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Investigating Physical Violence Against Classroom and Other School Personnel Using Ohio Workers' Compensation Data: 2001–2012

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Abstract

This study uses workers' compensation data to explore the extent, severity, and context of violence-related injuries sustained by classroom (teachers and aides) and other personnel (e.g., administrators, education support specialists, security, custodial and maintenance workers, food workers) in Ohio's K-12 urban public schools. The Ohio Bureau of Workers' Compensation provided access to claims filed by workers from the state's nine urban school districts from January 01, 2001 to December 31, 2012 (N = 19,508). Injury trends were explored with descriptive statistics and logistic regression analyses. Approximately 25% of all claims filed were violence-related. Overall, violence-related injury rates remained relatively stable from the 2001–2002 to the 2011–2012 academic year. However, the odds of victimization for classroom personnel were 1.84 times the odds of victimization for other personnel. For both classroom and other personnel, the most commonly-sustained injuries resulting from a violent event included contusions; sprains to the neck, back, and upper or lower extremities, and open wounds. Most violence-related injuries were sustained during direct contact with students displaying escalated or aggressive behavior, or during efforts to de-escalate third-party violence. Implications of using workers' compensation data to inform workplace violence research and practice are discussed.

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Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Disclaimer

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author, SJN. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

Keywords

school violence; school health; workplace violence; occupational health; occupational injury; workers' compensation; injury claims

Introduction

In 2018, approximately 8.6 million U.S. workers were employed in elementary and secondary schools (Bureau of Labor Statistics [BLS], 2019a). The majority of these workers were classroom personnel, classified under Standard Occupation Classification (SOC) code 25–0000: Education, Training, and Library Occupations. Approximately 38% (3.2 million) held K-12 teaching positions, 13% (1.1 million) worked as teaching assistants or aides, and 5% (430,410) were employed as special education teachers. The remaining 44% were in non-classroom positions in areas such as administration, food service, janitorial service, other service (e.g., library, healthcare, and technology services), security, and transportation.

Reports published by the National Center for Education Statistics (NCES) indicate that nonfatal work-related physical violence is a growing concern for classroom personnel in U.S. schools. During the 2015–2016 academic year, 10% of public school teachers reported being threatened with injury by a student, and 6% reported being physically attacked by a student (Musu, Zhang, Wang, Zhang, & Oudekerk, 2019). Elementary public school teachers were more likely than secondary public school teachers to be victimized by a student attack (9% v. 2%; Musu et al. 2019), a finding that has been reported in previous studies as well (e.g., Anderman et al. 2018). Though NCES limits its occupation-based investigations to teachers' experiences of physical violence, evidence from other sources suggests that teachers are at increased risk for physical assault compared to several other education occupations, such as administrative support, transportation, security, food service, and janitorial services (Tiesman, Konda, Hendricks, Mercer, & Amandus, 2013).

Nonfatal physical school violence against classroom personnel is an important public health topic because of its detrimental consequences for school systems. The majority of studies on this topic focus specifically on violence against teachers and have found that victimization increases teachers' risk for developing depression; anxiety; sleeping difficulties; and symptoms of post-traumatic stress disorder, including feelings of fear and helplessness (Daniels et al., 2007; Galand et al., 2007; Gerberich et al., 2011). Victimized teachers may also exhibit poorer job performance and increased job dissatisfaction and burnout (Fisher & Kettl, 2003; Wilson et al., 2011). This may adversely affect the quality of education students receive (Fisher & Kettl, 2003). Schools may also struggle to retain adequate staffing levels when teachers who experience physical assaults transfer to new schools or exit the profession entirely (Galand et al., 2007; Gerberich et al., 2011).

Despite the evidence of its adverse systemic consequences, little is known about the context and circumstances in which classroom personnel—including teachers and aides—are victimized (Espelage et al., 2013; Reddy, Espelage, Anderman, Kanrich, & McMahon, 2018). This dearth of empirical evidence hinders our ability to generate theories and models

of work-related violence that account for the unique experience of working in a classroom environment.

Recently, Schofield, Ryan, and Stroinski (2017) indirectly demonstrated that workers' compensation (WC) systems can serve as a useful data source when investigating physical school violence. WC is an insurance program that provides medical benefits, rehabilitation services, and replacement of lost wages to employees who are injured as a result of their jobs. In their investigation of WC claims resulting from student-inflicted injuries to Minnesota school employees, Schofield et al. found most events included some form of student-perpetrated violence, such as students who were acting out (45%); needing to be escorted, restrained, or held (15%); or fighting (3%). Workers most frequently sustained contusions (39%), sprains/strains (38%), puncture wounds (6%), and lacerations (6%) as a result of these events. Licensed staff (teachers, administrators, and counselors) were at increased risk of student-related injury compared to clerical, custodial, and nutrition workers; and education assistants were at increased risk of student-related injury compared to licensed staff.

Schofield et al. (2017) specifically encouraged future studies to leverage WC data from other states to investigate education worker injuries. The current study directly responds to that call by using Ohio WC data to explore the violent victimization of K-12 urban public school workers. As the eighth-largest school system in the U.S., Ohio is a rich source of education sector data (National Center for Education Statistics [NCES], n.d.). In Ohio, WC is a state-run program where all employers must be insured by the Ohio Bureau of Workers' Compensation (OHBWC), with two exceptions: coverage is voluntary for sole proprietorships and partnerships, and financially-capable employers with 500+ employees may be self-insured. At the time of the current study, 97% of Ohio's 614 public school districts were insured by OHBWC.

This study specifically uses WC data from nine urban school districts ensured by OHBWC. Each of these districts are considered large in size (enrollment of 9,750 or more) and have a high percentage of students (55% or more) who are considered economically disadvantaged because they qualify for free- or reduced-price lunch (i.e., have a family income below 185% of the U.S. federal poverty level), receive public assistance (e.g., SNAP, Medicaid, TANF, SSI, Section 8 housing, or LHEAP), or meet the income guidelines specified for Title I (Ohio Department of Education [ODE], 2018). The rationale for focusing on these districts is twofold. First, research suggests that large school size, urban location, and high poverty levels are risk factors for school violence (Adams & Mrug, 2019; Berg & Cornell, 2016; Gerberich et al., 2014; McMahon et al., 2014; Reddy et al., 2018; Tiesman et al., 2014). Second, a stakeholder working group convened by OHBWC recently identified these nine urban districts as strategic safety priorities for Ohio's school system.

