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Development of Personal Safety Education Program for Nursing Students Using Hybrid Application

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Abstract

Background/Objectives: This study describes a method of developing a personal safety education program for nursing college students using a hybrid application. The purpose of this study is to ensure that nursing college students receive appropriate education, protect themselves from the elements, and make the best use of their nursing ability before conducting clinical training.

Method/Statistical Analysis: This study uses Orem's theory of self-nursing as the basis of the theory, and the program was developed according to the ADDIE model. In the literature review, we selected themes with high demands through interviews with experts and research subjects, and developed a personal safety education hybrid application.

Findings: The contents of the developed educational program were conducted in four chassis. When practicing at a hospital, when visiting a practicum in a local community, management of musculoskeletal diseases and stress management during clinical practice. The satisfaction level of education through the developed application was very high with 4.84±.33 points out of 5 points.

Improvements/Applications: Using the application developed through this research, pre-clinical education for health centers in hospitals and communities at nursing colleges could reduce safety accidents in the field. In the future, it will be necessary to verify the effectiveness of various nursing universities and grades.

Keywords: *Mobile application, Hybrid application, Nursing student, Personal safety, Occupational hazards.*

Introduction

The working environment of medical personnel is not safe. Many health care workers are at risk of being easily exposed to nosocomial infections, and the shift and long hours of work disrupt the circardian rhythm and reduce the quality of sleep. The degree of fatigue continues to increase[1]. Long hours of work have also been found to increase the incidence of musculoskeletal injury and needle sticks[2-3]. In the past, emphasis was placed on infectious diseases that occurred in patients, and recently, it has been expanded to include subjects who should be protected by health care practitioners who carry out medical practices, and safety management in the overall medical environment. It is accessed as a department[4]. For these reasons, nurses, especially nurses, are often in direct or indirect close contact with patients and are often exposed to various infectious diseases. Much of the time spent in clinical practice is spent on patient care, which increases the risk of infection exposure. A study of nursing students found that up to 61.5% of clinical trials had been exposed to infectious diseases, and had been exposed to needle stick injuries or blood of patients[5-8].

Nursing students are more vulnerable to safety accidents than licensed nurses due to lack of experience, lack of expertise and skills, lack of knowledge, lack of tututorial, anxiety and lack of self-care[9,10]. In addition, 85% of nursing college students did not report to the organization at the time of the occurrence of a safety accident related to infection and could not know the

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results of the patient's serological test[11]. Considering these points, before starting these exercises, standard precautions must be given to recognize and prevent risks and ensure that the agency in the event of a safety accident occurs. As shown in the current study of nurses working in hospitals, nurses who work in the infection control room or who do not specialize in infection control in graduate school lack knowledge of infection management and lack of self-confidence[12].

[13]Presents hazards that threaten the health of health professionals who provide family nursing care. It is being described, but the guideline is not provided in Korea yet. Home health care providers experience a variety of hazards in the United States, which can have a negative impact on job performance, job satisfaction and health. In addition, broader training is needed to identify hazards in the client homes they visit and to provide care in a safe environment [14]. Currently, when a job is found at a university hospital in Korea, new nurses are educated at the point of incidence, but this is also not structured for each hospital. In the case of education, lecture-centered education is provided using manuals, pamphlets, and materials collected by the hospital nursing department[15-17]. In Korea, there were a needlestick prevention program for nurses [15] and an education program for new infection control nurses[16], but the development of educational programs for nursing college students has not been carried out. Although it is not well understood, only the investigation of blood and body fluid exposure during clinical training[18] and the influence factors[4,12] that affect the implementation of standard attention instructions for infection prevention have been advanced, and the structure before clinical training has been structured. It is time to find a plan that can be educated efficiently. In this study, Orem's theory of self-care[19] was applied as a theoretical framework. The purpose of this study is to define nursing students as beings with self-care needs that can protect themselves from risks and to comply with safety, and to contribute to the maximum performance of nursing students by developing and applying personal safety education programs. The theoretical framework of this study is shown in Figure 1.

