

3.1.2. Gender and Mining

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3.1.2. Gender and Mining

In this chapter, we looked at gender issues in mining and the implications for safety engagement. Ethnographic factors are defined as those factors related to the group under study. In this study, those ethnographic factors identified were machismo and hegemonic masculinity. Machismo is defined as maleness or masculine pride; and hegemonic is defined as the dominant social context (Oxford Dictionary, 2016). Therefore, hegemonic masculinity is the dominant expression of masculinity in the group under study.

The questions that guided the scoping review were: What is the experience of women in mining and how do women in mining impact safety engagement of employees in the mining industry? How do ethnographic factors (dominantly male) influence employee safety engagement in the mining industry?

Method

Two scoping searches of the literature were undertaken. The first search included the following key words:

1. Miners (miners or “mining industry” or “mining community” or “resource extraction”) and
2. Women (women or woman or female or females) and
3. Safety engagement (“safety engagement” or “risk taking behavior” or “risk taking behaviour” or “safety behavior” or “safety behaviour” or safety or “high risk behavior” or “high risk behaviour” or “safety rule violation” or “accident proneness” or “risk perception” or “perception of safety” or “safety devices” or “workplace safety” or “work safety” or “risk tolerance”)

The second search included the following search terms:

1. Miners (miners or “mining industry” or industry) and
2. Ethnographic factors (“ethnographic factors” or machismo or “culture of mining” or “self-reliance” or maleness or “men’s work” or manliness or masculine or macho or ruggedness or “mining culture” or masculinity) and
3. Safety engagement (“safety engagement” or “risk taking” or safety or “high-risk behavior” or “high risk behaviour” or “safety rule violation” or “accident proneness” or “risk perception” or “perception of safety” or “safety devices” or “workplace safety” or “work safety” or “risk tolerance” or “safety compliance”)

Search Strategy. The details of the searches are included in appendix A. The databases searched are listed in the results. From this search, we selected articles based on the inclusion/exclusion criteria. The inclusion and exclusion criteria were kept broad in that we did not specify the types of research methods to be included or excluded in order to capture as many research articles on the topic as possible. In our search, we collected articles that were pertinent in this topic area. The broad inclusion and exclusion criteria allowed us to explore the literature in this area more completely, see Table 1.

Table 1. Gender and mining Inclusion / Exclusion criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> • Articles with key terms in the title or abstract • Peer reviewed • Within 5 years • English language articles 	<ul style="list-style-type: none"> • Editorials • Commentaries • Book reviews

Screening Strategy. From the search results, we reviewed the title and abstract of each article to determine its inclusion in the scoping review. Each selected article was read by a team member and information pertinent to the study was extracted. Those not applicable to the scoping review were excluded. The selected articles were reviewed by at least two team members for inclusion in the study.

Results

A brief summary of each article including its location, population studied, main issue addressed, comparison group, and primary outcomes is provided in Appendix G: 3.1.2. Gender and Mining. Table 2 (a & b) is an overview of the scope of this review.

Table 2a. Gender and Mining (Search 1) number of articles by database

Database	No of articles found from search	Articles Selected for Review	Final article selection
Embase	3	45	24
Scopus	5		
Web of Science	11		
ABI Inform	10		
CBCA Business	91		
CBCA Education	8		
PsycInfo	5		
Engineering Village	8		
Academic Search Complete and Nursing and Allied Health	30		
CINAHL	82		
Medline	10		

Table 2b. *Gender and Mining (Search 2) number of articles by database*

Database	Number of articles found from search	Articles selected for review	Final article selection from summaries
Academic Search Complete and Nursing and Allied Health	33	77	5
Medline	6		
CINAHL	6		
Engineering Village	15		
PsycInfo	0		
CBCA Business and Education	8		
Embase	2		
Scopus	2		
Web of Science	0		
ABI Inform Complete	5		

Description of Included Articles. Table 3 (a & b) provides an overview of the types of publications, country of publication, and populations covered by the selected articles.

