Attributes Underlying Non-surgical Treatment Choice for People With Low Back Pain: A Systematic Mixed Studies Review

Thomas G. Poder1,2* and Marion Beffarat3

Abstract

Background: The knowledge of patients' preferences in the medical decision-making process is gaining in importance. In this article we aimed to provide an overview on the importance of attributes underlying the choice of non-surgical treatments in people with low back pain (LBP).

Methods: A systematic mixed studies review was conducted. Articles were retrieved from the search engines PubMed, ScienceDirect, and Scopus through June 21, 2018. The Mixed Methods Appraisal Tool (MMAT) was used to assess the quality of the study, and each step was performed by 2 reviewers.

Analysis: From a total of 390 articles, 13 were included in the systematic review, all of which were considered to be of good quality. Up to 40 attributes were found in studies using various methods. Effectiveness, ie, pain reduction, was the most important attribute considered by patients in their choice of treatment. This attribute was cited by 7 studies and was systematically ranked first or second in each. Other important attributes included the capacity to realize daily life activities, fit to patient's life, and the credibility of the treatment, among others.

Discussion: Pain reduction was the most important attribute underlying patients' choice for treatment. However, this was not the only trait, and future research is needed to determine the relative importance of the attributes.

Keywords: Low Back Pain, Preference, Treatment, Choice, Systematic Review

Introduction

Low back pain (LBP) is a common condition experienced by most individuals at least once during their lifetime.1,2 LBP refers to pain located between the lower rib margins and the buttock creases.3 Generally, the lower back is where most back pain occurs. According to the National Institute for Neurological Disorders and Strokes,4 a branch of the National Institute of Health, chronic LBP is defined “as pain that persists for 12 weeks or longer.”

In industrialized countries, the prevalence of LBP in a person's lifetime was assessed at 60% to 70%3 and the incidence rate was between 60% and 90%.6 An evolution toward chronicity of LBP was observed in 6 to 8% of cases.7,8 Throughout the world, chronic LBP has high economic/professional (incapacity, absenteeism, activity limitation) and social (isolation, decrease in quality of life, constant need of care) impact on the population. Indeed, chronic LBP is the second cause of incapacity after cardiovascular disease.9 To effectively treat this population is essential. However, to be effective, these treatments must adhere to patients' concerns, values and beliefs, and thus, consider their preferences.10

According to Bowling and Ebrahim,11 treatment preference is defined as the option chosen by the patient after having assessed the risks and benefits of available actions. To take into account the preference of patients in their choice of treatment is especially important in LBP considering the large number of potential treatments, ie, more than 200 according to Haldeman and Dagenais,12 and their relatively low effectiveness.13 In addition, Aboagye14 puts forward other reasons for which preferences need to be examined in the treatment of this specific condition, including patient empowerment and satisfaction.

According to the Common Sense Model,15 a widely used theoretical framework to explain the processes by which patients become aware of and interact with a health threat, patients develop treatment preferences when attempting to match their illness representations with treatment beliefs. Therefore, it is important to consider what drives their choice for treatment and to better understand their preferences for the various attributes (ie, characteristics) describing a given treatment. This is also highlighted by Aboagye14 and the National Institute for Health and Care Excellence,16 who indicate that preferences and individual values are important and must be considered in the intervention choice process.

To contribute to a better understanding of which preferences drive treatment choice in LBP patients, we conducted a systematic mixed studies review. Specifically, the purpose of this article is twofold: (1) to determine which non-

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surgical treatment attributes are important for patients in their decision-making process, and (2) to report the ranking of these attributes in order of patients’ preferences.

Methods
A systematic mixed studies review of the literature was conducted on non-surgical treatment preferences of people with LBP. To do so, we followed the statement rules used in our health technology assessment unit (unpublished), which are very close to what is described in the guideline developed for systematic reviews by the Institut national de l’excellence en santé et en services sociaux (INESSS),17 the national health technology assessment agency in Quebec, Canada. The rational for a systematic mixed studies review was to get as much information as possible on this specific topic which may have been understudied. In addition, studying attributes that drive non-surgical treatment preferences will help decision-makers in our institution to reorganize the patients’ trajectory of care and to offer patients alternatives to surgical care. The methodological quality of each study was evaluated using the Mixed Methods Appraisal Tool (MMAT).18 In our review protocol, the inclusion criteria were established so as to be as exhaustive as possible. These criteria included studies analyzing health preferences regardless of the method used, eg, discrete choice experiment (DCE), qualitative studies, mix method design, ranking studies, swing weighting studies, analytical hierarchy process, and best-worst scaling. We also used studies referring to acute or chronic pain treatments in the low back region. Exclusion criteria were: preferences other than those of patients, sub-studies of other studies, studies about utilities associated with any health condition, studies combining data from patients with pain other than in the low back region, and studies that only referred to surgical treatment (ie, a study could compare surgical treatment with non-surgical treatment, but could not compare two surgical treatments). There was no limitation of language.

