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Adding Brief Pain Science or Ergonomics Messages to Guideline Advice Did Not Increase Feelings of Reassurance in People With Acute Low Back Pain: A Randomized Experiment

OBJECTIVE: To investigate the effects of adding pain science or ergonomics messages to guideline advice on feelings of reassurance and management intentions among people with acute low back pain (LBP).

DESIGN: Three-arm parallel-group randomized experiment.

METHODS: We recruited people with acute LBP (pain for ≤6 weeks) to participate in an online experiment. Participants were randomized at a 1:1:1 ratio to one of three groups: guideline advice alone or guideline advice with the addition of brief pain science or ergonomics messages. The intervention was delivered via prerecorded videos in all 3 groups. Coprimary outcomes were reassurance that (1) no serious condition is causing LBP and (2) continuing with daily activities is safe. Secondary outcomes were perceived risk of developing chronic pain, management intentions (bed rest, see a health professional, see a specialist, and imaging), credibility, and relevance of the advice in addressing the participant's concerns.

RESULTS: Two thousand two hundred ninety-seven responses (99.3% of 2,313 randomized) were analyzed. Adding brief pain science or ergonomics messages to guideline advice did not change reassurance that LBP was not caused by serious disease. The addition of ergonomics advice provided worse reassurance that it is safe to continue with daily activities compared to guideline advice (mean difference [MD], −0.33; 95% CI: 0.13, 0.53). There was no difference between groups on management intentions.

CONCLUSION: Adding pain science or ergonomics messages to guideline advice did not increase reassurance or change management intentions in people with acute LBP. Ergonomics messages may lead to reduced feelings of reassurance.
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Advice (information provided by a health care professional to improve a patient's understanding of pain or appropriate management) is recommended by international guidelines as first-line treatment for acute LBP (pain ≤6 weeks).[9] Advice reassures people with acute LBP: it reduces fears and concerns about the condition[34] and slightly reduces pain and disability in the short term compared to no advice or placebo advice.[15]

There are many approaches to providing advice for LBP. The current approach recommended in most guidelines involves providing information on the nature of LBP and its typically favorable prognosis, encouraging people to continue with normal activities (eg, activities of daily living, leisure, and work) and to avoid bed rest.[25] Clinicians report several barriers to providing advice about LBP in clinical practice, including lack of skills and knowledge to recognize when messages such as advice to stay active are appropriate.[11] Two other common approaches are framing advice using concepts of pain science education and ergonomic principles.

Pain science education is a popular treatment for LBP that aims to reassure patients by reducing emphasis on tissue damage and explaining the complex nature of LBP, and has been shown to be more reassuring than placebo education.[36] Given its efficacy in reassuring patients compared to placebo, a next step is to investigate the effects of pain science versus guideline-recommended advice. The framework that informs pain science

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education borrows several key messages from guideline advice (eg, advice to stay active) and adds specific messages that are informed by concepts of neurophysiology of pain.[19] A comparative effectiveness study would add value to the field if it compared guideline advice versus adding a pain science component to guideline advice. As some have suggested that key messages in pain science education should be simplified and delivered more concisely, it is also warranted to investigate the effect of adding brief pain science messages to guideline advice.[20]

Ergonomics advice relies on a biomechanical framework to describe how postures and lifting techniques contribute to a person's LBP and advise people on what can be done to reduce or prevent LBP. These include reducing strain on the lumbar spine by maintaining good posture when sitting or lifting objects and losing weight.[15] Similarly to pain science education, advice provided using an ergonomics approach often involves adding messages based on a biomechanics framework to messages that are common in guideline advice (eg, advice to stay active).

Previous systematic reviews have been unable to tease out the effect of 1 approach to providing advice over another.[34] It is unclear whether adding messages from pain science education or ergonomics to standard guideline advice can change reassurance outcomes in people with acute LBP. It is also unclear whether adding pain science and ergonomics messages to guideline advice would change intentions to use health services, such as tests and treatments that have no net benefit or cause harm (eg, bed rest and imaging for acute LBP), and how credible and relevant each one of those approaches are perceived by people with acute LBP. Interventions that are perceived as more credible and relevant may be more likely to elicit changes in attitudes and behaviors and patient outcomes.[6]

While adding pain science messages could increase reassurance because it offers explanations about pain that many patients value,[20] pain science messages may not be well received by people who live with pain in the community.[37] While providing advice using ergonomics messages (eg, postural hygiene, safe lifting) has received growing criticism as they may perpetuate the belief that the lumbar spine is a vulnerable structure that needs to be protected,[26] this claim has not been formally investigated in an experimental study. To address these gaps in the literature, the aim of our study was to investigate the effects of adding pain science or ergonomics messages to guideline advice on feelings of reassurance and management intentions among people with acute LBP.

