# Educating a new generation of nurses about workplace violence using an innovative virtual simulation module

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## ABSTRACT

Workplace violence (WPV) continues to be a pervasive and burdensome issue. Nurses spend more time with patients and families increasing their WPV risk. Unfortunately, nursing programs do not routinely provide education or training on de-escalation or management of WPV. Future and current nurses should acknowledge and receive education for the prevention and mitigation of WPV as well as frequent reviews and updates on current trends and strategies. The purpose of this study was to evaluate the impact of education on knowledge of WPV among pre-nursing students at a Midwestern university. This study used a pre-and post-tests, quasi-experimental design with 99 students. A brief knowledge test was completed by participants both before and after the intervention. Pre- and post-test scores were collected across sections. Analysis of paired sample t-tests demonstrated a 20% average increase in post-test scores with a statistically significant increase from pre-test scores ($t=-11.357$, $p<0.001$). Results indicated that the innovative, virtual simulation module increased participants' knowledge of workplace violence in healthcare. Increased knowledge of and preparation for the WPV workplace would strengthen students' safety readiness for practice with the persistence of WPV against nurses. Prevention and response of WPV education must be an essential component of every undergraduate nursing program following licensure.

**Keywords:** *Nursing students, Simulation, Virtual, Workplace violence.*

**Highlights of this paper**
- Workplace violence remains a significant issue for nurses. This vulnerability underscores the critical need for targeted education and training.
- Nursing programs often lack formal education or training on management of workplace violence, leaving nurses inadequately prepared to handle such situations.
- The study highlights the effectiveness of a virtual simulation module in enhancing students' knowledge of workplace violence demonstrating a 20% average increase in post-test scores.

## 1. INTRODUCTION

WPV continues to be a burdensome issue in healthcare. The National Institute for Occupational Safety and Health (2024) defines workplace violence (WPV) as physical or psychological threats, attacks or harassment that causes harm in the workplace. Violence against nurses and other healthcare professionals is increasing with more than 44% of nurses in a recent student reporting experiences with physical violence and nearly 68% reporting experiences with verbal abuse (Byon et al., 2022). Furthermore, The Joint Commission (2018) indicates that more than 70% of WPV incidents occur in healthcare settings.

Workplace violence (WPV) creates numerous challenges for healthcare workers ranging from financial burden to severe psychological and physical injury (Cannavò, La Torre, Sestili, La Torre, & Fioravanti, 2019; Hassankhani, Parizad, Gacki-Smith, Rahmani, & Mohammadi, 2018). Bystanders and peers may also suffer from witnessing violence (Van Den Bos, Creten, Davenport, & Roberts, 2017). Long-term consequences of WPV may be severe contributing to burnout and driving many nurses to leave the profession (Oneal et al., 2019; Şat, Akbaş, & Yaman Sözbir, 2021) ultimately extending throughout the healthcare system and the community.

Nursing and healthcare professionals must acknowledge the risks of WPV as well as the potential consequences of experiencing or witnessing WPV and be prepared to prevent and respond to these situations. New nurses can be prepared for practice in nursing school and healthcare settings can offer updated information and facility-specific policies and procedures as a follow-up. Cost-effective, consistently replicable methods for providing this education and training must be developed and included in the nursing education curriculum. The authors developed an innovative virtual simulation module as an addition to a quick lecture to address this among prelicensure, traditional Bachelor of Science in Nursing BSN students (4-year undergraduate degree). The purpose of this study was to evaluate the impact of the education (lecture and simulation) on post- education knowledge of WPV. The research question was: What is the impact of an innovative virtual simulation module as a supplement to the lecture, on the post-education knowledge of workplace violence (WPV) among prelicensure and traditional BSN nursing students?

## 2. LITERATURE REVIEW

WPV accounts for most non-fatal workplace injuries due to violence occurring among healthcare professionals (United States Department of Labor, 2018). WPV generates several constraints for healthcare workers from financial liability to post-traumatic stress disorder (PTSD). WPV can be immensely harmful. Incidents of WPV in healthcare are associated with serious adverse health outcomes (Cannavò et al., 2019; Hassankhani et al., 2018). According to a recent qualitative study Hassankhani et al. (2018) nurses described four subcategories of suffering from WPV occurrences in addition to an overall sense of suffering including 1) mental health risks (depression, anxiety and stress). 2) Physical health risks (injuries, sleeping difficulties and chronic stress-related conditions). 3) Threats to professional integrity (loss of interest and burnout, poor nursing interactions and disruptions in care) and 4) threats to social integrity (family disruptions and impairments in activities of daily life).

