Check for updates

ARTICLE

The Impact of Language and Culture Diversity in Occupational Safety

Mayra De Jesus-Rivas, RN, BSN[1], Helen Acree Conlon, DNP, MPH, ARNP-BC, COHN-S[1], and Candace Burns, PhD, ARNP[1]

Abstract: Occupational health nursing plays a critical part in improving the safety of foreign labor workers. The development and implementation of safety training programs do not always regularly take into account language barriers, low literacy levels, or cultural elements. This oversight can lead to more injuries and fatalities among this group. Despite established health and safety training programs, a significant number of non-native English speakers are injured or killed in preventable, occupation-related accidents. Introducing safety programs that use alternative teaching strategies such as pictograms, illustrations, and hands-on training opportunities will assist in addressing challenges for non-English laborers. Occupational health nursing has an opportunity to provide guidance on this subject and assist businesses in creating a safer and more productive work environment.

Keywords: health education, occupational health and safety programs, health literacy, occupational injuries, diversity, workforce, immigrant

For many decades, immigrant workers have come to the United States from different parts of the world in hopes of finding new job opportunities. As a result, the U.S. workforce has fewer native workers in construction, maintenance, installation and repairs, agriculture, and natural resource extraction. According to the Bureau of Labor in 2012, 25 million foreign-born workers had an opportunity to enter the U.S. labor force (Demirkesen & Arditi, 2015). However, many workers are confronted with language challenges, little education, and cultural work environments where minimal emphasis is placed on safety, training, or government safety regulations (Demirkesen & Arditi, 2015).

Even with extensive federal regulations regarding safety training, 4,628 fatal work injuries were reported in the United States in 2012 with 806 or just over 17% of those injuries occurring in construction (Demirkesen & Arditi, 2015). It is predicted that by 2050, the Hispanic population will account for 25% of the entire U.S. population and 20% of worksite fatalities (Lavy, Aggarwal, & Porwal, 2010). Specifically, Hispanic workers have multiple occupational challenges due to language barriers and are regularly involved in risky work tasks (e.g., construction work tasks; Lavy et al., 2010).

Some work accidents are preventable by simply providing the appropriate language manual to workers during training. A report released by The National Institute for Occupational Safety and Health (2004) described an incident of a 23-year-old Hispanic worker killed when he was crushed between the frame and arms of a skid steer loader. Even though an additional six Hispanic workers at the plant spoke primarily Spanish and the operator manual and safety decals are available in all languages, the employer only used the English version, perhaps because the manual and decals in other languages come at an additional cost (Lavy et al., 2010). The consequences of occupational injuries or illnesses extend the burden to workers' families, employers, and communities. In fact, they create significant financial obligations when, according to The National Safety Council, the average cost of treating a work-related injury or illness is approximately US$48,000 per case (Hurley & Lebbon, 2012).

Even when companies diligently follow Occupational Safety and Health Administration (OSHA) criteria for conducting safety training and meeting all work requirements, non-English-speaking or limited English language workers are still at a disadvantage in understanding and learning safety concepts (Demirkesen & Arditi, 2015). Despite the availability of safety manuals in multiple languages, worker comprehension should be assessed, especially for non-English-speaking workers (Hare, Cameron, Real, & Maloney, 2013). Occupational health nurses can implement various teaching strategies such as pictorial aids, role-playing, and hands-on experience to assist worker comprehension. Adult learning strategies should be an integral part of safety training when teaching foreign-born workers with language barriers and little education (Arcury, Estrada, & Quandt, 2010).

DOI: 10.1177/2165079915607872. From [1]University of South Florida. Address correspondence to: Mayra De Jesus-Rivas, RN, BSN, College of Nursing, MDC 22, 12901 Bruce B. Downs Blvd., Tampa, FL 33612, USA; email: mdejesu7@health.usf.edu.

The author(s) declared no potential conflicts of interest and received no financial support with respect to the research, authorship, and/or publication of this article.

For reprints and permissions queries, please visit SAGE's Web site at http://www.sagepub.com/journalsPermissions.nav.
Copyright © 2015 The Author(s)

Background and Epidemiology

Language difficulties create a communication barrier that can lead to confusion, and misunderstanding, a common problem among immigrant workers (Lavy et al., 2010). Many industries employ immigrant workers to meet work demands not realizing the responsibilities of employers to ensure that workers understand work hazards and safety precautions. According to the U.S. Census, 46% of foreign-born workers have limited English language skills and nearly 73% consider Spanish to be their primary language (Madera, Dawson, Neal, & Busch, 2013). Previous research has demonstrated that 66% of workplace injuries among non-English speakers can be attributed to lack of safety training at the language or comprehension level of the worker (Demirkesen & Arditi, 2015). Furthermore, the number of workplace injuries among immigrants is underestimated because many nonfatal injuries are unreported due to workers' fear of retribution and refusal to accept health care (Madera et al., 2013).

