Equity in Cochrane MSK reviews

Full title: How is health equity assessed in Cochrane Musculoskeletal Reviews?

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Key Indexing Terms: Health Equity; Systematic Reviews as Topic*; Musculoskeletal Diseases / prevention & control; Arthritis, Rheumatoid / therapy*; Peer Review, Research / methods*; Evidence-Based Medicine / standards*

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Statement of ethics and consent: No ethics approval or consent was needed for the conduct of this project.

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Abstract:
Objective
To evaluate the extent to which Cochrane Musculoskeletal systematic reviews assess and analyze health equity considerations.

Methods
We included Cochrane Musculoskeletal systematic reviews that included trials with participants older than 50 years published from 2015-2020. We assessed the extent to which reviews considered health equity in the description of the population in the PICO (population, intervention, comparator, and outcome) question, data analysis (planned and conducted), description of participant characteristics, summary of findings and applicability of results using the PROGRESS-Plus framework: Place of residence (rural or urban), Race/ethnicity/culture, Occupation, Gender/sex, Religion, Education, Socioeconomic status, and Social capital–Plus: age, disability, relationship features, time-dependent relationships, comorbidities and health literacy.

Results
Fifty-two systematic reviews met our inclusion criteria. One or more elements of PROGRESS-Plus were considered in 90% (47 reviews) in the description of participants, and 85% (44 reviews) of reviews in question formulation. For participant description, the most reported factors were age (47 reviews, 90%) and sex (45 reviews, 87%). Eight (15%) reviews planned to analyze outcomes by sex, age and comorbidities. Only one had sufficient data to carry this out. Nineteen reviews (37%) discussed the applicability of the results to one or more PROGRESS-Plus factor, most frequently across sex (12 reviews, 23%) and age (9 reviews, 17%).

Conclusion
Sex and age are the most reported PROGRESS-Plus factors in any sections of Cochrane Musculoskeletal reviews. We suggest a template for reporting participant characteristics that authors of reviews believe may influence outcomes. This could help patients and practitioners make judgements about applicability.

Background

Equity is widely recognized as the principle goal of all aspects of global health with inclusion and diversity being vital elements in producing impactful research that can resolve social injustices [1]. In turn, global funding agencies such as Canadian Institutes of Health Research (CIHR) are encouraging researchers to conduct more equitable, diverse, and inclusive research [2] to expand the applicability of research findings, mitigate biases and promote fairness in health.

According to the World Health Organization (WHO), around one third of the world's population has some form of musculoskeletal (MSK) disorder [3]. These conditions may substantially diminish quality of life, reduce functional capacity, and increase demands on the healthcare system [4-6]. Their prevalence increases with age, having a significant impact in healthy aging trajectories [7-9]. Inequities in MSK burden, treatment and management that are considered avoidable have been reported in the literature [10,11]. For example, the prevalence of osteoarthritis in African Americans is higher compared to Caucasians and Mexican Americans and is more prominent in women [12-14]. People living in rural areas of the United States (US) and Russia also have a higher prevalence compared to those in urban populations [15]. Residents of the United Kingdom (UK) with low income have a greater likelihood of potentially needing arthroplasty [16]. Despite greater need, joint replacement is less likely among African Americans, Hispanics and Asians [12], and total joint arthroplasty is underutilized in people with low income [16]. Therefore, enhancing access and improving management of MSK disorders in underserved populations should be a priority.

The PROGRESS-Plus framework is a tool used to consider health equity in intervention studies and systematic reviews and is endorsed by both the Outcome Measures in Rheumatology (OMERACT) initiative and the Campbell and Cochrane Equity Methods Group [17,18]. The acronym stands for Place of residence, Race or culture or ethnicity, Occupation, Gender or sex, Religion, Education, Socioeconomic status, Social capital, Plus: personal characteristics (i.e., age, disabilities), relationship features (i.e., exclusion from school, parent drug use), and time-dependent relationships (i.e., leaving the hospital, released from prison or other times when an individual might be temporarily disadvantaged) [19]. A survey of meeting attendees and members of both organizations noted that other characteristics such as health literacy, access to social care and age may be of importance, which can be captured in the Plus component [18].

