In 2010, more than 6 million students aged 6 to 21 years were identified as needing school-age services (i.e., for a disability requiring special attention) (Blackorby et al., 2010). According to the U.S. Department of Education, only one-third of students with disabilities continue on to post-secondary education (Lederman, 2005). Therefore, secondary vocational career and technical education (CTE) programs can result in lasting and meaningful employment. More specifically, work experience and participation in CTE programs can influence students with special health care needs (SHCNs) in finding post-secondary employment. Nevertheless, lacking the physical fitness of the average employee exposes some workers with SHCNs to risk for injury in physically demanding jobs. For example, few individuals with intellectual disabilities (8%) met previous recommendations for exercising at least three times per week for 30 minutes or more (Ratzon, Schejter, Alon, & Schreve, 2011). A recent study also suggested individuals with disabilities are more prone to injury; young people with intellectual disabilities have higher rates of injuries compared with the general population of young people (Finlayson, Morrison, Jackson, Mautry, & Cooper, 2010).

More recently, using National Health Interview Survey data from 2006 through 2010, Price et al. (2012) reported disabled workers had a higher risk of suffering occupational injuries (odds ratio = 2.39; 95% confidence interval = 1.89, 3.01) compared to non-disabled workers, and most of these injuries were related to falls. Furthermore, effective communication among the employer, em-

Personal Protective Equipment Use Among Students With Special Health Care Needs Reporting Injuries in School-Sponsored Vocational, Career, and Technical Education Programs in New Jersey

Eric Rubenstein, BS; Derek G. Shendell, DEnv, MPH; Brian C. Eggert, MPH; Stephen W. Marcella, MD, MPH

RESEARCH ABSTRACT

Students with special health care needs (SHCNs) and individualized education plans (IEPs) may be injured more often in vocational, career, and technical education (CTE) programs. No research to date considers personal protective equipment (PPE) use among students with SHCNs in school-based programs reporting injuries to agencies. Data from 1999 to 2011 on PPE use among injured students in CTE programs in public schools and private secondary schools for the disabled were analyzed; students with SHCNs were distinguished by IEP status within New Jersey Safe Schools surveillance data. Among students with IEPs using PPE, 36% of injuries occurred to body parts PPE was meant to protect. Likely injury types were cuts-lacerations and burns for students with IEPs using PPE and cuts-lacerations and sprains for students with IEPs not using PPE. Females with IEPs using PPE were injured less often than males across ages. Results suggested students with SHCNs with IEPs need further job-related training with increased emphasis on properly selecting and fitting PPE. [Workplace Health Saf 2014;62(1):12-18.]

In 2010, more than 6 million students aged 6 to 21 years were identified as needing school-age services (i.e., for a disability requiring special attention) (Blackorby et al., 2010). According to the U.S. Department of Education, only one-third of students with disabilities continue on to post-secondary education (Lederman, 2005). Therefore, secondary vocational career and technical education (CTE) programs can result in lasting and meaningful employment. More specifically, work experience and participation in CTE programs can influence students with special health care needs (SHCNs) in finding post-secondary employment. Nevertheless, lacking the physical fitness of the average employee exposes some workers with SHCNs to risk for injury in physically demanding jobs. For example, few individuals with intellectual disabilities (8%) met previous recommendations for exercising at least three times per week for 30 minutes or more (Ratzon, Schejter, Alon, & Schreve, 2011). A recent study also suggested individuals with disabilities are more prone to injury; young people with intellectual disabilities have higher rates of injuries compared with the general population of young people (Finlayson, Morrison, Jackson, Mautry, & Cooper, 2010).

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ployee, and job coach or teacher can decrease injuries and enhance the employee’s experience. Many students with SHCNs, including young workers with developmental disabilities, have health impairments placing them at risk when they encounter workplace exposures, particularly chemicals, and must communicate these potential risks to employers (Centers for Disease Control and Prevention-National Institutes of Occupational Health, 2005). Due to these communication needs, a common belief is that it is expensive to accommodate special needs employees. However, available data suggest approximately half of accommodations cost on average $200, and for every dollar a company spends on accommodations, $34 is saved on insurance and other trainings (National Dissemination Center for Children With Disabilities, 1999).

