

Pilot Study: A Pediatric Pedestrian Safety Curriculum for Preschool Children

Stephanie E. Bovis, MEd ■ Taijha Harden, MA ■ Gillian Hotz, PhD

ABSTRACT

To evaluate and implement the WalkSafe Pre-Kindergarten Pedestrian Safety Curriculum. A quasi-experimental pretest–posttest design without a control group was used to measure children’s pedestrian safety knowledge. Knowledge assessments consisting of multiple-choice and short-answer questions were administered pre- and post-curriculum implementation by classroom teachers. Knowledge assessments gauged prekindergarten students’ knowledge of pedestrian safety activities prior to safety curriculum implementation and, again, after the students received the curriculum. A total of 605 children (aged 3- to 5-year) from 38 prekindergarten classrooms in 16 randomly selected elementary schools participated in the pedestrian safety education pilot program. Subjects were of multiethnic and diverse backgrounds from the Miami-Dade County Public School District. Of the 605 educated subjects, 454

children completed both pre- and posttests. A statistically significant difference was found between pretest knowledge ($M = 5.49$, $SD = 1.54$) and posttest knowledge ($M = 6.64$, $SD = 1.35$) assessment scores across all 454 subjects, $t(452) = -16.22$, $p < .001$, 95% CI $[-1.29, -1.01]$. Previous studies have shown that classroom-based training of children as young as 4 years old can yield significant improvements in traffic safety knowledge. The statistical findings of the WalkSafe Pre-Kindergarten Pedestrian Safety Curriculum revealed statistically significant improvements in pedestrian safety knowledge of these young children. Future research efforts will focus on longitudinal behavioral changes in these students and an increase in pedestrian safety behaviors (e.g., utilization of crosswalks or sidewalks).

Key Words

Curriculum, Educational curriculum, Injury prevention, Pediatric, Prekindergarten, Program evaluation

In 2012, there were a total of 33,561 traffic fatalities and 2,362,000 traffic-related injuries in the United States (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2014a). Both traffic fatalities and injuries saw an increase of 3% and 6%, respectively, when compared with the previous year (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2014b). Pedestrian-related traffic crashes accounted for 14% ($n = 4,743$) of all traffic fatalities and 3% (76,000) of all traffic injuries. Pedestrian fatalities in 2012 increased by 6% when compared with 2011 and displayed the greatest number of fatalities within the

past 5 years (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2014b).

Motor vehicle crashes were the leading cause of death for children aged 4 years and children aged 11–14 years (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2014a). Although there has been a 34% decrease in pedestrian fatalities of children younger than 14 years from 2003 to 2012, both the 1- to 3-year-old and 4- to 7-year-old age groups showed an increase of about 37% since 2011. This increase represents a jump in pedestrian fatalities for these age groups that have not occurred since 2006 (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2014a). According to the Centers for Disease Control and Prevention (CDC) WISQARS (2014), last reported in 2011, unintentional pedestrian was the seventh leading cause of injury/death for children aged 1 to 4 year in the United States.

In 2012, 73% of pedestrian fatalities occurred in an urban setting versus a rural setting (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2014b). Numerous findings reveal that pedestrian injuries and fatalities are more prevalent in low-income, denser, and urban neighborhoods. Consistent with these characteristics, urban areas within the state of Florida

Author Affiliation: WalkSafe Program–KiDZ Neuroscience Center, University of Miami Miller School of Medicine, Miami, Florida.

Author contributions: S.E.B.—lead researcher, lead preparation of the manuscript; T.H.—assisted with all aspects of research, assisted with preparation of the manuscript; G.H.—principal investigator, received grant award to fund project and researchers, reviewed, and approved the manuscript.

The authors declare no conflicts of interest.

Correspondence: Stephanie E. Bovis, MEd, WalkSafe Program–KiDZ Neuroscience Center, University of Miami Miller School of Medicine, Dominion Tower-609A (R-48), 1400 NW 10th Ave, Miami, FL 33136 (Sbovis07@gmail.com).

DOI: 10.1097/JTN.0000000000000228

pose a great risk for children as pedestrians (American Academy of Pediatrics, 2009). Florida had the third highest pedestrian fatalities ($n = 476$) in the United States (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2014b). About 12% of these fatalities occurred in Miami-Dade County (M-DC), the most populous county in the state of Florida. Miami-Dade County was responsible for the most pedestrian fatalities in 2012, similar to neighboring county, Broward, making South Florida a very dangerous place for pedestrians.

