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“What affects the implementation of lifestyle interventions in patients with osteoarthritis? A multidisciplinary focus group study among healthcare professionals”

Sjoukje E. Bouma^a , Juliette F. E. van Beek^{a,b}, Manna A. Alma^c , Ron L. Diercks^a ,
Lucas H. V. van der Woude^b , Inge van den Akker-Scheek^{a*}  and Martin Stevens^{a*} 

^aDepartment of Orthopedics, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands; ^bCenter for Human Movement Sciences, University of Groningen, University Medical Center Groningen, Groningen, the Netherlands; ^cDepartment of Health Sciences, Applied Health Research, University of Groningen, University Medical Center Groningen, Groningen, The Netherlands

ABSTRACT

Purpose: To identify factors affecting the implementation of lifestyle interventions (LIs) in patients with hip and/or knee osteoarthritis (OA) from the perspective of primary and secondary healthcare professionals (HCPs) in the Dutch healthcare system.

Methods: Multidisciplinary focus groups were composed. Data analysis was performed following thematic analysis. The Tailored Implementation for Chronic Diseases checklist was used to guide data analysis.

Results: Four focus groups meetings were conducted with 38 participating HCPs (general practitioners (or in-training), orthopedic surgeons (or in-training), physiotherapists, dieticians, a general practice assistant, lifestyle counselors, and nurse practitioners). Influencing factors were grouped into nine themes: (1) intervention factors; (2) individual HCP factors; (3) patient factors; (4) professional interactions; (5) incentives and resources; (6) capacity for organizational change; (7) social, political and legal factors; (8) patient and HCP interactions; and (9) disease factors.

Conclusions: A wide variety of factors affecting the implementation of LIs was identified in this study, where the importance of effective interdisciplinary collaboration was emphasized by the multidisciplinary group of participants. This thorough analysis of influencing factors is an important first step toward improved implementation of LIs within OA care. Further research is required to identify the most significant targets for change in daily practice.

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Clinicians; health promotion; implementation; nutrition; physical activity; qualitative research



► IMPLICATIONS FOR REHABILITATION

- The implementation of lifestyle interventions (LIs) by healthcare professionals (HCPs) in patients with hip and/or knee osteoarthritis (OA) is affected by both individual and environmental factors.
- The influencing factors identified in this study can support the development of interventions aimed at improving the implementation of LIs in OA care.
- A multilevel approach is required when developing interventions to improve the implementation of LIs in OA care.
- Continued efforts of both primary and secondary HCPs and policymakers are needed in order to promote the use of LIs within OA care.


Introduction

A worldwide shift in disease burden from communicable to non-communicable diseases (NCDs) has been observed in recent decades [1]. NCDs, or chronic diseases, are often lifestyle-related and a major cause of disability and mortality [2]. Osteoarthritis (OA) is one such highly prevalent NCD; it is estimated that worldwide 9.6% of men and 18.0% of women aged over 60 years suffer from symptomatic OA [3]. In the Netherlands, nearly 1.5 million people were diagnosed with OA in 2018 [4]. OA is an age-related degenerative joint disorder, with the knee and hip being the most

affected [5]. Obesity is considered one of the main risk factors for the development of OA [6]. Various other potentially modifiable risk factors have been identified, such as physical inactivity, previous joint injury and occupational activity [6,7]. Symptoms of OA include pain, stiffness, muscle weakness and instability, leading to limitations in physical functioning [8]. The resulting immobility can lead to a vicious cycle of inactivity, deconditioning (i.e., muscle weakness), weight gain, increasing pain and functional impairments, reduced social participation and quality of life, thus impacting healthy ageing [8,9].

CONTACT Sjoukje E. Bouma  s.e.bouma@umcg.nl  Department of Orthopedics (BB51), University of Groningen, University Medical Center Groningen, PO Box 30.001, Groningen, 9700 RB, The Netherlands

*Authors who contributed equally to this work.

 Supplemental data for this article can be accessed [here](#).

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Because of an aging population and the rising incidence of obesity and physical inactivity, the prevalence of OA is expected to further increase in the near future [7,8]. Currently, there is no curative treatment [5]. Total joint arthroplasty (TJA) is the most frequently performed surgical procedure for advanced OA [10]. Although TJA is considered a successful and cost-effective intervention, the lifespan of a prosthesis is limited, eventually resulting in revision surgery. Since revision surgery is associated with relatively worse outcomes and higher costs [11], primary TJA should ideally be postponed for as long as possible. In the Netherlands, the number of primary total hip and knee arthroplasties in 2018 was 27 573 and 28 872, respectively [12]. Projections indicate that these numbers may increase considerably in the coming years [13]. Similar trends are seen internationally, with over 1 million primary total hip and knee arthroplasties being performed annually in the United States [14]. To address the rising individual and socioeconomic burden of OA, a shift toward prevention and early management of OA according to evidence-based conservative strategies has been advocated [15,16].

Clinical guidelines on conservative strategies for OA recommend regular physical activity and weight management, which can be incorporated into lifestyle interventions (LIs) [17–21]. Substantial evidence has demonstrated that exercise therapy, alone or in combination with dietary weight loss, has positive effects in terms of reduced pain and improved physical functioning [22–25] and is cost-effective [26,27]. Despite this demonstrated effectiveness, LIs are currently underutilized [28–30]. The evidence-practice gap shows that the implementation of LIs within OA care is still insufficient [16]. This lack of implementation is considered to be the result of multiple-level factors, such as those related to the patient, the healthcare professional (HCP), and the societal context (e.g., structure of healthcare system) [31,32]. HCPs play an important role in patients' lifestyle behavior [33,34]. Although barriers to patient adherence to LIs are well-known [35,36], limited research focusing on the experiences of HCPs and factors influencing the implementation of LIs in their daily practice has been conducted.

