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Economic evaluations of musculoskeletal physiotherapy: protocol of a systematic review

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ABSTRACT

Introduction Several economic evaluations of musculoskeletal physiotherapy have been published in the literature. We aim to provide an overview of these existing economic evaluations. This overview will be useful for healthcare funders in identifying studies matching their context. In addition, research gaps as well as literature extensive enough to be combined in a meta-analysis will be identified. This will support researchers in planning relevant research projects.

Methods and analyses We will search in PubMed, EconLit and NHS-EED for relevant literature. Full economic evaluations of musculoskeletal physiotherapy interventions will be included, regardless of type, and economic evaluation perspective. Initial searches were performed on 7th October 2021. Study selection, data extraction and the quality evaluation will be conducted initially by two independent researchers. If their agreement is sufficient, one reviewer will proceed with the respected process. From the included studies, we will extract information on the publication year, the country of origin, the type of economical evaluation analyses and the specific musculoskeletal condition. An overview will be provided, concerning the distributions of the included studies regarding the extracted information. Furthermore, an evaluation of the individual study quality will be offered.

Ethics and dissemination No ethical approval will be required for this systematic review, since no human participants are involved. We aim to distribute the findings of this review in a peer-reviewed journal, on national and international conferences, as well as via social media.

Strengths and limitations of this study

- ► This systematic review protocol enhances the quality of the following research work by reducing the chance of duplication and by providing transparency to the methods and procedures.
- ► Study inclusion and study quality will be evaluated—both independently by two reviewers.
- ► Our search is restricted to three electronic databases and to German and English language.

BACKGROUND

Rationale

Health economic evaluations extend evidence-based medicine by considering the monetary costs besides the potential risks and benefits of an intervention.[1] The limitation of financial resources for healthcare—including rehabilitation services—makes these evaluations essential for decision makers, who try to allocate resources effectively. The scarcity in monetary resources is likely to further increase due to the medical technology process and the ageing population, which underlines the importance of economic evaluations and summarising reviews.

Full economic evaluations are recommended as basis for healthcare decisions. They compare the costs and effects of at least two treatment options.[1] Full economic evaluations can be categorised into cost-effectiveness, cost-utility and cost-benefit analyses. Some economists consider the cost-utility analyses as part of the cost-effectiveness analyses. The outcome of a cost-effectiveness is a specific clinical outcome such as survival time. In cost-utility analyses, the outcomes are usually quality-adjusted life-years, which may be considered as a specific clinical outcome. In cost-benefit analyses, the health effects of an intervention are monetary quantified. Thus, the willingness to pay is considered.

To determine the costs for full economic evaluations, two different perspectives can be chosen. The health system perspective considers only direct costs involving, for example, hospital costs and outpatient services. The society perspective respects indirect costs in addition to the direct costs involving, for example, loss in work efficiency.

Physiotherapy contributes to the financial healthcare burden. The duty of physiotherapists is to assess, plan and implement rehabilitation programmes.[2] The most important contributors to the global rehabilitation needs are musculoskeletal health conditions including fractures, low back pain and osteoarthritis.[3] Thus, physiotherapy contributes to the financial burden arising from the

treatment of musculoskeletal conditions and needs to be economically evaluated.

Some full economic evaluations of musculoskeletal physiotherapy as well as related systematic reviews have been performed.[4 5] Nevertheless, *for several musculoskeletal conditions*, there is still a *lack of full economic evaluations of physiotherapeutic interventions*. Besides, transferability from existing evaluations depends largely on a matching design and context between the study setting and the destination. The studies' quality is further of importance to decide whether the results are transferable. Finally, the quality also informs about the extent of research gaps.

A recent systematic review of economic evaluations of neurological physiotherapeutic interventions has addressed this challenge.[6] In contrast to standard systematic reviews that article only provides an overview of existing studies, based on their geographical location and underlying health condition in the neurological physiotherapeutic field. Unfortunately, the quality of the included studies was not evaluated, which would have provided valuable insights on the quality of the evidence and the research gaps. Nonetheless, the results of that review on the one hand help healthcare funders to identify relevant articles matching their destination and, on the other hand, highlight the knowledge gaps and areas with sufficient articles for systematic review studies.

A similar overview of economic evaluations of musculoskeletal physiotherapy interventions is however missing. The first step to provide such an overview of existing studies and their quality is conducting a systematic review. This includes the publication of a study protocol, which secures high transparency in the research process.[7]

Objective

The aim of this systematic review is to identify studies of economic evaluations of musculoskeletal physiotherapeutic interventions.

