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Original Research

TEXT4myBACK – The Development Process of a Self-Management Intervention Delivered Via Text Message for Low Back Pain



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List of abbreviations: LBP, low back pain.

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KEYWORDS

Low back pain;
Rehabilitation;
Telemedicine;
Text messaging

Abstract Objective: To develop a bank of text messages for a lifestyle-based self-management intervention for people with low back pain (LBP).

Design: Iterative development process.

Setting: Community and primary care.

Participants: Fifteen researchers, clinicians, and consumer representatives participated in the concept and initial content development phase. Twelve experts (researchers and clinicians) and 12 consumers participated in the experts and consumers review phase. Full study sample of participants was N=39.

Interventions: Not applicable.

Main Outcome Measures: We first conducted two 2-hour workshops to identify important domains for people with LBP, sources of content, appropriate volume, and timing of the messages. The messages were then drafted by a team of writers. Second, we invited expert researchers and clinicians to review and score the messages using a 5-item psychometric scale according to (1) the appropriateness of the content and (2) the likelihood of clinical effectiveness and to provide written feedback. Messages scoring ≤ 8 out of 10 points would be modified accordingly. Consumers were invited to review the messages and score them using a 5-item psychometric scale according to the utility of the content, the understanding of the content, and language acceptability and to provide feedback. Messages scoring ≤ 12 out of 15 points would be improved.

Results: Exercise, education, mood, sleep, use of care, and medication domains were identified and 82 domain-specific evidence-based messages were written. Messages received a mean score of 8.3 out of 10 points by experts. Twenty-nine messages were modified accordingly. The mean score of the messages based on consumers feedback was of 12.5 out of 15 points. Thirty-six messages were improved.

Conclusions: We developed a bank of text messages for an evidence-based self-management intervention using a theory-based, iterative, codesign process with researchers, consumers, and clinicians. This article provides scientific support for future development of text message interventions within the pain field.

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Low back pain (LBP) is currently understood as a long-lasting and complex condition.¹ It encompasses related recurrent episodes and is influenced by multiple factors, including biopsychosocial and lifestyle factors as well as comorbidities and pain-processing mechanisms.¹ Most cases of LBP can be defined as nonspecific because it is not possible to identify a specific nociceptive source.¹ LBP is the greatest cause of disability worldwide, affecting approximately 576 million people and accounting for 64.9 million years lived with a disability in 2017.² The number of years lived with disability due to low back pain has increased by 17% between 2007 and 2017,² and it is expected to continue to rise owing to rises in population and ageing.¹ The economic burden of LBP is also growing, and it is related to both direct (related to health care) and indirect (related to absence at work and reduced productivity) costs.¹ Both the economic and societal burdens of the condition are influenced by the high prevalence of LBP-related disability in the working population leading to work absenteeism or productivity loss.¹

Current evidence recommends the use of education and self-management as first-line care for LBP.³ Self-management strategies can be defined as “all tasks that lead individuals to engage in managing their own symptoms, treatments, and the physical, emotional and social impacts of living with a chronic condition.”⁴ Previous systematic reviews have shown that self-management interventions can improve outcomes, such as pain and disability, when compared to usual care for people with LBP.^{5,6} Even though some studies included components of

important lifestyle behaviors known to be risk factors of LBP development (ie, physical activity participation, sleep quality, mood),⁷ most of these studies failed to include these elements in the interventions delivered.^{5,6}

Text message-based programs are effective and cost-effective self-management interventions for various health conditions, such as diabetes, cardiovascular diseases, and HIV.⁸⁻¹² Self-management interventions delivered via text messages have provided health promotion benefits, increased physical activity levels, and provided support for successful weight loss and smoking cessation.^{9,10,13-15} Because the development and management of LBP are influenced by lifestyle factors,^{1,7} people with LBP could benefit from lifestyle-based self-management interventions delivered via text messages. However, no such text message-based program exists to support the management of LBP. Thus, the aim of the current study was to develop a lifestyle-based self-management intervention delivered via text messages for people with LBP. The effectiveness of the intervention is being tested in a randomized clinical trial.