METHODS

Design

We conducted a 3-arm parallel-group randomized online experiment. We registered the study on the Australia New Zealand Clinical Trials Registry (ACTRN12623000364673) on March 27, 2023, and began data collection on April 4th, 2023. We reported this online experiment in accordance with the CONSORT and CHERRIES checklists.[7,32] This study was approved by The University of Sydney Human Research Ethics Committee (reference number: 2023/112). All participants gave written informed consent before data collection began.

Participants

We recruited participants aged ≥18 years with self-reported acute LBP through Qualtrics in April 2023. Eligible participants had to (1) self-identify as currently having an episode of acute LBP with duration ≤6 weeks; (2) rate their average LBP intensity over the previous 24 hours as ≥1 on a scale of 0 to 10; (3) not have been diagnosed by a doctor with fracture in the lumbar spine, infection in the lumbar spine, cancer, or cauda equina syndrome; and (4) not have undergone lumbar surgery. The questions used to screen participants are described in **APPENDIX A**. We included participants with pain ≥1, as we did not want to use arbitrary thresholds of pain intensity to screen participants for eligibility.

Qualtrics uses existing, nationally representative panels of individuals who have previously agreed to complete online surveys. Qualtrics has partnered with over 20 panel providers globally to recruit participants for studies in various fields (eg, health care, retail, technology), employs random sampling, and provides incentives for participants to complete surveys (eg, cash, airline miles, gift cards). To ensure validity of responses, Qualtrics checks every IP address and uses de-duplication technology—more information on the recruitment process employed by Qualtrics and the data quality checks used can be found elsewhere.[29]

The survey was available only to participants who were contacted by the research panel. Data were collected through the Qualtrics platform. No login details or password were required to complete the survey, and no personal information from participants was passed onto us by Qualtrics. The survey was piloted with 40 participants prior to the start of recruitment to check survey usability and functionality. Each question had a back button to allow respondents to change their answers.

Data Collection

Participants were asked questions on demographics (eg, age, sex, health literacy), clinical history of LBP (eg, pain intensity, interference of current episode of LBP), general health (eg, depressive symptoms), and health care use (eg, previous imaging).

We assessed health literacy with the Single-Item Literacy Screener.[24] Pain intensity was assessed as average pain over the previous 24 hours using a 0-to-10 numerical pain-rating scale. We assessed LBP interference with function using a single item as used in previous studies.[5,33] Emotional distress (anxiety and depressive symptoms) was assessed using 2 questions taken from the Örebro Musculoskeletal Pain Questionnaire.[22,35] We assessed participants' risk of developing chronic LBP using the PICKUP tool.[33]

Interventions

After providing baseline data, participants were randomized in a 1:1:1 ratio to one of three groups: guideline advice (*guideline advice*), guideline advice with the addition of pain science advice (*guideline advice + pain science advice*), or guideline advice with the addition of ergonomics advice (*guideline advice + ergonomics advice*). Randomization was performed using Qualtrics survey software. The intervention in all 3 groups were delivered by a physiotherapist via a prerecorded video embedded in the survey (see **SUPPLEMENTAL FILES 1-3**). The videos covered 2 main themes: what causes LBP and what can be done for LBP, 2 key concerns among people with LBP.[21] Each of the prerecorded videos had a different duration: guideline advice (1 minute and 38 seconds), guideline advice + pain science advice (3 minutes and 49 seconds), and guideline advice + ergonomics advice (2 minutes and 18 seconds). We chose to show participants prerecorded videos to standardize the key messages showed to participants in each group, allowing participants to focus on the content and reducing the likelihood of nonspecific factors such as interaction with a therapist to confound the results.[30]

Guideline advice was based on resources available for consumers developed by the Australian Commission of Quality and Safety in Health Care (ACQSHC) for their LBP clinical care standard.[23] The developed resources for consumers and key messages reflect those from clinical practice guidelines.[3] Guideline advice described LBP as a common condition that typically has a favorable prognosis. It mentioned the lack of relationship between pain intensity and damage to the spine, and that most LBP is not caused by serious pathology. Guideline advice recommended self-management, staying active, avoiding bed rest, maintaining regular physical activity, and remaining or returning to work.

