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Barriers and facilitators for general practitioners towards using a decision-support tool regarding referring patients with chronic musculoskeletal pain: A usability study

Author: Juliët ter Braake

1st Supervisor: Dr.ing. Gert-Jan Prosman, PhD

2nd Supervisor: Dr. Peter ten Klooster, PhD

University of Twente

Faculty of Behavioural, Management, and Social Sciences

Department of Psychology, Health, and Technology

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Abstract

Background: Chronic musculoskeletal pain (CMP) is considered a multifactorial problem. The complexity and comorbidity of CMP make it difficult to define a single classification system for CMP patients, potentially leading to inadequate referrals by GPs. Clinical decision-support tools help GPs with better-informed referrals.

Objective: The main goal of this study is to investigate barriers and facilitators for GPs towards using a decision-support tool recently developed to refer CMP patients. To achieve this, usability tests with additional interviews were conducted to answer the following question: 'Which factors are facilitating and which factors hinder GPs from using a decision-support tool regarding the referral of CMP patients?'

Methods: GPs (N=6) all working in the East of the Netherlands, were recruited. The decision-support tool was evaluated with scenario-based think-aloud usability tests and additional interviews. Findings were recorded via video recordings, transcribed verbatim, and analysed in Atlas.ti using deductive coding.

Results: Facilitators for GPs towards using the decision-support tool for the referral of CMP patients include its user-friendliness, the decision-support tool fits in well with GPs' regular method of working, it takes little effort to click through the decision-support tool, its facilitation of shared decision making, and a basic layout of the decision-support tool. Barriers were found as the decision-support tool decides per answer to a question if there will be a follow-up question or if the patient can be referred while leaving other important questions unanswered and concerning the high workload experienced by GPs.

Conclusion: The decision-support tool was found to be useful for GPs in the referral of patients with CMP due to the facilitating factors described above. However, due to the high workload of GPs, implementing the decision-support tool within a clinical consultation setting may not be feasible at this point.

Recommendations: Due to the high workload of GPs, developing a short decision-support tool consisting of two questions for the GPs to investigate if they can refer patients with CMP directly to an expertise centre for pain and revalidation may be more feasible for GPs. Furthermore, designing the tool so that all patient-related factors are taken into account for a referral outcome is recommended to enhance the effectiveness of the tool and to improve GPs' levels of satisfaction with the referral outcomes of the decision-support tool.

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Introduction

Musculoskeletal pain is one of the most frequent reasons why people are seeking medical help (Lavand'homme, 2011). Musculoskeletal pain is an umbrella term for pain in muscles, bones, tendons, ligaments, and joints including the nerves, cartilage, and bursae. Within the general population, musculoskeletal pain has a lifetime prevalence rate varying between 11.4% and 24% (Cimmino, Ferrone, & Cutolo, 2011). The study by Picavet and Schouten (2003) found that the prevalence rate of musculoskeletal pain in the Netherlands is 28% and can therefore be considered as high. When musculoskeletal pain is persistent for three months or longer for inexplicable reasons to the general practitioner (GP), it is defined as chronic musculoskeletal pain (CMP) (Vitality, 2019). Within the Dutch population, 20% experiences CMP complaints (Vitality, 2019; "Werkgroep Pijnrevalidatie Nederland," 2017).

Chronic musculoskeletal pain

The review study by Vellucci (2012, p.3) defined CMP as a multifactorial condition caused by 'the complex interplay of nociceptive, neuropathic, or mixed pathogenic mechanisms.' Pain can become chronic due to continuing stimuli of pain as a result of actual tissue damage or inflammation, named nociceptive stimuli (Koltzenburg, 2000; van Zorg, 2011; Voscopoulos & Lema, 2010). This type of chronic pain is generally referred to as nociceptive pain (Daniel et al., 2008; Koltzenburg, 2000; van Zorg, 2011). Chronic pain can also arise as a repercussion of a lesion or illness that disrupts the somatic-sensory mechanism, leading to pain impulses without certain pain stimuli or reinforcement of pain stimuli via stimulation, referred to as neuropathic pain (Campbell & Meyer, 2006; Colloca et al., 2017; van Zorg, 2011). Nociceptive and neuropathic pain can also coexist next to each other, this is named mixed chronic pain (van Zorg, 2011). The continuation and intensity of chronic pain can lead to both peripheral and central nervous system stimulation that interdependently exacerbates pain perception (Voscopoulos & Lema, 2010). Due to chronicity, the central

nervous system is influenced in a way that it reacts more sensitively to stimuli like smell, light, noise, and pain (Vitality, 2019). This hypersensitivity to stimuli is a repercussion of unusual divergent responsiveness of nociceptors in the central nervous system regarding either regular or subliminal sensory input (Latremoliere & Woolf, 2009). Central sensitization causes patients to have difficulties or to experience an inability to execute their daily tasks, with emotional and social consequences as a result (Cimmino et al., 2011).

The definition of CMP used in this research is defined according to the Dutch general practitioners association (NHG) as: 'A persistent, multifactorial health problem in which physical, psychological, and social factors contribute to varying degrees with varying mutual correlations to pain perception, pain behaviour, perceived limitations in daily functioning, and perceived reduced quality of life' (NHG-werkgroep Pijn, 2018). CMP is found to be most prevalent in (young) adults, women, individuals with low social-economic status, and psychologically stressed individuals, and rises with age (Cimmino et al., 2011). The most common CMP complaints include lower back pain, fibromyalgia, pain in the neck, and shoulder pain (McBeth & Jones, 2007).

Treatment options for chronic musculoskeletal pain

Various treatment options are available for CMP patients. Drug treatment is commonly used for CMP patients and the type of drug prescribed is dependent on the assumed underlying mechanisms of pain (Schnitzer, 2006). Anti-depressants, tramadol, and anticonvulsants are used primarily for centralized pain syndromes such as fibromyalgia (Uhl, Roberts, Papaliodis, Mulligan, & Dubin, 2014). Topical medications like diclofenac, capsaicin, menthol, and methyl salicylate are essentially used for neuropathic pain whereas paracetamol and NSAIDs are commonly used for nociceptive and inflammatory pain (Schnitzer, 2006; Uhl et al., 2014).

When severe pain endures despite drug treatments, other treatments that are commonly used are mono- and multidisciplinary treatments. Monodisciplinary treatments for CMP patients consist of first-line treatments aimed at reducing the musculoskeletal complaints as much as possible, such as physiotherapy, remedial therapy, sessions with a psychologist, and occupational therapy (Bee, McBeth, MacFarlane, & Lovell, 2016; Cimmino et al., 2011).

Because monotherapy is not always effective, multidisciplinary treatments are increasingly applied to patients with a mixture of physical, psychological, and social complaints (Boonstra, Hoogers, Stewart, Reneman, & Schiphorst Preuper, 2021). Multidisciplinary treatment includes two or more healthcare professionals, such as physicians, physiotherapists, psychologists, and/or social workers (Boonstra, Reneman, Waaksma, Schiphorst Preuper, & Stewart, 2015; Salduker et al., 2019; Scascighini, Toma, Dober-Spielmann, & Sprott, 2008; Schnitzer, 2006).

A Cochrane systematic review and meta-analysis found that multidisciplinary treatments reduced pain perception, and disability significantly compared to monodisciplinary treatments (Kamper et al., 2015). Another meta-analysis found that cognitive behavioural therapy (CBT) was the most frequently used multidisciplinary treatment associated with the greatest effect sizes for fibromyalgia patients (Glombiewski et al., 2010). This is in line with another systematic review and meta-analysis that investigated alternatives to CBT for CMP patients. This study found that mindfulness-based stress reduction programs (MBSR) and acceptance and commitment therapies (ACT), when applied in a multidisciplinary setting, are not significantly superior to CBTs, but are helpful alternatives (Randolph, Cantu, Tacon, & Greak, 1999; Veehof, Oskam, Schreurs, & Bohlmeijer, 2011). Multidisciplinary treatment is found to have moderate beneficial effects for CMP patients concerning pain perception and daily functioning, and since it is not equally effective for everyone it can be difficult for GPs to refer patients correctly (Boonstra et al., 2021; Guzmán et al., 2001).

Consequences of chronic musculoskeletal pain

Several studies found that CMP has a major impact on a patient's life, such as a low physical activity level, depressive symptoms, cognitive deficiency, sleep deprivation, feeble mobility, frailty, and a higher risk of falling (Blyth & Noguchi, 2017; Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). The study by Goesling, Clauw, and Hassett (2013) found a bidirectional relationship between CMP and depression, indicating that 30 to 60 per cent of patients with CMP experience depressive symptoms. This is in line with the study of Crofford (2015), who found that depressive complaints tend to intensify pain perception. Furthermore, the study by Outcalt et al. (2015) concluded that CMP is also strongly associated with post-traumatic stress disorder (PTSD).