Methods

Design

An iterative, codesign process was conducted to develop lifestyle-focused self-management text messages for

individuals with LBP. The process was based on a previously published framework¹⁶ and included 2 phases—the concept and content development phase and the expert and consumer review phase. The study was conducted at the Kolling Institute, the University of Sydney. Ethics approval from the Northern Sydney Local Health District was attained before study commencement (NSLHD RESP 18/173). The feasibility of the text message intervention was later tested in a pilot study.

Phase 1: concept and initial content development

The concept of the intervention was first discussed in two 2-hour workshops with researchers, consumer representatives from Musculoskeletal Australia (a support group for people with arthritis and musculoskeletal conditions), and multidisciplinary clinicians (medicine, behavioral change methodology, public health, allied health, pharmacy) with specific knowledge of LBP. Consumer representatives were those who represented patients and the broader musculoskeletal pain community by providing their perspective in decision-making processes, service planning, and improvement of health care and research.

At the first workshop, clinicians, researchers, and consumer representatives met to discuss and decide on the key domains relevant to individuals with LBP based on the main domains found on the “Managing your pain: an A-Z guide” consumer resource developed by Musculoskeletal Australia, which is a consumer organization.¹⁷ This evidence-based consumer guide was created by Musculoskeletal Australia staff and consumers with input from clinicians (ie, rheumatologists, physiotherapists, pain specialists).

The same participants met for the second workshop. The aim of the second workshop was to identify the sources of content that should be used to develop the text messages and decide on the structure of the text message intervention. The participants discussed and decided on the duration of the intervention, the total number of text messages to be sent, frequency of text messages to be sent per week, as well as days and time of day that the messages should be sent. This process was based on scientific evidence.^{18,19} Participants also discussed possible names for the text message intervention. The name “TEXT4myBACK” was suggested by 1 of the investigators after the workshop and was approved by the study team.

The messages were then drafted by the team of writers composed of researchers (J.P., G.V.) and consumer representatives (O.C., L.B.) who participated in the initial workshops. The researchers were experienced physiotherapists with expertise and training in the treatment and research of musculoskeletal disorders. The 2 consumer representatives had more than 20 years of experience in working with evidence-based practice and providing information resources and support for consumers and have previously developed consumer guides for people with musculoskeletal pain. They collaborated to systematically formulate a series of messages for each domain from the recommended sources previously identified.

The messages were based on evidence^{1,3,17,20-25} and written under the theoretical basis of behavior change methodology²⁶ previously used in an effective self-management text message intervention.¹⁶ The behavior change techniques used in the text messages included provision of

information and encouragement; prompting about consequences, intention formation, monitoring self-behavior, and barrier identification; advice about setting graded tasks; and strategies aimed at relapse prevention and the use of prompting and cues. Each message was developed to convey a single concept and had 1 of 3 aims: education, motivation, or behavior change.

The text messages were developed to be sent to individuals with LBP who may or may not be seeking care for their LBP but are willing to receive a text message-based self-management intervention. The messages were written using simple language and contained common abbreviations. The number of characters of each message was limited to 160, which is the maximum number of characters that can be sent in a single text message. They were designed to be 1-way messages, which do not require a reply from the receivers, and to be sent by an automated software. The software would randomly select the days and times that the messages would be sent. After the initial bank of text messages was developed, writers met to confirm that different text messages did not contain the same content, were in simple and clear language, and within the limit of characters.