Because employers cannot discriminate based on disability, effective and graduated transitioning from classrooms to workplace is vital for the safety of workers with SHCNs (Stein, 2005). By preparing for potentially hazardous workplace situations, students with SHCNs learn to react properly, improving safety. Proper training and early planning is the key to a successful transition from pediatric to adult services, especially in education, employment, and health care; programs and resources should focus on self-determination, problem-solving, relationship building, and environmental supports (Stewart, 2009).

Although young adults with SHCNs typically desire employment opportunities, the number of opportunities available and the willingness of employers to employ this sub-population are limited (Kirsh et al., 2009). Jahoda, Kemp, Riddell, and Banks (2008) noted that work is an aspiration for adults with SHCNs given the connection of work to social inclusion. In a mail survey using questions validated in multiple prior national surveys, 44% of young adults who graduated from a state-based program for students with SHCNs reported having a job, and approximately two-thirds of the 56% who had no work at that time wanted to work (Blomquist, 2006). White and Weiner (2004) reported 7 in 10 young adults with SHCNs in Orange County, California, who graduated from secondary schools with community-based training incorporating on-the-job instruction had secured integrated (with non-disabled coworkers) paid work. Brown, Shiraga, and Kessler (2006) summarized work history details of 50 non-disabled coworkers) paid work. Brown, Shiraga, and Kessler (2006) summarized work history details of 50 young to middle-aged adults with SHCNs. Achterberg, Wind, De Boer, and Frings-Dresen (2002) reported a relationship between lower intellectual level and unemployment, and how level of education was a critical factor for securing and maintaining employment; education and training specific to a particular career was advantageous for adults with SHCNs.

In addition, the ability to adapt to a workplace is a significant consideration when adults with SHCNs are seeking transition to work; transition and supported employment programs are vital for those workers with SHCNs as they develop the necessary knowledge, skills, and awareness to succeed in the workplace (Moon, Simonsen, & Neubert, 2011). It is also necessary for those who place individuals with SHCNs in jobs to be aware of day-to-day changes with the employees in their respective workplaces; employees with SHCNs may not realize the level of support they require and self-ratings of work performance may be incompatible with supervisor assessments (Bennett, Frain, Brady, Rosenberg, and Suri, 2009). Finally, an Australian study found that among individuals with SHCNs, traineeships and apprenticeships were crucial in learning valuable job skills before securing employment and rates of program completion increased when participants were adequately supported throughout the experience and matched to appropriate jobs by local employment service organizations (Lewis, Thoresen, & Cocks, 2011).

With a potentially large number of students with SHCNs in school systems, CTE programs ensure these youth are successful and safe. To maximize safety in these programs, employers must be aware of and address federal and state laws regarding the provision of properly fitting personal protective equipment (PPE). In this article, the authors characterize the reported use of PPE among injured students with SHCNs based on New Jersey incident data from students in CTE programs in school-sponsored structured learning experiences.

METHODS

Data were taken from the new survey form of the New Jersey Incident Reporting Form administered by the New Jersey Safe Schools Program (New Jersey Safe Schools Program, 2005; Shendell et al., 2010, 2012a,
2012b), from January 7, 1998, to September 23, 2010; 1,722 incidents were reported. The new form collects data about individualized education plan (IEP) status, whereas the original (old) form did not (New Jersey Safe Schools Program 2012a; Shendell et al., 2010, 2012a). New Jersey Safe Schools (NJSS) has exempt institutional review board approval from the University of Medicine and Dentistry of New Jersey (now Rutgers Biomedical and Health Sciences, Rutgers University) for incident surveillance because the program is based on state law.

To determine which incidents qualified as occurring to a student with an IEP of high school age, an expansion of a previously determined NJSS protocol was used (Eggert, 2011). The first exclusion criterion applied to injuries occurring to staff and non-students, and if this data field was blank or other. Additional criteria omitted students younger than 15 years and older than 21 years, students whose grade level was listed as less than 9th, and students whose age was blank (Figures 1-2). The remaining 94 IEP incidents were examined to determine PPE status. Data management and analyses were conducted using Microsoft Excel for Windows XP/2000 (Microsoft Corporation, Redmond, WA) and in SAS v.9 software (SAS, Cary, NC).

