

Editorial

Gender, Work, and Health

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Women and men occupy different positions in the labor market and, in turn, have different work-related exposures and subsequent health effects. There is growing recognition that occupational studies need new methods to account for these differences in order to improve the workplace (Kilbom *et al.*, 1998; Messing, 1998; Doyal, 2003; Messing *et al.*, 2003; Johnson *et al.*, 2009; Eng *et al.*, 2011; Springer *et al.*, 2012; Lewis and Mathiassen, 2013; Locke *et al.*, 2014). Women and men can have different experiences of work exposures and health due to their sex, referring to biological differences, or to their gender, referring to socially constructed differences. Many occupational studies continue to ignore sex and gender considerations or use single sex samples and assume that findings can be generalized to both men and women (Hohenadel *et al.*, 2015). While some researchers present results separately for men and women, which is a starting point, newer more comprehensive methods for modeling and data analyses are needed to advance the field.

To advance occupational exposure and health research, we put out a call for papers for a special issue on new approaches to considering gender and sex. When we put out our call in early 2017, we were not sure what to expect. We are happy to say that the response was beyond our expectations, with many high-quality submissions, from which we eventually selected the papers that comprise this issue. As a group, these papers demonstrate not only the importance of considering sex and

gender but also provide some novel study designs and methods that we hope other researchers can build on.

There are 10 papers in this issue reporting occupational exposure and epidemiology studies from six countries: Canada, Chile, Finland, France, Italy, and the USA. While these papers address an impressively broad range of experiences, their scope is also limited in some important ways: all of the countries are classified as high income by the World Bank (including Chile since 2012) and so experiences of low- and middle-income countries are not represented. The term ‘work’ primarily refers to employment in the paid labor force, although some of the papers also considered the contribution of unpaid work, especially care work predominantly performed by women, on compounding paid work exposures and on health at work and outside of work. Despite innovative approaches, most studies were constrained to evaluate gender and sex as a male/female binary variable, rather than expanding their metrics in ways that could be more relevant to gender diverse people (Bauer *et al.*, 2017).

Several overarching lessons emerge from these papers:

1. *Women and men experience differences in occupational exposures and health throughout all stages of their working lives.* Cherry *et al.* (2018) and Curtis *et al.* (2018) showed differences between men and women in exposures and health among apprentices first entering employment in the construction trades. Throughout working life, Padkapayeva *et al.* (2018) found differences in psychosocial and work

organizational exposures and related experiences of work and life stress, [Beauregard et al. \(2018\)](#) reported differences in work exposure and work-family conflict in relation to burnout, and [Bertin et al. \(2018\)](#) documented different occupational carcinogen exposures between men and women. With regard to disability and treatment, [Leinonen et al. \(2018\)](#) identified differences in sickness absence from work, while [Gignac et al. \(2018\)](#) highlighted differences in the need for work accommodations among workers with arthritis. [Farioli et al. \(2018\)](#) found that women are more likely than men to receive surgery for work-related carpal tunnel, and [Geoffrion et al. \(2018\)](#) found that, while men experience more violent events at work, women experience more post-traumatic stress reactions to workplace violence. Finally, at the end of working life, [Vives et al. \(2018\)](#) found that men and women have different part-time employment opportunities following retirement from their main job and that precarious economic experiences and demands of unpaid care work outside of paid employment impact health in retirement differently for men and women.