As per protocol, inclusion and exclusion criteria were established before conducting searches in the electronic database and were applied to the final search field. The search engines used in this systematic review were PubMed, ScienceDirect, and Scopus. In addition, to consider unpublished studies we completed the review by scanning grey literature. The search was conducted without date limits in the systematic mixed studies review. The Cohen’s kappa coefficient was 0.7937 in the first phase of the selection process (screening of both titles and abstracts) and 0.9217 in the second phase (full-text readings). The reasons for excluding 24 studies that were fully read were as follows: the study was a systematic review without original data (n = 3)19-21; the study did not consider the preferences of patients (n = 4)22-25; the study analyzed preferences but not for treatment characteristics (n = 1)26-28; the pain site was somewhere other than in the low back or data were aggregated with other sites (n = 4)29-32; the study was a sub-study of another one (n = 1)29; and data was not available even after contacting the authors (n = 1)29. Details of the process selection can be found in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram in Figure.

Table 1 lists the 13 selected studies.41-54 A majority of these studies (n = 7) were published during the past 5 years and mainly originated from Europe (n = 7) and the United States (n = 3). This shows that the topic of health preferences is increasingly gaining importance in the Western world. Very few information about the characteristics of the respondents were provided in the studies, with the exception of age and gender. Of the 11 studies that reported these data, mean age ranged from 41 to 62 years, and mean proportion of women was between 50.4% and 75.6%. Seven of the included studies
were qualitative, while the others were mixed-method or quantitative studies, including 4 DCEs. In general, included studies had a satisfactory score of quality. None of these studies had a score below 50% in the MMAT. In addition, studies with lower scores were mainly because of missing information in their method's section. As a result, the MMAT score had little impact on how to interpret the findings. A very high heterogeneity in study designs was observed in this systematic review. In particular, the primary studies each used specific measurement methods for patients’ preferences. Some were measured with questionnaires and others used focus groups or individual interviews, while the DCE studies used different attributes and levels for treatments. This precluded performing a meta-analysis.

Results of the systematic mixed studies review are reported in Table 2. According to studies included in this review, the attributes most frequently cited in the preferences of patients were effectiveness (ie, reduction in pain level), the capacity to realize daily life activities, fit to the patient’s life, providers’ attitudes and characteristics, and the frame/design of the treatment (eg, supervised or not, in groups or individually). These attributes were cited in at least four studies. Among these five attributes, effectiveness and capacity to realize daily life activities appeared to be the most valued, while providers’ attitudes and characteristics seemed to be much less important.

Alternatively, other attributes were less frequently cited but revealed strong preferences. This was particularly the case for credibility of treatment, capacity to return to work, and treatment frequency. These three attributes were cited in three studies each. Other attributes were also cited in three studies, but revealed less important preferences: onset of

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**Table 1. Characteristics of Studies Included in the Systematic Review**