Exploration of the WC data was guided by three research questions:

RQ 1. What types of injuries are associated with violence against workers in Ohio's urban public schools?

RQ 2. How does the probability of injury by violence for classroom personnel compare to the probability of injury by violence for non-classroom personnel?

RQ 3. What characteristics describe the violent incidents that result in physical injury to classroom and non-classroom workers?

Method

Study population

ODE supplied full-time equivalent (FTE) employee counts by occupation. FTE data for the 2005–2006 to 2011–2012 academic years (July 01, 2005 – June 30, 2012) were downloaded using the Advanced Reports feature of the online Ohio School Report Cards (ODE 2018). At the authors' request, ODE Office of Data Quality and Governance provided data for academic years 2001–2002 to 2004–2005 (July 01, 2001 to June 30, 2005). All occupation groups were included. When the datasets were combined, the population of interest included 440,146 FTE. Classroom personnel (teachers and aides) accounted for approximately 58% (N = 255,235) of the FTE. The remaining 42% were non-classroom (other) personnel (e.g., administrators; support staff; custodial, maintenance, or food service workers; security guards).

Workers' compensation data—OHBWC maintains a database of all claims filed through the WC program. Each claim contains claim metadata (e.g., date filed, associated medical treatment and lost time remuneration benefit), employer data (e.g., industry, public or private standing), injured worker data (e.g., date of birth, gender), and injury data (e.g., type of injury sustained). Each claim also contains an open-field narrative describing the incident during which the worker was injured. In 2010, OHBWC entered into a research partnership with the U.S. National Institute for Occupational Safety and Health (NIOSH) to permit the use of de-identified claims for occupational injury surveillance (Wurzelbacher et al., 2016). This partnership is covered by NIOSH IRB protocol 11-DSHEFS-01XP.

The current study examined all de-identified claims filed between January 01, 2001 and December 31, 2012 for the nine public school districts. These represent all relevant claims available for analysis under the data use agreement at the time the research was conducted. From 2001–2012, OHBWC allowed (i.e., reviewed and deemed compensable) 19,508 claims filed by workers from the nine districts. Available claimant characteristics are summarized in Table 1.

Data Coding Approach

Using Schofield et al. (2017) as a guide, the authors generated an in vivo codebook for study measures derived from the WC claim narratives (see Appendix A). Two authors were randomly assigned to each WC claim. They completed independent manual reviews of the claims, providing one value for each codebook variable. Initial inter-rater coding agreement ranged from 62.6% for *intent* to 99.0% for *source*. All four authors collectively discussed each instance of inter-rater disagreement until 100% agreement was reached for all codes assigned to each claim. The codebook, including exemplar claims for each code, is presented as Appendix A.

Measures Derived from WC Claim Narratives

Dependent variable—Experience of physical violence was the outcome of interest. The authors adapted the Work + Family Researchers Network (WFRN, 2018) definition of physical violence to operationalize *physical school violence* as 'the use of physical force with the potential for causing death, disability, injury, or harm in a school setting. Examples include, but are not limited to, scratching; pushing; shoving; throwing; grabbing; biting; choking; shaking; slapping; punching; burning; use of a weapon; and use of restraints or one's body, size, or strength against another person.' Each claim narrative was reviewed against this definition and coded as either *not violence-related* or *violence-related.* Appendix A provides an exemplar claim for each violence category.

Intent—Perpetrator intent described in each claim narrative was defined as 'purposely injuring a worker' and was coded as one of the following: (1) *clearly had intent*; (2) unclear but *likely had intent* based on narrative context; or (3) *had no intent*. Appendix A provides an exemplar claim for each intent category.

Nature—Similar to Schofield et al.'s (2017) scheme, the nature of described events leading to worker injury was coded as one of the following for each claim: (1) students with *escalated/aggressive behavior* making contact or throwing objects at worker; (2) worker *intervening on violent event* (e.g., an in-process fight); (3) worker implementing a behavioral, safety, or discipline *student intervention* (e.g., restraining a student); (4) *non-deliberate* actions (e.g., slip/trip/fall; knocked off balance; run and collide); (5) worker *assisting* with student toileting, transfers, lifting, or mobility; and (6) contact by *other adult* (e.g., coworker, parent) with escalated or aggressive behavior. Appendix A provides an exemplar claim for each nature category.

Measures Derived from Other WC Claim Fields

Occupation—Claimant occupation was assigned based on two fields: occupation name supplied by the claimant, and the SOC code supplied by the claimant's managed care organization. Unfortunately, patterns of mismatch and missingness were common across these two fields (e.g., the supplied occupation name was 'teacher' but the SOC field indicated aide, or vice versa; an occupation name was provided but the SOC field was blank, or vice versa). Because these data could not be triangulated against other records (e.g., employment files) to rectify discrepancies, all claims were conservatively divided into two occupation groups for the current analyses. Any claims referencing 'teacher' or 'aide' in the occupation or SOC field were collapsed into a *classroom personnel* (classroom) group, and all others (e.g., administration, office and educational support, custodial, maintenance, food service, security) were collapsed into an *other school personnel* (other) reference group. Position codes in the ODE FTE data file were similarly recoded to yield *classroom* and *other* groups for the underlying population.

Special education—The authors reviewed occupation name, SOC code, and the incident narrative for mentions of special education. If any of these fields denoted a special education affiliation for either the victim or perpetrator(s), the authors coded the claim as *special*

education. Otherwise, the claim was coded *not special education.* Appendix A provides an exemplar claims for each special education category.