2. *Despite growing participation of women in the paid labor force, there remains extensive gender segregation across and within jobs.* [Leinonen et al. \(2018\)](#) documented gender segregation among a number of industrial sectors and occupational classes in Finland, despite gender-progressive employment policies. [Cherry et al. \(2018\)](#) showed gender segregation within job in the construction trades and that workers in the gender minority have different, often more hazardous, psychosocial and physical exposures than workers in the gender majority. [Cherry et al. \(2018\)](#) found that more women than men reported bullying or harassment during welder and electrician apprenticeships, similar to the findings of [Curtis et al. \(2018\)](#) showing that female tradeswomen were more likely to report bullying and gender-based discrimination related to unequal access to skill building tasks within jobs.
3. *Women and men continue to have different occupational exposures and different patterns of multiple, co-occurring exposures.* There are also differences in the temporal patterns of exposure between men and women due to decades when significantly more men were in the paid labor force. [Bertin et al. \(2018\)](#) showed that men have more exposures to carcinogens, including multiple occupational carcinogen exposures to 53 recognized carcinogens. Harmful physical and chemical exposures have become so institutionalized in 'men's' work that it is considered 'normal.' However, when we look at men's disproportionately high occupational carcinogen exposures through the gender perspective, we can ask in a new way: Why is this inequality so persistent? and what can we do to prevent carcinogen exposures experienced by both men and women? Using path modeling, [Beauregard et al. \(2018\)](#) showed that male/female differences in work exposures and work family conflict experiences explain differences in levels of burnout between men and women. Taken another way, if work exposures and non-work demands were similar for men and women in this sample, then male/female inequalities in burnout would be minimal. Among men and women in the construction trades, [Curtis et al. \(2018\)](#) found that women reported more problems with the fit of personal protective equipment; however, men reported more exposure to dust and working at heights without barriers. [Vives et al. \(2018\)](#) showed that men generally face more adverse work exposures, while women face more precarious employment conditions and carry the double burden of paid work and unpaid care work into their later years. They concluded that women appear to be affected more profoundly by health conditions accumulated earlier in working life so that the probability of women finding and keeping a job as they age is lower than for men.
4. *Women and men experience differences in the health impacts of work exposures.* [Cherry et al. \(2018\)](#) found that the bullying and harassment more frequently reported by female construction trade apprentices were risk factors for female welders reporting more depression than male welders. Overall, however, the authors concluded that the prevalence of depression in both genders (about one-third of all apprentices) suggests that depression is a substantial public health problem for all. [Padkapayeva et al. \(2018\)](#) found that higher levels of supervisor support at work were associated with lower work stress among women, but not among men. These same authors found that higher job insecurity was more strongly associated with higher life stress among men than women.
5. *Work impacts women and men differently in their lives outside of work.* [Cherry et al. \(2018\)](#) found that women in the electrical and welding trades were less likely to have children and less likely to be married. [Geoffrion et al. \(2018\)](#) observed that the sex of the aggressor for serious violent work events had a differential impact on men and women, with male aggressors leading to post-traumatic reactions among women, but not among men. The authors suggest that this may be because biological strength differentials

between men and women, which are further perpetuated and maintained by societal stereotypes, lead to these violent events being perceived by women as more than an isolated, work-related incident. Padkapayeva *et al.* (2018) observed that while job insecurity is a similarly important predictor for work stress among men and women, men are more likely to experience life stress related to high job insecurity. The authors suggest that differences in the attachment to work and differential importance of work for self-esteem among men and women may provide an explanation.

6. *Despite differences in work exposures and health effects, women and men also have some similar experiences.* Contrary to their hypothesis, Padkapayeva *et al.* (2018) did not observe male/female differences in the relationships between work stress and life stress levels: the relationship between work stress and life stress was similar among men and women, with higher levels of work stress associated with higher levels of life stress in both men and women. In addition, by examining multiple aspects across the domains of work, family, and the individual, Beauregard *et al.* (2018) were able to identify which experiences of men and women were similar and which were not. For example, men and women reported similar levels of marital strain and caregiving responsibilities, but differences in hours per week on domestic tasks.

When considered together, the papers provide several insights related to the state of gender and sex evaluation in work exposure and health studies and suggest directions to advance the field:

1. All of the papers show that including gender and sex analyses in studies of workers remain very challenging. Metrics of gender and sex diversity, data sets with large study populations evaluated to account for gender and sex diversity, methodologies, and even terminology are lacking. Clearly, the quantitative approaches that are utilized in this area of enquiry require further development.
2. While many of the studies used innovative approaches, none were able to clearly separate the effects of gender and/or sex on work exposures and health (see for example, Beauregard *et al.* (2018), Curtis *et al.* (2018), Geoffrion *et al.* (2018), Farioli *et al.* (2018) and Padkapayeva *et al.* (2018)) Only one study used inclusive language in their exposure and health assessment questionnaire so that transgendered women could participate (Curtis *et al.*, 2018) Overall, occupational epidemiology studies still mainly ascertain gender and sex identities using a single question offering only the possibility of a

binary male/female response. The male/female variable likely represents a mixture of sex and gender identities. The field is far from being able to address occupational experiences across a range of gender diverse people (Bauer *et al.*, 2017).

3. Application of newer quantitative data analytic methods can contribute to more comprehensive and nuanced knowledge about gender, work exposures, and health. Beauregard *et al.* (2018) and Padkapayeva *et al.* (2018) offered excellent examples of how path/structural equation modeling can inform the pathways that produce male/female inequalities in health outcomes. The Beauregard *et al.* (2018) approach of making male/female the main independent variable of interest, produced new information about which differences in work exposures and non-work exposures would be best to target to reduce inequalities in burnout burden between men and women. Using a Monte Carlo simulation, Farioli *et al.* (2018) estimated the difference in biomechanical exposures that would be required to explain differences in the probability of receiving carpal tunnel surgery among men and women in their observed data. They concluded from the Monte Carlo simulations that the required male/female difference in biomechanical exposures was not plausible, and thus other biological and social factors were likely also important determinants of male/female differences in carpal tunnel surgery.
4. Further exploration of the role of work organization and other contextual factors is needed and quantitative studies could benefit from having a qualitative methods complement (Cherry *et al.*, 2018).