In 2011, 600 workers were exposed to harmful chlorine fumes at an Arkansas poultry processing plant because a worker, who did not speak English, mixed sodium hypochlorite in a drum of acidic antimicrobial solution. Due to his limited language skills, he was unable to read and understand the English label on the container (Whitlow et al., 2012). Occupational health nurses should be aware of communication gaps that exist for non-English workers and advocate for accommodations during training to ensure workers fully comprehend occupational hazards (Whitlow et al., 2012).

Another challenge, beyond language barriers among foreign-born workers, is the relatively high percentage of immigrants who are illiterate, even in their primary languages. Only a small percentage of workers have achieved the equivalent of a 12th-grade education, which increases immigrant workers' risk of workplace accidents due to limited reading and writing skills (Wilkins, 2011). In fact, Whitlow et al. (2012) estimated that 30 million adults with lower literacy skills work at higher risk jobs. Despite the availability of OSHA-approved training materials in Spanish, comprehension may still be difficult for workers with limited literacy. In addition, nonlocalized translations, wordy or technical content, and few graphics or pictures can negatively affect workers' understanding of basic safety concepts (Evia & Patriarca, 2012).

When learning theory was introduced in the United States by Knowles (1966), the term *androgogy* was defined as "the art and science of helping adults to learn" (p. 43). Learning theory emphasizes how educators or trainers should focus on the interests of the learner to tailor appropriate teaching materials and training aids to facilitate the learning process (Wilkins, 2011). Regardless of literacy, adult learning theory suggests that strategies educators can use to assist workers' learning include asking questions about the workplace and engaging workers in the training process (McGrath, 2009). One of the unique characteristics of adult learning is adults' need to know "why" or the reasons that learning the material is important (McGrath, 2009). Evaluating and using teaching tools (i.e., visual aids, pictorial, hands-on, or demonstration) is critical for occupational health nurses to ensure that non-English speakers comprehend all aspects of workplace hazards and occupational health and safety.

Effective safety training is crucial to prevent ambiguity among workers. A study of farmworkers and their families showed how few of them were following safety guidelines such as washing their hands, wearing gloves and other personal protective equipment, and refraining from eating fruits directly from the field because of potential exposure to pesticides (Levesque, Arif, & Shen, 2012). The adequacy of educational materials and resources when language is a barrier has played a role in guaranteeing effective pesticide safety training (Levesque et al., 2012).

Another aspect to consider in effective safety training is culture, individual patterns of behavior, values, and beliefs that impact how individuals think, decide, and behave (Carruth & Levin, 2014). Even though language is a barrier to understanding safety, culture also influences safety behavior. Immigrants who hold differing values about work ethic, family, and company loyalty (Lavy et al., 2010) may not perceive the same dangers as nonforeign workers who have a clear understanding of safety hazards in the workplace. Many immigrants believe their health is not under their control because accidents occur due to natural causes or "God's" will (Arcury et al., 2010). Another belief is *humoral medicine*, the negative effect different substances and materials "hot" or "cold" can produce in the body. For example, workers may be reluctant to take a shower immediately after work because the effect of the cold or warm water on their hot bodies could make them sick (Arcury et al., 2010). This belief explains why immigrants from Mexico and other Latin American countries who work with lead may hesitate engaging in proper hand washing or showering at the end of their shifts (Arcury et al., 2010). In addition, other workers may believe that questioning management is forbidden, even in the presence of dangerous situations (Arcury et al., 2010). To prevent the mismanagement of cultural diversity in the workplace, occupational health providers should provide uniform safety vocabulary and training protocols to assist workers in learning about safety and hazards in the workplace (Starren, Hornikx, & Luijters, 2013).

Creating diversity in the workplace by hiring workers with varying talents and experiences brings new ideas, which ultimately contribute to the company's success. Language barriers and workers' unwillingness to change previous unsafe behaviors can lead to additional occupational injuries. Occupational health nurses should assess the workplace and customize a safety training program that takes into account language or literacy barriers and cultural differences.