Before referring CMP patients, GPs investigate the case complexity of each patient to examine the condition of the patient, set aims and assess the number of consultations. Establishing the case complexity of CMP patients is necessary as CMP may be caused by multiple factors with varying amounts of involvement, causing CMP to vary in case complexity (Waterschoot, Bennen, van der Woude, Schiphorst Preuper, & Reneman, 2016). According to Waterschoot et al. (2016), case complexity can be defined as: 'The extent to which combinations of factors influence the functioning of CMP patients.' Ten factors have been explored to determine the case complexity of CMP patients, namely: financial and work-related issues, characteristics of pain complaints, individual injury course of action, life events, mentalization ability, motivation, psychopathological issues, somatization, treatment-disruptive personality characteristics, and family-related issues (Dade, 2011; Gergely, Fonagy, Jurist, & Target, 2002; Stein et al., 2010; Waterschoot et al., 2016). Of all these factors, the factor 'psychopathological complaints' is most decisive in the determination of case complexity indicating that CMP is often comorbid with anxiety disorder, depression, and/or posttraumatic stress disorder, leading to a lower quality of life (Bair, Wu, Damush,

Sutherland, & Kroenke, 2008; McBeth & Jones, 2007; McGeary, McGeary, Moreno, & Gatchel, 2016; Outcalt et al., 2015). These comorbidities are associated with more intense pain which is paired with more symptoms of depression, anxiety, sleep deprivation, and a lower quality of life (Bair et al., 2008; Gupta et al., 2007). Since case complexity is mostly determined by GPs' investigations and interpretations based on the patient's pain perception, it is difficult for GPs to consistently classify case complexity and to refer patients correctly to the most suitable treatment (Bair et al., 2008; Waterschoot et al., 2016).

Studies found that GPs often use unnecessary diagnostic tests, prescribe medication unnecessarily, and do not use patient-focused treatment possibilities, leading to inappropriate referrals of patients with chronic musculoskeletal complaints (El Miedany, 2019; Glazier et al., 1998; Mino-León, Reyes-Morales, Jasso, & Douvoba, 2012). Other factors that contribute to inappropriate referrals include unawareness of existing secondary care clinics, the demands of patients, and the absence of professional referral feedback (Albattal, 2014). As a consequence, patients may experience an increase in complaints and comorbidity of complaints, resulting in a lower quality of life (Bair et al., 2008; Rahman, Reed, Underwood, Shipley, & Omar, 2008). The study of Naseriasl, Adham, and Janati (2015) found that incorrect referrals serve as an extra burden on patients due to re-referrals, long waiting times, unstructured care, and double testing. Furthermore, it has been found that excessive waiting times have negative effects on pain perception, quality of life, and psychological complaints for CMP patients (Deslauriers et al., 2019). As a result, it can be summarised that incorrect referrals not only negatively affect patients' physical functioning, but also their mental- and emotional well-being (Foster, Thomas, Bishop, Dunn, & Main, 2010). Therefore, it is of importance that CMP patients are referred correctly.

Referring patients with chronic musculoskeletal pain

The referral of CMP patients is often done by the GP via the principle of stepped care; a principle entailing a system for presenting and managing treatments to display the most efficient, yet smallest resource-intensive treatment to the patient (Vereniging samenwerkingsverband pijnpatiënten naar één stem, 2017). The GP can also refer CMP patients via the principle of matched care, whereby patients will be checked thoroughly on their symptoms and complaints and will be consequently provided with the best fitting treatment (Linton, Nicholas, & Shaw, 2018)

The referral of a patient by the GP is not solely based on biomedical assumptions, but also on multiple circumstantial, individual, and clinical aspects that interact with each other, and form the decision-making process (Evans, 1993; Tzartzas et al., 2019). For instance, GPs take their relationship with the patient, the needs of the patient, the GP's gut feeling, waiting times for treatment, preference(s) of the patient, and travelling time from-to for the patient into account when deciding on a referral (Kier, George, & McCarthy, 2013; Mahon, Whitehouse, Wilkin, & Nocon, 1993). However, GPs differ in the weight they give these factors (Evans, 1993). Factors that negatively affect suitable referrals include the absence of familiarity with the location of specialists, absence of uniform referral forms, inconvenience of making referrals, absence of discharge information, and being ignorant about the program quality (Grace, Grewal, & Stewart, 2008).

Defining a single classification system for CMP patients is difficult due to the complexity and comorbidity of complaints. This may lead to inadequate referrals by GPs as patients with similar complaints may be differently diagnosed and thus also receive different treatments (Verbunt, Swaan, Preuper, & Schreurs, 2019). In the Netherlands, more than 30 per cent of CMP patients received insufficient treatment from a care specialist and were referred back to the GP (Bekkering et al., 2011). CMP patients are visiting around ten to

twenty-five professionals during their treatment (Bekkering et al., 2011). The study of Tzartzas et al. (2019) found that there is an increasing need among GPs towards using internal guidelines in helping GPs with the referral decision of a CMP patient.

E-Health applications in primary care

The use of e-health applications is globally increasing due to the assumption that e-health can increase efficient health- and patient care (Peeters, Krijgsman, Brabers, Jong, & Friele, 2016). Therefore, e-health applications may also be helpful for GPs to adequately refer patients with CMP. E-health is defined as health-related services retrieved via the internet and/or other connected information and communication technologies to enhance and/or facilitate health and health care (Eysenbach, 2001). Within the Netherlands, GPs may use e-health applications if these applications can contribute to the care of patients (NHG-Standpunt: E-health voor huisarts en patiënt, n.d.). Such e-health applications can be used by GPs in the Netherlands if they meet the following conditions: 1) the application is integrated complementary to a current doctor-patient relationship; 2) the application is used based on the needs of the patient; 3) the application is used in line with the privacy guidelines of the patient so that confidentiality can be guaranteed; 4) for the acceptance of the application is it important that the applications can be linked into the patient information system (NHG-Standpunt: E-health voor huisarts en patiënt, n.d. ; van Gemert-Pijnen, Kelders, Kip, & Sanderman, 2018).

GPs tend to have a positive attitude towards using e-health applications, which is found to be essential in the utilization of e-health applications (Peeters et al., 2016). Especially concerning online medical information inquiries, the use of electronic health care records, and to a minor extent the electronic transfer of client data (Hage, Roo, van Offenbeek, & Boonstra, 2013). Studies showed that GPs tend to only use e-health by advising patients on the availability of informational websites, even though e-health also allows

patients to engage in equalized two-way conversations during face-to-face conversations (Brandt, Søgaard, Clemensen, Sndergaard, & Nielsen, 2018; Macdonald et al., 2018).

GPs can make better-informed decisions regarding the referral of patients by also implementing applicable information from multimodal data authorities, such as electronic data records, scientific figures, and sensor dossiers (d'Hollosy, Jansen, & Poel, 2021; Roshanov et al., 2011). This information is however often too comprehensive to be interpreted by GPs alone. Therefore, clinical decision-support tools that help GPs with making referral decisions are essential (d'Hollosy et al., 2021). Clinical decision-support tools are defined as evidence-based tools created to analyse a patient's health profile to achieve custom-fit recommendations regarding diagnosis, treatment, education, follow-up treatment, and the appropriate observation of illness indicators during face-to-face conversations (Roshanov et al., 2011; Slater, Dear, Merolli, Li, & Briggs, 2016). The purpose of decision-support tools is to eliminate delayed, missed or wrong diagnoses and/or referrals (El-Kareh, Hasan, & Schiff, 2013). Therefore, decision-support tools allow GPs to make a well-thought-out decision between two or more treatment choices and have beneficial effects on patient-related care (El-Kareh et al., 2013; Slater et al., 2016).

At present, there are no decision-support tools available for Dutch GPs regarding the referral of CMP patients. Therefore, little is known about the use of decision-support tools by GPs for CMP patients. However, there may be several facilitators and barriers to the implementation of a decision-support tool for GPs for referring CMP patients in clinical practice. It is found that GPs using a decision-support tool for the referral of CMP patients is beneficial as the decision-support tool is cost-efficient in enhancing CMP outcomes (€ >150 million in the Netherlands) (d'Hollosy et al., 2021; Garg et al., 2005; Holbrook et al., 2009; Roshanov et al., 2011; Slater et al., 2016). Furthermore, barriers to implementing a decision-support tool for GPs may include having the preference to work without using digital systems,

insufficient usability of the tool, being incapable of choosing a highly demanding range of care, and inadequate knowledge regarding how to use a decision-support tool leading to inaccurate implementation of the tool in a clinical setting (Reisman, 1996). Furthermore, a study that investigated the effects of computerized clinical decision support systems on practitioner performance and patient outcomes showed that decision-support tools are most effective when GPs can use the tool directly instead of having to activate the system first (Garg et al., 2005). At present, it remains unclear which characteristics of decision-support tools are most strongly linked with successful and/or failing sustainable implementation of referrals (Roshanov et al., 2011; Slater et al., 2016).

