BMJ Open

The results of a feasibility randomized clinical trial on pain education for low back pain in Nepal: The PEN-LBP feasibility trial.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-026874
Article Type:	Research
Date Submitted by the Author:	24-Sep-2018
Complete List of Authors:	Sharma, Saurab; Kathmandu University School of Medical Sciences, Department of Physiotherapy; University of Otago Dunedin School of Medicine, Orthopedic Surgery Section, Department of Surgical Sciences Jensen, Mark; University of Washington, Department of Rehabilitation Medicine Moseley, G.; Sansom Institute for Health Research, University of South Australia Abbott, J. Haxby; University of Otago, Department of Surgical Sciences, Dunedin School of Medicine
Keywords:	Low back pain, Pain management < ANAESTHETICS, Musculoskeletal pain, Patient education, Culture, Low-income country

Title: The results of a feasibility randomized clinical trial on pain education for low back pain in Nepal: The PEN-LBP feasibility trial.

Authors: Saurab Sharma [1, 2]

Mark P. Jensen [3]

G. Lorimer Moseley [4]

J. Haxby Abbott [2]

Affiliations: [1] Department of Physiotherapy, Kathmandu University School of Medical Sciences, Dhulikhel, Nepal

[2] Centre for Musculoskeletal Outcomes Research, Department of Surgical Sciences, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[3] Department of Rehabilitation Medicine, University of Washington, Seattle, USA

[4] School of Health Sciences, University of South Australia, Adelaide, Australia.

Present address of corresponding author:

Saurab Sharma

Assistant Professor, Department of Physiotherapy

Kathmandu University School of Medical Sciences

Dhulikhel, P.O. Box No.: 11008, Nepal

Office fax: +977 1 490 707

saurabsharma1@gmail.com

Phone: +977 984 163 4043

ABSTRACT

Objectives: The aims of this study were to (1) develop pain education materials in Nepali and (2) determine the feasibility of conducting a randomized clinical trial (RCT) of a pain education intervention using these materials in Nepal.

Design: A two-arm, parallel, assessor-blinded, feasibility RCT.

Setting: A rehabilitation hospital in Kathmandu, Nepal.

Participants: Forty Nepalese with non-specific low back pain (mean [SD] age 41 [14] years; 12 [30%] women).

Interventions: Eligible participants were randomized, by concealed, 1:1 allocation, to one of two groups: (1) a pain education intervention and (2) a guideline-based physiotherapy active control group (CG) intervention. Each intervention was delivered by a physiotherapist in a single, one hour, individualized treatment session.

Primary outcome measures: The primary outcomes were related to feasibility: recruitment, retention, and treatment adherence of participants, feasibility and blinding of outcome assessments, fidelity of treatment delivery, credibility of, and satisfaction with, treatment. Assessments were performed at baseline and at 1- week post treatment.

Secondary outcome measures: Pain intensity, pain interference, pain catastrophizing, sleep disturbance, resilience, global rating of change, depression, and quality of life. Statistical analyses were conducted blind to group allocation.

Results: Forty participants were recruited. Thirty-eight participants (95%) completed the 1- week post-treatment assessment. Most primary

outcomes surpassed our *a priori* thresholds for feasibility. Several findings have clear implications for designing a full trial. Secondary analyses suggest clinical benefit of pain education over the control intervention – larger decrease in pain intensity and pain catastrophizing in the pain education group. Pain intensity would seem an appropriate outcome for a full clinical trial. One minor adverse event was reported.

Conclusion: We conclude that a full RCT of pain education for back pain in Nepal is feasible and warranted.

Trial registration: ClinicalTrials.gov; Identifier: NCT03387228

Keywords: Low back pain, pain management, low-income country, culture, patient education, musculoskeletal pain.

Strengths and limitations of this study

1. This is the first study to examine the feasibility of a clinical trial on low back pain in Nepal.
2. We developed a culturally suitable pain education package using local patient stories before using it in the feasibility trial.
3. We blinded the assessor and data analyst to the group allocation; however, due to the nature of the intervention we could not blind the therapists and study participants.
4. We used the guideline-based care as an active control group.
5. Conclusions regarding the effectiveness of the intervention should not be made because this was a feasibility study, not a clinical trial; however significant between-groups differences on proposed outcome measures justify proceeding with a full definitive trial.

INTRODUCTION

Low back pain is the leading cause of disability in both low- and high-income countries, and is associated with large direct (health care) and indirect costs.[1-3] The limited available literature on low back pain in Nepal indicates low back pain prevalence of between 35% and 65%,[4 5] and that prevalence will probably increase in the next decade.[3] Therefore, timely use of interventions that are evidence-informed, effective, and inexpensive is urgently required.

Internationally, clinical practice guidelines on low back pain consistently recommend non-pharmacological and non-surgical approaches as the first line of treatment.[6-8] For acute back pain, core common recommendations are education or advice for reassurance, remaining active, returning to work, and avoiding bed rest and lumbar supports. For chronic back pain, recommendations are education, exercise and psychological therapies.[6-9] Remarkably, although many high-income countries are moving away from primarily drug and surgical management of low back pain because of their associated risks and costs, and general lack of efficacy,[10] such interventions are now increasingly provided in Nepal.[11 12] Unfortunately, there is little or no research, nor clinical evidence, that evaluates the efficacy of any treatments for low back pain in Nepal, including the first line treatments that are now recommended in clinical guidelines elsewhere.

Although education is almost universally recommended for low back pain, there are no clear curricula for delivering it and little attention is given to training, methods, settings or context (see [13]). One type of education that is an exception to this rule and has been widely studied, focusses on improving patient understanding of the biological mechanisms that underpin pain and how best to promote recovery ([14 15]). This form of pain education (widely known as 'Explaining Pain' or 'Pain neuroscience education')[15-20] was developed in Australia and has been adapted in numerous Western countries, consistently demonstrating effectiveness for managing low back pain.[20-23] Education can be brief - around 10 minutes to deliver the key messages, although evidence in support of this approach is sparse - or extended (one hour to several hours). Longer-form pain education has several advantages over shorter: it allows for the integration of contemporary principles of conceptual change and education, for example including stories and metaphors,[24] and for providing adequate guidance on self-management strategies such as graded exposure to difficult or painful activities.[15-17] Longer duration allows greater tailoring of individual curriculum and target concepts, provides patients with time and opportunity to voice doubts and ask questions, and allows the clinician to assess learning in real time.[17]

Treatment that is effective in one culture may not necessarily be effective in another. We know of no reports of pain education being adapted or evaluated within an Eastern cultural context. The critical first

step then is to determine whether indeed it is feasible to do so.[25] We therefore (1) developed evidence-based pain education materials in Nepali for application in tertiary and primary care settings in Nepal, and (2) investigated the feasibility of conducting a randomized clinical trial (RCT) comparing effectiveness of pain education relative to an appropriate control condition. We aimed to determine whether or not it would be feasible to undertake a full RCT within the Nepalese health care system and to identify any modifications that may be needed before doing so.

METHODS

The research was conducted in two stages. First, we developed pain education package in Nepali, followed by a feasibility trial evaluating the feasibility of conducting a RCT to evaluate the effectiveness of pain education.

Development of pain education in Nepali

The primary investigator (SS) developed the pain education resources in Nepali, based on the "Explain Pain" pain education materials (NOIgroup publishing, Adelaide, Australia).[17 19] Figure 1 lists the development process, which included five steps.

In the first step, SS developed a context and culture-specific pain education curriculum according to the process set out in Moseley and Butler.[17] The curriculum was reviewed by the authors of that guide

(including coauthor of this paper - GLM). Four key concepts (described below) were identified, with one additional optional concept if time permitted. The final curriculum, including the key concepts to deliver, details of contents, and methods of delivery were published in our protocol paper[26] and are also presented in Supplementary file 1.

In the second step, a pain education handbook was created using contents from Explain Pain[17 19] and clinical practice guidelines on low back pain.[6-8] We used pain stories from Nepal to help explain the target concepts.[26] We kept the Nepalese adaptations as simple as possible, so that patients with low to no formal education would understand them.

In the third step, the material was reviewed by four Nepalese with a medical (n=2) or non-medical (n=2) background, and revised as a result. In the fourth step, we undertook initial pilot testing of the pain education handbook with six patients with chronic low back pain. We focused here on its readability, the relevance of the stories, and whether the new pictures created for the handbook delivered their intended meaning. The handbook text was revised, but no changes were made to the pictures. Finally, three native Nepali-speaking persons proof-read the handbook and a final version was completed.

Research design

We conducted a two-arm, assessor-blinded, feasibility, parallel, randomized clinical trial (RCT). We obtained ethical approval from Nepal

Health Research Council (reg. 422/2017) and the University of Otago Human Ethics Committee for Health (reg. H17/157). We registered the trial protocol at ClinicalTrials.gov (NCT03387228). We used the SPIRIT (Standard Protocol Items: Recommendations for Interventional Trials) statement[27] during the development of the protocol, and followed the CONSORT (Consolidated Standards of Reporting Trials) statement extension for a pilot and feasibility randomized trials[28] for reporting. Feasibility was to be determined on *a priori* criteria.[26] For the detailed review of the research methods, we refer readers to the published protocol.[26]

Participants

We included adults (age 18 years or more) with non-specific low back pain of any duration. We excluded patients with specific causes of low back pain such as malignancy, fracture, infection, or inflammatory arthritis identified from history or investigations. We also excluded pregnant women and patients presenting with the history of bladder and bowel incontinence or perineal anesthesia.

We recruited participants from a rehabilitation hospital in Kathmandu, Nepal. We invited consecutive patients presenting at the center to participate in the study. Additionally, we made advertisements on social media about the research to improve the recruitment, as almost 28% of Nepalese use Facebook (www.internetworldstats.com). We provided an appointment to interested candidates for screening at the center. A

research assistant (a trained physiotherapist) screened for eligibility all potential participants who expressed a willingness to participate in the current study. All participants signed the consent form prior to baseline assessment.

Interventions

We used the TIDieR (Template for Intervention Description and Replication) Checklist to plan and report the study interventions.[29 30] There were two interventions in a two arms RCT design. We provided pain education to the participants who were randomly allocated to the experimental group (Pain Education Group: PEG) and guideline-based physiotherapy treatment to the participants who were randomly allocated to the control group (CG). Treatment time for both groups was one hour.

The PEG group: Delivery of pain education

The principal investigator (SS), who has received extensive training in *Explain Pain* via NOIgroup (Adelaide, Australia) Professional Development and one-on-one mentoring with pain education experts, delivered the treatment. The pain education deliverer first asked two questions to the patients in the PEG: (1) "*Is there anything in particular that you would like to learn about your low back pain, or pain in general?*", and (2) *"Do you know what caused your low back pain? Can you please explain the cause of your low back pain from what you have understood, or what you have been told?"* Up to 15 minutes was allotted to addressing, with evidence-informed answers, any questions

participants had and to clarify any misconceptions the patients had regarding their low back pain. The rest of the session was used to deliver information regarding the target concepts.

Target concepts delivered

The key target concepts were: (1) pain is normal and almost everyone experiences it at different times during their life; (2) the body sends danger signals (i.e., not necessarily information about physical damage, but the danger of potential physical damage), and the brain decides whether to produce pain; (3) learning about pain physiology changes pain, and anything previously associated with pain (e.g., past learning, social factors, environmental cues) can influence current pain, and (4) the body can learn to experience pain and become more overprotective over time. One additional target concept "pain and tissue damage are poorly related" was delivered if there was time available after the four key concepts were addressed. During the pain education session, strategies for graded-exposure to painful or difficult activities were also provided to the patients to increase their physical activity.

Guideline-based physiotherapy treatment

CG treatment consisted of guideline-based physiotherapy interventions extracted from recent clinical practice guidelines on low back pain.[6 31 32] Criteria for the CG treatment component required that it be: (1) a first-line recommended treatment, or; (2) a second-line recommended treatment to make the total duration of the session be one hour (to

match PEG treatment time); (3) feasible to be delivered during the first clinical contact; and (4) one that is routinely delivered in, and can be competently delivered by, physiotherapists at the recruitment center. Given these criteria, the CG treatment condition included: (1) brief education to reassure the patient, advice to remain active and remain at or return to work (if the participant had been working prior to pain onset), general education about the favorable prognosis of low back pain that it will generally get better in two to six weeks, and advice to avoid bed rest and lumbar corsets (10 - 15 minutes),[6 31 32] (2) superficial heat (10 - 15 minutes),[6 32] (3) back massage (10 minutes),[6 31] and (4) static cycling to promote physical activity (remaining time; between 20 – 30 minutes).[6 31 32]

Home treatment

We also prescribed a home program for both groups. This included a leaflet providing brief education on self-management of low back pain, with pictures to remind the participants to remain physically active, education regarding positive prognosis, advice to walk for 30 minutes daily (with rest if required) and to avoid bed rest or lumbar corsets.

In addition to the leaflet that was also provided to the control group, participants in the PEG received the pain education handbook. We suggested to participants that they read the booklet at least once during the following week. If the patients could not read, they were advised to request a family member to read the pain education handbook to them.

Adherence to both exercise (e.g., walking), and reading the pain education handbook at home was recorded, by self-report, one week post-treatment.

Participants in both treatment groups were required to pay the same fee for physiotherapy services as usual for non-trial patients. This payment was identical for both interventions.

Outcome Measures

Demographic data were collected as per the recommendations of the NIH task force on research standards for chronic low back pain.[33]

Primary outcome measures

The primary outcomes were related to feasibility: recruitment, retention, and treatment adherence of participants, feasibility and blinding of outcome assessments, fidelity of treatment delivery, credibility of, and satisfaction with, treatment. To assess recruitment-related feasibility outcomes, we recorded the numbers of potential participants who were eligible and recruitment rates. Participation-related feasibility outcomes were (1) rates of willingness to participate in a RCT and (2) acceptability of random allocation to a treatment group. Feasibility outcomes related to outcome assessment were (1) feasibility of assessor blinding procedures and (2) acceptability of screening procedures. Finally, the treatment-related feasibility outcomes were (1) possible contamination between the groups, (2) the credibility and acceptability of the

interventions, (3) adherence to the interventions, (4) treatment satisfaction, (5) difficulty in understanding the treatment, and (6) adverse events related to the interventions. Details of these feasibility outcome measures are presented in Supplementary file 2.

Secondary outcome measures

The secondary outcome measures selected were those that had the potential to be primary or secondary outcomes of a potential full clinical trial, based on the core-outcome sets recommended for low back pain.[34] [35] We used eight outcome measures previously translated and cross-culturally adapted to the Nepali language: four Patient-Reported Outcome Measurement Information System (PROMIS) short form measures assessing pain intensity, pain interference, sleep disturbance, and depression;[36] a two-item Quality of Life scale, 7-point Global Rating of Change (GROC);[37] [38] the Pain Catastrophizing Scale (PCS);[39] and the 10-item Connor Davidson Resilience Scale (CDRISC).[40]

Sample size

Sample size estimation was performed to achieve the primary feasibility outcomes goals, as described in the protocol[26] and registration documents (clinicaltrials.gov registration number: NCT03387228), and not to detect differences in the secondary, treatment effects outcomes.[41] Based on guidance in the literature,[42] the research team estimated that a sample size of 40 (20 in each treatment arm) would be sufficient to adequately evaluate the feasibility of undertaking a full clinical trial.[26]

Randomization

The published research protocol[26] was strictly followed. Allocation sequence was generated in random blocks of 4 and 6 using www.randomization.com, by a researcher (JHA) who was not involved in recruitment. Allocation concealment was performed using sequentially numbered opaque, sealed envelopes, prepared by JHA, and maintained until the interventions were assigned to the study participants. The group allocation was revealed to the study participants and intervention providers only after completion of the baseline assessment.

Blinding

The assessor performing all the assessments was blinded to group allocation of the participants throughout the study. The data analyst (SS) was also blinded to group allocation. That is, after the assessor entered data in the Excel spreadsheet without knowledge of group allocation, the entered data was sent to JHA, who added codes for group allocation (red and blue), before the data analyses were performed. Unblinding of group allocation occurred after all planned analyses were complete.

Statistical methods

Baseline characteristics for demographic and clinical data of the participants were reported using descriptive statistics. The plans for analysis of primary outcome measures are presented in Supplementary file 2.

We planned the exploratory analysis of between-group differences in the secondary outcome measures using two-group *t*-tests, with the understanding that the current study was not powered to detect statistically significant between-group differences in the secondary outcomes. Rather, analyses of between group differences were computed primarily for descriptive purposes in order to inform decisions regarding the selection of measures for a possible future full clinical trial. The scores of the PROMIS measures were transferred into the template provided by www.assessmentcenter.net, which computed the total raw scores, T-scores and standard errors. The assessment center automatically handles missing items when performing the analysis. For other measures, missing items were imputed using the mean of the present items for that patient. The details of the measures with the psychometric properties are outlined in Supplementary file 3.

Patient and Public Involvement

Patients with LBP and non-clinician volunteers provided significant feedback in the development of the Nepalese pain education package. We incorporated real but anonymous pain-related stories of Nepalese so that the intervention is relatable. Neither patients nor members of the public were involved in the design of the study.

RESULTS

Data were collected between February and April 2018, with mean (SD; range) duration to follow-up of 7.63 (1.08; 7 – 11) days. Recruitment was stopped after achieving the desired sample size of 40. Twenty participants were randomized to each treatment arm.

Sample characteristics

Fourteen participants (70%) in each treatment arm were recruited from the hospital. The majority of participants in each group were men, married, and Hindu. Baseline demographic characteristics were comparable between the groups. However, baseline scores on the secondary outcomes were somewhat higher in the PEG than the control group. Details of the baseline sample characteristics are presented in Table 1.

[Insert Table 1 about here]

Missing data

One item (item #10) in the baseline assessment of the PCS and one item in the follow-up assessment of CDRISC (item #8) were missing for one participant. Missing values were replaced by the mean score of each measure for that participant. One item in the baseline depression scale was missing for one participant, which was imputed by the PROMIS assessment center during the analysis.

Primary (feasibility) outcomes

Results related to feasibility outcomes are presented in Table 2, and summary results on feasibility criteria are presented in Table 3.

[Insert Table 2 and Table 3 about here]

Recruitment-related feasibility outcomes

Seventy candidates were invited to participate in the study. Twenty-eight participants (70%) were recruited from the data collection center; 12 (30%) from community advertisements. Fifty-seven percent of invited candidates participated. Of those who did not, 27 (90%) declined participation and 3 (10%) did not meet inclusion criteria. Forty out of 43 candidates (93%) screened were eligible to participate. All 40 participants (100%) who met the inclusion criteria provided written informed consent and were randomized to one of the study arms. One participant in each group was lost to follow-up. The reasons for all exclusions and losses to follow-up are outlined in the participant flow diagram (Fig. 2).

Participant-related feasibility outcomes

Willingness to participate in a randomized trial. The main reasons for unwillingness to participate were: (1) wanting to receive comprehensive physiotherapy treatment as an in-patient (n = 8), (2) not wanting to pay for treatment (n = 6), (3) not having time to participate in the study and complete the post-treatment assessment at one week (n = 6), and (4)

wanting to receive electrotherapy treatment for one week because it was recommended by their physician.

Acceptability of random allocation to a treatment group. Random allocation of the treatment was acceptable to 57 out of 70 individuals (81%). Of the 13 participants who did not accept random allocation, five (7%) wanted to receive electrotherapy treatment specifically, and eight (11%) wanted to be admitted at the center to receive comprehensive physiotherapy treatment (including electrotherapy) twice a day for a week as advised by their treating physician or physiotherapists.