Table 3a. 3.1.2. *Gender and Mining (search 1)*

Type of Study	Country of Research	Population
Quantitative Studies	USA (5)	Mining (15)
• Surveys (2)	Australia (2)	Petroleum (1)
• Secondary Analysis of Data (5)	India (2)	Electrical (1)
Qualitative Studies	Nigeria (1)	Construction (2)
• Interviews (8)	Philippines (1)	Manufacturing (1)
• Interpretive Phenomenology (1)	Chili (1)	Other trades (2)
• Ethnography (1)	Canada (1)	Other (2)
• Grounded theory (1)	Tunisia (1)	
Other	Sweden (1)	
• Articles (2)	Spain (1)	
• Literature review (2)	UK (1)	
• Book (1)	Africa/Asia (1)	
• Critical Discourse analysis (1)		

Table 3b. *Gender and Mining (search 2)*

Type of Research	Country of Research	Population Studied
Qualitative Study (2)	USA (1)	Oilfield workers
Quantitative Study (1)	Portugal (1)	Blue collar working class males
Literature Review (1)	South Africa (1)	General workers
Article (1)	Canada (2)	Male workers
		Industrial chemical company

Description of Identified Factors. In order to make it easier to describe the results of the scoping review, the articles were divided into four categories: gender roles, gender equity in industry, quality of life, hegemonic masculinity, and adapting the workplace.

Gender roles. Four articles were identified related to roles and identities of women in the mining industry. The articles discussed traditional roles of women in mining, and changes women make to be accepted as miners. Two articles discussed women's roles in mining. In a discussion paper of gender

identities and relations in the history of mining communities, Hardesty (2010) stated women occupied roles of housekeeper, laundress, dressmaker, and restaurateur while men were miners. He stated gender identities are distinctive and hard to change. Huesca (2013) found women in mining participate in three ways: doing work similar to men, doing lighter work, and serving food and beverages. According to Huesca, women are also expected to do household chores, and they are expected to wake up earlier to care for family. Two articles discussed women taking on male characteristics. In an ethnographic study of women in mining, Rolston (2010) found that women who cultivated an alternate “way of being,” a tomboy status, had an improved work life than women who behaved more typical of a female. This study illuminated the difficulty women face in a male-predominant work place. In a qualitative study of mine workers, Tallichet (2011) found women working in mines adopted discourse placing them in the same position as male miners such as “breadwinners” and “good miner.” The author described this discourse as masculinizing their identities in order to be accepted as miners. Tallichet also found foremen lacked confidence in the ability of women to become miners.

Gender Equity in Industry. There were 12 articles pertaining to gender equity. The articles discussed discrimination against women, income inequality, and transformation of the workplace to include women. Eight articles described discriminatory practices. In a survey study of young graduates, leaders, and labor unions, Mohsen and Zouari (2014) found the mining industry discriminated against women. They reported exogenous factors such as physical working conditions and undetected hazards as reasons for the discrimination. In an analysis of documents, interviews, and an ethnographic understanding of trades, Ness (2012) identified causes of women’s exclusion from the trades as maintaining the masculine status of the work, and male superiority ensures working-class men’s compliance. However, Ness noted a shortage of the right type of laborer, the young white male, is becoming a problem for construction companies; yet, they do not want the trouble of dealing with their current employees’ reactions to women in the workplace so they still don’t employ them. In a phenomenological study, MacIsaac and Domene (2014) identified the following themes: previous exposure to trades-related tasks, confidence, passion for the work, support from others, the physical nature of the work, the predominantly male environment, proving oneself to others, the “controlled” environment, and job-site discrimination. The authors found previous exposure to the trades, reinforcement, confidence, and passion for the work contributed to success; however, the physical nature of the work, the dominant male culture, discrimination, and female stereotypes were barriers. Kuntala (2011) explored the reactions of male employers and coworkers to women working in the mining industry. The researcher found women miners faced discrimination, harassment, and dangerous and demanding labor which impeded the entry of women into the mining workplace.

In a grounded theory study of women in the construction industry, Worrall, Harris, Stewart, Thomas, and McDermott (2010) identified a male-dominated culture and inflexible work practices as barriers to entering the profession. The authors suggested allowing for more women in managerial positions, increased confidence, and support systems would facilitate more women entering the construction industry. In an interview study in Nigeria, Kolade and Kehinde (2013) found barriers to career advancement in industry including family responsibilities, discrimination and sexual harassment,

and physical and verbal harassment. They found these barriers begin in educational institutions and continue through recruitment and employment. In a secondary analysis of population data, Bryant and Jaworski (2011) found the lack of women in the mining industry is associated with personal individual career choices. They identified long working hours, reproduction, and caring for children as reasons women don't choose mining; and they identified a masculine workplace culture which does not tolerate women as a barrier to women choosing that type of work. In a qualitative interview study, Lucas and Steimel (2009) looked at gender in a mining community, and they found a belief women were not strong enough to work as miners. They found women who did work in the mining industry were exposed to sexual harassment.