Safety Training

Health and safety training is critical to ensure employees have the necessary skills and knowledge to recognize hazards

and use safe procedures in the workplace. The most common training practices include orientation and regularly scheduled training, toolbox talks, informal communication (i.e., pamphlets), and formal presentations (Demirkesen & Arditi, 2015). However, as evidenced by previously presented data, these traditional methods are not as effective with non-English-speaking or low-literacy workers because these workers are learning from native English speakers. Merely translating materials into another language does not ensure that workers will completely understand potential hazards in the workplace. Literacy, language, or cultural barriers may hinder workers' ability to adequately understand health and safety training (Arcury et al., 2010).

Alternative teaching strategies (e.g., picture of spilled water on the floor or a person about to slip and fall) can help workers make a connection (Madera et al., 2013). This teaching method communicates effective safety information regardless of workers' reading levels or language barriers (Demirkesen & Arditi, 2015). Visual learners comprise approximately 65% of the working population (Madera et al., 2013). Because the brain can process images and words differently, some workers can use pictures to connect steps or concepts by creating a mental image. Studies have shown that the human brain can process images in 13 milliseconds (Madera et al., 2013), whereas when workers attempt to interpret a foreign language being read or spoken, the large cognitive load can lead to mental exhaustion (Madera et al., 2013). Pictograms are a more practical and effective solution than language alone. A picture of an individual stumbling over an object on the floor can easily be interpreted with few words to communicate the presence of a workplace hazard (Starren et al., 2013).

A visual color-coded system is another way to communicate chemical warnings and machinery precautions by correlating certain colors with hazards and risks (Or & Wang, 2014). Studies that have explored workers' perceptions of certain colors in cross-cultural environments could make a difference in occupational settings. One study of China, South Korea, Japan, and the United States demonstrated that particular colors produce a mental association to safety and workplace hazards: red for "stop," red for "danger," green for "go," and green for "safe" (Or & Wang, 2014). Occupational health nurses can assess the work environment and determine the colors that best help workers identify hazards and risks.

Experiential training is also beneficial in overcoming language and communication barriers. This method encourages workers to practice job skills and provides opportunities for the trainer to offer feedback and learning remediation (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). This training method facilitates learning while giving workers a sense of accomplishment and fulfillment (Madera et al., 2013).

Regardless of language barriers, education, or cultural differences, workers must understand the program's learning objectives and incentives (i.e., self-efficacy and motivation) as well as the importance of using safety skills (Salas et al., 2012).

Implications of Occupational Health Nurses

Diversity in the workplace can provide an opportunity for occupational health nurses to identify potential injury risks due to language, education, and cultural differences. First, a training needs analysis should be conducted to evaluate workers' safety knowledge, motivation, and characteristics of the environment (i.e., work team conflicts and worker cohesion). A job-task analysis can provide insight into task requirements, competencies, and skills needed to successfully complete job tasks (Salas et al., 2012). A personnel analysis can also determine which workers need particular training and the specific learning needs of each worker (Salas et al., 2012). This analysis can be used to determine the best training strategies to improve workers' understanding of safety hazards in the workplace.

Multiple languages spoken in the workplace bring additional challenges to safety training. Occupational health nurses can create or enhance safety training that takes into account the learning needs of all workers, brings awareness of safety issues, promotes pride when work tasks are completed without injury, and brings cohesiveness among workers who perceive themselves as different because of their language and cultural background.

Summary

Implementing an appropriate language and literacy safety training program can prevent injuries and fatalities in the workplace. Workers who receive inadequate safety training or have limited understanding of occupational hazards are at risk of work accidents or injuries. Describing risky situations to non-English-speaking workers is feasible using pictograms, audiovisual materials, and demonstrations. Other learning strategies such as hands-on training and color-coded signs can relay training information to workers with language barriers, low literacy skills, and cultural differences. Providing adequate safety materials does not guarantee worker behavior change, but describing potential hazards and risks can increase safety knowledge which in turn can change workers' safety perceptions.

Occupational health professionals are on the front line of health promotion and prevention of health and safety hazards in the workplace. They can highlight existent problems with foreign workers who have experienced illnesses and injuries due to lack of appropriate safety training tailored to workers' needs based on their languages, cultures, and educational backgrounds. Safety training materials should not merely be translated in the appropriate language for specific workers but implemented with other effective teaching methods. The overall goal is to meet safety learning objectives by reducing the number, frequency, and severity of injuries among international workers.

