent 6, focus group 18dec20)

General practitioner

The focus group participants describe their previous experiences with the GP both negative and positive. The negative stories are mainly about not being taken seriously and having to visit the GP numerous times before getting a referral. For example, patients complain about the fact that they are repeatedly told their complaints could be caused by stress or menopause, even if they find a plausible explanation of a specific diagnosis online. However, this is not limited to people who are at the age to experience menopause. Also, young people report the feeling of not being taken seriously, because of their age. The GP says they do not need to be referred to the hospital because chances on rheumatism caused disease are too low. The participants also report that the time before being referred to the hospital takes too long because the GP does not have appropriate knowledge about rheumatism. A lot of patients' blood test results show no abnormalities; however, they are still in pain and sent home, which for them does not feel like being helped.

"And I want to add something. There was nothing found when testing my blood, but because I took the initiative by googling pain and joint complaints I quickly came across fibromyalgia. I really wonder why I had to endure pain for eight or nine months before anyone said this to me... Why am I able to find this and a general practitioner is not?" (Respondent 3, focus group 11jan21)

The negative experiences are often described as recurring incidents, by which the trust and relationship with the GP is damaged and not easily restored. On the contrary the positive stories about the GP seem to lead to a positive relationship and better understanding of the patients' complaints. The positive experiences mostly enhance the GP listening and taking direct action. Patients describe situations in which the GP explains that referring to the hospital is not necessary but they feel the need to see a rheumatologist and get a referral because of this.

"I have a general practitioner who really helps; when I want to be referred and she is in doubt, she still refers me. She thinks that I have that right as a patient so she refers me." (Respondent 8, focus group 11jan21)

4.1.4 Facilitators

This theme consists of positive aspects about using a digital algorithm and reasons why there should be an algorithm that recognizes different causes of musculoskeletal complaints. Within facilitators there are three subcodes to be found: support base, trustworthiness, and added value. Which are also schematically shown in figure 2.

4.1.4.1   Support base

The focus groups revealed reasons why a digital algorithm should exist and when patients would like to use the tool. Since, the patients recognize the stories about living in pain without information what causes their pain. A tool like this can help to gather information about the patients' complaints. Furthermore, patients point out that they find it difficult to know when to visit a GP. They state that they would find a tool which guides them towards possible next steps helpful. Another reason for support for the tool is the desire for supportive information during the consult when they feel that they are not being heard by their GP.

"How do you find the information that going to the general practitioner is necessary? There should be a minus first line, before the first line." (Respondent 3, focus group 5okt19)

4.1.4.2   Trustworthiness

An important aspect of trustworthiness mentioned by patients is that doctors acknowledge the tool. According to patients, it is difficult to know which tool to trust, so a quality mark or logo from the NVR or a hospital would be desirable. Patients would like to see the outcome of the tool being taken into account by their GPs. Since the rheumatologists know best how to diagnose the different diseases and which treatments are necessary, they should help develop the tool. The patients also mentioned they will trust the algorithm if the validity, reliability, and specificity are adequate, this can be proved with such a quality mark by the NVR. When the above stated criteria are met, patients state that they would be willing to use the tool. This would be a considerable step towards successful implementation, as they are the intended users of the tool.

"I already said that I think it is important that the rheumatologists are behind it. That it is an acknowledged tool and not one of many on the internet." (Respondent 8, focus group 11jan21)

4.1.4.3   Added value

The added value code is separated between added value for GPs and patients.

Added value for GP

The patients state that the tool will have added value for the GPs, since they need to have knowledge on many diseases and this helps them to focus on musculoskeletal complaints. Even if the knowledge of the GP is not sufficient on rheumatology, this tool can assist them by giving extra information to make a distinction between different diseases.

"The general practitioners know a little bit about very many diseases, hence it would be useful that they know something more about this. And that such a tool exists." (Respondent 2, focus group 11jan21)

The patients also say that when the tool can be used at home before going to a GP, this can save work and time for the GP so focus can be shifted to the next steps that have to be taken in the medical process.

"But such a tool can be used to skip steps. How nice would it be if the general practitioner will be able to skip steps and refer you to the right specialist."(Respondent 3, focus group 11jan21)"

Added value for patients

Within the added value for patients code there are three distinctive elements that were found in the codes: assertiveness, awareness, and advice.

Assertiveness indicates the ability for patients to have greater control over their own medical journey. Some patients find it difficult to speak up to the doctor when they disagree on a decision. An outcome of an algorithm suggesting rheumatism could in these situations help them to convince their GP about the need for referral.

"I believe that this could really work, to stand your feet and push this in the face of your general practitioner with the message of: come on guys refer me. Help me." (Respondent 1, focus group 11jan21)"

There is also an added value for patients to be found in the motif of awareness. Patients say that at the start of the trajectory they did not know anything about the different specialists in the hospital and where to go with joint complaints. Some patients said a tool could help in having an idea of the profession of a rheumatologist and give an overview of all available information.

"What would have helped me a lot, was that if I had an overview of all that information together." *(Respondent 4, focus group 18dec20)*

The last element is advice whether referral to a rheumatologist is necessary or not. There are examples of patients who would have acted sooner or differently if they used a tool like this. These types of patients tend to ignore slight pain and feel like they just have to continue. A tool like this could be used to convince these patients about visiting a doctor. On the other hand, this tool could also be used in reassuring them that rheumatic disease is not likely and reference is not necessary.

4.1.5 Barriers

In this theme, opinions and explanations are given as to why a digital algorithm would not be used by patients at home.

Patients state that words like 'rheumatologist' or 'internist' deter them. The words and questions in the algorithm are also difficult to understand and an error is easily made. Some patients are afraid that a simple mistake can lead to not being referred to a rheumatologist. They state that mistakes can easily be made, as there is false information all over the internet, which is the main source of their information. A digital tool cannot replace a GP consult, because of the complexness of the disease.

"I just don't want to know, that word, rheumatic, I would avoid anything that has to do with it." *(Respondent 1, focus group 18dec20)*

They also think the tool is too short; just seven questions will be too general and not able to comprise the overview of their complaints. Other causes can be easily forgotten, because the tool will focus on a specific set of complaints and diseases.

"Instead of focussing on specific complaints, maybe the complaints are caused by something totally different. I would prefer going to the general practitioner." *(Respondent 4, focus group 18dec20)*

4.1.6 Implementation

This theme consists of the aspects proposed by patients of what is needed to implement the digital algorithm. Which things need to be adapted and what should be in it for the tool to be successful. The theme is separated by three subcodes: outcome, availability, and inclusivity. These are schematically shown in figure 2.

4.1.6.1 Outcome

This is about the outcome that is generated when filling in the digital algorithm from home. Patients want to have a broader outcome than only the indication whether visiting a rheumatologist is necessary or not. They prefer the tool to demonstrate an outcome on all the possible diseases and it should be connected to advise on further diagnostic workup.

Patients desire an outcome which also gives some information about the possibilities of different causes and explain the aetiology of it. Patients emphasize that the outcome should also explain that a rheumatologist is not only focused on rheumatic disease, but can also help with other disease, for example fibromyalgia.

"Thus, what a possible good sidenote would be is that also with other pain and joint complaints a visit to the rheumatologist may be helpful." *(Respondent 1 Focus group 18dec20)*

"For me it is very important that in the tool a link is made that if there is no expectation of rheumatic cause, that it could be fibromyalgia. That link should be made in the tool." *(Respondent 3, focus group 11jan21)*

4.1.6.2   Availability

This code is about where patients think they should find the tool, several options were suggested. The most mentioned option is finding it through Google. Patients will not immediately think of joint complaints or rheumatic causes, so the tool must be available through a broad search strategy on Google.

