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SUMMARY WITH CRITICAL APPRAISAL

Exercise for Chronic, Non-Cancer Back Pain: A Review of Cost-Effectiveness and Guidelines

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Abbreviations

ACP	American College of Physicians
AGREE II	Appraisal of Guidelines for Research and Evaluation, version II
AHRQ	Agency for Healthcare Research and Quality
AMSTAR	A Measurement Tool to Assess Systematic Reviews
CER	Comparative effectiveness review
CGC	clinical guideline committee
GRADE	Grading of Recommendations, Assessment, Development, and Evaluation
MA	Meta-analysis
NDMG	German Disease management Guideline
ODI	Oswestry Disability Index
RCT	randomized controlled trial
RMDQ	Roland Morris Disability Questionnaire
SR	Systematic review

Context and Policy Issues

Back pain is a common problem among adults, and it is estimated that up to 80% of people will be affected, at least once in their lifetime.[1] Non-specific low back pain is the most common type of back pain, accounting for approximately 90% of cases in primary care settings.[2] Usually, back pain resolves within two weeks, but symptoms may linger for up to two months, and some patients will experience further episodes or a reoccurrence within a year, with about 2% to 7% of patients developing chronic low back pain.[2] Thus, the condition is frequently classified into acute, subacute, or chronic based on duration, and treatment may vary according to the classification.[3] Acute back pain is defined as lasting less than four weeks, subacute back pain lasts four to 12 weeks, and chronic back pain lasts more than 12 weeks.[3]

Low back pain is most common among the working population, with peak incidence occurring in individuals between 25 and 64 years old.[2] The occurrence of low back pain has been associated with life factors, such as obesity and sedentary lifestyles, and multiple contributors, including physical, social, and psychological features, have been identified.[4] The pain can lead to significant loss of function, making low back pain one of the most common reasons why working adults take days off work or become disabled.[5] Therefore, low back pain is associated with high costs, including direct health care costs and indirect costs related to missed work or reduced productivity.[3] In Canada, the cost of medical expenditures alone for low back pain are estimated between $6 and $12 billion annually.[1] The impact on society due to the loss in worker productivity from absenteeism and the associated disability payments are additional related costs.[1]

A variety of therapies are available for the treatment of low back pain, including pharmacologic interventions and non-pharmacologic interventions such as exercise. Exercise therapy is commonly used adjunctively or as an alternative to usual care for managing low back pain, and it has been reported to have positive effects on pain and back function.[5] However, there is considerable uncertainty regarding the respective value of the various interventions (pharmacologic and non-pharmacologic). Thus, the selection of appropriate therapies can vary substantially across clinicians for chronic, non-cancer, back

pain, and evidence is scarce on the cost-effectiveness of different treatments for the condition.[6]

The objective of this report is to summarize the evidence regarding the cost-effectiveness of exercise for chronic, non-cancer, back pain and recommendations from evidence-based guidelines for its use to treat the condition.

Research Questions

1. What is the cost-effectiveness of exercise for chronic, non-cancer back pain?
2. What are the evidence-based guidelines regarding exercise for chronic, non-cancer back pain?

Key Findings

Two evidence-based clinical practice guidelines provide strong recommendations for using professionally supervised exercise therapy, including motor control exercise, as the primary treatment of chronic non-specific low back pain. One guideline strongly recommends combining exercise with educative measures based on behavioral-therapeutic principle, and strongly recommends against using bed rest as a part of the treatment of non-specific low back pain. The applicability and implementation of exercise therapy for chronic non-cancer back pain were not adequately addressed by either guideline, and the information about the specific movements involved in exercise regimens and the order in which to perform them, duration, and frequencies of exercise was not provided.

No relevant evidence regarding the cost-effectiveness of exercise for chronic, non-cancer back pain was identified; therefore, no summary can be provided.