Injury type—OHBWC maintains and applies a proprietary protocol that identifies a primary injury *type* (e.g., open wound, sprain, fracture, contusion, superficial injury) for each filed claim. OHBWC designated primary injury codes for all claims in advance of data sharing with NIOSH. For single-injury claims, the primary injury code represented the sole listed injury. For multi-injury claims, the primary injury code represented the injury associated with the greatest average number of missed workdays according to historic WC trend data.

Injury severity—For internal purposes, OHBWC defines *medical only* (*MO*) claims as those filed for injuries requiring medical treatment and fewer than eight lost workdays, and *lost time* (*LT*) claims are those filed for injuries requiring medical treatment and eight or more lost workdays. OHBWC designated each claim as either MO or LT in advance of sharing data with NIOSH. For the current study, MO claims were considered representative of less severe injuries, and LT claims were considered representative of more severe injuries.

Injury probability—Probability of injury was calculated as a ratio of OHBWC data to ODE FTE data. Total cross-district WC claims filed with OHBWC served as the numerator. Total cross-district ODE FTE count served as the denominator. Because ODE FTE data are available by academic rather than calendar year (i.e., from July 1 to June 30 rather than January to December), OHBWC claims filed between January 1, 2001 and June 30, 2001 (N = 1,023) or July 1, 2012 and December 31, 2012 (N = 583) were excluded from the numerator. Separate ratios were calculated for classroom and other personnel. Separate probabilities were calculated for classroom and other school personnel for violence-related and nonviolent injuries.

Violence-Related Injury Probability for Classroom Personnel

The numerator for this ratio was the total number of WC claims filed by classroom personnel employed by the nine priority districts for violence-related injuries sustained July 01, 2001 to June 30, 2012. The denominator was the total number of classroom (teacher and aide) FTE employed by the nine priority districts from July 01, 2001 to June 30, 2012.

Violence-Related Injury Probability for Other School Personnel

The numerator for this ratio was the total number of WC claims filed by other (non-classroom) personnel employed by the nine priority districts for violence-related injuries sustained July 01, 2001 to June 30, 2012. The denominator was the total number of other school (non-classroom) FTE employed by the nine priority districts from July 01, 2001 to June 30, 2012.

Nonviolent Injury Probability for Classroom Personnel

The numerator for this ratio was the total number of WC claims filed by classroom personnel employed by the nine priority districts for nonviolent injuries sustained July 01,

2001 to June 30, 2012. The denominator was the total number of classroom (teacher and aide) FTE employed by the nine priority districts from July 01, 2001 to June 30, 2012.

Nonviolent Injury Probability for Other School Personnel

The numerator for this ratio was the total number of WC claims filed by other school personnel employed by the nine priority districts for nonviolent injuries sustained July 01, 2001 to June 30, 2012. The denominator was the total number of other school (non-classroom) FTE employed by the nine priority districts from July 01, 2001 to June 30, 2012.

Data Analysis

Descriptive statistics were calculated using all available claims data (January 01, 2001 to December 31, 2012) to answer RQ 1 and RQ 3. RQ 2 was answered using mixed model logistic regression using the reduced sample of academic year data (July 01, 2001 to June 30, 2012). RQ 2 was answered with mixed model logistic regression. Descriptives were calculated using SPSS Version 25 (IBM Corp., Armonk, NY). Logistic regressions were performed using SAS® Version 9.4 (SAS Institute, Cary, NC).

Results

RQ 1. What types of injuries are associated with violence against workers in Ohio's urban public schools?

From January 01, 2001 to December 31, 2012, 25% (N = 4,798) of the 19,508 claims filed by workers in Ohio's nine priority districts were for violence-related injuries. Classroom personnel filed 71% (N = 3,426) of these claims, and other personnel filed the remaining 29% (N = 1,372). Violence-related claims represented 38% of all claims filed by classroom personnel and 13.1% of all claims filed by other personnel.

Table 2 presents violence-related injury counts for classroom and other personnel. For each group, injury counts are organized by severity (MO or LT). The table is limited to the 12 most frequently occurring injuries for the sake of readability, with the remaining injuries collapsed into an *other* category. Overall, the majority of violence-related claims filed were less severe (MO) for both classroom (78.7%; N = 2,700) and other personnel (67.2%; N = 922). The most common violence-related injuries for classroom and other personnel were similar: contusions (36.3% v. 34.5%), upper extremity sprains (15.0% v. 13.9%), back sprains (11.0% v. 11.4%), open wounds (8.1% v. 6.3%), neck sprains (7.0% v. 6.6%), and lower extremity sprains (6.2% v. 10.6%).

RQ 2. How does the probability of injury by violence for classroom personnel compare to the probability of injury by violence for non-classroom personnel?

Figure 1 depicts injury rate trends for classroom (Panel A) and other personnel (Panel B). In the stacked area charts, violence-related injuries are represented by black fill, and nonviolent injuries are represented by gray fill. Where total injury rates remained relatively constant over time for classroom personnel (3.3 per 100 FTE in 2001–2002, compared to 3.1 per 100 FTE in 2011–2012), they showed a modest decline over time for other personnel (5.7 per 100 FTE in 2001–2002, compared to 4.4 per 100 FTE in 2011–2012). Violence-related

injury rate trends, however, remained relatively constant for both classroom personnel (1.1 per 100 FTE in 2001–2002, compared to 1.2 per 100 FTE in 2011–2012) and other personnel (0.6 per FTE in 2001–2002, compared to 0.7 per 100 FTE in 2011–2012).The rate of violence-related injuries was also consistently higher for classroom personnel than other personnel for each academic year.

A mixed-model logistic regression analysis was conducted to assess relationship between occupation group (IV) and probability of violence-related injury (DV). The model was adjusted for school year (fixed effect) and district (random effect). The results of the regression are presented in Table 3. Controlling for district, the association between school year and violence-related injury rate was statistically significant, $F(10, 174) = 3.98$, $p < .0001$. After accounting for this year-based injury rate variability, the association between occupation and injury rate was also statistically significant, $F(1, 174) = 327.95$, $p < .0001$. Controlling for school year and district, the odds of violence-related injury for classroom personnel across all school years were 1.84 times the odds of violence-related injury for other personnel (95% CI [1.72, 1.97]).

