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Stakeholder views about a novel consumer health resource for knee osteoarthritis

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SUMMARY

Objective: This study aimed to explore consumers', clinicians', and arthritis advocates' perceptions of a novel osteoarthritis (OA) information booklet that challenged existing beliefs, integrated a biopsychosocial perspective, and incorporated consumer voice and experience.

Design: A mixed-methods study was conducted using an evaluation survey completed after first reading the booklet and subsequent focus groups with Thematic Analysis. Focus groups were conducted with consumers (people with OA; four groups; $n = 19$), general practitioners (two groups; $n = 11$), primary healthcare nurses (two groups; $n = 14$) and arthritis advocates (two groups; $n = 12$).

Results: Quantitative data identified positive initial impressions of the booklet. Four key themes emerged from the focus groups related to: i) an informative and empowering booklet; ii) the need to be clear about the booklet's purpose and audience; iii) discordance between clinician, advocate, and consumer perspectives; and iv) information and advice conflicting with prior beliefs or experience.

Conclusion: A novel information booklet was well received by consumers, clinicians, and arthritis advocates. New information resources can be improved in partnership with consumers and key stakeholders. Co-design with consumers needs to be carefully considered during resource development as consumer views often contrasted with professionals' perceptions of consumer needs. Successful implementation of updated OA information will require a multi-faceted approach that also targets clinicians' knowledge and beliefs.

1. Introduction

Activation to self-manage is central to the healthcare of people with long-term conditions [1,2]. Knowledge and information can assist people to understand their health, improve their management choices, and identify helpful behaviours [1,3,4]. Development of health information resources often has inadequate consumer involvement to incorporate lived experience and there is a tendency to focus on biomedical explanations [5,6]. Involving consumers in the co-design of health information is a key tenet of healthcare quality and produces material that is more relevant, readable, and understandable [7–9].

Beliefs about osteoarthritis (OA) and its management influence support seeking, self-management, physical activity levels, social and leisure participation, and emotional well-being [10,11]. All OA clinical practice guidelines recommend education [12], however, people with OA report that education is often not included in primary care consultations and that reliable information about OA is hard to find [11,13,14]. This limits consumers' ability to engage in healthcare and creates opportunities for misunderstanding [15]. In addition, existing consumer resources often do not represent the experience of people who have OA, often over-emphasise biomedical aspects of the condition, and may reinforce unhelpful beliefs about OA [16,17].

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We have previously explored the beliefs and understanding of people who have knee OA through qualitative interviews [18]. Analysis of these interviews informed the development of a novel information booklet that integrated important OA knowledge and consumer voice [19]. A number of information resources about osteoarthritis already exist in either printed or web format. These have been developed by national advocacy groups (such as Arthritis New Zealand, Musculoskeletal Australia) and research organisations (such as OARSI or Arthritis Research UK). Core messages of the novel booklet were consistent with these existing resources, but the focus and presentation was quite different. Key aspects of difference were the integration of direct quotations from consumers, the absence of imagery related to structural joint changes, the explanation of the multidimensional nature of pain and relative importance of joint surface changes, addressing common misconceptions, the optimistic tone and focus on positive health/health behaviour change, and guidance to create an Action Plan.

The aim of this study was to explore perceptions of this novel booklet, its understandability, acceptability, and perceived utility to people who have knee OA (consumers), primary care clinicians involved in OA care (general practitioners (GPs) and primary healthcare (PHC) nurses), and employees of the national arthritis advocacy group (advocates; Arthritis New Zealand).

2. Methods

University of Otago Health Ethics Committee (H15/081) approved this study that was conducted with accordance with the Helsinki Declaration. The study is reported in accordance with the consolidated criteria for reporting qualitative research (COREQ) guidelines [20].

2.1. Design

Mixed-methods were used. Qualitative data were collected using focus groups and given priority in analysis and interpretation. Quantitative data were concurrently collected through a brief participant survey to supplement and triangulate qualitative data.