<table>
<thead>
<tr>
<th>Authors/Year</th>
<th>Country</th>
<th>Study’s Method</th>
<th>No. of Patients</th>
<th>MMAT Score</th>
<th>Source of Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>François et al/2018</td>
<td>USA</td>
<td>Quantitative (cross-section)</td>
<td>104</td>
<td>68.75%</td>
<td>NIHR, NICHD, NCMRR</td>
</tr>
<tr>
<td>Aboagye et al/2017</td>
<td>Sweden</td>
<td>Quantitative (DCE)</td>
<td>112</td>
<td>95.85%</td>
<td>AFA Insurance, Swedish Research Council for Health, Working Life and Welfare</td>
</tr>
<tr>
<td>Verbrugghe et al/2017</td>
<td>Belgium</td>
<td>Mixed method (interviews questionnaires)</td>
<td>40</td>
<td>58%</td>
<td>Not declared</td>
</tr>
<tr>
<td>Chen et al/2015</td>
<td>China</td>
<td>Quantitative (DCE)</td>
<td>86</td>
<td>75%</td>
<td>Research Committee of the University of Macau</td>
</tr>
<tr>
<td>Dima et al/2015</td>
<td>England</td>
<td>Quantitative (questionnaires)</td>
<td>115</td>
<td>70.5%</td>
<td>NIHR School for Primary Care Research</td>
</tr>
<tr>
<td>Gardner et al/2015</td>
<td>Australia</td>
<td>Qualitative (Interviews)</td>
<td>20</td>
<td>70.83%</td>
<td>Self-financing</td>
</tr>
<tr>
<td>Klojaard et al/2014</td>
<td>Denmark</td>
<td>Quantitative (DCE)</td>
<td>348</td>
<td>83.35%</td>
<td>Danish Strategic Research Council project CeSpine</td>
</tr>
<tr>
<td>Dima et al/2013</td>
<td>England</td>
<td>Qualitative (focus group)</td>
<td>75</td>
<td>81.25%</td>
<td>NIHR School for Primary Care Research</td>
</tr>
<tr>
<td>Haanstra et al/2013</td>
<td>USA</td>
<td>Qualitative (interviews)</td>
<td>77</td>
<td>77.1%</td>
<td>Not declared</td>
</tr>
<tr>
<td>Klojaard et al/2012</td>
<td>Denmark</td>
<td>Qualitative (interviews)</td>
<td>3</td>
<td>91.65%</td>
<td>Danish Strategic Research Council project CeSpine</td>
</tr>
<tr>
<td>Yi et al/2011</td>
<td>Scotland</td>
<td>Quantitative study (DCE)</td>
<td>124</td>
<td>62.5%</td>
<td>Scottish Government Health Directorate and Aberdeen University</td>
</tr>
<tr>
<td>Hsu et al/2010</td>
<td>USA</td>
<td>Qualitative (interviews)</td>
<td>327</td>
<td>64.62%</td>
<td>NIH-NCCAM, NIAMS</td>
</tr>
<tr>
<td>Slade et al/2009</td>
<td>Australia</td>
<td>Qualitative (focus group)</td>
<td>18</td>
<td>58.35%</td>
<td>National Health and Medical Research Council PhD Scholarship</td>
</tr>
</tbody>
</table>