To see if violence-related injury odds differed from overall injury odds, a second mixed-model logistic regression was conducted to compare odds of injury from any cause for classroom and other school personnel. This model was also adjusted for school year (fixed effect) and district (random effect), and the results are presented in Table 3. Controlling for district, the association between school year and rate of injury from any cause was statistically significant, $F(10, 174) = 5.73$, $p < .0001$. After accounting for this year-based injury rate variability, the association between occupation and injury rate was also statistically significant, $F(1, 174) = 973.13$, $p < .0001$. Controlling for school year and district, the odds of injury from any cause for classroom personnel were significantly lower than the odds of injury for other personnel ($OR = 0.62$ [0.60, 0.64]).

RQ 3. What characteristics describe the violent incidents that result in physical injury to classroom and non-classroom workers?

Table 4 presents frequencies for perpetrator intent, situational nature, and special education affiliation for violent incidents that resulted in physical injury to classroom and other school personnel from January 01, 2001 to December 31, 2012. For each occupation group, frequencies are organized by injury severity (MO or LT). Characteristics were similar for MO and LT claims within each occupation group. Perpetrator intent to harm was clear or likely in nearly all cases for both classroom (97.4%) and other personnel (98.2%). The most common reasons classroom personnel sustained violence-related injuries were: (1) having direct contact with students displaying escalated or aggressive behavior (40.9%); (2) intervening on or trying to de-escalate a violent event involving two or more other people (34.6%); and (3) administering some other type of student intervention (19.4%). The order was slightly different for other personnel, who were most often injured when intervening in or trying to de-escalate a violent event involving others (48.2%), followed by having direct contact with students displaying escalated or aggressive behavior (27.4%) and administering some other student intervention (20.1%). The victim or perpetrator had a noted affiliation

with special education in 12.1% of violent events involving classroom personnel and 3.9% of violent events involving other school personnel.

Discussion

This study sought to compare the type, severity, and probability of violence-related injuries sustained by classroom and other personnel in Ohio's urban public schools and to describe the events during which each occupation group is victimized. To the best of the authors' knowledge, this is the only study that has responded to Schofield et al.'s (2017) call for WC-based investigations of school worker injuries.

Violence-Related Injury Prevalence and Types for Classroom and Other Personnel

Approximately 25% of all WC claims reviewed in the current study were filed as a result of violence-related injuries, and nearly all of these stemmed from events in which students were the perpetrators. This finding aligns with Schofield et al. (2017), where 26% of WC claims were the result of student-perpetrated injuries. In the current study, injuries sustained by classroom and other personnel were similar. The most common violence-related injuries sustained by both groups were contusions; sprains to the back, neck, and extremities; and open wounds. These findings are also consistent with Schofield et al. (2017), where the most common student-inflicted injuries to Minnesota education workers included contusions, sprains/strains, and lacerations or punctures. Given that both Minnesota and Ohio are Midwestern states, however, the generalizability of these findings is geographically limited. Where the current study focused on large urban public schools with high attendance by economically disadvantaged students, Schofield et al. analyzed data from multiple district types (public, charter, integration, and intermediate) from both metropolitan and outstate regions. Therefore, the similarities in findings across the two studies provide evidence of potential generalizability of findings across a variety of school settings. However, it is worth noting that both Minnesota and Ohio are Midwestern states, which may geographically limit the generalizability of these findings due to known differences in student demographics and disadvantage across U.S. census regions (Logan & Burdick-Will 2017). Additional studies using WC data from the West, South, and Northeast census regions are needed to enhance the evidence of generalizability to all K-12 schools across the U.S.

As can be seen in Fig. 1, the overall injury rate for other school personnel was the only rate to modestly decline over time. Overall injury rates for classroom personnel and violence-related injury rates for both classroom and other school personnel, on the other hand, remained relatively constant over time. Despite the stability of violence-related injury rates for both groups, the current study found classroom personnel (teachers and aides) experience violence-related injuries at a rate nearly twice that of other school personnel. This may be due, at least in part, to the nature of classroom-based work. Teachers and aides are required to engage in constant interaction and relationship building with others, especially students (National Center for O*NET Development 2018). Therefore, compared to other school occupation groups, classroom personnel may have a greater chance of experiencing violence at work every day simply because their jobs involve more direct contact with students (Espelage et al. 2013; McMahon et al. 2014).

Though we collapsed teachers and aides into a single category in the current study due to data limitations, more fine-grained occupational analyses have found that aides – especially special education assistants – are at increased risk of physical assault or injury by a student when compared to general education teachers and other licensed school staff members (Schofield et al., 2017; Tiesman et al., 2014). Aides spend a large portion of their working time engaged in one-on-one interactions with students for the purposes of both instruction and self-care (BLS, 2019b). This may leave them at increased risk for violence compared to their licensed teacher counterparts, who spend more time engaging with students at the group level. Our review of the extant literature, however, uncovered no studies that attempt to systematically differentiate the risk factors of violent victimization for teachers and aides. Future research comparing risk rates and factors for these two classroom-based occupation groups is clearly needed.

Characteristics of Violent Events Against Classroom and Other Personnel

In the current study, perpetrators exhibited clear or likely intent to harm workers in nearly all instances of violence, suggesting these events were not accidental. Escalated student behavior was the most common contextual factor involved in violence-related injuries to classroom personnel, and it was the second most common factor for violence-related injuries to other school personnel. This difference may be due to the fact that general classroom management responsibilities include preventing inappropriate behaviors from escalating in the classroom (Shukla-Mehta & Albin, 2003). When attempts to redirect or de-escalate inappropriate student behavior fail, student actions toward classroom personnel may become violent, regardless of intent. To date, evidence-based recommendations for preventing classroom violence have been published for teachers (Espelage et al. 2013). However, previous research also suggests factors such as negative school culture, lack of administrative support, time pressures, inadequate professional development, and family and student disengagement can all serve as barriers to controlling students' problem behaviors (Bambara et al. 2009). As such, additional studies of classroom management specific to student-inflicted violence—especially those taking an ecological view of the school system--are needed in order to grow the evidence base around barriers, facilitators, and viable prevention solutions.