"In first instance you don't think about rheumatism, so you won't look at rheumatism website, but just at Google." *(Respondent 2, focus group 18dec20)*

The tool should be found via the GP, it was suggested the tool could be handed over during the first visit to the GP. This tool could be integrated in the system of the GP, so they can use it together with the patients and the GP is aided with the tool.

"I think it is more important that when you visit the general practitioner and your blood is tested, you get the list with questions." *(Respondent 1, focus group 5okt19)*

"I think that if a general practitioner uses Google or looks into an online dossier for specific complaints, the questions could be integrated in their systems. So that it pops up in the screen of the GP." *(Respondent 3, focus group 11jan21)*

The tool should be integrated in already existing websites with information about joint complaints, like thuisarts.nl or reuma.nl. These websites are reliable because they are made by GPs and rheumatologist. If such a tool is found on that website, they would have high trustworthiness. The website of the hospital could also be a good option.

4.1.6.3   Inclusivity

This code is about patient suggestions of how the tool should be displayed and for whom. Some older patients say that using the internet for searching their complaints is difficult and confuses them. They would like to go to the GP for their complaints and fill in the tool together with the GP. The tool should contain simple language and should not take longer than ten minutes

"You have to make it as accessible as possible." *(Respondent 10, focus group 5okt19)*

"I think older people will often not understand an online tool that quickly." *(Respondent 6, focus group 11jan21)*

4.2 Healthcare professionals' perspective

4.2.1 Baseline characteristics

The baseline characteristics of the respondents for the surveys are shown in table 5. In total of 333 surveys filled in by healthcare professionals were included. Baseline characteristics did not differ between groups.

Table 5: Baseline characteristics of healthcare professionals.

Survey			
	Rheumatologists (n=104)	General practitioners (n=111)	Physiotherapists (n=118)
Age in years, mean (sd)	44.9 (8.9)	43.3 (12.0)	41.0 (13.8)
Female, n (%)	52 (74)	46 (61)	32 (48)
Working at academic hospitals, n (%)	10 (13.9)		

The closed question on how many patients being referred to the rheumatologist are suspected to have an IRD is answered by rheumatologists with a mean of 31,2% (sd of 20,8) and by GPs with a mean of 40,0% (sd of 23,38). This shows that the GP also refers patients that are not suspected to have an IRD.

4.2.2 Themes

Within all surveys, 897 individual codes are identified across the 333 surveys. Four main themes could be identified: "facilitators", "barriers", "implementation", and "adapted consultation". The definitions if all the themes are given in table 4. Adapted consultation only involves the rheumatologists group. The number of codes per theme are shown in table 6.

Table 6: Total set of patient codes of different themes and number of individuals mentioning a theme at least once.

Healthcare professionals combined		
Themes	Total codes (n=897)	Individuals (n=333)
Facilitators, n (%)	153 (17)	125 (38)
Barriers, n (%)	207 (23)	136 (41)
Implementation, n (%)	469 (52)	175 (53)
Adapted consultation, n (%)	68 (8)	67 (20)

Note. This table shows all the codes found in the surveys divided by theme. The second column (vertical) shows the individual respondents mentioning a theme at least once. For example, 125 healthcare professionals mentioned something that is codes within the facilitators theme.

All the themes, codes and subcodes that are deducted from the open-ended survey questions based on the the six phases of TA by two independent researchers (ED, RB) are shown in figure 3.
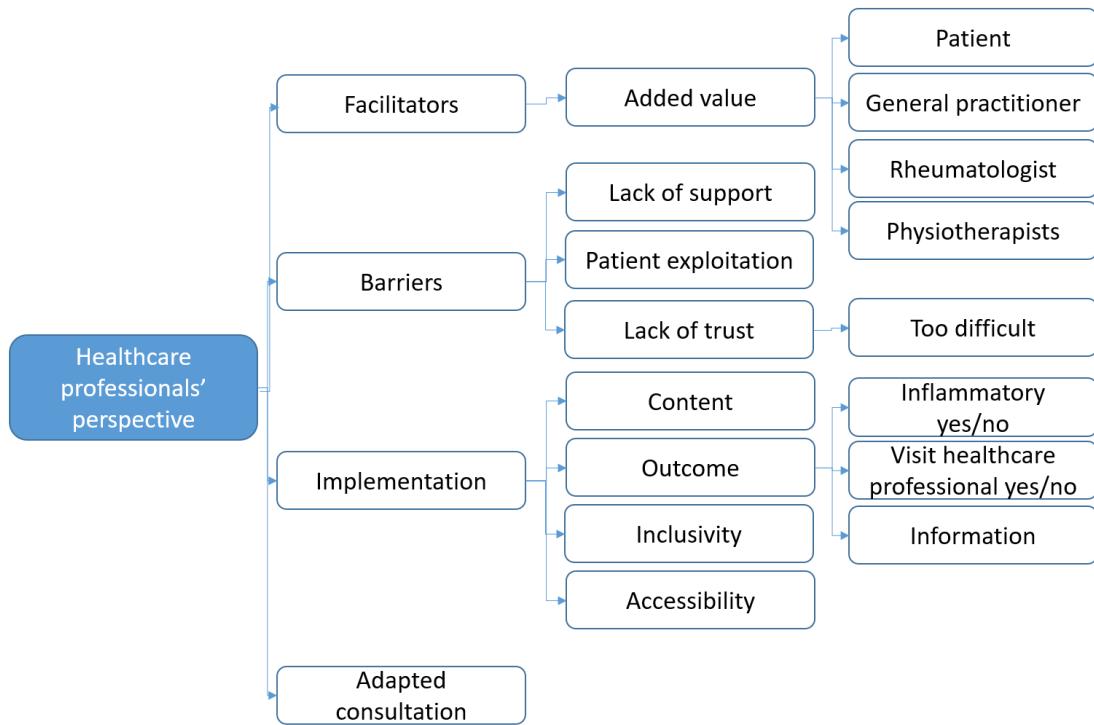
Figure 3: Overview of themes and subcodes from the healthcare professionals' perspective
This figure gives a overview of all the themes and subcodes that are deducted from the open-ended survey questions, this is the results from the six phases of TA by two independent researchers (ED, RB).