Outcomes assessment-related feasibility outcomes

Feasibility of blinding the assessor. The assessor did not receive any definitive information about participants' group allocation for any of the participants during the study. The assessor's guess was correct for 12 participants (60%) in the PEG condition, and for 11 participants (55%) in the CG condition. On questioning, the assessor identified some clues that may have influenced a correct guess: (1) "duration of treatment time" (see below) (n = 5; 3 correct and 2 incorrect guesses), (2) patients' reporting the treatment as "interesting" (n = 2; both incorrect guesses), and (3) the treating therapist's description of the treatment as interactive (n = 1; correct guess).

Acceptability of screening procedures by the assessor. Mean (SD; range) time taken to complete the screening process (including time to

sign the consent) was 7 (6; 6 – 45) minutes. Mean (SD; range) time taken to complete all the forms during the baseline assessment was 20 (5; 12 – 35) minutes.

The screener reported that the screening procedures were acceptable, but there were two problems. First, the duration of screening was occasionally too long, for example when patients told stories about their pain rather than keeping answers focused on the questions that were asked, or an accompanying friend kept responding on the patient's behalf. Second, interspersing assessments unrelated to pain (e.g. CDRISC, sleep disturbance, depression, and quality of life) between assessments related to pain (e.g., pain intensity, pain interference) made it difficult for some participants to switch focus between the pain and general domains. As a result, some participants kept answering about pain when the questions asked about other domains such as sleep or depression.

Treatment-related feasibility outcomes

Contamination. There were no detected instances of contamination between the two groups. Table 2 presents the results of the five separate contamination questions.

Credibility and acceptability of the interventions. The credibility scores of the two conditions at one-week assessment and average treatment time were similar (Table 2). Both interventions were

acceptable to all the participants. However, patients in the PEG often expected some form of physiotherapy interventions in addition to education. For example, one patient, assigned to the PEG condition, had severe pain and stated that he wanted a physical treatment for his back pain. Similarly, most of the patients in the control group mostly expected back-specific exercises and or electrotherapy treatment over the painful sites. One comment from a participant after completing cycling was *"Okay, this was exercise for my general health. What exercise should I perform for my back pain?*" Similarly, many participants in the CG were keen to receive pain education intervention, which they did (n = 15) after post-treatment assessment at one week.

Adherence to intervention and treatment satisfaction. Adherence to intervention and treatment satisfaction were similar in both groups (Table 2). Twelve out of 38 patients who completed the post-treatment assessment at one week (32%; 5 in the PEG and 7 in the CG) wished to receive their regular physiotherapy treatment (mostly electrotherapy) at the center between the two assessment time-points; these participants did receive this treatment as requested.

Difficulty in understanding the treatment. In both groups, 15 participants (75%) reported that the treatment was "easy" to understand (Table 2). This result contravened our *a priori* cutoff point for this criterion of 50%.

Adverse events. One participant in the CG reported lower extremity pain after cycling for 20 minutes. The increase in her leg pain lasted for two days and then subsided. None of the other participants reported any other adverse events associated with the treatments.

Results of secondary outcomes. We found significant within-group improvements from pre- to post-treatment in all the secondary outcomes, except resilience for the PEG participants. In the CG group, we found pre- to post-treatment improvements in pain interference, depression and catastrophizing. We found between-group differences in favor of PEG for pain intensity and pain catastrophizing (Table 4).

[Insert Table 4 about here]

Other findings

The standard low back pain treatment protocol at the data collection center typically included non-guideline-based care such as advice to rest, advice against physical activity, admission for bed rest and intensive passive therapies (mostly electrotherapy). Such a care pathway contrasts with the recommendations and treatments presented in both groups. We found it challenging to alter the physiotherapists' usual practice.

Related to this, all of the physiotherapists who provided the control group treatment reported being dissatisfied with not being able to provide interventions they would normally provide, many of which were

treatments that patients also wanted to receive, such as spine-specific exercises and manual therapies. Moreover, five of the physiotherapists who were initially trained in the guideline-based care prior to the initiation of the study left the treatment center during the trial recruitment period. They were replaced by four physiotherapists who therefore had not been trained in guideline-based care as part of this study.

DISCUSSION

We aimed to determine whether or not it would be feasible to undertake a full RCT within the Nepalese health care system and to identify any modifications that may be needed before doing so. Seven of the eight *a priori* feasibility criteria were met, which suggests that a clinical trial to evaluate the effectiveness of pain education and evidence-based physiotherapy treatment in Nepal is feasible. This feasibility trial also provided important additional information that inform the design of the full trial.

Primary feasibility outcomes

The recruitment rate exceeded our target of four participants enrolled every week. We used advertisements in social media, and we suspect that recruitment was aided by patient-to-patient word of mouth as the trial progressed. This, and the finding that our attrition rate (5%) was well below our *a priori* maximum rate of 20% (which is thought to lead to serious threats to validity[43]), was surprising considering that most patients in both groups did not receive the care they expected to receive.

This is encouraging because it suggests that a broader education strategy, to prepare potential patients for an alternative approach to their problem *before* including them in a trial, is probably not required.

Although screening and data collection procedures were generally acceptable to the assessor, the assessor provided important recommendations to improve overall screening and data collection. For example, extended assessment sessions might be avoided by upskilling the assessors in dealing with patients, who are often elderly and uneducated and who tend to tell stories about their pain rather than provide direct answers to the questions being asked. An important caveat here however, is the potentially critical role that this extra time and attention – particularly insofar as it is dedicated to listening to patient stories – may have had in subsequent engagement and participation, particularly against the backdrop of unexpected care. The patients' stories in fact provide a context and meaning of their health problems,[44] which may be a therapeutic intervention in itself, and is important to establish a good doctor-patient relationship.[45] Clearly, the cost-benefit relationship of time-limited assessment is likely to be individually-specific and nuanced.

The advantages and disadvantages of interviewing patients without their friends or family members present are also worthy of consideration. There were instances when excluding an accompanying family member would have reduced the data collection time, and possibly improved the

accuracy of the answers. However, the relationships patients have with those around them play an important role in the experience of pain[46 47] and what people do about it;[46] exclusion of important others at a critical time may also disengage the patient or instill other barriers to their participation in the project. A final pragmatic modification to improve assessment would be to organise pain-related and pain-unrelated questions into different sections of the data collection protocol, so as to avoid patients being confused regarding the domains being assessed.

Blinding appeared to be successful and contamination appeared to be avoided. Most controlled trials do not adequately examine assessor blinding,[48] even though it is widely considered a very important component of good study design.[49] We were able to blind the assessor here because we could provide a separate office space that was isolated from the treatment area. We were also able to schedule appointments to avoid contact with assessors that would unblind them to group. Our inclusion of participant-reported items to evaluate contamination is not routinely included in feasibility or full clinical trials – the common approach, is to implement strategies to minimize the risk *a priori* but not investigate it *post hoc*. However, in settings such as that involved here, where the community is well connected and word of mouth appears to be a significant recruitment pathway, we considered it important to also examine potential contamination *post-hoc*. Limiting the number of patient recruitments performed in a single day to two may also have helped

avoid contamination, but to see no evidence of contamination was surprising.

Treatment credibility and satisfaction were high for both groups (even though the participants did not receive the treatment they expected). That most participants in the pain education group found the material "easy" or "very easy", was surprising and contrary to an *a priori* feasibility criterion. Our protocol[26] stipulated a response to this outcome requiring that the material presented be viewed as difficult before proceeding to full trial. Whether we should increase difficulty by increasing the number of concepts covered, or going more fully into the four concepts we chose, or both, will require some pilot testing. That secondary outcome data findings suggesting a beneficial effect in the PEG condition appears to support making such a change.

Secondary outcomes

Mean improvements over time were observed for 7/8 outcomes in the PEG condition and 4/8 outcomes in the CG condition. Although assessment of the effectiveness of the interventions on the secondary outcomes was not a primary aim of this study, significant between-group differences were found, in favor of PEG, and the apparent effect was substantial on two key target outcomes - pain intensity and pain catastrophizing (Table 4). However, the consistently larger improvements in all of the other outcomes for the PEG condition, relative to the CG condition, suggests the possibility of wide benefits of pain

education as compared to guideline care, in Nepal. It should be remembered that these are secondary outcomes, not corrected for multiple analyses and therefore at risk of false positive results. However, these results add pertinence to the feasibility results - a full-scale clinical trial appears warranted.

Recommendations

Although the findings suggest that a clinical trial evaluating effectiveness of an adapted "Explaining pain" intervention within Nepali primary and tertiary care is feasible, some improvements could be made. First, to improve the compliance of the physiotherapists with the control group treatment - guideline-based care - and adherence of patients to that care, the control group treatment condition may need to be modified. Ideally, this modification would be made so that the control treatment was consistent with the evidence-based practice paradigm as much as possible; for example, by giving participating patients and their therapists the ability to choose treatments that are mostly consistent with guideline recommendations for low back pain treatment. For example, the guideline-based treatment could have two components: (1) mandatory first line care recommended by the guidelines (education and reassurance, promotion of physical activity, early return to work, advice about positive prognosis for back pain), in addition to (2) a more pragmatic approach to low back pain treatment. This second component may include any form of exercise (treadmill, static cycling or back-specific motor control or movement exercises), manual therapy

(massage, mobilization, or manipulation, based on therapist's preference), or electrotherapy treatment, according to therapist and patient preference (as per recommendations of evidence-based care[50]), as long as it is safe and does not extend treatment time to beyond one hour. We should also consider fidelity assessment of the interventions provided by the therapist to be certain that per protocol treatment is being provided in each treatment arm.

A final modification would be the addition of economic analysis. Nepalese individuals are often poor and the Nepalese public health system is resource-poor. Not surprisingly, cost was a barrier to participation for 9% of potential participants. Pain education intervention appears to be a less resource-intensive alternative to current practice and could be delivered outside of the public health system, in community settings, although the costs and time of physiotherapist would be no different from guideline-based care as delivered in a physiotherapy department. Pain education might require more training of therapists, although training in guideline-based care may be necessary too. As such, a full trial would benefit from the addition of a full economic evaluation.

Strengths and limitations

The current study has a number of strengths: we used an active guideline-based care as the comparator group; we successfully blinded the assessor and analyst, and assessed both blinding and

contamination; outcomes were consistent with NIH recommendations on research standards for chronic low back pain[33] and core outcome sets for low back pain research;[34] and we submitted our protocol prior to data collection and remained transparent in all reporting.[51]

To our knowledge, this is the first study to examine the feasibility of a clinical trial on low back pain in Nepal. Conducting a feasibility study is an important step before conducting a full clinical trial,[42] especially in a setting where a clinical trial has never been conducted, which lacks recommendations from previous experiences for such a study. For example, we had planned a full clinical trial in 2016,[52] but were unable to recruit participants because the clinicians were too busy to collect data and provide interventions as per protocol, and we encountered difficulty ensuring access to an assessor blinded to group allocation because of multiple responsibilities of the clinicians. These are feasibility problems that would have been revealed in a preliminary feasibility study.[42]

The current study also has a number of important limitations. Our follow-up was shorter than we would use in a full clinical trial. The short follow-up duration was chosen because one-week assessment was sufficient to answer the feasibility-related questions, but whether or not long-term follow-ups are feasible in this setting and population remains to be demonstrated. We did not assess treatment fidelity in the current study, because we did not have the resources to do so. That the current practice in the low back pain management at the study site was very

different from clinical practice guidelines made it harder for the physiotherapists to comply with the guideline-based care. A final limitation was that we did not include any measure of physical activity as a secondary outcome despite improved physical activity being one aim of pain education. In a definitive trial we may consider using a measure to assess physical activity such as International Physical Activity Questionnaire,[53] or even an objective measure of physical activity, such as Actigraphy.[54]

Summary and conclusions

We conclude that a clinical trial to evaluate the effectiveness of pain education and evidence-based physiotherapy treatment in Nepal is feasible and warranted, although some minor modifications are required.

Acknowledgements

Authors would like to thank Sahara Physiotherapy Hospital for providing permission to conduct the research and providing access to hospital space and patients. We are also thankful to the physiotherapists involved in the treatment of patients in the control group, and the assessor (Bandana Gautam) for assisting with data collection. Finally, we would like to thank all the persons reviewing and providing valuable comments on the Nepali pain education handbook especially Anupa Pathak who provided feedback at all stages of patient handbook development.

The protocol of the original study

The protocol of this study is published in BMJ Open (DOI: http://dx.doi.org/10.1136/bmjopen-2018-022423).

Competing interest

GLM has received support from Pfizer, AIA Australia, Gallagher Bassett, Kaiser Permanente USA, Port Adelaide Football Club, Arsenal Football Club and the International Olympic Committee. GLM receives royalties for books on pain and rehabilitation, including the text on which the content for the proposed intervention was based. He also receives speaker fees for lectures on pain and rehabilitation. Neither GLM, nor the publishers of the Explain Pain materials, had any role in data collection or analysis or the decision to publish the data. Other authors have no conflicts of interest to declare.

Funding

The authors did not receive any funding to conduct this study. SS is supported by University of Otago Doctoral Scholarship, and GLM is supported by a Research Fellowship from the NHMRC of Australia ID1061279.

Data sharing

No additional data.

Author's contribution

SS: Conception, design, development of pain education package in Nepali, data analysis, drafting the manuscript, final approval of the manuscript.

JHA: Conception, design, revision of the manuscript, and final approval.

MPJ: Conception, design, revision of manuscript, final approval.

GLM: Feedback on the development of pain education, study design, revision, final approval.

Table 1. Baseline characteristics of the two study groups.

Variable	PEG (n = 20) N (%) or Mean (SD)	CG (n = 20) N (%) or Mean (SD)
Recruitment, N (%)		
Advertisement	6 (30%)	6 (30%)
Hospital	14 (70%)	14 (70%)
Sex, N (%)		
Men	15 (75%)	13 (65%)
Women	5 (25%)	7 (35%)
Marital status		
Married	16 (80%)	15 (75%)
Single	4 (20%)	3 (15%)
Separated or widowed	0 (0%)	2 (10%)
Religion, N (%)		
Hindu	19 (95%)	16 (80%)
Buddhist	1 (5%)	3 (15%)
Others	0 (0%)	1 (5%)
Race/Ethnicity, N (%)		
Chettri	6 (30%)	5 (25%)
Brahmin	4 (20%)	9 (45%)
Newar	4 (20%)	2 (10%)
Others	6 (30%)	4 (20%)
Education, N (%)		
No school	3 (15%)	2 (10%)
Primary school (<5 years)	3 (15%)	1 (5%)
Upto high school (6-12 years)	5 (25%)	8 (40%)
Bachelor degree and over	9 (45%)	9 (45%)
Primary occupation, N (%)		
Business or office work	13 (65%)	7 (35%)
Unemployed	0 (0%)	5 (25%)
Homemaker	2 (10%)	3 (15%)
Currently Sick leave for LBP	1 (5%)	1 (5%)
Other	4 (20%)	2 (10%)
Smoking history		
Never smoked	10 (50%)	12 (60%)
Currently smoker	8 (40%)	5 (25%)
Have quit smoking	2 (10%)	3 (15%)
Have left work for more than 1 month due to LBP		
Yes	4 (20%)	4 (20%)
No	16 (80%)	16 (80%)
Medications used for LBP		
NSAIDs	3 (15%)	6 (30%)
Pregabalin	2 (10%)	3 (15%)
Vitamin B12	3 (15%)	1 (5%)
Gabapentin	1 (5%)	0 (0%)
Opioids	1 (5%)	0 (0%)
Antidepressant	1 (5%)	0 (0%)
Secondary outcomes		
Pain intensity*	54.38 (3.48)	52.72 (2.45)
Pain interference*	62.28 (6.62)	58.92 (7.69)
Sleep disturbance*	51.84 (7.68)	45.63 (8.71)
Depression*	56.99 (8.08)	53.60 (11.25)

Quality of life	5.70 (1.22)	6.10 (1.21)
Pain Catastrophizing	22.70 (10.99)	20.50 (12.56)
Resilience	26.95 (9.14)	28.60 (8.08)

Abbreviations: PEG, Pain Education Group; CG, Control Group; LBP, Low Back Pain; NSAIDs, Non-steroidal anti-inflammatory drugs.
*T scores.

Table 2. Feasibility results for the two study groups.

Feasibility outcomes	PEG N (%) or Mean (SD)	CG N (%) or Mean (SD)	Mean Difference (95% CI) or *P* values	Summary
Attrition rate	1 (5%)	1 (5%)	1.000	No difference in attrition rates between groups.
Assessor's correct guess for group allocation	12 (60%)	11 (55%)	0.756	Assessor correctly guessed the group allocation slightly more often for the PEG than the CG.
Understanding possible contamination between groups (n=19)				
1. Have you talked to other participants about the intervention?	0 (0%)	0 (0%)	-	No contamination between groups.
2. If yes, was your attitude/ intervention changed?	0 (0%)	0 (0%)	-	
3. Are you aware of the intervention that participants in the other group are receiving?	0 (0%)	0 (0%)	-	
4. Are participants in the other group aware of the type of intervention you are receiving?	0 (0%)	0 (0%)	-	
5. For the control group: Did you read the pain education booklet provided to the experimental group?	-	0 (%)	-	

Credibility and acceptability of interventions				Similar credibility scores between groups.
Baseline assessment (n=20)	12.55 (2.89)	12.95 (3.80)	0.40 (-2.56, 1.76)	
Final assessment (n=19)	12.37 (2.63)	12.26 (4.17)	0.11 (-2.19, 2.40)	
Adherence to treatment (number of days)				Participants were adherent to the treatment in both groups, with slightly more adherence reported by the CG participants.
Followed advice (n=19)	17 (89%)	18 (95%)	0.501	
Performed home exercises (Mean days (SD))	3.84 (2.43)	5.53 (1.58)	-1.68 (-3.03, -0.33)	
Number of patients who received other treatments (total)	5 (26%)	7 (37%)	0.471	Slightly more CG participants received regular physiotherapy at the center, massage or acupuncture, and NSAIDs.
Regular physiotherapy at the center*	4 (21%)	5 (26%)	0.719	
Massage or acupuncture	1 (5%)	2 (10%)	0.563	
Number of NSAIDs per week used at follow-up	2	5	-3	
Total treatment time (in minutes)	61.00 (7.88)	60.60 (8.85)		Treatment time is very similar between the two treatment conditions, and consistent with the planned treatment duration of treatment.
Satisfaction	3.89 (0.46)	3.68 (0.75)	0.21 (-0.20, 0.62)	Satisfaction of treatment scores were similar between groups

				with slightly higher satisfaction reported by the PEG participants.
Difficulty; mean (SD)	2.26 (0.56)	2.16 (0.60)	0.10 (-0.28, 0.49)	Majority of the participants (75%) reported both treatments as easy, with slightly higher difficulty scores reported by the PEG participants.
Very easy	0 (0%)	1 (5%)		
Easy	15 (75%)	15 (75%)		
Neither easy nor difficult	3 (15%)	2 (10%)		
Difficult	1 (5%)	1 (5%)		
Very difficult	0 (0%)	0 (0%)		

Abbreviations: PEG, Pain Education Group; CG, Control Group; NSAIDS, Non-steroidal anti-inflammatory drugs.

*Mostly included electrotherapy treatment.

Table 3. Were the feasibility criteria met?