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources, including Medline via OVID, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were back pain and exercise. Search filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, or network meta-analyses, economic studies, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and October 10, 2019.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed, and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Adults with chronic, non-cancer back pain from any cause, who are not pregnant
Intervention	Exercise alone, excluding yoga, Pilates, tai chi, physiotherapy, or sling training
Comparator	Q1: Pharmacological interventions • No treatment (e.g., waitlist) • Usual care (if usual care is pharmacological interventions only) Q2: Not applicable
Outcomes	Q1: Cost-effectiveness (e.g., incremental cost per quality adjusted life year gained, incremental cost-effectiveness ratio, quality adjusted life years) Q2: Guidelines
Study Designs	Economic Evaluations, Evidence-based Guidelines

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or were published before January 1, 2014. Guidelines with unclear methodology were also excluded.

Critical Appraisal of Individual Studies

The included guidelines were appraised using the Appraisal of Guidelines for Research and Evaluation, version II (AGREE II) instrument.[7] The AGREE II instrument consists of six quality-related domains: scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence of guidelines, with a total of 23 items. The tool is widely used to assess the development and reporting of guidelines.

No relevant economic study was identified regarding the cost-effectiveness of exercise for chronic, non-cancer back pain. Therefore, an instrument to critically appraise economic evaluation was not necessary.

Summary of Evidence

Quantity of Research Available

A total of 320 citations were identified in the literature search. Following screening of titles and abstracts, 305 citations were excluded, and 15 potentially relevant reports from the electronic search were retrieved for full-text review. The grey literature search did not identify any additional relevant publications. Of the 15 potentially relevant publications, 13 papers were excluded for various reasons, and two evidence-based guidelines.[3,8] that met the inclusion criteria were included in this review. No relevant economic study was identified regarding the cost-effectiveness of exercise for chronic, non-cancer back pain.

Appendix 1 presents the PRISMA flowchart of the study selection process.

Summary of Study Characteristics

Additional details regarding the characteristics of included publications are provided in Appendix 2.

Study Design

Two evidence-based guidelines were identified regarding exercise for chronic, non-cancer back pain. The National Care Guideline development group produced the German Disease Management Guideline (NDMG) on non-specific low back pain,[8] whereas the American College of Physicians (ACP) developed the guideline on noninvasive treatments for acute, subacute, and chronic low back pain.[3]

Evidence for the NDMG guideline was derived from systematic reviews retrieved by a systematic search of the literature, with supplementary searches for primary studies carried out where necessary.[8] The guideline development process was guided by the standards prescribed by the Guidelines International Network, the guideline criteria of the German Medical Association, the National Association of Statutory Health Insurance Physicians, the guideline regulations of the Association of the Scientific Medical Societies in Germany, and the German Guideline Evaluation Instrument.

The recommendations of the NDMG guideline[8] were graded based on the strength of the evidence and other factors such as patient perspectives, applicability, ethical considerations and ability to implement in clinical practice. The parameters were not described further in the publication in English available for this Rapid Response report. A strong recommendation was represented by two upward arrows (↑ ↑), whereas a single upward arrow (↑) and a horizontal double arrow (↔) indicated a weak recommendation and an open recommendation, respectively. The definition of open recommendation was not provided. A written voting procedure (Delphi process) or a consensus conference was used to arrive at the recommendations, algorithms, and information for patients. Although the strength of each recommendation was presented along with references to the supporting literature, the ratings of the quality of evidence were not reported.

The recommendations of the ACP guideline[3] were based on a comparative effectiveness review of 156 publications from 1982 to 2014[9] and a systematic review of 114 publications published through April 2015,[10] both sponsored by the Agency for Healthcare Research and Quality (AHRQ). For these evidence reviews,[9,10] randomized trials were evaluated using methods developed by the Cochrane Back Review Group and the AHRQ, and systematic reviews were assessed using A Measurement Tool to Assess Systematic Reviews (AMSTAR).