Of great concern in the current study are the rates at which third-party violence-related claims were filed by classroom and other school personnel. More than one-third (34.6%) of classroom personnel and almost half (48.2%) of other school personnel sustained injuries as a result of intervening on third-party violence. This finding is notably higher than the 3.3% of education workers injured while breaking up fights in Schofield et al. (2017). Though the exact reason for this discrepancy between studies is unclear, one possible explanation is the differences in school types included in the two studies. Where Schofield et al. included all Minnesota school districts (urban and non-urban; public and other) in their analyses, the current study focused on large urban public school districts with high poverty rates. Previous research suggests schools fitting these criteria experience higher rates of overall school violence (Adams and Mrug 2019; Berg and Cornell 2016; Gerberich et al. 2014; McMahon et al. 2014; Reddy et al. 2018; Tiesman et al., 2014). Additional WC-based studies of violence occurring in a variety of states and school district types are needed in order to

more clearly identify factors that influence reported school violence rates, including school demographics, the existence and enforcement of school violence policies, or the research approach used to investigate prevalence of violence.

Of additional note, the rates of injury from intervening on third-party violence for classroom (34.6%) and other school personnel (48.2%) were not as disparate as we anticipated for the current study. The rates become even more concerning when the 1,846 instances of intervening on third-party violence are reviewed in isolation: 64.2% of these were filed by classroom personnel, and only 35.8% were filed by other school personnel. We assumed other school personnel would account for the majority of these injuries because this reference group included school security staff, who are tasked with responding to ongoing emergencies, such as in-process violent events on school property, and school bus drivers, who are responsible for managing order and safety (often without additional onboard security oversight) while transporting students to and from school (Bureau of Labor Statistics 2018a; Bureau of Labor Statistics 2018b). Additional studies are needed to further explore the factors that leave classroom personnel so vulnerable to injury from third-party violence in the school setting while security guards and other administrators are also present. These studies may include investigations of the intra- and interpersonal factors that affect classroom personnel's feelings of responsibility around third-party violence de-escalation, or district- and school-level policies around intervening on third-party violence.

While working with special education students accounted for 39% of assaults self-reported by Pennsylvania education workers (Tiesman et al., 2014), only 9.8% of violence-related WC claims were clearly affiliated with special education in the current study. Though the exact reasons for this difference are unclear, it is possible that WC claim narratives and occupation fields do not fully capture special education affiliations for victims and aggressors. In addition, because data were only identifiable to the district level, it is unknown if special education affiliations we did identify in the WC claims denote victim/perpetrator associations with a dedicated special education organization or special education services that are integrated into a traditional school setting. In the case of the latter, it is further unknown if victims' special education affiliations are full- or part-time within the school setting, which would have implications for the probability of injury in a special education circumstance. In addition, it is important to note that the two studies relied on different data sources to explore violence-related injuries for school personnel. Where the results of the current study are based on WC claims data, the findings of Tiesman et al. (2014) are derived from a cross-sectional self-report survey that was mailed to a random sample of education workers. Each data collection method has unique strengths and limitations, and direct comparison across diverse methods is not always appropriate. Additional research investigating violence against special education workers using a variety of data sources and data collection methods is needed to enhance our understanding and capacity to address risk factors for this specific worker subgroup.

Limitations

The limitations of the current study should be considered when interpreting the findings. First, WC claims likely underrepresent all-cause injury rates for school personnel. The data

are limited to instances that result in physical injuries severe enough to warrant filing a claim. They do not offer insights into events that leave workers with lesser physical injuries or psychological distress of any severity.

Second, WC claims almost certainly underrepresent rates of physical occupational injuries associated with school violence. According to conservative estimates, half of all annual reportable work-related injuries and illnesses go unreported to regulatory authorities like OHBWC (Probst et al. 2019). Further, it is well-established that workers across industries and occupations generally underreport instances of violent victimization (Barling 1996; NIOSH 2006). The education sector is no exception: in a recent survey administered by the American Psychological Association, National Education Association, and American Federation of Teachers, 20% of teachers victimized by school violence in the past year said they knowingly chose not to inform school administrators of the incident (Anderman et al. 2018).

Previous research identifies several factors that may contribute to the trend of underreporting violence against education workers at both the elementary and secondary school levels. Some of these factors have internal origins. For example, concerns about accumulating workload and adverse impact on students' academic achievement frequently prevent classroom personnel from taking time off work for any reason (Miller et al. 2008; Ost and Schiman 2017). Such concerns may influence classroom personnel to avoid the WC system for fear it will result in mandatory time off work. Feelings of self-blame or personal responsibility (i.e., agreement with statements such as "They do this to me because I won't fight back" and "It was my fault") may also lead classroom personnel to under-report violent incidents (Anderman et al. 2018). However, external pressures may also contribute to under-reporting. A comprehensive review of school violence, for instance, indicates school administrators may actually encourage under-reporting of school crimes (including violence) as a result of political pressures or reputation concerns (Schonfeld 2006). Though the design and evaluation of interventions to improve reporting accuracy of violence against education workers is beyond the scope of the current study, it is clearly an area where concerted efforts are needed.

Third, available data were limited because this study was a secondary analysis of existing WC claims records for nine large urban school districts in Ohio. The districts were selected based on stakeholder interests, and analyses were constructed based on data availability and quality. For example, occupation was dichotomized to 'classroom' and 'other' personnel due to inconsistencies in the relevant data fields, which prohibited investigations of potentially meaningful between-group differences of more refined occupation groupings. In addition, there was no specific data field to denote special education affiliation in the WC data file. The fields used to derive this variable may underrepresent special education affiliation for perpetrator or victim in the current analyses.