Participants in the *guideline advice + pain-science messages* group were shown the key messages from the guideline advice group in addition to content specific to pain science advice. The additional pain science messages were adapted from the PREVENT trial,[36] a placebo-controlled trial of pain science advice for acute LBP, which showed that this type of advice effectively reassured patients.[4] The messages addressed key learning statements recognized by consumers as important concepts linked to pain science education,[19] including (1) pain is a protective feeling; (2) pain and tissue damage are poorly correlated; (3) pain has multiple drivers; (4) when pain persists, it becomes overprotective; (5) it is possible to retrain a person's pain system to be less protective; (6) learning how pain works is an effective treatment; (7) active strategies are better than passive strategies; and (8) all pain is real no matter what is causing it.

Participants in the *guideline advice + ergonomics messages* group were shown the key messages from the guideline advice group in addition to ergonomics messages. The specific ergonomics messages were based on consumer resources available on the Healthdirect website.[13] Healthdirect provides health information for consumers and is supported by the Australian government. Ergonomics messages described poor posture, weakness in back and abdominal muscles, muscle strain or spasm, and sitting for too long as likely causes of LBP, and always maintaining a good posture, practicing safe lifting, and keeping a healthy weight as strategies to manage LBP.

We combined guideline advice with specific messages provided in the other 2 groups, as key messages from guideline advice are typically presented in education interventions involving both pain science and ergonomic principles. For example, key messages around the common nature of LBP, the low incidence of serious pathology, and on the importance of self-management and avoiding bed rest are commonly conveyed with both approaches.[2,13,36] The contrasting element of pain science and ergonomics messages are the different frameworks used to explain why LBP develops and how to treat it.

Outcomes

Outcomes were collected immediately after participants watched the video. Our coprimary outcomes were reassurance that (1) no serious condition is causing LBP and (2) continuing with daily activities is safe. Both outcomes were adapted from a previous trial[36] and assessed on a 0 (not reassured at all) to 10 (completely reassured) scale.

Secondary outcomes were perceived risk of developing chronic pain, management intentions (bed rest, see a health professional, see a specialist, and imaging), credibility, and relevance of the advice. Perceived risk of developing chronic pain was adapted from previous cohort studies and trials in acute LBP and measured on a 0 (no risk)-to-10 (very large risk) scale.[33,38] Intentions to seek tests and treatments included perceived need for bed rest, imaging, to see a health professional, and to see a specialist. They were adapted from previous trials and measured on a 0 (definitely do not)-to-10 (definitely do) scale.[27,39,40] We assessed the credibility of each intervention using the first 4 questions of the Credibility and Expectancy Questionnaire,[6] a valid and reliable questionnaire that has been used in LBP trials.[8,36] Relevance of the each intervention was assessed with the following question: "*To what extent did the advice that you received address your concerns?*", measured on a 0 (did not address my concerns at all)-to-10 (addressed my concerns completely) scale.

Sample Size Calculation

A sample size of 614 participants per group (1842 in total) had 90% power to detect a 0.5-point difference on the coprimary outcomes, assuming a conservative standard deviation of 2.7[37] and an alpha of 5%. We increased the sample size by an additional 15% to account for potential attrition, thus resulting in a total sample size of 2118 participants (706 per group). Due to Qualtrics' short delay in stopping recruitment, an additional 195 participants were recruited.

Data Analysis

Two pairwise comparisons were conducted for all outcomes: *guideline advice* vs *guideline advice + pain science messages* and *guideline advice* vs *guideline advice + ergonomics messages*. For each comparison, we used multivariable linear regression analysis to estimate the mean treatment effect of 1 type of advice compared to another and reported the mean effect of treatment as mean differences (MDs) and 95% confidence intervals (CI). Adjustment for multiple comparisons was deemed unnecessary.[17,31]

All analyses were adjusted for age and LBP intensity, 2 prognostic factors for LBP.[12,28] Risk of developing chronic LBP was also adjusted by its baseline value, and need for imaging was also adjusted for previous history of imaging of the lumbar spine.[18] Data were analyzed using intention-to-treat principles (ie, all participants were analyzed as randomized) using Stata/BE version 17 (StataCorp, College Station, TX). Due to the negligible number of participants who did not provide primary outcome data (n = 7, or 0.3% of the total sample), we report findings from the complete case analyses.

