The effect of telehealth on pain management: Protocol for a systematic review and meta-analysis

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Method Article

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Abstract

This protocol outlines a systematic review and meta-analysis aimed at evaluating the impact of telehealth on pain management. The inception of telehealth as a revolutionary method in healthcare delivery, particularly in pain management, has become increasingly prominent, especially during the COVID-19 pandemic. The review will follow the PRISMA-P guidelines, incorporating randomized controlled trials (RCTs) that compare telehealth interventions with non-telehealth controls for pain management in diverse populations, settings, and clinical conditions. Only English-language studies, published from 2018 onwards, will be included. Eligibility criteria are based on the PICOS framework, focusing on two-arm RCTs. The search will encompass major databases like PubMed and the Cochrane Library, with subsequent screening and data extraction conducted by independent reviewers. Risk of bias will be assessed using the ROB 2 tool. A random-effects meta-analysis will synthesize evidence, adjusting for heterogeneity and potential biases. The GRADE tool will evaluate the quality of evidence. This study aims to comprehensively assess telehealth's effectiveness in pain management, addressing knowledge gaps and guiding future research, policy development, and clinical practice. Its findings are expected to inform healthcare professionals and policymakers, aiding in the integration of telehealth into pain management strategies and adapting to the changing landscape of healthcare delivery in a digital age.

Introduction

Over the last several years, telehealth has emerged as a significant breakthrough in the field of healthcare delivery, leading to a major transformation of the medical services environment. The worldwide health issues presented by the COVID-19 epidemic have further emphasized its relevance [1]. Telehealth offers a practical alternative, particularly in the field of pain administration [2], as healthcare systems globally struggle to provide efficient, accessible, and cost-effective care [3].

Chronic pain, a complex and widespread issue, affects a significant portion of the population, leading to substantial personal, social, and economic challenges [4]. Traditional approaches to pain management often require multiple in-person visits, creating barriers for patients with physical mobility issues, geographic constraints, or financial restrictions [5]. Telehealth offers an innovative solution to these challenges by enabling remote consultation, assessment, and pain management through the use of technological advancements like video conferencing, mobile health apps, and digital monitoring tools [6].

The use of telehealth in pain management is hypothesized to enhance healthcare accessibility, improve patient outcomes, reduce healthcare costs, and increase patient satisfaction. However, the empirical evidence supporting these claims varies widely in different populations and often lacks conclusive findings [7,8]. This systematic review and meta-analysis aims to offer a thorough evaluation of the existing research on the effectiveness of telehealth interventions in pain management in all patients with any clinical conditions. This review seeks to provide a comprehensive understanding of telehealth's role in pain management by synthesizing existing information. It aims to identify current knowledge gaps and suggest directions for future research, policy development, and clinical practice. The outcomes of this
analysis are anticipated to equip healthcare professionals, policymakers, and patients with insights into
the potential benefits and limitations of telehealth in pain management. Ultimately, this will assist in
enhancing healthcare delivery in an increasingly digital world.

Reagents

Equipment

Procedure

The PRISMA-P (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols)
statement offers an optimal framework for outlining items in protocols for systematic reviews and meta-
analyses. This statement guided the development of the protocol used in this investigation [9].

Eligibility criteria

This review will exclusively encompass two-arm randomized controlled trials written in English that
compare the efficacy of telehealth interventions with a non-telehealth control group. The specific
inclusion criteria, based on the PICOS framework, are as follows:

Population: This includes all groups suffering from clinical conditions who have used telehealth
technologies for pain management, both in clinical settings and remotely at home, encompassing all
races, genders, and age groups.

Intervention: Telehealth technologies employed in managing pain for all patients, either remotely or in
clinical settings.

Comparator: Various non-telehealth technologies used as comparators to assess the effectiveness of
telehealth technologies in two-arm randomized controlled trials.

Outcome: The management of pain, a continuous outcome, with telehealth technologies being utilized to
address this issue in populations.

Setting: Both clinical environments and remote home settings are eligible for inclusion in this study.

Study Design: Two-arm randomized controlled trials that implement telehealth technologies in one arm
and non-telehealth technologies in the other arm.

Exclusion criteria

Studies not in English, those that are not randomized controlled trials (RCTs) such as reviews, RCTs with
more than two arms, protocols, observational studies, studies where telemedicine is not used as an
intervention in one arm, studies where the primary outcome is not pain or where pain is not reported as a continuous outcome, will be deemed inappropriate for this review and thus excluded.

**Search strategies**

Two major electronic health libraries, PubMed and the Cochrane Library, will be searched using the following search syntax:

PubMed: "Telemedicine"[Title/Abstract] AND ("Pain"[MeSH Terms] OR "pain"[Title/Abstract])

Cochrane Library: telehealth in Record Title AND pain in Title Abstract Keyword - (Word variations have been searched).

In both electronic databases, searches will be limited to studies published from 2018 onward. In PubMed, to specifically identify randomized controlled trials (RCTs), the article type will be restricted to 'randomized controlled trial'.