Abbreviations: MMAT, Mixed Methods Appraisal Tool – the score provided is the mean of both reviewers; DCE, discrete choice experiment; NIHR, National Institute for Health Research; NICHD, National Institute of Child Health and Human Development; NCMRR, National Center for Medical Rehabilitation Research; NIH, National Institute for Health; NCCAM, National Center for Complementary and Alternative Medicine; NIAMS, National Institute for Arthritis and Musculoskeletal and Skin Disease.
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Importance/Ranking</th>
<th>Treatment Modality (Levels)</th>
<th>Reference/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness/pain reduction</td>
<td>Relevant (determined during focus group) Same weight but prioritised by patients, top 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relevant (determined during focus group) Same weight but prioritised by authors, top 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relevant (validated questionnaire) Same weight – ranked 2-4 over 4 attributes</td>
<td>Six different treatments</td>
<td>Dima et al/2013</td>
</tr>
<tr>
<td></td>
<td>Significant P &lt; .001 – ranked 2/4</td>
<td>Dx, exercise, manual therapy, acupuncture</td>
<td>Dima et al/2015</td>
</tr>
<tr>
<td></td>
<td>Significant P &lt; .001 – ranked 1/4</td>
<td>Exercise</td>
<td>François et al/2018</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by literature review, doctors and patients) – ranked 1-5/17</td>
<td>Acupuncture, infrared treatment (minor, moderate, major reduction)</td>
<td>Chen et al/2015</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by patients’ interviews) – ranked 1/9</td>
<td>Surgical vs. non-surgical (same, less, none)</td>
<td>Klojaard et al/2014</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surgical vs. non-surgical</td>
<td>Klojaard et al/2012</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HDS or home exercise, spinal manipulation</td>
<td>Haanstra et al/2013</td>
</tr>
<tr>
<td>Capacity to realize common/leisure/daylife activities</td>
<td>Relevant (determined by patients) – ranked in top 3</td>
<td>Rehabilitation program + exercise</td>
<td>Verbrugghe et al/2016</td>
</tr>
<tr>
<td></td>
<td>Significant P &lt; .001 (positive) – ranked 2/4</td>
<td>Surgical vs. non-surgical (same, fewer, none)</td>
<td>Klojaard et al/2014</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by patients’ interviews) – ranked 2/9</td>
<td>HDS or home exercise, spinal manipulation surgical vs. non-surgical</td>
<td>Haanstra et al/2013</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by literature review, doctors and patients) – ranked 1-5/17</td>
<td></td>
<td>Klojaard et al/2012</td>
</tr>
<tr>
<td>Fit to patients’ life/convenience</td>
<td>Relevant (determined during focus group) same weight, top 4</td>
<td>Six different treatments</td>
<td>Dima et al/2013</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined during focus group) same weight, top 4</td>
<td>Dx, exercise, manual therapy, acupuncture</td>
<td>François et al/2018</td>
</tr>
<tr>
<td></td>
<td>Relevant (validated questionnaire) most important according to authors – ranked 1/4</td>
<td>Exercise</td>
<td>Slade et al/2009</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined during focus group) time management and flexible time-tables for 18/18 persons, fit to patients’ capacities for 18/18 persons</td>
<td>Physical exercises program</td>
<td></td>
</tr>
<tr>
<td>Frame/design of the treatment (supervision or not and individual or group)</td>
<td>Significant P &lt; .001 for group with supervision – attribute ranked 4/6 – weight 17%</td>
<td>Exercise (Individual w/o supervision, group w/o supervision)</td>
<td>Aboagye et al/2017</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined during focus group) Non-clinical setting for 16/18 persons, close supervision for 16/18 persons and in group for 11/18 persons</td>
<td>Physical exercises program</td>
<td>Slade et al/2009</td>
</tr>
<tr>
<td></td>
<td>Significant P &lt; .01 preference for small group – ranked 1/5</td>
<td>Pain management program (individual, 2-6, 7-12, more than 12)</td>
<td>Yi et al/2011</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by patients’ interviews) 9/9</td>
<td>HDS or home exercise, spinal manipulation</td>
<td>Haanstra et al/2013</td>
</tr>
<tr>
<td>Providers’ attitudes and characteristics</td>
<td>Relevant (determined by patients’ interviews) – ranked 9/9</td>
<td>HDS or home exercise, spinal manipulation physical exercises program</td>
<td>Haanstra et al/2013</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined during focus group) encouraging instructors and their quality teaching skills, take time to listen and shared decision-making for 18/18 persons</td>
<td>Pain management program (nurse, pharmacist, physiotherapist, GP, psychologist, pain team)</td>
<td>Slade et al/2009</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by focus group) conscientious, knowledgeable, empathic, respectful and trustworthy, outside the top 4</td>
<td></td>
<td>Dima et al/2013</td>
</tr>
<tr>
<td></td>
<td>Non-significant – ranked 3/5</td>
<td></td>
<td>Yi et al/2011</td>
</tr>
<tr>
<td></td>
<td>Credibility of treatment</td>
<td>Six different treatments</td>
<td>Dima et al/2013</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined during focus group) Same weight, top 4</td>
<td>Dx, exercise, manual therapy, acupuncture</td>
<td>Dima et al/2015</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined during focus group) Same weight but prioritised by authors, top 4</td>
<td>CAM</td>
<td>Hsu et al/2010</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by patients’ interviews) Awareness and Confidence in treatment options – ranked 1/11 – weight 16.2%</td>
<td></td>
<td>Gardner et al/2015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physiotherapy</td>
<td>Verbrugghe et al/2016</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rehabilitation program + exercise</td>
<td>Klojaard et al/2012</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surgical vs. non-surgical</td>
<td></td>
</tr>
<tr>
<td>Capacity to return to work</td>
<td>Relevant (determined by patients) – ranked 2/5 – weight 14.29%</td>
<td>Exercise (once, 2, 3 per week)</td>
<td>Aboagye et al/2017</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by patients) ranked in top 3</td>
<td>Pain management program (10, 5, 2, 1 sessions a week over 2, 4, 10, 20 weeks)</td>
<td>Yi et al/2011</td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by literature review, doctors and patients) – ranked 6-17/17</td>
<td>Surgical vs. non-surgical</td>
<td>Klojaard et al/2012</td>
</tr>
<tr>
<td>Treatment frequency</td>
<td>Significant P &lt; .001 for Once or two times per week – attribute ranked 3/6 – weight 18%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Significant P &lt; .01 preference for fewer sessions over a longer period – ranked 2/5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relevant (determined by literature review, doctors and patients) – ranked 6-17/17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Table 2. Continued

