Effectiveness of Computer-Assisted Instruction using Multimedia CD-ROM to Prevent Child Accident

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Abstract

The purpose of the study was to find out the effects of Computer-Assisted Instruction through the Multimedia CD-ROM for prevent of child accidents. 235 Korean school-aged-children participated in this study. The subjects studied the education program through multimedia CD-ROM. The Design of this study was one group pretest-posttest design. Data was collected before and after the education was given to the subjects, to assess their knowledge and attitudes toward child accidents. After education, the scores of children's knowledge and attitude for prevention of accidents was higher than before. Therefore, this research indicates that CAI is effective in reinforcing increase children's knowledge and preventive attitude related accident.

Keywords:

CAI, Child Accident, Safety Educational Program, Multimedia CD-ROM

Introduction

Child accidents involving children are important cause of death and disability. The reported rate of children death due to accidents reached 40%, which ranked the highest. They also have enormous financial implications [1].

Young children easily become accident victims because of their fragility and their inability to cope with the circumstances arising during an accident. Once they have an accident, the children who are not fully developed suffer from devastating long-term effects. It is clear that some injuries would require extended periods of absence from school. There are also indications of what may be more long-term health problems [2]. The results not only cause physical signs and symptoms, but also leave lifetime emotional scars, which lead to disability.

Child accident risk was strongly related to social disadvantage [3]. The death rates from accidents involving children aged 0-14 by health districts were strongly correlated with social deprivation [4]. This data suggests that the children are exposed to unsafe environments without any protection, and it also explains how vulnerable the children are in these environments.

Lee, Lee, Kang and Han (1995) reported that ninety percent of accidents could be prevented [5]. But there is no national system to manage, evaluate, and analyze the information relating to child accidents, even though it is necessary for accident prevention policies and the promotion of general public health [5]. Furthermore, the shortage of health care facilities and providers is another

Carter, Bannon and Jones (1994) studied about the role of the teacher in child accident prevention [6]. A sample of 278 head teachers of children between the ages of three and eleven in North Stafford shire were sent a postal questionnaire to determine the manner and extent to which they were involved in accident prevention. The majority of respondents agreed that accident prevention was a suitable subject to be taught in schools. However, a minority felt that they had enough background information or training on the subject. First-aid instruction was particularly requested. The reported levels and management of individual accident cases varied. Agreed upon guidelines on the reporting of accidents, the role of the school medical service in accident prevention, and the supervision of children during recreation periods are desirable. The contents and materials of the program may not be appropriate for the public and most of them are not feasible for public use because of in accessibility and/or in compatibility with the available media. However, many schools may not implement specific prevention programs due to lack of knowledge about the prevalence of child accidents, lack of funds, or lack of personnel.

While evaluating the efficacy of child-directed accident prevention programs, there have been concerns about design problems, such as the lack of control groups or random assignment, a lack of standardized measures, and problems in assessing that outcomes demonstrate that children have been protected. Of great concern was creating an accessible program that allows the participants to fully understand the difficult concepts. Presenter-audience interactions and new materials incorporating quizzes or games between children were recommended so that the core concepts could be reinforced in individualized ways. Parental involvement had the added benefit of giving parents an understanding of the level of their children's knowledge about accident prevention concepts after having participated in a prevention program. Prior to their involvement they might provide misinformation to their children, which would contradict the concepts taught in the prevention program.

Based on this background information, the investigator concluded that it was imperative to develop and implement a child accident prevention program that focuses on young children, teachers and parents in a consistent manner and which allows constant evaluation of efficacy of the problem. Also, the investigator was developed multimedia CD-ROM title and Home-Based Management System for Prevention of Child Accident in 2002. Korea Science and Engineering Foundation funded this project. The second phase of this project was evaluated this program for further development. The investigator was planed to examine the changes in

knowledge, attitude, and behavior of the viewers who had an opportunity to participate in the program.

The purpose of the study was to find out the effects of Computer-Assisted Instruction through the Multimedia CD-ROM for prevent of child accidents. The goals of the program were: 1) to decrease the incidence of child accidents by educating the public, including children, to gain the perception of safety, and 2) to strengthen the children by teaching them how to defend themselves. The program will, hopefully, change children's behaviors and provide them with safety skills and coping abilities that help to prevent accidents.

Methodology

235 Korean school-aged-children participated in this study. The subjects studied the education program through multimedia CD-ROM.

The Design of this study was one group pretest-posttest design. Subjects took this test as the pretest and posttest to determine whether there was a difference in overall test scores.

Data was collected before and after the education was given to the subjects, to assess their knowledge and attitudes toward child accidents.

Two instruments were used in this study. Cronbach's ALPHA validity and reliability measures were used to test these instruments. The analysis of the data was done with SPSS PC+ for descriptive statistics, paired t-test and ANOVA.

The education program was developed based on a survey. School-aged-children, parents, and teachers were interviewed to reveal their educational needs based on their experiences related to accidents. The current primary school curriculum in Korea addresses traffic order, health, guided field trips, observation of public morals, and human relationships. However, it does not include any issues regarding child accidents. This program promoting accident preventive behavior will, hopefully, be an initial step in establishing a mechanism for future integration. The objectives of the project and the contents of the program are laid out in Table 2. Different scenarios at home, at school, in the playground, and in social environments were constructed based on the results of the study, so that the participants could relate with the daily living activities. The instructional designers also selected the materials, characters, and instructions appropriate for children in primary school and their parents. The program contains an introduction, children's page, parent's page and resource page.