The PRefferal project

The PReferral project is designing a decision-support tool for personalized referral advice for CMP patients for GPs in the style of an electronic decision tree. This decision-support tool is developed in the form of an executable file. This tool aims to help GPs with referring CMP patients to the best fitting referral outcome per patient. As this recently developed decision-support tool is still in the prototype phase, this research will investigate the usability and content of the prototype decision-support tool for GPs towards the referral of CMP patients. By exploring the usability and content of the prototype decision-support tool, information on motivations for GPs to use or not use the decision-support tool will be retrieved. These findings can be used to further optimize the decision-support tool.

Usability

Usability is not a steady concept, as it is not a property or tangible thing. Instead, usability is influenced by the communications among users, products, tasks, and environments. Therefore, usability can be considered an umbrella term with multiple definitions (Tractinsky, 2018). The most commonly used overarching definition of usability is given by the International Standard Organization (ISO) which identifies usability as: 'The

extent to which a system, product, or service can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use' (Bevan, Carter, Earthy, Geis, & Harker, 2016; Bevan, Carter, & Harker, 2015). This definition will be used in this research.

Usability can be measured in four ways, namely in a product-oriented, user-oriented, user-performance, or context-oriented way. The first approach measures usability by looking at the ergonomic qualities of the product, the second approach measures usability via the perceived effort and mental outlook of the user, the third approach measures usability by testing how the user collaborates with the product, and the last approach emphasizes that usability is influenced by the target group, the tasks the target group has to perform, and the environment wherein the tasks are being executed. This approach focuses on either the ease of use (e.g., how easy the product is to use) or acceptability (e.g., if the product will be used in real life) (Bevana, Kirakowskib, & Maissela, 1991). It is argued that all these four approaches should be taken into consideration when evaluating usability (Bevana et al., 1991; Sauer, Sonderegger, & Schmutz, 2020).

Usability testing is an evaluative approach whereby a specific target group carries out certain tasks and explains their intentions (Riihiaho, 2018). Participants are usually asked to think aloud while performing the usability test to investigate their thoughts (Riihiaho, 2018). Furthermore, usability testing is a qualitative process whereby the researcher observes how a certain target group uses a specific product. During the observation, the researcher looks at what is difficult, useful, likeable, or dislikeable for participants. Based on the observations, the tool can be redesigned correspondingly (Nielsen, 1996). Nielsen (1996) found that usability testing is a sufficient method to ensure usability enhancements without providing the exact degree of how much the usability of a certain product is improved. Moreover, usability

testing enables further development of a tool before its integration into a clinical workspace (Press et al., 2015).

Purpose of this research

This research aims to investigate the usability of the prototype decision-support tool for GPs regarding referring CMP patients to the best fitting treatment plan. Based on the definition of usability (ISO), the usability of the decision-support tool will be measured by looking at user-friendliness, acceptability, effectiveness, efficiency, ergonomics, and time duration of the decision-support tool according to the GPs by conducting scenario-based usability tests. The research question of this study is: 'Which factors are facilitating and which factors hinder GPs from using the decision-support tool regarding the referral of CMP patients?' This research also includes sub-questions as these questions are of relevance to investigating the attitudes of GPs regarding the usability and the content of the decision-support tool. Therefore, the sub-questions for this research are:

- To what extent do GPs find the decision-support tool user-friendly?
- What is the attitude of GPs regarding the accessibility of the decision-support tool?
- What is the attitude of GPs regarding shared decision-making when applying the decision-support tool?
- What is the attitude of GPs regarding the effectiveness of the decision-support tool?
- What is the attitude of GPs regarding the efficiency of the decision-support tool?
- What is the attitude of GPs regarding the ergonomics of the decision-support tool?
- What is the attitude of GPs regarding the time duration of the decision-support tool?
- To what extent do GPs find the decision-support tool reliable?
- What is the attitude of GPs regarding the outcomes of the decision-support tool?

Methods

Setting

This study consisted of scenario-based usability tests with additional interview questions. The usability of the prototype was tested using the scenario-based think-aloud method, captured by researcher observations and voice recordings (Riihiaho, 2018; Van Someren, Barnard, & Sandberg, 1994). The usability tests took place from the 17th of June 2022 till the 24th of June 2022. The current prototype of the PReferral decision-support tool was evaluated during the usability tests. The usability tests and the additional interviews took place online, via Microsoft Teams.

Prototype of the decision-support tool

The PReferral decision-support tool includes twelve questions regarding CMP complaints, focusing on the presence of CMP, psychopathology, need for more research to explain the somatic pain, the capability of the patient to receive treatment two times a week, daily functioning of the patient, ability of the patient to be physically active for more than five hours a day, a personal injury requiring a lot of attention and energy from the patient, language barriers, addiction problems, the influence of pain medication on body awareness, the domestic environment of the patient, and the capability of the patient to travel independently to the treatment location. The referral outcomes of the decision-support tool are based on the answers to the questions. These outcomes entail mental health care (GGZ), physical therapist, occupational therapist, exercise therapist, hospital (specialist), a specialist in intercultural psychiatry (IPSY), somatic physical therapist, psychosomatic therapist, rehabilitation, safe at home (veilig thuis), clinical medical specialised revalidation, and poly-clinical medical specialised revalidation. Figure 1 shows a representation of the prototype of the decision-support tool developed by the PReferral project

Figure 1

Screenshot of the prototype of the decision-support tool developed by the PReferral project

Participants

Participants were recruited via a database retrieved from Dr Van der Lugt. This database included sixteen participants and all were asked to participate in the study. The aim was to generate as many participants from this database as possible, as the study of Schmettow (2012) found that a sample size of sixteen participants predicts an 80% discovery rate of the findings. However, six participants responded to be willing to participate in this study. These participants all met the inclusion criteria of working actively as GP at the time of participation in this study.

Ethics approval and consent to participate

The study was approved by the university's Ethical Committee (BCE220218). Participants were informed of the voluntary nature of their participation and confidentiality was guaranteed. All participants gave oral consent before the usability test.

Procedure

GPs were contacted by the researcher via e-mail wherein an explanation of the nature and purpose of the study was provided. Furthermore, the e-mail included the question if the GP was willing to participate in the study. When the GP replied that they would like to participate, the participant received an e-mail confirmation of the appointment for the interview. Moreover, the e-mail also included additional information regarding participation. Additionally, all participants received the decision-support tool via WeTransfer before participation.

The usability tests were conducted individually in a face-to-face interview setting online. Before the interviews, the nature and purpose of the study were explained again, and permission for participation and audio recordings was given orally. Furthermore, participants were asked to share their screens so that the researcher could watch along with the

participants. The test protocol started with general questions regarding the GP's working history and patient experience. Then, each participant was asked to take into account a certain CMP patient they had referred without using a decision-support tool. The GPs were free in choosing which cases they brought to the interview. Therefore, the cases included in this research ranged from CMP patients with psychological complaints to CMP patients with fibromyalgia.

Thereafter, GPs decided on a referral outcome of the same cases but now while using the decision-support tool, representing actual use of the decision-support tool while simultaneously thinking out loud. After clicking through the decision-support tool, semi-structured interview questions regarding the participants' opinions of the usability, and the content of the decision-support tool were asked (see Appendix 1). Within the interview questions, the GPs had to assess different characteristics of usability (i.e., user-friendliness, accessibility, efficiency, effectivity, ergonomics, and time duration) and content (i.e., reliability, and outcomes) of the decision-support tool.

Data analysis

The data analysis was conducted solely by the researcher, under the supervision of Dr. Ing. Prosman. The video recordings of the usability tests were stored on an external drive and were only accessible to the researcher involved. The recordings were transcribed verbatim by the researcher, and all transcripts were analysed by the researcher to identify fragments on user-friendliness, accessibility, efficiency, effectivity, ergonomics, time duration, reliability, and outcomes. Relevant fragments were deductively labelled with the fundamental codes 'user-friendliness', 'accessibility', 'efficiency', 'effectivity', 'ergonomics', 'time duration', 'reliability', and 'outcomes' in Microsoft Excel. Subsequently, the fragments within the fundamental codes were analysed axially to link fragments to each other and to create new sub-codes within each fundamental code. The coding scheme was revised several times by the

researcher, and fragments were reread and recoded if necessary. Descriptive statistics were generated for the participant characteristics using SPSS.