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Importance/Ranking</th>
<th>Treatment Modality (Levels)</th>
<th>Reference/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of treatment efficacy</td>
<td>Significant P &lt; .001 – ranked 4/4</td>
<td>Acupuncture, infrared treatment (2, 4, 8 courses) Surgical vs. non-surgical (1, 3, 6, 12 months) Surgical vs. non-surgical</td>
<td>Chen et al/2015 Klojgaard et al/2014 Klojgaard et al/2012</td>
</tr>
<tr>
<td>Content of program/treatment</td>
<td>Non-significant except for education + drug management P &lt; .05 (negative) – ranked 5/5</td>
<td>Pain management program (education, physical therapy, coping with pain, drug management) HDS or home exercise, Spinal manipulation surgical vs. non-surgical</td>
<td>Yi et al/2011 Haanstra et al/2013 Klojgaard et al/2012</td>
</tr>
<tr>
<td>Energy/ability to sleep</td>
<td>Relevant (determined by patients) – ranked 5/5 – weight 6.35% Relevant (determined by patients’ interviews) – ranked 8/11 – weight 2.4% Relevant (determined by literature review, doctors and patients) 6-17/17</td>
<td>Physiotherapy CAM Surgical vs. non-surgical</td>
<td>Gardner et al/2015 Hsu et al/2010 Klojgaard et al/2012</td>
</tr>
<tr>
<td>Realize physical activities</td>
<td>Relevant (determined by patients) – ranked 1/5 – weight 49.2% Relevant (determined by literature review, doctors and patients) – ranked 6-17/17</td>
<td>Physiotherapy Surgical vs. non-surgical</td>
<td>Gardner et al/2015 Klojgaard et al/2012</td>
</tr>
<tr>
<td>Type of exercise</td>
<td>Significant P &lt; .001 for cardiovascular training – attribute ranked 2/6 – weight 19% Relevant (determined during focus group) Fun and varied exercises for 18/18 persons, water-based for 8/18</td>
<td>Exercise (cardiovascular, strength, mindfulness-based training) Physical exercises program</td>
<td>Aboagye et al/2017 Slade et al/2009</td>
</tr>
<tr>
<td>Risk of relapse</td>
<td>Significant P &lt; .001 for 30% risk (negative) – ranked 3/4 Relevant (determined by literature review, doctors and patients) – ranked 1-5/17</td>
<td>Surgical vs. non-surgical (10%, 20%, 30%) Surgical vs. non-surgical</td>
<td>Klojgaard et al/2014 Klojgaard et al/2012</td>
</tr>
<tr>
<td>Patients’ concerns (financial and security)</td>
<td>Relevant (determined during focus group) same weight, top 4 Relevant (determined during focus group) same weight, top 4</td>
<td>Six different treatments Dx, exercise, manual therapy, acupuncture</td>
<td>Dima et al/2013 Dima et al/2015</td>
</tr>
<tr>
<td>Improvement in emotional state</td>
<td>Relevant (determined by patients’ interviews) Emotional state ranked 3/11 – weight 8.3% - Well-being ranked 6/11 – weight 3.5% Relevant (determined by literature review, doctors and patients) – ranked 6-17/17</td>
<td>CAM Surgical vs. non-surgical</td>
<td>Hsu et al/2010 Klojgaard et al/2012</td>
</tr>
<tr>
<td>To have a social life</td>
<td>Relevant (determined by patients) – ranked 4/5 – weight 6.35% Relevant (determined by literature review, doctors and patients) – ranked 6-17/17</td>
<td>Physiotherapy Surgical vs. non-surgical</td>
<td>Gardner et al/2015 Klojgaard et al/2012</td>
</tr>
<tr>
<td>Out-of-pocket cost</td>
<td>Significant P &lt; .001 – not ranked, used as reference Relevant (determined by focus group) for 10/18 persons</td>
<td>Acupuncture, Infrared treatment (120, 600, 1000 CNY per course) Physical exercises program</td>
<td>Chen et al/2015 Slade et al/2009</td>
</tr>
<tr>
<td>Knowledge about their body</td>
<td>Relevant (determined by patients’ interviews) ranked 4/11 – weight 7.6% Relevant (determined by focus group) for 18/18 persons</td>
<td>CAM Physical exercises program</td>
<td>Hsu et al/2010 Slade et al/2009</td>
</tr>
<tr>
<td>Knowledge about treatment and disease</td>
<td>Relevant (determined by patients’ interviews) – ranked 5/9 Relevant (determined by focus group) for 18/18 persons</td>
<td>HDS or home exercise, spinal manipulation physical exercises program</td>
<td>Haanstra et al/2013 Slade et al/2009</td>
</tr>
<tr>
<td>Knowledge about etiology and access to real diagnostic</td>
<td>Relevant (determined by patients’ interviews) – ranked 6/9 Relevant (determined during focus group), outside the top 4</td>