In 2008, Tugwell and colleagues assessed health equity considerations in systematic reviews of Cochrane Musculoskeletal and identified that limited information is reported to inform policy decisions [20]. None of the included reviews specified PROGRESS elements in the inclusion criteria, but sex and place of residence distribution of the population were described in seven (50%) reviews. Furthermore, none of the reviews reported analyses of differential effects across any PROGRESS factors. However, 11 of the primary studies analyzed the results by education level, showing that review authors might not report outcomes stratified by dimensions of inequities.

The limited heterogeneity of available evidence in terms of geographical factors and aspects of study design (i.e. inclusion and exclusion) make the generalizability of results uncertain [21,22]. Accordingly, Cochrane Musculoskeletal updated their method guidelines for systematic reviews and meta-analyses in 2014 [23], advising review authors to "include explicit descriptions of the effect of the interventions not only on the whole population but to describe

their effect upon the vulnerable and disadvantaged and/or their ability to reduce socioeconomic inequalities in health and to promote their use to the wider community", thus, helping to build evidence that can be used to bridge health inequity gaps. At the very least Cochrane reviews should provide a description of trial participants using the PROGRESS-Plus framework in a table as exemplified in a 2014 Cochrane Musculoskeletal review on self-management education programs for osteoarthritis [24]. More recently, the Campbell and Cochrane Equity Methods Group published guidance on integrating equity in evidence synthesis, including a chapter and interactive learning module as part of the Cochrane Handbook in 2019 [17,25-27].

Given that Cochrane Musculoskeletal, which now also includes Cochrane Back and Neck, is one of the largest registered Cochrane review groups, we sought to evaluate the extent to which PROGRESS-Plus was considered in systematic reviews published by the Cochrane Musculoskeletal since these updates in guidance.

Methods

Selection of studies

Details of the study selection process were previously described in a study evaluating the effects of interventions on functional outcomes for older adults in reviews by Cochrane Musculoskeletal [28]. In brief, we included all Cochrane Musculoskeletal systematic reviews published between 01/01/2015 (after the update of the Cochrane Musculoskeletal review guidance) and 16/06/2020, containing at least one trial that included participants over the age of 50 years. Cochrane back and Neck reviews were not included in our study as they were not integrated into Cochrane Musculoskeletal at that time. We chose to focus on reviews which included studies with participants older than 50 years because this work was conducted collaboratively with Cochrane-Campbell Global Ageing Partnership to inform priorities for evidence synthesis for the UN Decade of Healthy Ageing (2021-2030) [29]. The age cut-off was selected based on the lower age range used to capture aging populations by the Global Burden of disease study [30].

Data extraction

Data were extracted by two independent reviewers (two of NJ, SD, OD, TM, or SA) using a pretested data extraction form and any discrepancies were resolved by discussion. We designed the data extraction based on the methods in the previous assessment [20]. We extracted data on descriptive characteristics of each review including the health condition, intervention, number of studies and participants included in the review, as well as equity considerations across the following dimensions of inequities: place of residence (rural vs urban), race or ethnicity, occupation, gender or sex, religion, education, socioeconomic status, social capital (PROGRESS). In addition to the previous dimensions, we also extracted equity considerations across age, disability (excluding the MSK condition), presence of comorbidities, features of relationship and time dependent circumstances and health literacy (Plus) since these factors are also associated with inequities [18,31].