We preplanned 2 moderation analyses to investigate whether the predicted probability of developing chronic pain using the PICKUP tool and health literacy modified the effect of the intervention on the coprimary outcomes. The PICKUP tool investigates a range of characteristics that we hypothesized could moderate the effect of advice on reassurance, such as compensable status, feelings of depression, and perception that the pain may become persistent. We opted to model the overall predicted probability calculated by PICKUP rather than conduct multiple 1-way analyses of each of those factors due to concerns with multiple testing. We also hypothesized that participants with lower levels of health literacy would display lower levels of reassurance after being exposed to the interventions as people with low health literacy are more likely to have worse health outcomes and adverse health behaviors.[1] We modeled the predicted probability of developing chronic pain as a continuous variable, and dichotomized the single item health literacy screener into suggested cutoffs (scores ≤2 or >2).[24]

RESULTS

Flow of Participants Through the Study

The survey was sent to 21 501 participants, of whom 19 188 were excluded (**FIGURE**). Altogether, 2313 participants were randomized to the 3 groups: guideline advice (n = 784), guideline advice + pain science messages (n = 760), and guideline advice + ergonomics messages (n = 769). Participants spent a median (interquartile range) of 10 minutes (7.2 to 14.6) on the survey and watched the videos for an average of 88% (19.3) of their total duration. Participants were similar in their demographic and clinical characteristics across the 3 groups (**TABLE 1**).

Primary Outcomes

The addition of pain science or ergonomics messages did not provide better outcomes for either reassurance outcome compared to guideline advice alone. The addition of ergonomic messages yielded worse reassurance that it is safe to continue with daily activities compared to guideline advice alone (MD, 0.33; 95% CI: 0.13, 0.53) (**TABLE 2**).

Secondary Outcomes

There were no differences between the groups for most secondary outcomes. Guideline advice was perceived as slightly less relevant in addressing participants' concerns than guideline advice + ergonomics messages (MD, −0.20, 95% CI: −0.41, −0.003), but not guideline advice + pain science messages (MD, −0.09; 95% CI: −0.30, 0.11).

Moderation Analyses

Neither the predicted risk of developing chronic nor health literacy modified the effect of the interventions on any of the pairwise comparisons for both coprimary outcomes (**APPENDIX B**).

DISCUSSION

Adding either pain science or ergonomic messages did not provide better reassurance outcomes than guideline advice alone. The addition of ergonomics messages provided worse reassurance that it was safe to move. We did not identify the predicted risk of developing chronic pain or health literacy as being treatment effect modifiers.

Advice is an important element of LBP care that is known to reassure patients[34] and have small, short-term benefits on reducing pain and disability.[15] However, how to best provide advice to people with LBP was unknown, and our study is the first to provide direct evidence of the value of adding pain science or ergonomic messages to guideline advice. Our findings show that clinicians wanting to reassure their patients with acute LBP about the cause of their LBP and that it is safe to continue with daily activities do not need to use messages from pain science and ergonomics—they can use the simple messages from guideline advice to achieve the same outcome. As many clinicians are typically pressed for time, knowing that a simpler approach to providing advice provides the same benefits in terms of reassurance should be a welcome finding.

The pain science messages used in our study were based on a placebo-controlled trial that found pain science education to be effective at reassuring people with acute LBP that their LBP was not caused by serious disease.[36] That effect was no longer observed when the intervention was reduced from a 2-hour, individualized, in-person approach to a short video and compared to another active intervention. However, our results suggest that adding additional messages from pain science and ergonomics in a primary care consultation may not necessarily lead to increased reassurance or promote more positive management intentions, such as reducing the need for bed rest and imaging.