The ACP guideline[3] was developed by ACP's Clinical Guidelines Committee (CGC) according to ACP's guideline development process.[11] In summary, the CGC made the initial recommendations based on evidence presented in the evidence reviews[9,10] including considerations of clinical effect sizes, costs and other resource implications, patient and caregiver perspectives, and ethical, legal, and implementation considerations.[11] The ACP's governing body, the Board of Regents, voted on and approved the recommendations. Input was also sought from the international members of ACP and the Board of Governors who represent the United States of America.[11]

The grading of the strength of recommendations of the ACP guideline[3] and the quality of supporting evidence was adapted from the classification developed by the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) workgroup. The recommendations were graded as strong, weak, or insufficient. A strong recommendation means that benefits clearly outweigh risks and burden, or risks and burden clearly outweigh benefits (for a negative recommendation). A recommendation was rated weak when benefits were finely balanced with risks and burden or significant uncertainty existed about

the magnitude of benefits and risks. For recommendations with insufficient grade, a balance of benefit versus risks and burdens could not be determined. The quality of evidence supporting the recommendation was graded as high, moderate, low or insufficient depending on the methodological rigor of the source. High-quality evidence was obtained from one or more well-designed and well-executed randomized, controlled trials (RCTs) that yield consistent and directly applicable results. Moderate-quality evidence was that obtained from RCTs with important limitations, indirect evidence originating from similar (but not identical) populations of interest, and RCTs with a very small number of participants or observed events. Evidence obtained from observational studies were rated as low quality because of the risk for bias.

Country of Origin

One guideline[8] was developed and intended for used in Germany, and another guideline[3] was developed and meant to be used in the United States of America.

Patient Population

The target patient population in the guidelines[3,8] were adults presenting with acute, subacute, or chronic non-specific low back pain. One guideline[3] also targeted radicular low back pain, or symptomatic spinal stenosis.

Interventions and Comparators

The two guidelines[3,8] discussed both pharmacologic and non-pharmacologic interventions (including exercise) for low back pain. The NDMG guideline[8] presented exercise in a generic sense without details about types. In the ACP guideline[3] generic exercise was discussed separately from specific types of exercises such as motor control exercise, tai chi, yoga, progressive relaxation. In the authors description, “motor control exercise focuses on restoring coordination, control, and strength of the muscles that control and support the spine.” (p. 518)[8] Details specifying the steps involved or how often to apply any of the exercises were not provided. The exclusion criteria of this Rapid Response report include tai chi, yoga, or progressive relaxation. Therefore, they will not be discussed further.

Outcomes

The outcomes of interest common to both guidelines[3,8] were improvement of pain and functional ability. The NDMG guideline[8] also reported resumption of usual activities as an outcome, whereas the ACP guideline[3] reported on health-related quality of life, work disability or return to work, global improvement (not otherwise described), number of back pain episodes or time between episodes, patient satisfaction (method of measurement not provided), and adverse effects.[3] The NDMG guideline[8] did not define how changes in pain and function were outcome measured or what constituted improvement in the other outcomes. In the ACP guideline,[3] the magnitude of pain effect was categorized into small, moderate, or large using a visual analogue scale of 0 to 100 or equivalent, with a small effect on pain defined as a mean between group difference after treatment of 5 to 10 points whereas a moderate effect was defined as a mean between-group difference of greater than 10 to no more than 20 points. The Oswestry Disability Index (ODI)[12] or the Roland Morris Disability Questionnaire (RMDQ)[13] was used to evaluate function. The ODI (also known as the Oswestry Low Back Pain Disability Questionnaire) is a validated tool used by researchers and disability evaluators to measure a patient's permanent functional disability.[12] The test has 10 sections with a total possible score of 5 for each section and 50 overall. Higher scores on the instrument trend with increasing severity and disability.[12] The

RMDQ is a validated instrument that covers specific physical problems, and not psychological or social problems.[13] It has 24 questions, and it is scored by adding up the number of items checked by the patient. The score ranges from 0 to 24, corresponding with no disability to maximum disability.[13] A small effect in function was defined in the ACP guideline[3] as a mean between-group difference of 5 to 10 points on the ODI, or 1 to 2 points on the RMDQ, or a standardized mean difference of 0.2 to 0.5. A moderate effect on function was defined as a mean between-group difference of greater than 10 to no more than 20 points on the ODI, a mean between-group difference of greater than 2 to no more than 5 points on the RMDQ, or a standardized mean difference greater than 0.5 but no more than 0.8. The definition of what would constitute a large effect was not provided.[3]

Summary of Critical Appraisal

Additional details regarding the strengths and limitations of included publications are provided in Appendix 3.