Included reviews were evaluated for the reporting of the PROGRESS-Plus categories in the following review sections: Description of the population in the PICO framework (population, intervention, comparator, and outcome), data analysis (i.e. whether the study planned to carry out

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subgroup analyses and whether the analysis was actually carried out), characteristics of the participants in the included studies (as described in the tables of characteristics and descriptions in text), conducted analyses, summary of findings and applicability of results. For assessing the summary of findings tables, we followed guidance specified in the Cochrane handbook [32]; authors could include different rows for different baseline risk of outcomes for socially disadvantaged populations as a subgroup, or present information for socially disadvantaged populations in a separate summary of findings table if the effects are deemed different.

Statistical analysis

Data were analyzed using SPSS statistical software and reported descriptively as frequencies and percentages. We cross tabulated the proportion of studies that reported each PROGRESS-Plus element, at least once, in each of the review sections (listed in *data extraction*).

Results

Characteristics of included systematic reviews

We identified 57 Cochrane Musculoskeletal reviews published within the specified timeframe; 52 reviews included at least one trial that included participants over the age of 50 years. Table 1 details the characteristics of the included 52 reviews. Five network meta analyses were included because they included component reviews in our sample. The median number of primary studies included in each review was 14 (range 3 to 158) and the median number of participants was 1928 (range 150 to 37,000). The most common conditions were osteoarthritis (16 reviews, 31%), rheumatoid arthritis (14 reviews, 27%) and fibromyalgia (6 reviews, 21%). Almost half of the reviews (22 reviews, 42%) assessed pharmacological interventions while 30 reviews (58%) evaluated non-pharmacological interventions. Forty-five reviews (87%) described the age of participants; the median of the means was 54 years. The range of individual participant ages within the trials was from 16 to 94 years. Women represented approximately 70% (5-100%) of the participants. Further details of these characteristics can be found in supplemental Table 1.

Overall consideration of populations experiencing inequities in Cochrane Musculoskeletal reviews

Nearly all reviews (n=49, 94%) considered or reported at least one PROGRESS-Plus factor in at least one review section (Table 2). Most reviews (47, 90%) reported at least one PROGRESS factor in the description of the participants of included studies. Forty-four (85%) included at least one PROGRESS-Plus factor in the definition of the PICO question. PROGRESS-Plus factors were less frequently reported in the applicability of results (19 reviews, 37%) or analysis plan (8 reviews, 15%) and no PROGRESS-Plus factor was included in the summary of findings table(s).

Description of the population in the PICO framework

The most commonly reported PROGRESS-Plus factors in the description of the population in the PICO question were age (28 reviews, 54%), followed by disability (21 reviews,

40%) and sex (20 reviews, 39%) (Table 2). No reviews considered religion, education, feature of relationships or time dependent circumstances of participants in the PICO question.

Data analysis

Five reviews (10%) planned to analyze outcome data by sex in a subgroup analysis. Only one review, synthesizing the evidence regarding benefits and harms of bisphosphonates for steroid-induced osteoporosis had sufficient data available to perform this analysis. Five reviews (10%) planned to analyze outcome data by age, but none found disaggregated data in the published trials. One review, synthesizing the evidence regarding effectiveness and safety of surgery for trigger finger, planned a subgroup analysis comparing outcomes in participants with or without comorbidities but was also unable to conduct the analysis due to lack of information in the included studies.

Description of participant characteristics within the included studies

The most reported PROGRESS-Plus factors reported in the description of participant characteristics were age (47 reviews, 90%), sex (45 reviews, 87%) and place of residence (29 reviews, 56%). Seven reviews (14%) reported race or ethnicity, and 2 reviews (4%) reported the number and proportion of participants with comorbidities. No other PROGRESS-Plus characteristics were reported.

Summary of findings

None of the systematic reviews reported details for populations experiencing inequities in the summary of finding tables, either as different rows for different baseline risk of outcomes for socially disadvantaged populations or in a separate summary of findings table.

Applicability of results

The extent of the applicability of the results across sex was discussed in 12 reviews (23%). Nine (17%) discussed the applicability of their results with regards to age. Additional factors mentioned in applicability of findings were race/culture/ethnicity/language (7 reviews, 14%), comorbidities (6 reviews, 12%), place of residence (4 reviews, 8%) and socioeconomic status (2 reviews, 4%).