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Experienced WPV can have severe consequences. Both physiological and psychological trauma can lead to burnout and result in nurses leaving the profession (Oneal et al., 2019; Şat et al., 2021). These damages can further impact one's ability to self-identify and progress (Escribano, Beneit, & Garcia, 2019). It is the cognitive threat to personal integrity (Needham, Abderhalden, Halfens, Fischer, & Dassen, 2005) that may be most psychologically damaging to the nurse who is often viewed or self-proclaimed as a superhero. Ashton, Morris, and Smith (2018) reported victims' complaints of "wounded professionalism" highlighting how WPV may place the nurse in the role of hero and victim simultaneously (Ashton et al., 2018). It is the nurse's responsibility to care for patients but they may also feel a duty to "rescue" patients in all situations. Consequently, if the nurse is unable to effectively handle a challenging patient, they may experience a great deal of guilt or failure (Ashton et al., 2018). Additionally, experiences with WPV are likely to impact perceptions of personal workplace safety and well- being, job satisfaction and work relationships and performance (Copeland & Henry, 2017; Escribano et al., 2019; Wadsworth & Estrada, 2022).

Bystanders and peers may also experience stress-related conditions or trauma from witnessing a violent event in addition to the negative health outcomes reported by victims of WPV (Van Den Bos et al., 2017). Sick leave related to acute injury or chronic conditions, absenteeism, reduced quality of care and staff turnover, extend beyond the individual impacting the entire healthcare system and the community (Hassankhani et al., 2018; Jakobsson, Axelsson, & Örmon, 2020; Van Den Bos et al., 2017). The financial burden to the employee and the facility itself can be detrimental with the negative sequelae associated with in-facility WPV approximating $428.5 million annually (Van Den Bos et al., 2017). Furthermore, relationships with friends and family can be impacted as a result of the frequent transfer of work stress.

Organizations such as the American Nurses Association (ANA), Emergency Nurses Association (ENA), the Joint Commission, NIOSH and the Occupational Safety and Health Administration (OSHA) have made efforts to draw attention to the problem of WPV and have indicated a need for further education and training as well as environmental and other changes to reduce risks but the problem persists (Hester, Harrelson, & Mongo, 2016). There are commercial programs available to prepare and train staff on recognizing hostile and potentially violent situations, de-escalation and physical maneuverability but many facilities do not require or provide training and it can be costly for the healthcare professional to take independently. Nursing schools do not routinely offer these programs as they are often costly to implement, outdated or not consistent in content or approach leaving room for misinformation and poor preparation. Furthermore, few studies have been conducted to examine the effectiveness of these programs in improving awareness, knowledge and skill in preventing or reducing risks associated with WPV.

Nurses should be well- informed and prepared to address hostile and violent situations in the workplace. The issue of WPV in healthcare has received increased attention throughout time and it is continuously recommended that more education and training should be provided (American Nurses Association, 2015; Centers for Medicare and Medicaid Services, 2022; Farrell & Cubit, 2005; Hartley, Ridenour, & Wassell, 2019; The Joint Commission, 2015, 2018).

The literature provides support for the effectiveness of simulation, virtual reality (VR) and cinematic virtual reality (Cine-VR) in healthcare education. Witherspoon, Pankonien, Baldwin, and Hunter (2023) provide evidence to support the use of role-play simulation in increasing empathy among nursing students. Bai et al. (2023) report the development of professional competence and clinical decision-making using simulation. An earlier meta-analysis conducted by Shin, Park, and Kim (2015) offered evidence that simulation can improve learning outcomes and demonstrate improvements in psychomotor, affective and cognitive skills.

There are numerous studies in the extant literature that promote the use of traditional virtual reality (VR) integration into simulation education for nursing students. Many of these studies report positive outcomes for psychomotor skills trainings including tracheostomy care, indwelling catheterization and intravenous catheter insertion among other skills and competencies (Bayram & Caliskan, 2019; İsmailoğlu, Orkun, Eşer, & Zaybak, 2020; Park & Yoon, 2023). Other studies support the use of VR in increasing cognitive and affective qualities such as providing patient education (Harmon, Pitt, Summons, & Inder, 2021) and improving attitudes and communication (Chae et al., 2023; Chang & Chang, 2021). Cine-VR provides a 360° twist to traditional VR offering the user an "immersive, you- are-there experience", with panoramic video and real, living characters instead of avatars or animations (Bowditch, 2022). Interdisciplinary researchers in nursing, social work and medicine report the effectiveness of education using Cine-VR in increasing cultural self-efficacy, altering attitudes and increasing empathy towards the treatment of patients with diabetes (Love & Beverly, 2021) and drug addiction (Shaw, 2022).