2.2. Participants

Potential consumer participants with knee OA were recruited through several mechanisms: i) those who had participated in earlier in-depth interviews that informed the initial booklet development [18]; ii) advertisements in general practices and community settings; iii) referrals from healthcare practitioners. Purposive sampling was used to achieve heterogeneity in gender, age, ethnicity, duration of OA, and socioeconomic circumstance (one proxy for lower health literacy [21]). GPs and PHC nurses were recruited through advertisements in professional newsletters and social media groups, as well as direct invitations to clinicians and primary care practices known to the research team. Arthritis New Zealand advocacy staff were recruited through advertisements in internal organisational emails. All participants gave written informed consent.

2.3. Procedure and data collection

The booklet was developed by an interdisciplinary group of clinicians and academics using professional designers. Readability, assessed with Microsoft Word (Microsoft Corp, Redmond, USA), indicated the text could be understood by an 11 year old (Flesch Reading Ease 82.6%, Flesch-Kinkaid Grade Level 4.8) [22].

Participants were posted the booklet two weeks before their focus group. Participants were invited to complete a brief evaluation survey (Appendix A) [23] after their first reading of the booklet to gather their immediate impressions and encourage active reflection. Participants were encouraged to make annotations and comments on the booklet, highlight sections they wished to discuss, and bring their booklet to their focus group. Consumer participants were also asked to complete sections of the booklet designed to help them to develop an OA Action Plan. Demographic details were collected from participants through completion of a paper-based survey following the focus group.

Four focus groups were held with people who have knee OA ($n = 19$), two with GPs ($n = 11$), two with PHC nurses ($n = 14$), and two with Arthritis New Zealand educators and staff involved in advocacy, strategic or operational roles ($n = 12$). Groups were held in Wellington and Christchurch regions of New Zealand and averaged 6 participants. An additional 3 consumers, 1 GP and 1 PHC nurse initially agreed to take part but were unavailable at times groups were conducted.

Audio-recorded focus groups, facilitated by one of two experienced qualitative researchers with in-depth knowledge of the booklet (MB (research fellow and health coach) or BD (senior lecturer and physiotherapy specialist)), lasted around 75 min (range 54–94 min). These were hosted in a university meeting room (consumer groups 1, 3, 4, PHC nurse group 2, GP group 2), a primary care practice (consumer group 2, PHC nurse group 1), Arthritis NZ office (advocate group 1), videoconference (advocate group 2) and a participants' home (GP group 1). Only participants were present. Four consumer participants had previously participated in face-to-face interviews with MB prior to initial booklet development and two GP participants knew BD from prior research/professional relationships. Item schedules (adapted for consumer, clinician and advocate focus groups) were used to guide focus groups, but participants were able to share information as they wished. Interview schedules explored perceptions of booklet content, clarity, flow, design, and utility (Appendix B). Field notes were recorded about participants' interaction with the booklet.

2.4. Analysis

Quantitative data were entered into an Excel (Microsoft Corp., Redmond, USA) spreadsheet and analysed descriptively. Audio-recordings were transcribed verbatim. Data were analysed inductively using Thematic Analysis [24]. Data collection and analysis occurred concurrently, informing each other iteratively. Although interview schedules were based on study aims, analysis was based on themes emerging in the data. MB and BD met after each focus group to review emergent categories, topics, themes and group dynamics. Consumer, clinician (GPs, PHC nurses) and advocate focus groups were analysed independently to allow for potentially different themes to emerge, and final coding was compared across groups. Each transcript was examined and coded by MB according to emergent categories within NVivo 11 software (QSR International Pty Ltd, Australia). Re-reading and coding of the data incorporated findings from subsequent transcripts in an iterative fashion. Initial coding was undertaken on a line-by-line basis with use of 'open coding' to allow multiple codes to be applied to single segments of data. The relationships between and within codes were then explored by MB and BD with increasingly higher levels of conceptualisation. As coding progressed, emergent themes were identified, tested within previously coded data, and refined. Commonalities and differences between consumers, clinician and advocate groups were analysed. Coding frameworks, theme summaries, and representative data were shared and discussed with the wider research team to further develop emerging themes. Participants did not check transcripts or analysis, but themes were checked in relation to survey data to ensure participants' initial thoughts were represented in focus group findings.