Results

Participant characteristics

In total, six GPs participated in this research; three women and three men with an average age of 50 years old. In general, the participants were working for 12.5 years in clinical practice. Two of the participants are working in solo practice and four of the participants are working in group practice. Furthermore, the participants have an average amount of 4267 patients each. The participants rated their familiarity with CMP patients on average with an 8.2 on a scale from 0-10. In Table 1, the demographics of the participating GPs are presented.

Table 1

Demographics of participating GPs

Characteristics		n	Median (range)
Sex	Male	3	
	Female	3	
Kind of practice	Solo	2	
	Group	4	
Age			50 (34-63)
Amount of patients			4267 (1400-3000)
Experience as GP (years)			12.5 (4-25)
Familiarity with CMP patients (0-10)			8.2 (7-10)

The referral process

Before the interview, participants described how a CMP patient from their practice received referral advice without using a decision-support tool. Three participants referred their patient to a specialist in the hospital (rheumatologist), one participant referred the patient towards revalidation, one participant referred the patient to a mental healthcare institution for somatically inadequately explained physical complaints, and one participant didn't refer the patient. Noticeably, all participants indicated that they had already referred the specific patient once or more often, but that the patient returned to their practice as the referral was no success. When making the referral decision, two GPs based the referral on the patient's main request for help whereas four GPs based the referral primarily on the specific wishes or needs and feasibility of the patient.

During the interview, the GPs used the decision-support tool for the same patients. Remarkably, based on the decision-support tool, four GPs referred the patient to a specialist in the hospital (rheumatologist), one GP referred the patient to a physical therapist, and one GP referred the patient to a physical therapist, occupational therapist, and/or exercise therapist. As a result, three of the GPs ended up with the same referral for CMP patients using the decision-support tool as their actual referral. GP4 stated: *'The referral outcome of the tool is the same as I had without using the tool. Therefore I am glad to know that I made the correct referral choice.'* Additionally, five GPs agreed with the outcomes of the decision-support tool. So did GP2 mention: *'The decision-support tool referred the patient to a physical therapist. And even though I referred the patient to mental healthcare institution for somatically inadequately explained physical complaints, this patient was already receiving physical therapy. So therefore I do agree with the outcome of the decision-support tool.'* One GP did not agree with the referral outcome of the decision-support tool, GP6 stated: *'I think the outcome is too short-sighted. Because how do you differentiate between the options of a*

physical-, occupational- and/ or exercise therapist and which option do you choose? It would

be nice if that becomes clear from the tool so that the GP can work more efficiently.'

To measure the GPs' experiences with the decision-support tool towards the referral of patients with CMP, the interview was divided into a usability category and a content category. These categories were split into a total of eight factors. To analyse the eight factors thoroughly, the factors were further divided into a total of 14 codes, as presented in Figure 2.

Figure 2

The two categories with associated factors and codes
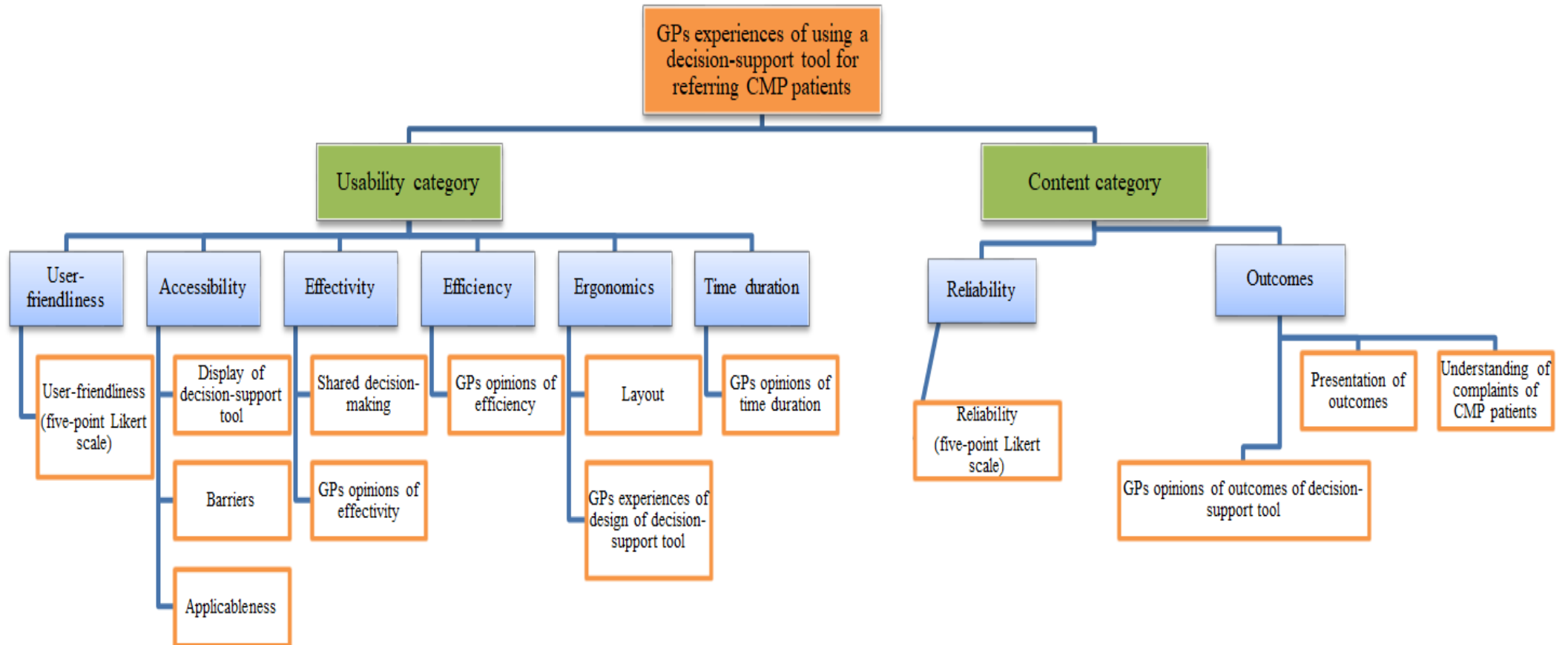
The usability category

For this research, usability was explored by six factors, including user-friendliness, accessibility, effectivity, efficiency, ergonomics, and time duration. To measure the factors more thoroughly, the factors are further divided into a total of ten codes, presented in Table 2. The used codes are labelled user-friendliness, display of the decision-support tool, barriers, application, effectivity, shared decision-making, efficiency, layout, the experience of the design, and time duration. Figure 3 provides an overview of the results of the codes.

User-friendliness

The factor user-friendliness is measured by a five-point Likert scale with the answer categories of 1) very user-hostile, 2) user-hostile, 3) moderately user-friendly, 4) user-friendly, and 5) very user-friendly, which showed that five GPs considered the tool as user-friendly and one GP considered the tool to be very user-friendly. GP2 stated: *'From what I have seen, the questions are easy to answer and is it also easy to walk through the decision-support tool. Therefore, I find the tool user-friendly.'*

Accessibility

The factor accessibility is investigated by three codes, namely representation of the decision-support tool, barriers, and applicability. One GP indicated displaying the tool as a mobile application; the other five GPs suggested displaying the decision-support tool in ZorgDomein, a digital healthcare system developed by Plexus Medical Group to optimize the communication between GPs and healthcare professionals, as well as patient logistics within hospitals (Bal, Mastboom, Spiers, & Rutten, 2007).

