


How Is Health Equity Assessed in Cochrane Musculoskeletal Reviews?

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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 aged ≥ 50 years and that were published from 2015 to 2020. We assessed the extent to which reviews considered health equity in the description of the population in the PICO (Patient/Population – Intervention – Comparison/Comparator – Outcome) framework, data analysis (planned and conducted), description of participant characteristics, summary of findings, and applicability of results using the PROGRESS-Plus framework. The PROGRESS acronym stands for place of residence (rural or urban), race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital, and Plus represents age, disability, relationship features, time-dependent relationships, comorbidities, and health literacy.

Results. In total, 52 systematic reviews met our inclusion criteria. At least 1 element of PROGRESS-Plus was considered in 90% (47/52) of the reviews regarding the description of participants and in 85% (44/52) of reviews regarding question formulation. For participant description, the most reported factors were age (47/52, 90%) and sex (45/52, 87%). In total, 8 (15%) reviews planned to analyze outcomes by sex, age, and comorbidities. Only 1 had sufficient data to carry this out. In total, 19 (37%) reviews discussed the applicability of the results to 1 or more PROGRESS-Plus factor, most frequently across sex (12/52, 23%) and age (9/52, 17%).

Conclusion. Sex and age were the most reported PROGRESS-Plus factors in any sections of the 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 judgments about applicability.

Key Indexing Terms: epidemiology, prevention and control, preventive medicine, rheumatic diseases

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Equity is widely recognized as the principal 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, are encouraging researchers to conduct more equitable, diverse, and inclusive research² to expand the applicability of research findings, mitigate biases, and promote fairness in health.

According to the World Health Organization, approximately 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 effect on 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 (OA) in African American individuals is higher compared to White and Mexican American individuals and is more prominent in women.^{12–14} People living in rural areas of the United States and Russia also have a higher prevalence compared to those in urban populations.¹⁵ Residents of the United Kingdom with low income have a greater likelihood of potentially needing

arthroplasty.¹⁶ Despite greater need, joint replacement is less likely among African American, Hispanic, and Asian populations,¹² and total joint arthroplasty is underused 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 OMERACT (Outcome Measures in Rheumatology) initiative and the Campbell and Cochrane Equity Methods Group.^{17,18} The PROGRESS acronym stands for place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital. Plus stands for personal characteristics (eg, age and disabilities), relationship features (ie, exclusion from school and parent drug use), and time-dependent relationships (ie, leaving the hospital and released from prison or other times when an individual might be temporarily disadvantaged).¹⁹ A survey of OMERACT 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 colleagues²⁰ assessed health equity considerations in systematic reviews from Cochrane Musculoskeletal and identified that limited information is reported to inform policy decisions. 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 7 (50%) reviews. Further, 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 (ie, inclusion and exclusion criteria) make the generalizability of results uncertain.^{21,22} Accordingly, Cochrane Musculoskeletal updated their method guidelines for systematic reviews and metaanalyses in 2014,²³ and advised review authors to include explicit descriptions of the effect of the interventions not only on the whole population but also on 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 OA.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 for Systematic Reviews of Interventions (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 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 January 1, 2015 (after the update of the Cochrane Musculoskeletal review guidance), and June 16, 2020, containing at least 1 trial that included participants older than 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 that included studies with participants older than 50 years because this work was conducted collaboratively with the Cochrane Campbell Global Ageing Partnership to inform priorities for evidence synthesis for the United Nations 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 2 independent reviewers (2 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 process based on the methods in the previous assessment.²⁰ We extracted data on descriptive characteristics from each review, including the health condition, intervention, and number of studies and participants included in the review. We also extracted data on 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, and social capital (ie, the PROGRESS factors). In addition to the previous dimensions, we also extracted data on equity considerations across age; disability, excluding the MSK condition; presence of comorbidities; relationship features; time-dependent circumstances; and health literacy (ie, Plus factors), 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 (Patient/Population – Intervention – Comparison/Comparator – Outcome) framework; data analysis (ie, whether the study planned to carry out subgroup analyses and whether the analyses were actually carried out); characteristics of the participants in the included studies, as described in the tables of characteristics and descriptions in the text; conducted analyses; summary of findings; and applicability of results. For assessing the “summary of findings” tables, we followed the guidance specified in the Cochrane Handbook³²; authors could include different rows for different baseline risks of outcomes for socially disadvantaged populations as a subgroup, or they could present information for socially disadvantaged populations in a separate “summary of findings” table if the effects were deemed different.

Statistical analysis. Data were analyzed using SPSS statistical software (IBM Corp) 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 the data extraction section).

Ethics considerations. No ethics approval or consent was needed for the conduct of this project because it involves the evaluation of published systematic reviews that contain nonidentifiable data.

RESULTS

Characteristics of included systematic reviews. We identified 57 Cochrane Musculoskeletal reviews published within the specified timeframe; 52 reviews included at least 1 trial that included

participants aged > 50 years. Table 1 details the characteristics of the included 52 reviews. In total, 5 network metaanalyses were included in our sample because they included component reviews. The median number of primary studies included in each review was 14 (range 3-158), and the median number of participants was 1928 (range 150-37,000). The most common conditions were OA (16/52, 31%), rheumatoid arthritis (RA; 14/52, 27%), and fibromyalgia (6/52, 12%). Almost half of the reviews (22/52, 42%) assessed pharmacological interventions, whereas 30 reviews (58%) evaluated nonpharmacological interventions. In total, 47 reviews (90%) described the age of participants (Table 2), and the median of the means was 54 years (Table 1). The individual participant ages within the trials ranged from 16 to 94 years. Women represented a median of 70% (range 5-100%) of the participants. Further details of these characteristics can be found in Supplementary Table S1 (available from the authors upon request).

