INNOVATION ARTICLE

Developing application software to quickly detect the adolescent's risky behaviour to prevent teen pregnancy

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Abstract

Objective: To develop a software application for early detection of adolescent's risky behaviour, and promotion of safe reproductive health.

Method: The multi-stage study was conducted from September 20, 2018, to April 3, 2019, at Rumbai District Pekanbaru, Riau-Indonesia. The planned software application was developed using the waterfall design model which is a sequential process. Every progress was acknowledged to be flowing downwards, like a waterfall, by going through the phases of requirements, design, implementation, verification and maintenance. The application software was pilot-tested on a group of adolescents after it was first tested for validity. The adolescents were given a questionnaire at baseline and 2 weeks after the intervention to assess the application's effectiveness. The data was analyzed using SPSS version 21.

Results: Validation of the tool was confirmed by Aiken's V values >0.85, with sensitivity 84.8% and specificity 75%. Of the 45 adolescents tested, majority respondens were girls 38(84,4%), early adolescent 18(40%), middle adolescent 16(35,5%) and late adolescent 11(24,4%). About 5(11.1%) were found to be positive, and 28(62.2%)were truly positive, while 3(6.7%) were found negative and 9(20%) were truly negative. There was a significant difference between the pre-test and post-test assessments (p=0.0001).

Conclusion: The application proved to be effective for the early detection of risky behaviour, and for the promotion of safe reproductive health.

Keywords: Adolescent, Reproductive Health, hapus Knowledge, Attitudes, Practice (JPMA 74: S-74 [Suppl. 5]; 2024)

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Introduction

Adolescence is the greatest human capital for future generations. Human capital influences the process of behaviour adoption and occurs in complex systems.[1] Adolescents undergo physiological and psychological development which can be seen in changes that take place physically and in behaviour terms.[2,3] During this phase of life, adolescents experience physical, psychological and sexual maturation and tend to develop increased interest in sex and relationships.[4,5] This interest has the poetential to lead to risky behaviour for which adolescents have identified peer influence and low self-confidence as key factors.[6] Sexual intercourse and an increase in active sexual behaviour among adolescents contribute to teenage marriages and pregnancies. Adolescent risky behaviour has an impact on maternal mortality rates of 14.2% globally and 9.9% nationally in Indonesia. The infant mortality rate for mothers aged <20 years was reportedly 50 per 1,000 births.[7] Female adolescents aged 10-14 years have a five-time greater risk of dying in pregnancy and childbirth than women aged 20-24 years. This risky behaviour occurs globally, causing death at a young age.[8]

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Previous research has found that knowledge, attitude, self-efficacy, life skill, and peer influence are associated with adolescent pregnancy prevention behaviour.[9] These variables can be used to develop a software application health promotion programmes based on information technology (IT) enable effective communication of health services.[1]

The current study was planned to develop a software application for early detection of adolescent's risky behaviour, and promotion of safe reproductive health.

Materials and Methods

The multi-stage study was conducted from September 20, 2018, to April 3, 2019, at Rumbai District Pekanbaru, Riau-Indonesia. The planned software application was developed using the waterfall design model which is a sequential process in which every progress is acknowledged to be flowing downwards, like a waterfall, by going through the phases of requirements, design, implementation, verification and maintenance.[10]

Stage 1 comprised software application development. The design included an introduction section consisting of pictures to attract the attention of teenagers to continue to the next stage. The application design included home display, health promotion display, expert chat view display,

and friend chat display.

The home display contained information about the menus in the application, including features, profiles, change of passwords, information about the application, and logout. The scenario feature consisted of 10 scenarios along with an infographic image display. The promotion display consisted of 5 parts; knowledge, attitude, self-efficacy, life skills, and peer influence. This could be read and downloaded by the users. The download section was a display in the form of infographics. The expert chat display feature enabled the users to communicate with experts via WhatsApp, and consisted of the experts' biodata and a send message tab to connect the user directly to the expert. The users could also communicate with the experts via telephone service. The friend chat feature enabled the users to connect directly through WhatsApp with individuals of the same age, or peers, who had been previously trained.

Stage 2 comprised validity testing of the application. The common statistical technique used was content validity index (CVI) based on the experts' agreement level on the item content validity coefficient using Aiken's V formula.[11] The application category was considered valid if it could achieve a value ranging from 0.667 to 1.00.