3. Results

Focus group participant characteristics are presented in Table 1.

The booklet evaluation survey endorsed the information as clear, interesting, easy to follow, and likely to be helpful (Table 2). Many consumers and some professionals indicated learning new information and

Table 1
Characteristics of Focus Group Participants.

Group (group code)	No. of participants	Age (years; mean, (range))	Gender	Ethnicity[a]	Education level[b]	Occupation[b]	Pain duration[b]/professional experience[c] (years; mean (range))
Consumer group 1 (C1)	7	65.1 (59–73)	M (2), F (5)	NZE (7)	Secondary (2), Tertiary (4), Post-graduate (1)	Manager (1), Professional (3), Service (1), Retired (2)	15.6 (3–40)
Consumer group 2 (C2)	3	63.7 (56–69)	F (3)	Māori (1), Samoan (1), Niuean (1)	Tertiary (2), Post-graduate (1)	Professional (1), Service (1), Retired (1)	13 (2–31)
Consumer group 3 (C3)	4	41 (36–44)	M (1), F (3)	NZE (3), Samoan (1), Tokelauan (1)	Secondary (2), Tertiary (2)	Professional (1), Clerical (1), Service (1)	1.9 (0.5–10)
Consumer group 4 (C4)	5	71.6 (61–86)	M (3), F (2)	NZE (4), Samoan (1)	Secondary (2), Tertiary (2), Post-graduate (1)	Service (1), Retired (4)	17.8 (6–40)
GP group 1 (G1)	6	52 (44–61)	M (1), F (5)	NZE (6), Māori (1)			20.5 (18–27)
GP group 2 (G2)	5	49.8 (38–58)	F (5)	NZE (5)			21.6 (10–32)
PHC nurse group 1 (N1)	7	55.6 (26–68)	F (7)	NZE (6), English (1)			20.9 (6–35)
PHC nurse group 2 (N2)	7	49.1 (31–68)	F (7)	NZE (7)			9.8 (0.8–15)
Advocate group 1 (A1; advocacy staff)	6	53.3 (33–61)	M (1), F (5)	NZE (5)			1.1 (0.3–4)
Advocate group 2 (A2; arthritis educators)	6	46.8 (30–62)	M (2), F (4)	NZE (4), Māori (2), Filipino (1), British (1)			3.9 (0.8–10.5)

[a] Ethnicity is self-defined, participants could identify with more than one ethnicity.
[b] Item only asked of consumers.
[c] Item only asked of clinicians and advocates. GP = general practitioner; PHC = primary healthcare; M = male; F = female; NZE = New Zealand European.

changing how they thought about OA. Participants thought that people with knee OA might increase their activity levels after reading the booklet.

Four key themes emerged from the focus groups related to: i) an informative and empowering booklet; ii) the need to be clear about the booklet's purpose and audience; iii) discordance between clinician, advocate, and consumer perspectives; and iv) information and advice conflicting with prior beliefs or experience. Quotations supporting themes are presented in text, with further data presented in Appendix C.

3.1. Informative and empowering booklet

Consumers, clinicians, and advocates considered the booklet took a different approach to existing resources, particularly with its focus on positive health messages, addressing commonly-held myths about knee OA, providing ‘revolutionary’ information about pain, and explaining best-practice management informed by contemporary evidence. Many participants (including those who had lived with OA for a long time and some clinicians) commented that the booklet contained information that was new to them.

> *The thing that was new to me, is that I always thought the pain was destroying the joint. But apparently it's not. (C4).*

Participants across all consumer focus groups reported the booklet made them more hopeful about their prognosis and their ability to improve their health, and gave confidence and motivation to increase physical activity. They identified utility in having a wide range of relevant topics included in a single comprehensive resource, rather than spread across different resources.