Figure 4 visualizes the themes mentioned by the different healthcare professional groups. The most noticeable is that the rheumatologists mentioned more barriers.
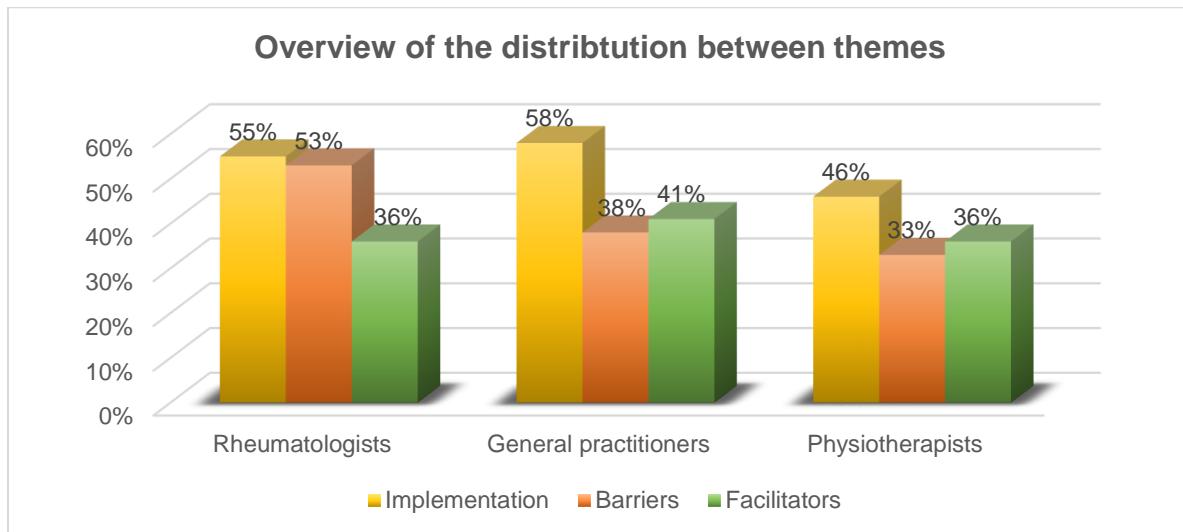
Figure 4: Overview of the different healthcare professionals mentioning something at least one within a theme.
Note. A chi-square test run between the different codes and profession shows that rheumatologists have significantly less issues in implementation (p=0.025) compared to the other healthcare professionals, no differences are found in barriers (p=0.180) and rheumatologists mention less issues in the facilitators (p=0.031). In a thematic analysis only things mentioned can be analysed. This does not mean that the other part of the professionals are in favour or against the implementation of a referral algorithm.

4.2.3 Facilitators

This theme consists of all positive aspects about using a digital algorithm. In figure 4 the distribution of the theme facilitators is shown across the healthcare professionals. It shows that the healthcare professionals in general agree with each other on the facilitators of the algorithm. In supplementary file 3A the distribution of the facilitators is shown across the rheumatologists, GPs and physiotherapists

The theme facilitator consists of different subcodes (figure 3), namely added value for patients, GPs rheumatologists, and physiotherapists.

4.2.3.1   Added value for the patient

Among the theme added value, most frequently the patients were mentioned to have the most benefit. There were no differences found between the perspectives of the different healthcare professionals on the added value for the patient. The healthcare professionals explained added value by mentioning that the patients will get more information about their complaints, that might prepare them better before a medical consult. Patients might be able to make appropriate expectation of their visit to a doctor and this can lead to better understanding of what the doctor can and cannot do. This might increase shared decision making and getting control about their own healthcare. The GPs mention that the tool can be used to reassure the patient in case specialist referral is not considered necessary. Physiotherapist believe that using this tool will speed up the referral and appropriate treatment plans for patients.

"It can alter the expectation of some of the patients that every joint complaint needs to be seen by a rheumatologist." (by rheumatologist respondent 42)

"It could lead to less inappropriate referrals at request of the patient and better reassurance." (by GP respondent 47)

4.2.3.2   Added value for general practitioner

Rheumatologists and GPs state that the tool could help in improving appropriate triage because it helps to make a distinction between inflammatory and non-inflammatory cause of complaints. For GPs, the tool can be used as confirmation of their clinical considerations and probably helps them in reassuring the patient.

"Hopefully the tool can convince the patient that there is no indication for referral to the rheumatologist. The sense and nonsense of additional research like a blood test and X-ray could be better explained." (by GP respondent 23)

4.2.3.3   Added value for rheumatologist

The healthcare professionals show consent about the added value for rheumatologists. A digital algorithm can support making a better distinction between inflammatory and non-inflammatory diseases and decrease inappropriate referrals of patients. Insight in urgency of the complaints can help in differentiate which patients need to be looked at first. Knowing this in advance could also give rheumatologists more time for patients with higher probability of IRD. Rheumatologists mention that a lot of patients can achieve appropriate assistance in the first line of care and that the algorithm can filter the chronic pain and fibromyalgia patients who can be helped in the first line.

"Reducing inadequate referrals and improve meaningful care." (by rheumatologist respondent 7)

4.2.3.4 Added value physiotherapists

The physiotherapists report the possibility of using the tool during a first consult when they might suspect IRD and their knowledge is not sufficient.

4.2.4 Barriers

This theme consists of all the challenging aspects about using the digital algorithm by patients. In supplementary file 3B the distribution of the barriers is shown across the rheumatologists, GPs, and physiotherapists. In figure 4 the distribution of the theme barriers is shown across the healthcare professionals. It shows that some more barriers are found by the rheumatologists and some less by the physiotherapists, which is also shown in the representation of the results.

The theme barriers consist of different subcodes (figure 3), namely lack of support, patient exploitation, and lack of trust with the sub-subcode too difficult.

4.2.4.1 Lack of support

This subcode consists of opinions and explanations of why healthcare professionals would not support using a digital algorithm in the currently proposed format.

There is disagreement within rheumatologists because some (40%) believe this will not help patients in their healthcare process and their outcome. They state that the algorithm is focused on making a distinction between inflammatory and non-inflammatory disease which will only protect the workload of the rheumatologist and not help the patient. Rheumatologists that mainly foresee barriers, emphasize that rheumatologists are also capable of diagnosing and helping patients with non-inflammatory disease. The patients request for help is not overcome by saying something is inflammatory or not; they should be helped by a diagnosis and appropriate treatment plan.

"In your view, a rheumatologist is the specialist who is engaged in determining and treating inflammatory diseases of the musculoskeletal system. I have to disappoint you. That is not the job of the rheumatologist. The profession of the rheumatologist is to find, together with the patient, a cause for the trauma and persistent complaints of the posture and musculoskeletal system." (By rheumatologist respondent 6)

GPs believe that an online tool can be used as an extra argument for a patient to suspect IRD without there being a rational for actually having inflammatory disease. The diagnosis on joint complaints and IRD should stay with the healthcare professional and should not be done by patients themselves with a digital algorithm. The GP should be helped in adequate recognition of inflammatory causes.

4.2.4.2 Patient exploitation

This subcode consists of all codes about patients that will use the tool inappropriately to argue what they need. The GP and physiotherapist believe that there is a possibility for patients to fill in the algorithm so it generates a preferred outcome. Patients can use the tool to get a referral and it will become more difficult for the GP to deviate from the self-directed outcome.

"The pitfall is that they fill it in according to their wishes and then it turns out that they should be referred." (By GP respondent 18)

4.2.4.3 Lack of trust

This subcode involves all the healthcare professionals that do not think this tool will succeed in making an adequate or valid distinction between inflammatory and non-inflammatory disease.

The healthcare professionals are in consent about the main message, but emphasize different topics in this code. Rheumatologists emphasize the tool should be tested on effectivity, sensitivity, specificity, and validity. It is important that evidence about the effect of the algorithm is gathered and analysed. They also warn for possible delay in appropriate referrals which can have consequences for the health of the patients.

"First test the algorithm in practice." (By GP respondent 74)
"Publish data on sensitivity/specificity first." (By rheumatologist respondent 76)

Some of the GPs (21%) emphasize that their patients will not understand a digital algorithm assessing their joint complaints and think this tool will increase referrals instead of decreasing. Also, the rheumatologists say that tool does not look like it can make proper distinction between patients with or without IRD. The tool must be validated by rheumatologists, proven to be effective, and it should be according to the guidelines of the National Society of General Practitioners/Nationaal Huisartsen Genootschap (NHG).

The physiotherapists emphasize that patients in pain will not be content with the outcome of a tool indicating their complaints are inflammatory or not, these complaints are too complex to grasp in a tool like this.