References

Arcury, T., Estrada, J. M., & Quandt, S. A. (2010). Overcoming language and literacy barriers in safety and health training of agricultural

workers. *Journal of Agromedicine*, *15*, 236-248. doi:10.1080/10599 24X.2010.486958

Carruth, A. K., & Levin, J. L. (2014). Cultural influences on safety training among Vietnamese shrimp fisherman. *Journal of Agromedicine*, *19*, 207-208. doi:10.1080/10599924X.2014

Demirkesen, S., & Arditi, D. (2015). Construction safety personnel's perception of safety training practices. *International Journal of Project Management*, *33*, 1160-1169.

Evia, C., & Patriarca, A. (2012). Beyond compliance: Participatory translation of safety communication for Latino construction workers. *Journal of Business and Technical Communication*, *26*, 340-367. doi:10.1177/10565191239697

Hare, B., Cameron, I., Real, K. J., & Maloney, W. F. (2013). Exploratory case study of pictorial aids for communicating health and safety for migrant construction workers. *Journal of Construction Engineering and Management*, *139*, 818-825.

Hurley, D. T., & Lebbon, A. R. (2012). A comparison of nonfatal occupational injuries and illnesses among Hispanic versus non-Hispanic workers in the United States. *Hispanic Journal of Behavioral Sciences*, *34*, 474-490. doi:10.1177/0739986312448316

Knowles, M. S. (1966). *The modern practice of adult education from pedagogy to andragogy*. New York, NY: Cambridge.

Lavy, S., Aggarwal, C., & Porwal, V. (2010). Fatalities of Hispanics workers: Safety initiatives taken by U.S. construction companies to address linguistic and cultural issues. *International Journal of Construction Education and Research*, *6*, 271-284. doi:101080/15578771.2010.514693

Levesque, D. L., Arif, A. A., & Shen, J. (2012). Effectiveness of pesticide safety training and knowledge about pesticide exposure among Hispanic farmworkers. *Journal of American College of Occupational and Environmental Medicine*, *54*, 1550-1556. doi:10.1097/ JOM.0b013e3182677d96

Madera, J. M., Dawson, M., Neal, J. A., & Busch, K. (2013). Breaking a communication barrier: The effect of visual aids in food preparation on job attitudes and performance. *Journal of Hospitality & Tourism Research*, *37*, 262-280. doi:10.117/1096348012436376

McGrath, V. (2009). Reviewing the evidence on how adult students learn: An examination of Knowles' model of androgogy. *The Irish Journal of Adult and Community Education*, 99-110.

National Institute for Occupational Safety and Health, (2004). Fatalities of Hispanic workers: Safety initiatives taken by U.S. construction companies to address linguistic and cultural issues. *International Journal of Construction Education and Research, 6*, 271-284.

Or, C. K. L., & Wang, H. H. L. (2014). Color-concept associations: A cross-occupational and cultural study and comparison. *Color Research and Application*, *39*, 630-634. doi:10.1002/col.21832

Salas, E., Tannenbaum, S. I., Kraiger, K., & Smith-Jentsch, K. A. (2012). The science of training and development in organization: What matters in practice. *Association for Psychological Science*, *13*, 74-101. doi:10.1177/1529100612436661

Starren, A., Hornikx, J., & Luijters, K. (2013). Occupational safety in multicultural teams and organizations: A research agenda. *Safety Science*, *52*, 43-P49. doi:10.1016/j.ssci.2012.03.013

Whitlow, A., Louie, S., Mueller, C., King, B., Page, E., & Bernard, B. (2012). *Chlorine gas released associated with employee language barrier—Arkansas, 2011*. Atlanta, GA: Centers for Disease Control and Prevention.

Wilkins, J. R. (2011). Construction workers' perceptions of health and safety training programmes. *Construction Management and Economics*, *29*, 1017-1026. doi:10.1080/01446193

Author Biographies

At the time of manuscript submission, Mayra De Jesus-Rivas, RN, BSN, was a graduate student in Occupational Health Nursing, University of South Florida College of Nursing and the Sunshine Education and Research Center. She graduated December 2015.

Helen Acree Conlon, DNP, MPH, ARNP-BC, COHN-S, is an instructor at the University of South Florida and Deputy Director of the Dual Degree Program for Adult-Gerontology Nurse Practitioner/Occupational Health Nursing and a member of the USF Sunshine Education and Research Center. She also holds a position at All Children's Hospital - Johns Hopkins Medicine, in the Employee Health Department, working as an ANP-BC in Occupational Health.

Candace Burns, PhD, ARNP, is a Professor at the University of South Florida and the Director of the Dual Degree Program for Adult-Gerontology Nurse Practitioner/Occupational Health Nursing and the Deputy Director of the USF Sunshine Education and Research Center. She is also Colonel, USA, retired.