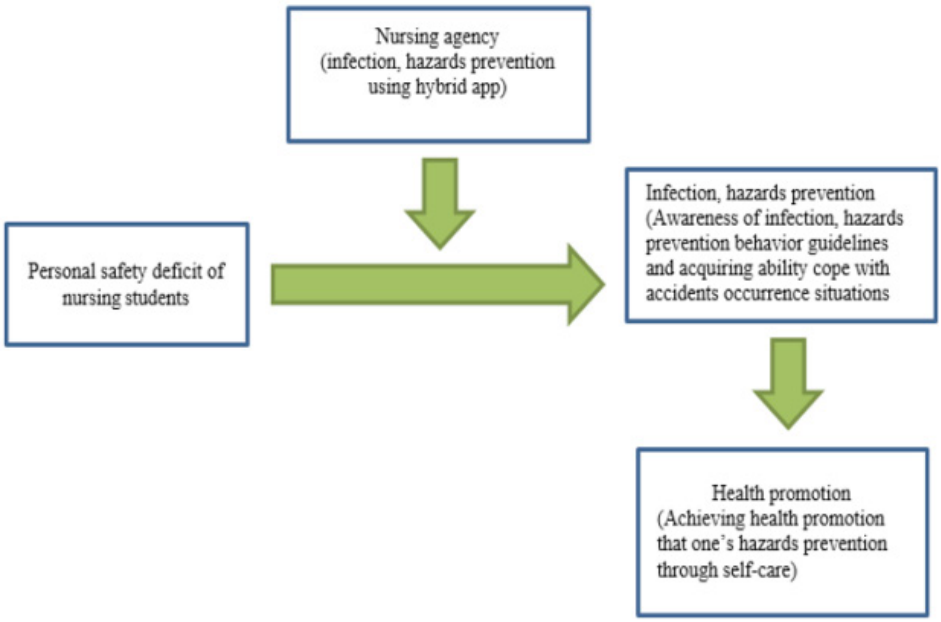

Figure 1. Framework of this study

Method

This study is a methodological study to improve the safety and health of nursing college students by developing a safety prevention program including the infection of nursing college students using a hybrid app. The ADDIE model [20] was used to develop the program of this study. The ADDIE model has also been used as an evaluation rubric when developing new teaching strategies or media in instructional design[21,22].

Result

1. **Analysis:** We referred to the guidelines proposed by [13]. In addition, we conducted a semi-structured interview survey on the necessity, content, method, and implementation period of safety education for nursing college students who completed clinical training for three or more semesters. As shown in Table1 are composed of application contents.

Table 1. Contents of personal safety education program with hybrid app

Phase	Content
1	When practicing in the hospital • Concept of hospital infection, high risk of hospital infection, prevention of infection accidents, bloodborne pathogens including needlestick and sharp injuries, reporting method after infection exposure, necessary tests and vaccinations
2	When practicing home visit nursing at a health center or community care (in home health care) • The overall environment of the house (such as entering the house after confirming that the animal is bound, temperature in the house, house hygiene, places and things that only hurt)
3	Prevention of musculoskeletal diseases in all clinical practice (when changing patient position, assisting mobility)
4	Occupational Stress (verbal violence, sexual violence, sexual harassment, bullying, incivility)

2. **Design:** The program of this study was divided into the case of practicing in the hospital according to the practice place and the case of visiting nursing practice in the public health center and the community. Touch each table in the table view with the application then, it was designed to move to that area. When a nursing college student had a hospital infection accident during practical training, he was able to comprehend the situation in which the specific situation was embodied in video and accurately handled and reported.

3. **Development:** Development was based on the smartphone's general-purpose operating system Android. The screen was made using the photoshop CS4 program and using clear colors and text sizes. Each content has been developed so that it can be easily checked by turning it over, allowing nursing college students to play with videos that can happen in actual practical situations, and for confirmation learning, choose O, X quiz. Figure 2 shows part of the main screen. Two of the computer engineering majors with extensive experience in developing educational smartphone applications and a professor who is currently teaching pedagogy at the university, participated in this development process.

Figure 2. Screenshot of the smartphone-based app

4. **Implementation:** After developing this educational program, the content validity was verified by using a group of experts and revised based on the results. QUIS[24] was used to evaluate the validity of the hybrid app training program. It reflects overall satisfaction (method, impact, interest), screen drive(characters, sequence order), system information and capabilities (terminology, technology, speed, position on the screen), learner(requests), usefulness of confirmation learning, and can be evaluated on a 10-point scale. The supplemented assessment tool was validated with a CVI score of over 90% in all items in a content validation study of a specialist group including two professors in the nursing department and eight nurses working in hospitals and health centers verified.

5. **Evaluation:** As shown in Table 2, in the evaluation of the expert group after the development of the program. Table 3 was designed to evaluate the satisfaction after directly implementing the program for 12 nursing college students in 3rd grade.