4.2.4.4 Too difficult

This sub-subcode of lack of trust involves warnings about a digital algorithm being too difficult for patients to use without the expertise of a GP.

The healthcare professionals say that patients interpret their own body incorrect, they find deviations or symptoms that are not there and miss those who are. Patients will have difficulty understanding medical terminology and they will exaggerate the redness, warmth or swollenness of joints. There are many rheumatologists who doubt the capability of patients to assess what is causing their complaints and they will not be able to use the tool appropriately. The GPs and physiotherapists mention that patients are not trained to give proper attention to the important information, but will focus on what they think they have. Furthermore, patients are not capable of explaining their complaints like tiredness and other general complaints within the proposed tool.

"There is often poor knowledge of one's own body, you frequently find abnormalities during physical examination that the patient is not aware of." (By rheumatologist respondent 15)

"Too difficult for my patients. What is inflammatory backpain, NSAID? Etc etc" (By GP respondent 53)

4.2.5 Implementation

This theme consists of advice and opinions from the healthcare professionals about the optimal implementation of the current algorithm. In supplementary file 3C the precise distribution of the implementation codes is shown across the rheumatologists, GPs and physiotherapists. In figure 4 the distribution of the theme implementation is shown across the healthcare professionals. It shows that the GPs have more things to say about the aspects of implementation, which is also found in the analysis of the text.

The theme implementation consists of different subcodes (figure 3), namely content, outcome, inclusivity and availability.

4.2.5.1 Content

The aspect of content encloses the specific questions asked in the algorithm and the adequacy of those. Most of the healthcare professionals have consensus and agree with the included

questions but some additions are suggested. Shared suggestions are a question on symmetrical complaints (5% of rheumatologists and GPs) and a question on the redness and warmth of the joints (5% of rheumatologists and GPs). A question about fears and feelings of patients and why patients think they need help and what has already been tried to alleviate complaints is suggested. Next to this, the algorithm should be made easier to understand for patients. GPs say the tool needs to be consistent with NHG guidelines. A rheumatologist and physiotherapist suggest using a Visual Analogue Scale (VAS) to score pain. The physiotherapists emphasize questions about the moment of complaints and which activities influence the complaints, which daily activities are limited because of the complaints.

4.2.5.2   Outcome

With outcome, the result that follows after filling in the digital algorithm is meant. This subcode exits of three sub-subcodes: risk on IRD yes/no, visiting a doctor yes/no and information.

4.2.5.2.1   Risk on IRD yes/no

Rheumatologists and GPs both suggest that the outcome must consist of a risk score on the chance of having IRD or a non-inflammatory condition together with the prevalence of conditions. This risk score should contain the probability of having an IRD together with the a posteriori chance. Physiotherapists say the outcome should contain the expected kind of rheumatism.

"Statistical expectation that a rheumatic disease will be the cause." (By GP respondent 69)

4.2.5.2.2   Visiting a doctor yes/no

The healthcare professionals mostly agree that the outcome should contain the advice to visit a GP or not so the GP can decide if seeing a rheumatologist is necessary. The GP can then use the outcome together with his own expertise to determine whether referral is necessary. With a negative score on IRD, the outcome should contain the advice that consulting a rheumatologist is not necessary. A few GPs and physiotherapists say that the outcome should contain the advice of seeing a rheumatologist if the score is positive.

"That a negative outcome on inflammatory arthropathy does not require a consultation with the rheumatologist." (By rheumatologist respondent 42)

"The outcome should consist if a visit to the GP is necessary. The GP then determines with the patient whether referral is useful." (By GP respondent 88)

4.2.5.2.3   Information

This subcode exists of all the codes that suggest extra information supplemental to the previous two components in the outcome.

The outcome should contain advice what actions patients can undertake to resolve their complaints if the outcome is they are not at risk for IRD. Additionally, the advice to visit other first line care like physiotherapy or ergotherapy should be given.

"Advice on what the patient can do; but also advice to visit your doctor. General tips, perhaps an option of, for example, appoint occupational therapy." (By rheumatologist respondent 36)

The outcome should contain information on the possible diagnosis that causes the complaints and information on inflammatory and non-inflammatory causes of joint complaints. It needs to consist of an easy-to-understand policy what the patient can do and why he or she should do it. The outcome needs to be focused on all the patients using the tool and not only when there

is a risk for IRD. A clear explanation why a rheumatologist should not be visited in case of non-inflammatory causes needs to be given so this can help to reassure the patient.

In some cases advice to visit first line care providers like physiotherapy or ergotherapy is given by all groups of healthcare professionals. It is mentioned these treatment options are often missed by patients but can be very helpful.

"Various diagnoses that can cause the complaints." (By GP respondent 24)

"The decision aid should also include information about all the treatment options available in primary care, that people do not have the feeling that it is a rheumatologist or 'nothing'." (By GP respondent 51)

"Clear advice, especially with fibromyalgia because there is often a lack of clarity. " (By physiotherapist respondent 100)

4.2.5.3   Inclusivity

This is about the people that use the digital algorithm. The biggest problems that can be noticed from the codes is low literacy and immigrants that will not understand the questions. Medical terminology should not be part of the tool and it needs to be understandable by everyone, also low schooled and non-Dutch speakers. Another problem is that there are people, especially elderly, that are not used to computers and internet and can have difficulties in using and finding the algorithm.

A proposed solution is trying to create an audio or visual route to help understand the questions.

"A lot of patients in the Netherlands are low literate, they cannot handle text and for that it would probably work better via audio or visual route " (By rheumatologist respondent 103)

4.2.5.4   Availability

Availability is about where and how the digital algorithm should be used. The digital algorithm is originally developed to use for patients at home, prior to visiting a doctor.

There are a lot of remarks coming from all healthcare professionals on the availability of the digital algorithm for patients at home; the general practitioner should use it to improve their appropriate referrals. The patient will not have the knowledge to appropriately use a digital algorithm about the distinction between inflammatory and non-inflammatory causes, as this is very complex. Next to this, a patient in pain should always be seen by a GP regardless of inflammatory or non-inflammatory causes.

"I think a patient with pain always wants to know what it is and have that assessed by a doctor. The patient does not necessarily have to use a decision aid. The general practitioner maybe does." (By rheumatologist respondent 52)"

"A decision tool may be useful for a general practitioner. " (By GP respondent 43)

Almost all GPs and physiotherapists suggest that the tool should be integrated in thuisarts.nl, HIS, Intramed or the Electronic Health Record (EHR). This will help to use it without needing extra time or effort, without integrating in the current systems this will be a big issue. GPs emphasize that cooperation with the NHG and implementing it in their standards should help to use it in daily practice. A few GPs and physiotherapists also mention that the tool can be useful for patients to use together with their healthcare professional in the first line of care.

"Integration in systems is necessary otherwise the time pressure is too high because of registration." (By physiotherapist respondent 82)

4.2.6 Adapted consultation.

This theme is a result of the questions about changing the healthcare consult as outcome of the digital algorithm and the opinion of changing to an online consult if the risk on IRD is low. Within this theme sub-codes are made to separate the positive and negative answers regarding online consult. 20 codes are appointed to facilitators and 48 codes to barriers. This can also be seen in the closed ended question, for example the question in figure 4.

The use of the algorithm will mostly affect the current method of work for physiotherapists and GPs, because it could help indicate IRD and increase referral. The question in figure 4 is asked to find out if rheumatologists would also be willing to change their current way of work if no IRD is expected. For example, a shorter consultation or an online consult with patients. This will also decrease workload of the rheumatologist without the patient being denied a referral.