Fourth, there was possible contamination by rater subjectivity during the coding process. Many of the measures used in this study were derived from manual review, interpretation, and categorization of narrative incident descriptions. It is possible that different raters could have drawn different conclusions about the representative meaning of the narratives. We

have confidence in the results of our multi-coder approach, however, which required 100% agreement among raters with different areas of subject matter expertise (public health, workers' compensation systems, and occupational health psychology).

Conclusions

The results of the current study contribute to our understanding of school violence by estimating the frequency and characterizing the nature of violence directed at employees in Ohio's K-12 urban public schools. Our findings may serve as a useful input during the design and implementation of policies, programs, and practices that seek to protect school personnel from violent victimization in the workplace. In light of our finding that classroom personnel are twice as likely as other school personnel to be injured as a result of violent victimization at work, we recommend schools and districts with limited resources concentrate their efforts on interventions specifically designed to mitigate physical violence against teachers and aides. Given that most classroom personnel injuries were sustained as the result of students displaying escalated or aggressive behavior or intervening on third-party violence, initiatives that enhance classroom personnel's capacity to safely manage student behavior may be a particularly salient starting place. It is worth noting here that previous research has identified physical aggression as the most common form of workplace school violence that co-occurs with perceived lack of support from administrators (McMahon et al. 2017). Considering this link, violence prevention initiatives would very likely benefit from the inclusion of specific efforts to improve staff perceptions of administrator support.

This study also provides valuable insights into the utility of WC claims data in studies of physical violence experienced by school personnel. Despite a tendency for workers to underreport violent victimization, WC data nonetheless complement self-report data in two ways. First, WC data offer an opportunity to compare self-report data with information from a more objective data system. This allows researchers to quantify similarities and discrepancies between two unique sources and obtain a more complete picture of school violence. Second, WC data hold the potential to offer a more accurate description of violence exposures because the reporting system requires clear and honest descriptions of events that lead to injuries for workers to collect their benefits.

As demonstrated in the current study, WC systems can provide unique insights into the issue of violence against school personnel. Organizational health professionals may benefit from leveraging WC and other nontraditional input systems during the needs assessment, implementation, and evaluation phases of violence prevention efforts for workers in all sectors, including education.

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Appendix A

NIOSH/OHBWC/BGSU School Violence Codebook for WC Claims

Variable	Brief description	Values	Labels	Example Claim Narrative
Physical school violence	WC claim narrative describes incident meeting operational definition of physical school violence for the current study	0	Not violence-related	*Slipped on wet floor [and] went down on right knee.*
		1	Violence-related	*Was shoved hard in the chest by student...*
Intent	Clarity of perpetrator intent to harm injured worker, according to WC claim narrative	0	Perpetrator not described as having intent to harm	*While I finished feeding student, I was wiping his mouth and [he] bit my middle left finger.*
		1	Perpetrator described as having clear intent to harm	*Student threw a chair at me...*
		2	Description of perpetrator intent unclear, but other contextual factors of narrative suggest there was likely intent to harm	*I was taking a student to the office. [The student] began struggling and pushed me down [the] steps.*
Nature	Nature of events that led to injury to worker, according to WC claim narrative	1	Students with escalated/ aggressive behavior making contact or throwing objects at injured worker	*[Student] kicked me repeatedly and then punched me in my left eye.*
		2	Worker injured while intervening on third-party violence (e.g., student-on-student; student-on-adult; etc.)	*I was breaking up a fight at lunch and was pushed down...*
		3	Worker injured during other student intervention (behavioral, safety management, or discipline)	*Student bit me while doing a behavioral intervention.*
		4	Worker injured as result of non-deliberate actions (e.g., slip/trip/fall; worker knocked off balance; running student collides with worker)	*Student ran into me, causing fall on steps.*
		5	Worker injured while assisting with student toileting, transfers, lifting, wheelchair, or other mobility-related tasks	*I was trying to keep [student] from hanging himself with his harness. He turned and twisted my left arm*
		6	Worker injured by coworker, parent, or other adult	*Parent tried to strangle me.*
Special education	WC claim narrative, SOC code, or write-in occupation information indicates special education affiliation for worker or perpetrator	0	No special education affiliation for worker or perpetrator	*Default if value of '1' does not apply.*
		1	Special education affiliation for worker or perpetrator	*I work with special education students... SOC code = 2050 ('Special*

Variable	Brief description	Values	Labels	Example Claim Narrative
				education teacher') write-in occupation = 'Special education teacher'

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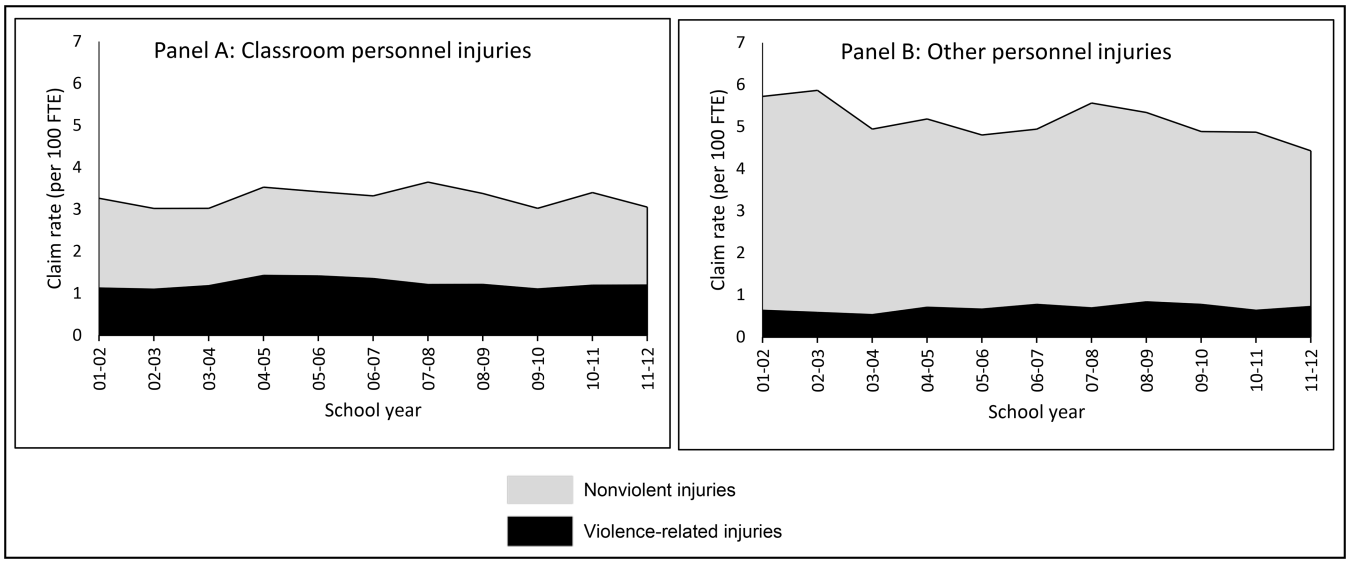