RESULTS

Of the 94 incidents, 42 students were wearing PPE, 17 students were not wearing PPE, and 35 incidents did not report whether PPE was used. The most common career cluster where students with an IEP were injured while wearing PPE was in the program areas of the architecture and construction career cluster (62%) (Table 1). The number of injured students who were not using PPE was somewhat evenly distributed, with most injuries occurring in the architecture and construction career cluster (18%) and in the education and training career cluster (18%). When the PPE use field was blank, the majority of incidents (57%) were in the education and training career cluster. Previous NJSS incident surveillance work suggested this career cluster was overreported (Shendell et al., 2010). Further research of incidents in the education and training career cluster is needed. Overall, educators must understand the necessity of proper PPE use and potential injurious consequences of not using PPE across career areas, career clusters, and program pathways within each career cluster, in both classrooms and on-campus shops, as well as at off-campus worksites.

State of New Jersey and federal law dictates PPE must be paid for and provided to students in school and at approved worksites; proper fit and training are required (New Jersey Safe Schools Program, 2012b). In this study, eight types of PPE were reportedly used (n = 58 total; n = 4 students left blank): safety glasses (n = 24), work boots (n = 15), uniform (n = 9), gloves (n = 5), shield (n = 2), pot holder (n = 1), tip holder for soldering pencil (n = 1), and welding leathers (n = 1).

Incidents occurred most frequently among 16 to 18 year olds across the three PPE classifications (Table 2). Historically, most students in CTE programs and young workers are in this age range. Incidents stratified by gender (Table 2) suggested the number of female students injured while using PPE was lower than the total number of incidents (injury) among females. Twenty-five percent of reported incidents among students with an IEP were female, but when IEP and PPE variables were added, the percentage of incidents among females was only 16%.

The most likely causes of injury for a student with an IEP using PPE (Figure 3A) were struck by (43%) and contact with temperature extremes (21%). Students with an IEP and no PPE (Figure 3B) were also likely...
to experience struck by (34%) as the leading cause of injury, but other causes of injury included struck against (18%). For incidents when PPE was blank (Figure 3C), struck by (50%) and contact with temperature (17%) were the most prevalent, again similar to when PPE was reported used. Given the struck by results, PPE may not be as useful in preventing injuries from blunt force trauma. Similarities between “Yes PPE” and “Blank PPE” suggested incidents listed with the blank response may have involved PPE.

The most likely type of injury for students with IEPs and PPE (Figure 4A) were cut-lacerations (37%), burns (21%), and other (21%). For students with an IEP but no PPE (Figure 4B), the most common types were cut-lacerations (40%), sprains (13%), and other (9%). When the PPE field was left blank (Figure 4C), the most common types were cut-lacerations (56%) and burns (17%). Based on descriptions listed on the incident reporting form, narrative (description), and corrective action taken, the category “other” included contusions, foreign bodies, irritations, movements, irritations in the eye, sawdust in the eye, pulled muscles, and paper cuts. Thus, cut-lacerations were uniformly high, consistent with the complete New Jersey CTE incident surveillance database through fall 2010 (Shendell et al., 2012b), but sprains were not prevalent among students with an IEP and with PPE use reported. Proper work boots may prevent trips and falls leading to sprains.

From further examination of free text incident descriptions provided by school district or school staff completing the incident reporting form, 15 of 42 incidents (36%) involving students with IEPs and PPE appeared to have occurred to the body part the PPE was supposed to protect (e.g., oil or chemical affecting the eye of a student wearing goggles). A recent study reported adults with intellectual disabilities more likely experienced fractures, burns, cuts, poisonings, falls, trips, slips, and burns from using kitchen equipment (Finlayson et al., 2010). These

<table>
<thead>
<tr>
<th>Career Cluster</th>
<th>Yes PPE (n = 42)</th>
<th>No PPE (n = 17)</th>
<th>Blank PPE (n = 35)</th>
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<tr>
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</tr>
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</tr>
<tr>
<td>Transportation, Distribution &amp; Logistics</td>
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Table 2

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<th>Age (y) or Gender</th>
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<th>Blank PPE (n = 35)</th>
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<tr>
<td>Female</td>
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<td>9</td>
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data, collectively, suggest extra safety measures should be taken with students with SHCNs, ensuring proper use and fit of PPE among CTE programs both on- and off-campus.