GP5 mentioned: *'I would suggest ZorgDomein. I am not sure if this is applicable but I think ZorgDomein would be a great outcome as almost if not all GPs work with this platform.'* Furthermore, one of these GPs suggested making the tool available in a paper

format as well to serve as a backup. Moreover, four GPs experienced the barrier that the decision-support tool did not fit completely on their computer screen. GP4 indicated: *'While using the tool, I could not see the bottom questions on the screen.* Additionally, three GPs considered the fact that the decision-support tool decides per answer to a question if there will be another question, or if the patient can be referred while leaving other important questions unanswered, a barrier. When looking at the applicableness of the decision-support tool, one GP found the tool most applicable when GPs can be relieved from their high workload. Another GP considered the tool always applicable, whereas another GP did not find the tool applicable due to their substantial knowledge and experience with CMP patients. Three GPs considered the tool to be most applicable when not knowing where to refer the CMP patient to. GP6 mentioned: *'The tool would be applicable in situations where CMP patients are already referred once but return to practice as the referral did not help them. At times I feel stuck in helping such patients.'*

Effectivity

The factor effectivity is established via two codes, namely the effectivity of the decision-support tool and shared decision-making. When looking at the effectiveness of the decision-support tool, four GPs did not consider the decision-support tool to be effective as the tool included all the important questions but did not take the answers to all questions into account to generate a referral outcome. GP5 commented: '*If the tool would take the answers of all questions into account, you will look at the psyche and physical complaints which may lead to a different referral. Pain and psyche are closely related. Therefore, I don't think the tool is effective in generating a referral.'* Furthermore, GP3 stated: *'One question should not exclude another question as all should be equally important for making the correct referral choice.'* On the contrary, two GPs considered the tool effective as their point of view was that all important aspects that need to be taken into account when referring a CMP patient, are

included in the decision-support tool. In addition, all GPs considered the tool to be most effective when making use of shared decision-making. GP3 stated: *'CMP patients often feel hopeless and misunderstood. Via shared decision-making you allow patients to be actively involved within the referral process which may give them the feeling that their complaints are taken seriously as they can indicate what is feasible for them and what their wishes and needs are.'* 16.7% of these GPs suggested letting the patient independently fill in the decision-support tool if possible so that the GPs experience a lower workload.

Efficiency

The factor efficiency investigated if the tool leads to a more efficient referral that costs little time and effort. In general, all participating GPs found the tool efficient. GP6 mentioned: *'I consider the tool as efficient as I have to think less about the patient's complaints, leading to less time spend on the patient and thus a more efficient referral.'*

Ergonomics

The factor ergonomics was established by exploring the layout and the general experiences of the design of the decision-support tool. Generally, all participating GPs were satisfied with the layout of the tool, even though they did consider the tool to be basic in layout. Additionally, the use of colours and the font and text size were considered to be pleasant when using the decision-support tool. GP1 commented: *'The layout of the tool is very basic, but it is fine to me.'* Moreover, the general experience of the design of the tool was considered satisfying by all the GPs. GP 6 stated: *'The general experience was fine; I did not experience any trouble with the design of the decision-support tool.'*

Time duration

The factor time duration is measured via the opinions of the GPs about the duration of filling in the decision-support tool from beginning to end. The majority of the GPs considered the time duration of using the decision-support tool sufficient, meaning that they found

themselves to have enough time for filling out the decision-support tool during a consultation. GP1 mentioned: *'The time duration of the decision-support tool is good; it costs little time to fill in the decision-support tool.'* However, one GP considered the time duration insufficient, as this GP took the maximum amount of time of consultation into consideration when filling in the decision-support tool. GP4 mentioned: '*The time duration of the tool is insufficient when taking into account that the maximum amount of time for a consultation is ten minutes, and filling in the decision-support tool (maybe even with the patient) will take more than five minutes of your time. When taking into consideration to also have time to answer questions of the patient and to make the referral, I do not consider the time duration of the decision-support tool to be sufficient.'*

Table 2

Explanation of the factors and codes within the usability category

Factors and codes	Definition	Example Quote
User-friendliness	*Easy to use*	
User-friendliness	User-friendliness of tool	GP2: *'From what I have seen are the questions easy to answer and is it also easy to walk through the decision-support tool. Therefore, I find the tool user-friendly.'*
Accessibility	*Accessibility of tool*	
Display of decision-support tool	Where would GPs like to see the decision-support tool displayed	GP5: *'I would suggest ZorgDomein. I am not sure if this is applicable but I think ZorgDomein would be a great outcome as almost if not all GPs work with this platform.'*
Barriers	Barriers when using the tool	GP4: *'While using the tool, I could not see the bottom questions on the screen.'*
Applicability	When would the tool be applicable for GPs	GP6: *'The tool would be applicable in situations where CMP patients are already referred once but return to practice as the referral did not help them. At times I feel stuck in helping such patients.'*
Effectivity	*The ability to achieve the desired result*	
Effectivity	The ability to achieve the desired result	GP5: *'If the tool would take the answers to all questions into account, you will look at the psyche and physical complaints which may lead to a different referral. Pain and psyche are closely related. Therefore, I don't think the tool is effective in generating a referral.'*
Shared decision-making	Tool filled in with or without patient	GP3: *'CMP patients often feel hopeless and misunderstood. Via shared decision-making you allow patients to be actively involved within the referral process which may give them the feeling that their complaints are taken seriously as they can indicate what is feasible for them and what their wishes and needs are.'*
Efficiency	*The ability to produce the correct referral with minimum effort*	
Efficiency	The ability to produce the correct referral with minimum effort	GP6: *'I consider the tool as efficient as I have to think less about the patient's complaints, leading to less time spend on the patient and thus a more efficient referral.'*
Ergonomics	*Design of the tool*	
Layout	GPs' experiences of the layout of tool	GP1: *'The layout of the tool is very basic, but it is fine to me.'*
Experience of	GPs' experiences in the	GP 6: *'The general experience was fine; I did not experience any trouble with the design of the decision-*

design	design of the tool	*support tool.'*
Time duration	Duration of filling in tool	
Time duration	Duration of filling in tool	GP1: *The time duration of the decision-support tool is good; it costs little time to fill in the decision-support tool.'*

Figure 3

Factors and codes of usability category
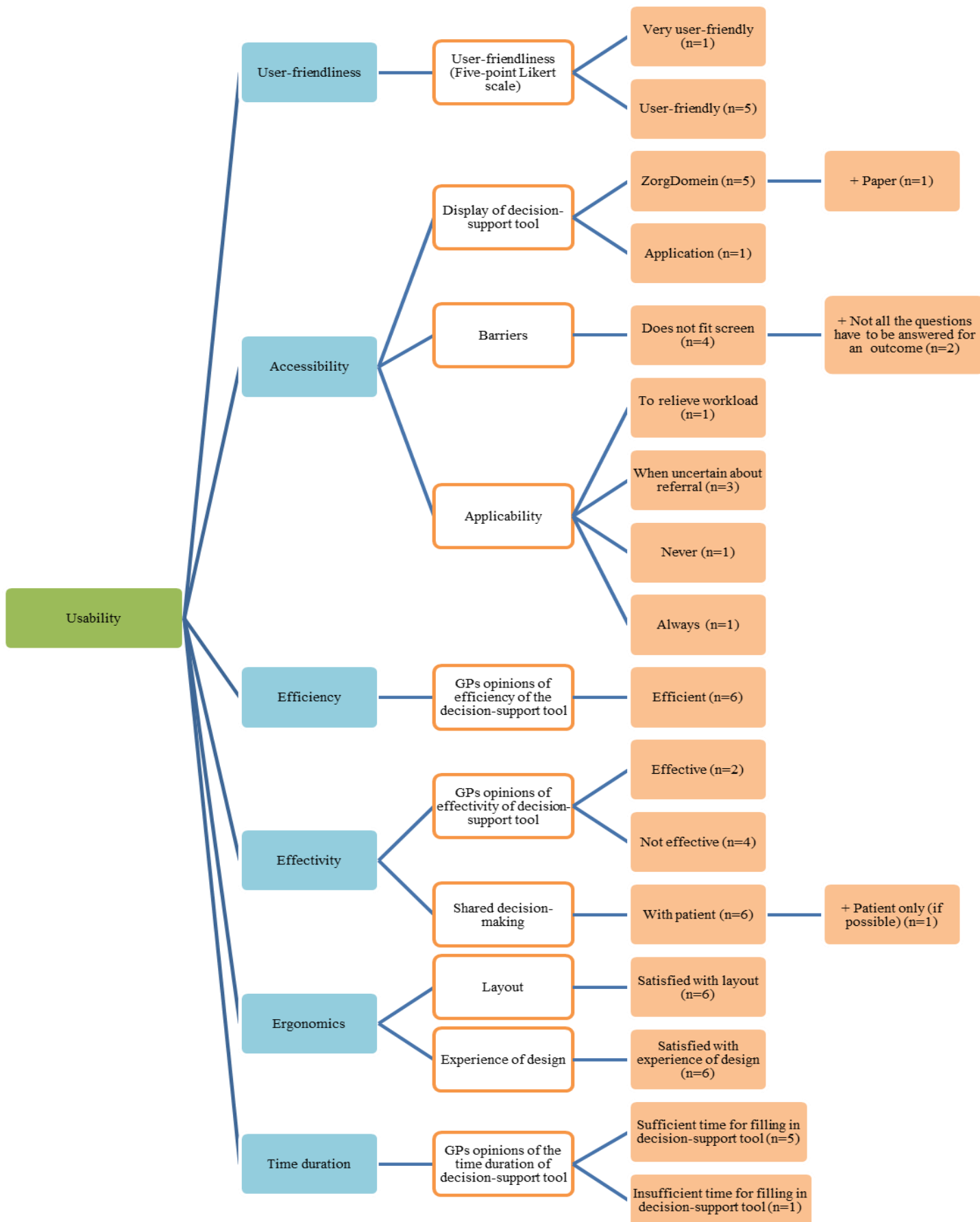
The content category

The content of the decision-support tool is investigated via two factors, labelled reliability and outcomes. These factors are divided into a total of four codes, entailing reliability, understanding of complaints of CMP patients with aim of the decision-support tool, presentation of the outcomes, and outcomes, presented in Table 3. Figure 4 provides an overview of the results of the codes used for the content category.