Overall consideration of populations experiencing inequities in Cochrane Musculoskeletal reviews. Nearly all reviews (49/52, 94%) considered or reported at least 1 PROGRESS-Plus factor in at least 1 review section (Table 2). Most reviews (47/52, 90%) reported at least 1 PROGRESS-Plus factor in the description of the participants of included studies. In total, 44 (85%) reviews included at least 1 PROGRESS-Plus factor in the definition of the PICO framework. PROGRESS-Plus factors were less frequently reported in the applicability of results (19/52, 37%) or the analysis plan (8/52, 15%), and no PROGRESS-Plus factors were included in the “summary of findings” tables.

Description of the population in the PICO framework. The most commonly reported PROGRESS-Plus factors in the description of the population in the PICO framework were age (28/52, 54%), disability (21/52, 40%), and sex (20/52, 38%; Table 2).

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

	Value, N = 52
Condition	
Osteoarthritis	16 (31)
Rheumatoid arthritis	14 (27)
Fibromyalgia	6 (12)
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)
Nonpharmacological	30 (58)
No. of primary studies, median (range)	14 (3-158)
No. of participants, median (range)	1928 (150-37,000)
Age, yrs, median (range)	54 (16-94)
Percentage of female participants, median (range)	70 (5-100)

Data are in n (%) unless otherwise indicated.

No reviews considered religion, education, relationship features, or time-dependent circumstances of participants in the PICO framework.

Data analysis. In total, 5 (10%) reviews planned to analyze outcome data by sex in a subgroup analysis. Only 1 review, which synthesized evidence regarding the benefits and harms of bisphosphonates for steroid-induced osteoporosis, had sufficient data available to perform this analysis. In total, 5 (10%) reviews planned to analyze outcome data by age, but none found disaggregated data in the published trials. In total, 1 review, which synthesized evidence regarding the effectiveness and safety of surgery for trigger finger, planned a subgroup analysis comparing outcomes in participants with or without comorbidities; this review was also unable to conduct the analysis because of a lack of information in the included studies.

Description of participant characteristics within the included studies. The most reported PROGRESS-Plus factors in the description of participant characteristics were age (47/52, 90%), sex (45/52, 87%), and place of residence (29/52, 56%). In total, 7 (13%) reviews reported race or ethnicity, and 2 (4%) reviews 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 findings” 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 (23%) reviews. In total, 9 (17%) reviews discussed the applicability of their results with regard to age. Additional factors mentioned regarding applicability of findings were race, culture, ethnicity, or language (7/52, 13%); comorbidities (6/52, 12%); place of residence (4/52, 8%); and socioeconomic status (2/52, 4%).

DISCUSSION

In Cochrane Musculoskeletal reviews that are inclusive of older adults, age, sex, and place of residence were most commonly reported but are yet to be described in all reviews. Other PROGRESS-Plus factors and health literacy were reported in less than half of the reviews, and there was 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 RA is higher in individuals living in rural areas compared to those in urban areas because of residents in rural areas having a higher rate of obesity, which is associated with more MSK complaints.^{36,37} Similarly, the prevalence

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

	Description of the Population in the PICO Framework	Planned Analysis	Description of Participant Characteristics Within the Included Studies	Conducted Analysis	Summary of Findings	Applicability of Results	PROGRESS-Plus Element in ≥ 1 Section
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)
Gender/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 status	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)	47 (90)	5 (10)	0 (0)	9 (17)	47 (90)
Disability	21 (40)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	21 (40)
Relationship features	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Time-dependent circumstances	0 (0)	0 (0)	0 (0)	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)
≥ 1 PROGRESS-Plus characteristic in each section	44 (85)	8 (15)	47 (90)	8 (15)	0 (0)	19 (37)	49 (94)

Data are in n (%). PICO: Patient/Population – Intervention – Comparison/Comparator – Outcome; PROGRESS: place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital.

of RA is disproportionately higher among Canadian First Nations populations and immigrants compared to non-First Nations populations and nonimmigrant populations.^{37,38} These differences are believed to exist, in part, as a result of 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 al²⁴ in their review of self-management education programs for OA (see template, Table 3). This table can help us identify the details that are missing regarding the description of participant characteristics in the primary studies.

Few of the included reviews (8/52, 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 in order to avoid spurious findings.⁴¹ It is highly desired that any objective to assess equity issues 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 MSK conditions; hence, they might not be relevant to consider.⁴³⁻⁴⁵ Therefore, review authors need to consider which elements of PROGRESS-Plus are most relevant for their question and for the intended users of the review.

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

Table 3. Template^a for reporting participant baseline characteristics across PROGRESS-Plus.

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

^aThis template was adapted from Kroon et al²⁴ in their review of self-management education programs for osteoarthritis. ^b“Plus” elements can be operationalized depending on author rationale. PROGRESS: place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital.

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 in all health conditions,^{48,49} including MSK disorders,⁵⁰⁻⁵³ other subgroup analyses based on clinical characteristics (eg, disease duration) might have been considered more clinically important.

Strengths of this study are the use of a predetermined 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 because of resource limitations. Hence, we cannot determine whether 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 were reported in the studies included in these reviews. We also restricted our assessment to reviews in Cochrane Musculoskeletal that included participants aged ≥ 50 years. This may have indirectly biased the results toward reviews that considered participant age at any step of the review process, thereby potentially overestimating the number of reviews that considered age. Further, the exclusion of MSK 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 health equity is considered in other reviews.

In conclusion, the efficacy or effectiveness of an intervention is a necessary but insufficient criterion for informing decisions by practitioners, patients, and policy makers. In order to contextualize the evidence, it is vital to consider 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. 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 as the table proposed by Kroon et al.²⁴ Further research is needed to understand the feasibility and utility of extracting and reporting this information.

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