Work-from-home-related musculoskeletal pain during the COVID-19 pandemic: A rapid review protocol

Ivan Neil Gomez [a,b,*], Consuelo Gonzalez-Suarez [c,d], Ken Erbvin Sosa [e], Maria Lourdes Tapang [d]

[a] Department of Occupational Therapy, College of Rehabilitation Sciences, University of Santo Tomas, Manila, Philippines
[b] Center for Health Research and Movement Sciences, University of Santo Tomas, Manila, Philippines
[c] Research Center for Health Sciences, University of Santo Tomas, Manila, Philippines
[d] Department of Rehabilitation Medicine, Faculty of Medicine, University of Santo Tomas, Manila, Philippines
[e] Department of Physical Therapy, College of Rehabilitation Sciences, University of Santo Tomas, Manila, Philippines

ARTICLE INFO

ABSTRACT

Background: The recent COVID-19 pandemic has forced various workforce industries to work from home. The work-from-home set-up has exposed some workers to some office-related work, typically not included in their jobs, consequently exposing them to an increased risk for developing musculoskeletal pain.
Methods: We will search PubMed, MEDLINE, and CINAHL for observational studies published between May 2020–June 2021. This review will include published peer-reviewed studies in the English language. We will include studies that recruited adults aged 20–65 from any work industry reporting on outcomes related to musculoskeletal functions (i.e., pain, disorder, condition, etc.). Two independent reviewers will screen the search results. Two independent reviewers will accomplish risk of bias assessment using the JBI-MAStARI critical appraisal tools. Likewise, data extraction will be performed by one reviewer and verified by a second reviewer. Pooled prevalence estimates will be generated using Revman V.5.2.1, where Forest plots will be generated to determine overall estimates of random-effects and confidence intervals. To quantify heterogeneity, we will index the I^2 and X^2 p-value. A narrative synthesis summarised into tables and themes will likewise be used to summarize the extracted data.
Discussion: A rapid review methodology was chosen to rapidly synthesize the available literature on the prevalence of musculoskeletal pain associated with work-from-home conditions during the COVID-19 pandemic, which is essential in informing health programs and policies that address both the public and private industry sectors.
Systematic review registration: This is registered in the PROSPERO Registry (CRD42021266097).

Introduction

Musculoskeletal conditions refer to various health-related issues with underlying pathophysiology concerning musculoskeletal functions [1]. Example of common musculoskeletal conditions includes pain in the neck, back, leg, and different joint regions. Musculoskeletal conditions have been recognized as the most common cause of chronic pain and physical disability among hundreds of millions of individuals across age groups worldwide [2]. The causes of musculoskeletal conditions fall in a varied spectrum of pathophysiology, including inflammatory diseases, age-related functional decline, and, more commonly, occupational or activity-related reasons. Left alone without intervention, musculoskeletal conditions may progress to a disorder that compromises individuals'

health, well-being, and function.

Work-related musculoskeletal disorders are a subtype of musculoskeletal disorders related to occupational exposure of risk. Approximately 1.71 billion people have some form of musculoskeletal condition [3]. An earlier systematic review suggests that occupations exposed to computer-related office work may be at a higher risk for musculoskeletal disorders of the neck and upper extremity due to repetitive movements, static and awkward posture, and manual tasks [4]. With the increasing use of handheld devices, the prevalence of associated musculoskeletal complaints may be as high as 67.80% [5]. Work-related musculoskeletal disorders present a pressing issue. In the United Kingdom, around 9.25 million days were lost [6], while Germany reports almost 29 million Euros lost due to work-related musculoskeletal disorders [7]. This brings

* Corresponding author. Center for Health Research and Movement Science, University of Santo Tomas, Manila, Philippines.
E-mail address: ibgomez@ust.edu.ph (I.N. Gomez).

a global disability-adjusted life years of over 30,000 due to musculo-skeletal disease [8]. Thus, the effects of work-related musculoskeletal disorders are not exclusive to physical well-being but may influence their work performance and economic status.