With children being at an increased risk for pedestrian injury and fatality, the introduction of education and prevention methods is of paramount importance. Prekindergarten classrooms are usually described as center-based programs for 4-year-old children that operate in schools or under the guidance of state education agencies (Clifford et al., 2005). Head Start programs are also considered as a prekindergarten program but only when the school system serves as the grantee or delegate. Home-based care, programs for children younger than 4 years, and programs targeted exclusively at parents or children with disabilities are excluded from this group. This description is analogous to definitions used in other studies of the prekindergarten population (Barnett, Lamy, & Jung, 2005; Brown & Scott-Little, 2003). An increase in the availability of prekindergarten programs and an increased emphasis on providing high-quality experiences to young children highlight recent research confirming the effects of environmental enrichment on the number and complexity of neuronal connections made in early childhood (Shonkoff & Phillips, 2000).

Although young children have a large mental capacity, they have less practice and have more problems crossing the street because they are not skilled at processing several pieces of information at once (Piaget & Inhelder, 1969). Because younger children are at high risk of traffic injury, a way to deduce that would be to begin traffic safety education at an earlier age, which has been shown to yield positive results. Van Schagen and Rothengatter (1997) showed that 7-year-olds could improve on both conceptual and behavioral assessments following classroom training, roadside training, and a combination of the two. Conceptual knowledge of traffic safety concepts can be improved using a single 20-min classroom training for children as young as 4 years old (Zeedyk, Wallace, & Spry, 2002). Zeedyk et al. (2002) found that this did not have an effect on behavior, but it is important to note that young children often require repetition and multiple presentations to fully understand concepts (Childers & Tomasello, 2002; Foot et al., 2006; Zeedyk et al., 2002; Zeedyk & Wallace, 2003). Albert and Dolgin (2010) showed that when given multiple classroom sessions and a variety of training methods (game, story, song), preschool students increased their knowledge of traffic safety concepts. Albert

and Dolgin (2010) also found that preschool children retained this information at a 6-month follow-up. Previous research has shown that preschoolers are able to learn traffic safety information during multiple classroom lessons when multiple modes of presentation are enforced.

This study evaluates a revised version of the University of Miami WalkSafe Program's Pedestrian Safety Curriculum (K-5). The WalkSafe Program is an evidence-based educational injury prevention program that targets students from kindergarten through Grade 5. The WalkSafe Program utilizes videos, formal educational curricula, workbooks, and outside simulation activities to promote pedestrian safety among school-aged children (Hotz, Cohn, Nelson, et al., 2004). The original WalkSafe Program started from a pilot study using a 10-question multiple-choice and open-ended assessment to gauge students' pre- and posttest knowledge (Hotz, Cohn, Castelblanco, et al., 2004).

PURPOSE

The purpose of the current study was to evaluate the effectiveness of the newly developed WalkSafe Pre-Kindergarten (Pre-K) Pedestrian Safety Curriculum to educate preschoolers on basic pedestrian safety concepts for reinforcement throughout elementary school and beyond.

RESEARCH HYPOTHESES

The objective of this study was to test our hypothesis that students will increase their knowledge of pedestrian safety skills and vocabulary from receiving the 5-day curriculum outlined by this report. In learning the educational curriculum, we hypothesize that students will gain a knowledge base for being a safer pedestrian as they grow.

METHODS

Study Design

This study utilized a quasi-experimental pretest–posttest design with no control group. The intervention group included preschool-aged children from a diverse socioeconomic background. Students participated in the educational program as an addition to their regular classroom curriculum, as outlined by the school district. Participants were between 3 and 5 years old ($M = 4.50$ years) and were all registered in general mainstream prekindergarten or Head Start classrooms. There were a total of 38 classrooms within 16 elementary schools from M-DC that participated in this study. The WalkSafe Program was in collaboration with Miami-Dade County Public Schools (M-DCPS) the local education agency (public school), the program in providing a supplemental curriculum for prekindergarten students.

Classrooms

The study was conducted in collaborative, full-day prekindergarten programs administered through the M-DC

School Board, which educates approximately 8,300 prekindergarten students (Miami Dade County Public Schools [M-DCPS], 2015). The WalkSafe Pre-K Pedestrian Safety Curriculum is a supplemental program, implemented for 5 days to students in their classroom. Participating schools were randomly selected by the M-DC Physical Education and Health Literacy Director. Children were eligible to participate in the WalkSafe Pre-K program if enrolled in the public prekindergarten program and attended one of the 16 target public schools. The decision was made to contact 16 schools from about 100 prekindergarten programs within M-DC, equally representing the county's prekindergarten population. The diverse schools are divided by their school board region within M-DC according to geographical location, student enrollment, and academic standing. The following schools were selected: five north region schools, six central region schools, and five south region schools.

Recruitment

All children attending the 16 target prekindergarten target schools were eligible to participate in the study. Of the children eligible to participate ($n = 605$), 556 children participated in the entire program (92%). Over the course of the study, 102 children were unable to participate in the posttest administration due to absences or transfers to other schools. Only children who responded to all questions at pre- and posttesting were included in the final statistical analysis ($n = 454$).