Stage 3 comprised the application's testing for effectiveness for which teenagers using sensitivity and specificity test for whcich a set of adolescents were enrolled. The were given a questionnaire at baseline and 2 weeks after using the application (Figure). The number of Ethical Clearance is 480/KEP/FK/2018 by Committee of the

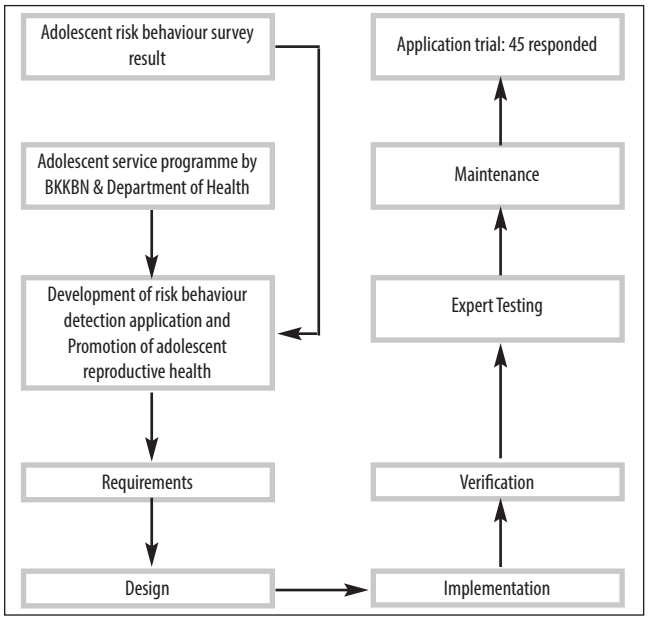

Figure: Development stages of the application.

Table-1: The application's validation result.

Validity Expert	Result	Category
Media Validator	0.92	Valid
Material Validator	0.85	Valid
Module Validator	0.94	Valid

Table-2: Distribution of adolescent risky behaviour in based on the application's trial result.

Risky Behaviours	n (%)
Desiring Early Marriage	11 (39.28)
Agreeing with pre-marital sexual activity and having done it	2 (7.14)
Being addicted to watching porn videos	5 (17.85)
Being not afraid of early marriage risks	6 (21.42)
Allowing the activities of kissing and touching sensitive parts of their partners	4 (14.28)
Total	28 (100)

Table-3: The application's sensitivity and specificity trial.

At Risk	Not At Risk
28 (a)	(b) 3
5 (c)	(d) 9

Table-4: The application's effectiveness trial.

Variable	Pre-test	Post-test	Gap	*p*-value
Reproductive health knowledge	9.45	13.14	3.69	0.000
Risky behaviour prevention attitudes	24.88	41.93	17.05	0.000
Decision-making skills	7.21	12.26	5.05	0.000
Life skills	9.17	12.55	3.38	0.000
Peer positive influences	25.69	37.24	11.58	0.000
Risky behaviour prevention	7.17	11.19	4.02	0.000

Research Ethics of The Faculty of Medicine, Andalas University and data was analysed using paired *t*-test and SPSS version 21. Data was presented as frequencies and peercentages, or as mean±standard deviation, as appropriate. Paired t test was used. P<0.05 was considered significant.

Results

Validation of the tool was confirmed by Aiken's V values >0.85 (Table 1). Of the 45 adolescents tested, majority respondents were girls 38(84,4%), early adolescent 18(40%), middle adolescent 16(35,5%) and late adolescent 11(24,4%). About 5(11.1%) were foud to be positive, and 28(62.2%) were truly positive, while 3(6.7%) were found to be negative and 9(20%) were truly negative. The application had 84.8% sensitivity and 75% specificity (Table 2,3). There was a significant difference between the pre-test and post-test assessments (p=0.0001) (Table 4).

Discussion

The items' clarity, coherence and relevance were quantified using Aiken's V formula with 95% confidence interval CI[12-14] for which ≥0.70 value represented positive evaluation, while the lower limit value of 95% CI was >0.59

considerdd appropriate.[15] All values in the current study were >0.8, indicating good validity of the application.

A study in the United States using the Checklist to Assess Pregnancy in Teenagers and Young Women reported the tool's sensitivity to be 71% and specificity 75%.[16] The literature has outlined challenges to ensure long-term effect regarding adolescent behaviour.[4,17,18] This can be addressed with follow-ups lasting up to 2 years, and family's involvement might be a practical option, where parents could be trained to provide support to their children during difficult times.[19]

In the current study, there was a significant gap between measurements taken at the baseline and 2 weeks after the application's use. Risk prevention value increased after the adolescents used the application. Measurements were carried out after 2 weeks because the measured knowledge was already stored in the subject's long-term memory.[20-22]

The complication risk of pregnancy among female adolescents has been reported to be 2.5 times higher than women in their 20s, and most teenage mothers have been found to be deficient in vitamin A and iodine.[23] In addition, adolescents are known to be psychologically at risk because they experience higher levels of stress, hopelessness, depression, helplessness, low self-esteem, and a sense of personal failure, and suicide attempts have been more common among them than the more mature women.[24,25]

Conclusion

The software application was found to be a suitable platform to fulfil the needs of adolescents in terms of preventing risky behaviour.

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