Research at the Gaming Research and Immersive Design (GRID) lab at Ohio University supports the use of simulation specifically VR and Cine VR to create memories that the user will remember and can revert to in future situations (Williams, Love, & Love, 2021). Supporters of simulation profess that implementing simulation activities in healthcare education may enhance students self-esteem and confidence thus promoting learning (Koukourikos et al., 2021).

Nursing school affords an opportune time to prepare novice nurses for practice while healthcare settings can provide follow up with updated information and facility-specific policies and procedures. Cost-effective, consistently replicable methods for providing this education and training must be developed and included in nursing education curriculum.

## 3. VIRTUAL SIMULATION DEVELOPMENT

Authors developed the content and video script using best practices available in the literature and second-year nursing students volunteered as actors. Additionally, authors held a face-to-face discussion with a law enforcement officer who offers self-defense training to identify a safe wrist "breakaway" technique that was used in the module. Visual communications students filmed and photographed in the College of Health Sciences and Professions' Simulation Suite and produced the film for the project. The primary author created the basic educational module in Articulate 360 storyline with assistance from instructional design. Storyline is an innovative, virtual course content authoring application that allows the creator to design custom, interactive learning modules and courses that can be used on numerous devices (Articulate Global Incorporated, 2021). The educational module was further developed to include video clips, assessment breaks and a separate 360° hotspot room in the Adobe Connect platform with assistance from Instructional Design and the Office of Instructional Technology (OIT).

The simulation module took approximately 15 minutes to complete and began with a description of the problem of WPV in healthcare, examples of WPV, statistics of incidents and underreporting. A final "introduction" slide introduced the module format and expectations. The following are the module learning objectives: 1) describe the types of workplace violence experienced in healthcare. 2) Explain the risks associated with WPV in healthcare. 3) Identify strategies for reducing provider risk for harm and 4) demonstrate recommended strategies for de-escalation during tense or violent encounters.

The first video clip shows the nurse coming down a hallway towards patient rooms with a security guard nearby. The nurse enters the room and begins to assess the patient leaning over him while he sleeps. The clip pauses to allow the student to reflect on a quick observation of the nurse's appearance and behavior that may increase the nurse's risk for harm (such as wearing a lanyard or stethoscope around the neck or leaning over an

unconscious patient). The student is given the correct responses and explanation regardless of their responses to the questions and the next clip begins once they click "submit". The brief clips continue with a reflective pause and question after each clip. The nurse is faced with a situation in which the disoriented client grabs her wrist and refuses to let go with progression to the patient shoving the bedside table and knocking items to the floor. The nurse must then decide to break away from the patient's grip and attempt to exit safely from the room. The student then has another reflection opportunity to identify actions by the nurse that were not best practices in this situation (such as backing up against a wall). The video ends with a security guard entering the room and a review of best practices in similar incidents. The final slides of the module include descriptions of the four types of WPV, high-risk areas for WPV in healthcare, common signs for impending violence, tips for defusing hostile situations, and general information about the use of self-defense techniques when all else fails. Links and references for additional resources are included at the end of the module.

The AIA Simulation Lab 360° Hotspot Room consisted of a full panoramic view of the hospital room without the patient or staff that allows the user to click on the hotspots to identify items that could potentially be used as weapons by a hostile or violent patient or visitor. Upon opening a hot spot item, the user can read text and hear audio related to the use of the item as a weapon (see Figures 1 and 2).