Figure 1.

Injury rate trends for classroom and non-classroom personnel in Ohio urban public schools, July 01, 2001 to June 30, 2012. Violence-related injuries are represented by black fill, and nonviolent injuries are represented by gray fill.

Table 1.

Descriptive statistics for OHBWC claimants from Ohio urban public school workers by experience with violence and occupation group, 2001 to 2012 (N = 19,508)

	Violence-related claims		Nonviolence-related claims		Total		
	Classroom (*N* = 3,426)	Other (*N* = 1,372)	Classroom (*N* = 5,638)	Other (*N* = 10,444)	Classroom (*N* = 9,064)	Other (*N* = 10,444)	Grand Total (*N* = 19,508)
Characteristic	***N* (%)**	***N* (%)**	***N* (%)**	***N* (%)**	***N* (%)**	***N* (%)**	***N* (%)**
Gender							
Female	2,624 (76.6)	793 (57.8)	4,756 (84.4)	5,616 (61.9)	7,380 (81.4)	6,409 (61.4)	13,789 (70.7)
Male	744 (21.7)	562 (41.0)	771 (13.7)	3,359 (37.0)	1,515 (16.7)	3,921 (37.5)	5,436 (27.9)
Unspecified	58 (1.7)	17 (1.2)	111 (2.0)	97 (1.1)	169 (1.9)	114 (1.1)	283 (1.5)
Age group (years)							
< 20	1 (0.0)	1 (0.0)	4 (0.1)	45 (0.5)	5 (0.0)	46 (0.4)	51 (0.3)
20–24	104 (3.0)	14 (1.0)	99 (1.8)	111 (1.2)	203 (2.2)	125 (1.2)	328 (1.7)
25–34	593 (17.3)	214 (15.6)	751 (13.3)	725 (8.0)	1,344 (14.8)	939 (9.0)	2,283 (11.7)
35–44	854 (24.9)	408 (29.7)	1,143 (20.3)	2,133 (23.5)	1,997 (22.0)	2,541 (24.3)	4,538 (23.3)
45–54	1,116 (32.6)	489 (35.6)	1,899 (33.7)	3,540 (39.0)	3,015 (33.3)	4,029 (38.6)	7,044 (36.1)
55–64	687 (20.1)	214 (15.6)	1,525 (27.0)	2,079 (22.9)	2,212 (24.4)	2,293 (22.0)	4,505 (23.1)
>64	67 (2.0)	32 (2.3)	216 (3.8)	430 (4.7)	283 (3.1)	462 (4.4)	745 (3.8)
Unspecified	4 (0.1)	0 (0.0)	1 (0.0)	9 (0.1)	5 (0.1)	9 (0.1)	14 (0.1)
State region							
Northeast	1,668 (48.7)	707 (51.5)	2,268 (40.2)	3,565 (39.3)	3,936 (43.4)	4,272 (40.9)	8,208 (42.1)
Northwest	389 (11.4)	225 (16.4)	731 (13.0)	1,186 (13.1)	1,120 (12.4)	1,411 (13.5)	2,531 (13.0)
Southwest	1,369 (40.0	440 (32.1)	2,639 (46.8)	4,321 (47.6)	4,008 (44.2)	4,761 (45.6)	8,769 (45.0)

Table 2.

Frequency of violence-related injuries for classroom and other school personnel, by injury severity (N = 4,798)

	Classroom			Other			
Injury	**LT[a] *N* (Col %)**	**MO[a] *N* (Col %)**	**Total *N* (Col %)**	**LT[a] *N* (Col %)**	**MO[a] *N* (Col %)**	**Total *N* (Col %)**	**Grand Total *N* (Col %)**
Contusion	155 (21.3)	1,090 (40.4)	1,245 (36.3)	106 (23.6)	367 (39.8)	473 (34.5)	1,718 (35.8)
Sprains – lower extremity	65 (9.0)	149 (5.5)	214 (6.2)	56 (12.4)	89 (9.7)	145 (10.6)	359 (7.5)
Sprains – back	109 (15.0)	267 (9.9)	376 (11.0)	68 (15.1)	88 (9.5)	156 (11.4)	532 (11.1)
Sprains – upper extremity	104 (14.3)	409 (15.1)	513 (15.0)	59 (13.1)	132 (14.3)	191 (13.9)	704 (14.7)
Open wounds	8 (1.1)	271 (10.0)	279 (8.1)	7 (1.6)	79 (8.6)	86 (6.3)	365 (7.6)
Sprains – neck	74 (10.2)	165 (6.1)	239 (7.0)	40 (8.9)	50 (5.4)	90 (6.6)	329 (6.9)
Superficial injury	9 (1.2)	167 (6.2)	176 (5.1)	4 (0.9)	52 (5.6)	56 (4.1)	232 (4.8)
Fracture – upper extremity	19 (2.6)	30 (1.1)	49 (1.4)	12 (2.7)	15 (1.6)	27 (2.0)	76 (1.6)
Fracture – lower extremity	11 (1.5)	10 (0.4)	21 (0.6)	5 (1.1)	2 (0.2)	7 (0.5)	28 (0.6)
Soft tissue/enthesopathy	33 (4.5)	26 (1.0)	59 (1.7)	21 (4.7)	10 (1.1)	31 (2.3)	90 (1.9)
Disc disorders	37 (5.1)	4 (0.1)	41 (1.2)	32 (7.1)	3 (0.3)	35 (2.6)	76 (1.6)
Dislocation	25 (3.4)	11 (0.4)	36 (1.1)	16 (3.6)	3 (0.3)	19 (1.4)	55 (1.1)
Other	77 (3.8)	101 (1.4)	178 (2.0)	24 (0.6)	32 (0.5)	56 (0.5)	234 (1.2)
Total	726 (100)	2,700 (100)	3,426 (100)	450 (100)	922 (100)	1,372 (100)	4,798 (100)