Thus, our population of interest compromises all patients with a musculoskeletal condition, which are eligible for a physiotherapeutic treatment. The outcomes need to be derived from a full economic evaluation study. Finally, a control group needs to be involved in the included studies.

METHODS

To design this protocol and the related systematic review, we follow the five-step approach for preparing a systematic review of economic evaluations for Clinical Practice Guidelines.[7] Furthermore, we used the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols 2015 statement to report this protocol.[8]

Eligibility criteria

We will include full economic evaluation studies of musculoskeletal physiotherapy, published in any language up to 31 January 2022.

Details on the inclusion and exclusion criteria are provided in table 1. They are in line with the PICOS acronym of our research question (P=population, I=intervention, C=control, O=outcomes, S=study type).

Information sources

We will search for relevant articles in the following databases from their inception:

- Medline (through PubMed).
- EconLit.
- NHS-EED (can only be searched up to March 2015).

Initial searches in all databases were performed on 7. October 2021. The databases EconLit and NHS-EED were chosen to secure and coincide economic study inclusion, although NHS-EED is no longer updated and therefore only includes articles up to March 2015. The reference list of all included studies as well as of relevant systematic

Table 1 Criteria for inclusion and exclusion of articles

	Inclusion criteria	Exclusion criteria
Population	Patients, with a primary musculoskeletal condition.	Patients with intellectual disabilities and studies with heterogenous participant groups, of which the majority have different primary conditions than musculoskeletal.
Intervention	Any intervention, which can be conducted by a physiotherapist alone, including among other patient education, single or group-based exercise therapy, and manual therapy, any additional treatment would need to be offered/delivered in the intervention and in the control group (eg, pain medication or surgery).	E-interventions and interventions offered a) from non-health professionals including sport instructors or by b) an interdisciplinary team, including studies in which the physiotherapeutic treatment of interest is combined with treatments mostly delivered from other disciplines.
Control	Any control group is considered, including those treated with a wait-and-see approach, with a placebo or an alternative treatment.	
Outcome	Cost-effectiveness ratios, cost-utility ratios and net benefits.	
Study type	Full economic evaluations based on clinical studies or based on modelling.	Conference abstracts and studies without results, for example, protocols, review studies.

Table 2 Overview of included search terms

Population	Intervention	Outcome
Musculoskeletal	Physiotherap*	Cost-effectiveness
chirur*	Exercise training	Cost-utility
orthop*	Exercise therapy	Cost-benefit*
Osteoarthritis	Conservative treatment	Economic analy*
Back pain	Conservative management	Cost analy*
	Conservative therap*	Economic evaluation
	Physical rehabilitation	
	Orthopaedic rehabilitation	

literature reviews identified through the search will be screened for additional eligible studies. Finally, experts in the field will be asked for further eligible studies.

Search strategy

After the initial search in PubMed, LB will draft a search strategy, which will be revaluated, discussed and adjusted in the research team by using the Peer Review of Electronic Search Strategies 2015 checklist.[9]

The search strategy combines three main terms 'economic evaluation', 'physiotherapy' and 'musculoskeletal' (table 2). For each of the main term's synonyms and relevant examples were identified and added with an OR to the respected main term in the search. To reduce search terms and maintain sensitivity of the search, truncation was used, for example, physiotherap*. 'Musculoskeletal' is considered to define the included population, 'Physiotherapy' describes the intervention and 'Economic evaluation' designates the outcome of interest. A detailed description of the search is provided in online supplemental file 1.

No limits are planned for the publication date. In the first step, there will also be no limit regarding the language; however, studies published in another language than English, German or Danish will be excluded during the full-text screening. The search will be conducted in 'all fields' of the articles, including title and abstract as well as the main body text.

To secure that the review will be up to date, prior to submission, the search will be redone and potential, new released, relevant articles will be incorporated.

Data management

The articles identified via the searches in the different databases will be merged in EndNote V.X9. Articles included for full-text assessment will be stored in EndNote as well. To extract study characteristics and findings, an Excel spreadsheet will be prepared in accordance with Broman and Woo.[10]

Selection process

At first, duplicates will be removed automatically via EndNote. The remaining duplicates will be sorted out by hand. Title and abstracts of identified articles will be screened by two independent reviewers (LB and BK). In case of disagreement, a discussion will be initiated if no consensus can be reached, and a third reviewer (AH or H-HK) will be involved. Full texts of all articles, deemed to be relevant from first title and abstract screening, will be inspected by the same two reviewers. They will decide on the final inclusion of the articles in the systematic review. Disagreement will be solved via discussion and consulting a third reviewer, if necessary (AH or H-HK). The reason for each study excluded, based on full-text reading, will be recorded and incorporated in the systematic review. The references of all the included studies as well as the identified relevant systematic reviews will be checked for additional eligible studies. Inclusion and exclusion of articles will be displayed in a flow chart.