> *As a newbie to [a diagnosis of OA] … I'd thought oh that's it, I'm overweight, I've got [OA], that's it, I'm done. You know. But reading some of the information in here has given me hope. (C3).*

3.2. The need to be clear about the booklet's purpose and audience

The booklet's attempt to provide comprehensive information and facilitate behaviour change was considered to be too broad by some participants. Advocacy staff (group A1) reported they were unsure which audience the booklet targeted:

> *Is it information? Is it an activity book? Is it a self-help? What is it? Because it seems to be all of the above – what's its purpose? (A1).*

3.2.1. Information or behaviour change tool

The Action Plan aimed to assist consumers to develop goals and identify areas to discuss with clinicians – this aspect of the booklet was poorly received by most consumers. Although some consumers found the Action Plan to be helpful (“*oh, someone's asking me the right questions*” – C2) other consumers considered the questions were too vague, too superficial, too detailed, or not relevant to individual circumstances; others did not see the purpose. Some participants considered the Action Plan was demonstrative of the booklet attempting to move beyond ‘*what*’ to do, to ‘*how*’ to do it. Instead, these participants thought that an information resource should focus on providing information and links to places where people can receive support to implement recommendations.

> *There's actually a disconnect in the booklet between the action, and the places to access assistance for that action. (C1).*

Participants recommended the booklet focused on reinforcing, reminding, and encouraging people to stay active rather than developing a behaviour change plan. Nevertheless, comments from different groups indicated that the booklet may stimulate both consumers and clinicians to change their behaviour. Consumers discussed encouragement to participate in physical activity, as well as identifying specific strategies they could employ.

> *Normally I wouldn't have walked, but I felt confident to walk … [previously] I'd think oh, am I damaging it? But now I'm confident I'm not. (C1).*

PHC nurses and GPs reported the booklet gave them encouragement and confidence to actively promote physical activity in their patients and stimulated them to reconsider how they currently practice. One GP described reflecting on their current focus of just providing diagnostic

Table 2
Booklet Evaluation Survey Responses.

Item	Group	Response count (%)			
		I did not believe much of the information	**I believed most of the information**	**I believed all of the information**	
Did you believe the information?	Consumers (n=19)	0	9 (47%)	10 (53%)	
	Professionals (n=37)	0	14 (38%)	23 (62%)	
		Not at all	**A bit**	**A lot**	
Has the information changed the way you think about knee OA?	Consumers (n=19)	2 (11%)	11 (58%)	6 (32%)	
	Professionals (n=37)	13 (35%)	13 (35%)	11 (31%)	
		I found it boring	**Somewhat interesting**	**Very interesting**	
How interesting was the information?	Consumers (n=19)	1 (6%)	9 (47%)	9 (47%)	
	Professionals (n=37)	0	18 (49%)	19 (51%)	
		The information was confusing	**Some of the information was clear**	**All of the information was clear**	
How clear was the information?	Consumers (n=19)	0	3 (16%)	16 (84%)	
	Professionals (n=37)	0	10 (27%)	27 (73%)	
		I knew most of it already	**I know most of it already, but it was good to be reminded**	**I learned a few new things**	**I learned a lot of new things**
Was the information new?	Consumers (n=19)	3 (16%)	4 (21%)	8 (42%)	4 (21%)
	Professionals (n=37)	3 (8%)	19 (51%)	12 (32%)	3 (8%)
		All of the information was hard to follow	**Some of the information was easy to follow and some was hard to follow**	**The information was somewhat easy to follow**	**The information was easy to follow**
How easy was the information to follow?	Consumers (n=19)	0	1 (5%)	4 (21%)	14 (74%)
	Professionals (n=37)	1 (3%)	7 (19%)	7 (19%)	22 (60%)
		Are unlikely to increase their activity	**Might increase their activity**	**Are very likely to increase their activity**	
After receiving this information, people with knee OA....	Consumers (n=19)	1 (6%)	10 (53%)	8 (42%)	
	Professionals (n=37)	2 (5%)	21 (57%)	14 (38%)	
		I don't think the information will help people much	**I think the information could help people a bit**	**I think the information could help people a lot**	
Do you think the information will help people?	Consumers (n=19)	0	4 (21%)	15 (79%)	
	Professionals (n=37)	0	7 (19%)	30 (81%)	

Professionals = general practitioners, primary healthcare nurses and arthritis advocates.