Guideline advice was more effective than adding ergonomics messages to

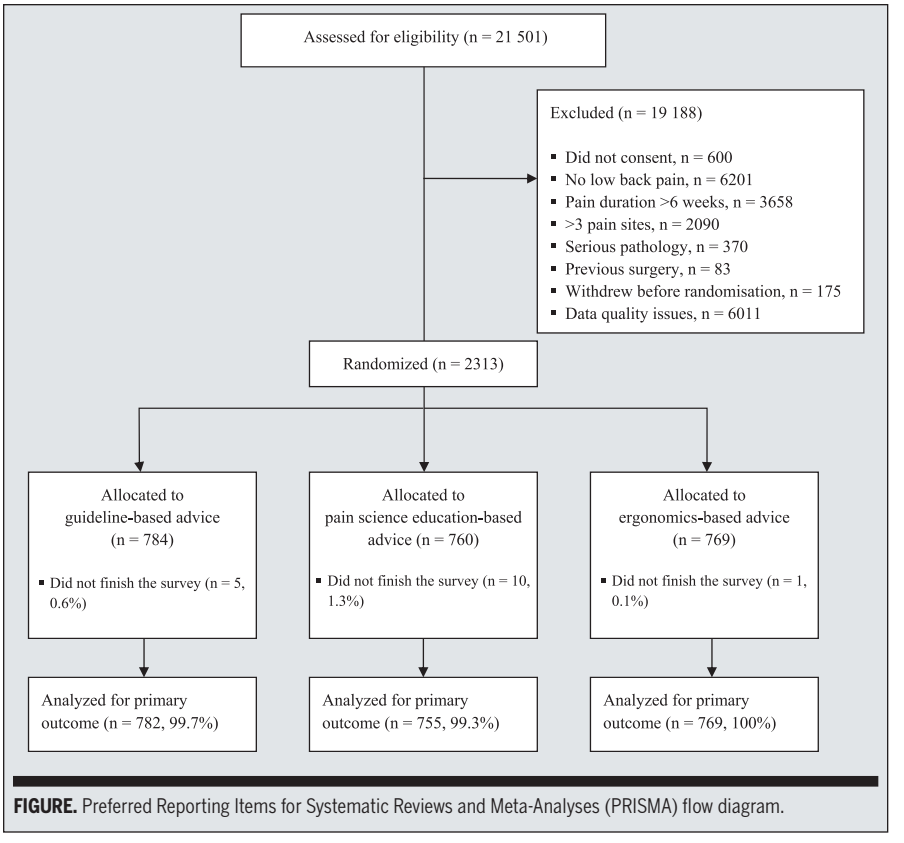

FIGURE. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.

guideline advice in reassuring participants that it is safe to continue with daily activities. However, the difference between groups was very small—less than 0.4 points on a 0-to-10 scale—which may not be clinically important. Delivering ergonomics messages combined with guideline advice could have influenced the magnitude of the observed effect, as guideline advice contained messages around the importance of avoiding bed rest, practicing regular physical activity, and carrying on with daily activities whenever possible. The differences between groups could have been larger had the ergonomics group not received elements of guideline advice. Although it can be assumed that some clinicians only provide advice to their patients using ergonomic principles such as only mentioning the harms of poor posture, on the need for safe lifting, etc, there are no data showing how common that practice is.[16] Our choice for a more balanced presentation of ergonomics messages is supported by a popular resource for patients and consumers in Australia that contains a mix of guideline and ergonomics information.[13]

Strengths of this study include a large sample size from multiple countries, use of random allocation, concealed allocation, and intention-to-treat analysis. The main limitation is that it is an online experiment. It is possible that the effects of advice provided by a health professional in an in-person consultation might be different from what we observed. Advice delivered in person by a therapist is inherently more likely effective than advice delivered via a prerecorded video, or because of the interaction with the therapist may leverage nonspecific effects. Our approach to providing prerecorded videos allowed the message in each group to be delivered in a standardized fashion and reduced the likelihood of nonspecific factors (eg, patient-therapist relationship) to confounding the results. Our sample was overall very educated and had high health literacy. The effects of advice could be different in a less educated population with reduced health literacy, especially for more complex messages such as those with pain science content.[20] When screening patients for eligibility, we did not define LBP using anatomical definitions, and people with other types of back pain (eg, thoracic pain) could have been recruited instead. However, our first screening question asked if participants had pain in several body sites, including the "lower back," as well as "pain in the neck" and "pain in the shoulders," which we believe would have minimized the chances of people without LBP from entering the study. Our coprimary outcomes were adapted from a published trial[36] but have not been validated. However, there are no published measures of reassurance that would have been applicable to our study.[14] Our sample had comparable levels of emotional distress (ie, anxiety and depression symptoms and perceived risk that their acute LBP was going to become chronic) but was slightly younger and had lower levels of pain and interference compared to data available from care-seeking populations.[33]