The COVID-19 pandemic has placed the global community in a state of lockdown and quarantine in place to control the spread of the virus. One of the most common public health strategies is enforcing a "work-from-home" set-up [9]. The shift to a work-from-home status places some professions that are typically not desk-based confined in a make-shift office [10]. For example, teachers who are typically class-room or laboratory-based have been forced to deliver their lectures and activities seated in front of a computer for hours on end. Thus, current work demands and resource limitations have likewise shifted, and affected workers are exposed to additional physical, and occupational stress. Recent findings suggest that individuals who work from home have higher reported musculoskeletal pain [11]. Additionally, there is initial evidence that as many as 86.30% of individuals who have worked from home developed musculoskeletal disorders [12]. The available literature on the effects of the COVID-19 pandemic work-from-home set-up on musculoskeletal functions has been fragmented or, at best, yet to be reviewed. With the known health and socio-economic effects of work-related musculoskeletal disorders, there is a need to rapidly review the existing relevant literature to inform decision-making towards im-mediate programs and policies that address the health and well-being of individuals who are continuously working from home. The intersection between individuals and their working environment is an essential area of research that needs evidence to support the development of respon-sive medical interventions. The purpose of this rapid review is to explore musculoskeletal pain symptoms associated with work-from-home con-ditions during the COVID-19 pandemic.

Methods

Rapid review question

What is the prevalence of musculoskeletal pain symptoms associated with work-from-home conditions during the COVID-19 pandemic?

Protocol and registration

A rapid review was chosen due to the urgent need to support decision-making on preventing and addressing the possible effects on the musculoskeletal functions due to the work-from-home set-up during the COVID-19 pandemic. The methods in this rapid review were informed by the World Health Organization's practical guide on rapid reviews [13], and we used the Selecting Approaches for Rapid Reviews (STARR) Decision Tool [14] to address possible methodological limita-tions. The reporting of this protocol is adapted from the Preferred Reporting Items for Systematic Reviews and Meta-analysis Protocols (PRISMA-P) [15]. This protocol is registered in the PROSPERO Registry (CRD42021266097), and any amendments will be documented therein.

Eligibility criteria

Studies. This review will consider peer-reviewed published obser-vational studies, including epidemiological studies, prospective and retrospective cohort studies, case-control studies, cross-sectional studies, case series, case studies, or reports for inclusion, published be-tween May 2020–June 2021. Due to the expedited nature of this rapid review, certain constraint limitations are enforced to exclude studies limited to abstract reports only (i.e., conference proceedings, conference posters), studies with incomplete data or outcome reported, articles reported in a language other than English or those without an English translation, and studies in pre-print status. For this rapid review of prevalence, we describe herein the condition, context, and population criteria to be considered.

Condition. We will review studies that report on the incidence of patient-reported musculoskeletal pain related to work-related disorders. These can be pain symptoms of the muscles, nerves, tendons, joints, or cartilage, including type and intensity of pain, location of pain, associ-ated pain burden, or a formal diagnosis of musculoskeletal disorder.

Context. The musculoskeletal pain must be work-related and was experienced or reported by the patients during the period of work-from-home set-up as a result of quarantine measures during the COVID-19 pandemic. The covered period should be between May 2020–June 2021.

Population. The studies must include adult workers ages 20–65 in different industries who, because of the COVID-19 pandemic, were forced to work from home. We will consider studies that recruited and reported data on any gender, occupation, race/ethnicity, or socio-economic.

Information sources

Following the recommendations of the STARR Decision tool, the initial search strategy was developed by members of the review team who have been trained in the Cochrane and JBI evidence-based practice models. The following databases will be searched: PubMed, MEDLINE, and CINAHL. This review will not include grey literature searching.

Search strategy

Table 1 summarizes the keywords and alternative terms that will be strung together. A sample of how the search strategy is used in sys-tematic searching of the PubMed database is presented in Table 2.

Data management and selection process

A three-step search and selection strategy will be utilized in this re-view, using Mendeley reference management software. The included databases will be searched, followed by an analysis of the text words contained in the title and abstract and the index terms used to describe the article. A second search using all identified keywords and index terms will then be undertaken across all included databases. Thirdly, the reference list of all identified articles will be searched for additional studies. Two independent review authors will accomplish the search and screening process following an initial workshop on the relevant search methods. In case of unresolved issues after a consensus meeting, a third review author will be recruited to finalize the decision. The summary of the study selection and screening process will be presented in a PRISMA flow diagram.

Risk of bias assessment

Articles selected for retrieval will be assessed by two independent reviewers for methodological validity before inclusion in the review using study design-specific standardized critical appraisal instruments from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) [16]. Any disagreements that arise between the reviewers will be resolved through discussion for a consensus or with a third review author.

Table 1
Search strategy.

Keyword	Other terms
COVID-19	COVID-19 pandemic *OR* pandemic *OR* COVID
work from home	work-from-home *OR* home-based *OR* home
Musculoskeletal	musculoskeletal function* *OR* musculoskeletal pain *OR* musculoskeletal condition *OR* musculoskeletal disorders *OR* musculoskeletal*

Table 2
Sample search results from PubMed.