Discussion

In Cochrane Musculoskeletal reviews inclusive of older adults, age, sex and place of residence are most commonly reported, but yet to be described in all reviews. Other PROGRESS factors and health literacy are reported in less than half of the reviews and there is little discussion of PROGRESS-Plus characteristics on the applicability of the review findings.

According to the Methodological Expectations of Cochrane Intervention Reviews (MECIR), authors should provide adequate information about the study population to assess the applicability of the review's findings (R10 of MECIR) [33]. The PROGRESS-Plus framework can be used to identify dimensions of health inequities that have been shown to possibly explain the extent of MSK disease [34,35]. For example, several studies have shown that the prevalence of Rheumatoid Arthritis (RA) is higher in individuals living in rural areas compared to urban due to residents in rural areas having a higher rate of obesity which is associated with more

musculoskeletal complaints [36,37]. Similarly, the prevalence of RA is disproportionately higher among Canadian First Nations populations and immigrants compared to non-First Nations populations non-immigrant populations [37,38]. These differences are believed to exist in part due to variation in care access, practice and delivery [39,40]. Therefore, we propose that reviews include a table describing the included study participants using the PROGRESS-Plus framework, similar to the one used by Kroon et al in their review of self-management education programs for osteoarthritis [24] (see template, Table 3). This table can help us identify the details missing regarding the description of participant characteristics in the primary studies.

Few of the included reviews (8/52 reviews, 15%) conducted analyses across dimensions of health inequities but this may be due to several factors. Subgroup analyses should be restricted in number and follow criteria for credibility effect modification to avoid spurious findings [41]. Any objectives to assess equity issues is highly desired to be stated as a specific question (PR6 of MECIR) and supported with an explicit description of the effects of the intervention on populations experiencing inequities (C4 of MECIR)[42]. Of note, several of the dimensions of inequities may not have a direct connection with musculoskeletal conditions, hence might not be relevant to consider [43-45]. Therefore, review authors need to consider which elements of PROGRESS are most relevant for their question and for intended users of the review.

For those reviews which planned subgroup analyses, the authors reported lack of disaggregated data in trials. Greater consideration of equity factors in design and reporting of randomized trials could improve the ability to carry out these analyses in systematic reviews as recommended by the Consolidated Standards of Reporting Trials (CONSORT)-Equity reporting guideline [46].

Since the assessment of equity conducted in 2008 by Tugwell and colleagues [20], the reporting of sex when describing participant characteristics has more than doubled (from 36% to 87%) and place of residence has tripled (from 14% to 56%). Analysis by dimensions of inequities have also increased (from 0% to 15%). Comparison to other studies assessing sex and gender in Cochrane reviews of different conditions show that our findings are comparable [47]. This indicates that although sex distribution of participants in included studies is reported in most reviews, few plan to conduct sex-based subgroup analyses. As above, this may be due to caution in the number of planned subgroup analyses. Although there is mounting evidence of the importance of sex and gender for all health conditions [48,49], including MSK disorders[50-53], other subgroup analyses based on clinical characteristics (e.g. disease duration) might have been considered more clinically important.

Strengths of this study are the use of a pre-determined data extraction template, duplicate data extraction and use of a framework for analysis based on previous studies. The major limitation of this study is that we did not assess the primary studies of the 52 reviews due to resource limitations. Hence, we cannot determine if the data were not available in primary studies or were not collected by the review authors. We did not find reviews that explicitly stated that the included studies did not report participant characteristics. Thus, further research is needed to determine whether the PROGRESS-Plus factors are reported in the studies included in these reviews. We also restricted our assessment to reviews in Cochrane Musculoskeletal including participants 50 years old and older. This may have indirectly biased the results towards reviews that considered participant age at any step of the review process thereby potentially overestimating the number of reviews that considered age. Furthermore, the exclusion of

musculoskeletal conditions such as bone, joint and muscle trauma limits the generalizability of the findings of this study to other Cochrane groups. However, since all Cochrane review groups use the MECIR guidance, it would be worthwhile to investigate how heath equity is considered in other reviews.