The two included guidelines[3,8] referred readers to separately published supporting studies and further details. For the ACP guideline,[3] the publications included a comparative effectiveness review[9] and a systematic review,[10] as well as a document on the development of clinical practice guidelines and guidance statements that provided additional details on methods of ACP guideline development[11] However, for the NDMG guideline,[8] the supporting documents were in German, and they could not be translated for this Rapid Response report.

Both included guidelines[3,8] demonstrated strengths in four of the six domains in the AGREE II instrument[7] – scope and purpose, stakeholder involvement, clarity of presentation, and editorial independence. Each of the two guidelines had a positive score for every item in these four domains. Also, the ACP guideline[3] provided a clear description for all the items in the rigour of development domain, with much of the relevant information found in the referenced publication on the development of clinical practice guidelines and guidance statements.[11] Thus, important details, such as an explicit link between recommendations and supporting evidence, clearly described criteria for selecting evidence, the strengths and limitations of the body of evidence, clearly defined methods for formulating recommendations, side effects, and risks of the interventions, and a procedure for updating the guideline were provided. However, for the NDMG guideline,[8] the methodological quality could not be fully evaluated as part of the information was published in German. The NDMG guideline[8] provided enough information to confirm that systematic methods were used to search for evidence, and clearly described the methods for formulating the recommendations, with an explicit link between the recommendations and the supporting evidence. Also, it was clear that the health benefits were considered in formulating the recommendations. However, while side effects and risks were discussed for pharmacological treatment, they were not mentioned in reference to exercise. Further, although the draft of the NDMG guideline[8] was made accessible for public comment, the process for external peer-review was unclear and the procedure to update the guideline was not described. It was unclear if the lack in details could be offset with information from the accompanying documents that were published in German Language.

The ACP guideline[3] presented monitoring and/or auditing criteria, whereas the NDMG guideline[8] had no clear information on this item. None of the guidelines[3,8] provided descriptions of the facilitators and barriers to, and/or tools on how the recommendations about exercise for chronic low back pain can used in practice. Also, no information was

given concerning the potential resource implications of applying the exercises for the indication.

Summary of Findings

Cost-Effectiveness of exercise for chronic, non-cancer back pain

No relevant evidence regarding the cost-effectiveness of exercise for chronic, non-cancer back pain was identified; therefore, no summary can be provided.

Evidence-based Guidelines regarding exercise for chronic, non-cancer back pain

Two evidence-based guidelines[3,8] that addressed nonspecific back pain were included in this report. The two guidelines recommended some types of nonpharmacologic intervention, including exercise, as initial treatment of chronic back pain. Both guidelines found evidence indicating that exercise improved pain and function. In this regard, the ACP guideline[3] stated that the effects ranged from small to moderate, whereas the NDMG guideline[8] reported without quantitation that exercise yields more effective pain reduction and better functional ability than general medical care and passive treatment measures. The key recommendation of the two guidelines is that professionally supervised exercise therapy, including motor control exercise, may be offered as the primary treatment of chronic non-specific low back pain. Also, one guideline[8] strongly recommends combining exercise with educative measures based on behavioral-therapeutic principle, and strongly recommends against using bed rest as a part of the treatment of non-specific low back pain. Behavioral-therapeutic principle was not defined. Thus, patients should be encouraged to maintain or intensify physical exercise and physicians should advise against bed rest.