**Figure 1.** AIA simulation lab 360° hotspot room presented in Adobe Connect.
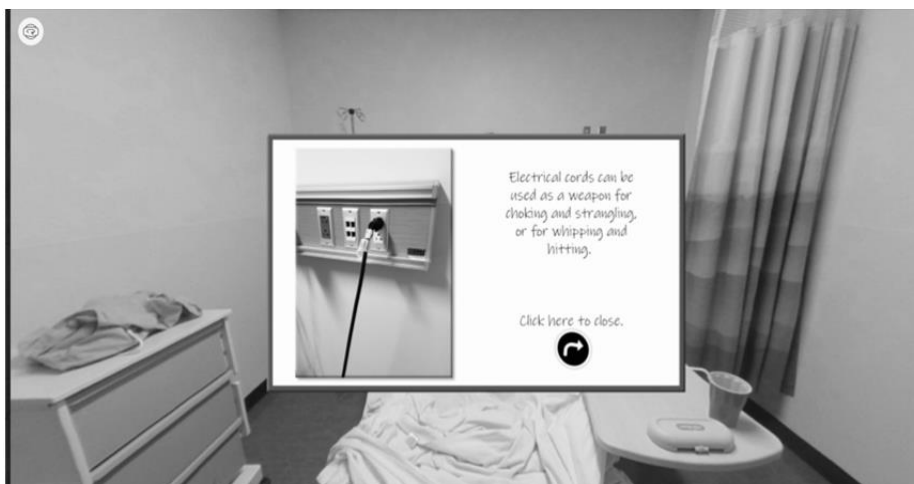


**Figure 2.** AIA simulation lab 360° hotspot room with open hotspot.

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## 4. METHODS

### 4.1. Research Design

This study used a pre- and post-test quasi-experimental design with 99 students. A 45-minute synchronous online lecture on WPV was provided to students as part of an introductory pre-nursing course. Students also had to complete the virtual simulation module and 360° hotspot room activity posted in the university's learning management system (Blackboard Learn) and repeat the 10-question quiz (scored up to 100%) within 48 hours.

### 4.2. Research Population

The virtual simulation module was offered to enrolled pre-licensure BSN, pre-nursing students (n=99) at Ohio University, Athens, Ohio, USA. Students were primarily traditional age students, between 18 and 23 years old. Demographics related to age, race or ethnicity, gender or sex, socioeconomic status, etc., were not collected. All students enrolled in the pre-nursing course and clinical judgement were included in this study.

### 4.3. Institutional Review Board Statement

This study analyzed data collected retrospectively after an educational activity situated in the context of a pre-nursing course. Data was collected from courses that were offered during both the fall and spring semesters. Only de-identified data in the form of pre- and post-test scores was analyzed. The ethical committee (Institutional Review Board) of Ohio University, USA, approved (through exemption based on review category 2, educational tests without the involvement of the investigators) on November 18, 2020, (Institutional Review Board #20-E-354).

### 4.4. Instrument

The lecture materials and quizzes were not tested for validity or reliability because they were intended to be a mandatory and non-graded assessment of WPV knowledge. The quiz used for implementation in this study was faculty-developed using questions related to types of WPV, potential indicators for impending violence, common motivators for WPV and post-incident recommendations presented in the literature. Topics for the quiz were identified using NIOSH's Workplace Violence Prevention for Nurses course from the literature and from lecture materials created by faculty. The quiz was considered a closed book with 10 questions. Students had 15 minutes and one sitting to complete the assessment. Questions were presented randomly (computer-generated randomization) and one question at a time to limit the likelihood of cheating. The quiz included select all that apply, true/false, multiple choice and matching questions. Sample questions are given below. Which of the following are types of workplace violence and a matching prompt: Match the type of workplace violence with the example that best demonstrates that type.

Since this was a pre-nursing course, most questions were developed at the remember and understand levels of Bloom's Taxonomy. Students completed the pre-test assessment in the physical classroom using the Blackboard learning management system. Students were asked to complete the post-test (same assessment) through the learning management system after the educational intervention.

## 5. RESULTS

Paired t-test analyses using SPSS version 27 were conducted on pre- and post-education quiz scores to determine changes in mean scores. Paired t-test analysis demonstrates a significant change in scores before and after the education was provided (t=-11.357, p<.0010 with a mean increased score greater than 20% (see Table 1).

**Table 1.** Paired samples statistics and results.

| Test | Mean | Std. dev. | 95% CI of the difference | | t value | Sig. |
|---|---|---|---|---|---|---|
| | | | Lower | Upper | | |
| Pre-test | 50.40* | 17.078 | | | | |
| Post-test | 71.11* | 16.218 | | | | |
| Pre- and post-tests | -20.707 | 18.141 | -24.325 | -17.089 | -11.357 | <0.001 |

**Note:** *Mean score for pre-and post-tests expressed as a percentage.

## 6.. DISCUSSION

There are few studies exploring the effectiveness of WPV education or training in increasing knowledge of WPV and reducing the overall incidence of aggressiveness in the healthcare workplace. However, a few studies indicate that training for violence prevention (with nursing students and licensed nurses) can be effective in improving ability to cope with and manage WPV (Jeong & Lee, 2020; Young, Fawcett, & Gillman, 2022). Furthermore, nursing students have reported benefits of WPV awareness and prevention training, including completing the National Institute for Occupational Safety and Health's (NIOSH) Workplace Violence Prevention for Nurses online course (Brann & Hartley, 2017). Our virtual simulation module added innovation to current online courses and trainings by including a virtual simulation and interactive hotspot activity.

The purpose of this study was to evaluate the impact of the educational training (lecture and simulation) on knowledge of WPV among pre-nursing students. Pre-education quiz scores indicate students have a lack of understanding of the types of WPV and precipitating factors as well as strategies for defusing and responding in hostile situations. The use of a virtual simulation module allowed students to engage with scenarios in a realistic and interactive way enhancing the overall learning experience. Furthermore, the interactive hotspot activity provided an opportunity for students to apply practical knowledge and skills reinforcing their learning.