Data collection process

Prior to the data extraction, LB will extract the data of two random studies to evaluate the user-friendliness and completion of the data extraction sheets, and potential adjustments will be executed. Afterwards, data from three studies will be pilot extracted by two reviewers (LB and BK). Discrepancies will be discussed until consensus is reached and, if necessary, the spreadsheet will be revised. If the agreement of the data extraction is high, one reviewer will extract the data from the remaining studies. In case of insufficient agreement, the pilot extraction will be repeated. The authors of the studies with missing data will be contacted via email to complete the spreadsheet. A reminder will be sent out two weeks after the initial contact. Unresolved, uncertain or missing data will be marked as such in the review.

Data items

Information on the data items extracted from the included studies may be found in table 3.

Outcomes and prioritisation

The main outcome of interest is the descriptive overview of existing economic evaluations of musculoskeletal physiotherapy interventions.

Risk of bias in and methodological quality of individual studies

The quality of the individual economic evaluations will be investigated with the Consensus on Health Economic Criteria checklist.[11] Two reviewers (LB and BK) will independently evaluate three of the included studies. Discrepancies will be discussed until consensus is reached. If their initial agreement is high, one reviewer will evaluate the remaining studies. If their agreement is insufficient, they will evaluate another three studies and repeat the procedure.

Table 3 Overview of the data items to be extracted

Item	Content of the item
Study ID	First author's last name and year of publication
Registration	If available
Location	Country or countries where the investigation was conducted
Setting/context	Inpatient versus outpatient and prevention/prehabilitation versus rehabilitation
Study design	Randomised controlled trials versus modelling
Population	Number of included participants, including their mean age and sex distribution
Pathology/condition	For example, fracture versus osteoarthritis versus rheumatology versus back pain
Type of intervention	Single versus group based Exercise therapy versus education versus manual therapy versus combination of therapies Length of intervention Units of interventions
Control intervention	Wait-and-see versus usual care versus surgical procedure
Effect measure	For example, QALY versus years of life versus walking speed versus pain versus physical functioning
Time horizon	Length of follow-up to calculate the effects and costs in month
Type of economic analysis	Cost-benefit versus cost-utility versus cost-effectiveness
Cost perspective	Health system perspective versus societal perspective
Discounting	Yes versus No/not stated
Inflation rate	Yes versus No/not stated
Reference year and currency	Year of data collection, if not stated it will be highlighted but also approximated For example, US dollar versus euros
Missing data	No missing data versus not stated versus percentage of missing data and information of imputation or not
Analyses to handle statistical and other uncertainties	Statistical uncertainties: CIs for incremental cost-effectiveness ratios and cost-effectiveness acceptability curve Other uncertainties: sensitivity analyses, Yes versus No, and if yes which
Source of funding	Profit versus non-profit versus mixed versus unclear versus no funding In case of funding extraction of funder's name
Competing interests	Yes versus No versus not stated If yes: extract specification
Authors' conclusion	A summary of the authors' conclusion In favour of intervention versus in favour of control versus uncertain

QALY, quality-adjusted life-years.

Data synthesis

The results of the included studies will be synthesised by different characteristics. We will provide an overview of the publication years, countries of origin, type of analyses (clinical trial vs modelling with a stratification for decision tree, Markov model, discrete event simulation), time of interventions (primary, secondary or tertiary prevention), overall types of interventions (primary or add-on, for example, after surgery) and the specific musculoskeletal condition. A special focus will be set on the latter one, that is, the summary of results of the included studies including a stratification for specific type of intervention will be provided by musculoskeletal condition.

Metabias(es)

We will investigate if available associated protocols deviate from the results of the included studies to address reporting bias. Furthermore, we will search for study protocols and trial registrations at the ISRCTN registry matching our study aim to account for a publication bias. An overview of these protocols and trial registrations will be added to the systematic review.

Confidence in cumulative evidence and transferability

Since we do not combine the results to formulate conclusions or suggestions, it is not applicable for this type of review to provide a confidence measure on the transferability.

Study dates

The systematic review is currently ongoing. Preliminary searches and conception started on 1 September 2021. The anticipated date for review completion is 1 June 2022.

Patient and public involvement

Patient and the public were not involved in designing, conducting, reporting or disseminating this study.