Criteria	Feasibility criteria met?	Recommendations for full trial
Blinding of assessor	Yes	Treatment providers should try to keep the treatment duration close to or equal to one hour to avoid any guesses of group allocation between the treatment groups.
Recruitment rate	Yes	Incorporating advertisement to recruit the patients was a good idea, which should be considered in the full trial.
Attrition rate (in both arms)	Yes	Phone call reminders for the follow-up assessment helped reduce the drop-outs and which should be considered in the future trial.
Feasibility of outcome assessment	Yes	1. Practice administration of the outcome measures on real patients who are older and have lesser education before the actual recruitment by learning ways to keep patients focused on the questions being asked, 2. Keep the relatives and friends of the patients separate from the participant during screening and assessment. 3. Self-administration of the questionnaires for participants who can read and write could improve the efficiency of completing the screening and data collection forms. 4. Separate the pain-related questionnaires and general questionnaires during administration.
Contamination of intervention	Yes	Appointment time for follow-up helps avoid contamination.
Credibility of treatment	Yes	The credibility scores of the two treatment conditions were within 0.50 SD of each other therefore no changes in the treatment conditions are required.
Adherence to treatment	Yes	Not many patients read the handbook provided to them. Creating interesting short audios or videos with the key messages may be

		helpful for improving the adherence to home advice.
Difficulty level of the intervention	No	The complexity of the pain education content may be increased by providing more complex neurophysiological knowledge to the patients. However, this may demand longer duration of treatment time, and or compromise the effectiveness of the intervention, and may require pre-testing of the changed intervention before using it in the full trial.

Table 4. Results of secondary outcome measures: within-group and between-group differences

	Pain Education Group			Control group			Between-group difference	
Measures	Baseline Mean (SD)	Follow-up	Change (95% CI)	Baseline Mean (SD)	Follow-up	Difference (95% CI)	*t*	Difference
Pain intensity[a]	54.38 (3.48)	49.14 (3.77)	-5.28*** (2.91, 7.65)	52.72 (2.45)	50.95 (6.54)	1.72 (-0.82, 4.26)	2.16	3.56* (0.21, 6.91)
Pain interference[a]	62.28 (6.62)	57.67 (5.80)	-4.47** (1.91, 7.04)	58.94 (7.69)	56.13 (8.24)	3.03* (0.69, 5.36)	0.88	1.45 (-1.90, 4.79)
Sleep disturbance[a]	51.84 (7.68)	43.74 (5.31)	-7.62** (3.50, 11.74)	45.63 (8.71)	42.25 (8.41)	3.49 (-0.12, 7.10)	1.58	4.13 (-1.16, 9.42)
Depression[a]	56.99 (8.08)	48.25 (8.36)	-8.89*** (5.28, 12.50)	53.60 (11.25)	49.49 (10.29)	4.61* (0.69, 8.54)	1.68	4.27 (-0.88, 9.42)
Quality of life	5.70 (1.22)	6.42 (0.77)	0.79* (-1.42, -.15)	6.10 (1.21)	6.58 (1.22)	-0.47 (-1.04, 0.09)	-0.78	-0.32 (-1.13, 0.50)
Pain catastrophizing	22.70 (11.00)	11.16 (7.59)	-11.63*** (7.19, 16.07)	20.50 (12.56)	16.10 (12.16)	5.47** (1.79, 9.16)	2.24	6.16* (0.59, 11.72)
Resilience	26.95 (9.14)	28.61 (5.55)	+1.39 (-4.19, 1.41)	28.60 (8.08)	27.00 (8.08)	1.95 (-2.02, 5.92)	-1.43	-3.34 (-8.07, 1.40)
Global rating of change	-	5.16 (0.69)	-	-	5.37 (0.64)	-	-0.95	-0.21 (-0.66, 0.24)

*Significant at $P < 0.05$; **Significant at $P < 0.01$; ***Significant at $P < 0.001$

[a]T-scores are reported.

References

1. GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017;390(10100):1211-59. doi: 10.1016/S0140-6736(17)32154-2

2. Hartvigsen J, Hancock MJ, Kongsted A, et al. What low back pain is and why we need to pay attention. *Lancet* 2018 doi: 10.1016/S0140-6736(18)30480-X

3. Buchbinder R, van Tulder M, Oberg B, et al. Low back pain: a call for action. *Lancet* 2018 doi: 10.1016/S0140-6736(18)30488-4

4. Sharma S, Shrestha N, Jensen MP. Pain-related factors associated with lost work days in nurses with low back pain: A cross-sectional study. *Scand J Pain* 2016;11:36-41. doi: 10.1016/j.sjpain.2015.11.007

5. Paudyal P, Ayres JG, Semple S, et al. Low back pain among textile workers: a cross-sectional study. *Occup Med (Lond)* 2013;63(2):129-34. doi: 10.1093/occmed/kqs231

6. Qaseem A, Wilt TJ, McLean RM, et al. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Ann Intern Med* 2017;166(7):514-30. doi: 10.7326/M16-2367

7. Van Wambeke P, Desomer A, Ailiet L, et al. Low back pain and radicular pain: assessment and management. *KCE Report* 2017;287

8. Almeida M, Saragiotto B, Richards B, et al. Primary care management of non-specific low back pain: key messages from recent clinical guidelines. *Med J Aust* 2018;208(6):272-75.

9. Foster NE, Anema JR, Cherkin D, et al. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *Lancet* 2018 doi: 10.1016/S0140-6736(18)30489-6

10. Maher C, Underwood M, Buchbinder R. Non-specific low back pain. *Lancet* 2017;389(10070):736-47. doi: 10.1016/S0140-6736(16)30970-9

11. Bhattarai S, Chhetri HP, Alam K, et al. A study on factors affecting low back pain and safety and efficacy of NSAIDs in acute low back pain in a tertiary care hospital of Western Nepal. *J Clin Diagn Res* 2013;7(12):2752-8. doi: 10.7860/JCDR/2013/6520.3752

12. Bajracharya S, Singh M, Singh GK, et al. Clinico-epidemiological study of spinal injuries in a predominantly rural population of eastern Nepal: A 10 years' analysis. *Indian J Orthop* 2007;41(4):286-9. doi: 10.4103/0019-5413.36988

13. Moseley GL. Whole of community pain education for back pain. Why does first-line care get almost no attention and what exactly are we waiting for? *Br J Sports Med* 2018 doi: 10.1136/bjsports-2018-099567

14. Moseley GL, Butler DS. Fifteen Years of Explaining Pain: The Past, Present, and Future. *J Pain* 2015;16(9):807-13. doi: 10.1016/j.jpain.2015.05.005 [published Online First: 2015/06/09]

15. Moseley GL, Nicholas MK, Hodges PW. A randomized controlled trial of intensive neurophysiology education in chronic low back pain. *Clin J Pain* 2004;20(5):324-30.

16. Moseley GL. Evidence for a direct relationship between cognitive and physical change during an education intervention in people with chronic low back pain. *Eur J Pain* 2004;8(1):39-45. doi: 10.1016/S1090-3801(03)00063-6

17. Moseley G, Butler D. Explain pain supercharged. *Adelaide, Australia: Noigroup publications* 2017

18. Butler DS, Moseley GL. Explain Pain 2nd Edn: Noigroup Publications 2013.

19. Moseley GL, Butler DSB. Explain Pain Handbook: Protectometer2015.

20. Malfliet A, Kregel J, Coppieters I, et al. Effect of Pain Neuroscience Education Combined With Cognition-Targeted Motor Control Training on Chronic Spinal Pain: A Randomized Clinical Trial. *JAMA Neurol* 2018 doi: 10.1001/jamaneurol.2018.0492

21. van Ittersum MW, van Wilgen CP, van der Schans CP, et al. Written pain neuroscience education in fibromyalgia: a multicenter randomized controlled trial. *Pain Pract* 2014;14(8):689-700. doi: 10.1111/papr.12137

22. Rizzo RRN, Medeiros FC, Pires LG, et al. Hypnosis Enhances the Effects of Pain Education in Patients with Chronic Non-Specific Low Back Pain: a Randomized Controlled Trial. *J Pain* 2018 doi: 10.1016/j.jpain.2018.03.013

23. Werner EL, Storheim K, Lochting I, et al. Cognitive Patient Education for Low Back Pain in Primary Care: A Cluster Randomized Controlled Trial and Cost-Effectiveness Analysis. *Spine (Phila Pa 1976)* 2016;41(6):455-62. doi: 10.1097/BRS.0000000000001268

24. Gallagher L, McAuley J, Moseley GL. A randomized-controlled trial of using a book of metaphors to reconceptualize pain and decrease catastrophizing in people with chronic pain. *Clin J Pain* 2013;29(1):20-5. doi: 10.1097/AJP.0b013e3182465cf7

25. Eldridge SM, Lancaster GA, Campbell MJ, et al. Defining Feasibility and Pilot Studies in Preparation for Randomised Controlled Trials: Development of a Conceptual Framework. *PLoS One* 2016;11(3):e0150205. doi: 10.1371/journal.pone.0150205

26. Sharma S, Jensen MP, Moseley GL, et al. Pain education for patients with non-specific low back pain in Nepal: protocol of a feasibility randomised clinical trial (PEN-LBP Trial). *BMJ Open* 2018;8(8):e022423. doi: 10.1136/bmjopen-2018-022423

27. Chan AW, Tetzlaff JM, Gotzsche PC, et al. SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. *BMJ* 2013;346:e7586. doi: 10.1136/bmj.e7586

28. Eldridge SM, Chan CL, Campbell MJ, et al. CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *BMJ* 2016;355:i5239. doi: 10.1136/bmj.i5239

29. Yamato T, Maher C, Saragiotto B, et al. The TIDieR Checklist Will Benefit the Physical Therapy Profession. *J Orthop Sports Phys Ther* 2016;46(6):402-4. doi: 10.2519/jospt.2016.0108

30. Hoffmann TC, Glasziou PP, Boutron I, et al. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 2014;348:g1687. doi: 10.1136/bmj.g1687

31. National Institute for Health and Care Excellence. Low back pain and sciatica in over 16s: assessment and management 2016 [Available from: https://www.nice.org.uk/guidance/ng59.

32. Toward Optimized Practice (TOP) Low Back Pain Working Group. Evidence-informed primary care management of low back pain: clinical practice guideline 2015 [Available from: http://www.topalbertadoctors.org/cpgs/885801.

33. Deyo RA, Dworkin SF, Amtmann D, et al. Report of the NIH Task Force on research standards for chronic low back pain. *J Pain* 2014;15(6):569-85. doi: 10.1016/j.jpain.2014.03.005

34. Chiarotto A, Boers M, Deyo RA, et al. Core outcome measurement instruments for clinical trials in nonspecific low back pain. *Pain* 2018;159(3):481-95. doi: 10.1097/j.pain.0000000000001117

35. Deyo RA, Battie M, Beurskens AJ, et al. Outcome measures for low back pain research. A proposal for standardized use. *Spine (Phila Pa 1976)* 1998;23(18):2003-13.

36. Sharma S, Pathak A, Maharjan R, et al. Psychometric properties of nepali versions of PROMIS short from measures of pain intensity, pain interference, pain behaviour, depressions, and sleep disturbance. *The Journal of Pain* 2018;19(3):S59.

37. Sharma S, Palanchoke J, Abbott JH. Cross-Cultural Adaptation and Validation of the Nepali Translation of the Patient-Specific Functional Scale. *J Orthop Sports Phys Ther* 2018(0):1-23. doi: 10.2519/jospt.2018.7925

38. Sharma S, Palanchoke J, Reed D, et al. Translation, cross-cultural adaptation and psychometric properties of the Nepali versions of numerical pain rating scale and global rating of change. *Health Qual Life Outcomes* 2017;15(1):236. doi: 10.1186/s12955-017-0812-8

39. Sharma S, Thibault P, Abbott JH, et al. Clinimetric properties of the Nepali version of the Pain Catastrophizing Scale in individuals with chronic pain. *J Pain Res* 2018;11:265-76. doi: 10.2147/JPR.S153061

40. Sharma S, Pathak A, Abbott JH, et al. Measurement properties of the Nepali version of the Connor Davidson resilience scales in individuals with chronic pain. *Health Qual Life Outcomes* 2018;16(1):56. doi: 10.1186/s12955-018-0884-0

41. Billingham SA, Whitehead AL, Julious SA. An audit of sample sizes for pilot and feasibility trials being undertaken in the United Kingdom registered in the United

Kingdom Clinical Research Network database. *BMC Med Res Methodol* 2013;13:104. doi: 10.1186/1471-2288-13-104 [published Online First: 2013/08/22]

42. Abbott JH. The distinction between randomized clinical trials (RCTs) and preliminary feasibility and pilot studies: what they are and are not. *J Orthop Sports Phys Ther* 2014;44(8):555-8. doi: 10.2519/jospt.2014.0110
43. Dettori JR. Loss to follow-up. *Evidence-Based Spine-Care Journal* 2011;2(1):7-10. doi: 10.1055/s-0030-1267080
44. Greenhalgh T, Hurwitz B. Why study narrative? *BMJ : British Medical Journal* 1999;318(7175):48-50.
45. Richards T. Listen to patients first. *BMJ : British Medical Journal* 2014;349 doi: 10.1136/bmj.g5765
46. Block AR, Kremer EF, Gaylor M. Behavioral treatment of chronic pain: the spouse as a discriminative cue for pain behavior. *Pain* 1980;9(2):243-52.
47. Flor H, Kerns RD, Turk DC. The role of spouse reinforcement, perceived pain, and activity levels of chronic pain patients. *J Psychosom Res* 1987;31(2):251-9.
48. Fergusson D, Glass KC, Waring D, et al. Turning a blind eye: the success of blinding reported in a random sample of randomised, placebo controlled trials. *BMJ* 2004;328(7437):432. doi: 10.1136/bmj.37952.631667.EE
49. Schulz KF, Grimes DA. Blinding in randomised trials: hiding who got what. *Lancet* 2002;359(9307):696-700. doi: 10.1016/S0140-6736(02)07816-9
50. Sackett DL, Rosenberg WM, Gray JA, et al. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312(7023):71-2.
51. Lee H, Lamb SE, Bagg MK, et al. Reproducible and replicable pain research: a critical review. *Pain* 2018 doi: 10.1097/j.pain.0000000000001254

52. ClinicalTrials.gov. Identifier: NCT02343315, Are Supervised Exercises and TENS Necessary Along With Prescribed Home Exercises for Chronic Low Back Pain? Bethesda (MD): National Library of Medicine (US)2015 [cited 2015 January 22]. Available from: https://clinicaltrials.gov/ct2/show/NCT02343315?cond=back+pain&intr=motor+control&age=1&rank=10.

53. Craig CL, Marshall AL, Sjostrom M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003;35(8):1381-95. doi: 10.1249/01.MSS.0000078924.61453.FB

54. Patterson SM, Krantz DS, Montgomery LC, et al. Automated physical activity monitoring: validation and comparison with physiological and self-report measures. *Psychophysiology* 1993;30(3):296-305.

Figure Legends:

Figure 1. Development of pain education.

Figure 2. Participant flow diagram.

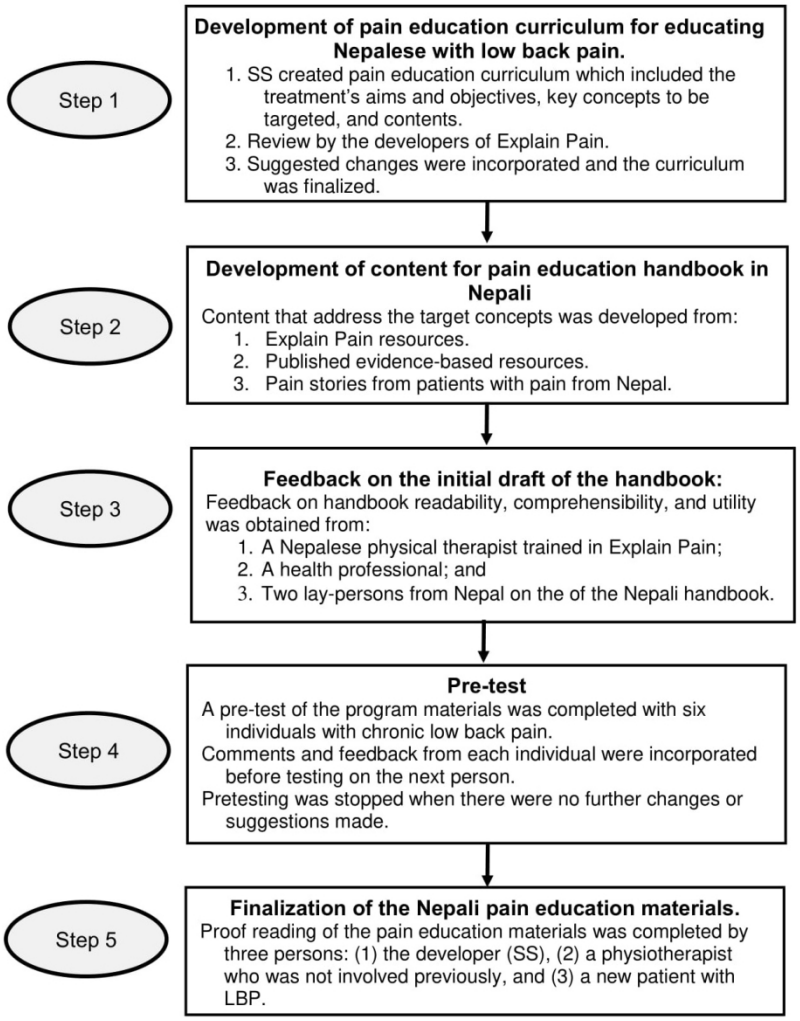

Figure 1. Development of pain education package in Nepali.

Development of pain education package in Nepali

116x159mm (300 x 300 DPI)

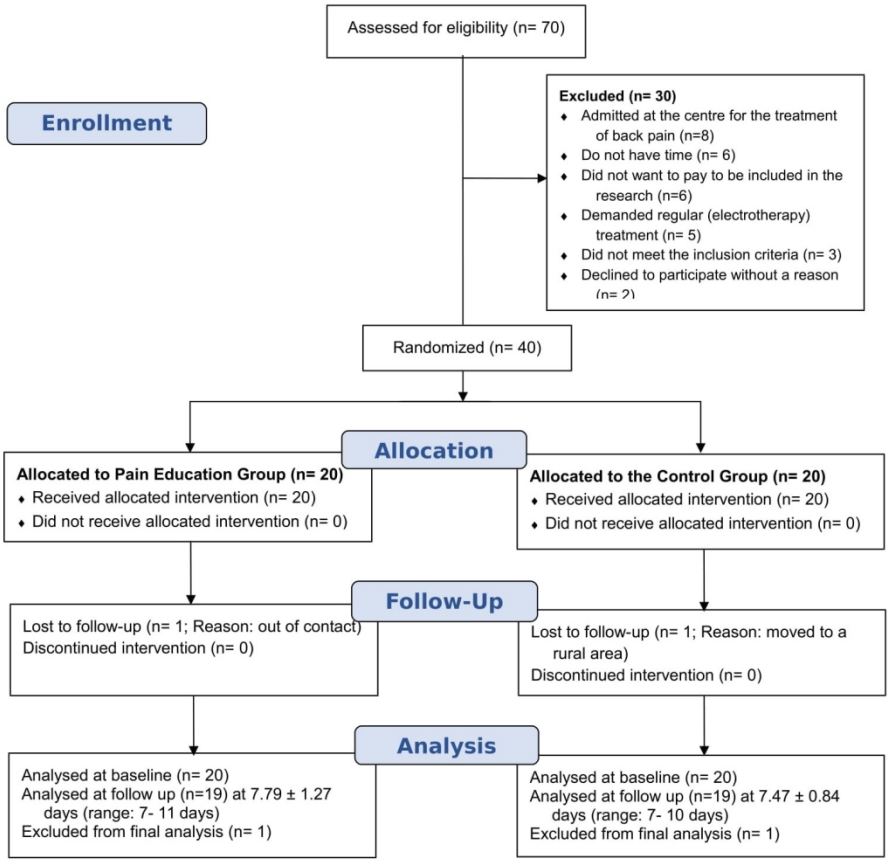

Figure 2. Participant flow.