information; the booklet highlighted the lack of management information they offered. Another GP reflected on their use of explanatory models:

> *I've been guilty of talking about osteoarthritis as the wear and tear type of arthritis … it does challenge some of the ways in which we explain osteoarthritis to people. (G2).*

3.2.2. Clarifying the target audience

Arthritis advocates, PHC nurses and GPs thought that health care providers could learn a lot from the information, but there were concerns that the booklet was too detailed or too complex for consumers. Consumers, however, did not perceive the booklet as targeted at clinicians. Consumers' mostly discussed which consumer subgroup would find the booklet most helpful. The booklet was seen as being particularly useful for guiding people with newly-diagnosed OA or to help families to understand:

> *I thought it was not just useful for people with knee pain, but for, for example, family or partners or somebody who you would like to understand about what's happening to you. (C1).*

Although much of the information was known to those consumers with longer OA experience, the booklet was nevertheless seen as useful for affirming or confirming their knowledge, encouraging or motivating healthy habits, and at times providing new information or challenging existing beliefs.

> *[After reading] the book I thought there're things that I've stopped doing that maybe I could start doing again. You know, so that was the best thing I got from it. (C1).*

3.3. Discordance between clinician, advocate, and consumer perspectives

Assertions were often made by clinicians or advocates about what consumers or groups of consumers (e.g. Māori and Pacifica) needed, however, these concerns often did not seem to be shared by the consumers themselves.

3.3.1. Booklet style and length

Some advocates and clinicians felt that the booklet was written in an academic style, was at times patronising, was too long, too repetitive, contained too much information, and did not adequately cater for different literacy levels, cultural approaches, and learning styles.

> *The whole tone and language … it's very, very white, middle-class … it's been written to people, not with … [it's] an academic type of document. (A1).*

However, clinician and advocate participants who themselves had OA, found the tone and detailed information acceptable.

> *Well I didn't find that at all … I found it really enlightening. I read it all the way through …. I found the language fine. (A1 with knee OA).*

Furthermore, although consumers provided useful feedback on areas of the booklet to rephrase and shorten, most consumers disagreed that it was too long and appreciated having lots of topics in one place.

In contrast to clinician and advocate assertions that the booklet was too academic and difficult-to-read, all participants in the focus group of Pacifica participants recruited from a deprived sociodemographic area and the two Pacifica participants in the focus group of younger participants felt the booklet was a good length and of appropriate complexity. These participants commented that they rarely received information of this sort and appreciated receiving as much information as possible.

> *I hadn't had any information whatsoever, other than seeing the same information at a doctors and at the chemist. This was very new to me and I enjoyed reading it. (C2).*

Some non-Maori and non-Pacifica participants suggested using fewer words and more images to improve accessibility for Māori and Pacifica, however, these issues were not raised by the Māori and Pacifica participants. Pacifica participants considered the level of language was appropriate and it was easy to read, including those participants for whom English was a second language:

> *I really enjoy every bit in the book that explains it, everything about yeah, the arthritis that I've got … For me, the English is my second language. It's amazing me how I can understand, you know, what's in the book and what it says. (C2, older Pacifica consumer).*

3.3.2. Specific content

Some participants – consumers, clinicians and advocates – did not think that having quotations from people with OA added value. However, most participants with OA (including clinicians and advocates) appreciated these:

> *I found the quotes important, because I'm in that situation. I found I went, "Oh yeah, I relate to that too." (A1 advocate with OA).*

The lack of illustrations of knee anatomy was another area of disagreement. Clinicians wanted knee pictures to explain anatomic structures and pathology to patients. Consumers in the group of older Pacifica participants agreed pictures would help them understand explanations provided by clinicians or help them to explain their condition to family members.

> *They always talk about some ball or something. You know, the ball might be square for all I know, in the knee, because I can't see it. (C2, older Pacifica consumer).*

However, most consumers wanted pictures for functional reasons, particularly to identify which specific muscles to strengthen through exercise.