Phase 2: experts and consumers review

After the initial bank of messages was developed, the research investigators identified key opinion leaders in the field of LBP to be part of the expert review panel. The expert review process aimed to improve the quality of the content of the messages as well as their likelihood of clinical effectiveness. Potential review panel members were sent an invitation by email with a description of the project and the participant information statement detailing the aim and role of the review panel. After the signature of the online consent form, the experts were asked to score each message via an online survey using a 5-item psychometric scale (strongly agree: 5 points; strongly disagree: 1 point) according to (1) appropriateness of content according to available evidence and (2) likelihood of clinical effectiveness. Each message received a total score between 2-10 points by each reviewer. The mean of the total scores for each message and across all reviewers was calculated, providing a total average score of 2-10 points. Panelists were also able to provide recommendations for improvement. It was established that messages receiving a sum score <8 points by any reviewer would be changed and improved according to the reviewer's comment to maximize their quality and likelihood of effectiveness.

After the messages were improved based on experts' reviews, 12 people living with LBP were identified by Musculoskeletal Australia and invited to participate in the review process. Consumer review panel members were sent an invitation by email with a description of the project and the participant information statement detailing the aim and role of the review panel. After signing the consent form, the consumers were asked to complete an online survey assessing each message in terms of (1) perceived utility of the text content, (2) understanding of the text content, and (3) language acceptability. The same 5-item psychometric scale was used for each of the 3 items above. The total score for all 3 items and each message were summed, yielding a total score of 3-15 points for each reviewer (consumer). The

mean of the total scores for each message and across all reviewers was calculated, providing a total average score of 3-15 points for each text message. The consumers were also asked to provide recommendations for improvement. We established that messages receiving a sum score <12 points by any reviewer would be changed and improved according to the comments received.

Results

Phase 1: concept and content development

In the first workshop, the following key domains were identified as important for people with LBP: exercise, education, mood, use of care, sleep, and medication.

In the second workshop, content for the development of text messages were sourced from the Low Back Pain Lancet Series,^{1,3,20,21} international clinical practice guidelines (ie, the National Institute for Health and Care Excellence guidelines for low back pain,²² the National Health and Medical Research Council guideline for acute musculoskeletal pain,²³ and the New South Wales Agency for Clinical Innovation model of care for people with acute low back pain²⁴), and consumer group educational resources.^{17,25} Based on previous evidence,¹⁹ the group established that the acceptable frequency was 4 text messages per week. Twelve weeks of text message intervention was considered an appropriate duration for people with LBP, leading to a total volume of 48 text messages to be delivered. The time slots of 9 AM, 12:30 PM, 4 PM, and 6 PM were identified as potentially appropriate for this population.¹⁹ Considering the importance of advice to remain active for people with LBP,³ it was agreed that exercise was the domain that needed most emphasis and reinforcement in the messages. Therefore, it was decided that messages from the exercise domain would be sent twice per week, and 1 message from education or mood domains and sleep, use of care, or medication domains will be sent once a week.

In this way, a total of 82 text messages were written to ensure enough messages would be available for personalization and after possible deletions following the expert and consumer reviews. Forty messages were developed for the exercise domain, 10 messages were developed for education and mood domains, 8 messages for use of care domain, and 7 messages for sleep and medication domains. The messages were developed to empower patients, thus sentences with a negative tone using words such as “do not” or “should not” were not included in the messages.

The team of writers reviewed all messages to remove duplicates and to ensure they provided evidence-based information, were of appropriate length, and contained only lay terms. All messages were reviewed by researchers with expertise in behavior change techniques to maximize potential effectiveness and ensure alignment with behavior change (J.R., C.C.). Researchers have over 10 years of experience in developing content for over 11 text message programs for patients with chronic diseases including publishing process,¹⁶ developing a methodology to customize the content for different cultural and ethnic populations,²⁷ ongoing evaluation of consumer engagement and feedback,¹⁸ as well

as identifying the characteristics of the text messages that make them more effective.²⁸ The messages underwent a further writing process to ensure that the correct message was captured in approximately 160 characters and included the sign of “#Usyd” to enable patients to easily identify where the messages are from.

Phase 2: experts and consumers review

The expert review panel consisted of 12 experts in the field of LBP, including researchers, pharmacists, physiotherapists, rheumatologists, clinical psychologists, and general practitioners. Each expert reviewed 15 messages to ensure that every message was reviewed by a minimum of 2 experts.