Subjects

Ages of the children at the time of the student knowledge assessment (SKA) administration ranged from 3 to 6 years, with a mean age of 4.51 years and standard deviation of 0.61. Table 1 shows the demographic characteristics of the knowledge-assessed subjects from this study. Ethnicity data was not directly collected during this study, but they were consistent with M-DCPS Statistical Highlights 2013–2014, which lists ethnicity information for the entire school district population (M-DCPS, 2015). The overall M-DC student population demographic information are as follows (M-DCPS, 2015): 5% White non-Hispanic; 36% Black non-Hispanic; 58% Hispanic; and 1% Other (American Indian, Asian, and multiracial categories). There were 229 male students (50%) and 226 female students (50%) who received both pre- and post-knowledge assessments. Children were not excluded if they received special services through the public school. Children's primary language was not an exclusion factor.

Teachers

On the basis of the train-the-trainer model, WalkSafe staff members provided all of the 38 female teachers with a comprehensive curriculum training on how to implement the WalkSafe Pre-K curriculum prior to implementation.

TABLE 1 Demographic Characteristics of Knowledge-Assessed Subjects

Characteristics	Number of Prekindergarten Students	Percentage of Prekindergarten Students
Age, years		
3	27	5.9
4	169	37.2
5	258	56.8
Gender		
Female	225	49.6
Male	229	50.4
Ethnicity		
White	23	5.1
Black	164	36.1
Hispanic	263	57.9
Other/multiracial	4	0.88

The training included a standard PowerPoint presentation and one-on-one walkthrough of the lesson plans and materials. Trainings lasted between 30 and 45 min, based on the number of teachers present. Trainings occurred at a convenient time and location for school teachers and WalkSafe staff members; all training took place at the respective school that was to implement the program. Delivery of the curriculum was conducted by each of the 38 trained classroom teachers within their regular classroom. The week of implementation for each school was selected by the school's administration to accommodate mandatory testing and prior activities. Implementation of the program was completed by the general classroom teacher within an estimated time of 20–30 min per lesson. Each lesson was taught once a day in succession until completing all 5 lessons. Teachers utilized the curriculum's built-in DVD, which consisted of visual and verbal repetition of the curriculum for students. This was followed by a teacher-led classroom discussion, involving a demonstration (modeling) segment, and, finally, a creative activity.

Setting

In the 2013–2014 academic school year, the WalkSafe Pre-K program served approximately 556 children attending 16 public elementary schools in M-DC. Classes were 6 hours a day, Monday through Friday. Each class was composed of an average of 14 students, with one state certified Early Childhood Education teacher and one paraprofessional provided by the local school district.

The WalkSafe Pre-K curriculum was implemented by each classroom teacher within each individual classroom. The curriculum utilized a multimodal learning style to benefit children aged 3–5 years. The curriculum included instructional, modeling, and creative modes for the children to learn the pedestrian safety material (taken from the general evidence-based WalkSafe curriculum, created by education professionals). The instructional component of the curriculum was administered by teachers during a circle discussion with the entire classroom. Teachers then used classroom materials and vocabulary flash cards from the curriculum to implement the modeling portion of the curriculum. The curriculum was completed by students by participating in the creative portion. All teachers completed all of the lessons in full within 5 consecutive days.

Materials

Curriculum

The WalkSafe Pre-K Pedestrian Safety Curriculum was a part of a large CDC grant-funded project to be piloted in 16 preschool programs across the large metropolitan school district during the 2013–2014 academic school year (see Appendixes A and B). The curriculum was developed from the general WalkSafe curriculum and modified by an Early Education specialist at the school district and WalkSafe staff (Hotz et al., 2009). This specialized curriculum was created to introduce pedestrian safety messages to children aged 3–5 years to increase knowledge and better prepare students with safety and security while walking to and from school. Furthermore, the design of the program is based on the multimodal presentation of the curriculum and repetition of concepts (Childers & Tomasello, 2002). The program curriculum outlined in Figure 1 shows the general concepts taught within each lesson. (*Note:* The vertical label indicates the type of mode delivered.)

Measures

Student Knowledge Assessment

The SKA is a standardized assessment tool created specifically for measuring and monitoring the progress of preschool children aged 3–5 years. It was created in collaboration with the school district curriculum and test experts, as appropriate for the 3- to 5-year age group. The assessment comprises eight questions for each student to answer. The same questions were asked at pre- and post-testing by the two research assistants (RAs), who were trained to implement the WalkSafe Pre-K curriculum. The instrument was utilized by the two RAs to ensure standardization and interrater reliability in an effort to decrease researcher biases. The SKA was conducted in about 2 min per student, and RAs did not prompt or answer questions for students during the testing period. Questions were asked verbally by RAs and repeated once if necessary. The SKA was administered in a standard manner, asking the same question and using the same technique for every student.