The interventions were delivered via prerecorded videos with durations that ranged from 1 minute and 38 seconds (guideline advice) to 3 minutes and 48 seconds (guideline advice + pain science messages). Although some may argue that the duration of the intervention may have been too short, we believe that amount of time is representative of how much many clinicians have available to provide advice aiming at reassuring patients with acute LBP. For example, consultation times with a primary care physician were 5 minutes or less in 18 countries representing 50% of the global population.[10]

CONCLUSION

Adding brief messages based on pain science or ergonomics principles to simple guideline advice, delivered in prerecorded videos, for

TABLE 1 Characteristics of Participants (n = 2313)

	Guideline Advice (n = 784)	Guideline Advice + Pain Science Advice (n = 760)	Guideline Advice + Ergonomics Advice (n = 769)
Age (years), mean (SD)	38.5 (13.6)	38.3 (13.5)	38.6 (13.2)
Sex, n (%)			
Female	464 (59.2)	459 (60.4)	424 (55.1)
Male	319 (40.7)	300 (39.5)	343 (44.6)
Prefer not to say	1 (0.1)	1 (0.1)	2 (0.3)
Education[a]			
Up to high school (not completed)	24 (3.1)	37 (4.9)	37 (4.8)
High school (completed)	175 (22.3)	171 (22.5)	151 (19.6)
Nonuniversity tertiary education	99 (12.6)	115 (15.1)	130 (16.9)
University	485 (61.9)	435 (57.2)	451 (58.6)
Employment			
Employed	624 (79.6)	597 (78.6)	630 (81.9)
Unemployed	76 (9.7)	77 (10.1)	66 (8.6)
Student	26 (3.3)	32 (4.2)	18 (2.3)
Retired	58 (7.4)	54 (7.1)	55 (7.2)
Private health insurance (yes), n (%)	502 (64)	463 (60.9)	459 (59.7)
Health literacy (need help with medical instructions or materials), n (%)			
Never	379 (48.3)	361 (47.5)	377 (49)
Rarely	173 (22.1)	162 (21.3)	164 (21.3)
Sometimes	171 (21.8)	171 (22.5)	164 (21.3)
Often	50 (6.4)	56 (7.4)	55 (7.2)
Always	11 (1.4)	10 (1.3)	9 (1.2)
Previous low back pain (yes), n (%)	616 (78.6)	588 (77.4)	617 (80.2)
Received advice for low back pain previously (yes), n (%)	472 (60.2)	450 (59.2)	455 (59.2)
Previous imaging for low back pain (yes), n (%)	307 (39.2)	293 (38.6)	284 (36.9)
Low back pain intensity (0-10), mean (SD)	4.6 (2.1)	4.7 (2.1)	4.6 (2)
Duration of current episode (weeks), n (%)			
<1 week	177 (22.6)	187 (24.6)	185 (24.1)
1-2 weeks	236 (30.1)	208 (27.4)	214 (27.8)
2-4 weeks	206 (26.3)	194 (25.5)	211 (27.4)
4-6 weeks	165 (21)	171 (22.5)	159 (20.7)
Leg pain (yes), n (%)	250 (31.9)	258 (33.9)	253 (32.9)
Low back pain interference, n (%)			
Not at all	83 (10.6)	101 (13.3)	92 (12)
A little	341 (43.5)	300 (39.5)	314 (40.8)
Moderately	247 (31.5)	244 (32.1)	251 (32.6)
Quite a bit	100 (12.8)	108 (14.2)	104 (13.5)
Extremely	13 (1.7)	7 (0.9)	8 (1)
Compensable episode (yes), n (%)	164 (20.9)	164 (21.6)	153 (19.9)
Emotional distress (0-10), mean (SD)			
Anxiety symptoms (0-10)	5.2 (2.2)	5.3 (2.3)	5.2 (2.3)
Depression symptoms (0-10)	4.6 (2.8)	4.7 (2.8)	4.5 (2.8)
Perceived risk of developing chronic pain (0-10), mean (SD)	4.7 (2.4)	4.7 (2.5)	4.6 (2.5)

(Table continues on next page.)