The mean score of the bank of messages was 8.3 out of 10 points. The mean scores of the appropriateness of the content and the likelihood of clinical effectiveness of the messages from each domain are shown in [table 1](#). Experts also shared written feedback related to some messages. Comments were most frequently grammatical suggestions, such as changing or adding words and restructuring sentences for easier understanding. Experts also provided suggestions about the content of the messages, including adapting technical language to improve lay understanding, changing the emphasis of the content, and adding or modifying the examples provided. The reviewers also suggested personalizing some of the messages, shared their own experiences related to the content, and provided positive feedback about some messages. Please refer to [figures 1 and 2](#) to see examples of the iterative process along with quotations of the feedback received and changes made to 1 message of each domain.

Approximately 34% of the bank of drafts (29 messages) received a sum score <8 points by 1 reviewer and were modified according to the written feedback provided. Regarding changes in each domain, the medication domain received the greatest proportion of suggested changes and 57% of these draft messages were improved. This was followed by the education, use of care, and exercise domains, with 50%, 37.5%, and 35% of the draft messages revised, respectively. The domains with the least changes were sleep and mood, with 14% and 10% of the messages improved, respectively. However, only 24% of the bank of drafts had a mean sum score of <8 out of 10 points.

The consumer review panel consisted of 12 people with LBP invited to review the messages and provide feedback. Sixty-seven percent of consumers were women (n=8). Each consumer also evaluated 15 messages to ensure that every message was reviewed by a minimum of 2 people.

The mean score of the bank of messages was 12.5 out of 15 points. The mean scores of the easiness to understand the information, the usefulness of the information, and the acceptability of the language of the messages from each domain are shown in [table 2](#). Consumers also shared written feedback related to some messages. Comments were most frequently related to the content of the messages and suggested the provision of more specific, less technical information and the use of more examples. Some also recommended targeting a few messages to people with specific clinical characteristics. Consumers also provided grammatical advice to alter words and restructure sentences to facilitate understanding, readability, and provide information in a

Table 1 Survey scores from experts for each text message domain

Domains	Characteristics Assessed	Score*
Exercise domain	Appropriateness of the content	4.18±0.92
	Likelihood of clinical effectiveness	3.98±0.92
	Mean sum score (2-10 points)	8.19±1.35
Education domain	Appropriateness of the content	4.07±0.98
	Likelihood of clinical effectiveness	4.04±0.79
	Mean sum score (2-10 points)	8.08±1.13
Mood domain	Appropriateness of the content	4.60±0.60
	Likelihood of clinical effectiveness	4.40±0.60
	Mean sum score (2-10 points)	9.00±1.00
Use of care domain	Appropriateness of the content	4.10±1.02
	Likelihood of clinical effectiveness	3.75±1.21
	Mean sum score (2-10 points)	7.96±1.74
Sleep domain	Appropriateness of the content	4.35±0.63
	Likelihood of clinical effectiveness	4.07±0.73
	Mean sum score (2-10 points)	8.43±1.00
Medication domain	Appropriateness of the content	4.07±1.00
	Likelihood of clinical effectiveness	4.07±1.00
	Mean sum score (2-10 points)	8.14±1.34

NOTE. Values are mean ± SD.

* Appropriateness of the content and likelihood of clinical effectiveness scores range from 1-5 points.

friendlier way. They also shared their personal experiences that related to some aspects of the messages, including their difficulties related to the advice provided or the positive effect that the advice had on their pain.

Approximately 42% of the bank of drafts (36 messages) received a score <12 points by 1 reviewer and were modified according to the written feedback provided. Regarding changes in each domain, the education domain had the greatest proportion of changes with 70% of the draft messages improved. It was followed by the sleep, medication, use of care, and exercise domains, with 57%, 57%, 50%, and 40% of the drafts revised, respectively. None of the mood domain messages was changed. However, only 31% of the messages

had a mean sum score of <12 out of 15 points. Examples of the final versions of the text messages can be found in [table 3](#).