PERCENTAGE OF RHEUMATOLOGISTS WILLING TO CHANGE THEIR METHOD OF WORK AS RESULT OF THE OUTCOME

■ Absolutely ■ Maybe ■ Neutral ■ Maybe not ■ Absolutely not
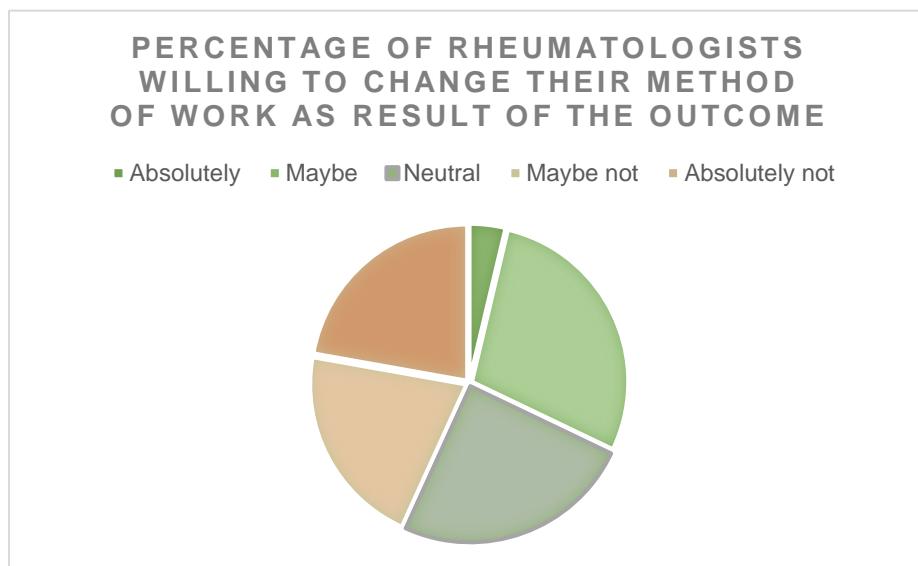
Figure 4: Closed ended question about adapted consultation
Note. This is one of the closed ended questions in the survey to rheumatologists. It shows that only a small part of rheumatologists is willing to change their current way how they work depending on the outcome of the algorithm.

A part of the rheumatologists is willing to try a pilot to test if this can be effective and it is suggested this can be complementary to the current triage system. It can be used to assess if the patient needs to see the rheumatologists or not.

"It seems like a good idea to me, my experience is that with a good anamnesis you can distinguish very well between who you should and should not see." (By rheumatologist respondent 102)

The bigger part of the rheumatologists say they do not prefer an online consult because they can easily miss essential information of the joints of patients. They state that physical examinations are necessary for a sufficient consult. The other problem is that the rheumatologists say that patients want to see a doctor in person and will not be satisfied with an online consult.

Another argument against an online consult is that some rheumatologist doubt if this takes less time than doing a regular consult, but probably will have less outcome.

"Doubtful whether this is sufficient, return on a physical consultation is higher and time investment is probably comparable." (By rheumatologist respondent 46)

5. Discussion and conclusion

In this chapter the research questions will be answered by interpreting the results found by the surveys and focus groups. Secondly, a comparison with existing literature is given. Thirdly, strengths and limitations of the research are discussed. Fourthly, recommendations will be given on the practical implementation and on future research. Finally, we will answer the main research question.

5.1 Interpretation and answering the research questions

The main objective of this study was to gain insight if and how a digital algorithm for patients with musculoskeletal complaints should be implemented to be used by patients from home. The next section will give a brief summary of the focus groups and survey followed by answering the sub-questions, this will help to address the main objective.

The focus groups have given interesting insights in the experiences of the patients, many of them reported to experience some sort of diagnostic delay because of their own knowledge or lacking knowledge of their GP. These experiences brought about the overall support of a digital supportive tool, the tool can improve care being organized around them as patients and maybe improve the relation with their GP. On the contrary patients think they are not able to use the tool correctly, they do not have any medical knowledge and find it difficult to assess their complaints.

What are the barriers and facilitators in using a digital algorithm from a patient perspective?

The differences between the baseline characteristics of the focus groups are not believed to influence the results and conclusion of this research, because all the patients had experienced the referral to the rheumatologist. Saturation of data was achieved and no extra information was expected in doing more focus groups. First, the barriers will be discussed. It was found that patients mainly fear the possibility of using the tool incorrectly, and thus will receive an inadequate referral. Patients are also afraid that by using a tool in general other possible diagnoses are skipped and not taken in consideration anymore. Patients do not believe that all GPs will accept the outcome of the tool because not every GP is open to information a patient brings in.

There is a big support base among patients for a supportive tool which is organized around the patient. Pain was found to be the main reason for using the tool, this is their motive to act and search for a solution. Cooperation with the GP can be improved by using this tool together. The tool would be welcomed when it is a validated tool advised by doctors, like on the website www.thuisarts.nl. There is also added value in using the algorithm for GPs in providing knowledge about IRD, which will improve and speed up their decision making. For patients there is value in increasing awareness about IRD, advice where to gather information for the right diagnosis and increasing assertiveness to speak up and act.

Because of the high response rate, the surveys show an extensive reflection of the different healthcare perspectives. It is found that the healthcare professionals believe the algorithm can add value to patients, GPs, Rheumatologists, and physiotherapists. However, the survey also shows some fundamental barriers, the disagreement on treatment, misuse by patients, lack of trust in making distinction on IRD and non-IRD, and patient finding it too difficult to asses their complaints.

What are the barriers and facilitators in using a digital algorithm from a healthcare professional perspective?

The differences in the codes found between the healthcare professionals show that there is a discrepancy of support between the different professions. However, the differences within the professions are most interesting. There seems to be a lack of support because a part of the healthcare professionals feel also non-IRD patients should be seen by a rheumatologist. The disagreement between rheumatologists on which patients should be treated by a rheumatologist is very relevant for the implementation of an algorithm. Around 40% says their job is also to help patients with other diseases, while the most common other diseases can also be treated by a GP. Rheumatologists will not be willing to implement a referral algorithm if they do not agree on which treatment should be treated by them.

At first it was expected that the most barriers for implementing such a tool would come from the GPs, because together with the patients they are expected implement the most changes to their current way of work. Inadequate referrals to the rheumatologist are expected to decline and thus the biggest support base was expected to be among rheumatologists. This appeared not to be true, 53% of the rheumatologist found barriers in this algorithm being used by patients in contrast of 38% of the GPs and 33% of the physiotherapists. This is relevant because the patients find it important the tool is supported by the rheumatologist, since they are the most specialized in the treatment of this complaints.

Without appropriate testing of the algorithm on aspects like effectivity, sensitivity, specificity, and validity, the healthcare professionals will not have confidence in the tool. Another reason why there is a lack of trust from healthcare professionals is that such a tool would be too difficult for patients to use. Patients are not capable of assessing their complaints objectively and understanding their own body without the help of a doctor. Next to not understanding the tool correctly, another problem is that patients fill in the algorithm incorrectly on purpose so they get the desired outcome indicating a referral.

There is added value found for patients, GPs, rheumatologists, and physiotherapists in using an online algorithm. For patients, the tool can increase awareness about rheumatism and it may help in preparing a consult with the doctor. General practitioners should use the tool to support their decision-making process by using it to distinct whether or not IRD is suspected. The tool should also be used to invigorate their decision to better convince patients in case that referral is not necessary. Rheumatologists will have less inappropriate referrals and will have more time for patients that cannot be helped in the first line of care. Physiotherapists can use to tool when they expect a rheumatic disease but their knowledge about IRD is insufficient.