Qualitative research methods can be very useful toward gaining more insight into the factors affecting the implementation of LIs from the perspective of HCPs. Qualitative research aims to understand the meanings and experiences of individuals or groups in relation to a particular phenomenon, and is increasingly being used to collect information on the delivery and quality of healthcare [37]. Previous qualitative studies on this topic have focused on the perspective of general practitioners, orthopedic surgeons and physiotherapists as separate specialists [38–41], yet other primary and secondary HCPs might also be involved in the treatment of patients with OA. Additionally, to our knowledge, no qualitative studies have been conducted examining the perspectives of all these potentially involved HCPs jointly. The aim of the current study is therefore to identify factors experienced by primary and secondary HCPs that affect the implementation of LIs in patients with hip and/or knee OA in the Dutch healthcare system.

Methods

Study design and theoretical framework

A qualitative design based on the research paradigm of interpretivism was used. The research paradigm aims to understand human behavior by studying people's interpretations of the real world (as opposed to the positivism research paradigm, which assumes there is an objective reality that can be observed) [42]. The interpretivism paradigm was adopted to allow deeper insight into the

personal or subjective experiences of HCPs with implementing LIs. Focus group discussions were used to collect data, since the occurring group interaction, which can deepen the discussion and individual responses [43], fits with the multidisciplinary nature of OA treatment.

The Tailored Implementation for Chronic Diseases (TICD) checklist was used as a theoretical framework for data analysis in the current study. This checklist, developed by Flottorp et al. [44], is intended for use in implementation research and quality improvement and aims to assist in identifying key determinants for a specific change in order to develop tailored interventions [44]. It has previously been used in the context of other conditions, such as cancer, depression and stroke [45–47]. The TICD checklist consists of 57 potential determinants of professional practice grouped into seven domains: guideline factors; individual health professional factors; patient factors; professional interactions; incentives and resources; capacity for organizational change; and social, political and legal factors [44]. In the current study, these seven domains were adopted when organizing the study findings.

The Medical Ethics Review Board of University Medical Center Groningen (METc UMCG) decided that this study did not fall under the Medical Research Involving Human Subjects Act (WMO) (METc no.: 2018/665). Participants gave their written informed consent prior to the start of the focus groups. The Standards for Reporting Qualitative Research were used to guide the preparation of this manuscript [48].

Participants

Four focus groups meetings were conducted in April and May 2019 at different locations in the northern Netherlands. Participants were primary and secondary HCPs involved in the treatment of patients with hip and/or knee OA. Purposive sampling using a maximum variation sampling strategy in the profession was used to ensure that the different perspectives that might exist among the various HCP disciplines were reflected in the focus groups [43]. Various recruitment methods were used. General practitioners (or in-training) were approached via the Dutch Academic General Practitioner Development Network [*Academisch Huisarts Ontwikkel Netwerk*], a partnership between general practitioners in the northern and eastern Netherlands and the Department of General Practice and Elderly Care Medicine of UMCG. An information e-mail about the study was distributed among all members. Orthopedic surgeons (or in-training) were recruited from the network of the research group. Other HCPs (dietitians, general practice assistants, lifestyle counselors, nurse practitioners and physiotherapists) were recruited by one or more of the following methods or sources: (1) the network of the research group; (2) the network of HCPs already participating in the study; (3) LinkedIn; and (4) invitations to HCPs working in the geographical region of the focus group meetings. More detailed information about the study was provided to all HCPs when they indicated an interest in participating and were able to attend a focus group meeting. All participants received financial reimbursement as compensation for the time invested.

Procedure

The four focus groups were led by an experienced moderator (MA), who had no prior relationship with any of the participants nor was involved in OA treatment or research. In addition, two researchers were present who did not actively participate in the

discussion: one (JvB) for audio-recording the discussion and performing administrative tasks, the other (SB) for asking or answering any content-related questions. Each meeting lasted around two hours. At the start, a short presentation was given (SB) explaining the context of the study and defining the following key terms: (1) Patient population: patients with hip and/or knee OA; (2) Relevant lifestyle factors: physical activity (ranging from physical activity during activities of daily living to participation in supervised or non-supervised exercise therapy or sports) and nutrition; and (3) LIs: all methods that HCPs can implement to promote a healthy lifestyle or influence patients' physical activity and/or eating behavior (ranging from discussing a healthy lifestyle or giving lifestyle advice to referring to or running specific lifestyle programs). The focus groups were conducted following a semi-structured interview guide (Supplemental File 1) that had been reviewed by the project team, a general practitioner and experienced qualitative researchers. Minor changes were made to the guide after the first group, mainly concerning the formulation of questions and time schedule. The TICD checklist was kept in the background during the focus groups and only mentioned in the interview guide as a potential probe. The following baseline characteristics of participants were collected with a questionnaire: gender, age, profession, years of work experience in the current profession and work setting. A debriefing (SB/JvB/MA) took place after each focus group to evaluate the group process, results and circumstances. Given the content of the fourth group (i.e., no new topics), we considered sufficient data saturation was reached.