> *A diagram of the knee showing, understanding which muscles take the load. And how to strengthen them. (C4).*

As the focus group discussions progressed, participants across all groups agreed (unprompted by interviewers) that pictures contrasting healthy and OA-affected knees were unhelpful and that omitting them from the booklet helped readers focus positively on managing their OA.

> *There's not a lot of scary pictures … so I think that's quite a clever touch. (A2).*

Some clinicians suggested removing information related to symptom interpretation, such as joint noises, as they considered patients already focused excessively on these symptoms. In contrast, participants with OA liked this information and said that it was reassuring; it acknowledged their experience and addressed questions that were often unasked or unanswered:

> *I get grating and we probably all do … And I wondered what that was. But apparently that is another thing that I didn't know, it [the booklet] sorted that out. (C4).*

Another area of disagreement was the presentation of the booklet developers' academic and professional titles. This was disliked by some PHC nurse participants, but appreciated by consumers. Consumers commented that the authors' credentials demonstrated the information was trustworthy, up-to-date, reliable, and well researched:

> *Serious stuff from people who know … [and] not trying to sell you something. (C4).*

Finally, a number of participants across all groups – clinicians, advocates and consumers – thought that the booklet could be broadened to include other joints with OA where similar advice was relevant. However, many participants thought the specific focus was important:

> *I like that it's specific about the knees … it feels like it's written for me. (C3).*

3.4. Information and advice conflicting with prior beliefs or experience

Some consumers indicated that aspects of booklet information conflicted with their beliefs or past experience or were overly positive. Participants in all groups appreciated the booklet's overall positive tone but thought this needed to be tempered. Participants identified a risk that statements interpreted as being too positive or unrealistic could cause scepticism, and thereby undermine other information.

> *When you're reading the booklet and it's getting, it's building you up, getting you positive, and then there's the sort of the statement, that says 'go for it' … I was thinking, how much of the other things that I've heard previously [in the booklet's earlier pages], how much should I doubt that? Um, I guess that statement to me just feels a bit bold. (C3).*

Consumers also felt that information often conflicted with what clinicians had previously told them. Participants were concerned that if they implemented advice from the booklet and aggravated their symptoms they would receive criticism rather than support from clinicians.

> *I think it's great … [but] I still feel like it's one booklet against the weight of everyone else. (C3).*

4. Discussion

Diverse consumer, clinician, and arthritis advocate focus groups indicated that a novel OA information booklet was acceptable and useful. Participants appreciated the positive approach, integration of a biopsychosocial perspective, challenging commonly held beliefs, incorporating consumer voice and experience, and providing new information that supported active self-management. Some cautions were expressed and refinements suggested that will enable the booklet to be improved prior to efficacy testing. Quantitative survey data triangulated with focus group findings.

This resource was designed to explain updated concepts related to knee OA and to broaden thinking beyond a commonly-held biomedical model of the condition [18]. Consumers appreciated the updated information, but raised two important concerns. Firstly, they were concerned when messages felt overly positive or conflicted strongly with widely held views; they felt these could undermine the message of the booklet. Secondly, consumers reported that many explanations conflicted with advice previously received from clinicians; consumers were concerned that these clinicians would not want or be able to support behaviours recommended in the booklet, or may even criticise them for following the booklet's advice. Studies have found variable beliefs amongst health professionals about OA management, particularly in relation to the value of exercise [25–27]. In addition, many clinicians perceive they have inadequate knowledge and skills to educate people about OA, coordinate care, and prescribe exercise [28]. Teaching clinicians to provide explanations to consumers has been found to be an effective way to positively influence clinician beliefs and behaviour in relation to low back pain [29]. In the current study, a number of clinicians indicated that their own knowledge or clinical behaviour was influenced by reading the booklet.

Differences emerged between what consumers wanted to know and what clinicians and advocates thought consumers needed to know or were able to understand. Written health information has been criticised for focusing on what is considered to be important by clinicians rather than by consumers, and consumers have indicated that they desire broader and more comprehensive information than assumed by clinicians [6]. This highlights the importance of engaging consumers in health information co-design and developing information to meet consumers' expressed needs, rather than clinicians' perceptions of their needs [30]. Some clinicians considered that inclusion of quotations from people with knee OA and the authors' credentials were unnecessary, however, participants with knee OA disagreed and said these elements made the booklet more relevant, credible and trustworthy. These consumer views are consistent with recommendations to present authors' credentials and include consumers' perspectives [7,31,32].