**Studies selection**

Once the searches are completed in the two electronic databases, all retrieved studies will be compiled into an Excel file. Subsequently, duplicates will be identified and removed using their associated DOI numbers. After the removal of duplicates, the screening process will be conducted in two distinct phases. In the first stage, the titles and abstracts of the collected studies will be reviewed. Any studies that fail to meet the established inclusion criteria will be excluded at this point. Following this initial screening, those studies that pass will undergo a detailed full-text review to ascertain their compliance with the predefined inclusion criteria. The inclusion criteria, derived from the previously outlined PICOS framework, will act as the foundational guidelines for determining the eligibility of studies for this review. Each study will be carefully assessed against these criteria to ensure a comprehensive and relevant collection of research. Furthermore, to enhance the breadth and depth of this review, the reference lists of the studies deemed eligible will be thoroughly examined. This additional step is aimed at uncovering any potentially overlooked studies that align with our eligibility criteria [10], thereby ensuring a more exhaustive exploration and inclusion of pertinent research in the field of telehealth and pain management. Throughout both stages of the screening process, which includes reviewing titles and abstracts as well as full-text analysis, two reviewers, HM-N and AS, will independently assess the studies. In cases where HM-N and AS cannot reach a consensus, a third reviewer, HS, will be brought in to make the final decision. To visually depict the search and selection process, a PRISMA flow diagram will be utilized. Additionally, we will provide a list of studies excluded during the full-text screening phase, accompanied by the specific reasons for their exclusion.

**Data extraction**

HM-N and AS, as independent reviewers, will undertake the task of data extraction for the final studies deemed eligible for inclusion. The data points to be extracted from these studies include the year of
publication, the first author's name, the country of origin, population characteristics such as clinical attributes, gender, and age, details of the intervention and follow-up durations, the type of comparator used, the effect size of the outcome (pain) along with its 95% confidence intervals or standard error, the total participant count, and the number of participants in each study arm. Where the effect size is not directly reported in the study, the Standardized Mean Difference (SMD) will be calculated based on available data. This step ensures the comparability of results across different studies. To effectively present the characteristics of the included studies, a tabular format will be utilized, offering a clear and organized overview of the key aspects of each study.

**Risk of bias assessment**

The ROB 2 tool [11] will be employed by the two reviewers to assess the risk of bias in the final studies that have been included in the review. This tool is designed to evaluate the potential for bias systematically in randomized controlled trials, providing a comprehensive analysis of various aspects that might influence the integrity and validity of the study results.

**Evidence synthesis**

The included studies will be categorized based on the type of outcome reported. Each study reporting a similar type of effect size will be grouped together. If feasible, all reported effect sizes of pain will be converted to the Standardized Mean Difference (SMD) when the original studies do not already present this standardized measure. This conversion aims to harmonize the effect size measures across different studies for comparative analysis. A random-effects meta-analysis will be conducted using the DerSimonian and Laird method, utilizing the R programming software. This approach accounts for variation both within and between studies, providing a more generalized result applicable to a broader context. In cases where the studies report different effect sizes, efforts will be made to calculate comparable effect sizes wherever possible. Studies with effect sizes that are incompatible or cannot be reliably estimated will be excluded from the meta-analysis. The I-squared statistic will be used to assess heterogeneity in meta-analysis. If the I-squared value exceeds 50%, indicating significant heterogeneity, a basic meta-regression analysis using age groups will be performed to determine whether age contributes to this heterogeneity. Additionally, meta-analysis will involve a subgroup analysis based on the levels of risk of bias, aimed at exploring any marked differences between the overall pooled effect size and the subgroups. To detect publication bias in the meta-analysis, the Trim and Fill technique [12] and the Egger and Begg tests [13] will be employed.

**Quality of evidence**

To assess the strength of the evidence supporting the outcome, the GRADE (Grading of Recommendations Assessment, Development, and Evaluation) tool will be utilized [14,15]. This tool evaluates the quality of evidence in the meta-analysis by considering five key factors: risk of bias, publication bias, inconsistency, imprecision, and indirectness. The overall confidence level in the outcome
will be determined based on the number of downgrades across these factors and will be categorized as High, Moderate, Low, or Very Low [16].

**Troubleshooting**

**Time Taken**

**Anticipated Results**

This protocol was established and set in place prior to initiating the data collection process. The activities for searching, screening, and extracting data will commence in April 2024, and will be conducted following the guidelines and criteria outlined in this protocol.

**Discussion**

This study will present a review and meta-analysis examining the effects of telehealth on pain treatment. Central to this research is addressing the need for alternative pain treatment approaches, particularly in response to the significant healthcare service transformations during the COVID-19 pandemic. Specifically, this study focuses on telehealth, a rapidly evolving sector in healthcare adapting to the growing use of digital technologies. The importance of this work is accentuated by the rising prevalence of chronic pain and the practical challenges faced in traditional pain treatment methods.

**Conclusions**

This systematic review and meta-analysis is poised to make a contribution to the understanding of telehealth's role in pain management. It stands to offer insights into the effectiveness of telehealth interventions, potentially guiding future healthcare policies and clinical practices. The anticipated outcomes of this research could empower healthcare professionals and policymakers with evidence-based information, facilitating informed decisions about integrating telehealth into pain management strategies. Moreover, this study could illuminate pathways for future research, especially in addressing the identified gaps and exploring the critical aspects of telehealth applications in diverse healthcare settings. In conclusion, this research holds the potential to impact the field of pain management, aligning with the evolving dynamics of healthcare in a digital age.

**References**


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