Reliability

The factor reliability is measured via a five-point Likert scale with the answer categories of 1) very unreliable, 2) unreliable, 3) moderately reliable, 4) reliable, and 5) very reliable. Three of the GPs scaled the decision-support tool a three on reliability, indicating that they considered the tool to be moderately reliable. GP5 mentioned: *'I would scale the reliability of the tool a 3 because I find the tool too vague. Some questions should be more specific to answer them correctly and also the tool should take the psyche as well as the physical complaints more into account when deciding on a referral outcome, as the psyche plays an important role when it comes to CMP complaints.'* Another three GPs considered the tool a four on reliability, suggesting that they find the tool reliable. GP3 stated: *'I find the decision-support tool reliable as I believe that all main elements are included.*

Outcomes

The factor outcomes are established based on three codes, namely understanding of complaints of CMP patients with the decision-support tool, presentation of the outcomes, and outcomes. When looking at the understanding of complaints of CMP patients with the aim of the decision-support tool, 50% of the participating GPs acquired a better understanding of the complaints whereas the other 50% of the participating GPs did not acquire a better understanding of complaints. GP1 mentioned: *'As the tool includes all the main aspects, I feel like I can gain a better understanding of the complaints of the patient. In an ideal setting, I*

would like to go through the tool together with the patient to save time for the GP as well. I think that that way you can immediately discuss the feasibility and the needs and wishes of the patient.' In contrast, GP5 commented: *'I did not acquire a better understanding of the complaints of the CMP complaints of the patient with the aim of the decision-support tool as I do not see anything other than what I take into account when deciding where to refer a CMP patient to.'*

The code presentation of the outcomes served to measure how the GPs would like to see the outcomes of the decision-support tool presented. One GP found the current condition of the decision-support tool sufficient enough for usage. However, five GPs mentioned that the current decision-support tool does include all the main aspects that need to be taken into account when referring CMP patients, but that the tool does not base the referral on all the answers to the questions of the decision-support tool. Instead, the decision-support tool decides per answer to a question if there will be another question, or if the patient can be referred; leaving other important questions unanswered. GP6 commented: *'I would like to see that the tool takes the answers of all the questions into consideration, as I do not believe that one question can exclude the other since they all are equally important.'*

The code outcomes summarized the GPs' opinions of the suggested outcomes of the decision-support tool. Whereas one GP was satisfied with the outcomes of the decision-support tool, five GPs were unsatisfied with the outcomes. From this group of GPs, 4 GPs considered it a pity that the tool is focused on a one-track policy. They suggested that for CMP patients, the psyche also plays an important role, in the current version of the decision-support tool the focus only lays on physical complaints while the psychological complaints are also of importance. GP1 elaborated: *'I don't agree with the outcomes as I think the decision-support tool should become a two-way policy, looking at both the psyche and the physical complaints. E.g., a psychosomatic physiotherapist could be a very good option for*

patients with chronic musculoskeletal pain complaints.' Furthermore, one GP considered the outcomes of the decision-support tool insufficient as this GP believes that there are more referral options possible than represented in the tool. GP4 mentioned: *'I believe more referral options could have been added. E.g., an occupational therapist is only suggested when someone is independent in their daily functioning, but I think an occupational therapist can be of more help. I would also involve a psychosomatic physiotherapist instead of just a physiotherapist as pain and psychological complaints often go hand in hand.'*

Table 3

Explanation of the elements within the content category

Factors and codes	Definition	Quote
Reliability	Reliability of the decision-support tool	
Reliability	Reliability of the decision-support tool	GP5: *'I would scale the reliability of the tool a 3 because I find the tool too vague. Some questions should be more specific to answer them correctly and also the tool should take the psyche as well as the physical complaints more into account when deciding on a referral outcome, as the psyche plays an important role when it comes to CMP complaints.'* GP3 stated: *'I find the decision-support tool reliable as I believe that all main elements are included.*
Outcomes	Outcomes of the decision-support tool	
Presentation of the outcomes	How GPs would like to see the outcomes presented	GP6: *'I would like to see that the tool takes the answers to all the questions into consideration, as I do not believe that one question can exclude the other since they all are equally important.'*
A better understanding of complaints with the decision-support tool	GPs can retrieve a better understanding of complaints of CMP patients with the decision-support tool	GP1: *'As the tool includes all the main aspects, I feel like I can gain a better understanding of the complaints of the patient.'* GP4: *'I did not acquire a better understanding of the complaints of the CMP complaints of the patient with the aim of the decision-support tool as I do not see anything other than what I take into account when deciding where to refer a CMP patient to.'*
Outcomes	GPs opinion about the outcomes of the decision-support tool	GP1: *'In an ideal setting, I would like to go through the tool together with the patient to save time for the GP as well. I think that that way you can immediately discuss the feasibility and the needs and wishes of the patient.'*

Figure 4

Factors and codes of content category
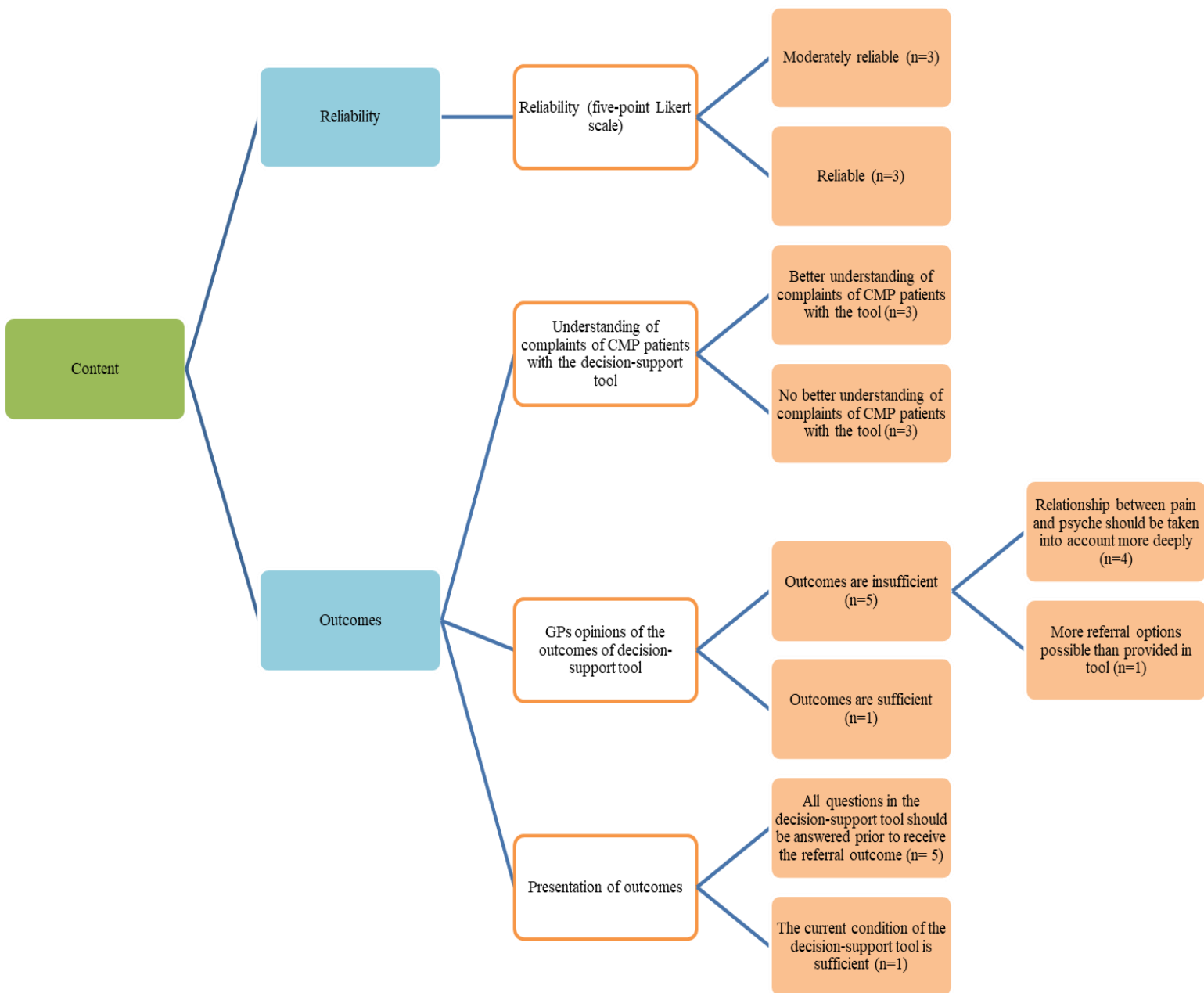
Discussion