<td>HDS or home exercise, spinal manipulation six different treatments</td>
<td>Haanstra et al/2013 Dima et al/2013</td>
</tr>
<tr>
<td>Self-management capacities</td>
<td>Relevant (determined by patients’ interviews) – ranked 3/9 Relevant (determined by focus group), outside the top 4</td>
<td>HDS or home exercise, spinal manipulation six different treatments</td>
<td>Haanstra et al/2013 Dima et al/2013</td>
</tr>
<tr>
<td>Attribute</td>
<td>Importance/Ranking</td>
<td>Treatment Modality (Levels)</td>
<td>Reference/Year</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td>Others symptoms non related to LBP</td>
<td>Relevant (determined by researchers, doctors and patients) – ranked 6-17/17 Relevant (determined by patients’ interviews) – ranked 7/11 – weight 2.7%</td>
<td>Surgical vs. non-surgical CAM</td>
<td>Klojgaard et al/2012 Hsu et al/2010</td>
</tr>
<tr>
<td>Proximity</td>
<td>Non-significant – attribute ranked 6/6 – weight 4% Significant P &lt; .01 (negative) – ranked 4/5</td>
<td>Exercise (10, 20, 30 minutes) Pain management program (15, 30, 45, 60, 75, 90, 105, 120 minutes from the clinic)</td>
<td>Aboagye et al/2017 Yi et al/2011</td>
</tr>
<tr>
<td>Incentives</td>
<td>Significant P &lt; .001 for none, exercise at work and wellness subsidies – attribute ranked 5/6 – weight 17%</td>
<td>Exercise (none, wellness subsidies, exercise at work, discount coupon)</td>
<td>Aboagye et al/2017</td>
</tr>
<tr>
<td>Exercise intensity</td>
<td>Significant P &lt; .001 for High intensity – attribute ranked 1/6 – weight 25%</td>
<td>Exercise (low, high, medium)</td>
<td>Aboagye et al/2017</td>
</tr>
<tr>
<td>Acceptability/logicality</td>
<td>Relevant (validated questionnaire) same weight – ranked 2-4 over 4 attributes</td>
<td>Exercise</td>
<td>François et al/2018</td>
</tr>
<tr>
<td>Suitability/appropriateness</td>
<td>Relevant (validated questionnaire) same weight – ranked 2-4 over 4 attributes</td>
<td>Exercise</td>
<td>François et al/2018</td>
</tr>
<tr>
<td>Knowledge of the exercise</td>
<td>Relevant (determined during focus group) for 18/18 persons</td>
<td>Physical exercises program</td>
<td>Slade et al/2009</td>
</tr>
<tr>
<td>Duration of efficacy</td>
<td>Significant P &lt; .001 – ranked 3/4</td>
<td>Acupuncture, Infrared treatment (sore and numb, mild thermal and vibration)</td>
<td>Chen et al/2015</td>
</tr>
<tr>
<td>Sensation of treatment</td>
<td>Significant P &lt; .001 – ranked 1/4</td>
<td>Acupuncture, Infrared treatment (2, 6, 12 months)</td>
<td>Chen et al/2015</td>
</tr>
<tr>
<td>Find motivation and self-confidence</td>
<td>Relevant (determined by patients’ interviews) 8/9</td>
<td>HDS or Home exercise, Spinal manipulation</td>
<td>Haanstra et al/2013</td>
</tr>
<tr>
<td>Improvement biomechanical functioning</td>
<td>Relevant (determined by patients’ interviews) – ranked 4/9</td>
<td>HDS or Home exercise, Spinal manipulation</td>
<td>Haanstra et al/2013</td>
</tr>
<tr>
<td>Relaxation (mind and body)</td>
<td>Relevant (determined by patients’ interviews) relaxation ranked 2/11 – weight 8.3% - mind-body-spirit ranked 10/11 – weight 1.1% - mindfulness ranked 11/11 – weight 0.5%</td>
<td>CAM</td>
<td>Hsu et al/2010</td>
</tr>
<tr>
<td>Changes in way of thinking</td>
<td>Relevant (determined by patients’ interviews) ranked 5/11 – weight 4.9%</td>
<td>CAM</td>
<td>Hsu et al/2010</td>
</tr>
<tr>
<td>Dramatic improvement in overall health and well-being</td>
<td>Relevant (determined by patients’ interviews) ranked 9/11 – weight 1.5%</td>
<td>CAM</td>
<td>Hsu et al/2010</td>
</tr>
<tr>
<td>Use of pain killers</td>
<td>Relevant (determined by literature review, doctors and patients) – ranked 6-17/17</td>
<td>Surgical vs. non-surgical</td>
<td>Klojgaard et al/2012</td>
</tr>
<tr>
<td>Neurological deficits</td>
<td>Relevant (determined by literature review, doctors and patients) – ranked 6-17/17</td>
<td>Surgical vs. non-surgical</td>
<td>Klojgaard et al/2012</td>
</tr>
<tr>
<td>Coping skills</td>
<td>Relevant (determined by patients) – ranked 3/5 – weight 11.11%</td>
<td>Physiotherapy</td>
<td>Gardner et al/2015</td>
</tr>
<tr>
<td>Seeking alternative treatment</td>
<td>Relevant (determined by focus group), outside the top 4</td>
<td>Six different treatments</td>
<td>Dima et al/2013</td>
</tr>
</tbody>
</table>