Participant flow diagram

143x150mm (300 x 300 DPI)

Explaining Pain in an hour

Curriculum for Nepalese with non-specific low back pain

Learner or patient characteristics

Learners are adult patients who present to a Physiotherapy Department in Kathmandu, Nepal for the management of their low back pain (LBP). This education will be delivered to patients with any duration of LBP. Every participant who understands and can speak Nepali can be the learner for the planned curriculum of Explain Pain. These individuals may have a very low literacy level. Patients who have diagnosed psychiatric illness will be excluded from this intervention.

Deliverer or physiotherapist

A physiotherapist (Saurab Sharma) who has undergone "Explain Pain" course twice (in 2015 and 2017) will deliver Explain Pain to all the participants in the study. The physiotherapist will be supervised by Prof. G. Lorimer Moseley, one of the developers of the concept.

Number of learners or patients

A total of 40 learners will participate in Explain Pain in this study. All interventions will be delivered individually to each participant. No other concurrent interventions will be provided to the patients with Explain Pain, however, patients will be encouraged to perform some exercises at home for one week.

Unique needs of the learners

These learners are from Nepal, many of them may not have any formal education, and education as the core component of treatment may be new to these patients. Thus, this group may be a challenging group to provide Explain Pain intervention. Therefore, the contents are simplified and adapted to their need to match their level of understanding, and culture.

Delivery methods

The study physiotherapist will deliver approximately an hour long session of one-on-one Explain Pain to every study participant. Every participant will be provided with a take away education booklet, which includes details of target concept, pictures and stories to strengthen their education provided by the physiotherapist face-to-face. Participants will read the booklet if they are educated, or the family members can read out for them if they cannot read themselves. All the participants will be provided with an additional audio-visual information on neurophysiology knowledge of pain, if they can operate these at home (or office) to reinforce the learning so that the participants hear this every day before the follow-up for assessment in a week.

Place

A room at a physiotherapy facility (Sahara Care Hospital) in Kathmandu, Nepal.

Patient consideration

1. Physiotherapist will extract learner's personal goal of treatment. Nepalese generally struggle to bring out their own goals in general, this will be a difficult task.
2. Involvement of family throughout the education session will be encouraged if they accompany the patients. Role of family members will be highlighted in the education program and prognosis of the individuals with LBP.
3. All the participants will be reminded to perform their home-based tasks (reading, listening/watching audio-visual support, and exercising) by a text message or a phone call every day for five days a week.

Aims

The deliverer intends to:

1. Advise patient that educate is an important aspect of treatment of pain.
2. Provide contemporary knowledge about pain biology in relation to low back pain in an individual face-to-face teaching and learning environment.
3. Provide a comprehensive patient education by providing relevant information on graded exposure, pacing, and self-management.
4. Use pictures, metaphors, and relevant stories related to pain to explain details and complexities related to pain.

Objectives

At the end of the session learner will:

1. Have contemporary knowledge of pain biology that is relevant to their low back pain.
2. Understand importance of pain knowledge as a therapy.
3. Use the pain knowledge in changing the danger messages into safety signals, and using exercises to pave the track for recovery.

Explain Pain Curriculum plan

Part 1: Question and answer **[10 – 15 minutes]**

Physiotherapist will first toss two questions.

Question 1- "*Is there anything in particular that you would like to learn about your low back pain, or pain in general?*"

Physiotherapist will answer to any questions that arise.

Question 2- *"Do you know what caused your low back pain? Can you please explain the cause of your low back pain from what you have understood, or what you have been told?"*

Address any misconceptions and acknowledge and appreciate healthy/sound understanding about their pain. Talk about scans if appropriate.

Part 2: Discuss the key concepts of pain biology. **[40 minutes]**

1. Pain is normal and almost everyone gets it in life.
2. Body sends danger signals, and brain decides whether to produce pain.
3. Learning about pain changes pain; and anything associated with it can influence it.
4. Body learns pain and becomes overprotective over time.
5. Additional concept: Pain and tissue damage are poorly related.

[see the table below for the details]

Part 3: Do you want to learn ways to train your system? **[5 – 10 minutes]**

Teach 1 – 2 ways to train the system.

End: Ask if the patient has a cell phone. If he or she has a cell phone, ask if he/she wants to receive a daily reminder to perform home-based tasks, and learn more about pain.

Record the number and send the information daily.

Explain Pain Curriculum Plan

SN	Target concepts	Time required	Other ways of expressing the target concept	Content	Delivery and resources	Reinforcement/ Experiential learning	Did the patient understand? Assessment
1	Pain is normal and almost everyone gets it in life.	10 minutes	• Everyone has some pain in lifetime so you are not alone. • Pain is normal. • Your LBP is yours, is unique to you and real, and only you can control your pain.	• There is no test for pain or love. • Emotional and physical pain are one. • Pain is always a conscious event.	• Stories • Brief pain epidemiology	• Pain should not be a reason to worry about, and stop you from enjoying life, and fulfilling life goals.	• Ask- so who suffers pain or how many people suffer pain? *Answer- almost everyone.*
2	Body sends danger signals, and brain decides whether to produce pain.	10 minutes	• How danger signal travels in the body and how pain is perceived. • Brain is needed to create/ perceive pain. • Human body has danger sensors not pain sensors. • Pain depends on the balance between danger and safety.	• Nociceptive pathway. • Pain is created in the brain. • Ask patient if they had pain when they did not have tissue injury (or use aggravating factors).	• Use a picture/ animation of how danger signals reach brain? • Use the earthquake story.	• Have you ever experienced having an injury and no pain? • Have you ever experienced pain when there was no injury? • Use the scale protectometer to describe.	• So what creates pain? *Answer: brain!!!*
3	Learning about pain changes pain; and anything associated with it can influence it.	10 minutes	• Knowing about pain can reduce pain. • Education is analgesic. • Retraining your system can reduce sensitization.	• Understanding your pain can reduce your pain. • Wrong understanding can increase your pain.	• Sikha's pain story.	• Hear other's pain stories and analyse how it can be changed.	

4	Body learns pain and becomes overprotective over time.	10 minutes	• Out of many outputs of the brain, pain is only one protective output. • As pain persists, body systems can be over protective. • Multiple systems protect us from threats, and allow us to learn and heal. • You can train your body systems to be less protective.	• As pain persists, body becomes sensitized and over protective. • This can be changed by training our systems.	• The bending and lifting story.	• Ask the patient what are the other symptoms they get with pain? [Examples are: sweating, no sleep, stress, anxiety, fear, anger etc].	• Ask, do you understand this and think if this is logical? • Reinforce this by saying, this is also scientific.
Optional	Pain and tissue damage are poorly related	5 minutes	• Pain is an unreliable indicator of tissue damage. • Pain and scans do not correlate.	• Tissue stop hurting a long time before they heal. • Recent evidences regarding poor correlation between pain and scan reports.	Bad scans in pain free people.	Reinforce by saying degeneration is like greying of hair, which is normal ageing process. It does not hurt.	

Supplementary file 2: Feasibility outcomes.

SN	Objectives	Measures to assess specific objectives	Statistical analysis
1	Willingness to participate in a randomized controlled trial	Consecutive participants presenting at the center were invited to participate in the study. They were asked if they were willing to participate in the study. The reasons for refusal was recorded.	Total number of participants willing to participate in the study with percentage was recorded. The reasons for non-willingness were collated and reported.
2	Feasibility of blinding the assessor	Assessed by asking the assessor if she received any information regarding patients' group allocation. Further, the way how this information was received was recorded. Assessor's guess regarding group assignment was recorded for each participant, and each response was coded as "correct" or "incorrect" guess.	The frequency of "Yes" were counted and reported as percentage. Frequency of correct guesses were computed and compared between the groups. Finally, reasons for guesses were recorded and reported.
3	Eligibility and recruitment rates	The total number of participants invited, screened, found eligible, and recruited was recorded. The reasons for exclusion were recorded. Consent rates were also recorded.	Eligibility rate, recruitment rate, and consent rate were reported as percentages.
4	Acceptability of screening procedures	*Any difficulties or challenges in screening and recruiting the participants were recorded. Further,* outcome assessor's recommendations for overcoming any challenges were recorded. Time taken to complete the questionnaires were also recorded.	The frequency of difficulties or challenges were counted, difficulties or challenges noted and reported with assessor's recommendations to overcome those challenges.
5	Acceptability of random allocation to a treatment group	Acceptability of random allocation to one of the two treatment groups is acceptable by the participants were recorded as "Acceptable", "Not acceptable", or "No preference".	The frequency and percentage of acceptability was recorded and reported.
6	Understanding possible contamination between the groups	Participants were asked if: 1. They talked to other participants in this study about the intervention they are receiving, and if the attitude towards the intervention was changed after talking to participant(s) in the other group, 2. The participants are aware of the intervention that participants in the other group are receiving,	The positive responses were computed for the first three questions for each group separately. Frequency of how many patients in control group had access to pain education materials was recorded and reported as percentage.

		3. The participants in the other group are aware of the intervention you are receiving. Participants in the control group was asked if he or she read the pain education booklet or any videos related to PEG.	
7	Credibility and acceptability of the interventions	Five questions were asked to assess credibility of the interventions as described in the study protocol [1]. Response to each question was recorded on a Likert Scale where, 0= "*Not at all*", 1= "*A little bit*", 2= "*Somewhat*", 3= "*Quite a bit*", 4= "*Very much*." The total scores ranged between 0 and 20. Higher scores indicate greater credibility of the intervention.	Mean of the total scores on the credibility scale were computed separately for each treatment arm. Between group differences in creditability was evaluated using a *t*-test.
8	Adherence to the intervention	Adherence to home treatment was assessed during the post-treatment assessment by recording "Yes" or "No" response to "Did you follow home advices?"; and "how many days did you perform the home exercises?". The latter was recorded as the number of days. Any deviation from prescribed home treatment program were recorded.	The treatment adherence was recorded in the number of days and reported for both treatment arms separately. Deviation from the treatment protocol was reported.
9	Satisfaction of treatment	Patient Global Assessment of Treatment Satisfaction (PGATS) scale was used to assess treatment satisfaction. Responses were recorded on a 5-point categorical scale (0 = ''*Very dissatisfied*''; 1 = ''*Dissatisfied*''; 2 = ''*Neutral or no preference*"; 3 = "*Satisfied*"; 4 = ''*Very satisfied*''). Total scores of treatment satisfaction ranges between 0 and 4, with higher scores indicating greater treatment satisfaction.	Mean scores for treatment satisfaction were computed for each treatment arm separately. Between-group difference was evaluated using a *t*-test.
10	Difficulty in understanding the information provided by the physiotherapist.	Difficulty in understanding the information provided by the physiotherapist were asked with responses recorded on a 5-point Likert Scale, where 1= "*Very easy*", 2= "*Easy*", 3= "*Neither easy nor difficult*", 4= "*Difficult*", 5= "*Very difficult*". Scores range between 1 and 5, with higher scores indicating more difficulty in understanding.	The differences in the difficulty in understanding the information provided was compared between the two groups.
11	Adverse events	Any adverse events after treatment were recorded as written verbatim.	The number of adverse events were computed for each treatment condition separately. The responses were collated.

References

1. Sharma, S., et al., *Pain education for patients with non-specific low back pain in Nepal: protocol of a feasibility randomised clinical trial (PEN-LBP Trial).* BMJ Open, 2018. **8**(8): p. e022423.

Supplementary file 3. Secondary outcome measures.

Name of outcome measure	Domain	No. of Items	Response Scale	Scoring	Measurement properties of Nepali versions of the scale.
PROMIS Pain Interference short form 6b	Pain interference	6	5 point, Ordinal	Responses are scored as a T-score that can range from 0-100, with a mean of 50 and SD of 10 in the normative sample.	• Cronbach alpha= 0.85 and Intraclass correlation coefficient (ICC) = 0.80 chronic pain sample from Nepal.[1]
Pain Catastrophizing Scale (PCS)	Pain catastrophizing	13	5-point, Ordinal	The total PCS score can range from 0 to 52, with higher scores indicating greater pain catastrophizing.	• Cronbach alphas= 0.85- 0.93, • ICC= 0.89- 0.90, • Positive moderate correlations with measures of pain intensity, depression, and anxiety in a chronic pain sample from Nepal.
Global rating of Change (GROC)	Patient's global rating of change	1	1-7, Ordinal	*Overall improvement were rated* with 4 = "*No change*". Scores greater than 4 indicate greater improvement and scores lower than 4 indicate a perceived worsening in the health condition.	Minimum important change= 1 point change.
Quality-of-Life (QOL) rating scale	Quality of life	2	5-point, Ordinal	Respondents were asked to rate their general quality of life and general health by responding to the questions on a 5 point Likert Scale. Total scores range from 0 to 10 with greater score indicating better quality of life.	Not available during the time of protocol writing the manuscript. Internal consistency between the two items of the QOL scale in the current sample is 0.73.
PROMIS Pain Intensity short	Pain intensity	3	5-point, Ordinal	Responses were scored as a T-score that can range from 0-100, with a	ICC= 0.71 in a chronic pain sample from Nepal.[1]

form 3b				mean of 50 and SD of 10 in the normative sample.	
PROMIS Sleep Disturbance short form 8b	Sleep disturbance	8	5-point, Ordinal	Responses were scored as a T-score that can range from 0-100, with a mean of 50 and SD of 10 in the normative sample.	ICC= 0.78. Good internal consistency of 7-items (Cronbach's alpha = 0.89).[1]
PROMIS Emotional Distress-Depression-short form 8b	Depression	8	5-point, Ordinal	Responses were scored as a T-score that can range from 0-100, with a mean of 50 and SD of 10 in the normative sample.	• Cronbach's alpha= 0.93. • ICC= 0.81 in a chronic pain sample from Nepal.[1]
10-item Connor Davidson Resilience Scale	Resilience	10	4-point, Ordinal	Responses were summed such that total scores range from 0 to 40, with higher scores indicating more resilience.	• Cronbach's alpha= 0.87- 0.90. • ICC=0.89. • Standard error of measurement= 2.42 points. • Minimum detectable change= 6.72 points. • Significant negative and moderate association with the PCS in a chronic pain sample from Nepal.[2]
-	Use of pain medications and other pain treatments	-	-	Names, and dosage of pain medication intake were recorded. Medications were categorized into analgesic type (opioids, NSAIDs, sedatives, and anti-seizure medications). Other pain treatments received were also recorded and classified (e.g., electrotherapy). The number of days each treatment of these treatments received were recorded.	• No validity data for self-reported analgesic or pain treatment use in Nepali patients available at the time of manuscript writing.

References

1. Sharma S, Pathak A, Maharjan R, et al. Psychometric properties of nepali versions of PROMIS short from measures of pain intensity, pain interference, pain behaviour, depressions, and sleep disturbance. *The Journal of Pain* 2018;19(3):S59.
2. Sharma S, Pathak A, Abbott JH, et al. Measurement properties of the Nepali version of the Connor Davidson resilience scales in individuals with chronic pain. *Health Qual Life Outcomes* 2018;16(1):56. doi: 10.1186/s12955-018-0884-0

CONSORT 2010 checklist of information to include when reporting a pilot or feasibility trial*

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a pilot or feasibility randomised trial in the title	1
	1b	Structured summary of pilot trial design, methods, results, and conclusions (for specific guidance see CONSORT abstract extension for pilot trials)	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale for future definitive trial, and reasons for randomised pilot trial	6-7
	2b	Specific objectives or research questions for pilot trial	7
Methods			
Trial design	3a	Description of pilot trial design (such as parallel, factorial) including allocation ratio	8
	3b	Important changes to methods after pilot trial commencement (such as eligibility criteria), with reasons	N/A
Participants	4a	Eligibility criteria for participants	9
	4b	Settings and locations where the data were collected	9
	4c	How participants were identified and consented	9 – 10
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	10 – 13
Outcomes	6a	Completely defined prespecified assessments or measurements to address each pilot trial objective specified in 2b, including how and when they were assessed	13, 14, Supplementary Tables 2, 3.
	6b	Any changes to pilot trial assessments or measurements after the pilot trial commenced, with reasons	N/A
	6c	If applicable, prespecified criteria used to judge whether, or how, to proceed with future definitive trial	Table 3.
Sample size	7a	Rationale for numbers in the pilot trial	14
	7b	When applicable, explanation of any interim analyses and stopping guidelines	N/A
Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	15
	8b	Type of randomisation(s); details of any restriction (such as blocking and block size)	15
Allocation concealment	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	15

mechanism			
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	15
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	15
	11b	If relevant, description of the similarity of interventions	-
Statistical methods	12	Methods used to address each pilot trial objective whether qualitative or quantitative	15, 16
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were approached and/or assessed for eligibility, randomly assigned, received intended treatment, and were assessed for each objective	Figure 2.
	13b	For each group, losses and exclusions after randomisation, together with reasons	Figure 2.
Recruitment	14a	Dates defining the periods of recruitment and follow-up	17
	14b	Why the pilot trial ended or was stopped	17
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	Table 1.
Numbers analysed	16	For each objective, number of participants (denominator) included in each analysis. If relevant, these numbers should be by randomised group	Tables 3, 4
Outcomes and estimation	17	For each objective, results including expressions of uncertainty (such as 95% confidence interval) for any estimates. If relevant, these results should be by randomised group	Tables 3, 4
Ancillary analyses	18	Results of any other analyses performed that could be used to inform the future definitive trial	N/A
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	22
	19a	If relevant, other important unintended consequences	-
Discussion			
Limitations	20	Pilot trial limitations, addressing sources of potential bias and remaining uncertainty about feasibility	28 – 30
Generalisability	21	Generalisability (applicability) of pilot trial methods and findings to future definitive trial and other studies	27 – 28
Interpretation	22	Interpretation consistent with pilot trial objectives and findings, balancing potential benefits and harms, and considering other relevant evidence	23 – 30
	22a	Implications for progression from pilot to future definitive trial, including any proposed amendments	31
Other information			
Registration	23	Registration number for pilot trial and name of trial registry	2
Protocol	24	Where the pilot trial protocol can be accessed, if available	2
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	2
	26	Ethical approval or approval by research review committee, confirmed with reference number	8, 9

Citation: Eldridge SM, Chan CL, Campbell MJ, Bond CM, Hopewell S, Thabane L, et al. CONSORT 2010 statement: extension to randomised pilot and feasibility trials. BMJ. 2016;355.

*We strongly recommend reading this statement in conjunction with the CONSORT 2010, extension to randomised pilot and feasibility trials, Explanation and Elaboration for important clarifications on all the items. If relevant, we also recommend reading CONSORT extensions for cluster randomised trials, non-inferiority and equivalence trials, non-pharmacological treatments, herbal interventions, and pragmatic trials. Additional extensions are forthcoming: for those and for up to date references relevant to this checklist, see www.consort-statement.org.

BMJ Open

The results of a feasibility randomized clinical trial on pain education for low back pain in Nepal: The PEN-LBP feasibility trial.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-026874.R1
Article Type:	Research
Date Submitted by the Author:	15-Jan-2019
Complete List of Authors:	Sharma, Saurab; Kathmandu University School of Medical Sciences, Department of Physiotherapy; University of Otago Dunedin School of Medicine, Orthopedic Surgery Section, Department of Surgical Sciences Jensen, Mark; University of Washington, Department of Rehabilitation Medicine Moseley, G.; Sansom Institute for Health Research, University of South Australia Abbott, J. Haxby; University of Otago, Department of Surgical Sciences, Dunedin School of Medicine
Primary Subject Heading:	Evidence based practice
Secondary Subject Heading:	Epidemiology, Global health, Public health
Keywords:	Low back pain, Pain management < ANAESTHETICS, Musculoskeletal pain, Patient education, Culture, Low-income country

Title: The results of a feasibility randomized clinical trial on pain education for low back pain in Nepal: The PEN-LBP feasibility trial.