Discussion

This article describes an iterative process used for the development of lifestyle-based self-management text messages to support recovery from an episode of LBP. Eighty-two text messages were developed and will be used in a future evaluation of the effectiveness of self-management for people with LBP. The messages contain useful and lay content in a well-accepted language by patients. This approach was

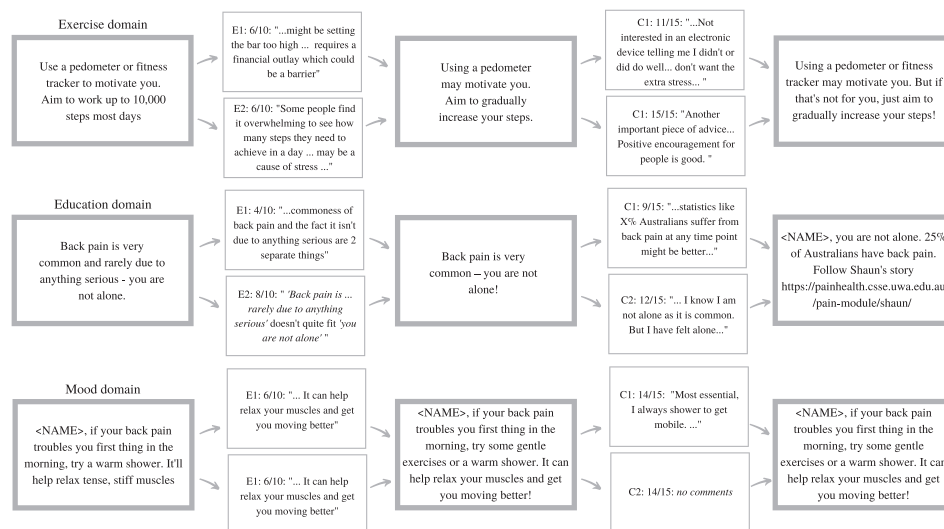


Fig 1 Examples of the review process of text messages from exercise, education, and mood domains with quotations of the feedback provided by experts and consumers. C, consumer; E, expert.

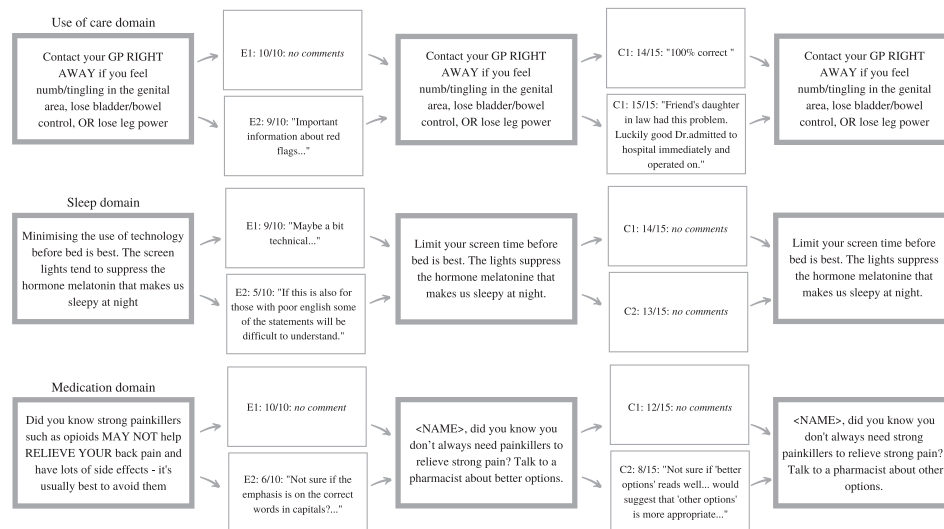


Fig 2 Examples of the review process of text messages from use of care, sleep, and medication domains with quotations of the feedback provided by experts and consumers. C consumer; E, expert; GP, general practitioner.

based on current evidence^{29,30} and on previous text message development processes aimed at preventing cardiovascular events in people with coronary heart disease performed by members of the study team.^{16,18} This iterative development was proved to be feasible and aimed to maximize the possible clinical effectiveness and future implementation of the messages.