Principal findings

This study aims to answer the research question: 'Which factors are facilitating and which factors hinder GPs from using a decision-support tool regarding the referral of CMP patients?' The study investigated the attitudes of GPs regarding the decision-support tool based on user-friendliness, accessibility, effectivity, efficiency, ergonomics, time duration, reliability, and satisfaction with the outcomes.

The findings of this research indicate that using the decision-support tool for the referral of CMP patients is useful for GPs due to the facilitating factors of the decision-support tool. These facilitating factors for GPs towards using the decision-support tool for the referral of CMP patients include its user-friendliness, accessibility, efficiency, shared decision-making, and ergonomics. Based on the results of this research, it can be concluded that the decision-support tool is sufficiently user-friendly as GPs found the decision-support tool understandable and easy to use. When zooming in on accessibility, displaying the decision-support tool in ZorgDomein was suggested to be a facilitator for GPs, just like the use of the decision-support tool by GPs when they are uncertain where to refer a CMP patient to. Moreover, the efficiency of the decision-support tool is considered to be facilitating as it did not cost GPs a lot of effort to use the tool. As to shared decision-making, GPs consider shared decision-making with the patient a facilitating factor for using the decision-support tool, since the patients are immediately able to express their wishes, needs, and feasibilities. Concerning ergonomics, the layout of the decision-support tool was considered basic but pleasant to use, leading the basic layout of the decision-support tool to be a facilitating factor.

Nevertheless, a barrier for GPs regarding the use of the decision-support tool for the referral of patients with CMP entailed the time duration of the decision-support tool when

taking the time duration of a single consultation in a clinical setting into account. Moreover, the main barrier for GPs towards using the decision-support tool for the referral of CMP patients is the fact that the decision-support tool decides per answer to a question if there will be a follow-up question or if the patient can be referred while leaving other important questions unanswered. As a result, doubts and disagreements were expressed regarding the effectiveness and referral outcomes of the decision-support tool. At the start of this study, half of the GPs advised different referral outcomes than the decision-support tool indicated, while most GPs considered the outcomes of the decision-support tool to be sufficient at first glance since all important aspects for generating a referral outcome are included in the decision-support tool. Remarkably, after conducting the usability test and the additional interviews, the majority of GPs considered the outcomes of the decision-support tool to be insufficient since the decision-support tool decides per answer to a question if there will be a follow-up question or if the patient can be referred; leaving other important questions unanswered. Additionally, the reliability of the decision-support tool is questioned by half of the GPs due to this barrier.

Comparison with other studies

This is the first study to test the usability and content of a decision-support tool designed by the PReferral project for GPs towards referring patients with CMP. However, a study that investigated unintended consequences of decision-support tools, found that 95% of the outcomes of decision-support tools are ineffective because GPs often disagree with the outcomes of such decision-support tools (Ash, Sittig, Campbell, Guappone, & Dykstra, 2007). This positive correlation between ineffectiveness and perceived insufficient outcomes is in line with the results of this research. This research showed that GPs found the decision-support tool ineffective as not every question of the tool needs to be answered to receive a referral outcome. As these questions are patient-related, GPs believe that not all factors of a

patient are taken into account when deciding on a referral outcome, making GPs consider the referral outcomes of the decision-support tool insufficient. This finding is in line with other studies that found that patient-related questions are essential for a decision-support tool to receive sufficient outcomes (Forrest, Nutting, von Schrader, Rohde, & Starfield, 2006; Krueger, 2014).

Furthermore, the study of Dixon, Robertson, and Bal (2010) found low adoption rates of GPs towards e-health applications when they entail that GPs need to change their regular method of referring. Therefore, user-friendliness serves as an important facilitating factor regarding the implementation of decision-support tools by GPs, as user-friendliness makes GPs feel more at ease with the adoption of the decision-support tool within their regular referral method (Støme, Wilhelmsen, & Kværner, 2021; Ward, 2001).

When referring a patient, GPs have to open ZorgDomein from the electronic patient record (EPR) and select the speciality they want to refer the patient to. The referral includes two steps, the first step is to generate a short message that the patient will be referred and the second step includes the GP generating a referral letter using a standardized format, which is sent electronically to the healthcare specialist (Bal et al., 2007). Since almost all GPs use ZorgDomein for the referral of patients, implementing the decision-support tool in ZorgDomein could create the least change in the referral method of GPs (Bal et al., 2007; Pees, Bosma, vanOostrom, & Proper, 2022). Therefore, it can be concluded that the representation of the decision-support tool in ZorgDomein would likely be a facilitating factor for GPs regarding the use of the decision-support tool.

Based on the findings of this research, GPs considered shared decision-making a facilitating factor for using the decision-support tool for CMP patients, as the patients are then able to express their needs, wishes and their feasibilities directly to their GP, leading to a

more time-efficient referral outcome. Interestingly, several studies found that GPs are not making much use of shared decision-making due to the barriers regarding GPs' concerns about ensuring that decisions are shared, and the patient's willingness and capability to participate in shared decision-making (Barry, Bradley, Britten, Stevenson, & Barber, 2000; Britten, Stevenson, Barry, Barber, & Bradley, 2000; Elwyn, Edwards, Kinnersley, & Grol, 2000; McKinstry, 2000; Stevenson, 2003; Stevenson, Barry, Britten, Barber, & Bradley, 2000). According to the study by Stevenson (2003), the difficulty of implementing shared decision-making into clinical practice lies in the translation of agreeableness from theory into practice, as shared decision-making in clinical practice is more difficult than described in its theory when it comes to reaching a consensus between patient and GP.

Furthermore, a study that investigated the association between the workload of GPs and patient experiences with care, found that an increase in patients with complex health issues, such as CMP, increases the workload of GPs (Morken, Rebnord, Maartmann-Moe, & Hunskaar, 2019; Schäfer, van den Berg, & Groenewegen, 2020). The increase in workload causes GPs to experience more time pressure, which may have a negative influence on consultation times (Flinterman, Korevaar, & Bakker, 2016; Morken et al., 2019). Especially for patients with complex health issues, such as CMP, this can be a problem as these patients frequently need extra time to address health problems (Østbye et al., 2005). The study of Morken et al. (2019) found that GPs experience a concerning high workload, which may also affect the GPs' health negatively. During this research, the majority of GPs did not take their current workload into account during participation. This finding functions as a potential explanatory factor regarding the relatively large number of GPs that considered the decision-support tool to be sufficient in time duration. However, one GP did take their high workload into account during participation and mentioned that in clinical practice, clicking through the decision-support tool and deciding upon the best fitting referral outcome for a patient with

CMP, will not be executable within one consultation session of ten minutes. As a repercussion of the concerning high workload, GPs are unable to add more of their time to the consultation session. Therefore, this GP considered the time duration of the decision-support tool insufficient. Reducing the high workload of GPs by making them less occupied with the complex health issues of CMP patients, can be achieved by referring CMP patients directly to an expertise centre regarding pain and revalidation whereby scientific research, innovation, and care are closely connected with the revalidation process (Adelante, n.d.; Schäfer et al., 2020).