Authors: Saurab Sharma [1, 2]

Mark P. Jensen [3]

G. Lorimer Moseley [4]

J. Haxby Abbott [2]

Affiliations: [1] Department of Physiotherapy, Kathmandu University School of Medical Sciences, Dhulikhel, Nepal

[2] Centre for Musculoskeletal Outcomes Research, Department of Surgical Sciences, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

[3] Department of Rehabilitation Medicine, University of Washington, Seattle, USA

[4] School of Health Sciences, University of South Australia, Adelaide, Australia.

Present address of corresponding author:

Saurab Sharma

Assistant Professor, Department of Physiotherapy

Kathmandu University School of Medical Sciences

Dhulikhel, P.O. Box No.: 11008, Nepal

Office fax: +977 1 490 707

saurabsharma1@gmail.com

Phone: +977 984 163 4043

ABSTRACT

Objectives: The aims of this study were to (1) develop pain education materials in Nepali and (2) determine the feasibility of conducting a randomized clinical trial (RCT) of a pain education intervention using these materials in Nepal.

Design: A two-arm, parallel, assessor-blinded, feasibility RCT.

Setting: A rehabilitation hospital in Kathmandu, Nepal.

Participants: Forty Nepalese with non-specific low back pain (mean [SD] age 41 [14] years; 12 [30%] women).

Interventions: Eligible participants were randomized, by concealed, 1:1 allocation, to one of two groups: (1) a pain education intervention and (2) a guideline-based physiotherapy active control group intervention. Each intervention was delivered by a physiotherapist in a single, one hour, individualized treatment session.

Primary outcome measures: The primary outcomes were related to feasibility: recruitment, retention, and treatment adherence of participants, feasibility and blinding of outcome assessments, fidelity of treatment delivery, credibility of, and satisfaction with, treatment. Assessments were performed at baseline and at 1- week post treatment.

Secondary outcome measures: Pain intensity, pain interference, pain catastrophizing, sleep disturbance, resilience, global rating of change, depression, and quality of life. Statistical analyses were conducted blind to group allocation.

Results: Forty participants were recruited. Thirty-eight participants (95%) completed the 1- week post-treatment assessment. Most primary outcomes surpassed our *a priori* thresholds for feasibility. Several findings have important implications for designing a full

trial. Secondary analyses suggest clinical benefit of pain education over the control intervention, with larger decrease in pain intensity (mean difference = 3.56 [95% CI: 0.21, 6.91]) and pain catastrophizing (mean difference = 6.16 [95% CI: 0.59, 11.72]) in the pain education group. Pain intensity would seem an appropriate outcome for a full clinical trial. One minor adverse event was reported.

Conclusion: We conclude that a full RCT of pain education for back pain in Nepal is feasible and warranted.

Trial registration: ClinicalTrials.gov; Identifier: NCT03387228

Keywords: Low back pain, pain management, low-income country, culture, patient education, musculoskeletal pain.

Strengths and limitations of this study

1. This is the first study to examine the feasibility of a clinical trial on low back pain in Nepal.
2. We developed a culturally suitable pain education package using local patient stories before using it in the feasibility trial.
3. We blinded the assessor and data analyst to the group allocation; however, due to the nature of the intervention we could not blind the therapists and study participants.
4. We used the guideline-based care as an active control group.
5. Conclusions regarding the effectiveness of the intervention should not be made because this was a feasibility study, not a clinical trial; however significant between-groups differences on proposed outcome measures justify proceeding with a full definitive trial.

INTRODUCTION

Low back pain is the leading cause of disability in both low- and high-income countries, and is associated with large direct (health care) and indirect costs.[1-3] The limited available literature on low back pain in Nepal indicates low back pain prevalence of between 35% and 65%,[4 5] and that prevalence will probably increase in the next decade.[3] Therefore, timely use of interventions that are evidence-informed, effective, and inexpensive is urgently required.

Internationally, clinical practice guidelines on low back pain consistently recommend non-pharmacological and non-surgical approaches as the first line of treatment.[6-8] For acute back pain, core common recommendations are education or advice for reassurance, remaining active, returning to work, and avoiding bed rest and lumbar supports. For chronic back pain, recommendations are education, exercise and psychological therapies.[6-9] Remarkably, although many high-income countries are moving away from primarily drug and surgical management of low back pain because of their associated risks and costs, and general lack of efficacy,[10] such interventions are now increasingly provided in Nepal.[11 12] Unfortunately, there is little or no research, nor clinical evidence, that evaluates the efficacy of any treatments for low back pain in Nepal, including the first line treatments that are now recommended in clinical guidelines elsewhere.

Although education is almost universally recommended for low back pain, there are no clear curricula for delivering it and little attention is given to training, methods, settings

or context.[13] One type of education that is an exception to this rule and has been widely studied, focusses on improving patient understanding of the biological mechanisms that underpin pain and how best to promote recovery.[14 15] This form of pain education (widely known as 'Explaining Pain' or 'Pain neuroscience education')[15-24] was developed in Australia and has been adapted in numerous Western countries, demonstrating mixed results for effectiveness for managing low back pain.[15 17 21 23-25] Education can be brief - around 10 minutes to deliver the key messages, or extended (one hour to several hours). Although no strong evidence exists in support of effectiveness of longer versus shorter education duration, a short education session is time efficient. On the other hand,longer forms of pain education haveseveral advantages over shorter forms; specifically, they allow for the integration of contemporary principles of conceptual change and education (e.g., including stories and metaphors[26]) and can provide adequate time for guidance on self-management strategies such as graded exposure to difficult or painful activities.[15 27 28] Longer duration pain education also allows for greater tailoring of individual curriculum and target concepts, provides patients with time and opportunity to voice doubts and ask questions, and allows the clinician to assess learning in real time.[28]

Treatment that is effective in one culture may not necessarily be effective in another. We know of no reports of pain education being adapted or evaluated within an Eastern cultural context. The critical first step then is to determine whether indeed it is feasible to do so.[29] We therefore (1) developed evidence-based pain education materials in Nepali for application in tertiary and primary care settings in Nepal, and (2) investigated the

feasibility of conducting a randomized clinical trial (RCT) comparing effectiveness of pain education relative to an appropriate control condition. We aimed to determine whether or not it would be feasible to undertake a full RCT within the Nepalese health care system and to identify any modifications that may be needed before doing so.

METHODS

The research was conducted in two stages. First, we developed pain education package in Nepali, followed by a feasibility trial evaluating the feasibility of conducting a RCT to evaluate the effectiveness of pain education.

Development of pain education in Nepali

The primary investigator (SS) developed the pain education resources in Nepali, based on the "Explain Pain" pain education materials (NOIgroup publishing, Adelaide, Australia).[28 30] Figure 1 lists the development process, which included five steps.

In the first step, SS developed a context and culture-specific pain education curriculum according to the process set out in Moseley and Butler.[28] The curriculum was reviewed by the authors of that guide (including coauthor of this paper - GLM). Four key concepts (described below) were identified, with one additional optional concept if time permitted. The final curriculum, including the key concepts to deliver, details of contents, and methods of delivery were published in our protocol paper[31] and are also presented in Supplementary file 1.

In the second step, a pain education handbook was created using contents from Explain Pain[28 30] and clinical practice guidelines on low back pain.[6-8] We used pain stories from Nepal to help explain the target concepts.[31] We kept the Nepalese adaptations as simple as possible, so that patients with low to no formal education would understand them.

In the third step, the material was reviewed by four Nepalese with a medical (n=2) or non-medical (n=2) background, and revised as a result. In the fourth step, we undertook initial pilot testing of the pain education handbook with six patients with chronic low back pain. We focused here on its readability, the relevance of the stories, and whether the new pictures created for the handbook delivered their intended meaning. The handbook text was revised, but no changes were made to the pictures. Finally, three native Nepali-speaking persons proof-read the handbook and a final version was completed.

Research design

We conducted a two-arm, assessor-blinded, feasibility, randomized clinical trial (RCT). We obtained ethical approval from Nepal Health Research Council (reg. 422/2017) and the University of Otago Human Ethics Committee for Health (reg. H17/157). We registered the trial protocol at ClinicalTrials.gov (NCT03387228). We used the SPIRIT (Standard Protocol Items: Recommendations for Interventional Trials) statement[32] during the development of the protocol, and followed the CONSORT (Consolidated Standards of Reporting Trials) statement extension for a pilot and feasibility randomized

trials[33] for reporting. Feasibility was to be determined on *a priori* criteria.[31] For the detailed review of the research methods, we refer readers to the published protocol.[31]

Participants

We included adults (age 18 years or more) with non-specific low back pain of any duration. We excluded patients with specific causes of low back pain such as malignancy, fracture, infection, or inflammatory arthritis identified from history or investigations. We also excluded pregnant women and patients presenting with the history of bladder and bowel incontinence or perineal anesthesia.

We recruited participants from a rehabilitation hospital in Kathmandu, Nepal. We invited consecutive patients presenting at the center to participate in the study. Additionally, we made advertisements on social media about the research to improve the recruitment, as almost 28% of Nepalese use Facebook (www.internetworldstats.com). We provided an appointment to interested candidates for screening at the center. A research assistant (a trained physiotherapist) screened for eligibility all potential participants who expressed a willingness to participate in the current study. All participants signed the consent form prior to baseline assessment.

Interventions

We used the TIDieR (Template for Intervention Description and Replication) Checklist to plan and report the study interventions.[34 35] There were two interventions in a two arms RCT design. We provided pain education to the participants who were randomly

allocated to the experimental group (Pain Education Group: PEG) and guideline-based physiotherapy treatment to the participants who were randomly allocated to the control group (CG). Treatment time for both groups was one hour.

The PEG group: Delivery of pain education

The principal investigator (SS), who has received extensive training in *Explain Pain* via NOIgroup (Adelaide, Australia) Professional Development and one-on-one mentoring with pain education experts, delivered the treatment. The pain education deliverer first asked two questions to the patients in the PEG: (1) "*Is there anything in particular that you would like to learn about your low back pain, or pain in general?*", and (2) *"Do you know what caused your low back pain? Can you please explain the cause of your low back pain from what you have understood, or what you have been told?"* Up to 15 minutes was allotted to addressing, with evidence-informed answers, any questions participants had and to clarify any misconceptions the patients had regarding their low back pain. The rest of the session was used to deliver information regarding the target concepts.

Target concepts delivered

The key target concepts were: (1) pain is normal and almost everyone experiences it at different times during their life; (2) the body sends danger signals (i.e., not necessarily information about physical damage, but the danger of potential physical damage), and the brain decides whether to produce pain; (3) learning about pain physiology changes pain, and anything previously associated with pain (e.g., past learning, social factors,

environmental cues) can influence current pain, and (4) the body can learn to experience pain and become more overprotective over time. One additional target concept “pain and tissue damage are poorly related” was delivered if there was time available after the four key concepts were addressed. During the pain education session, strategies for graded-exposure to painful or difficult activities were also provided to the patients to increase their physical activity.

Guideline-based physiotherapy treatment

CG treatment consisted of guideline-based physiotherapy interventions extracted from recent clinical practice guidelines on low back pain.[6 36 37] Criteria for the CG treatment component required that it be: (1) a first-line recommended treatment, or; (2) a second-line recommended treatment to make the total duration of the session be one hour (to match PEG treatment time); (3) feasible to be delivered during the first clinical contact; and (4) one that is routinely delivered in, and can be competently delivered by, physiotherapists at the recruitment center. Given these criteria, the CG treatment condition included: (1) brief education to reassure the patient, advice to remain active and remain at or return to work (if the participant had been working prior to pain onset), general education about the favorable prognosis of low back pain that it will generally get better in two to six weeks, and advice to avoid bed rest and lumbar corsets (10 - 15 minutes),[6 36 37] (2) superficial heat (10 - 15 minutes),[6 37] (3) back massage (10 minutes),[6 36] and (4) static cycling to promote physical activity (remaining time; between 20 – 30 minutes).[6 36 37] Although treatment in CG involved communication between the treating therapist and patients, this communication was strictly limited to providing either

(1) brief education as described above, or (2) active listening. Key concepts delivered in the PEG were not provided to the patients in this group.

Home treatment

We also prescribed a home program for both groups. This included a leaflet providing brief education on self-management of low back pain, with pictures to remind the participants to remain physically active, education regarding positive prognosis, advice to walk for 30 minutes daily (with rest if required) and to avoid bed rest or lumbar corsets.

In addition to the leaflet that was also provided to the control group, participants in the PEG received the pain education handbook. We suggested to participants that they read the booklet at least once during the following week. If the patients could not read, they were advised to request a family member to read the pain education handbook to them. Adherence to both exercise (e.g., walking), and reading the pain education handbook at home was recorded, by self-report, one week post-treatment.

Participants in both treatment groups were required to pay the same fee for physiotherapy services as usual for non-trial patients. This payment was identical for both interventions.

Outcome Measures

Demographic data were collected as per the recommendations of the NIH task force on research standards for chronic low back pain.[38]

Primary outcome measures

The primary outcomes were related to feasibility: recruitment, retention, and treatment adherence of participants, feasibility and blinding of outcome assessments, fidelity of treatment delivery, credibility of, and satisfaction with, treatment. To assess recruitment-related feasibility outcomes, we recorded the numbers of potential participants who were eligible and recruitment rates. Participation-related feasibility outcomes were (1) rates of willingness to participate in a RCT and (2) acceptability of random allocation to a treatment group. Feasibility outcomes related to outcome assessment were (1) feasibility of assessor blinding procedures and (2) acceptability of screening procedures. Finally, the treatment-related feasibility outcomes were (1) possible contamination between the groups, (2) the credibility and acceptability of the interventions, (3) adherence to the interventions, (4) treatment satisfaction, (5) difficulty in understanding the treatment, and (6) adverse events related to the interventions. Details of these feasibility outcome measures are presented in Supplementary file 2.

Secondary outcome measures

The secondary outcome measures selected were those that had the potential to be primary or secondary outcomes of a potential full clinical trial, based on the core-outcome sets recommended for low back pain.[39 40] We used eight outcome measures previously translated and cross-culturally adapted to the Nepali language: four Patient-

Reported Outcome Measurement Information System (PROMIS) short form measures assessing pain intensity, pain interference, sleep disturbance, and depression;[41] a two-item Quality of Life scale, 7-point Global Rating of Change (GROC);[42 43] the Pain Catastrophizing Scale (PCS);[44] and the 10-item Connor Davidson Resilience Scale (CDRISC).[45]

Sample size

Sample size estimation was performed to achieve the primary feasibility outcomes goals, as described in the protocol[31] and registration documents (clinicaltrials.gov registration number: NCT03387228), and not to detect differences in the secondary, treatment effects outcomes.[46] Based on guidance in the literature,[47] the research team estimated that a sample size of 40 (20 in each treatment arm) would be sufficient to adequately evaluate the feasibility of undertaking a full clinical trial.[31]

Randomization

The published research protocol[31] was strictly followed. Allocation sequence was generated in random blocks of 4 and 6 using www.randomization.com, by a researcher (JHA) who was not involved in recruitment. Allocation concealment was performed using sequentially numbered opaque, sealed envelopes, prepared by JHA, and maintained until the interventions were assigned to the study participants. The group allocation was revealed to the study participants and intervention providers only after completion of the baseline assessment.

Blinding

The assessor performing all the assessments was blinded to group allocation of the participants throughout the study. The data analyst (SS) was also blinded to group allocation. That is, after the assessor entered data in the Excel spreadsheet without knowledge of group allocation, the entered data was sent to JHA, who added codes for group allocation (red and blue), before the data analyses were performed. Unblinding of group allocation occurred after all planned analyses were complete.

Statistical methods

Baseline characteristics for demographic and clinical data of the participants were reported using descriptive statistics. The plans for analysis of primary outcome measures are presented in Supplementary file 2.

We planned the exploratory analysis of between-group differences in the secondary outcome measures using two-group *t*-tests, with the understanding that the current study was not powered to detect statistically significant between-group differences in the secondary outcomes. Rather, analyses of between group differences were computed primarily for descriptive purposes in order to inform decisions regarding the selection of measures for a possible future full clinical trial. The scores of the PROMIS measures were transferred into the template provided by www.assessmentcenter.net, which computed the total raw scores, T-scores and standard errors. The assessment center automatically handles missing items when performing the analysis. For other measures, missing items were imputed using the mean of the present items for that

patient. The details of the measures with the psychometric properties are outlined in Supplementary file 3.

Patient and Public Involvement

Patients with LBP and non-clinician volunteers provided significant feedback in the development of the Nepalese pain education package. We incorporated real but anonymous pain-related stories of Nepalese so that the intervention is relatable. Neither patients nor members of the public were involved in the design of the study.

RESULTS

Data were collected between February and April 2018, with mean (SD; range) duration to follow-up of 7.63 (1.08; 7 – 11) days. Recruitment was stopped after achieving the desired sample size of 40. Twenty participants were randomized to each treatment arm.

Sample characteristics

Fourteen participants (70%) in each treatment arm were recruited from the hospital. The majority of participants in each group were men, married, and Hindu. Baseline demographic characteristics were comparable between the groups. However, baseline scores on the secondary outcomes were somewhat higher in the PEG than the control group. Details of the baseline sample characteristics are presented in Table 1.

[Insert Table 1 about here]

Missing data

One item (item #10) in the baseline assessment of the PCS and one item in the follow-up assessment of CDRISC (item #8) were missing for one participant. Missing values were replaced by the mean score of each measure for that participant. One item in the baseline depression scale was missing for one participant, which was imputed by the PROMIS assessment center during the analysis.

Primary (feasibility) outcomes

Results related to feasibility outcomes are presented in Table 2, and summary results on feasibility criteria are presented in Table 3.

[Insert Table 2 and Table 3 about here]

Recruitment-related feasibility outcomes

Seventy candidates were invited to participate in the study. Twenty-eight participants (70%) were recruited from the data collection center; 12 (30%) from community advertisements. Fifty-seven percent of invited candidates participated. Of those who did not, 27 (90%) declined participation and 3 (10%) did not meet inclusion criteria. Forty out of 43 candidates (93%) screened were eligible to participate. All 40 participants (100%) who met the inclusion criteria provided written informed consent and were randomized to one of the study arms. One participant in each group was lost to follow-up. The reasons for all exclusions and losses to follow-up are outlined in the participant flow diagram (Fig. 2).

Participant-related feasibility outcomes

Willingness to participate in a randomized trial. The main reasons for unwillingness to participate were: (1) wanting to receive comprehensive physiotherapy treatment as an in-patient (n = 8), (2) not wanting to pay for treatment (n = 6), (3) not having time to participate in the study and complete the post-treatment assessment at one week (n = 6), and (4) wanting to receive electrotherapy treatment for one week because it was recommended by their physician.

Acceptability of random allocation to a treatment group. Random allocation of the treatment was acceptable to 57 out of 70 individuals (81%). Of the 13 participants who did not accept random allocation, five (7%) wanted to receive electrotherapy treatment specifically, and eight (11%) wanted to be admitted at the center to receive comprehensive physiotherapy treatment (including electrotherapy) twice a day for a week as advised by their treating physician or physiotherapists.

Outcomes assessment-related feasibility outcomes

Feasibility of blinding the assessor. The assessor did not receive any definitive information about participants' group allocation for any of the participants during the study. The assessor's guess was correct for 12 participants (60%) in the PEG condition, and for 11 participants (55%) in the CG condition. On questioning, the assessor identified some clues that may have influenced a correct guess: (1) "duration of treatment time" (see below) (n = 5; 3 correct and 2 incorrect guesses), (2) patients'

reporting the treatment as “interesting” (n = 2; both incorrect guesses), and (3) the treating therapist’s description of the treatment as interactive (n = 1; correct guess).

Acceptability of screening procedures by the assessor. Mean (SD; range) time taken to complete the screening process (including time to sign the consent) was 7 (6; 6 – 45) minutes. Mean (SD; range) time taken to complete all the forms during the baseline assessment was 20 (5; 12 – 35) minutes.