Ethics and dissemination

Ethics approval is not required since no human participants or their identifiable information was contained in this study. To follow good research practice for systematic reviews, we submitted a PROSPERO protocol on 7 October 2021 (CRD42021276050). The findings of the reviewers are anticipated to be presented at international conferences, published in a peer-reviewed journal and disseminated via social media.

Amendments

Amendments from this protocol will be documented in the related PROSPERO protocol (CRD42021276050).

DISCUSSION

The aim of our upcoming systematic review is to provide an overview of existing economic evaluation studies of musculoskeletal physiotherapy and to evaluate their quality. This paper presents the protocol of this systematic review.

The protocol aids in preventing waste of research resources. It informs the research community about this ongoing work and may prevent it, that additional resources are spent on this topic only duplicating the results. Furthermore, publishing a systematic review protocol supports research transparency and is in line with the recommendations from van Mastrigt *et al* on the preparation of a systematic review of economic evaluations.[7]

This systematic review will provide an overview of existing full economic evaluations of musculoskeletal physiotherapy interventions. This overview will be helpful to healthcare funders searching for economic evaluations of musculoskeletal physiotherapy matching their specific context of interest.

Moreover, researchers will benefit from the results of this review as knowledge gaps as well as areas with sufficient literature for a meta-analysis will be highlighted, which may inspire and guide future research. Our review might, for example, identify that most economic evaluations are performed in Europe, whereas there might be a lack of studies from the African countries. Another example could be that several cost-effectiveness studies on physiotherapeutic interventions for knee osteoarthritis may already exist but there is still a lack of cost-utility analyses. A final example of a result of our review could be that despite the existence of cost-effectiveness studies for the physiotherapeutic treatment after a lower limb fracture, there would be still a need for further investigations due to the poor quality in sampling of the existing studies.

A strength of the review is the inclusion of only full economic evaluations since it secures relevance of the included studies for healthcare funders.

Nonetheless, systematic reviews have their limitations, especially raising from the quality of the methods used. It needs to be distinguished between limitations within the systematic review and within the included studies.

Publication bias is one of the within-review concerns. Studies which have been performed but were not published, for example, due to negative results may lead to a waste of additional research resources. To address this issue, we will add information to our review on relevant ongoing studies and published protocols, which we find during our search process.

The quality of included studies in meta-analyses is of importance since poor quality of the original studies also weakens the reliability of the review. Therefore, we aim for providing an overview of the existing economic evaluations of musculoskeletal physiotherapy and to evaluate their quality. This can assist in identifying areas with limited quality of the evidence.

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REFERENCES

1 Roeder N. *Gesundheitsökonomie Gesundheitssystem und öffentliche Gesundheitspflege*. Deutscher Ärzteverlag, 2009.
2 Office IL. International standard classification of occupations 2008 (ISCO-08): structure. *group definitions and correspondence tables: International Labour Office* 2012.
3 Cieza A, Causey K, Kamenov K, *et al*. Global estimates of the need for rehabilitation based on the global burden of disease study 2019: a systematic analysis for the global burden of disease study 2019. *Lancet* 2021;396:2006–17.
4 Mazzei DR, Ademola A, Abbott JH, *et al*. Systematic review of economic evaluations investigating education, exercise, and dietary weight management to manage hip and knee osteoarthritis: protocol. *Syst Rev* 2020;9:1–7.
5 Miyamoto GC, Lin C-WC, Cabral CMN, *et al*. Cost-Effectiveness of exercise therapy in the treatment of non-specific neck pain and low back pain: a systematic review with meta-analysis. *Br J Sports Med* 2019;53:172–81.
6 García-Álvarez D, Sempere-Rubio N, Faubel R. Economic evaluation in neurological physiotherapy: a systematic review. *Brain Sci* 2021;11:265.
7 van Mastrigt GAPG, Hiligsmann M, Arts JJC, *et al*. How to prepare a systematic review of economic evaluations for informing evidence-based healthcare decisions: a five-step approach (part 1/3). *Expert Rev Pharmacoecon Outcomes Res* 2016;16:689–704.
8 Moher D, Shamseer L, Clarke M, *et al*. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev* 2015;4:1–9.
9 McGowan J, Sampson M, Salzwedel DM, *et al*. PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement. *J Clin Epidemiol* 2016;75:40–6.
10 Broman KW, Woo KH. Data organization in Spreadsheets. *Am Stat* 2018;72:2–10.
11 Evers S, Goossens M, de Vet H, *et al*. Criteria list for assessment of methodological quality of economic evaluations: consensus on health economic criteria. *Int J Technol Assess Health Care* 2005;21:240–5.