[a]LT = lost time claims; MO = medical only claims.

Table 3.

Mixed model logistic regression model assessing odds of violence-related injuries and injuries from any cause, by occupation, controlling for district and year

	Violence-related injury			Injury from any cause		
Predictor	***B***	***SE B***	***OR* (95% *CI*)**	***B***	***SE B***	***OR* (95% *CI*)**
District[a]	0.23	0.12	- (-)	0.10	0.05	- (-)
Occupation						
Classroom	**0.61** *	**0.03**	**1.84 (1.72, 1.97)**	**−0.48** ***	**0.02**	**0.62 (0.60, 0.64)**
Other[b]	0	-	1.00 (-)	0	-	1.00 (-)
School year						
2001–2002	−0.11	0.07	0.90 (0.78, 1.04)	0.17***	0.04	1.19 (1.10, 1.28)
2002–2003	−0.15*	0.07	0.86 (0.75, 1.00)	0.14**	0.04	1.15 (1.07, 1.24)
2003–2004	−0.13	0.07	0.88 (0.76, 1.01)	0.05	0.04	1.06 (0.98, 1.14)
2004–2005	0.11	0.07	1.11 (0.97, 1.28)	0.16***	0.04	1.17 (1.09, 1.26)
2005–2006	0.11	0.07	1.11 (0.97, 1.29)	0.11**	0.04	1.11 (1.03, 1.20)
2006–2007	0.13	0.07	1.13 (0.98, 1.31)	0.10*	0.04	1.10 (1.02, 1.19)
2007–2008	0.00	0.08	1.00 (0.86, 1.16)	0.21***	0.04	1.24 (1.15, 1.34)
2008–2009	0.06	0.07	1.07 (0.92, 1.23)	0.17***	0.04	1.18 (1.09, 1.27)
2009–2010	−0.02	0.08	0.98 (0.85, 1.14)	0.06	0.04	1.06 (0.98, 1.15)
2010–2011	−0.03	0.07	0.97 (0.83, 1.13)	0.09*	0.04	1.10 (1.01, 1.18)
2011–2012[b]	0	-	1.00 (-)	0	-	1.00 (-)
Constant	−5.10*	0.17		−3.03	0.11	
χ^2	369.37			765.89		
Df	182			182		

[a]Random effect; no OR reported

[b]Reference

*$p < .05$

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** $p < .01$

*** $p < .0001$

Table 4.

Characteristics of violence-related incidents resulting in injuries to classroom and other school personnel, by injury severity, January 01, 2001 to December 31, 2012 (N = 4,798)

		Classroom			Other			
Characteristic		**LT *N* (Col %)**	**MO *N* (Col %)**	**Total *N* (Col %)**	**LT *N* (Col %)**	**MO *N* (Col %)**	**Total *N* (Col %)**	**Grand Total[a] *N* (Col %)**
Intent	Clearly had intent	414 (57.0)	1,648 (61.0)	2,062 (60.9)	242 (53.8)	480 (52.1)	722 (52.6)	2,784 (58.0)
	Likely had intent	292 (40.2)	958 (35.5)	1,250 (36.5)	202 (44.9)	424 (46.0)	626 (45.6)	1,876 (39.1)
	No intent	20 (2.8)	94 (3.5)	114 (3.3)	6 (1.3)	18 (2.0)	24 (1.7)	138 (2.9)
Nature	Escalated or aggressive behavior	284 (39.1)	1,118 (41.4)	1,402 (40.9)	132 (29.3)	244 (26.5)	376 (27.4)	1,778 (37.1)
	Intervening on third-party violence	261 (36.0)	924 (34.2)	1,185 (34.6)	214 (47.6)	447 (48.5)	661 (48.2)	1,846 (39.1)
	Student intervention	146 (20.1)	517 (19.1)	663 (19.4)	81 (18.0)	195 (21.1)	276 (20.1)	1,039 (21.7)
	Non-deliberate	22 (3.0)	103 (3.8)	125 (3.6)	5 (1.1)	12 (1.3)	17 (1.2)	142 (3.0)
	Assisting	3 (0.4)	25 (0.9)	28 (0.8)	5 (1.1)	6 (0.7)	11 (0.8)	39 (0.8)
	Other adult	10 (1.4)	13 (0.5)	23 (0.7)	13 (2.9)	18 (2.0)	31 (2.3)	54 (1.1)
Special Ed	Not special education	625 (86.1)	2,386 (88.4)	3,011 (87.9)	437 (97.1)	881 (95.6)	1,318 (96.1)	4,329 (90.2)
	Special education	101 (13.9)	314 (11.6)	415 (12.1)	13 (2.9)	41 (4.4)	54 (3.9)	469 (9.8)
	Total	726 (100)	2,700 (100)	3,426 (100)	450 (100)	922 (100)	1,372 (100)	4,798 (100)[a]

[a]Grand Total row counts are mutually exclusive within *Intent*, *Nature*, and *Special education* and sum to 4,798 (100%) for each characteristic.

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