The screener reported that the screening procedures were acceptable, but there were two problems. First, the duration of screening was occasionally too long, for example when patients told stories about their pain rather than keeping answers focused on the questions that were asked, or an accompanying friend kept responding on the patient’s behalf. Second, interspersing assessments unrelated to pain (e.g. CDRISC, sleep disturbance, depression, and quality of life) between assessments related to pain (e.g., pain intensity, pain interference) made it difficult for some participants to switch focus between the pain and general domains. As a result, some participants kept answering about pain when the questions asked about other domains such as sleep or depression.

Treatment-related feasibility outcomes

Contamination. There were no detected instances of contamination between the two groups. Table 2 presents the results of the five separate contamination questions.

Credibility and acceptability of the interventions. The credibility scores of the two conditions at one-week assessment and average treatment time were similar (Table 2). Both interventions were acceptable to all the participants. However, patients in the PEG often expected some form of physiotherapy interventions in addition to education. For example, one patient, assigned to the PEG condition, had severe pain and stated that he wanted a physical treatment for his back pain. Similarly, most of the patients in the control group mostly expected back-specific exercises and or electrotherapy treatment over the painful sites. One comment from a participant after completing cycling was *"Okay, this was exercise for my general health. What exercise should I perform for my back pain?*" Similarly, many participants in the CG were keen to receive pain education intervention, which they did (n = 15) after post-treatment assessment at one week.

Adherence to intervention and treatment satisfaction. Adherence to intervention and treatment satisfaction were similar in both groups (Table 2). Twelve out of 38 patients who completed the post-treatment assessment at one week (32%; 5 in the PEG and 7 in the CG) wished to receive their regular physiotherapy treatment (mostly electrotherapy) at the center between the two assessment time-points; these participants did receive this treatment as requested.

Difficulty in understanding the treatment. In both groups, 15 participants (75%) reported that the treatment was "easy" to understand (Table 2). This result contravened our *a priori* cutoff point for this criterion of 50%.

Adverse events. One participant in the CG reported lower extremity pain after cycling for 20 minutes. The increase in her leg pain lasted for two days and then subsided. None of the other participants reported any other adverse events associated with the treatments.

Results of secondary outcomes. We found significant within-group improvements from pre- to post-treatment in all the secondary outcomes, except resilience for the PEG participants. In the CG group, we found pre- to post-treatment improvements in pain interference, depression and catastrophizing. We found between-group differences in favor of PEG for pain intensity and pain catastrophizing (Table 4).

[Insert Table 4 about here]

Other findings

The standard low back pain treatment protocol at the data collection center typically included non-guideline-based care such as advice to rest, advice against physical activity, admission for bed rest and intensive passive therapies (mostly electrotherapy). Such a care pathway contrasts with the recommendations and treatments presented in both groups. We found it challenging to alter the physiotherapists' usual practice.

Related to this, all of the physiotherapists who provided the control group treatment reported being dissatisfied with not being able to provide interventions they would normally provide, many of which were treatments that patients also wanted to receive,

such as spine-specific exercises and manual therapies. Moreover, five of the physiotherapists who were initially trained in the guideline-based care prior to the initiation of the study left the treatment center during the trial recruitment period. They were replaced by four physiotherapists who therefore had not been trained in guideline-based care as part of this study.

DISCUSSION

We aimed to determine whether or not it would be feasible to undertake a full RCT within the Nepalese health care system and to identify any modifications that may be needed before doing so. Seven of the eight *a priori* feasibility criteria were met, which suggests that a clinical trial to evaluate the effectiveness of pain education and evidence-based physiotherapy treatment in Nepal is feasible. This feasibility trial also provided important additional information that inform the design of the full trial.

Primary feasibility outcomes

The recruitment rate exceeded our target of four participants enrolled every week. We used advertisements in social media, and we suspect that recruitment was aided by patient-to-patient word of mouth as the trial progressed. This, and the finding that our attrition rate (5%) was well below our *a priori* maximum rate of 20% (which is thought to lead to serious threats to validity[48]), was surprising considering that most patients in both groups did not receive the care they expected to receive. This is encouraging because it suggests that a broader education strategy, to prepare potential patients for

an alternative approach to their problem *before* including them in a trial, is probably not required.

Although screening and data collection procedures were generally acceptable to the assessor, the assessor provided important recommendations to improve overall screening and data collection. For example, extended assessment sessions might be avoided by upskilling the assessors in dealing with patients, who are often elderly and uneducated and who tend to tell stories about their pain rather than provide direct answers to the questions being asked. An important caveat here however, is the potentially critical role that this extra time and attention – particularly insofar as it is dedicated to listening to patient stories – may have had in subsequent engagement and participation, particularly against the backdrop of unexpected care. The patients' stories in fact provide a context and meaning of their health problems,[49] which may be a therapeutic intervention in itself, and is important to establish a good doctor-patient relationship.[50] Clearly, the cost-benefit relationship of time-limited assessment is likely to be individually-specific and nuanced.

The advantages and disadvantages of interviewing patients without their friends or family members present are also worthy of consideration. There were instances when excluding an accompanying family member would have reduced the data collection time, and possibly improved the accuracy of the answers. However, the relationships patients have with those around them play an important role in the experience of pain[51] [52] and what people do about it;[51] exclusion of important others at a critical time may also

disengage the patient or instill other barriers to their participation in the project. A final pragmatic modification to improve assessment would be to organise pain-related and pain-unrelated questions into different sections of the data collection protocol, so as to avoid patients being confused regarding the domains being assessed.

Blinding appeared to be successful and contamination appeared to be avoided. Most controlled trials do not adequately examine assessor blinding,[53] even though it is widely considered a very important component of good study design.[54] We were able to blind the assessor here because we could provide a separate office space that was isolated from the treatment area. We were also able to schedule appointments to avoid contact with assessors that would unblind them to group. Our inclusion of participant-reported items to evaluate contamination is not routinely included in feasibility or full clinical trials – the common approach, is to implement strategies to minimize the risk *a priori* but not investigate it *post hoc*. However, in settings such as that involved here, where the community is well connected and word of mouth appears to be a significant recruitment pathway, we considered it important to also examine potential contamination *post-hoc*. Limiting the number of patient recruitments performed in a single day to two may also have helped avoid contamination, but to see no evidence of contamination was surprising.

Treatment credibility and satisfaction were high for both groups (even though the participants did not receive the treatment they expected). That most participants in the pain education group found the material “easy” or “very easy”, was surprising and

contrary to an *a priori* feasibility criterion. Our protocol[31] stipulated a response to this outcome requiring that the material presented be viewed as difficult before proceeding to full trial. Whether we should increase difficulty by increasing the number of concepts covered, or going more fully into the four concepts we chose, or both, will require some pilot testing. That secondary outcome data findings suggesting a beneficial effect in the PEG condition appears to support making such a change.

Secondary outcomes

Mean improvements over time were observed for 7/8 outcomes in the PEG condition and 4/8 outcomes in the CG condition. Although assessment of the effectiveness of the interventions on the secondary outcomes was not a primary aim of this study, significant between-group differences were found, in favor of PEG, and the apparent effect was substantial on two key target outcomes - pain intensity and pain catastrophizing (Table 4). However, the consistently larger improvements in all of the other outcomes for the PEG condition, relative to the CG condition, suggests the possibility of wide benefits of pain education as compared to guideline care, in Nepal. It should be remembered that these are secondary outcomes, not corrected for multiple analyses and therefore at risk of false positive results. However, these results add pertinence to the feasibility results - a full-scale clinical trial appears warranted.

Recommendations

Although the findings suggest that a clinical trial evaluating effectiveness of an adapted "Explaining pain" intervention within Nepali primary and tertiary care is feasible, some

improvements could be made. First, to improve the compliance of the physiotherapists with the control group treatment - guideline-based care - and adherence of patients to that care, the control group treatment condition may need to be modified. Ideally, this modification would be made so that the control treatment was consistent with the evidence-based practice paradigm as much as possible; for example, by giving participating patients and their therapists the ability to choose treatments that are mostly consistent with guideline recommendations for low back pain treatment. For example, the guideline-based treatment could have two components: (1) mandatory first line care recommended by the guidelines (education and reassurance, promotion of physical activity, early return to work, advice about positive prognosis for back pain), in addition to (2) a more pragmatic approach to low back pain treatment. This second component may include any form of exercise (treadmill, static cycling or back-specific motor control or movement exercises), manual therapy (massage, mobilization, or manipulation, based on therapist's preference), or electrotherapy treatment, according to therapist and patient preference (as per recommendations of evidence-based care[55]), as long as it is safe and does not extend treatment time to beyond one hour. We should also consider fidelity assessment of the interventions provided by the therapist to be certain that per protocol treatment is being provided in each treatment arm.

A final modification would be the addition of economic analysis. Nepalese individuals are often poor and the Nepalese public health system is resource-poor. Not surprisingly, cost was a barrier to participation for 9% of potential participants. Pain education intervention appears to be a less resource-intensive alternative to current practice and could be delivered outside of the public health system, in community settings, although

the costs and time of physiotherapist would be no different from guideline-based care as delivered in a physiotherapy department. Pain education might require more training of therapists, although training in guideline-based care may be necessary too. As such, a full trial would benefit from the addition of a full economic evaluation.

Strengths and limitations

The current study has a number of strengths: we used an active guideline-based care as the comparator group; we successfully blinded the assessor and analyst, and assessed both blinding and contamination; outcomes were consistent with NIH recommendations on research standards for chronic low back pain[38] and core outcome sets for low back pain research;[39] and we submitted our protocol prior to data collection and remained transparent in all reporting.[56]

To our knowledge, this is the first study to examine the feasibility of a clinical trial on low back pain in Nepal. Conducting a feasibility study is an important step before conducting a full clinical trial,[47] especially in a setting where a clinical trial has never been conducted, which lacks recommendations from previous experiences for such a study. For example, we had planned a full clinical trial in 2016,[57] but were unable to recruit participants because the clinicians were too busy to collect data and provide interventions as per protocol, and we encountered difficulty ensuring access to an assessor blinded to group allocation because of multiple responsibilities of the clinicians. These are feasibility problems that would have been revealed in a preliminary feasibility study.[47]

The current study also has a number of important limitations. Our follow-up was shorter than we would use in a full clinical trial. The short follow-up duration was chosen because one-week assessment was sufficient to answer the feasibility-related questions, but whether or not long-term follow-ups are feasible in this setting and population remains to be demonstrated. We did not assess treatment fidelity in the current study, because we did not have the resources to do so. That the current practice in the low back pain management at the study site was very different from clinical practice guidelines made it harder for the physiotherapists to comply with the guideline-based care. Another limitation was that we did not include any measure of physical activity as a secondary outcome, despite improved physical activity being one aim of pain education. In a definitive trial we may consider using a measure to assess physical activity such as International Physical Activity Questionnaire,[58] or an objective measure of physical activity, such as Actigraphy.[59] Finally, the experimental group treatment was provided by the primary author of the study, who may have inadvertently communicated more enthusiasm for the experimental group treatment than the therapists providing the control group treatment; this may have influenced the study findings. A full clinical trial would ideally include a number of therapists who would be trained to deliver both treatments, as one way to control for the therapist effects. This could also improve the generalizability of the study findings.

Summary and conclusions

We conclude that a clinical trial to evaluate the effectiveness of pain education and evidence-based physiotherapy treatment in Nepal is feasible and warranted, although some minor modifications are required.

Acknowledgements

Authors would like to thank Sahara Physiotherapy Hospital for providing permission to conduct the research and providing access to hospital space and patients. We are also thankful to the physiotherapists involved in the treatment of patients in the control group, and the assessor (Bandana Gautam) for assisting with data collection. Finally, we would like to thank all the persons reviewing and providing valuable comments on the Nepali pain education handbook especially Anupa Pathak who provided feedback at all stages of patient handbook development.

The protocol of the original study

The protocol of this study is published in BMJ Open (DOI: http://dx.doi.org/10.1136/bmjopen-2018-022423).

Competing interest

GLM has received support from Pfizer, AIA Australia, Gallagher Bassett, Kaiser Permanente USA, Port Adelaide Football Club, Arsenal Football Club and the International Olympic Committee. GLM receives royalties for books on pain and rehabilitation, including the text on which the content for the proposed intervention was based. He also receives speaker fees for lectures on pain and rehabilitation. Neither

GLM, nor the publishers of the Explain Pain materials, had any role in data collection or analysis or the decision to publish the data. Other authors have no conflicts of interest to declare.

Funding

No.

Data sharing

Deidentified data from the principal investigator will be available upon request.

Author's contribution

SS: Conception, design, development of pain education package in Nepali, data analysis and interpretation, drafting the manuscript, final approval of the manuscript.

JHA: Conception, design, interpretation, revision of the manuscript, and final approval.

MPJ: Conception, design, revision of the manuscript, and final approval.

GLM: Contributions to the development of pain education, study design, revision of the manuscript, and final approval.

Table 1. Baseline characteristics of the two study groups.

Variable	PEG (n = 20) N (%) or Mean (SD)	CG (n = 20) N (%) or Mean (SD)
Recruitment, N (%)		
Advertisement	6 (30%)	6 (30%)
Hospital	14 (70%)	14 (70%)
Sex, N (%)		
Men	15 (75%)	13 (65%)
Women	5 (25%)	7 (35%)
Marital status		
Married	16 (80%)	15 (75%)
Single	4 (20%)	3 (15%)
Separated or widowed	0 (0%)	2 (10%)
Religion, N (%)		
Hindu	19 (95%)	16 (80%)
Buddhist	1 (5%)	3 (15%)
Others	0 (0%)	1 (5%)
Race/Ethnicity, N (%)		
Chettri	6 (30%)	5 (25%)
Brahmin	4 (20%)	9 (45%)
Newar	4 (20%)	2 (10%)
Others	6 (30%)	4 (20%)
Education, N (%)		
No school	3 (15%)	2 (10%)
Primary school (<5 years)	3 (15%)	1 (5%)
Upto high school (6-12 years)	5 (25%)	8 (40%)
Bachelor degree and over	9 (45%)	9 (45%)
Primary occupation, N (%)		
Business or office work	13 (65%)	7 (35%)
Unemployed	0 (0%)	5 (25%)
Homemaker	2 (10%)	3 (15%)
Currently Sick leave for LBP	1 (5%)	1 (5%)
Other	4 (20%)	2 (10%)
Smoking history		
Never smoked	10 (50%)	12 (60%)
Currently smoker	8 (40%)	5 (25%)
Have quit smoking	2 (10%)	3 (15%)
Have left work for more than 1 month due to LBP		
Yes	4 (20%)	4 (20%)
No	16 (80%)	16 (80%)
Medications used for LBP		
NSAIDs	3 (15%)	6 (30%)
Pregabalin	2 (10%)	3 (15%)
Vitamin B12	3 (15%)	1 (5%)
Gabapentin	1 (5%)	0 (0%)
Opioids	1 (5%)	0 (0%)
Antidepressant	1 (5%)	0 (0%)
Secondary outcomes		

Pain intensity*	54.38 (3.48)	52.72 (2.45)
Pain interference*	62.28 (6.62)	58.92 (7.69)
Sleep disturbance*	51.84 (7.68)	45.63 (8.71)
Depression*	56.99 (8.08)	53.60 (11.25)
Quality of life	5.70 (1.22)	6.10 (1.21)
Pain Catastrophizing	22.70 (10.99)	20.50 (12.56)
Resilience	26.95 (9.14)	28.60 (8.08)

Abbreviations: PEG, Pain Education Group; CG, Control Group; LBP, Low Back Pain; NSAIDs, Non-steroidal anti-inflammatory drugs.
*T scores.

Table 2. Feasibility results for the two study groups.

Feasibility outcomes	PEG N (%) or Mean (SD)	CG N (%) or Mean (SD)	Mean Difference (95% CI) or *P* values	Summary
Attrition rate	1 (5%)	1 (5%)	1.000	No difference in attrition rates between groups.
Assessor's correct guess for group allocation	12 (60%)	11 (55%)	0.756	Assessor correctly guessed the group allocation slightly more often for the PEG than the CG.
Understanding possible contamination between groups (n=19)				
1. Have you talked to other participants about the intervention?	0 (0%)	0 (0%)	-	No contamination between groups.
2. If yes, was your attitude/ intervention changed?	0 (0%)	0 (0%)	-	
3. Are you aware of the intervention that participants in the other group are receiving?	0 (0%)	0 (0%)	-	
4. Are participants in the other group aware of the type of intervention you are receiving?	0 (0%)	0 (0%)	-	
5. For the control group: Did you read the pain education booklet provided to the experimental group?	-	0 (%)	-	
Credibility and acceptability of interventions				Similar credibility scores between groups.
Baseline assessment (n=20)	12.55 (2.89)	12.95 (3.80)	0.40 (-2.56, 1.76)	

Final assessment (n=19)	12.37 (2.63)	12.26 (4.17)	0.11 (-2.19, 2.40)	
Adherence to treatment (number of days)				Participants were adherent to the treatment in both groups, with slightly more adherence reported by the CG participants.
Followed advice (n=19)	17 (89%)	18 (95%)	0.501	
Performed home exercises (Mean days (SD))	3.84 (2.43)	5.53 (1.58)	-1.68 (-3.03, -0.33)	
Number of patients who received other treatments (total)	5 (26%)	7 (37%)	0.471	Slightly more CG participants received regular physiotherapy at the center, massage or acupuncture, and NSAIDs.
Regular physiotherapy at the center*	4 (21%)	5 (26%)	0.719	
Massage or acupuncture	1 (5%)	2 (10%)	0.563	
Number of NSAIDs per week used at follow-up	2	5	-3	
Total treatment time (in minutes)	61.00 (7.88)	60.60 (8.85)		Treatment time is very similar between the two treatment conditions, and consistent with the planned treatment duration of treatment.
Satisfaction	3.89 (0.46)	3.68 (0.75)	0.21 (-0.20, 0.62)	Satisfaction of treatment scores were similar between groups with slightly higher satisfaction reported by the PEG participants.
Difficulty; mean (SD)	2.26 (0.56)	2.16 (0.60)	0.10 (-0.28, 0.49)	Majority of the participants (75%) reported both treatments as easy, with slightly higher difficulty scores reported by the PEG participants.
Very easy	0 (0%)	1 (5%)		
Easy	15 (75%)	15 (75%)		
Neither easy nor difficult	3 (15%)	2 (10%)		
Difficult	1 (5%)	1 (5%)		
Very difficult	0 (0%)	0 (0%)		

Abbreviations: PEG, Pain Education Group; CG, Control Group; NSAIDS, Non-steroidal anti-inflammatory drugs.

*Mostly included electrotherapy treatment.

Table 3. Were the feasibility criteria met?

Criteria	Feasibility criteria met?	Recommendations for full trial
Blinding of assessor	Yes	Treatment providers should try to keep the treatment duration close to or equal to one hour to avoid any guesses of group allocation between the treatment groups.
Recruitment rate	Yes	Incorporating advertisement to recruit the patients was a good idea, which should be considered in the full trial.
Attrition rate (in both arms)	Yes	Phone call reminders for the follow-up assessment helped reduce the drop-outs and which should be considered in the future trial.
Feasibility of outcome assessment	Yes	1. Practice administration of the outcome measures on real patients who are older and have lesser education before the actual recruitment by learning ways to keep patients focused on the questions being asked, 2. Keep the relatives and friends of the patients separate from the participant during screening and assessment. 3. Self-administration of the questionnaires for participants who can read and write could improve the efficiency of completing the screening and data collection forms. 4. Separate the pain-related questionnaires and general questionnaires during administration.
Contamination of intervention	Yes	Appointment time for follow-up helps avoid contamination.
Credibility of treatment	Yes	The credibility scores of the two treatment conditions were within 0.50 SD of each other therefore no changes in the treatment conditions are required.
Adherence to treatment	Yes	Not many patients read the handbook provided to them. Creating interesting short audios or videos with the key messages may be helpful for improving the adherence to home advice.