TABLE 1 Characteristics of Participants (n = 2313) (continued)

	Guideline Advice (n = 784)	Guideline Advice + Pain Science Advice (n = 760)	Guideline Advice + Ergonomics Advice (n = 769)
Predicted probability of developing chronic low back pain, median (interquartile range)	18%(12.7%-27.3%)	19.2%(13.3%-27.2%	18.6%(12.8%-27%)
Predicted probability of chronic LBP >30%, n (%)	137 (17.5)	143 (18.8)	143 (18.6)

Abbreviations: LBP, low back pain; SD, standard deviation.
[a]*Three missing values for the variable education.*

TABLE 2 Unadjusted Means (SD) and Adjusted Between-Group Differences (95% CI) for Primary and Secondary Outcomes (n = 2313)

Outcomes	Guideline Advice	Guideline Advice + Pain Science Advice	Guideline Advice + Ergonomics Advice	Effect of Pain Science Advice	Effect of Ergonomics Advice
Coprimary outcomes					
Reassurance that LBP is not caused by serious disease[a], n = 2308	7 (2.2)	7.2 (2.1)	7.1 (2.1)	−0.13 (−0.34 to 0.08)	−0.09 (−0.3 to 0.12)
Reassurance that it is safe to continue with daily activities,[a] n = 2306	7.5 (1.9)	7.5 (1.8)	7.1 (2.1)	−0.08 (−0.26 to 0.11)	0.33 (0.13 to 0.53)
Secondary outcomes[a]					
Perceived risk of developing chronic pain,[b] n = 2305	4.4 (2.5)	4.4 (2.6)	4.4 (2.6)	−0.05 (−0.24 to 0.14)	−0.10 (−0.29 to 0.08)
Need for bed rest,[c] n = 2304	3.9 (3)	4.1 (3)	4.1 (3)	−0.12 (−0.38 to 0.13)	−0.15 (−0.41 to 0.11)
Need to see a health professional,[c] n = 2303	4.6 (2.9)	4.6 (2.9)	4.5 (2.9)	0.29 (−0.22 to 0.28)	0.12 (−0.12 to 0.37)
Need to see a specialist,[c] n = 2302	4.1 (3)	4.1 (3)	4.1 (3)	0.13 (−0.12 to 0.38)	0.10 (−0.15 to 0.35)
Need imaging,[c] n = 2302	4 (3.1)	3.9 (3.1)	3.9 (3.1)	0.19 (−0.06 to 0.44)	0.09 (−0.15 to 0.34)
Credibility,[d] n = 2298	27.2 (5.9)	27.2 (5.9)	27.5 (5.8)	0.08 (−0.49 to 0.67)	−0.30 (−0.88 to 0.27)
Relevance,[e] n = 2297	6.9 (2.1)	7 (2.1)	7.1 (2.1)	−0.09 (−0.30 to 0.11)	−0.20 (−0.41 to −0.003)

Abbreviations: CI, confidence interval; LBP, low back pain; SD, standard deviation.
[a]*Coprimary outcomes range from 0 (not reassured at all) to 10 (completely reassured); higher values mean increased reassurance.*
[b]*Perceived risk of developing chronic pain ranges from 0 (no risk) to 10 (very large risk); higher values mean increased perceived risk.*
[c]*Perceived need for bed rest, to see a health professional, to see a specialist, and imaging ranges from 0 (definitely do not) to 10 (definitely do); higher values mean increased perceived need.*
[d]*Credibility ranges from 3 to 37; higher scores mean increased credibility.*
[e]*Relevance ranges from 0 (did not address my concerns at all) to 10 (addressed my concerns completely); higher values mean increased relevance.*

people with acute LBP may not increase their feelings of reassurance. Ergonomics messages may lead to inferior reassurance. ◉

KEY POINTS

FINDINGS: Adding brief pain science or ergonomics messages to guideline advice did not increase feelings of reassurance in people with acute low back pain or treatment intentions.

IMPLICATIONS: Clinicians wanting to reassure their patients with acute low back pain do not need to use messages from pain science and ergonomics—they can use the simple messages from guideline advice to achieve the same outcome.

CAUTION: The interventions were delivered via prerecorded short videos, which does not mimic a clinical encounter.