To our knowledge, this is the first study to describe the development process of a text message intervention aimed to educate and promote self-management in individuals with LBP. The process included researchers, clinicians, consumers, and consumers representatives in the process and followed the recommended framework.^{29,30} The characteristics of the overall text message program are valuable to

Table 2 Survey scores from consumers for each text message domain

Domains	Characteristics Assessed	Score*
Exercise domain	Information easy to understand	4.40±0.65
	Information was useful	4.28±0.87
	Language was acceptable	4.13±0.81
	Mean sum score (3-15 points)	12.83±1.50
Education domain	Information easy to understand	4.03±0.76
	Information was useful	3.57±0.97
	Language was acceptable	3.70±1.05
	Mean sum score (3-15 points)	11.30±1.86
Mood domain	Information easy to understand	4.42±0.61
	Information was useful	4.47±0.51
	Language was acceptable	4.39±0.50
	Mean sum score (3-15 points)	13.40±1.12
Use of care domain	Information easy to understand	4.18±0.81
	Information was useful	3.94±0.97
	Language was acceptable	3.89±0.99
	Mean sum score (3-15 points)	11.80±2.55
Sleep domain	Information easy to understand	4.45±0.52
	Information was useful	4.07±1.10
	Language was acceptable	4.07±0.80
	Mean sum score (3-15 points)	12.30±1.18
Medication domain	Information easy to understand	4.45±0.49
	Information was useful	3.94±0.97
	Language was acceptable	3.88±0.78
	Mean sum score (3-15 points)	12.00±12.28

NOTE. Values are mean ± SD.

* Information easy to understand, information was useful, and language was acceptable scores range from 1-5 points.

Table 3 Examples of final text messages developed

Domain	Example
Exercise domain	
Aim: education	Your back is designed to move. It may feel challenging but too much bed rest can actually make your back pain worse. #Usyd
Aim: behavior change	<NAME>, are you making yourself sore by doing too much or too little? Planning breaks and change your position between activities could help. #Usyd
Education domain	
Aim: education	<NAME>, the amount of pain you feel does not mean ‘more damage.’ Many things can increase your pain like worry, stress, or lack of sleep. #Usyd
Aim: education	<NAME>, did you know that 80% of people have back pain during their lives? It might not feel like it now but it does reduce with time. #Usyd
Mood domain	
Aim: motivation	<NAME>, even when you have pain, try to keep doing the things you enjoy, like seeing family and friends.
Aim: education/motivation	When you exercise your body releases chemicals that boost your mood and make you feel good, they also ‘turn down the volume’ on your pain system. #Usyd
Use of care domain	
Aim: education	<NAME>, haven’t had a scan or x-ray? It’s a good sign because studies have found most of what they show is normal. #Usyd
Aim: education	<NAME>, did you know that back pain rarely needs surgery? A nonsurgical treatment based on exercise and activity is usually good enough to help you. #Usyd
Sleep domain	
Aim: education/behavior change	Having problems sleeping? Try progressive muscle relaxation to ease your muscle tension. Tense your muscles 1 at a time, feel the tension, and then relax. #Usyd
Aim: advice/behavior change	Can’t get to sleep? It may help to have a warm caffeine free drink, read a book, do some stretches or breathing exercises and go to bed when you feel more comfortable. #Usyd
Medication domain	
Aim: education	Endorphins are feel good hormones and your body’s natural pain reliever. Your body releases them when you exercise and when you laugh. #Usyd
Aim: behavior change/education	Pain medication won’t speed up your recovery but can be used with exercise to keep you active and doing the things you want to do. #Usyd