Data analysis

All focus group discussions were transcribed verbatim (JvB), after which the transcripts were checked for accuracy (SB). A summary of each transcript was made (JvB), checked (SB/MA), and sent to the participants for member-checking, with the request to respond within two weeks if there were any additions and/or comments. Data analysis was performed using thematic analysis [49], combining an inductive and a deductive approach. First, two researchers (SB/JvB) independently coded two transcripts, developing all codes inductively from the data. The codes were compared and organized into a coding tree, mapping each code to either a domain of the TICD checklist [44] (deductive approach) or to a new domain (inductive approach). For example, codes regarding knowledge of HCPs could be mapped to the TICD

domain "Individual health professional factors" (deductive approach). By contrast, codes regarding variability in causes and clinical presentation of OA could not be mapped to one of the TICD domains, therefore a new domain "Disease factors" was created (inductive approach). The coding tree was further refined based on the feedback from a third researcher (MA) and by independently coding an additional transcript (SB/JvB). Lastly, one researcher coded all transcripts (SB), which was verified by a second researcher (JvB). During the entire coding process, any differences between the researchers were discussed and resolved in consensus meetings. All three coders shared a background in Human Movement Sciences, while one (SB) also held a medical degree and one (MA) had extensive experience in qualitative research. To interpret the data, one researcher (SB) formulated themes (matching the domains of the coding tree) and sub-themes, which were discussed and agreed upon in a group meeting with multiple members of the research team (SB/JvB/MA/lvdAS/MS). The focus groups and data analysis were conducted in Dutch, after which results and quotes were translated into English. The software ATLAS.ti version 8.4.16 (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany) was used for data analysis.

Results

In total, 38 HCPs participated in the four focus groups. Their demographic characteristics are presented in Table 1. The median age was 36.5 years (range: 27–64) and a majority was female (60.5%). The median number of years of work experience in the current profession was 6.5 (range: 0–33).

Nine themes were identified during the analysis: seven corresponding with the domains of the TICD checklist and two corresponding with two additional domains. Within each theme, subthemes were identified which are discussed below. An overview of all themes and subthemes is shown in Table 2. Illustrative quotes of the participants are provided for each subtheme, using brackets ('[...]') to indicate omitted text within a quote. After each quote, the following characteristics are presented successively: quote number (Q), participant number (P), profession, and whether below or above the median number of years of work experience (<MWE or >MWE). Additional quotes and all original Dutch quotes are available in Supplemental File 2 and Supplemental File 3.

Table 1. Baseline characteristics of the participants of the four focus groups (FGs)^a.

	FG 1	FG 2	FG 3	FG 4
Number of participants	11	10	8	9
Gender: female	6	8	5	4
Age (y) ^b	37 (28–57)	35 (29–54)	35 (27–64)	41 (28–57)
Work experience in current profession (y) ^b	6 (2–33)	7.5 (0–30)	4.5 (1–30)	12.5 (3–32)
Profession				
Dietician	1	1		1
General practice assistant		1		
General practitioner	2	3	2	1
General practitioner-in-training	3	1	4	
Lifestyle counselor	1	1		1
Nurse practitioner	1	1		1
Orthopedic surgeon	1		1	3
Orthopedic surgeon-in-training			1	1
Physiotherapist	2	2		1
Work setting				
Primary care	6	8	6	4
Secondary care	5	1	2	5
Primary and secondary care		1		

^aData are shown as n unless indicated otherwise.

^bPresented as median (range).

Table 2. Overview of themes and subthemes^a.

Analysis approach	Theme	Subtheme ^b	Definition of theme or subtheme
Themes based on the TICD checklist (deductive approach)	Intervention factors	Effectiveness	Effects of LIs on patients' health condition
		Complexity of behavioral change	Whether the complexity of achieving permanent behavioral change is taken into account in LIs
		Availability	Availability and implementability of existing LIs and related issues (e.g., clinical guidelines, educational materials)
	Individual HCP factors	Knowledge	Factors related to individual primary and secondary HCPs
		Attitude toward LIs	Knowledge of HCPs
		Responsibility	Attitude of HCPs toward implementing LIs
	Patient factors	Health status	Responsibility of HCPs to promote a healthy lifestyle
		Treatment preferences	Factors related to patients with hip and/or knee OA
		Capability	Current health status and patient history
	Professional interactions	Health ownership	Patients' preferences regarding OA treatment
		Network	Patients' ability or opportunities to change their lifestyle
		Coordination of OA treatment	Extent to which patients take responsibility to change their health status and behavior
	Incentives and resources	Communication	Factors related to interactions between primary and secondary HCPs
		Time	Professional network of HCPs
		Financial resources	Coordination and collaboration between HCPs in OA treatment
	Capacity for organizational change	Facilities	Face-to-face or digital contact between HCPs
		Leading character	Factors related to the availability of incentives and resources for primary and secondary HCPs
Support within the organization		Time availability	
Social, political and legal factors	Societal lifestyle climate	Availability of financial resources	
	Healthcare system	Availability of other facilities (e.g., ICT systems, workspace)	
	Media	Factors related to the organization where primary and secondary HCPs work	
Themes based on focus group data (inductive approach)	Patient and HCP interactions	Therapeutic alliance	Professional specifically tasked with improving implementation of LIs
		Disease factors	Support from managers within the organization
			Image
		Variability	Factors related to the social, political and legal context

^aHCP: healthcare professional; LI: lifestyle intervention; OA: osteoarthritis; TICD: Tailored Implementation for Chronic Diseases.

^bAll subthemes were inductively developed from focus group data.