Difficulty level of the intervention	No	A large proportion of patients reported the interventions to be 'easy'. The complexity of the pain education content may be increased by providing more complex neurophysiological knowledge to the patients. However, this may demand longer duration of treatment time, and or compromise the effectiveness of the intervention, and may require pre-testing of the changed intervention before using it in the full trial.

Table 4. Results of secondary outcome measures: within-group and between-group differences

	Pain Education Group			Control group			Between-group difference	
Measures	Baseline Mean (SD)	Follow-up	Change (95% CI)	Baseline Mean (SD)	Follow-up	Difference (95% CI)	*t*	Difference
Pain intensity[a]	54.38 (3.48)	49.14 (3.77)	-5.28*** (2.91, 7.65)	52.72 (2.45)	50.95 (6.54)	1.72 (-0.82, 4.26)	2.16	3.56* (0.21, 6.91)
Pain interference[a]	62.28 (6.62)	57.67 (5.80)	-4.47** (1.91, 7.04)	58.94 (7.69)	56.13 (8.24)	3.03* (0.69, 5.36)	0.88	1.45 (-1.90, 4.79)
Sleep disturbance[a]	51.84 (7.68)	43.74 (5.31)	-7.62** (3.50, 11.74)	45.63 (8.71)	42.25 (8.41)	3.49 (-0.12, 7.10)	1.58	4.13 (-1.16, 9.42)
Depression[a]	56.99 (8.08)	48.25 (8.36)	-8.89*** (5.28, 12.50)	53.60 (11.25)	49.49 (10.29)	4.61* (0.69, 8.54)	1.68	4.27 (-0.88, 9.42)
Quality of life	5.70 (1.22)	6.42 (0.77)	0.79* (-1.42, -.15)	6.10 (1.21)	6.58 (1.22)	-0.47 (-1.04, 0.09)	-0.78	-0.32 (-1.13, 0.50)
Pain catastrophizing	22.70 (11.00)	11.16 (7.59)	-11.63*** (7.19, 16.07)	20.50 (12.56)	16.10 (12.16)	5.47** (1.79, 9.16)	2.24	6.16* (0.59, 11.72)
Resilience	26.95 (9.14)	28.61 (5.55)	+1.39 (-4.19, 1.41)	28.60 (8.08)	27.00 (8.08)	1.95 (-2.02, 5.92)	-1.43	-3.34 (-8.07, 1.40)
Global rating of change	-	5.16 (0.69)	-	-	5.37 (0.64)	-	-0.95	-0.21 (-0.66, 0.24)

*Significant at $P < 0.05$; **Significant at $P < 0.01$; ***Significant at $P < 0.001$

[a]T-scores are reported.

References

1. GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017;390(10100):1211-59. doi: 10.1016/S0140-6736(17)32154-2
2. Hartvigsen J, Hancock MJ, Kongsted A, et al. What low back pain is and why we need to pay attention. *Lancet* 2018 doi: 10.1016/S0140-6736(18)30480-X
3. Buchbinder R, van Tulder M, Oberg B, et al. Low back pain: a call for action. *Lancet* 2018 doi: 10.1016/S0140-6736(18)30488-4
4. Sharma S, Shrestha N, Jensen MP. Pain-related factors associated with lost work days in nurses with low back pain: A cross-sectional study. *Scand J Pain* 2016;11:36-41. doi: 10.1016/j.sjpain.2015.11.007 [published Online First: 2016/04/01]
5. Paudyal P, Ayres JG, Semple S, et al. Low back pain among textile workers: a cross-sectional study. *Occup Med (Lond)* 2013;63(2):129-34. doi: 10.1093/occmed/kqs231
6. Qaseem A, Wilt TJ, McLean RM, et al. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Ann Intern Med* 2017;166(7):514-30. doi: 10.7326/M16-2367 [published Online First: 2017/02/14]
7. Van Wambeke P, Desomer A, Ailiet L, et al. Low back pain and radicular pain: assessment and management. *KCE Report* 2017;287

8. Almeida M, Saragiotto B, Richards B, et al. Primary care management of non-specific low back pain: key messages from recent clinical guidelines. *Med J Aust* 2018;208(6):272-75.

9. Foster NE, Anema JR, Cherkin D, et al. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *Lancet* 2018 doi: 10.1016/S0140-6736(18)30489-6

10. Maher C, Underwood M, Buchbinder R. Non-specific low back pain. *Lancet* 2017;389(10070):736-47. doi: 10.1016/S0140-6736(16)30970-9

11. Bhattarai S, Chhetri HP, Alam K, et al. A study on factors affecting low back pain and safety and efficacy of NSAIDs in acute low back pain in a tertiary care hospital of Western Nepal. *J Clin Diagn Res* 2013;7(12):2752-8. doi: 10.7860/JCDR/2013/6520.3752

12. Bajracharya S, Singh M, Singh GK, et al. Clinico-epidemiological study of spinal injuries in a predominantly rural population of eastern Nepal: A 10 years' analysis. *Indian J Orthop* 2007;41(4):286-9. doi: 10.4103/0019-5413.36988

13. Moseley GL. Whole of community pain education for back pain. Why does first-line care get almost no attention and what exactly are we waiting for? *Br J Sports Med* 2018 doi: 10.1136/bjsports-2018-099567

14. Moseley GL, Butler DS. Fifteen Years of Explaining Pain: The Past, Present, and Future. *J Pain* 2015;16(9):807-13. doi: 10.1016/j.jpain.2015.05.005 [published Online First: 2015/06/09]

15. Moseley GL, Nicholas MK, Hodges PW. A randomized controlled trial of intensive neurophysiology education in chronic low back pain. *Clin J Pain* 2004;20(5):324-30.

16. Butler DS, Moseley GL. Explain Pain 2nd Edn: Noigroup Publications 2013.

17. Malfliet A, Kregel J, Coppieters I, et al. Effect of Pain Neuroscience Education Combined With Cognition-Targeted Motor Control Training on Chronic Spinal Pain: A Randomized Clinical Trial. *JAMA Neurol* 2018 doi: 10.1001/jamaneurol.2018.0492

18. Louw A, Butler DS, Diener I, et al. Development of a preoperative neuroscience educational program for patients with lumbar radiculopathy. *Am J Phys Med Rehabil* 2013;92(5):446-52. doi: 10.1097/PHM.0b013e3182876aa4

19. Louw A, Diener I, Landers MR, et al. Three-year follow-up of a randomized controlled trial comparing preoperative neuroscience education for patients undergoing surgery for lumbar radiculopathy. *J Spine Surg* 2016;2(4):289-98. doi: 10.21037/jss.2016.12.04

20. Nijs J, Meeus M, Cagnie B, et al. A Modern Neuroscience Approach to Chronic Spinal Pain: Combining Pain Neuroscience Education With Cognition-Targeted Motor Control Training. *Phys Ther* 2014 doi: ptj.20130258 [pii]

10.2522/ptj.20130258 [published Online First: 2014/02/01]

21. Rizzo RRN, Medeiros FC, Pires LG, et al. Hypnosis Enhances the Effects of Pain Education in Patients with Chronic Non-Specific Low Back Pain: a Randomized Controlled Trial. *J Pain* 2018 doi: 10.1016/j.jpain.2018.03.013

22. Robins H, Perron V, Heathcote LC, et al. Pain Neuroscience Education: State of the Art and Application in Pediatrics. *Children (Basel)* 2016;3(4) doi: 10.3390/children3040043

23. van Ittersum MW, van Wilgen CP, van der Schans CP, et al. Written pain neuroscience education in fibromyalgia: a multicenter randomized controlled trial. *Pain Pract* 2014;14(8):689-700. doi: 10.1111/papr.12137

24. Werner EL, Storheim K, Lochting I, et al. Cognitive Patient Education for Low Back Pain in Primary Care: A Cluster Randomized Controlled Trial and Cost-Effectiveness Analysis. *Spine (Phila Pa 1976)* 2016;41(6):455-62. doi: 10.1097/BRS.0000000000001268

25. Traeger AC, Lee H, Hubscher M, et al. Effect of Intensive Patient Education vs Placebo Patient Education on Outcomes in Patients With Acute Low Back Pain: A Randomized Clinical Trial. *JAMA Neurol* 2018 doi: 10.1001/jamaneurol.2018.3376 [published Online First: 2018/11/07]

26. Gallagher L, McAuley J, Moseley GL. A randomized-controlled trial of using a book of metaphors to reconceptualize pain and decrease catastrophizing in people with chronic pain. *Clin J Pain* 2013;29(1):20-5. doi: 10.1097/AJP.0b013e3182465cf7

27. Moseley GL. Evidence for a direct relationship between cognitive and physical change during an education intervention in people with chronic low back pain. *Eur J Pain* 2004;8(1):39-45. doi: 10.1016/S1090-3801(03)00063-6

28. Moseley G, Butler D. Explain pain supercharged. *Adelaide, Australia: Noigroup publications* 2017

29. Eldridge SM, Lancaster GA, Campbell MJ, et al. Defining Feasibility and Pilot Studies in Preparation for Randomised Controlled Trials: Development of a Conceptual Framework. *PLoS One* 2016;11(3):e0150205. doi: 10.1371/journal.pone.0150205

30. Moseley GL, Butler DSB. Explain Pain Handbook: Protectometer2015.

31. Sharma S, Jensen MP, Moseley GL, et al. Pain education for patients with non-specific low back pain in Nepal: protocol of a feasibility randomised clinical trial (PEN-LBP Trial). *BMJ Open* 2018;8(8):e022423. doi: 10.1136/bmjopen-2018-022423

32. Chan AW, Tetzlaff JM, Gotzsche PC, et al. SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. *BMJ* 2013;346:e7586. doi: 10.1136/bmj.e7586

33. Eldridge SM, Chan CL, Campbell MJ, et al. CONSORT 2010 statement: extension to randomised pilot and feasibility trials. *BMJ* 2016;355:i5239. doi: 10.1136/bmj.i5239

34. Yamato T, Maher C, Saragiotto B, et al. The TIDieR Checklist Will Benefit the Physical Therapy Profession. *J Orthop Sports Phys Ther* 2016;46(6):402-4. doi: 10.2519/jospt.2016.0108

35. Hoffmann TC, Glasziou PP, Boutron I, et al. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 2014;348:g1687. doi: 10.1136/bmj.g1687

36. National Institute for Health and Care Excellence. Low back pain and sciatica in over 16s: assessment and management 2016 [Available from: https://www.nice.org.uk/guidance/ng59.

37. Toward Optimized Practice (TOP) Low Back Pain Working Group. Evidence-informed primary care management of low back pain: clinical practice guideline 2015 [Available from: http://www.topalbertadoctors.org/cpgs/885801.

38. Deyo RA, Dworkin SF, Amtmann D, et al. Report of the NIH Task Force on research standards for chronic low back pain. *J Pain* 2014;15(6):569-85. doi: 10.1016/j.jpain.2014.03.005

39. Chiarotto A, Boers M, Deyo RA, et al. Core outcome measurement instruments for clinical trials in nonspecific low back pain. *Pain* 2018;159(3):481-95. doi: 10.1097/j.pain.0000000000001117

40. Deyo RA, Battie M, Beurskens AJ, et al. Outcome measures for low back pain research. A proposal for standardized use. *Spine (Phila Pa 1976)* 1998;23(18):2003-13.

41. Sharma S, Pathak A, Maharjan R, et al. Psychometric properties of nepali versions of PROMIS short from measures of pain intensity, pain interference, pain behaviour, depressions, and sleep disturbance. *The Journal of Pain* 2018;19(3):S59.

42. Sharma S, Palanchoke J, Abbott JH. Cross-Cultural Adaptation and Validation of the Nepali Translation of the Patient-Specific Functional Scale. *J Orthop Sports Phys Ther* 2018(0):1-23. doi: 10.2519/jospt.2018.7925

43. Sharma S, Palanchoke J, Reed D, et al. Translation, cross-cultural adaptation and psychometric properties of the Nepali versions of numerical pain rating scale and global rating of change. *Health Qual Life Outcomes* 2017;15(1):236. doi: 10.1186/s12955-017-0812-8

44. Sharma S, Thibault P, Abbott JH, et al. Clinimetric properties of the Nepali version of the Pain Catastrophizing Scale in individuals with chronic pain. *J Pain Res* 2018;11:265-76. doi: 10.2147/JPR.S153061

45. Sharma S, Pathak A, Abbott JH, et al. Measurement properties of the Nepali version of the Connor Davidson resilience scales in individuals with chronic pain. *Health Qual Life Outcomes* 2018;16(1):56. doi: 10.1186/s12955-018-0884-0

46. Billingham SA, Whitehead AL, Julious SA. An audit of sample sizes for pilot and feasibility trials being undertaken in the United Kingdom registered in the United Kingdom Clinical Research Network database. *BMC Med Res Methodol* 2013;13:104. doi: 10.1186/1471-2288-13-104 [published Online First: 2013/08/22]

47. Abbott JH. The distinction between randomized clinical trials (RCTs) and preliminary feasibility and pilot studies: what they are and are not. *J Orthop Sports Phys Ther* 2014;44(8):555-8. doi: 10.2519/jospt.2014.0110

48. Dettori JR. Loss to follow-up. *Evidence-Based Spine-Care Journal* 2011;2(1):7-10. doi: 10.1055/s-0030-1267080

49. Greenhalgh T, Hurwitz B. Why study narrative? *BMJ : British Medical Journal* 1999;318(7175):48-50.

50. Richards T. Listen to patients first. *BMJ : British Medical Journal* 2014;349 doi: 10.1136/bmj.g5765

51. Block AR, Kremer EF, Gaylor M. Behavioral treatment of chronic pain: the spouse as a discriminative cue for pain behavior. *Pain* 1980;9(2):243-52.

52. Flor H, Kerns RD, Turk DC. The role of spouse reinforcement, perceived pain, and activity levels of chronic pain patients. *J Psychosom Res* 1987;31(2):251-9.

53. Fergusson D, Glass KC, Waring D, et al. Turning a blind eye: the success of blinding reported in a random sample of randomised, placebo controlled trials. *BMJ* 2004;328(7437):432. doi: 10.1136/bmj.37952.631667.EE

54. Schulz KF, Grimes DA. Blinding in randomised trials: hiding who got what. *Lancet* 2002;359(9307):696-700. doi: 10.1016/S0140-6736(02)07816-9

55. Sackett DL, Rosenberg WM, Gray JA, et al. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312(7023):71-2.

56. Lee H, Lamb SE, Bagg MK, et al. Reproducible and replicable pain research: a critical review. *Pain* 2018 doi: 10.1097/j.pain.0000000000001254

57. ClinicalTrials.gov. Identifier: NCT02343315, Are Supervised Exercises and TENS Necessary Along With Prescribed Home Exercises for Chronic Low Back Pain? Bethesda (MD): National Library of Medicine (US)2015 [cited 2015 January 22].

Available from: https://clinicaltrials.gov/ct2/show/NCT02343315?cond=back+pain&intr=motor+control&age=1&rank=10.

58. Craig CL, Marshall AL, Sjostrom M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003;35(8):1381-95. doi: 10.1249/01.MSS.0000078924.61453.FB

59. Patterson SM, Krantz DS, Montgomery LC, et al. Automated physical activity monitoring: validation and comparison with physiological and self-report measures. *Psychophysiology* 1993;30(3):296-305.

Figure Legends:

Figure 1. Development of pain education.

Figure 2. Participant flow diagram.

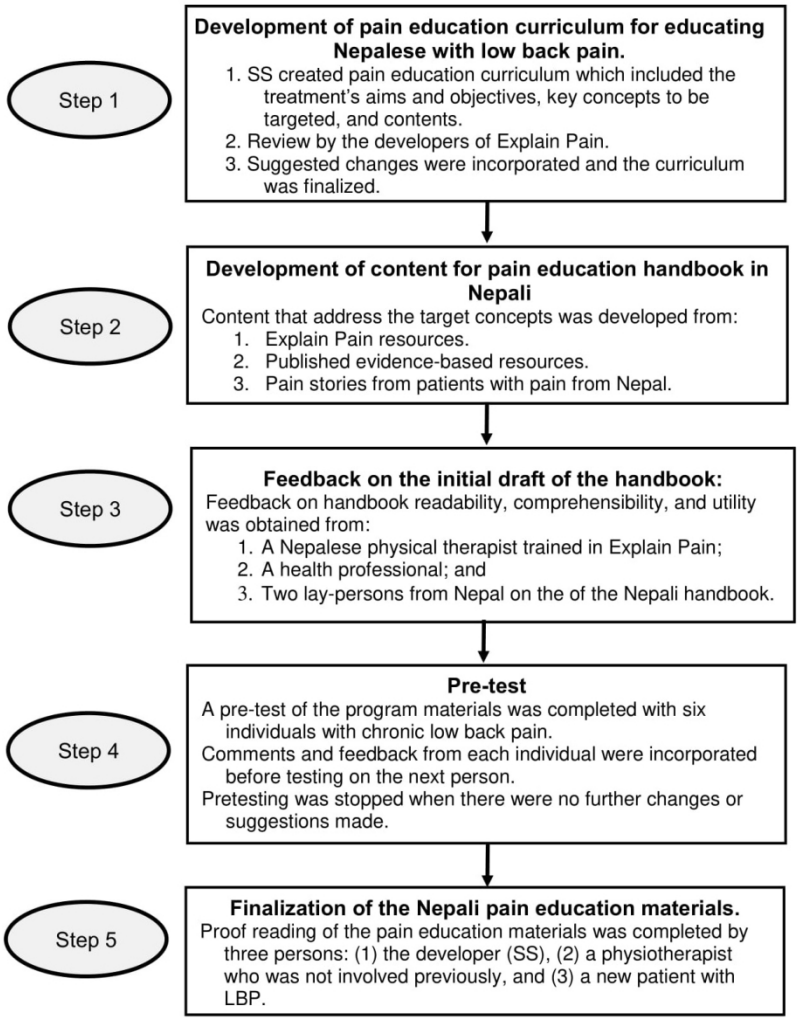

Figure 1. Development of pain education package in Nepali.

Development of pain education package in Nepali

116x159mm (300 x 300 DPI)

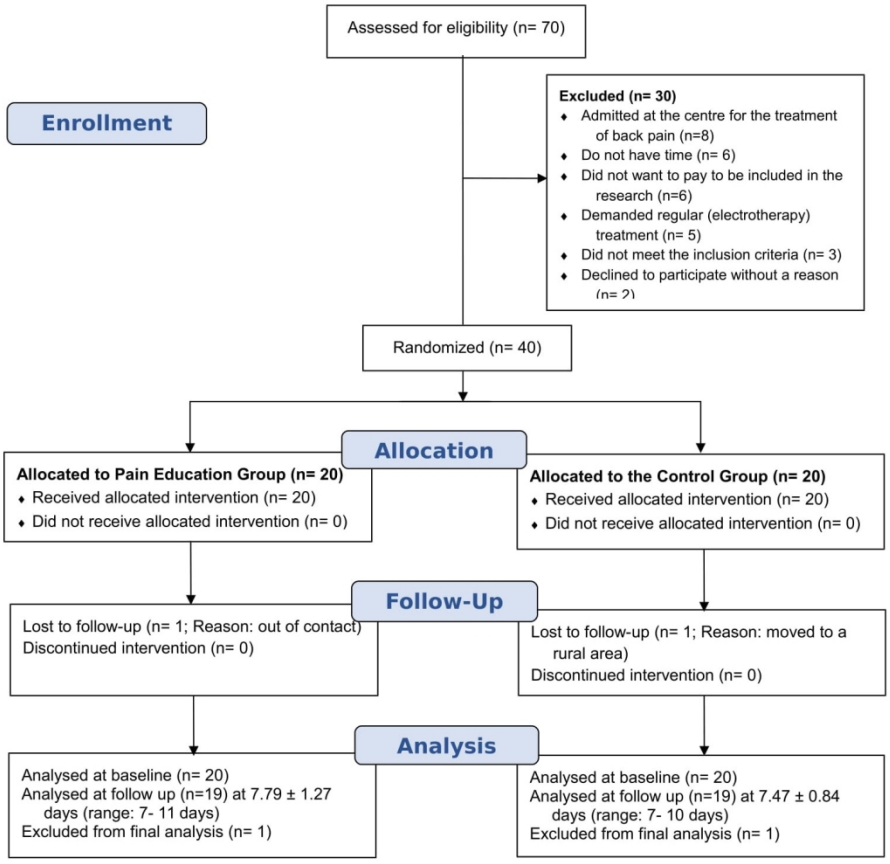

Figure 2. Participant flow.