DISCUSSION

Injury Prevention Strategies

Job coaches or teachers should thoughtfully choose placements for students with SHCNs after evaluating potential exposures and risks (Centers for Disease Control and Prevention-National Institutes of Occupational Health, 2005). Students with SHCNs with intellectual disabilities or developmental disabilities may need assistance learning to complete tasks correctly and safely, including PPE use. Specific training needs among students with SHCNs include more time devoted to training; breaking the description of a job into small, clearly defined steps; instructing in clear, basic language; developing pictures or diagrams to demonstrate task sequences; and ensuring warning signs are understood by employees with intellectual disabilities or developmental disabilities (Centers for Disease Control and Prevention-National Institutes of Occupational Health, 2005). By including extra steps and time to communicate specific tasks and provide safety training, including the proper selection, fit, and use of PPE, employees with SHCNs and students in CTE programs with intellectual disabilities or developmental disabilities are more likely to succeed.

Mechling (2008) determined role-playing along with verbal and visual instruction was a highly effective way to teach safety skills. Mechling, Gast, and Gustafson (2009) further demonstrated intellectually disabled young adults

Figure 3. Percentages of causes of injury for students with an individualized education plan (IEP) and (A) personal protective equipment (PPE) worn, (B) PPE not worn, and (C) PPE use left blank.

Figure 4. Percentages of the type of injury for students with an individualized educational plan (IEP) and (A) wearing personal protective equipment (PPE), (B) not wearing PPE, and (C) PPE use left blank.
could perform fire extinguishing skills correctly and apply them appropriately to new scenarios after receiving video modeling-based instruction. Instructional videos with voice-overs were found to better teach cooking-related fine motor skills than voiceless video (Mechling & Collins, 2012). Together, these data suggest individuals with SHCNs—adults in those studies and students in structured learning experiences as in the current study—can learn and apply general life skills, both safety and non-safety related, when presented with effective teaching techniques requiring the use of multiple senses simultaneously. Also, many skills can be used in the workplace and the same instructional methods can be used to teach safety skills specific to a particular job (e.g., preventing cuts, lacerations, and burns as documented in the current study).

Assessing individual risk factors and physical capabilities can also determine potential career pathways. Hsieh, Heller, and Miller (2001) stated individuals with SHCNs may be at high risk for both fall and non-fall related injuries. Ratzon et al. (2011) reported young adults with SHCNs took more time to complete work-related tasks and displayed less dexterity. However, contrary to the perceived risks of hiring individuals with SHCNs that New Jersey structured learning experiences coordinators have anecdotally reported to encounter from employers, a study reported a Canadian business did not experience a significant change in lost work time among employees with intellectual disabilities; indeed, the same group of workers actually experienced fewer injuries and a lower number of injury-related absences than their non-disabled colleagues (Lyssag, Sparring, Ouellette-Kuntz, & Marshall, 2011). Thus, this study’s data on potential exposures and the nature and cause of reported injuries, along with individual attributes and perceived risks in the community, must be addressed by New Jersey structured learning experience teachers and supervisors during classroom and job placement components of school-sponsored programs for students with SHCNs.

Limitations

It must be noted that the NJSS incident surveillance system does not allow NJSS staff to retrospectively interview teachers, supervisors, or health care providers for more information about injured students with SHCNs (Shendell et al., 2010, 2012a, 2012b). Future research should gather more information about circumstances in the work settings in which students with SHCNs were injured and personal attributes of the students.

IMPLICATIONS FOR PRACTICE

These novel data pertain to the use of PPE among minors with SHCNs and thus individualized education plans on file for school-sponsored structured learning experiences involving on-campus classroom and shop time, as well as on- or off-campus work experiences. Findings can inform nurses and therapists in occupational and educational settings of the potential injuries avoided by proper selection, fit, and use of PPE among students with SHCNs and an IEP, particularly with respect to upper body extremities. In addition, this study’s findings can assist occupational health nurses administering annual examinations or providing education to structured learning experience students, their teachers, and job coaches. Health professionals can further emphasize safety and inform selection of PPE in consideration of the individual’s SHCNs, age, gender, physical attributes and comorbidities. By understanding the importance of correct PPE, occupational health nurses can initiate and monitor prevention programs to reduce occupational injuries.

CONCLUSION

Available data in New Jersey suggested students with SHCNs, identified by IEPs, are at risk for injury even when the correct type of PPE is used. Further education on PPE selection, fit, and use should be administered both in training on-campus and while working on- or off-campus during approved school-sponsored structured learning experiences and then as young adults in the community. Further research with larger sample sizes to determine why females report fewer incidents when using PPE should be conducted.

REFERENCES


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