Theme 1: intervention factors

Effectiveness

Several participants stated they experienced the positive effects of LIs on patients, for both OA-related symptoms and general health, as a facilitating factor.

"What you mentioned is mainly in the field of osteoarthritis, but I think if you can get a patient exercising, it is of course beneficial for all factors." (Q1, P2, general practitioner-in-training, <MWE)

Other participants found the effectiveness to be limited and voiced their need for more scientific evidence on the effectiveness and optimal design of LIs.

"But I think that has a lot to do with, well, also the idea, what's right and what's not right. Whether you should exercise or not exercise or whether you should be careful or whether it is allowed to cause pain or not. I think that that's difficult for many people, especially for patients,

what is the benefit of doing more than you were already doing." (Q2, P6, physiotherapist, >MWE)

Complexity of behavioral change

During the discussions, two conditions emerged for achieving permanent behavioral change when implementing LIs. Firstly, the need for long-term or even lifelong (time) investments was discussed, as opposed to temporary interventions such as diets or a limited number of consultations with an HCP. Secondly, the importance of personalized motivating and counseling of patients by HCPs from a holistic perspective was mentioned. This meant that the needs and options of the individual patient should correspond with the type of LI and the method of counseling provided.

"Or it is a package of twelve treatment sessions [physiotherapy] and that doesn't lead to behavioral change. [...] To then take the next step to stay physically active, which of course doesn't cost you anything, is a

very big step for people who aren't sport-minded or exercise-minded." (Q3, P10, general practitioner, >MWE)

"Nobody likes to exercise three times a day. In the end the behavioral change doesn't happen, you do it for a few weeks and then you start doing less. You really have to strive for something practical, so it's just like dieting, nobody can keep it up. You have to find a way that suits someone and works for them." (Q4, P9, lifestyle counselor, <MWE)

Availability

The discussions showed that there are major regional differences in the current range of LIs, and that available LIs might not be used optimally for various reasons (e.g., no clear overview of available LIs).

"But that [exercise intervention] is the big incentive in that region, but in [region], where there is actually quite little, then you don't get those people ..." (Q5, P24, general practitioner, >MWE)

"And what I already mentioned at the beginning is that I often miss in the region that there, that it's not always clear where you can indeed find the right guidance." (Q6, P2, general practitioner-in-training, <MWE)

Although all HCPs have access to national clinical guidelines, participants mentioned situations in which these guidelines do not provide a clear framework to work with (e.g., limited information on LIs).

"Just for fun, I briefly checked the NHG standard [Dutch guidelines for general practice], what does it tell us, but those are just three lines I think, about what they call moderate-intensity exercise. But what exactly is it and how far can you go?" (Q7, P21, general practitioner, <MWE)

Theme 2: individual HCP factors

Knowledge

The following areas were mentioned in which insufficient knowledge can impede the implementation of LIs: OA-specific (e.g., physiology, effectiveness, types of LIs), motivational interviewing techniques, and local availability of LIs or other HCPs.

"It is more the knowledge which is lacking. [...] In that of osteoarthritis. [...] And what are the possibilities, and how can you help a patient, what can you offer them, and I do think you need that." (Q8, P17, general practice assistant, >MWE)

Attitude toward LIs

The majority of participants indicated they consider implementing LIs as very important within their daily practice. However, it was also discussed that other HCPs are not or less convinced of the importance of LIs.

"The thing is, we are all motivated, but I keep running into doctors or even surgeons you cannot say anything to – 'no, I will just cut [perform surgery], that's faster, I do not have to have the conversation, not that discussion with the patient.'" (Q9, P19, lifestyle counselor, <MWE)

Responsibility

Two ways were discussed in which HCPs could fulfill their responsibility for promoting a healthy lifestyle. Firstly, participants mentioned that HCPs can raise awareness by at least discussing a healthy lifestyle during patient consultations, regardless of whether they are the most suitable HCP to further guide the patient. Secondly, participants indicated that HCPs can set an example with their own physical activity and eating behavior.

"I think it is still very important that, even if you have little time, it is a good thing as a care provider, to at least have mentioned its importance, without immediately deploying a lot of behavioral change

techniques. But at least they've heard it once." (Q10, P5, physiotherapist, >MWE)

"I also strongly believe in setting a good example. There has been a general practitioner-in-training in the practice for some time now, so one day a week he takes care of emergency issues, and then I make house calls by bike. And then I pompously park my bicycle in front of patients' doors and then they say, 'oh it's actually not that far from the practice, is it.'" (Q11, P16, general practitioner, <MWE)

Theme 3: patient factors

Health status

Participants stated that for current health status, not only OA-related aspects (e.g., symptom severity, impact on daily functioning) but also other somatic and psychological comorbidities may be of influence.

"Those are of course generally people who not only have osteoarthritis, they also have high blood pressure, they also have diabetes. And if you say 'well if you actually lose weight and start exercising more, and maybe also go on a diet', you can tackle all kinds of things at the same time. And yeah, it is ultimately up to the patient whether they want to work on it." (Q12, P24, general practitioner, >MWE)

For patient history, participants discussed the influence of any previously provided treatments and the experiences with these treatments or the HCPs involved.

"In any event, negative experiences I think are very defining to the patient in terms of whether or not something will succeed. In the sense of, I also see people regularly who have previously been to a dietician and achieved nothing, you know, and then you have the attitude of 'why do you think this time it will work out.'" (Q13, P15, dietician, >MWE)

Treatment preferences

Participants felt that the extent to which patients are intrinsically motivated to change their lifestyles varies. It was discussed that patients often seem to prefer a "quick fix", a solution requiring less effort than behavioral change (e.g., medication, surgery).