Limitations

This research faced several limitations. Firstly, because the decision-support tool was developed as an executable file, GPs may not be able to download the file as computers may screen the executable file as spam (Jawale, Mahajan, Shinkar, & Katdare, 2018). Secondly, the small sample size makes it difficult to establish the study's saturation level leading to the possibility that not all important information has been obtained (Schmettow, 2012). Therefore, the findings of this research should be interpreted with caution. Thirdly, this research only included GPs from the East of the Netherlands. By also focusing on GPs in other regions of the Netherlands, a clearer and more representative picture of barriers and facilitators for GPs to use a decision-support tool for the referral of CMP patients can be obtained. Fourthly, participants were retrieved from a database by Dr Van der Lugt; a GP who is very interested in CMP. Therefore, he may have unconsciously included participants in the database who he knew they are interested in CMP as well, which may increase the possibility of response bias (Paulhus, 1991). Fifthly, the usability tests and additional interview questions were transcribed and analysed by the same researcher that also administered the usability tests and additional interview questions, enhancing the odds of research bias. Studies found that the trustworthiness, transparency, and credibility of qualitative research are established via cross-

matching, meaning that different researchers code the data to establish trustworthiness, transparency, and credibility (Harding & Whitehead, 2013; Moravcsik, 2020). For qualitative data, two to three researchers are recommended to generate trustworthiness, transparency, and credibility (Harding & Whitehead, 2013; Moravcsik, 2020). However, since the data analysis of the current study was conducted by one researcher (under supervision), the trustworthiness, transparency, and credibility of this study should be interpreted with caution.

Recommendations

Practical implications

   This research found that the decision-support tool can be of great help for the referral of patients with CMP as the decision-support tool contains all the important aspects to refer CMP patients. However, since most GPs considered the tool to be ineffective because the decision-support tool does not take all patient-related factors into account when deciding upon a referral outcome, creating the decision-support tool so that all patient-related factors are taken into account when deciding upon a referral outcome is recommended to enhance the effectivity of the decision-support tool, and to enhance sufficient referral outcomes. Figure 5 shows a representation of the current working mechanism. Figure 6 shows a representation of the desired working mechanism of the decision-support tool.

Figure 5

Representation of the current working mechanism of the decision-support tool

Input: One single question included in the decision-support tool is answered → The decision-support tool → Output: Another question regarding the patient's complaints is asked, or the decision-support tool provides a referral outcome based on the answer of the single question

Figure 6

The desired working mechanism of the decision-support tool

Input: All the questions included in the decision-support tool are answered → The decision-support tool → Output: The decision-support tool provides a referral outcome based on the answers of all the questions included in the decision-support tool

Moreover, as GPs already experience a high workload, this research recommends shortening the decision-support tool into two questions for GPs, namely: 1) 'Does the patient experiences chronic pain?' and 2) 'Is the patient experiencing musculoskeletal pain?' When the answers to these questions are 'Yes' then GPs can discuss together with the patient the possibility of referring the patient to an expertise centre for pain and revalidation (Adelante, n.d.). In the expertise centre for pain and revalidation, the decision-support tool can be implemented to decide on the best fitting referral outcome for the patient while reducing the workload of GPs.

Suggestions for future research

This study specifically focused on facilitators and barriers for GPs in the East of the Netherlands towards using the decision-support tool for the referral of patients with CMP. Future research should investigate the reliability of the prediction of the decision-support tool by applying the decision-support tool in clinical practice.

Conclusion

This study aimed to investigate the barriers and facilitators for GPs towards using the decision-support tool for the referral of patients with CMP. Based on the findings of this research, it can be concluded that the decision-support tool is usable for the referral of patients

with CMP. Facilitators for GPs towards using the decision-support tool for the referral of CMP patients include its user-friendliness, the decision-support tool fits in well with GPs' regular method of working, it takes little effort to click through the decision-support tool, its facilitation of shared decision making, and a basic layout of the decision-support tool.

The main barrier for GPs towards using the decision-support tool for the referral of CMP patients is the fact that the decision-support tool decides per answer to a question if there will be a follow-up question or if the patient can be referred while leaving other important questions unanswered. Another barrier found is the high workload experienced by GPs. Due to concerning high workload that GPs experience, implementing the decision-support tool in a clinical consultation setting may not be feasible at this point. Therefore, creating a short decision-support tool consisting of two questions for GPs to see if they can refer CMP patients to an expertise centre for pain and revalidation may be more feasible for GPs. Within the expertise centre, the decision-support tool can be implemented to investigate the best fitting referral for the patient while reducing the high workload of GPs.

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Appendix1. Template for the semi-structured interviews

Informatie vooraf:
- Leeftijd
- Geslacht
- Aantal jaren werkzaam als huisarts
- Werkzaam in stad/ dorp
- Hoeveel patiënten
- Solo- of een groepspraktijk
- Op een schaal van 0 tot 10, hoe bekend bent u met patiënten met chronische pijn aan het houdings- en bewegingsapparaat?

Algemeen:
Voorafgaand aan het interview is aan de huisarts gevraagd of hij/ zij een geanonimiseerde patiënt met chronische musculoskeletale pijnklachten op papier mee wil nemen naar het interview. Het begin van dit interview start met enkele vragen over de verwijzing van de desbetreffende patiënt met chronische musculoskeletale pijn.

1. Kunt u mij kort iets vertellen over de patiënt? (leeftijd, klachten)
    a. Waar hebt u de patiënt naar verwezen?
    b. Waar let u op/ waar houdt u rekening mee bij het verwijzen van een patiënt?

Usability:
De volgende vragen gaan in op de bruikbaarheid (=usabillity) van de keuzehulp. Voorafgaand aan de vragen wordt gevraagd of de geïnterviewde de keuzehulp wil openen en zijn/ haar scherm wil delen, zodat de interviewer mee kan kijken met de stappen die de geïnterviewde maakt. Daarbij wordt gevraagd of de geïnterviewde hardop wil uitspreken welke afwegingen de geïnterviewde maakt bij het bepalen van de verwijzing.

2. Aan de hand van de keuzehulp, waar zou u de patiënt dan naartoe hebben verwezen?
    a. Wat vindt u van deze uitkomst?

Gebruiksvriendelijkheid:
3. Op een schaal van 0 tot en met 5, hoe gebruiksvriendelijk vindt u de keuzehulp?

Toegankelijkheid:
4. In welke vorm zou u de keuzehulp het liefst aangeboden krijgen? (app, in EPD, HIS, etc.)?
5. Wanneer zou de keuzehulp voor u van nut zijn?
    a. En waarom?
6. Ondervindt u belemmeringen bij het gebruik van de tool?
    a. En zo ja, welke belemmeringen ondervindt u?

Effectiviteit:
De volgende vragen gaan over effectiviteit. Met effectiviteit wordt bedoeld of de juiste activiteiten worden uitgeoefend om de doelstellingen te realiseren.

7. Vindt u de keuzehulp effectief?
    a. En zo ja, waarom?
8. Vindt u de vragen die gesteld worden effectief genoeg om patiënten te kunnen verwijzen?

9. Wanneer zou voor u de keuzehulp het meeste effect hebben?
10. Denkt u dat de tool ook effectief zou kunnen zijn als u de keuzehulp samen met de patiënt zelf in zou vullen?

Efficiëntie:

De volgende vragen hebben betrekking tot het begrip efficiëntie. Met efficiëntie wordt geduid op doelmatigheid op een manier die weinig inspanning kost.

11. Wat is uw mening over de efficiëntie van de keuzehulp?
12. Wat vindt u van de tijdsduur om de keuzehulp te doorlopen?
13. Zou u met de keuzehulp efficiënter kunnen verwijzen dan zonder de keuzehulp?
   a. Waar ligt dat aan?

Ergonomie:
14. Wat vindt u van de lay-out van de keuzehulp?
15. Zou u dingen anders willen zien in de lay-out?
16. Wat vindt u van de kleuren die worden toegepast in de keuzehulp?
17. Wat vindt u van het lettertype van de keuzehulp?
18. Hoe ervaarde u het doorlopen van de keuzehulp?

Inhoud:

De volgende vragen gaan in op de inhoud van de keuzehulp.
19. Wat vindt u van de inhoud van de keuzehulp over het algemeen?
20. Wat vindt u van de vraagstellingen waaruit de keuzehulp bestaat?
21. Is het taalgebruik van de keuzehulp duidelijk voor u?
22. Vindt u dat de keuzehulp de patiënten naar de juiste verwijzingsplaatsen doorstuurt?
23. Kunt u op basis van de keuzehulp een betere beoordeling geven gezien de complexiteit van de problematiek?
24. Op een schaal van 0 tot 5, hoe betrouwbaar vindt u de keuzehulp?
25. Wat vindt u van de uitkomsten van de keuzehulp?
26. Wat zou er veranderd kunnen worden aan de keuzehulp?
27. Hebt u nog aanvullingen voor de keuzehulp?

Bedankt en afsluiting:

Dit waren alle vragen. Hartelijk bedankt dat u tijd heeft vrijgemaakt voor dit interview.

Mocht u op de hoogte willen blijven van de resultaten, dan is dit zeker mogelijk