Neither of the two guidelines[3,8] adequately addressed the applicability and implementation of the recommendations of exercise for chronic non-cancer back pain, and information about the specific movements involved in exercise regimens and the order in which to perform them, duration, and frequencies of exercise was not provided. However, the NDGM guideline[8] found no evidence showing which specific type of exercise therapy is best for pain relief and improved functional ability, whereas the ACP guideline[3] found moderate-quality evidence showing no clear differences between different exercise regimens in more than 20 head-to-head RCTs in patients with chronic low back pain. Although both guidelines[3,8] discussed the acute, subacute, and chronic stages of non-specific low back pain, only the ACP guideline[3] had accompanying definitions.

The specific recommendations for applying exercise treatment for chronic (low) back pain, along with the strength of recommendation and/or supporting evidence, is presented in Appendix 4, Table 4.

Limitations

Two guidelines[3,8] were identified for the review, and no relevant evidence was found regarding the cost-effectiveness of exercise for chronic, non-cancer back pain.

Neither of the two guidelines[3,8] adequately addressed the applicability and implementation of the recommendations of exercise for chronic non-cancer back pain. Information about the specific movements involved in exercise regimens and the order in which to perform them, duration, and frequencies involved in exercise were not provided by either guideline. Also, the NDMG guideline[8] did not define what constituted acute, subacute or chronic low

back pain. Thus, there is the possibility that the targeted chronic low back pain population in that guideline differed from the patient group of interest in this Rapid Response report (i.e., with back pain lasting more than 12 weeks). Moreover, the NDMG guideline[8] did not provide the ratings of the strength of evidence supporting its recommendations. Therefore, it could not be assessed how well the grading of recommendations reflect their evidentiary base. However, given that the recommendations from the two guidelines are consistent, this may not be a worrisome limitation.

Finally, both the ACP and NDMG guidelines were intended for users outside Canada. Therefore, it was unclear if there are any generalizability concerns due to any difference(s) in the practice pattern between the countries of origins of the guidelines and Canada.

Conclusions and Implications for Decision or Policy Making

Two evidence-based guidelines that addressed exercise for non-specific back pain were included in this report. The overall conclusions of the two guidelines were that exercise therapy, under the supervision of qualified professionals should be the primary treatment for patients with non-specific (low) back pain.[3,8] It was recommended that exercise should be combined with educative measures, and patients be encouraged to pursue a healthful lifestyle, including regular physical exercise and engaging in activities while discouraging bed rest as part of the treatment of non-specific low back pain.[8]

Overall, exercise was presented in a generic sense in both guidelines,[3,8] except for motor control exercise that was specifically named in the recommendations of the ACP guideline.[3] However, information about the specific movements involved in generic or motor exercise regimens, the order in which to perform them, how often to perform them, and the duration per exercise session was not provided by either guideline.[3,8]

Neither of the two guidelines[3,8] adequately addressed the applicability and implementation of the recommendations of exercise for chronic non-cancer back pain. Also, one of the guidelines[8] did not rate the strength of the evidence supporting its recommendations. Future guidelines should address these limitations and others described in the critical appraisal and limitation sections of this report.

No relevant evidence regarding the cost-effectiveness of exercise for chronic, non-cancer back pain was identified; therefore, no summary can be provided.