STUDY DETAILS

AUTHOR CONTRIBUTIONS: Giovanni E Ferreira, Joshua Zadro, Adrian C Traeger, Caitlin Jones, Mary O'Keeffe, Hazel Jenkins, James McAuley, and Chris Maher

conceptualised the idea, developed the protocol and methods for the study. Giovanni E Ferreira, Joshua Zadro, Courtney West and Adrian Traeger created the intervention. Giovanni E Ferreira prepared, analysed the data and wrote the manuscript. Joshua Zadro secured funding for the study. All authors reviewed and edited the manuscript and reviewed it critically for important intellectual content. All authors approved the final version to be published.

DATA SHARING: Data (baseline and post-intervention) are available upon request for use in further research. Please contact the corresponding author via email for further information.

PATIENT AND PUBLIC INVOLVEMENT: We sought advice from 5 consumers with low back pain on their lived experience of having low back pain and what concerned them. Their feedback was used to inform the development of the guideline-based messages intervention.

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APPENDIX A

SCREENING QUESTIONS

Do you currently have any of the following? (Select up to 3)
NB: Those not selecting "lower back pain" were excluded.
NB2: Those selecting more than 3 options were excluded. We wanted to avoid people ticking all boxes just to go ahead with the survey.
- ▢ Headache
- ▢ Pain in the neck
- ▢ Pain in the shoulders
- ▢ Pain in the lower back
- ▢ Pain in your stomach
- ▢ Pain in your hips
- ▢ Pain in your knees
- ▢ I have no pain currently

How long have you had your current low back pain problem?
NB: those selecting 6-8 weeks or longer were excluded.
- ▢ Less than 1 week
- ▢ 1-2 weeks
- ▢ 2-4 weeks
- ▢ 4-6 weeks
- ▢ 6-8 weeks
- ▢ 8-10 weeks
- ▢ 10-12 weeks
- ▢ >12 weeks

How much low back pain have you had during the past week?
NB: Those not selecting "None" were excluded.
- ▢ None
- ▢ Very mild
- ▢ Mild
- ▢ Moderate
- ▢ Severe
- ▢ Very severe

On average, how much low back pain have you had over the past 24 hours?
0 = no pain at all, 10 = worst pain imaginable
NB: Those selecting 0 were excluded

Have you ever been told by a doctor that you have any of the following conditions: cancer, fracture in your lower back, infection in your lower back, cauda equina syndrome?
NB: Those selecting "Yes" were excluded
- ▢ Yes
- ▢ No

Have you ever had back surgery?
NB: Those selecting "Yes" were excluded
- ▢ Yes
- ▢ No

APPENDIX B

MODERATION ANALYSES

		Guideline Advice vs Guideline Advice + Pain Science Messages		Guideline Advice vs Guideline Advice + Ergonomics Messages	
Outcome	**Moderator**	**MD (95% CI)**	***P* Value (Interaction)**	**MD (95% CI)**	***P* Value (Interaction)**
Reassurance that LBP is not caused by serious disease	Predicted probability of developing chronic pain (PICKUP)[a]	0.0007 (−0.02 to 0.02)	0.94	−0.006 (−0.02 to 0.01)	0.49
Reassurance that it is safe to continue with daily activities	Predicted probability of developing chronic pain (PICKUP)[a]	0.001 (−0.02 to 0.02)	0.90	0.003 (−0.02 to 0.02)	0.75
Reassurance that LBP is not caused by serious disease	Health literacy[b] ≤2	0.22 (−0.03 to 0.48)	0.2	0.15 (−0.10 to 0.40)	0.44
	Health literacy[b] >2	−0.07 (−0.45 to 0.31)		−0.30 (−0.41 to −0.35)	
Reassurance that it is safe to continue with daily activities	Health literacy[b] ≤2	0.12 (−0.11 to 0.36)	0.50	−0.39 (−0.62 to −0.16)	0.40
	Health literacy[b] >2	−0.02 (−0.37 to 0.33)		−0.21 (−0.57 to 0.15)	

Abbreviations: CI, confidence interval; LBP, low back pain; MD, mean difference.
[a]The predicted probability of developing chronic pain was modeled as a contiwnuous outcome.
[b]Health literacy was assessed with the Single-Item Health Literacy Screener and dichotomized into low vs high levels of health literacy using suggested cut-offs (scores ≤2 or >2).