Table 2. Expert's satisfaction of the application (N = 10)

Categories of Satisfaction	M±SD
Overall reaction the application • Level of enjoyment, power, stimulation, ease of use, satisfaction	9.85±0.45
Screen • Character, sequence of order, organization of information, highlighting simplifies task	9.33±0.36

Terminology and system information • Use of term, positioning message, operation speed, reflecting the needs of the users	9.56±0.71
Learning • User's needs, remembering, use of commands	9.78±0.26
Total	9.63±0.24

Table 3. Nursing students satisfaction of the personal safety program (N = 12)

Questions of Satisfaction	M±SD
Was it easy to understand personal safety?	4.89±.31
Was the content and composition appropriate?	4.89±.31
Do you think the teaching method is effective?	4.78±.26
Do you have any ideas to recommend to other students?	4.92±.45
Has the intention to protect personal safety increased?	4.81±.38
Total	4.84±.33

Discussion

This study is based on the contents that students should know before clinical training, especially in high-risk incidents that are likely to occur in nursing college students who practice a lot of time at hospitals and patients' homes. Was carried out to develop the application. Considering the lack of pre-training education, the program was developed. In addition, it can be said that the arbitration study on safety for nursing college students is meaningful in that it was implemented for the first time.

In this study, the ADDIE model was applied to develop a program, which was also used in a study developed by a sex education program for college students[25] and elementary school students [26]. The ADDIE model allows the evaluation of the program process, and the teaching materials developed during the analysis, design and development process can be checked and changed. In this study, satisfaction levels were measured objectively for nursing college students and experts, and as a result, both groups were very satisfied. In addition, the quality of the program was improved by reflecting the modification requirements, and the safety of the research was ensured by actively reflecting the requirements of nursing college students who are users of the application.

In our study, we can find great significance in including the behavioral guidelines before and after home visit training for nursing college students for the first time in Korea. It can be said that education is necessary at this point when the number of elderly people living alone and patients with disabilities are increasing and the demand for home-visit nursing services is also increasing. In our research, it was confirmed that university students majoring in nursing were able to increase their nursing ability by trying new method. Future social and national efforts for nursing college students are likely to be necessary, and sufficient time and preventive education should be provided before clinical practice.

Conclusion

In this study, it is considered that a wide range of viewpoints were presented to promote physical and mental health of nursing college students from the aspect of nursing research. Through this study, we will be able to grasp the overall hazards of nursing college students in clinical practice, and this will help them develop nursing skills and promote health. Also, in this study, by developing a personal safety prevention program using an application in nursing practice, a university nursing professor provided information on prevention of infection and information on safety accidents for nursing university students and resources available for education. The significance can be found in that it was provided.

Considering the increasing phenomenon of nursing college students in Korea and the current rate of occurrence of these safety accidents, the program developed by this researcher is an appropriate customization program that is very necessary in the future. We expect these jobs to contribute greatly to satisfaction and health promotion. This program was developed by reflecting the specificity of college students with high smartphone use rate, and the respondents' response was very high. Although the personal safety program of nursing students suggested a new point of view, this study was applied only to nursing students of one university. Therefore, we recommend effectiveness verification through continuous arbitration studies for a large number of nursing college students in various regions.

Ethical Clearance: Not required

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Conflict of Interest: Nil

References

1. Paul LA. The changing organization of work

and the safety and health of working people: a commentary. Journal of Occupational and Environmental Medicine. 2003 Jan; 45(1):61-72.