Abbreviations: w/o, with or without; Dx, medication; CAM, complementary and alternative medicine; HDS, high dose supervised; GP, general practitioner; LBP, low back pain. Difference between relevant and significant is related to the use of a statistical test or not.
treatment efficacy, content of program, and energy/ability to sleep. Other attributes were only considered in one or two studies, thus making it difficult to identify which elements were really important for patients when choosing a treatment (see Table 2).

Some attributes provided conflicting results. This was particularly the case for the frame/design of the treatment and for the onset of treatment efficacy. While close supervision appeared to be valued by patients, the optimal size of the group supervised is still to be determined. In regard to the onset of treatment efficacy, patients seemed willing to wait a long time if the treatment would meet their expectations (ie, effectiveness).

Patients’ preferences in term of treatment modality are reported in Table 3. One study did not compare treatments, considering only one treatment. Six studies only concerned the patients’ preferences of attributes and not their treatment preferences. Consequently, only six studies investigated a specific preference for one of the treatments. Surgical treatment and acupuncture seemed to be less frequently preferred than other alternatives, such as physical exercise and medication. Most studies were about physical activities and compared various types of exercise, but no obvious tendency appeared.

### Discussion

We identified which non-surgical treatments attributes for LBP were preferred by patients based on the scientific literature. As previously indicated, treatment preference is the option a patient chooses after considering the risks and benefits of the multiple options available for treatment of a clinical condition. In this setting, treatment preference was led by the preferences of patients according to the attributes and expected benefits, which are on their turn based on their experiences, knowledge and beliefs about the treatment. Previous authors have suggested that including patients’ preferences in clinical decision-making about optimal treatment is a central aspect of practising evidence-based medicine. As such, to include patient preferences in the decision-making process has gained in importance among doctors. Knowing the patient’s general expectations and preferences not only guides the choice of treatment, but may potentially improve the outcome of the treatment. Moreover, patients want to be included in this process, which leads to

<table>
<thead>
<tr>
<th>Table 3. Preferences in Terms of Treatment Modality</th>
</tr>
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<tbody>
<tr>
<td><strong>Author, Year</strong></td>
</tr>
<tr>
<td>Francois et al, 2018</td>
</tr>
<tr>
<td>Aboagye et al, 2017</td>
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<tr>
<td>Verbrugghe et al, 2015</td>
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<td>Chen et al, 2015</td>
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<td>Dima et al, 2015</td>
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<td>Gardner et al, 2015</td>
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<td>Klaegaard et al, 2014</td>
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<td>Dima et al, 2013</td>
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<td>Haanstra et al, 2013</td>
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<td>Klaegaard et al, 2012</td>
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<td>Yi et al, 2011</td>
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<td>Hsu et al, 2010</td>
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<tr>
<td>Slade et al, 2009</td>
</tr>
</tbody>
</table>

Abbreviations: SF, strength and flexibility; MST, motor skill training; CAMs, complementary and alternative medicines. Note: When treatment A is preferred to treatment B, we indicated A > B.
greater satisfaction.\textsuperscript{57,58}

According to this systematic review, the most frequently mentioned attributes in the preferences of patients for non-surgical treatments were effectiveness, capacity to realize daily life activities, fit to the patient’s life, providers’ attitudes and characteristics, and the frame/design of the treatment (eg, supervised or not, in groups or individually). However, being mentioned does not guarantee that these attributes are considered important for patients. Indeed, these attributes are not of equal importance. By far, effectiveness is the attribute most mentioned (ie, 7 studies of 13) and the one that is frequently given the highest consideration by LBP patients. Other important attributes were capacities to realize daily life activities, fit to the patient’s life, credibility of the treatment, capacity to return to work, and treatment frequency (ie, generally fewer sessions over a longer time period).