Like Cai et al. 's (2023) examination of the effectiveness of WPV prevention education, this study also developed an intervention based on the expectations of clinical nurses. Cai et al. (2023) demonstrated that practical strategies tailored specifically to clinical nurses reduced the incidence and severity of WPV incidents and improved their coping resources. Using simulation in this study may improve the realism of the interventions and methods being taught. According to Ainsworth, Perumal, and Pillai (2023), increased realism can improve learning and increase preparation for real-life situations. Wu, Chen, Hsieh, Clinciu, and Tung (2019) and Ming et al. (2019) reported similar findings in their studies of simulation training to promote confidence and self-perception in managing WPV suggesting simulation as a valuable tool for enhancing preparedness and competence.

Krull, Gusenius, Germain, and Schnepper (2019) studied the impact of comprehensive computer and simulation-based training on management of violent patient behaviors. Results demonstrated a significant improvement in knowledge (21%) as well as improvements in skills, confidence, abilities and preparedness. This study not only highlights the effectiveness of simulation-based trainings but also emphasizes the value of combining different educational modalities to maximize learning outcomes. Pre-and post-test comparisons of mean scores using t-test analysis demonstrate that the virtual simulation module coupled with traditional (online) lecture pedagogy is effective in increasing students' knowledge of WPV in healthcare. The result of this study (20% increase in knowledge scores) is comparable to that reported by Krull et al. (2019).

## 7. IMPLICATIONS

Additional research is recommended with a larger more diverse sample size with variations on instructional delivery. Anecdotal comments from students who completed the simulation module indicate that the training and the interactive component of the hot spot room were well-received and enjoyed, so it is reasonable to conclude that

future use of interactive technologies would be of value. Authors suggest longitudinal incorporation of WPV education throughout the curriculum (increasing with each grade level) with simulations (virtual or face-to-face) becoming more intense and realistic to promote repetition and retention of knowledge and as Bowditch (2022) described, create memories from which to draw in future situations.

## 8. RELEVANCE FOR PRACTICE

Increased knowledge and preparation for WPV in the healthcare workplace would strengthen students' readiness for practice and can improve patient safety, reduce anxiety and fear, support professional development, and foster a culture of safety. Educating healthcare workers about workplace violence will better equip them to recognize the signs of potentially impending violent situations and respond early to de-escalate the perpetrator(s). This may reduce the number of incidents that escalate to physical violence or injury. A reduction in incidents may increase feelings of safety in the workplace, reduce injury and associated trauma and limit burnout and attrition from the nursing profession. Training to handle WPV can increase confidence in one's ability to manage challenging situations and this confidence can lead to better decision-making in stressful situations. Knowledge and preventive strategies contribute to a more positive work environment by reducing the frequency and severity of WPV incidents which fosters a culture of safety and respect. Furthermore, healthcare institutions and institutions of higher learning have a legal and ethical obligation to provide a safe working environment and to ensure that future professionals are aware of their rights and protocols in place to protect them and their patients or clients.

## 9. CONCLUSION

Workplace violence in healthcare is a persistent multifaceted issue with serious consequences for nurses, healthcare professionals, patients, families and the community. The negative sequelae associated with WPV is far-reaching impacting the physical and psychological well-being of those involved as well as the quality of care and financial stability of healthcare institutions. Though the media, healthcare stakeholders and prominent organizations continue to call attention to the issue of WPV in healthcare, there remains a great need for cost-effective, evidence-based and consistently replicable education and training to prevent and ameliorate the burden of WPV. The results of this study suggest that WPV education presented with traditional lecture and virtual simulation increases knowledge of WPV leading to improve prevention and management strategies in healthcare settings.

## 10. LIMITATIONS

Limitations to this study include a relatively small sample size (n=99) including only pre-nursing students at a traditional 4-year university. A technology-driven simulation may be less effective if it only includes pre-nursing students, usually younger than their non-traditional student counterparts. There were multiple course sections used for the collection of data, each with a different nursing faculty lead. Consequently, though the lecture content was the same, there may have been some variations in how the lecture material was presented. Additionally, as the study explored the impact of traditional lecture and virtual simulation, it is unclear if the simulation is effective in increasing knowledge as a separate training or if further development is necessary.

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## Appendix

The link to the Simulation Lab 360° Hotspot Room developed as part of this study, can be accessed here:

https://connect.ohio.edu/pe7q48jejhmo/