2. Trinkoff Am, Le R, Jeanne GB, Jane L, Lang G. Longitudinal relationship of work hours, mandatory overtime, and on-call to musculoskeletal problems in nurses. American Journal of Industrial medicine. 2006 May; 49(11): Infection Control & Hospital Epidemiology, 2006 Feb; 49(11): 964-71
3. Trinkoff Am, Le R, Jeanne GB, Jane L. Work schedule, needle use, and needle stick injuries among registered nurses. Infection Control & Hospital Epidemiology. 2007 Feb; 28(2): 156-64. DOI: 10.1086/510785
4. Lee SJ, Park JY, Jo NR. Influence of knowledge and awareness on nursing students' performance of standard infection control guidelines. Journal of Korean Nursing Administration Academic Society. 2017 Sep; 23(4): 347-58. DOI: 10.11111/jkana.2017.23.4.237
5. Yang Y, Wu M, Ho C, Chuang H, Chen L, Yang C, et al. Needlestick/sharps injuries among vocational school nursing students in southern Taiwan. American Journal of Infection Control. 2004 Dec;32(8):431-5. DOI: 10.1016/j.ajic.2004.02.007
6. Yao W, Wu Y, Yang B, Zhang L, Yao C, Huang C, et al. Occupational safety training and education for needlestick injuries among nursing students in China: intervention study. Nurse Education Today. 2013 Aug;33(8):834-7. DOI:10.1016/j.nedt.2012.02.004
7. Unver V, Tastan S, Coskun H. The frequency and causes of occupational injuries among nursing students in Turkey. Archives of Environmental & Occupational Health. 2012 Apr;67(2):72-7. DOI:10.1080/19338244.2011.573024
8. Talas MS. Occupational exposure to blood and body fluids among Turkish nursing students during clinical practice training: frequency of needlestick/sharp injuries and hepatitis B immunisation. J Clinical Nursing. 2009 Apr;18(10):1394-1403. DOI:10.1111/j.1365-2702.2008.02523.x
9. Salzer HJ, Hoenigl M, Kessler HH, Stigler FL, Raggam RB, Rippel KE, et al. Lack of risk-awareness and reporting behavior towards HIV infection through needlestick injury among European medical students. International Journal of Hygiene Environmental Health. 2011 Sep;214(5):407-10.
10. Sharma GK, Gilson MM, Nathan H, Makary MA. Needlestick injuries among medical students: incidence and implications. Academic Medicine. 2009 Dec;84(12):1815-21.
11. Souza-Borges, Fernanda Ribeiro Fagundes de, Ribeiro LA, Oliveira, Luiz Carlos Marques de. Occupational exposures to body fluids and behaviors regarding their prevention and post-exposure among medical and nursing students at a Brazilian Public University. Revista do Instituto de Medicina Tropical de São Paulo. 2014 Apr;56(2):157-63.
12. Yu HS. Factors influencing performance on standard precautions of infection control in nursing students. Journal of the Korean Data Analysis Society. 2017 Aug;19(4):2205-17.
13. Galinsky T, Hodson L, Malit BD, Nagy H, Parsons K, Swanson N, et al. Occupational hazards in home healthcare.2010.Availablefrom:https://www.cdc.gov/niosh/docs/2010-125/pdfs/2010-125.pdf
14. Polivka BJ, Wills CE, Darragh A, Lavender S, Sommerich C, Stredney D. Environmental health and safety hazards experienced by home health care providers: A room-by-room analysis. Workplace Health & Safety. 2015 Nov; 63(11):512-522. DOI:10.1177/2165079915535325
15. Park SM, Jeong IS, Jun SS. Effect of sharps injury prevention program on the incidence and reporting of sharp injury among nurses. Korean Journal Nosocomial Infection Control. 2013; 18(1): 15-25. DOI:10.14192/kjnic.2013.18.1.15
16. Jeong SY, Lee JY, Kim SR, Shin MJ, Lee SE, Kim OS. Development and implementation of an education program for novice infection control nurses. Korean Journal Nosocomial Infection Control.2016;21(1):18-30.
17. Yang Y, Liou S, Chen C, Yang C, Wang C, Chen C, et al. The effectiveness of a training program on reducing needlestick injuries/sharp object injuries among soon graduate vocational nursing school students in southern Taiwan. Journal of Occupational Health. 2007;49(5):424-429.
18. Kim HJ, Kim NC. The status of blood and body fluid exposure and affecting factors among nursing students including knowledge, performance regarding standard precautions. The Journal of Korean Society for School & Community Health Education. 2014 Dec;15(3): 17-30.

19. Orem D. Nursing: Concepts of practice.5th ed. Missouri: St. Lois, Mosby;1995.p.-478.
20. Dick W, Carey L, Carey JO. The systematic design of instruction. 2005.
21. Ozdilek Z, Robeck E. Operational priorities of instructional designers analyzed within the steps of the Addie instructional design model. Procedia-Social and Behavioral Sciences. 2009;1(1):2046-50. DOI: 10.1016/j.sbspro.2009.01.359
22. Robinson BK, Dearmon V. Evidence-based nursing education: Effective use of instructional design and simulated learning environments to enhance knowledge transfer in undergraduate nursing students. Journal of Professional Nursing. 2013July-Aug;29(4):203-209.
23. Trinkoff AM, Geiger-Brown JM, Caruso CC, Lipscomb JA, Johantgen M, Nelson AL, et al. Personal Safety for Nurses. In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses Rockville (MD); 2008.
24. Chin JP, Diehl VA, Norman KL. Development of an instrument measuring user satisfaction of the human-computer interface. Proceedings of the SIGCHI conference on human factors in computing systems: ACM; 1988.
25. Kim IO, Yeom GJ, Kim MJ. Development and effects of a sex education program with blended learning for university students. Child Health Nursing Research. 2018 Oct;24(4): 443-53. DOI:10.4094/chnr2018.24.4.443
26. Kim SJ, Kang SR, Lee JM. Development of a sexual abuse prevention education program for elementary school students using a hybrid application. Child Health Nursing Research. 2018 Jan;24(1):109-18. DOI:10.4094/chnr2018.24.4.109