The SKA consisted of a set of eight questions with seven pictures (see Appendix C) for the students, along with a set of scripted administration instructions for RAs. Students answered questions in one of three ways: physically pointing to one picture; touching one picture; or verbally answering “Picture 1” or “Picture 2.” The RA would nod and say “thank you” after each answer given; they did not tell the student which picture was correct or if they got the answer correct. The SKA guidelines were followed thoroughly at all testing times with every student.

Two RAs were present at all testing periods; one staff member administered the assessment, whereas the other sat quietly and recorded answers. A student scoring sheet was used to document student performance, age, grade, and transportation mode, one sheet per student with his or her unique identification numbers. The SKA was administered in an ongoing classroom at a table off

	LESSON 1 <i>Walking Basics</i>	LESSON 2 <i>Safe Places to Walk</i>	LESSON 3 <i>Crossing the Street</i>	LESSON 4 <i>Pedestrian Signals</i>	LESSON 5 <i>Crossing at Intersections</i>
<i>Instructional</i>	Interactive vocab video & flashcard activity	Interactive vocab video & flashcard activity	Interactive vocab video & teacher demo	Interactive vocab video & teacher demo	Interactive vocab video & teacher demo
<i>Modeling</i>	Pedestrian Simon Says	“Where do I cross?”	Street-crossing simulation	Pedestrian signal game	Intersection-crossing simulation
<i>Creative</i>	Walking Basics song	Draw-on-command	Street-crossing sequencing activity	Pedestrian signals art activity	Poster contest/safe walker art activity

Figure 1. Program curriculum components.

to the side. WalkSafe RAs obtained a printed roster from the classroom teacher before testing, which included first names of students. Each student was tested one by one by RAs at a desk or table. Students were asked their first name, age, and grade and how they got to school in the morning and how they were planning to get home from school in the afternoon. Teachers were then asked to verify all information collected and provide remaining necessary demographic information (teachers were asked the same questions that RAs asked the students). This was a standardized protocol that was formulated before testing commenced for the program.

SKA Questions

See Appendix C.

Question 1, students were shown Pictures 1 and 2.

They were then asked, "Which person is stopped at the curb?"

Question 2, students were shown Pictures 3 and 4.

They were then asked, "Which boy is being safe?"

Question 3, students were shown Picture 5 and asked to place and hold their finger on the crosswalk depicted within the picture.

Questions 4 Part A and 4 Part B, students were shown

Picture 6 and asked, "What do we do when we see this signal?" and "Do we stop?"

Question 5 students were asked (no pictures shown), "Should we ever cross the street alone?"

Questions 6 Part A and 6 Part B, students were shown

Picture 7. The RA placed his or her finger in a safe (the crosswalk) and unsafe (middle of the street) area to cross the street and students were asked, "Is this a good place to cross the street?" and "Is it safe to cross the street here?"

SKA Scoring Procedures

The same SKA was administered at pre- and posttesting to gauge an increase in pedestrian safety knowledge post-curriculum implementation. The assessment was visually and verbally administered to each individual student. The RAs were knowledgeable of the assessment answers to each question given to the students and marked either a 1 or a zero, for the correct or incorrect response, respectively. Responses were recorded by hand on a single sheet of paper belonging to each individual student. Classroom teachers were not present in the testing area for the administration of the SKA and were not allowed to provide assistance to students during testing time. If students were not able to respond, the tests were found to be invalid and were not included in final statistical analysis. This study was submitted and approved by the University of Miami Institutional Review Board.

Procedures

The WalkSafe Pre-K curriculum was organized into 5 consecutive days of lessons, conducted during the school week. Each lesson included a DVD/video for classroom instruction. Each lesson was split into three sections, one section for instructional mode, one for modeling mode, and one for creative mode. The DVD portion of the curriculum was played at the beginning of each lesson, corresponding with the instructional portion for that lesson. The DVD portion of the curriculum showed a puppet ("Wendy Walk-Safe" produced by WalkSafe staff), talking about being a safe pedestrian, and included vocabulary words within the curriculum. The DVD segment lasted between 3 and 6 min depending on lesson materials. Teachers were allowed to show the DVD portion as many times as they would like but mandatory to show at least once in its entirety.

Materials for the curriculum included a binder that contained the five predeveloped and printed lesson plans with explicit instructions. The lesson plans included scaffolding strategies, pictures and flash cards, implementation guidelines and suggestions for enhancement, and a DVD with five individual segments. The week of curriculum implementation was chosen by teachers at each school. The lessons lasted between 20 and 30 min. Each lesson was built around five different pedestrian knowledge concepts and included activities for the teacher to complete before, during, and after instructing students. Modeling and creative (modes) activities reinforced the instructional lessons. This multimodal approach has been shown to be most effective for students between the ages of 3 and 5 years (Hotz, Cohn, Castelblanco, et al., 2004). Post-data collection was completed when RAs returned to the same schools, within the same classrooms, and tested the same students 1 month after program implementation. Post-data collection followed the same protocol as pre-data collection in terms of standardization and same RAs administering the SKA.