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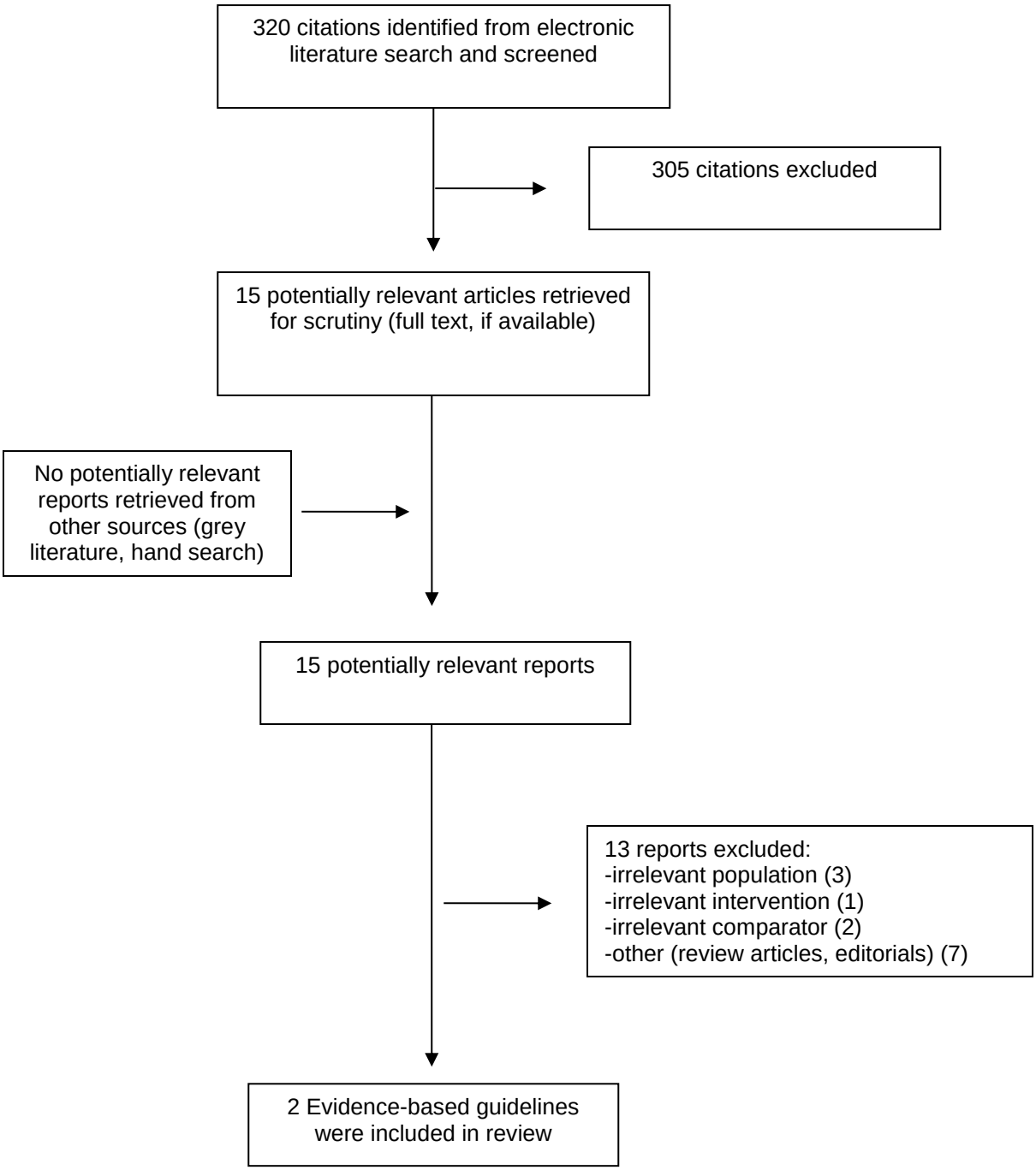
Appendix 1: Selection of Included Studies