Search number	Keywords and Combination	Results	Date	Time
1	(((((COVID-19)) OR (COVID-19 pandemic)) OR (pandemic)) OR (COVID)	174,259	19-Jun-21	3:39:00
2	(((work from home) OR (work-from-home)) OR (home-based)) OR (home)	277,165	18-Jun-21	3:39:49
3	(((((musculoskeletal) OR (musculoskeletal function*)) OR (musculoskeletal pain)) OR (musculoskeletal condition)) OR (musculoskeletal disorders)) OR (musculoskeletal*)	1,179,598	17-Jun-21	3:40:53
4	((((((COVID-19)) OR (COVID-19 pandemic)) OR (pandemic)) OR (COVID)) AND ((((work from home) OR (work-from-home)) OR (home-based)) OR (home))) AND ((((((musculoskeletal) OR (musculoskeletal function*)) OR (musculoskeletal pain)) OR (musculoskeletal condition)) OR (musculoskeletal disorders)) OR (musculoskeletal*))	50	16-Jun-21	3:43:42

Data extraction

Quantitative data will be extracted from papers included in the review using a study design-specific standardized data extraction tool from JBI-MAStARI, purposely built into an MS Excel spreadsheet. Two independent review authors will perform data extraction. The data extraction form will be pilot-tested on $n = 5$ articles for data validation and reviewer validity. The data extracted will include specific details about the context, population, study methods, and outcomes of significance to the review-specific objectives (e.g., prevalence rate and 95% confidence intervals, prevalence rate and 95% confidence intervals, type of pain, pain site, musculoskeletal condition). When available, we will likewise extract information on patient and environmental factors associated with musculoskeletal pain (i.e., odds ratio, correlational statistics, regression statistics).

Data synthesis and analysis

When there is a homogeneity of data in the included studies, a meta-analysis will be performed using Revman V.5.2.1. Heterogeneity within included studies will be assessed using I^2 statistics and X^2 p-value. A random-effects model will be employed to pool the prevalence estimates and their confidence intervals in a Forest plot. In case of heterogeneity of data, a subgroup analysis considering arising covariate variables will be accounted for. Sensitivity analysis will be performed for high methodological quality studies. In the case of an apparent heterogenous evidence database, a narrative synthesis will be performed to present the reviewed evidence in the form of tables and figures. However, we will still summarize quantitative data using basic descriptive statistics whenever possible. Qualitative data synthesis will follow the Synthesis Without Meta-analysis (SWiM) guidance [17]. To determine the certainty in the synthesized body evidence, we will use the GRADE (Grading of Recommendations, Assessment, Development and Evaluations) approach [18], and report any limitations and their effect on the outcomes.

Discussion

This rapid review will explore the prevalence of musculoskeletal pain associated with work-from-home conditions during the COVID-19 pandemic, as well as salient conditions such symptoms are related to.

The results of this review will highlight the implications of how the external working environment can impact the internal physiological environmental systems that support musculoskeletal functions. This review has implications on preventive, personalized, and participatory approaches to increasing occupational performance given contextual restrictions. We chose a rapid review methodology to rapidly synthesize the available evidence base to support informed decision-making and innovative intervention planning to design appropriate health and well-being policies and programs among affected workers. This review is intended to be conducted between July–September 2021. The results of this rapid review will be written in a review manuscript for journal submission, presentation in a relevant forum, and informing a policy brief.

Individual Author's contributions

All authors contributed to the conceptualization and writing of this rapid review protocol.

Funding sources

Ethical approval

This rapid review protocol does not require any ethical approval due to the nature of the secondary data research design involved.

Data availability

Any associated data not included will be made available upon request.

Declaration of competing interest

The authors of this paper declare no conflicting interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijosm.2022.04.005.

References

[1] Woolf AD, Vos T, March L. How to measure the impact of musculoskeletal conditions. Best Pract Res Clin Rheumatol 2010;24(6):723–32. https://doi.org/10.1016/j.berh.2010.11.002.

[2] Hoy DG, Smith E, Cross M, Sanchez-Riera L, Buchbinder R, Blyth FM, Brooks P, Woolf AD, Osborne RH, Fransen M, Driscoll T. The global burden of musculoskeletal conditions for 2010: an overview of methods. Ann Rheum Dis 2014;73(6):982–9. https://doi.org/10.1136/annrheumdis-2013-204344.