Data Analysis

Data collected during pre- and posttesting were entered by RAs into a Microsoft Excel spreadsheet containing all information and unique subject identifiers. The excel spreadsheet was then translated to all dichotomous variables (either assigned a 0 or 1) and transported into an SPSS database for computing purposes. Descriptive data were analyzed first from the entire sample. Gender, age, and score were analyzed independently. To analyze the SKA data, *t* tests and analysis of variance were performed using IBM SPSS 21.0 Statistical software. To measure the knowledge gain scores from pre- to posttesting, a paired-samples *t* test was conducted to compare the relative effects of the curriculum. Students were matched at pre- and posttests to show knowledge gains within subjects.

RESULTS

Student Knowledge Assessment

The students in our study ranged in age between 3 and 5 years, with a majority of students in the 5-year-old category (56.7%) and with the next largest group being 4-year-olds (37.1%). A majority of students in our study were Hispanic (58%), followed by Black (36%). There were an even number of males and females (50.3% and 49.7%, respectively).

A paired-samples *t* test was conducted to compare scores collected during preimplementation and postimplementation conditions. Table 2 shows there is a statistically significant difference in the scores for preimplementation ($M = 5.48$, $SD = 1.54$) to postimplementation ($M = 6.64$, $SD = 1.35$) conditions, $t(452) = -16.22$, $p < .001$, 95% CI [-1.29, -1.01]. These results indicate that pretest scores were lower before receiving the WalkSafe Pre-K Pedestrian Safety Curriculum than those after receiving the curriculum, which resulted in an increase in knowledge scores. Overall, as hypothesized, the scores increase after being exposed to the WalkSafe Pre-K curriculum in our study sample (Table 2).

DISCUSSION

The main goal in this study was to evaluate the efficacy of the WalkSafe Pre-K Pedestrian Safety Curriculum, a classroom-based educational training for children aged 3–6 years. Analysis revealed that the WalkSafe Pre-K curriculum provided improvement in pedestrian safety knowledge after receiving the 5-day curriculum. These findings were not dependent upon gender. No statistically significant difference was found between male and female students, allowing us to deduce that all prekindergarten students, regardless of gender, gained safety knowledge.

Previous research on the WalkSafe Program for Grades K–5 served as the framework for the Pre-K curriculum and highlighted the importance of multiple presentations of information in varying learning modalities (instruction, modeling, and creativity).

Our study helps reinforce previous research, indicating that this vulnerable population needs special attention and a specific curriculum. Such studies as that by Albert and Dolgin (2010), which explored pedestrian safety at

the preschool age level, will help redesign the education and focus in schools around the country (Albert & Dolgin, 2010). By providing education to preschool-aged students, these early safety lessons will likely help shape the rest of their lives and attitudes on safety in their communities (Albert & Dolgin, 2010). Early learning of these concepts is a key factor to keep students walking safe. If students are receiving this curriculum before grade school and it is again reinforced in grade school and at home, we hope to see a decrease in pedestrians-hit-by-cars, along with increased awareness of safety education for preschool- and school-aged children. This curriculum is considered a foundation for pedestrian safety knowledge and brings about awareness at a cognitively appropriate age. It is believed through literature and practice that children likely need reinforcement as they age and may need other components as well.

CONCLUSION

This study assessed the implementation and effectiveness of a school-based pedestrian safety injury prevention curriculum targeted toward preschool-aged children. The implementation of the curriculum was found to increase preschoolers' knowledge on basic pedestrian safety concepts. This study reinforces previous research findings displaying that children aged 3–5 years can gain and retain pedestrian safety knowledge from an educational curriculum (Albert & Dolgin, 2010). As this vulnerable population of individuals continues to be injured as pedestrians, our study lends support for necessary research and information to help educate preschool-aged children.

Future research is needed to determine the long-term effects of the curriculum implementation, to assess the longitudinal behavioral impacts of the lessons, and, finally, to closely track and monitor pedestrian injuries and fatalities in a high-risk population.