Participant flow diagram

143x150mm (300 x 300 DPI)

Supplementary file 1. Pain education curriculum for Nepalese with non-specific low back pain.

Learner or patient characteristics

Learners are adult patients who present to the Physiotherapy Department in Kathmandu, Nepal for the management of their low back pain (LBP). This education was be delivered to patients with any duration of LBP. Every participant who understood and spoke Nepali could be the learner for the planned curriculum of pain education. These individuals may have a very low literacy level. Patients who have diagnosed psychiatric illness was excluded from this intervention.

Deliverer or physiotherapist

A physiotherapist (Saurab Sharma) who has undergone “Explain Pain” course twice (in 2015 and 2017) delivered the pain education to all the participants in the study. The physiotherapist was supervised by Prof. G. Lorimer Moseley, one of the developers of the concept.

Number of learners or patients

A total of 40 learners participated in the study. All interventions were delivered individually to each participant. No other concurrent interventions were provided. However, patients were encouraged to perform physical activities at home for one week.

Unique needs of the learners

These learners are from Nepal, many of them did not have any formal education, and education as the core component of treatment may be new to these patients. Thus, this group may be a challenging group to provide Explain Pain intervention. Therefore, the contents were simplified and adapted to their need to match their level of understanding, and culture.

Delivery methods

The study physiotherapist delivered approximately an hour long session of one-on-one Explain Pain to every study participant. Every participant were provided with a take away education booklet, which included details of target concept, pictures and stories to strengthen their education provided by the physiotherapist. Participants read the booklet if they could read, or the family members read out for them if they cannot read themselves. All the participants provided with an additional audio-visual information on neurophysiology knowledge of pain, if they could operate these at home (or office) to reinforce the learning so that the participants hear this every day before the post treatment assessment at 1 week.

Place

A private room at a physiotherapy facility (Sahara Care Hospital) in Kathmandu, Nepal.

Patient consideration

1. Physiotherapist extracted learner's personal goal of treatment. Nepalese generally struggle to bring out their own goals in general, therefore this was a difficult task.
2. Involvement of family throughout the education session were encouraged if they accompanied the patients. Role of family members were highlighted in the education program along with the prognosis of the individuals with LBP.
3. All the participants were reminded to perform their home-based tasks (reading, listening/watching audio-visual support, and exercising) by a text message every day for five days a week.

Aims

The deliverer intended to:

1. Advise patient that educate is an important aspect of treatment of pain.
2. Provide contemporary knowledge about pain biology in relation to low back pain in an individual face-to-face teaching and learning environment.
3. Provide a comprehensive patient education by providing relevant information on graded exposure, pacing, and self-management.
4. Use pictures, metaphors, and relevant stories related to pain to explain details and complexities related to pain.

Objectives

At the end of the session learner will:

1. Have contemporary knowledge of pain biology that is relevant to their low back pain.
2. Understand importance of pain knowledge as a therapy.
3. Use the pain knowledge in changing the danger messages into safety signals.
4. Use exercises to pave the track for recovery.

Explain Pain Curriculum plan

Part 1: Question and answer [10 – 15 minutes]

Physiotherapist first asked two questions to the learners.

Question 1- "*Is there anything in particular that you would like to learn about your low back pain, or pain in general?*"

Physiotherapist answered to any questions that arose.

Question 2- *"Do you know what caused your low back pain? Can you please explain the cause of your low back pain from what you have understood, or what you have been told?"*

Physiotherapist addressed any misconceptions and acknowledged or appreciated healthy/sound understanding about their pain. Scan findings were discussed where appropriate.

Part 2: Discuss the key concepts of pain biology. [40 minutes]

1. Pain is normal and almost everyone gets it in life.
2. Body sends danger signals, and brain decides whether to produce pain.
3. Learning about pain changes pain; and anything associated with it can influence it.
4. Body learns pain and becomes overprotective over time.
5. Additional concept: Pain and tissue damage are poorly related.

[see the table below for the details]

Part 3: Do you want to learn ways to train your system? [5 – 10 minutes]

Teach 1 – 2 ways to train the system.

End: Patients were asked if they had a cell phone. If yes, they were further asked if they wanted to receive a daily reminder to perform home-based tasks, and learn more about pain.

The phone number was recorded and daily information were sent when applicable.

Explain Pain Curriculum Plan

SN	Target concepts	Time required	Other ways of expressing the target concept	Content	Delivery and resources	Reinforcement/ Experiential learning	Did the patient understand? Assessment
1	Pain is normal and almost everyone gets it in life.	10 minutes	• Everyone has some pain in lifetime so you are not alone. • Pain is normal. • Your LBP is yours, is unique to you and real, and only you can control your pain.	• There is no test for pain or love. • Emotional and physical pain are one. • Pain is always a conscious event.	• Stories • Brief pain epidemiology	• Pain should not be a reason to worry about, and stop you from enjoying life, and fulfilling life goals.	• Ask- so who suffers pain or how many people suffer pain? *Answer may be- almost everyone.*
2	Body sends danger signals, and brain decides whether to produce pain.	10 minutes	• How danger signal travels in the body and how pain is perceived. • Brain is needed to create/ perceive pain. • Human body has danger sensors not pain sensors. • Pain depends on the balance between danger and safety.	• Nociceptive pathway. • Pain is created in the brain. • Ask patient if they had pain when they did not have tissue injury (or use aggravating factors).	• Use a picture/ animation of how danger signals reach brain? • Use the earthquake story.	• Have you ever experienced having an injury and no pain? • Have you ever experienced pain when there was no injury? • Use the scale protectometer to describe.	• So what creates pain, or which part of the body creates pain? *Answer: brain!!!*
3	Learning about pain changes pain; and anything associated with it can influence it.	10 minutes	• Knowing about pain can reduce pain. • Education is analgesic. • Retraining your system can reduce sensitization.	• Understanding your pain can reduce your pain. • Wrong understanding can increase your pain.	• Student's pain story.	• Hear other's pain stories and analyse how it can be changed.	

4	Body learns pain and becomes overprotective over time.	10 minutes	• Out of many outputs of the brain, pain is only one protective output. • As pain persists, body systems can be over protective. • Multiple systems protect us from threats, and allow us to learn and heal. • You can train your body systems to be less protective.	• As pain persists, body becomes sensitized and over protective. • This can be changed by training our systems.	• The bending and lifting story.	• Ask the patient what are the other symptoms they get with pain? [Examples are: sweating, no sleep, stress, anxiety, fear, anger etc].	• Ask, do you understand this and think if this is logical? • Reinforce this by summarizing research findings if applicable.
Optional	Pain and tissue damage are poorly related	5 minutes	• Pain is an unreliable indicator of tissue damage. • Pain and scans do not correlate.	• Tissue stop hurting a long time before they heal. • Recent evidences regarding poor correlation between pain and scan reports.	Bad scan results in pain free individuals.	Reinforce by saying scan changes like degeneration are normal ageing process.	

Supplementary file 2: Feasibility outcomes.

SN	Objectives	Measures to assess specific objectives	Statistical analysis
1	Willingness to participate in a randomized controlled trial	Consecutive participants presenting at the center were invited to participate in the study. They were asked if they were willing to participate in the study. The reasons for refusal was recorded.	Total number of participants willing to participate in the study with percentage was recorded. The reasons for non-willingness were collated and reported.
2	Feasibility of blinding the assessor	Assessed by asking the assessor if she received any information regarding patients' group allocation. Further, the way how this information was received was recorded. Assessor's guess regarding group assignment was recorded for each participant, and each response was coded as "correct" or "incorrect" guess.	The frequency of "Yes" were counted and reported as percentage. Frequency of correct guesses were computed and compared between the groups. Finally, reasons for guesses were recorded and reported.
3	Eligibility and recruitment rates	The total number of participants invited, screened, found eligible, and recruited was recorded. The reasons for exclusion were recorded. Consent rates were also recorded.	Eligibility rate, recruitment rate, and consent rate were reported as percentages.
4	Acceptability of screening procedures	*Any difficulties or challenges in screening and recruiting the participants were recorded. Further, o*utcome assessor's recommendations for overcoming any challenges were recorded. Time taken to complete the questionnaires were also recorded.	The frequency of difficulties or challenges were counted, difficulties or challenges noted and reported with assessor's recommendations to overcome those challenges.
5	Acceptability of random allocation to a treatment group	Acceptability of random allocation to one of the two treatment groups is acceptable by the participants were recorded as "Acceptable", "Not acceptable", or "No preference".	The frequency and percentage of acceptability was recorded and reported.
6	Understanding possible contamination between the groups	Participants were asked if: 1.They talked to other participants in this study about the intervention they are receiving, and if the attitude towards the intervention was changed after talking to participant(s) in the other group, 2. The participants are aware of the intervention that participants in the other group are receiving, 3. The participants in the other group are aware of the intervention you are receiving.	The positive responses were computed for the first three questions for each group separately. Frequency of how many patients in control group had access to pain education materials was recorded and reported as percentage.

		Participants in the control group was asked if he or she read the pain education booklet or any videos related to PEG.	
7	Credibility and acceptability of the interventions	Five questions were asked to assess credibility of the interventions as described in the study protocol [1]. Response to each question was recorded on a Likert Scale where, 0= "*Not at all*", 1= "*A little bit*", 2= "*Somewhat*", 3= "*Quite a bit*", 4= "*Very much*." The total scores ranged between 0 and 20. Higher scores indicate greater credibility of the intervention.	Mean of the total scores on the credibility scale were computed separately for each treatment arm. Between group differences in creditability was evaluated using a *t*-test.
8	Adherence to the intervention	Adherence to home treatment was assessed during the post-treatment assessment by recording "Yes" or "No" response to "Did you follow home advices?"; and "how many days did you perform the home exercises?". The latter was recorded as the number of days. Any deviation from prescribed home treatment program were recorded.	The treatment adherence was recorded in the number of days and reported for both treatment arms separately. Deviation from the treatment protocol was reported.
9	Satisfaction of treatment	Patient Global Assessment of Treatment Satisfaction (PGATS) scale was used to assess treatment satisfaction. Responses were recorded on a 5-point categorical scale (0 = ''*Very dissatisfied*''; 1 = ''*Dissatisfied*''; 2 = ''*Neutral or no preference"*; 3 = ''*Satisfied*''; 4 = ''*Very satisfied*''). Total scores of treatment satisfaction ranges between 0 and 4, with higher scores indicating greater treatment satisfaction.	Mean scores for treatment satisfaction were computed for each treatment arm separately. Between-group difference was evaluated using a *t*-test.
10	Difficulty in understanding the information provided by the physiotherapist.	Difficulty in understanding the information provided by the physiotherapist were asked with responses recorded on a 5-point Likert Scale, where 1= "*Very easy*", 2= "*Easy*", 3= "*Neither easy nor difficult*", 4= "*Difficult*", 5= "*Very difficult*". Scores range between 1 and 5, with higher scores indicating more difficulty in understanding.	The differences in the difficulty in understanding the information provided was compared between the two groups.
11	Adverse events	Any adverse events after treatment were recorded as written verbatim.	The number of adverse events were computed for each treatment condition separately. The responses were collated.

References

1. Sharma, S., et al., *Pain education for patients with non-specific low back pain in Nepal: protocol of a feasibility randomised clinical trial (PEN-LBP Trial).* BMJ Open, 2018. **8**(8): p. e022423.

Supplementary file 3. Secondary outcome measures.

Name of outcome measure	Domain	No. of Items	Response Scale	Scoring	Measurement properties of Nepali versions of the scale.
PROMIS Pain Interference short form 6b	Pain interference	6	5 point, Ordinal	Responses are scored as a T-score that can range from 0-100, with a mean of 50 and SD of 10 in the normative sample.	• Cronbach alpha= 0.85 and Intraclass correlation coefficient (ICC) = 0.80 chronic pain sample from Nepal.[1]
Pain Catastrophizing Scale (PCS)	Pain catastrophizing	13	5-point, Ordinal	The total PCS score can range from 0 to 52, with higher scores indicating greater pain catastrophizing.	• Cronbach alphas= 0.85- 0.93, • ICC= 0.89- 0.90, • Positive moderate correlations with measures of pain intensity, depression, and anxiety in a chronic pain sample from Nepal.
Global rating of Change (GROC)	Patient's global rating of change	1	1-7, Ordinal	*Overall improvement were rated* with 4 = "*No change*". Scores greater than 4 indicate greater improvement and scores lower than 4 indicate a perceived worsening in the health condition.	Minimum important change= 1 point change.
Quality-of-Life (QOL) rating scale	Quality of life	2	5-point, Ordinal	Respondents were asked to rate their general quality of life and general health by responding to the questions on a 5 point Likert Scale. Total scores range from 0 to 10 with greater score indicating better quality of life.	Not available during the time of protocol writing the manuscript. Internal consistency between the two items of the QOL scale in the current sample is 0.73.
PROMIS Pain Intensity short form 3b	Pain intensity	3	5-point, Ordinal	Responses were scored as a T-score that can range from 0-100, with a mean of 50 and SD of 10 in the normative sample.	ICC= 0.71 in a chronic pain sample from Nepal.[1]
PROMIS Sleep Disturbance short form 8b	Sleep disturbance	8	5-point, Ordinal	Responses were scored as a T-score that can range from 0-100, with a mean of 50 and SD of 10 in the normative sample.	ICC= 0.78. Good internal consistency of 7-items (Cronbach's alpha = 0.89).[1]
PROMIS Emotional	Depression	8	5-point, Ordinal	Responses were scored as a T-score that can range from 0-100, with a	• Cronbach's alpha= 0.93.

Distress-Depression-short form 8b				mean of 50 and SD of 10 in the normative sample.	• ICC= 0.81 in a chronic pain sample from Nepal.[1]
10-item Connor Davidson Resilience Scale	Resilience	10	4-point, Ordinal	Responses were summed such that total scores range from 0 to 40, with higher scores indicating more resilience.	• Cronbach's alpha= 0.87- 0.90. • ICC=0.89. • Standard error of measurement= 2.42 points. • Minimum detectable change= 6.72 points. • Significant negative and moderate association with the PCS in a chronic pain sample from Nepal.[2]
-	Use of pain medications and other pain treatments	-	-	Names, and dosage of pain medication intake were recorded. Medications were categorized into analgesic type (opioids, NSAIDs, sedatives, and anti-seizure medications). Other pain treatments received were also recorded and classified (e.g., electrotherapy). The number of days each treatment of these treatments received were recorded.	• No validity data for self-reported analgesic or pain treatment use in Nepali patients available at the time of manuscript writing.

References

1. Sharma S, Pathak A, Maharjan R, et al. Psychometric properties of nepali versions of PROMIS short from measures of pain intensity, pain interference, pain behaviour, depressions, and sleep disturbance. *The Journal of Pain* 2018;19(3):S59.

2. Sharma S, Pathak A, Abbott JH, et al. Measurement properties of the Nepali version of the Connor Davidson resilience scales in individuals with chronic pain. *Health Qual Life Outcomes* 2018;16(1):56. doi: 10.1186/s12955-018-0884-0

CONSORT 2010 checklist of information to include when reporting a pilot or feasibility trial*

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a pilot or feasibility randomised trial in the title	1
	1b	Structured summary of pilot trial design, methods, results, and conclusions (for specific guidance see CONSORT abstract extension for pilot trials)	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale for future definitive trial, and reasons for randomised pilot trial	6-7
	2b	Specific objectives or research questions for pilot trial	7
Methods			
Trial design	3a	Description of pilot trial design (such as parallel, factorial) including allocation ratio	8
	3b	Important changes to methods after pilot trial commencement (such as eligibility criteria), with reasons	N/A
Participants	4a	Eligibility criteria for participants	9
	4b	Settings and locations where the data were collected	9
	4c	How participants were identified and consented	9 – 10
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	10 – 13
Outcomes	6a	Completely defined prespecified assessments or measurements to address each pilot trial objective specified in 2b, including how and when they were assessed	13, 14, Supplementary Tables 2, 3.
	6b	Any changes to pilot trial assessments or measurements after the pilot trial commenced, with reasons	N/A
	6c	If applicable, prespecified criteria used to judge whether, or how, to proceed with future definitive trial	Table 3.
Sample size	7a	Rationale for numbers in the pilot trial	14
	7b	When applicable, explanation of any interim analyses and stopping guidelines	N/A
Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	15
	8b	Type of randomisation(s); details of any restriction (such as blocking and block size)	15
Allocation concealment	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	15

mechanism			
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	15
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	15
	11b	If relevant, description of the similarity of interventions	-
Statistical methods	12	Methods used to address each pilot trial objective whether qualitative or quantitative	15, 16
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were approached and/or assessed for eligibility, randomly assigned, received intended treatment, and were assessed for each objective	Figure 2.
	13b	For each group, losses and exclusions after randomisation, together with reasons	Figure 2.
Recruitment	14a	Dates defining the periods of recruitment and follow-up	17
	14b	Why the pilot trial ended or was stopped	17
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	Table 1.
Numbers analysed	16	For each objective, number of participants (denominator) included in each analysis. If relevant, these numbers should be by randomised group	Tables 3, 4
Outcomes and estimation	17	For each objective, results including expressions of uncertainty (such as 95% confidence interval) for any estimates. If relevant, these results should be by randomised group	Tables 3, 4
Ancillary analyses	18	Results of any other analyses performed that could be used to inform the future definitive trial	N/A
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	22
	19a	If relevant, other important unintended consequences	-
Discussion			
Limitations	20	Pilot trial limitations, addressing sources of potential bias and remaining uncertainty about feasibility	28 – 30
Generalisability	21	Generalisability (applicability) of pilot trial methods and findings to future definitive trial and other studies	27 – 28
Interpretation	22	Interpretation consistent with pilot trial objectives and findings, balancing potential benefits and harms, and considering other relevant evidence	23 – 30
	22a	Implications for progression from pilot to future definitive trial, including any proposed amendments	31
Other information			
Registration	23	Registration number for pilot trial and name of trial registry	2
Protocol	24	Where the pilot trial protocol can be accessed, if available	2
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	2
	26	Ethical approval or approval by research review committee, confirmed with reference number	8, 9

Citation: Eldridge SM, Chan CL, Campbell MJ, Bond CM, Hopewell S, Thabane L, et al. CONSORT 2010 statement: extension to randomised pilot and feasibility trials. BMJ. 2016;355.

*We strongly recommend reading this statement in conjunction with the CONSORT 2010, extension to randomised pilot and feasibility trials, Explanation and Elaboration for important clarifications on all the items. If relevant, we also recommend reading CONSORT extensions for cluster randomised trials, non-inferiority and equivalence trials, non-pharmacological treatments, herbal interventions, and pragmatic trials. Additional extensions are forthcoming: for those and for up to date references relevant to this checklist, see www.consort-statement.org.