Two articles identified an income inequality between male and female workers. In a secondary analysis of data, Reeson, Measham, and Hosking (2012) found women in mining suffered from income inequality. They proposed the male-dominated mining workforce was the most likely cause. In a review of the literature, Sharma (2010) proposed women in mining towns suffered a social and economic disadvantage in income, household responsibilities, and representation in occupations. He postulated these factors promoted social and economic dependence on male partners. Sharma indicated mining companies preferred to hire males which leads to women's socioeconomic disadvantages. Two of the articles touched on transformations of the workplace to include women. In an article on gender and racial transformation, Cruise (2011) stated the demographics of mining education and professional registration is transforming the mining engineering education with a third of the graduates being women. In an interview study, Jurik (2010) found women electricians can manage physically challenging jobs and often demand improved safety measures which is viewed as a sign of weakness by men. Jurik also reported the need for flexibility for women associated with pregnancy and childrearing. Even though women are successful as electricians, only 7% of construction workers are women.

Quality of Life. Five articles were identified that related to women's quality of life. Two articles reported on factors affecting women in society. D'Souza, Somayaji, and Nairy (2011) identified higher age group, family economic status, higher age at menarche, lower number of children, absence of long term and reproductive illness, and domestic violence as a determinant of quality of life and reproductive health. Domestic violence, family economic status, and absence of reproductive illness were important determinant of Quality Life Index (QLI) and Reproductive Health Index. Domestic violence was important with QLI and Reproductive Health Index. Family economic status were important with QLI and absence of reproductive illness was important with Reproductive Health Index. D'Souza, Nairy, Somayaji, and Venkatesaperumal (2013) identified socio-economic cultural and environmental well-being, women's status, health, gender preference and cultural well-being, and marital relationship, support and decision making as the four main themes from the interviews. Primary role of married women in mining community is a wife, mother and care giver due to low education, low social status, economic instability, gender inequality and lack of decision making. Age at marriage, number of children, birth interval, methods used to prevent contraception, reproduction health choice made by husband, domestic violence, inter-spousal communication, husband drinking habits, decision-making were important factor affecting women's reproductive choice in Indian mining community.

Three articles reported on health related issues in women. In a survey study of 1589 men and 286 women, Nordin and Bolin (2014) found women had a risk of ill-health from work over-commitment whereas men had a risk of ill-health from work over-commitment and fatigue. They also found women had a larger risk of neck and back pain due to work-family conflict. In a secondary analysis of occupational statistics, Herrero, Saldana, Rodriguez, and Ritzel (2012) found women had higher stress levels than men; and they indicated companies should consider the gender of their workers when assigning tasks in high demand and high stress jobs. Herrero et al. found women more often had dual home-career workloads. In a secondary analysis of employment data in the United States, Huebner, Wojcik, Jorgensen, Marcella, and Nicolich (2010) found women employed in the petroleum industry had a lower overall death rate than the general population. They stated this could be due to a “healthy worker” effect.

Hegemonic Masculinity. Masculinity (hegemonic and non-hegemonic) was identified as a contributing factor to safety engagement in three articles. Fleras and Dixon (2011) looked at the current television portrayals of “macho” men and proposed these shows reinforce hegemonic masculinity by portraying working class men as heroic. They suggested the male persona portrayed in these shows reminds the audience that only men who are masculine enough can do this work. They proposed that by making workers in risky occupations heroic, it encourages risk-taking. Stergiou-Kita et al. (2015) examined the literature on masculinity and occupational risks, and they identified the following themes: celebration of heroism, physical strength, toughness, and stoicism; acceptance and normalization of risks; acceptance and normalization of work injury and pain; self-reliance, resistance to authority, assistance, and occupational health and safety; productivity pressures and profit over occupational health and safety. They recommended workplaces address how gender may influence perceptions of risk and risk-taking in the workplace. In a qualitative case study of oilfield employees, Filteau (2014) found the need for strict safety policies and adherence to them has created a new dominant masculinity with more obligations to teamwork and collective goals. He found the men who worked unsafely, used illicit drugs, showed aggression, or feminized other men, were subordinated and excluded.