Limitations

Limitations of this study included intrinsic differences in teaching styles within different schools. Although teachers were provided the same curriculum and a standardized training and procedures protocol, we must account for differences in teaching styles in implementation of the curriculum. The presentation, depth, and length of time

Time	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	CI
Pre	454	5.48	1.55	–	–	–	–
Post	454	6.63	1.35	–	–	–	–
Total (Diff)	453	1.15	1.51	16.22 ^a	452	.000	[-1.29, -1.01]

Note. SKA = student knowledge assessment.
^aA ($p = .001$) significance level.

each teacher spent on the five lessons differed. These factors as well as the use of supplemental materials and activities could have further enhanced the WalkSafe Pre-K lessons. The varying time period between curriculum implementation and the delivery of the post-knowledge assessment could have further increased the measurement error, due to the unforeseen and busy schedules of the different classrooms at the different schools. Each school set its own implementation and testing schedule, which may have conflicted with standardized testing and other busy times during the school year. Time constraints of the school year also prevented a secondary follow-up to determine lasting effects of the curriculum or individual behavioral change. This study also could have benefited from observational data collection and information to determine if implementation of the curriculum and increased pedestrian knowledge gains affected children's behavior when crossing the street. For this study, there was no control group at this time, due to limited time and resources. The no-control-group quasi-experimental nature of the study allowed us to use the pretest as a control group because the sample was matched and it compared the same people with themselves across two time points. This helped with more control over the variable being tested but does have its weaknesses, such as more room for human error, the pretest subjects may have been outliers, and there were fewer subjects to collect data on. In the future, this should be replicated in many different populations and include a control or comparison group. Future studies should include observing possible changes in safety behavior. With information gained from this research, there is an opportunity to provide prekindergarten students with the WalkSafe pedestrian safety messages that will keep children secure in their future.

Acknowledgments

The authors thank the Centers for Disease Control and Prevention and the Miami-Dade County Public Schools District for their grant funding of this Community Transformation Grant (The School Board Agency # MDCPUM01 and the Catalog of Federal Domestic Assistance Number: 93:737, Community Transformation Grant–Small Communities Program). The authors also express appreciation to Luisa Kim for assisting in the collection and coding during data collection. This study would not have been possible without the help of the Miami-Dade County Public Schools, Dr. Jayne Greenberg, District Director of Physical Education and Health Literacy, and the many teachers, parents, and children who participated in this study.

REFERENCES

Albert, R. R., & Dolgin, K. G. (2010). Lasting effects of short-term training on preschoolers' street-crossing behavior. *Accident Analysis & Prevention, 42*(2), 500–508.

- American Academy of Pediatrics. (2009). Policy statement—Pedestrian safety. *Pediatrics, 124*(2), 802–812.
- Barnett, W. S., Lamy, C., & Jung, K. (2005). *The effects of state prekindergarten programs on young children's school readiness in five states*. New Brunswick, NJ: National Institute for Early Education Research.
- Brown, E. G., & Scott-Little, C. (2003). *Evaluations of school readiness initiatives: What are we learning? SERVE's expanded learning opportunities national leadership area research report* (ERIC No. ED477427). Washington, DC: US Department of Education.
- Centers for Disease Control and Prevention Web-based Injury Statistics Query and Reporting System (WISQARS). (2003). *Ten leading causes of death and injury*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Retrieved January 31, 2016, from <http://www.cdc.gov/injury/wisqars/leadingcauses.html>
- Childers, J. B., & Tomasello, M. (2002). Two-year-olds learn novel nouns, verbs, and conventional actions from massed or distributed exposures. *Developmental Psychology, 38*(6), 967.
- Clifford, R. M., Barbarin, O., Chang, F., Early, D., Bryant, D., Howes, C. ... Pianta, R., (2005). What is pre-kindergarten? Characteristics of public prekindergarten programs. *Applied Developmental Science, 9*(3), 126–143.
- Foot, H. C., Thomson, J. A., Tolmie, A. K., Whelan, K. M., Morrison, S., & Sarvary, P. (2006). Children's understanding of drivers' intentions. *British Journal of Developmental Psychology, 24*(4), 681–700.
- Hotz, G. A., Cohn, S. M., Castelblanco, A., Colston, S., Thomas, M., Weiss, A. ... Duncan, R., (2004). WalkSafe: A school-based pedestrian safety intervention program. *Traffic Injury Prevention, 5*(4), 382–389.
- Hotz, G., de Marcilla, A. G., Lutfi, K., Kennedy, A., Castellon, P., & Duncan, R. (2009). The WalkSafe Program: Developing and evaluating the educational component. *Journal of Trauma and Acute Care Surgery, 66*(3), S3–S9.
- Hotz, G. A., Cohn, S. M., Nelson, J., Mishkin, D., Castelblanco, A., Li, P. ... & the Pediatric Pedestrian Injury Task Force. (2004). Pediatric pedestrian trauma study: A pilot project. *Traffic Injury Prevention, 5*(2), 132–136.
- Miami-Dade County Public Schools. (2015). *Miami-Dade County Public Schools statistical highlights 2013–2014*. Retrieved October 2015 from <http://drs.dadeschools.net/StatisticalHighlights/SH1314.pdf>
- Piaget, J., & Inhelder, B. (1969). *The psychology of the child*. New York, NY: Basic Books.
- Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academies Press.
- U.S. Department of Transportation, National Highway Traffic Safety Administration. (2014a, April). *Traffic safety facts 2012 data* (DOT HS 812 011). Washington, DC: NHTSA's National Center for Statistics and Analysis. Retrieved January 31, 2016, from <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812011>
- U.S. Department of Transportation, National Highway Traffic Safety Administration. (2014b, April). *Traffic safety facts 2012 data* (DOT HS 811 888). Washington, DC: NHTSA's National Center for Statistics and Analysis. Retrieved January 31, 2016, from <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811888>
- Van Schagen, I., & Rothengatter, T. (1997). Classroom instruction versus roadside training in traffic safety education. *Journal of Applied Developmental Psychology, 18*(2), 283–292.
- Zeedyk, M. S., & Wallace, L. (2003). Tackling children's road safety through edutainment: An evaluation of effectiveness. *Health Education Research, 18*(4), 493–505.
- Zeedyk, M. S., Wallace, L., & Spry, L. (2002). Stop, look, listen, and think? What young children really do when crossing the road. *Accident Analysis & Prevention, 34*(1), 43–50.