The focus groups and surveys also gave a lot of comments not classified as facilitator or barriers, but as implementation. The outcome of the tool should, regardless of risk on IRD, contain information on what the patient should do as next step. Also, the algorithm needs to be available on a trustworthy website and easy enough to understand to be inclusive for all people. The content of the tool is seen as mostly complete but a few extra questions are suggested. These comments are on aspects of the implementation process or on the algorithm, which can be used to answer the last sub question.

What actions could be taken to increase the usability, awareness, availability and acceptability of this referral algorithm among patients and healthcare professionals?

The majority of codes from the surveys and the focus groups are about implementation of the tool. Patients mentioned the availability of the tool to be the most important aspect for successful implementation. For the healthcare professionals most comments are made about the content and the outcome of the algorithm. In both perspectives, there was consensus on

the fact that the algorithm must be inclusive for all possible patients. Furthermore, it should be easy to use for non-Dutch speakers, older and low literate people as well. The tool needs to be available from a trustworthy website or be used together with the GP. There is a general consensus on the content of the tool; suggestions were made on adding some questions about redness and warmth of joints and whether the complaints are symmetrical or not. The content should also be better understandable for patients, in such a way that patients feel they are being taken seriously.

To solve the problem of difficulty, inclusivity, and availability, we suggest to implement the tool in the system of the GP. This is in contrast to the original plan of implementing the tool only for patients available from home. This is also beneficial for GPs, as it solves the problem of when GPs have insufficient knowledge about IRD. The GP agrees with the idea of using the tool together with patients to increase quality of the consult. Especially because it offers a helping hand in case of insufficient knowledge about IRD.

To increase the acceptability of the algorithm, the outcome must be broader than only making a distinction between IRD or not. All patients who use the algorithm need to be seen by a healthcare professional, regardless of whether they have an IRD or not. Nonetheless maybe the expensive outpatient care of the rheumatologist can be prevented. The chance of having an IRD should be given as outcome of the tool so that the patient receives more information on what they might expect. GPs emphasize that the outcome – in case the tool is used from home - should not enclose the recommendation to see a rheumatologist because this will increase questions to be referred; instead, the outcome should recommend to see a GP. The most essential change that has to be made in the outcome is that the tool should offer more information about the possible disease. The patient should be informed about other possible actions in case there is a low risk of IRD, such as visiting other first line care providers, for instance a physiotherapist.

5.2 Reflect our results with literature

It is known that referral tools used by patients can be an addition to referral tools implemented in the first line of care (Proft et al., 2020). The tool would receive more support if the tool is already implemented with the GP before making it available for patients from home (Proft et al., 2020). So, it appears to be a good idea to implement the algorithm within the system of the GP firstly and as a next step implementing it for patients from home.

The most important barriers that are found can be matched to the constructs of the NPT. The barriers caused by the disagreement of the healthcare professionals on treatment of non-IRD patients fits in with the first construct of coherence. The rheumatologists' opinions differ on if the tool should be used, because the distinction of IRD does not matter to some rheumatologists for referral to be necessary. The barriers caused by using the tool from home by patients fits in with the second construct of cognitive participation. In this case the participants of the tool doubt about being able to use the tool even if improvements are made. But in the case the algorithm is implemented in the GPs practice, this also fits in the construct as a facilitator. Lastly, the barriers of testing on effectivity fit in with the fourth construct of appraisal work. The users of the algorithm want to reflect on the new algorithm and ascertain the effectivity. The facilitators can also be matched with the constructs of NPT. The support base found for and by patients can be placed in the construct of coherence. Since this is the reason for healthcare professionals and patients to change the current situation without an algorithm. The facilitator of the GP and patient cooperation being improved because the

algorithm can lead to a better-informed patient and a GP who can use to tool to convince patients is difficult to fit into a construct. It is a matter of coherence, because it is a reason to use the algorithm. But it also fits in with cognitive participation, because the improved cooperation can lead to a better acceptance of the algorithm. The third construct of operational work does not seem to fit in with the algorithm as innovation, no specialized skilled work is necessary from this groups.

Instead of only focussing on the healthcare professionals' perspective, this study also included extensive patient perspective. Recent developments show that patient participation has become increasingly more important in healthcare research (Vahdat et al., 2014). This is supported by the findings of the current study, because the insight in the thoughts and reasoning of patients led to new insights. This research is performed from the rheumatology department with a certain mindset on adequate referrals and what a patient needs, but the patient's wishes can sometimes be totally different. Especially the conversations between patients in the focus groups discussing their experiences with each other gave a very interesting view on how they see the healthcare system. In general, the patients in this study find the hospital and different medical specialities difficult and confusing.

The quality of care is rated higher when there is patient participation (Arnetz et al., 2009). On top of that there are improved treatment outcomes that are associated with higher patient participation (Arnetz et al., 2009). In this research we found that using a patient perspective in assessing problems in the current situation is very helpful. Since the focus groups show that the outcome desired by patients is not always the same as the outcome that healthcare professionals think patients desire. The patient wants to be heard and cooperate together with the GP instead of being told what to do.

The results suggest that the proposed tool can increase shared decision making. This coincides with literature findings, where it is also shown that health outcomes for the patients and benefits for healthcare professionals are achieved if shared decision making improves (Tourignant-Laflamme et al., 2017) (Oshima et al., 2013).

Behavioural change that is necessary for successful implementation (Fleuren et al., 2004) is possible for using the proposed digital algorithm. The results provide support for using the algorithm if some changed are made. We believe that the support is great enough that behavioural change can be accomplished. The proposed changes will decrease burden on the already occupied GPs, which is necessary because change mainly takes place at the GP.

5.3 Strengths and limitations

Strengths

The broad use of the focus groups creates a unique and holistic understanding of the problems and desires the patients experienced. The focus groups have shown that the patient perspective can contribute to developing a tool with the optimal outcome. In the surveys the large quantity of randomly included healthcare professionals represent the overall group of professionals sufficiently (Weller et al., 2018). The major strength of this study is the large quantity of data that is collected with different research methods. The different methods can be combined to give an overall understanding of complex problems in the care sector by combining the patient and healthcare professional perspective. The open-ended questions in the online survey have proven to create well enough opportunity for the healthcare professionals to share their thoughts. The focus groups led to dynamic discussion between

researcher and patient and between patients. The thorough thematic analysis of all texts by two different researchers enable that the findings are reliable and complete. The combination of the extensive analysis of the focus groups and the high response rate of the survey creates a clear perception of the complex problems that arise in the health system for patients with musculoskeletal complaints.

Limitations

The main limitation of this study is the generalisability. The Dutch healthcare system where GPs act as important gatekeeper before a patient visits the secondary care is only comparable to countries with a similar healthcare system. Besides, the issues that arise with musculoskeletal complaints are not comparable with complaints from another origin. This means that this implementation study cannot easily be compared to implementing a tool for other causes of complaints. The cost effectiveness of using this algorithm is still unclear, which is an important aspect of implementation. For example, health insurers will not invest in a tool of which outcomes on this aspect are not yet known. So future research is necessary on cost-effectiveness.

The differences found in the diagnosis of the participants in the focus groups are significant which can have an influence on the results produced by this focus group. We believe this is not a problem, because all the patients are referred to the rheumatologists regardless of their diagnosis. All findings in the separate focus groups did not opposite each other but substantiate each other.