Results

Among those children, 102 children (43.4%) were injured from accidents. The children who were involved in accidents answered that they were already injured from falls (32.7%), traffic accidents (17%), burns (24.1%), food poisoning (9.2%) etc.

Table 1. The Characteristics of subjects

Characteristics	class	frequency (%)
Grade	1	42(17.8%)
	2	39(16.6%)
	3	38(16.3%)
	4	37(15.7%)
	5	40(17.0%)
	6	39(16.6%)
Sex	male	144(61.2%)
	female	91(38.8%)
Experience of accident	yes	102(43.4%)
	no	133(56.6%)

A statistically significant difference was identified in the scores between before education and after. For subjects who participated in CAI there was marked improvement. After education, the score of children's knowledge was higher than before ($t=5.23$, $p=0.001$). After education, the score of children's attitude for prevention of accidents was higher than before ($t=3.73$, $p=0.04$). Therefore, this CAI was revealed the positive effect for children's knowledge and attitude for prevention of child accident.

Until recently, books and videotapes have been a main media for child education outside of classrooms in Korea. However, it was believed that utilizing a computer CD-ROM title with interactive multimedia for individuals or groups rather than one directional audio/visual and static media would be more effective to meet different needs according to educational level and interest of the audience. According to Korean National Statistical Office (2000), currently, Korea holds the highest rate of computer usage in homes in the world (78.7%)[7]. The average age of the parents whose children in grammar school is between 30 and 40. Nearly all the parents in this age group complete high school educations. The findings from this study will provide an intervention strategy. Children especially, can learn specific methods to avoid being injured both at home and outside the home through a learning game and simulation based on problem solving.

Research indicates that CAI is effective in reinforcing certain behaviors CAI intervention did increase knowledge and preventive attitude related accidents in this sample [8-10]. These findings support previous research. However, replication studies using a CAI intervention are needed as are studies aimed at exploring other potentially effective interventions. In addition, studies related to retention of compliance behaviors are needed to determine which interventions have lasting effects on prevention of child accidents.

Conclusion

This project aims at finding out the effects of Computer-Assisted Instruction through the Multimedia CD-ROM for prevent of child accidents. It hopes to promote safety

awareness insight into child accidents, prevention, and coping methods. A child accidents prevention program utilizing Computer Disk-Read Only Media (CD-ROM) was initiated to address and ameliorate this problem based on the result of a study on educational needs regarding child accidents.

This project was intended to make child accidents a public health issue and to increase the awareness of child accidents among the children, the parents, and the teachers. This program not only provides information about child accidents but also serves as a way to access important resources, such as crisis intervention and professional counseling centers. Using the results of the child interviews and the parental surveys, the investigator and the team members selected and prioritized the content materials by using a negotiated process approach. Safety education should be actively promoted throughout life, with special emphasis on safety education for children. This CD-ROM title can also be used as a resource guide for the educators, administrators, and any public agencies requiring a program to promote child accident prevention .The lessons already learned in many parts of the world must now be put into practice in Korea.

Computer science is being introduced in education at an accelerated pace, thus forcing educators and students to become familiar with the technology. The objective of this project was aimed at the development and evaluation of the education software, The Child and the Medication. The program uses multimedia resources in four topics: the child, the medication, who administers it, and medication administration. The evaluation showed good acceptance of the program, with most of the items receiving excellent approval. The emphasis in this report is on the importance of teaching strategy development using computational means to teach nursing, thus capacitating the nurses of the next millennium.

Table 2 The Contents of Child accident Prevention Program Child Sexual Abuse Prevention Program

TITLE	OBJECTIVES	CONTENTS
Introduction 	• Identify the purposes of the program • Identify the contents and learn how to navigate	• The purpose and the emphasis of each section
We are all valuable 	• View the scene related to safety behavior and respect for others • Gain the concept of safety and its value • Review growth and development	• The concepts on safety • The behaviors of respecting friends • My body is important. • Body parts and functions
What is Child Accident? 	• Gain insight into the realities of child accidents	• Types of child accidents (car accident, fall, burn, drowning, poisoning) • The terms used in the program • Emphasis on the prevention of child accidents
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What shall I do? 	• Identify the potential situations which could lead to a child accident • Gain knowledge on the preventive measures • Interact with the program to familiarize oneself with the preventive actions	• Behaviors of perpetrators • Safe/Dangerous places • Safe/Dangerous situations • Plan for child accident prevention • Safety behaviors training • Self-defense • Help! Coping
Early detection & intervention 	For Adults • Identify child accident warning signs • Participate in the program to learn how to become proactive Intervention Practice • How to communicate with child victims • Medical interventions after incidents. • Psychosocial and emotional interventions after incidents	Guidelines for early detection • Characteristics of high risk environment • Typical behavior of high risk children • After effects of child accident
Resources Page: Available agencies 	• Learn how to utilize the resources • Internet sites of child accident educational agencies and the offices of law enforcement agencies • Telephone numbers of hospitals and emergency agencies	

Acknowledgments

This work was supported by grant No. R05-2000-000-00136-0 from the Korea Science & Engineering Foundation.

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