APPENDIX A

WalkSafe Pre-Kindergarten Introduction Page

This page provides the general overview of the lesson for teachers implementing the lessons. A Table of Contents, listing each lesson title and its corresponding page number, can be found on the left-hand side of the introduction page. Symbols used throughout the curriculum are listed and described. The color code for each lesson module is shown and described for teachers.



WalkSafe® Pre-Kindergarten Curriculum

Table of Contents

	Pg
Lesson 1 Walking Basics	
Instructional Module	1
Modeling Module	2
Creative Module	3
Materials	4
Lesson 2 Safe Places to Walk	
Instructional Module	17
Modeling Module	18
Creative Module	19
Materials	20
Lesson 3 Crossing the Street	
Instructional Module	34
Modeling Module	35
Creative Module	36
Materials	37
Lesson 4 Pedestrian Signals	
Instructional Module	44
Creative Module	45
Modeling Module	46
Materials	47
Lesson 5 Crossing at Intersections	
Instructional Module	55
Modeling Module	56
Creative Module	57
Materials	58

Teacher's Guide: Pre Kindergarten

The WalkSafe® program aims to improve pedestrian safety and promote student wellness through walking. This 5-day curriculum contains lessons and activities that teaches beginner pedestrian safety skills to children ages 3-4 through the use of videos, instructional demonstrations, simulation/modeling activities and art projects. Supplementary to the 5-day lesson plan, printable materials are provided to enhance the modules.

This basic 5-day curriculum includes 3 different learning modules in each day's lesson plan:

- Instructional Module
- Modeling Module
- Creative Module

Each Lesson Plan contains an activity description (on the left side of the page) and a recommended script for the instructor to follow (on the right side of the page).

An overview of the lesson components can be found on the left panel of the Lesson Plan pages.

Thank you for supporting the WalkSafe® Program and sharing the importance of pedestrian safety with your students.

Lesson Module Color Code

INSTRUCTIONAL

MODELING

CREATIVE

Lesson Feature Symbols



Interactive Curriculum Video
When this symbol appears, play the corresponding Interactive Curriculum Video chapter(s) indicated in the lesson plan.



Printable Materials
When this symbol appears, recommended printable materials are available to enhance supplement the lesson.



Especially Effective for Advanced Students
When this symbol appears, the corresponding activity is recommended by teachers for advanced students.

Targeted Curriculum for Advanced Students

- ✓ Interactive Curriculum Video (Instructional Component Activity in Lessons 1-5)
- ✓ Safe or Dangerous Flashcards (Instructional Component Activity in Lessons 1-3)
- ✓ Walking Basics Song

2013 © WalkSafe® may be reproduced for classroom use.

254 WWW.JOURNALOFTRAUMANURSING.COM

Volume 23 | Number 5 | September-October 2016

Copyright © 2016 Society of Trauma Nurses. Unauthorized reproduction of this article is prohibited.

APPENDIX B

WalkSafe Pre-Kindergarten Lesson 1: Instructional Module

Explains how the lesson is laid out, the overview of the first lesson, the objectives, materials, preparation for the teacher, and the vocabulary words that correlate with Lesson 1 (vocabulary flashcards with pictures are provided at the end of the lesson).



Pre-Kindergarten Curriculum

Lesson Overview:

1. Interactive Vocabulary Video
2. "Safe or Dangerous?" Flashcard Activity
3. Pedestrian Simon-Says (pg. 2)
4. Walking Basics Song (pg. 3)

Objectives:

1. Students will be exposed to Walking Basics vocabulary
2. Verbal students will recite Walking Basics vocabulary
3. Students will identify safe and dangerous pedestrian situations

Materials:

- Television
- DVD Player
- Interactive Curriculum Video on DVD
- "Safe or Dangerous?" Flashcards – Set 1 (pgs. 4-9)

Preparation:

Set up Television and DVD player, with Interactive Vocabulary Video ready to start from Chapter 1.