[3] Cieza A, Causey K, Kamenov K, Hanson SW, Chatterji S, Vos T. 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 2020;396 (10267):2006–17. https://doi.org/10.1016/S0140-6736(20)32340-0. Dec 19.

[4] Wærsted M, Hanvold TN, Veiersted KB. Computer work and musculoskeletal disorders of the neck and upper extremity: a systematic review. BMC Muscoskel Disord 2010;11(1):1–5. https://doi.org/10.1186/1471-2474-11-79.

[5] Xie Y, Szeto G, Dai J. Prevalence and risk factors associated with musculoskeletal complaints among users of mobile handheld devices: a systematic review. Appl Ergon 2017;59:132–42. https://doi.org/10.1016/j.apergo.2016.08.020. Mar 1.

[6] Health and Safety Executive United Kingdom. Work related musculoskeletal disorder statistics (WRMSDs) in Great Britain. 2020. 2020. Available from: https://www.hse.gov.uk/statistics/causdis/msd.pdf.

[7] European Agency for Safety and Health at Work. Work-related musculoskeletal disorders: prevalence, costs and demographics in the EU. 2019. Available from: https://osha.europa.eu/en/publications/msds-facts-and-figures-overview-prevalence-costs-and-demographics-msds-europe.

[8] World Health Organization. Global health risks global health risks WHO. Mortality and burden of disease attributable to selected major risks. Geneva: WHO; 2009.

[9] Burdorf A, Porru F, Rugulies R. The COVID-19 (Coronavirus) pandemic: consequences for occupational health. Scand J Work Environ Health 2020;46(3): 229–30. https://doi.org/10.5271/sjweh.3893.

[10] International Labour Organization. An employers' guide on working from home in response to the outbreak of COVID-19. 2020. Available from: https://www.ilo.org/wcmsp5/groups/public/—ed_dialogue/—act_emp/documents/publication/wcms_745024.pdf.

[11] Toprak Celenay S, Karaaslan Y, Mete O, Ozer Kaya D. Coronaphobia, musculoskeletal pain, and sleep quality in stay-at home and continued-working persons during the 3-month Covid-19 pandemic lockdown in Turkey. Chronobiol Int 2020;37(12):1–8. https://doi.org/10.1080/07420528.2020.1815759.

[12] Condrowati C, Bachtiar F, Maharani FT, Utari D. Musculoskeletal disorder of workers during work from home on covid-19 pandemic: a descriptive study. In: International conference of health development. Covid-19 and the role of healthcare workers in the industrial era (ICHD 2020). Atlantis Press; 2020. p. 153–60. https://doi.org/10.2991/ahsr.k.201125.025.

[13] Tricco AC, Langlois E, Straus SE, World Health Organization. Rapid reviews to strengthen health policy and systems: a practical guide. World Health Organization; 2017. Available from: https://apps.who.int/iris/bitstream/handle/10665/258698/9789241512763-eng.pdf.

[14] Pandor A, Kaltenthaler E, Cooper K, Martyn-St James M, Wong R. SelecTing approaches for rapid reviews (STARR) decision tool. The University of Sheffield; 2019. Available from: https://figshare.shef.ac.uk/articles/journal_contribution/SelecTing_Approaches_for_Rapid_Reviews_STARR_Decision_Tool/7970894/1.

[15] Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev 2015;4(1):1–9. https://doi.org/10.1186/2046-4053-4-1.

[16] Aromataris E, Munn Z. Chapter 1: JBI systematic reviews. In: Aromataris E, Munn Z, editors. JBI manual for evidence synthesis. JBI; 2020. https://doi.org/10.46658/JBIMES-20-02. Available from: https://synthesismanual.jbi.global.

[17] Campbell M, McKenzie JE, Sowden A, Katikireddi SV, Brennan SE, Ellis S, Hartmann-Boyce J, Ryan R, Shepperd S, Thomas J, Welch V. Synthesis without meta-analysis (SWiM) in systematic reviews: reporting guideline. BMJ 2020;368. https://doi.org/10.1136/bmj.l6890.

[18] Hultcrantz M, Rind D, Akl EA, Treweek S, Mustafa RA, Iorio A, Alper BS, Meerpohl JJ, Murad MH, Ansari MT, Katikireddi SV. The GRADE Working Group clarifies the construct of certainty of evidence. J Clin Epidemiol 2017;87:4–13. https://doi.org/10.1016/j.jclinepi.2017.05.006.