Appendix 2: Characteristics of Included Publications

Table 2: Characteristics of Included Guidelines

Intended Users, Target Population	Intervention and Practice Considered	Major Outcomes Considered	Evidence Collection, Selection, and Synthesis	Evidence Quality Assessment	Recommendations Development and Evaluation	Guideline Validation
The German Disease Management Guideline on Non-Specific Low Back Pain, Chenot, 2017[8]						
Intended users are physician. Targeted population comprises patients with non-specific low back pain (acute, subacute, or chronic)	• Diagnostic evaluation • Psychosocial and workplace-related factors • Pharmacotherapy and non-pharmacological treatment, including exercise	• Improvement of pain and functional ability • Resumption of usual activities	Based on systematic reviews published from 2006–2015 retrieved by a systematic search in Medline (via PubMed) and the Cochrane database of the literature for systematic reviews in April 2015. Supplementary searches for primary studies were carried out where necessary	It was unclear how evidence quality was assessed. Part of the methodological details were written in German and could not be translated into English for this Rapid Response report	The development and evaluation of the guidelines used instruments published in German and could not be evaluated in this Rapid Response report. The recommendations were agreed upon collaboratively by 29 scientific medical societies and organizations and approved in Delphi process or a consensus conference Grades were assigned to recommendations based on the strength of the evidence and other factors such as patient perspectives, applicability, ethical considerations and ability to implement in clinical practice. Two upward arrows (↑↑) indicate a strong recommendation, a single upward arrow (↑) indicates a weak recommendation, and a horizontal double arrow (↔) indicates an open recommendation.	The draft guideline was made accessible for public comment, and potential consequences of the comments that were received were voted upon in a written Delphi process.

Intended Users, Target Population	Intervention and Practice Considered	Major Outcomes Considered	Evidence Collection, Selection, and Synthesis	Evidence Quality Assessment	Recommendations Development and Evaluation	Guideline Validation
The American College of Physicians Guideline on Noninvasive Treatments for Acute, Subacute, and Chronic Low Back, Qaseem, 2017[3]						
The intended users include all clinicians, and the target population includes adults (aged ≥18 years) with acute, subacute, or chronic low back pain.	Provision of treatment guidance of noninvasive • Pharmacologic and • Nonpharmacologic treatments (including exercise) for acute, subacute, and chronic low back pain in primary care.	"Evaluated outcomes included reduction or elimination of low back pain, improvement in back-specific and overall function, improvement in health-related quality of life, reduction in work disability, return to work, global improvement, number of back pain episodes or time between episodes, patient satisfaction, and adverse effects."[3] (p.2)	The evidence for the guideline was based on a CER involving a total of 156 publications from 1982 to 2014 and a SR of RCTs and SRs published through April 2015 on noninvasive pharmacologic and nonpharmacologic treatments for low back pain. Updated searches were performed through November 2016.	The strength of evidence from RCTs included in the evidence studies were evaluated using methods developed by the Cochrane Back Review Group and the AHRQ. The strength of evidence from the SRs included in the evidence studies were assessed using AMSTAR	The CGC made the initial recommendations based on evidence presented in the evidence reviews;[9,10] including considerations of clinical effect sizes, costs and other resource implications, patient and caregiver perspectives, and ethical, legal, and implementation considerations. The CGC recommendations received approval through voting by the ACP's Board of Regents, the international members of ACP, and the Board of Governors. The strength of recommendations and the quality of supporting evidence were ranked using the GRADE system.	The systematic review forming the basis for the recommendations was sent to invited peer reviewers and posted on the AHRQ Web site for public comments. The accompanying evidence reviews was peer reviewed through the journal. The guideline underwent a peer review process through the *Annals of Internal Medicine* journal and was posted online for comments from ACP Regents and ACP Governors, who represent ACP members at the regional level.

ACP = American College of Physicians; AHRQ = Agency for Healthcare Research and Quality; AMSTAR = A Measurement Tool to Assess Systematic Reviews; CER = comparative effectiveness review, CGC = clinical guideline committee, GRADE = Grading of Recommendations, Assessment, Development, and Evaluation, RCT – randomized controlled trials, SR = systematic review, USA = United States of America.

