Study Protocol

Official Title: The effectiveness of chatbot facilitated education on child and adolescent abuse for nurses

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Project PI：Mei-Lin Hsieh

Project Co-PI：Ying-Fang Chou, Li-Cheng Kao

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Background

The incidence of child and adolescent abuse and neglect (CAN) is increasing both in Taiwan and globally. As frontline healthcare professionals, nurses play a pivotal role in the early identification and reporting of CAN. However, research indicates that insufficient knowledge and limited competency among nursing staff can impede timely recognition and notification of suspected cases. Strengthening nurses' knowledge and competencies in assessing and reporting CAN is therefore essential. With the advancement of technology, continuing nursing education has expanded beyond traditional lecture-based formats. In particular, online education has gained momentum since the COVID-19 pandemic, offering flexible, accessible learning opportunities. Chatbots, as a form of individualized digital learning, have emerged as a promising tool for enhancing nurses' ability to recognize and report CAN.

Objective

The study aims to evaluate the effectiveness of chatbot-facilitated education in assisting nursing personnel to prevent CAN. This evaluation will focus on the impact of this learning on CAN competency.

Method

An experimental study design was employed. Participants were purposively sampled and allocated to the experimental and control group. The experimental group received chatbot-facilitated education (CFE), while the control group received conventional lecture-based instruction. The course content, developed using the ADDIE instructional design model, comprised two modules: (1) Child and Adolescent Abuse and Neglect and (2) Nurses' Roles and Responsibilities in CAN. The *CAN Knowledge and Competency Scale* was used to measure learning outcomes at three time points: pre-intervention, one week post-intervention, and four weeks post-intervention.

Statistical Analysis Plan

The collected questionnaire data will be coded and analyzed using the SPSS for Mac version 29.0.1.0 statistical software package. The statistical analysis methods employed will include descriptive statistics and inferential statistics (Table 1-1). A significance level of $p < .05$ will be used for hypothesis testing.

1. Descriptive Statistics

The central tendency and dispersion trends of the sample will be presented using frequency distribution, percentage, mean, and standard deviation to understand the distribution of the sample's basic attributes.

2. Inferential Statistics

(1) Chi-square test (χ^2 test)

a. To test whether there are statistically significant differences in categorical variables between the two groups.

(2) Independent-samples t-test

a. To test whether there are statistically significant differences in continuous variables between the two groups.

b. To test whether the average scores of CAN intention to report, attitude toward reporting, and knowledge evaluations between the two groups are statistically significantly different.

(3) Paired-samples t-test

a. To test whether there are statistically significant differences in CAN intention to report, attitude toward reporting, and knowledge evaluations within each group over three time points.

(4) Generalized Estimating Equation (GEE)

a. To test whether there are statistically significant differences in CAN intention to report, attitude toward reporting, and knowledge evaluation scores between the two groups across different time points.

Table 1-1 Research hypotheses and analysis methods (1/2)

Research hypotheses	Assessment tool	Analysis methods	Statistical methods
1-1-1. There are differences in the intention to report CAN across three assessments within both the experimental and control groups. 2-1-1. There are differences in the attitude toward reporting CAN across three assessments within both the experimental and control groups. 3-1-1. There are differences in the knowledge of CAN across three assessments within both the EG and CG.	CAN Knowledge and Competency Scale	IV: Different assessment time points DV: Scores for the intention to report CAN, attitude toward reporting CAN, and knowledge of CAN	Paired-sample t-test
1-1-2. There are differences in the intention to report CAN across three assessments between the experimental and control groups. 2-1-2. There are differences in the attitude toward reporting CAN across three assessments between the experimental and control groups. 3-1-2. There are differences in the knowledge of CAN across three assessments between the experimental and control groups.	CAN Knowledge and Competency Scale	IV: Group DV: Pre-test, post-test 1, and post-test 2 scores for the intention to report CAN, attitude toward reporting CAN, and knowledge of CAN	Independent-samples t-test

CAN: child and adolescent abuse and neglect; EG: experimental group; CG: control group; IV: independent variable; DV: dependent variable.

Table 1-1 Research hypotheses and analysis methods (2/2)

Research hypotheses	Assessment tool	Analysis methods	Statistical methods
1-1-3. There are differences in the improvement scores for intention to report CAN between the experimental and control groups. 2-1-3. There are differences in the improvement scores for attitude toward reporting CAN between the experimental and control groups. 3-1-3. There are differences in the improvement scores for knowledge of CAN between the experimental and control groups.	CAN Knowledge and Competency Scale	IV: Group and different assessment time points DV: Scores for the intention to report CAN, attitude toward reporting CAN, and knowledge of CAN	Generalized estimating equation (GEE)

CAN: child and adolescent abuse and neglect; EG: experimental group; CG: control group; IV: independent variable; DV: dependent variable.