The purpose of gender and sex analyses in occupational health, as in public health more broadly, is to improve the health and well-being of all people by providing the evidence base for good practice and policies. Today's labor market is more diverse than ever, both in relation to gendered and sexed characteristics of labor market participants, as well as other aspects such as race and ethnicity. For occupational health to remain relevant, we need research that takes this diversity into account, as research that does not will be limited in both its quality and applicability. We hope this special issue can inspire future research toward this aim.

Conflict of Interest

No conflicting interests are declared. Peter M. Smith, PhD, MPH serves on the editorial board of the journal. However, the contents of this paper, including any opinions and/or conclusions expressed, are solely those of the authors.

References

- Bauer GR, Braimoh J, Scheim AI *et al.* (2017) Transgender-inclusive measures of sex/gender for population surveys: mixed-methods evaluation and recommendations. *PLoS One*; 12: e0178043.
- Beauregard *et al.* (2018) Gendered Pathways to Burnout: Results from the SALVEO Study. *Ann Work Expo Health*; 62: 426–37.
- Bertin *et al.* (2018) Do Women and Men Have the Same Patterns of Multiple Occupational Carcinogenic Exposures? Results from a Cohort of Cancer Patients. *Ann Work Expo Health*; 62: 450–64.
- Cherry *et al.* (2018) Health and Work in Women and Men in the Welding and Electrical Trades: How Do They Differ? *Ann Work Expo Health*; 62: 393–403.
- Curtis *et al.* (2018) Gendered Safety and Health Risks in the Construction Trades. *Ann Work Expo Health*; 62: 404–15.
- Doyal L. (2003) Sex and gender: the challenges for epidemiologists. *Int J Health Serv*; 33: 569–79.
- Eng A, 't Mannetje A, McLean D *et al.* (2011) Gender differences in occupational exposure patterns. *Occup Environ Med*; 68: 888–94.
- Farioli *et al.* (2018) Observed Differences between Males and Females in Surgically Treated Carpal Tunnel Syndrome Among Non-manual Workers: A Sensitivity Analysis of Findings from a Large Population Study. *Ann Work Expo Health*; 62: 505–15.
- Geoffrion *et al.* (2018) Post-traumatic Reactions and Their Predictors among Workers Who Experienced Serious Violent Acts: Are There Sex Differences? *Ann Work Expo Health*; 62: 465–74.
- Gignac *et al.* (2018) The Role of Sex, Gender, Health Factors, and Job Context in Workplace Accommodation Use Among Men and Women with Arthritis. *Ann Work Expo Health*; 62: 490–504.
- Hohenadel K, Raj P, Demers PA *et al.* (2015) The inclusion of women in studies of occupational cancer: a review of the epidemiologic literature from 1991–2009. *Am J Ind Med*; 58: 276–81.
- Johnson JL, Greaves L, Repta R. (2009) Better science with sex and gender: facilitating the use of a sex and gender-based analysis in health research. *Int J Equity Health*; 8: 14.
- Kilbom A, Messing K, Thorbjornsson CB, editors. (1998) *Women's health at work*. Solna, Sweden: National Institute for Working Life.
- Leinonen *et al.* (2018) Labour Market Segregation and Gender Differences in Sickness Absence: Trends in 2005–2013 in Finland. *Ann Work Expo Health*; 62: 438–49.
- Lewis C, Mathiassen SE. (2013) *State of knowledge report, physical work, gender, and health in working life*. Stockholm: Swedish Work Environment Authority.
- Locke SJ, Colt JS, Stewart PA *et al.* (2014) Identifying gender differences in reported occupational information from three US population-based case-control studies. *Occup Environ Med*; 71: 855–64.
- Messing K. (1998) *One-eyed science, occupational health and women workers*. Philadelphia, PA: Temple University Press.
- Messing K, Punnett L, Bond M *et al.* (2003) Be the fairest of them all: challenges and recommendations for the treatment of gender in occupational health research. *Am J Ind Med*; 43: 618–29.
- Padkapayeva *et al.* (2018) Gender/Sex Differences in the Relationship between Psychosocial Work Exposures and Work and Life Stress. *Ann Work Expo Health*; 62: 416–25..
- Springer KW, Mager Stellman J, Jordan-Young RM. (2012) Beyond a catalogue of differences: a theoretical frame and good practice guidelines for researching sex/gender in human health. *Soc Sci Med*; 74: 1817–24.
- Vives *et al.* (2018) Gender and Ageing at Work in Chile: Employment, Working Conditions, Work–Life Balance and Health of Men and Women in an Ageing Workforce. *Ann Work Expo Health*; 62: 475–489.