Some participants felt the booklet should be limited to an information resource rather than attempting to also support behaviour change. Although the ‘know-do’ gap is a well-recognised challenge for improving health outcomes through provision of health information [33], these focus groups reinforced that an information resource can realistically only provide knowledge. Additional supports are needed to translate knowledge into behaviour change, such as linking people with local resources to support implementation of recommendations.

A strength of this work is that it involved multiple focus groups with consumers from a range of backgrounds and three key professional groups (GPs, PHC nurses, arthritis advocates) who interact with consumers at different times and in different ways. The focus group design enabled interaction and exchange of perspectives that may not have been achieved with individual interviews [34]. A limitation is that some participants may not have been confident to express their views or disclose challenges they had experienced reading or understanding the material. We attempted to facilitate peer interaction by convening small consumer groups that included people with similar characteristics, such as a group of younger participants with recently-diagnosed OA. Survey responses that captured thoughts when the booklet was first read were concordant with focus group findings. Another limitation is that the number of focus groups was pre-determined rather than recruiting until saturation was achieved. However, no new themes emerged in the final professional or consumer focus groups, indicating that data redundancy was reached. Primary analysis was performed by a single researcher. A second researcher had full access to all data and regularly reviewed coding and interpretations and there were regular discussions about codes and themes. In addition, the wider research team reviewed coding frameworks and findings. The research team included one GP, one health coach, one nurse, three physiotherapists, and one rheumatologist, all of whom had prior qualitative research experience. This diverse disciplinary mix ensured that no particular perspective could influence data interpretation. These findings emerged in relation to a specific OA information resource, but appear to also be applicable to information development for other conditions.

The booklet underwent major revision as a result of these findings. The amount of text was reduced and infographics and stylised illustrations of the knee/lower limb were added to assist understanding and visual appeal; design of these was informed by participants' recommendations for solution-focused images highlighting structures around the joint that may respond to self-management strategies. Text was rewritten to incorporate feedback and temper over-optimism. Sections were reordered to prioritise information considered most valuable. The Action Plan pages were replaced with more information about where to seek support.

This study demonstrated that new information resources can be improved in partnership with consumers and key stakeholders. Consumer views need to be carefully considered during resource development as these can contrast with clinicians' or advocates' perceptions of consumer needs. Resource purpose needs to be clearly explained and links to local resources provided to support recommended behaviour change. Successful implementation of updated OA information will require a multi-faceted approach that also targets clinicians' knowledge and beliefs.

Author contributions

Ben Darlow: Conception and Design, Collection and assembly of data, Analysis and interpretation of the data, Obtaining of funding, Administrative and logistic support, Drafting of the article, Critical revision of the article, Final approval of the article. Ben Darlow (ben.darlow@otago.ac.nz) takes responsibility for the integrity of the work as a whole, from inception to finished article. **Melanie Brown:** Conception and Design, Collection and assembly of data, Analysis and interpretation of the data, Obtaining of funding, Drafting of the article, Critical revision of the article, Final approval of the article**. Rebecca Grainger:** Conception and Design, Obtaining of funding, Analysis and interpretation of the data, Critical revision of the article, Final approval of the article**. Ben Hudson:** Conception and Design, Obtaining of funding, Analysis and interpretation of the data, Critical revision of the article, Final approval of the article**. Andrew M. Briggs:** Conception and Design, Obtaining of funding, Analysis and interpretation of the data, Critical revision of the article, Final approval of the article**. J. Haxby Abbott:** Conception and Design, Obtaining of funding, Analysis and interpretation of the data, Critical revision of the article, Final approval of the article**. Eileen McKinlay:** Conception and Design, Obtaining of funding, Analysis and interpretation of the data, Critical revision of the article, Final approval of the article.

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Conflicts of interest

All authors have none to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ocarto.2020.100058.

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