lead to behavioral modifications, being frequent and unexpected messages key features to drive changes.¹⁸ Thus, the characteristics of the overall text message program were discussed in the initial workshops and were based on scientific evidence.^{18,19} Moreover, the developed text messages integrated the preferences and needs of patients with LBP reported in a recent systematic review.³¹ The recent systematic review has shown that people with LBP want to receive information about LBP, self-management strategies, treatment options, as well as how to psychologically deal with pain in simple language.³¹ Although patients wish to receive general information about LBP management, they also want to receive personalized advice from health care professionals that is more relevant to their symptoms.³¹ TEXT4myBACK includes all of these aspects, providing information about LBP, treatment options (such as exercise, medication, surgery), self-management strategies, and advice for improving sleep and mood. The number of text messages developed allows future tailoring of the messages, which may be performed based on participants’ characteristics, including physical activity participation, duration of symptoms, and presence of sleep issues.

Previous clinical trials have demonstrated the positive effects of text message interventions on exercise³² and medication adherence^{33,34} for people with musculoskeletal conditions. However, these studies did not describe the

methodology for message development.³²⁻³⁴ The lack of information about the development of text message interventions is also common in studies assessing their effectiveness in preventing cardiovascular diseases³⁵ and promoting health.¹⁴ Lack of clarity regarding the development of text messages has been a target of criticism of the research field.³⁶ A comprehensive description of the processes and methodology used to develop text message interventions is encouraged because it will directly affect future research and intervention implementation.³⁶

The TEXT4myBACK intervention represents a potential strategy to support self-management of LBP and, if proven effective, could be applied in clinical practice. The description of the development process ensures that messages are evidence-based and suitable for the target population. Conducting an iterative development process and describing the quality of the messages developed enhances the openness of the process and potentially the effectiveness of the intervention.³⁶ This report allows readers to better understand how the text message intervention was developed and will provide better instruments to assess its mechanisms of effect.^{30,37} Moreover, it provides meaningful information to researchers and clinicians to develop their own work and support the progress of text messages in the management of LBP and other painful musculoskeletal conditions.³⁰ Conducting focus groups with consumers could represent an

alternative option to gain more in-depth feedback from patients on the utility and understanding of the message content. Similarly, consumer perspectives on the acceptability of the language, frequency, and timing of the messages and the duration of the intervention could have been better ascertained using a focus group approach, possibly leading to a more patient-centered and well-accepted intervention.

Study limitations

Although the TEXT4myBACK intervention development followed the recommended framework^{29,30} and included relevant information for people with LBP,³¹ it has some limitations worth mentioning. The text messages were designed to be unidirectional only. Even though some may suggest the inclusion of bidirectional, interactive messaging,²⁹ recent systematic reviews have not identified any significant differences in treatment effects when comparing unidirectional and bidirectional interventions.^{13,14} Despite theory-driven text message interventions not being proved more effective than nontheory driven interventions,^{13,14} TEXT4myBACK text messages were developed based on behavioral change methodology.²⁶ The messages included features known to influence engagement, usefulness, and behavioral-change ability aiming to optimize its ability to change behavior, such as repeated presentation of a stimulus, practical advice, positive reinforcement, provision of achievable task-setting suggestions, and reliable and relevant information.¹⁸ Even though the information of the text messages was considered useful and easy to understand and their language was well accepted by consumers, the messages were individually reviewed, and the acceptability of the entire text message intervention was not assessed. Apart from sex, no other participant demographic data have been collected. Although we acknowledge this as a limitation of the study, ascertaining the influence of consumers' demographics on the quality assessment of the text messages was beyond the scope of this study. The effectiveness and acceptability of the TEXT4myBACK intervention will be assessed in a future randomized controlled trial.

Conclusions

Eighty-two evidence-based self-management text messages were developed to support recovery from LBP. The development of the TEXT4myBACK intervention was based on behavior change techniques,²⁶ incorporated information and advice that people with LBP wish to receive,³¹ and followed recommendations from previous research for text message interventions development.^{29,30} A future randomized clinical trial will be conducted to assess the effectiveness and cost-effectiveness of the intervention in improving health-related outcomes of people with LBP. This study provides scientific support for the future development of text message interventions within the pain field.

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