Appendix 3: Critical Appraisal of Included Publications

Table 3: Strengths and Limitations of Guidelines using AGREE II (AGREE 2017 AGREE II)[7]

Item	Guideline	
	The German Disease management Guideline, Chenot, 2017[8]	The American College of Physicians Guideline, Qaseem, 2017[3]
Domain 1: Scope and Purpose		
1. The overall objective(s) of the guideline is (are) specifically described.	Yes	Yes
2. The health question(s) covered by the guideline is (are) specifically described.	Yes	Yes
3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.	Yes	Yes
Domain 2: Stakeholder Involvement		
4. The guideline development group includes individuals from all relevant professional groups.	Yes	Yes
5. The views and preferences of the target population (patients, public, etc.) have been sought.	Yes	Yes
6. The target users of the guideline are clearly defined.	Yes	Yes
Domain 3: Rigour of Development		
7. Systematic methods were used to search for evidence.	Yes	Yes
8. The criteria for selecting the evidence are clearly described.	Unclear	Yes
9. The strengths and limitations of the body of evidence are clearly described.	Unclear	Yes
10. The methods for formulating the recommendations are clearly described.	Yes	Yes
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.	Yes	Yes
12. There is an explicit link between the recommendations and the supporting evidence.	Yes	Yes
13. The guideline has been externally reviewed by experts prior to its publication.	Unclear	Yes
14. A procedure for updating the guideline is provided.	Unclear	Yes
Domain 4: Clarity of Presentation		
15. The recommendations are specific and unambiguous.	Yes	Yes
16. The different options for management of the condition or health issue are clearly presented.	Yes	Yes

Item	Guideline	
	The German Disease management Guideline, Chenot, 2017[8]	The American College of Physicians Guideline, Qaseem, 2017[3]
17. Key recommendations are easily identifiable.	Yes	Yes
Domain 5: Applicability		
18. The guideline describes facilitators and barriers to its application.	Unclear	No
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.	No	No
20. The potential resource implications of applying the recommendations have been considered.	Unclear	No
21. The guideline presents monitoring and/or auditing criteria.	Unclear	Yes
Domain 6: Editorial Independence		
22. The views of the funding body have not influenced the content of the guideline.	Yes	Yes
23. Competing interests of guideline development group members have been recorded and addressed.	Yes	Yes

Appendix 4: Main Study Findings and Authors' Conclusions

Table 4: Recommendations of Included Guidelines

Recommendations	Strength of Evidence and Recommendations
The German Disease Management Guideline on Non-Specific Low Back Pain, Chenot, 2017[8] [a]	
"*A physician should be responsible [for] the overall care process*." (p.886)	Expert consensus / Strong recommendation
"*Over the course of the disease, the physician should continually explain the condition and the treatment to the patient and should encourage the pursuit of a healthful lifestyle, including regular physical exercise*." (p.886)	A total of five SRs, three with MAs / Strong recommendation
"*Patients should be instructed to continue their usual physical activities as much as possible*." (p.886)	One SR / Strong recommendation
"*Bed rest should not be a part of the treatment of non-specific low back pain, and patients should be advised against it*." (p.887)	A total of two SRs, one with MA / Strong recommendation)
"*Exercise therapy combined with educative measures based on behavioral-therapeutic principles should be used in the primary treatment of chronic non-specific low back pain*." (p.887)	A total of 25 studies – 21 SRs, nine with MA; two MA; one narrative review; and one study with unclear design / Strong recommendation
"*Weaker recommendations are given for rehabilitative sports and functional training*" (p.887)	Expert consensus / Weak recommendation
The American College of Physicians Guideline on Noninvasive Treatments for Acute, Subacute, and Chronic Low Back, Qaseem, 2017[3]	
For patients with chronic low back pain, clinicians and patients should initially select nonpharmacologic treatment with [b] • Exercise • Motor control exercise	 Moderate-quality evidence / Strong recommendation Low-quality evidence / Strong recommendation

MA = meta-analysis, SR = systematic review

[a] This guideline did not provide the strength of the evidence supporting the recommendation. Instead, each recommendation was stated with references to the studies supporting it or expert consensus. The number and types of studies, as identified by the author of this report, are included in the table. Also, A strong recommendation was represented by two upward arrows (↑ ↑), whereas a single upward arrow (↑) and a horizontal double arrow (↔). For consistency with the American College of Physicians guideline, these symbols have been replaced with the text description.

[b] The guideline contains other recommendations regarding non-pharmacological interventions for chronic low back pain that were beyond the scope of this report.