The use of theory in this research could be more extensive in interpretation of the results, the NPT is used to classify barriers and facilitators across constructs. But theory could also be used in the elaboration from data to the barriers and facilitators and into the development of the optimal implementation strategy. However, the NPT was not appropriate for the implementation of a tool to be used by patients from home, but is believed to be more appropriate in the implementation of larger processes.

5.4 Practical recommendations and future research.

In this section first some practical recommendations about the tool, which will deal with the most important barriers, will be given. Secondly some advice is given for future research that should be done.

Practical recommendations

The GP does not want to spend money without getting it reimbursed to implement a tool in his current system. First a collaboration has to be realized with the NHG and health insurance companies. When this collaboration is realised, the tool could be part of the normal guidelines and this will not lead to much extra work for already busy GPs. The health insurance companies can assist and improve an integration, because they can decide to reimburse GPs for using a tool that improves appropriate referrals. The insurance companies will likewise have less costs if less inadequate referrals are made to expensive outpatient secondary care.

Secondly, the outcome of the digital algorithm needs to be broader. This will improve the already existing support base. Broader outcome means that there should also be an outcome if the expectation is something else than IRD. This patient also needs to receive care at the right place and probably needs to be seen by a GP and referred to a place where the right care is received.

Thirdly, the disagreement between rheumatologists should be discussed and not lead to different treatment of patients when they visit a rheumatologist. The rheumatologists should revise their guidelines on the treatment of IRD and non-IRD patients according to future research.

Lastly, to assist the in the treatment of patients with musculoskeletal complaints the physiotherapists can be seen as a good candidate. They have enough time to listen to patients and the skill to provide appropriate care, but are now not always used in the care of patients. Especially this can be a solution in the care of patients with other causes than IRD, who sometimes need the confirmation of a healthcare professionals and the feeling they are taken seriously.

Future research

To improve the support across healthcare professionals a study on validity and effectivity of the tool should be done with patients that visit the GP with musculoskeletal complaints. The study done with patients that visit the rheumatologist is not enough, because these patients were already referred to the rheumatologist.

To prove that this referral method is cost effective, a cost effectiveness study should be performed where it is compared with the current situation of referrals.

The results of this study showed that there are complex situations concerning patients with fibromyalgia. There is a disagreement among rheumatologists that their job is also to help these patients, however some argue that these patients can be helped in the first line of care elsewhere. Some patients have the feeling to fall into a void where nobody is willing to help them. This can be caused by inadequate guidelines for treating this patient group. This patient group should be further investigated on how they want to be helped. This will possibly also relief some of the burden for GPs of patients that keep visiting. This can also save time of rheumatologists, because patients can be helped elsewhere. It is probably a good idea to also look to the physiotherapists to assist in treatment options for these patients. Physiotherapists can have in important role for this problem, since GPs only have ten minutes per consultation. Physiotherapists are able to give more time to a patient, which we found is exactly what fibromyalgia patients want. The physiotherapists in this study also mentioned that they are willing to help this group of patients. So, more research on the treatment of fibromyalgia can help this patient group to have less uncertainty.

5.5 Conclusion

How can a digital algorithm for patients with musculoskeletal complaints be implemented from the perspective of these patients and healthcare professionals?

This multi-perspective research identifying barriers and facilitators on implementation of an online algorithm shows that the algorithm is seen as a possible helpful innovation. There is support to improve the current referral strategy and decision making for GP, but there are a few barriers that need to be solved. The algorithm first needs to be tested and proven effective. Secondly, the original plan to use it for patients from home should be reconsidered. Real success of implementing the algorithm will depend on the integration of the tool in already existing systems in the first line. The integration will resolve the biggest issues of not supporting a tool used by patients alone and improve inclusivity and availability. Thirdly another important change is that the outcome of the tool needs to be broader for all patients with musculoskeletal complaints and that it should also give an advice on what to do when a non-inflammatory cause

is suspected. These changes need to be completed and after that the tool can be piloted together with GPs for further evaluation of implementation. By consulting both the perspectives of patients and healthcare professionals in combination with literature on referral strategies for patients with musculoskeletal complaints, we conclude that a digital algorithm should be implemented as referral strategy but some improvements are necessary for optimal implementation.

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Supplementary file 1

A. Focusgroep patiënten

Openingsvraag (moet door alle groepsleden kort beantwoord worden, om karakteristieken van de deelnemers in kaart te brengen, nog geen meningen)

1. Wanneer bent u voor het eerst bij de reumatoloog geweest en wat was de conclusie van dat bezoek?

Introductievragen (om het centrale onderwerp te introduceren, reflecteren op ervaringen die deelnemers hebben gehad, geen kritische vragen voor analyse, maar om het gesprek en de interactie op gang te krijgen)

2. Welk zorgtraject heeft u afgelegd om tot een afspraak bij de reumatoloog te komen?
3. Welk zorgtraject heeft u na het bezoek aan de reumatoloog nog afgelegd tot waar u nu staat?

Transitievragen (om het gesprek te verplaatsen naar de sleutelvragen)

4. Welke klachten ervaarde u in het begin?
5. Hoe lang heeft het geduurd voordat u met uw klachten naar de huisarts ging?
6. Heeft u hulp gehad of gezocht voordat u naar de huisarts ging (internet / patiëntenvoorlichting / patiëntenvereniging)?

Sleutelvragen (vragen die centraal staan in het onderzoek)

7. Wat denkt u ervan om het gebruik van zo'n keuzehulp voor iedereen thuis beschikbaar te maken?
   a. Wat voor toegevoegde waarde zou deze keuzehulp kunnen hebben?
   b. Wat zorgt ervoor dat je deze wel zou gebruiken?
   c. Wat zorgt ervoor dat je deze niet zou gebruiken?
   d. Welke uitkomst zou u graag terug willen krijgen uit de keuzehulp?
8. Hoe kunnen we het u zo makkelijk mogelijk maken om deze keuzehulp te gebruiken?
   a. Wat is ervoor nodig om vertrouwen te krijgen in deze keuzehulp?
9. Hoe denkt u dat huisartsen en reumatologen zullen reageren op deze keuzehulp?
   a. Hoe kunnen we ervoor zorgen dat artsen de uitkomst van deze keuzehulp vertrouwen en meenemen in hun behandelplan?
   b. Wie zouden we verder nog mee kunnen nemen in de doorontwikkeling van deze tool?
10. Welke obstakels voorziet u verder?

Eindvragen (om de discussie tot een eind te brengen, om te reflecteren op eerder gegeven commentaar)

11. Samenvatting. Is dat een adequate samenvatting of wilt u daar nog iets aan toevoegen?
12. Hebben jullie nog iets gemist tijdens deze discussie, wat we eventueel mee kunnen nemen naar volgende focusgroepen?