"And what I particularly come across [...] is that people's motivation is to rather have a quick fix than end up in an endless trajectory of exercise and losing weight. Plus they've spoken to their neighbor, who at some point had hip or knee surgery and is now in top shape. And then they really want to see the orthopedic surgeon, to hear that they are also eligible for a knee or hip prosthesis." (Q14, P24, general practitioner, >MWE)

Patient expectations of various treatment modalities, based on examples from their environment or information from other HCPs (either correct or incorrect), might likewise influence their preferences.

"If the neighbor has had a successful surgical procedure, then give me a surgery like that too. But if the neighbor has had a very good experience with dieticians, then I want to go to one too." (Q15, P19, lifestyle counselor, <MWE)

Capability

Participants explained patients' capability to change their lifestyle in four different areas: (1) Health literacy: a range of skills that enable patients to influence their health behavior (e.g., knowledge of OA, physical activity and nutrition, language skills, self-management skills); (2) Social environment: the living situation and the supporting social network; (3) Financial resources: whether these resources are sufficient to pay for LIs that are not covered or partially reimbursed; and (4) Access: to online or other information sources or HCPs in the local community. Participants indicated

that capability in each area might be influenced by socio-economic status.

"You also come across patients who very often say 'I can't lose weight' or 'I don't know how to do that.'" (Q16, P3, nurse practitioner, >MWE)

"It's the same with smoking, if the partner smokes and the other has to quit smoking, then it won't work either. But with food and exercising it is of course also the same." (Q17, P39, nurse practitioner, >MWE)

"Yes I've literally heard it, that PT [physiotherapy] wasn't reimbursed for a while, reimbursement for osteoarthritis was limited, no reimbursement for dieticians either, people say 'just give me a new knee, it's much cheaper for me'." (Q18, P20, nurse practitioner, >MWE)

"I sometimes come across people who'll say 'well I don't live or ever go anywhere near a dietician or I've been to a PT [physiotherapist] and they only do this'. And if you hear that frequently you think, okay people from that region, there's no point because they don't have access to support services, so that does hinder me from deploying lifestyle interventions." (Q19, P34, orthopedic surgeon, <MWE)

There is an upper layer of people who, well, it's a bit of that Matthew effect, that if you already have everything you get even more, like highly educated, healthy, well-informed, can read and are able to differentiate on the internet what is nonsense from what isn't. And precisely the people who cannot and do not have it all are left out." (Q20, P8, general practitioner, >MWE)

Health ownership

Some participants felt that patients often lack personal responsibility for their health status and behavior. They would like to see patients take the lead in changing their health behavior rather than rely too much on HCPs.

"A lot of people put it on you – 'just take care of me and give me a new knee and we're done. And then I will get moving' – but that's not how it works." (Q21, P3, nurse practitioner, >MWE)

Theme 4: professional interactions

Network

Regarding the professional network, participants mentioned the need to be aware of the availability and working practice of other HCPs in their region in order to refer patients properly.

"Your social map is important, the transparency, how do you know each other, what do you know about each other, what do you see about each other." (Q22, P12, physiotherapist, >MWE)

Examples were given of situations in which the potential network is not fully visible, such as working (albeit temporarily) in a new region or being unfamiliar with the profession of life-style counselor.

"Especially now as a general practitioner-in-training, that plays an important role too, not knowing the region well yet, so not knowing what's out there, and where you can find everyone." (Q23, P28, general practitioner-in-training, <MWE)

Coordination of OA treatment

Participants emphasized the importance of coordination and collaboration between HCPs, both within and between organizations.

"Collaboration I think, I believe that's what it's all about, we just have to say the same things. So somehow we have to come to some sort of thing where we endorse the same advice. And then you can indeed refer someone to someone else who has longer conversations about nutrition or weight loss. But then we need to be on the same page at least." (Q24, P6, physiotherapist, >MWE)

During the discussions, three aspects emerged where this coordination might not yet proceed optimally. Firstly, the medical

content of OA treatment was mentioned, with differences reported between aspects like applied physiotherapeutic modalities (active vs. passive) and the indications for TJA in hospitals and private clinics. Secondly, the care trajectory was discussed, referring to clarity on the role and order of all HCPs involved. Thirdly, communication with the patient was addressed. This concerns the information provided by HCPs, whereby transferring conflicting information at various points within the care trajectory should be prevented and no undue expectations should be raised among patients.

"But also every clinic and every hospital has different criteria, so [hospital] in [city] requires you to have a certain weight, and in [hospital] that's not a problem. And so this makes it very difficult to [say] something to a patient, to give them information." (Q25, P25, general practitioner, >MWE)

"Transmural conversations, multidisciplinary between the different care providers, so you are in full agreement, with a clear message to the patient. That you just know that, 'if I take this path, I know that it will continue the same way in secondary care', that seems very useful to me." (Q26, P8, general practitioner, >MWE)

"I often see people who say 'well my GP [general practitioner] said, you just need a new knee', period. And so then I give them, you know, my talk, and by then I'm actually already losing 1–0, and then I go, yeah, okay, alright." (Q27, P3, nurse practitioner, >MWE)

Communication

Regarding communication between HCPs for peer consultation or feedback of information about patient consultations, participants shared both positive (short communication lines) and negative (lack of contact) experiences.