Adapting the workplace. Inclusion of woman in traditionally male workplaces has highlighted viewpoints and exposed factors that had not previously been considered in safety engagement. Smallwood and Haupt (2009) found ergonomics in construction work was more of a problem for females than males. They suggested the following interventions to make construction work easier for females: mechanization, lighter materials, and less manual handling. They also suggested that integration of women into the construction process should be encouraged to facilitate the changes that are needed. Stergiou-Kita et al. (2015) examined the literature on masculinity and occupational risks, and they identified the following themes: celebration of heroism, physical strength, toughness, and stoicism; acceptance and normalization of risks; acceptance and normalization of work injury and pain; self-reliance, resistance to authority, assistance, and occupational health and safety; productivity pressures and profit over occupational health and safety. They recommend workplaces address how gender may influence perceptions of risk and risk-taking in the workplace.

Vasconcelos et al. (2012) found that even though a chemical company in Portugal did not consider

gender to be an issue related to safety, the exploration of gender did bring to light working conditions that had not been previously discussed. The male dominant work force tended to diminish the safety issues, considering them natural and just part of the job; however, these same men identified risks and laborious tasks to the job when defending why their current role couldn't be performed by women. Still, the males did not consider their work as risky and identified other reasons as to why women weren't given equal opportunity such as ability to work the required hours and lack of female washrooms and locker rooms. Asking questions about allowing women into the company's production sector has helped to identify issues of safety within the workplace. In a secondary analysis of the data, Lu (2012) found women miners are exposed to harmful work practices because mining companies focus on the hazards to men. Lu called for a more gender-neutral approach to policies and programs related to safety in mining. In a qualitative study of 31 industries and 613 women workers, Lu and Lu (2012) found health and safety programs improved enjoyment of jobs, decreased work pressure, and resulted in better salaries and more autonomy as well as exposure to fewer hazards. The authors proposed reviewing existing regulations and develop policies which are more appropriate for women workers.

Discussion

Mining and other industries are male-dominated with a masculinized workplace. The studies show that women who adopt a masculine persona are more likely to be accepted in this workplace (Rolston, 2010; Tallichet, 2011). Even so, there is discrimination against women in mining, and sexual harassment is a huge concern (Kolade & Kehinde, 2013; Kuntala, 2011; MacIsaac & Domene, 2014; Mohsen & Zouari, 2014; Ness, 2012; Bryant & Jaworski, 2011). Some articles inferred this happens to promote the superiority of men for this type of work (Ness, 2012).

There is becoming a shortage of the traditional perspective of the miner. Workplaces will need to change and become more open to women workers. The improvements to the workplace may help both men and women workers. Workplaces can be modified to encourage women to work in industry, such as hours of work, reducing physically-challenging tasks, and making the workplace safe for women (Ness, 2012; Worrall et al., 2010; Cruise, 2011; Jurek, 2010). The modifications to make the work easier for women will also benefit male workers. Women will benefit from taking on roles in industry and mining but only if they receive the same monetary compensation and chances for advancement.

Hegemonic understandings of masculinity can result in risk taking and unsafe behaviors. However, this stereotype is challenged in situations where these behaviors are not allowed, and a new culture of masculinity (non-hegemonic) can be developed. The employment of women into traditionally male fields such as mining may result in healthier and safer work environments as the work is modified ergonomically for women. Therefore, mixed gender workplaces may change the underlying masculine traditions in that workplace.

Gaps in the Literature. There were seven quantitative articles including surveys and secondary analysis of data sets. There were no controlled trials. The information from the surveys and data sets could indicate where a controlled trial may be beneficial. There were 11 qualitative studies using a range of methodologies. The studies used small sample sizes and would benefit from larger studies being done in these areas. Training programs are taking actions to increase the numbers of women attending

industrial training. A description of their programs or recruitment efforts is needed.

Only five articles were identified related to ethnographic factors of the industrial workplace. More research needs to be done in this area. There was very little information about how organizations and management teams are addressing the masculinized workplace. Organizational programs and harassment awareness programs may play a role in de-genderizing the workplace. Recruitment aimed at women may also improve the number of female workers in industry. It would be beneficial to research organizations and determine what they are doing to make these changes. The research will further awareness of the stereotypes related to mining work.

Recommendations. An equitable workplace may improve safety engagement. The research suggests that women demand more safety measures than men and require attention to be paid to physically-demanding work. As well, the research indicated women are more likely to follow safety protocols and suffer fewer workplace injuries. Thus, increasing the number of women employed in mining may improve safety engagement in this sector. Predominantly masculine workplaces may have a greater risk of injury and lack of safety engagement. Based on the current scoping review, the following are recommendations for the mining industry:

- Mining industries should put in place policies to increase equity in hiring of men and women.
- Recruiting practices should be geared towards women.
- Work procedures should be modified so any task can be done by either a man or a woman to improve safety outcomes for both genders.

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