B. Enquête zorgverleners

Welkom bij deze online enquête.
*Eerst in het kort wat achtergrondinformatie over het onderzoek. In Nederland hebben huisartsen een belangrijke functie als poortwachter van de tweedelijns zorg, met als doel om de patiënten de Juiste Zorg Op de Juiste plek (JZOJP) te laten krijgen. Nu blijkt deze selectiefunctie soms lastig. Patiënten worden te laat gezien **of** gezonde maar bezorgde mensen komen onterecht in het medisch specialistisch circuit. In het kader van Juiste JZOJP is er een keuzehulp ontwikkeld die de patiënt extra informatie kan geven of (gewricht)klachten afkomstig zijn van een inflammatoir reumatische aandoening (reumatoïde artritis, artritis psoriatica of axiale spondylartropathie) en verwijzing naar de reumatoloog nodig kan zijn. Met dit onderzoek willen we kijken hoe de keuzehulp geïmplementeerd zou kunnen worden voor gebruik door patiënten zelf voorafgaand aan een bezoek de huisarts als ondersteuning binnen het huidige integrale zorgtraject.*

1. Welk percentage van de verwezen patiënten verdenkt u van een inflammatoire reumatische aandoening?

   0   100
   |———■■———————————————————————————————————|

2. In hoeverre denkt u dat verwijzingen van patiënten zonder inflammatoire aandoening het gevolg zijn van te weinig bekendheid over inflammatoire reumatische aandoeningen bij patiënten?
   ☐ Volledig
   ☐ Redelijk
   ☐ Enigszins
   ☐ Niet
   ☐ Weet niet

3. In welke mate denkt u dat patiënten met gewrichtsklachten voor het zien van een huisarts op zoek gaan naar informatie/advies over mogelijke reumatische klachten?
   ☐ (Bijna) altijd
   ☐ Vaak
   ☐ Soms
   ☐ Zelden
   ☐ Nooit

4. In hoeverre denkt u dat patiënten zelf de juiste informatie gebruiken om te besluiten of ze naar een arts moeten? - Percentage juist

   0   100
   |——■—————————————————————————————————————|

Er bestaat bij patiënten met beginnende (gewricht)klachten een grote behoefte aan een platform waar ze terecht kunnen voor info en advies over hun klachten. De meest gebruikte voorbeelden hiervan zijn de websites www.thuisarts.nl en www.reumanederland.nl.

5. In hoeverre heeft u vertrouwen in de informatieplatformen die er nu zijn voor patiënten?

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0                                                          100
├───█──────────────────────────────────────────────────────┤
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6. Denkt u dat het nodig is om onder patiënten meer bekendheid te creëren over de eerste verschijnselen van inflammatoire reumatische aandoeningen?
   ☐ Zeker wel
   ☐ Misschien wel
   ☐ Weet niet
   ☐ Misschien niet
   ☐ Zeker niet

Wij hebben een keuzehulp ontwikkeld voor gebruik door patiënten met gewrichts- en lage rugklachten. Belangrijk om te melden is dat deze keuzehulp geen kansberekening geeft op een aandoening. Wel kan het patiënten meer bewust maken van eventuele reumatische aandoeningen en een advies geven voor het consulteren van een huisarts.
De keuzehulp is zo ontwikkeld dat de patiënten deze zelf kunnen invullen en dat zij met de uitslag van de tool gerichter bij de huisarts aan kunnen kloppen. De huisarts kan dan op basis van zijn of haar eigen bevindingen, in samenspraak met de patiënt besluiten om wel of niet door te verwijzen naar een reumatoloog.

7. Wat vindt u van het verwijsalgoritme?

	Helemaal eens	Eens	Weet niet	Oneens	Helemaal oneens
Het is duidelijk waarvoor de keuzehulp gebruikt kan worden					
De uitkomst van de keuzehulp bevat voldoende informatie					
De uitkomst van de keuzehulp zou voor mij belangrijk zijn					
De uitkomst van de keuzehulp is makkelijk te begrijpen					
Ik zou de uitkomst van de keuzehulp vertrouwen					

De keuzehulp kan betrouwbaar door patiënten worden ingevuld					
De keuzehulp helpt mij bij het nemen van beslissingen over een verder zorgtraject					
Het kost me weinig moeite om de uitkomst van de keuzehulp mee te nemen in een consult					

8. Welke vragen moet de keuzehulp zeker bevatten?

……………………………………………………………………………………………………
………………………………

9. Welke informatie moet de uitkomst van de keuzehulp zeker bevatten?

……………………………………………………………………………………………………
………………………………

10. Welke meerwaarde ziet u in het gebruik van deze keuzehulp door patienten?

……………………………………………………………………………………………………
………………………………

11. Welke obstakels voorziet u in het gebruik van deze keuzehulp?

……………………………………………………………………………………………………
………………………………

12. Heeft u nog overige suggesties/opmerkingen?

……………………………………………………………………………………………………
………………………………

Supplementary file 3

The prevalence of codes is not the main focus in TA, but it can help to give an overview on codes found between different groups.

Healthcare professional facilitator codes separated per profession

A. Facilitator codes				
	Rheumatologists	**General practitioners**	**Physiotherapists**	**Total healthcare professionals**
Healthcare professionals n, (% of total group)	37 (36)	45 (41)	43 (36)	125 (38)
number of codes, n (% all facilitators)	47 (31)	55 (36)	51 (33)	153 (100)
Added value Patient, n (% facilitators)	21 (45)	32 (58)	33 (65)	86 (56)
Added value GP, n (% facilitators)	14 (30)	16 (29)	4 (8)	34 (22)
Added value Rheumatologist, n (% facilitators)	12 (26)	7 (13)	3 (6)	21 (14)
Added value Physiotherapist, n (% facilitators)	-	-	7 (14)	7 (5)

In the first row(horizontal) the number of unique healthcare professionals mentioning something in this theme across the groups is mentioned. In the following rows this are the number of codes. The first number is the amount of different answers coded as the code in the left column(vertical). The second number between brackets is a percentage of the total codes. For example, 37(36) means that 37 rheumatologists have mentioned something that is coded in the theme "facilitators" and this is 36% of the total number of rheumatologists respondents. Another example, 32 (58) means that there are 32 codes in the added value patient code which is 58% of all facilitator codes from the GPs.

Healthcare professional barriers codes separated per profession

B. Barriers codes				
	Rheumatologists	**General practitioners**	**Physiotherapists**	**Total healthcare professionals**
Healthcare professionals n, (% of total group)	55 (53)	42 (38)	39 (33)	136 (41)
number of codes n (% of total barriers)	91 (44)	70 (34)	46 (22)	207 (100)
Lack of support (% barriers per professional)	36 (40)	9 (13)	9 (20)	54 (26)

	Rheumatologists	General practitioners	Physiotherapists	Total healthcare professionals
Patient exploitation (% barriers per professional)	-	9 (13)	5 (11)	14 (7)
Lack of trust (% barriers per professional)	24 (26)	37 (53)	19 (41)	80 (38)
Too difficult (% barriers per professional)	31 (34)	15 (21)	9 (20)	55 (27)

This table can be interpreted the same as the explanation given for table A

Healthcare professional implementation codes separated per profession

C. Implementation codes	Rheumatologists	General practitioners	Physiotherapists	Total healthcare professionals
Healthcare professionals n, (% of total group)	57 (55)	64 (58)	54 (54)	175 (53)
number of codes n, (% of total code)	122 (26)	196 (42)	151 (32)	469 (100)
Content n, (% implementation codes)	58 (48)	59 (30)	45 (30)	162 (35)
Outcome n, (% implementation codes)	38 (31)	62 (32)	50 (33)	150 (32)
Risk on IRD n, (% outcome)	*11(29)*	*14(23)*	*4(8)*	*29(19)*
Visit a doctor n, (% outcome)	*14(37)*	*28(45)*	*4(8)*	*46(31)*
More information (% outcome)	*13(34)*	*20(32)*	*25(50)*	*58(39)*
Availability n, (% implementation codes)	14(11)	51(26)	27(18)	92(20)
Inclusivity n, (% implementation codes)	12(10)	24(12)	25(17)	61(13)

This table can be interpreted the same as the explanation given for table A