"[name of dietician] is sitting here of course, so we also have short communication lines. And at our practice there is also a psychologist present once a week, so we also have very short communication lines, so you can refer and consult very quickly, and I do experience that as positive." (Q28, P18, physiotherapist, <MWE)

"I think orthopedic surgeons are just about the people you communicate the least with. And from our side, it's sort of passing the buck, 'you figure it out'. You never hear anything back." (Q29, P25, general practitioner, >MWE)

Theme 5: incentives and resources

Time

Participants discussed the time available for both patient consultations and other activities. For patient consultations, duration and total number could vary between specialties.

"You [general practitioners] also have 10-minute consultations I think, just like us. So that patient visits us once or maybe two or three times for ten minutes. They go to the PT [physiotherapist] maybe twice a week, and for half an hour." (Q30, P26, orthopedic surgeon-in-training, <MWE)

Other time-consuming activities (not directly related to consultations) mentioned are maintaining the professional network and starting or participating in LIs (like a walking group).

"We always joined, always the GP [general practice] assistant, usually two assistants and a physician [walking group]. So that was also greatly appreciated by people, that we gave up our evenings off. But of course that's not something you keep up forever." (Q31, P25, general practitioner, >MWE)

Financial resources

The financial possibilities of HCPs depended on their earnings (reimbursement for the treatment provided, grants) and expenses

(hiring other HCPs, costs of LIs). A few participants indicated that limited financial resources can be an obstacle.

"The project [exercise intervention] costs €30 000 a year. And of course we keep seeing that." (Q32, P23, *orthopedic surgeon*, >MWE)

Facilities

Some participants worked in a health center that also accommodates other primary HCPs, which might promote interdisciplinary collaboration. An information system to register and identify patients with OA within a practice was also discussed since the current visibility of this patient population in electronic health records seemed to be limited. Lastly, an online communication system to write reports or contact other HCPs was mentioned.

"At the health center [...] we have a dietician, and we indeed have a psychologist [...] and the GP [general practice] assistants. So we look for each other." (Q33, P12, *physiotherapist*, >MWE)

"Perhaps there should also be something like that [registration system] for people with osteoarthritis. Not easy, but maybe something like that can help you get going." (Q34, P21, *general practitioner*, <MWE)

"But the moment we all agree, well that has to be the means of communication, that also makes it easier as healthcare professionals to be able to update each other better on the progress. [...] So an online communication tool, yeah, to send reports more easily, or to be able to communicate with each other. Or just to ask a quick question." (Q35, P15, *dietician*, >MWE)

Theme 6: capacity for organizational change

Leading character

Participants discussed the potential benefits of the availability of a professional who is given the responsibility and required time to improve the implementation of LIs within the organization. Activities of this professional might take place at the coordinating level (i.e., preparing and monitoring LIs, care paths and the associated communication structures) and/or the executive level (i.e., being the contact person for other HCPs and patients with OA for advice on possible LIs).

"The moment there is someone, so to speak from such a research project, and they are exempted in order to set up such things. And they are able to, that will be their job too. Then you start making real progress." (Q36, P31, *physiotherapist*, >MWE)

"That there is one contact person who you can either call or email, or whatever. And then say 'there is this patient, can I refer them to you'. And that's the person who is then, let's say, the coordinating person to say something like 'we'll put them in this trajectory or that'." (Q37, P24, *general practitioner*, >MWE)

Support within the organization

One participant emphasized the positive influence of the board of the organization in recognizing the importance of LIs.

"The chairman of the Executive Board wants to go along with that now. He also sees its importance." (Q38, P23, *orthopedic surgeon*, >MWE)

Theme 7: social, political and legal factors

Societal lifestyle climate

Various participants shared the view that, as a casualty of prosperity, an unhealthy lifestyle seems to have become normal in today's society. Reasons for their view included the increasing prevalence of overweight and the trend toward physical inactivity

and sedentary behavior, both of which might be influenced by people's physical environment.

"We have all become more sedentary, sitting in the car, in entire neighborhoods nobody is physically active anymore, so if you look around no one is getting out of their chair. So it is quite an art, you have to go big, so to speak, to promote physical activity." (Q39, P6, *physiotherapist*, >MWE)

Although some participants felt that this aspect is being increasingly addressed, it was mentioned that the government could adopt a greater role in facilitating a healthy lifestyle within different contexts (i.e., not only at the national level but also within municipalities, schools and workplaces).

"I think physical education is very important here. So politicians and health insurers are also working on employing subject teachers again, preferably three times a week, also in primary schools. So yeah a lot is happening, but, well, sometimes I think it's like tinkering at the edges." (Q40, P36, *general practitioner*, >MWE)

Healthcare system

The view was expressed that the health insurance system works primarily as disease-oriented (as opposed to prevention-oriented), supported by the example of reimbursement for TJA compared to the limited coverage for physiotherapy or lifestyle coaching. In addition, some participants thought that the organization of the healthcare system with its strict division between primary and secondary care could hinder mutual collaboration.

"And of course health insurers must also go along with it. It should also not just be 'well here you have ten sessions, you can use them there'. And then it stops." (Q41, P24, *general practitioner*, >MWE)

"A lot of those things can be solved in primary care. I'd say you can think of a nice shared savings project that can considerably reduce the number of unnecessary referrals to orthopedics. Because someone who comes to you for no good reason is a waste of money. But those are the barriers in healthcare that are holding things back." (Q42, P31, *physiotherapist*, >MWE)

Media

The influence of media was described as twofold: media can have positive effects by increasing attention toward lifestyle, yet there may be negative effects such as dissemination of conflicting or non-evidence-based information.