Conclusions

The efficacy or effectiveness of an intervention is a necessary but not sufficient criterion for informing decisions by practitioners, patients, and policymakers. Considering potential differences in characteristics of trial participants and the general population which may affect their access to care or its delivery, and preferences related to outcomes are vital for contextualizing the evidence. Systematic reviews can contribute to this by providing baseline participant characteristics and reporting on planned analyses that are deemed important across social determinants of health. Efforts are needed to better report participant characteristics across PROGRESS-Plus factors such the table proposed by Kroon et al [24]. Further research is needed to understand the feasibility and utility of extracting and reporting this information.

Acknowledgements

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Table 1. Cochrane Musculoskeletal systematic reviews published after 2015 including older adults

	n	%
Condition		
Osteoarthritis	16	31
Rheumatoid arthritis	14	27
Fibromyalgia	6	21
Rotator cuff disease	5	10
Osteoporosis	3	6
Ankylosing spondylitis	2	4
Contracture of joints	2	4
Psoriatic arthritis	1	2
Trigger finger	1	2
Raynaud phenomenon	1	2
Paget disease of bone	1	2
Intervention type		
Pharmacological	22	42
Non-pharmacological	30	58
Number of primary studies (median, range)	14	3-158
Number of participants (median, range)	1928	150-37,000
Age (median, range)	54	16-94
Percentage Female (median, range)	70	5-100

Table 2. Reporting of equity in Cochrane Musculoskeletal systematic reviews stratified by PROGRESS-Plus characteristics and review section (n = 52 articles).

	Description of the population in the PICO framework n (%)	Planned analysis n (%)	Description of participant characteristics within the included studies n (%)	Conducted analysis n (%)	Summary of Findings n (%)	Applicability of Results n (%)	PROGRESS-Plus element in at least one sections n (%)
Place of residence (rural vs urban)	5 (10)	0 (0)	29 (56)	0 (0)	0 (0)	4 (8)	34 (65)
Race/ethnicity/culture/ language	3 (6)	0 (0)	7 (14)	0 (0)	0 (0)	7 (14)	13 (25)
Occupation	3 (6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (6)
Sex	20 (39)	5 (10)	45 (87)	1 (2)	0 (0)	12 (23)	47 (90)
Religion	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Education	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (2)
Socioeconomic	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	2 (4)	5 (10)

Social capital	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (4)
Age	28 (54)	5 (10)	45 (87)	5 (10)	0 (0)	9 (17)	47 (90)
Disability	21 (40)	0 (0)	0.00	0 (0)	0 (0)	0 (0)	21 (40)
Feature of relationships	0 (0)	0 (0)	0.00	0 (0)	0 (0)	0 (0)	0 (0)
Time dependent circumstances	0 (0)	0 (0)	0.00	0 (0)	0 (0)	0 (0)	0 (0)
Comorbidities	12 (23)	1 (2)	2 (4)	1 (2)	0 (0)	6 (12)	21 (40)
Health literacy	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
At least one PROGRESS-Plus characteristic in each section	44 (85)	8 (15)	47 (90)	8 (15)	0 (0)	19 (37)	-

Table 3. Template for reporting participant baseline characteristics across PROGRESS-Plus (adapted from by Kroon et al in their review of self-management education programs for osteoarthritis(24))

Study	PROGRESS								Plus		
	P	R	O	G	R	E	S	S	Age	Disability	Health Literacy
Study 1											
Study 2											
Study 3											

Note: "Plus" elements can be operationalized depending on author rationale.

P: place of residence, R: race/ethnicity, O: occupation, G: gender or sex, R: religion, E: education, S: socioeconomic status, S: social capital.