As per protocol, studies outside the scope of LBP were excluded from this systematic review. However, the results found are congruent with other chronic pain conditions.\textsuperscript{55,37}

To our knowledge, this study is the first systematic review on the topic of LBP patients’ preferences for attributes of treatments underlying their choices. This study will be useful for future research in this field and especially for preparing new studies that aim to elicit the preferences of patients to offer them convenient healthcare services and to better fit the design of intervention toward LBP patients. Indeed, knowing the patient’s preference for a given treatment is not sufficient to improve healthcare quality. This is why we need to know which attributes are important in the choice of a treatment modality by patients. This will help in clinical practice on how to adapt the design of treatments to better fit patients’ preferences and incite patients to be more adherent. As an example, many studies have revealed that patients have preferences for home exercises, but have found that between 50% and 70% of chronic LBP patients did not perform these prescribed home exercises.\textsuperscript{19} As such, patients’ preferences for specific attributes of home exercise could potentially impact clinical outcomes through adherence.

Several limits rise from this systematic mixed studies review. First, all included studies did not determine patients’ preferences using the same method: a number were identified with focus groups, some with interviews and/or questionnaires, and others with DCEs using different attributes and levels. In addition, some studies used statistical tests to compare the attributes, while others studies simply considered the attributes given spontaneously by patients or asked patients to perform a ranking. This could be interpreted as a methodological limitation for this review and could impede the comparability between results. Second, not all studies used the same attributes, which makes the comparison of attributes between studies even harder. Third, we indirectly assessed the risk of bias of the included studies using the MMAT which is imperfect considering that this tool mostly evaluates the quality of mixed-methods studies. However, we are not aware of specific tools to assess the risk of bias in preference studies. Fourth, all reviews, including the present one, is limited by the search strategy and the selection of databases, which may have led to some missed studies. Fifth, preferences may vary across populations with disparate demographic characteristics, but due to limited data provided in the studies we were not able to assess if these characteristics have an impact on patients’ preferences. Sixth, some information is missing or insufficiently described in the studies retrieved, such as at what time in the consultation process the patients were asked for their preferences, the information they may have received about treatments, and data to determine if patients were comparable from one study to another. This information would have been helpful to better understand patients’ preferences. Seventh, we attempted to report the attributes by the main treatment modalities (eg, exercise, acupuncture, surgical vs. non-surgical), but no specific pattern was found. A potential explanation for this is that each modality, even in the same category, can differ greatly from each other. Finally, included studies had various objectives, which may have led to different rankings or even omitting certain attributes. Despite the fact that we conducted a rigorous selection process in this systematic review, all these points are strong limitations that preclude establishing a clear ranking as to patients’ preferences.

However, as said above, a strength of this review is that we followed a standard and rigorous method, thus allowing to find some key preferences in treatment attributes. Moreover, this review is in line with various international recommendations to consider patients’ views in order to improve patient-centered care.\textsuperscript{59} Although including patients in clinical decisions may be challenging, patient involvement may potentially have a significant effect on treatment outcomes.\textsuperscript{60} The benefits of patient involvement and the skills required to achieve this is thus a central aspect of practicing evidence-based medicine.\textsuperscript{61} In this sense, the present study is important as it aims to highlight patients’ treatment preferences, which is pertinent for caregivers to know.

Conclusion

In this systematic mixed studies review, we found that effectiveness (ie, pain reduction) was the most important attribute considered by patients in their choice of a treatment. This attribute was cited in seven of the thirteen included studies and was systematically ranked first or second. Other important attributes were the capacity to realize daily life activities, fit to the patient’s life, and credibility of the treatment, among others. However, these are not the only traits and future research is needed to clearly determine their relative importance. This research is important considering that patients’ preference is essential in the decision-making process, since it could influence adherence to treatment and clinical outcomes. This is part of a process whereby healthcare providers should share treatment decisions with patients by listening to them, trying to understand them, and considering their wishes.\textsuperscript{50}

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Ethical issues
This article does not contain any studies with human participants performed by any of the authors.

Competing interests
Authors declare that they have no competing interests.

Authors' contributions
TGP and MB conceived and conducted the study. TGP wrote the manuscript and MB revised it critically.

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Supplementary file
Supplementary file 1 contains the complete search strategy based on keywords.

References
Poder and Beffarat