"You can find a lot about nutrition, on the internet and in books, and in diets that perhaps haven't even been scientifically proven. So you can retrieve it from anywhere." (Q43, P10, *general practitioner*, >MWE)

Theme 8: patient and HCP interactions

Therapeutic alliance

The relationship between patient and HCP might partly depend on previous consultations and the frequency of current consultations.

"It is safe [guidance by general practice assistant] because people are familiar with it, and they come here for their blood pressure anyway, and many of them have easy access, they are on a first-name basis. That is very accessible." (Q44, P8, *general practitioner*, >MWE)

Participants explained their attitude toward each other from both perspectives. Regarding the patient perspective, differences were described between patients who trust the advice of HCPs and patients who demand a certain action from HCPs. From the perspective of HCPs, it was discussed that their attitude could vary between "soft" (agreeing with patient's preferences) and "harsh" (being authoritative).

"It's also somewhat the perception of the patient, you know. They see many things as a right these days. I have the right to be referred to a specialist, because I pay this amount of premium per month. [...] And you just have to refer me." (Q45, P27, *general practitioner-in-training*, <MWE)

"Perhaps we should be much more, yeah, tougher. Also in giving advice and not acting too soft." (Q46, P23, *orthopedic surgeon*, >MWE)

Theme 9: disease factors

Image

Comparisons made by participants seem to indicate that the image of OA within society differs from other NCDs. The following three aspects were discussed that contribute to the current image and could thereby serve as a barrier to implementing LIs: (1) Local condition: OA is often considered a local joint condition rather than an NCD; (2) Irreversibility: the view that OA is a condition that cannot be improved and will only worsen (wear-and-tear); (3) Outcomes following TJA: the positive (short-term) effects, despite the potential of LIs to postpone or prevent TJA or to accomplish even better short- and long-term outcomes (such as the decreased risk of complications, longer lifespan of the prosthesis).

"But when you started talking about your research, I was thinking, gosh why are we doing less of that [implementing lifestyle interventions], what I, what I recognize is you do it in diabetes, COPD [chronic obstructive pulmonary disease], and some more systemic conditions and some more general ones and maybe in our minds it's still more locally. [...] A knee, or a hip, yeah." (Q47, P12, *physiotherapist*, >MWE)

"I think one important thing is that everyone should support the message that it is not a condition you can't do anything about. [...] So also that the term 'wear and tear' should no longer be used by healthcare professionals, because it simply gives an incorrect picture of the cause and of the possibilities." (Q48, P5, *physiotherapist*, >MWE)

"Perhaps that's also a bit of a downside of this surgical procedure, that people are back on their feet so quickly so to speak, that they are feeling so good." (Q49, P28, *general practitioner-in-training*, <MWE)

Variability

Due to the multifactorial nature of OA, the exact contribution of an unhealthy lifestyle to the development of OA is not always clear. In addition, participants questioned to what extent patients can be held fully responsible for an unhealthy lifestyle. This question brought up an ethical perspective on OA treatment: participants indicated that stressing the lifestyle-related component could lead to "blaming" patients, and raised the question of whether applying stricter indications (e.g., body mass index limits) for TJA could be justified.

"I do think you have to be extremely careful not to be too quick to say it is their own fault. I think lifestyle often contributes to the development of disorders, but to call it the cause is taking it a bit far. [...] If you're talking about osteoarthritis, lifestyle will certainly contribute, but just purely age and hereditary factors also play a part." (Q50, P8, *general practitioner*, >MWE)

[when you would refuse to perform surgery] "You blame people for something they may not be able to do anything about. So you also make them feel very guilty." (Q51, P7, *orthopedic surgeon*, <MWE)

Besides diversity in causes, variability in clinical presentation is also included in this subtheme. One participant felt that symptoms and limitations due to OA might be difficult to determine objectively, given individual differences in pain perception and the potential discrepancy between radiological image and perceived symptoms.

"But that is also difficult in the case of osteoarthritis, see, because it is, we take an X-ray, but we also know that an X-ray does not always correspond with the pain. Pain is very subjective, someone has pain and experiences many limitations, someone else feels pain and just keeps going." (Q52, P16, *general practitioner*, <MWE)

Discussion

The aim of this study was to identify factors among HCPs that affect the implementation in the Dutch healthcare system of LIs in patients with hip and/or knee OA. Multidisciplinary focus group discussions with both primary and secondary HCPs revealed factors at both the individual level (knowledge, attitude, responsibility) and various environmental levels (interpersonal, organizational, societal context). The importance of interprofessional collaboration was particularly emphasized by the multidisciplinary group of participants. This main finding suggests that to improve the implementation of LIs as a treatment for OA, primary and secondary HCPs should consolidate their expertise to provide appropriate care at the right place and time.

The results of this study are in line with previous qualitative research conducted in the Netherlands, in which individual interviews with primary and secondary HCPs demonstrated that lack of expertise, lack of evidence-based treatment and suboptimal organization of care were perceived as main barriers to providing non-pharmacological, non-surgical care [38]. Similarities with findings from international studies were also found – for instance, that HCPs perceived gaps in their knowledge and skills or expressed doubts about the effectiveness of LIs, and highlighted the need for training opportunities [39,40,50–52]. Previous research has also reported on the influence of patient-related factors, such as patient characteristics (e.g., comorbidity, socioeconomic status), motivation and engagement in OA management [41,50,51,53], and identified system-level aspects such as time pressure and the availability of and access to health services [41,50,51,54]. In the present study, these factors were confirmed at joint discussions for the first time. What's more, the multidisciplinary of the focus groups revealed the importance of collaboration among the various HCPs involved in OA care, stressing the importance of a joint approach. To this end, multidisciplinary teams could be composed which combine all expertise on OA, lifestyle and behavioral change and provide patient-centered care, which might improve the implementation of LIs and the quality of OA care.