Arrange students in an area where all are able to view the interactive Vocabulary Video.

Vocabulary:

1. Walk
2. Walker
3. Safe
4. Dangerous
5. Left
6. Right
7. Stop

Teacher's Guide: Lesson 1

Walking Basics

Walking Basics Lesson Plan: Instructional Module

Activity Descriptions:

  **Interactive Vocabulary Video Introduction**
Play Chapter 1-Walking Basics of the Interactive Curriculum Video on screen for children to watch.

  **"Safe or Dangerous?" Flashcard Activity**
Introduce activity and show students all of the SAFE flashcards (pgs. 4, 6, 8). Describe the actions shown in each flashcard for students, emphasizing why they are SAFE.

Show students all of the DANGEROUS flashcards (pgs. 5, 7, 9). Describe the actions shown in each flashcard for students, emphasizing why they are DANGEROUS.

Hold up a pair of safe/dangerous flashcards. (Be sure both flashcards in the pair are depicting the same situation, one SAFE and one DANGEROUS.) Ask the class, or ask each student individually, to identify the SAFE and DANGEROUS scenes. Repeat with all pairs of safe/dangerous flashcards.

Sample Script

"The WalkSafe® Video is going to help us learn the right way to walk and cross the street. We want to be SAFE when we walk so we don't get hurt. Our friend in the video is going to teach us how to be SAFE. When she asks us to say the words with her, everyone say the words as LOUD as you can!"

"I have pictures of things that are SAFE to do. SAFE is good! We should always do what is safe."

"The boy is walking with his dad. The boy and his dad are holding hands and walking together. The boy's dad will help him stay SAFE when they are walking."

"I have pictures of things that are DANGEROUS to do. DANGEROUS is bad. If we do things that are dangerous, we can get hurt. We never want to do something that is DANGEROUS."

"Tell me which picture is safe? Which picture is good?"

"Which picture is dangerous? Which picture is bad?"

"Is the picture in my left hand safe?"

Is the picture in my right hand safe?"

Optional reinforcement method: Have students who are able use the words "left" and "right" to identify which flashcard is safe/dangerous verbally.

Accommodation: Add texture to the outline of the pictures using puffy paint, felt or glue dots.

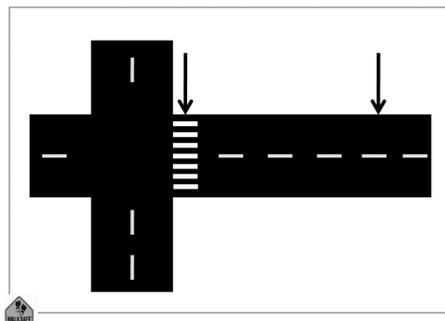
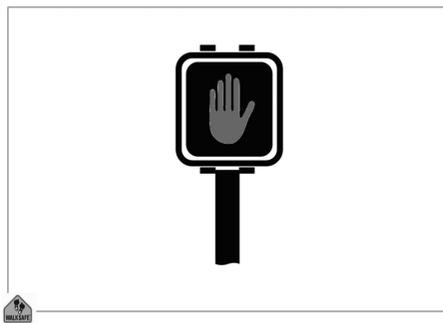
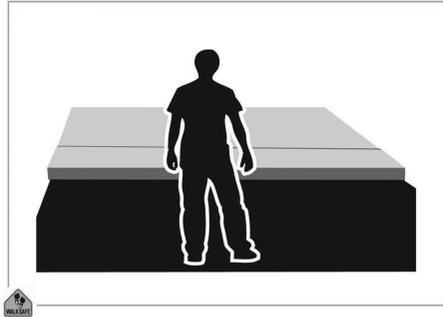
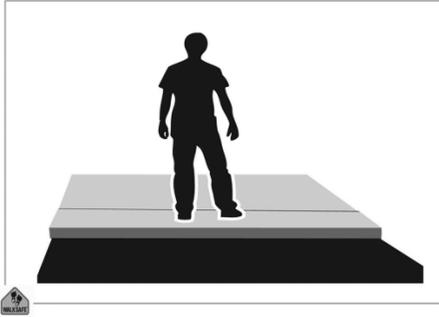
Modification: Use "yes/no" buttons and have students indicate whether or not the scene is safe/dangerous.

1

APPENDIX C

Student Knowledge Assessment

Pictures shown to students, when asked corresponding questions, to gauge understanding of pedestrian safety knowledge at pre- and posttests (seven pictures).



For more than 160 additional continuing education articles related to topics in pediatrics, go to NursingCenter.com/CE.