



Assessment of Gender Bias in Musculoskeletal Outcome Measures. Methods and Examples



Joy MacDermid PhD^{1,2}

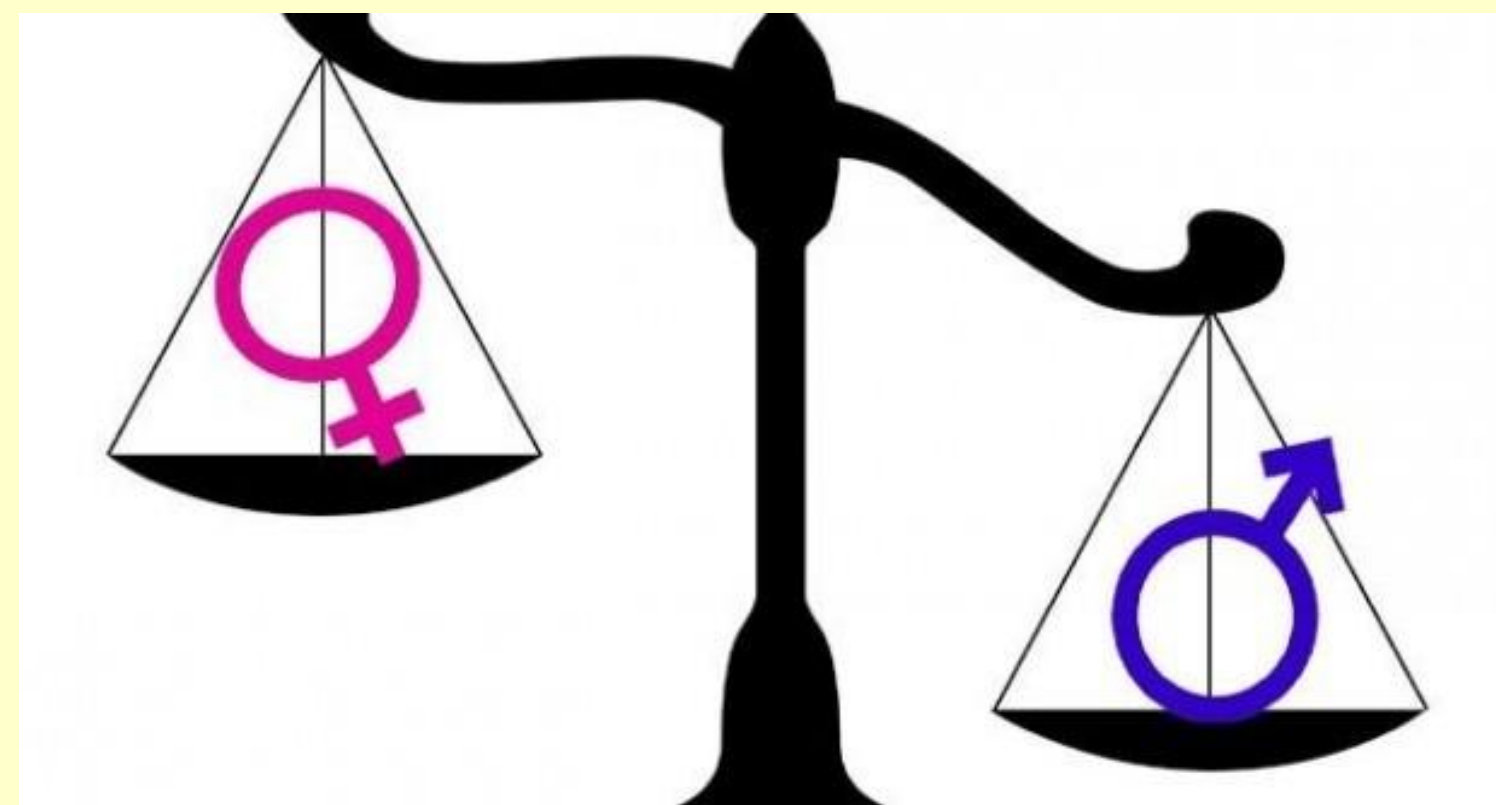
¹The University of Western Ontario, London, Ontario, Canada & The Hand and Upper Limb Center, St. Joseph's Health Care London,

²School of Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada

ROTH | MCFARLANE
HAND & UPPER LIMB CENTRE

AIMS

1. To describe different methods for identifying gender bias in musculoskeletal patient-reported outcome measures (MSK-PRO).
2. To provide examples of items with different forms of gender bias from a series of studies conducted on assessment of MSK-PRO.
3. To describe strategies for remediation of gender bias in existing items/tools.



METHODS

A series of clinical measurement studies were conducted on MSK-PRO to assess potential sources of bias with a particular emphasis on sex/gender bias. The techniques used included:

1. Rasch analysis (differential item functioning (DIF) based on sex or gendered roles, i.e., working inside or outside the home);
2. ICF linking patient-specific items or qualitative interviews; comparison of the distribution of codes across sex/gender;
3. Cognitive interviews to understand whether items were interpreted and calibrated differently based on gender, exploring gender roles within ICF codes; and
4. Use of specific tools that detect differences in a trait (e.g., pain) based on gender role expectations.

Method	Key Role	Limit
Rasch DIF	Identifies Items that have dif on reported SG	Does not identify source of differences
Cognitive Interviews	Captures SG differences in interpretation of item	Not ideal for gap identification
ICF Linking	Define content in common language	Wide diversity in gender roles within codes
Qualitative	Defines concept measured	? Ideal method.. (Interpretive) Descriptive
PUTTING IT ALL TOGETHER	INTEGRATE DATA: IDENTIFY EXTENT AND SOURCE OF BIAS; INFORM REMEDIATION	ORDER, EMPHASIS AND WHEN

RESULTS

These methods provided complementary information. Items that do not exhibit DIF can still exhibit gender bias in item importance or definition of the concepts.

Examples of Items with DIF:

1. Household work (multiple MSK PRO) - gender role difference (females: more routine, more interior work, high repetition/less heavy; males: more external, some heavy).
2. Sleep (Brief Pain Index and other MSK-PRO) - gender DIF based on working in paid or unpaid roles.
3. Gender-role - expectations around pain indicate more common to believe women more likely to report pain; have lower pain threshold and pain endurance.
4. Findings from Rasch were not consistent across measures or samples.

DISCUSSION

1. Sex differences in pain perception, strength, flexibility, body size, hormones and many other sex-based biologic traits can influence how MSK pain and disability are defined, experienced and calibrated.
2. Gender differences in education, income, access to social and health services, paid/unpaid work roles, gender role expectations, and personal safety and independence are gender mechanisms that affect MSK outcomes.

CONCLUSIONS

Explicit consideration of the potential for sex and gender bias in MSK measurement is important and should be considered a fundamental step in development and validation of measures.

Gender bias assessment should be multipronged to consider the source and type of potential gender biases - preferably in measure development.

PRO remediation by item removal or rehabilitation is possible; and gendered comparisons may be an alternative to reduce the potential for conclusions that are invalid due to gender bias.

ACKNOWLEDGEMENTS

Joy MacDermid is supported by the CIHR Chair in Gender, Work and Health and the Dr James Roth Chair in Musculoskeletal Measurement and Knowledge Translation.