The findings of this study have several implications for clinical practice, for both individual HCPs and policymakers. Referring to the previously described themes, individual HCPs should especially be able to influence their personal determinants (*individual HCP factors*), patient expectations (*patient factors*) and the collaboration with other HCPs (*professional interactions*). Individual HCPs could thus focus on increasing their knowledge of LIs, taking the responsibility to discuss patients' lifestyles in consultations and educating patients about OA and the benefits of LIs. Regarding professional interactions, individual HCPs could invest in maintaining and expanding their network and communicate more frequently with other HCPs about patients' health status and treatment progress.

In addition to individual HCPs, policymakers should focus on facilitating the organizational and societal context. As mentioned in the focus group discussions, various organizational conditions (financial resources, facilities) could be improved (*incentives and resources; capacity for organizational change*), and the government and health insurers could focus more on healthy lifestyle and disease prevention (*social, political and legal factors*). The need was

also expressed for more research into the effectiveness and optimal design of LIs, an overview of available LIs (*intervention factors*), and more attention for lifestyle in professional education (*individual HCP factors*). Lastly, the professional associations of the disciplines involved should cooperate in developing uniform and concrete care paths and guidelines for OA management (*professional interactions*).

To our knowledge, the TICD checklist [44] has never been used to identify determinants of practice in the context of OA care. The checklist was developed based on a systematic review of determinants of practice and a consensus process among implementation researchers [44]. Although its primary focus is on healthcare for patients with chronic diseases in general, the authors suggest applying the checklist to other contexts too, and they anticipate making further adaptations based on practical experiences. For example, previous research focusing on stroke thrombolysis recommended expanding the checklist to the acute setting [47]. Data analysis in the present study revealed two additional domains to the seven predefined domains of the checklist. The first additional domain, patient and HCP interactions, concerns the relationship and communication between patients and HCPs. A possible explanation for the emergence of this domain in the present study is that LIs, due to their current suboptimal implementation in daily practice [16], might be seen by patients as complementary instead of standard treatment. Hence in order to implement LIs, effective patient-professional interaction appears to be an important requisite, potentially requiring additional skills training (e.g., motivational interviewing [55]) on the side of HCPs. The second additional domain, disease factors, includes factors specifically related to OA, including its image and variability in causes and clinical presentation. By adding this domain the characteristics of a disease itself, which can also constitute relevant factors in the context of implementation research, are recognized. To further complement the TICD checklist we, therefore, recommend taking the addition of these two domains into consideration.

Strengths and limitations

To our knowledge, this is the first qualitative study on implementing LIs in which both primary and secondary HCPs involved in OA care participated in joint discussions. The study was conducted in the Netherlands and is therefore illustrative of the Dutch healthcare system and societal climate. Various methods were used to increase the reliability and validity of the findings, such as involving experienced qualitative researchers in study design, data collection and data analysis, and the encoding of transcripts by two researchers independently. The size of the focus groups was relatively large (8–11 participants per group), as we expected beforehand that some HCPs would not be able to attend (e.g., due to clinical duties). Although there was less time available to explore personal experiences in-depth, this group size allowed for extensive interaction between participants, which was precisely our intention when choosing focus groups as a data collection method rather than individual interviews.

Three limitations should be considered when interpreting the results. Firstly, there is a high probability of selection bias since the majority of participants indicated a specific interest in the subject of the focus group discussions. Their views may not reflect the perspectives of all HCPs, as less motivated HCPs could have other experiences. Secondly, the relative importance of the factors was not assessed during the focus group discussions. Lastly, since the study was conducted in the Netherlands, the findings on

organizational context may be less generalizable to other countries due to differences in infrastructure or healthcare system.

Future research

This study has resulted in the first inventory of factors influencing the implementation of LIs in Dutch healthcare from a multidisciplinary perspective. To improve the implementation of LIs within OA care, further insight into the prioritization and exact influence of all factors is required. To establish the relative importance and direction (i.e., whether the factor is perceived primarily as a barrier or facilitator) of the identified factors within each discipline, quantitative research among a larger group of primary and secondary HCPs should be undertaken.

Conclusion

Both individual and environmental factors affect the implementation by primary and secondary HCPs of LIs in patients with hip and/or knee OA. The importance of interdisciplinary collaboration was highlighted in the multidisciplinary focus group discussions. The wide variety of identified factors reveals the need to further prioritize these factors in order to determine the most significant opportunities to improve the implementation of LIs within daily practice.

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ORCID

Sjoukje E. Bouma  <http://orcid.org/0000-0002-8056-6586>

Manna A. Alma  <http://orcid.org/0000-0002-8203-2713>

Ron L. Diercks  <http://orcid.org/0000-0001-9873-208X>

Lucas H. V. van der Woude  <http://orcid.org/0000-0002-8472-334X>

Inge van den Akker-Scheek  <http://orcid.org/0000-0002-1614-8419>

Martin Stevens  <http://orcid.org/0000-0001-8183-6894>

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