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Original Article

The effect of an application-based educational intervention with a social cognitive theory model on pregnant women in Denpasar, Bali, Indonesia: a randomized controlled trial

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ABSTRACT

Objectives: The aim of this study was to elucidate the effect of application-based antenatal education based on social cognitive theory (SCT) on Health Promoting Lifestyle Profile II (HPLP II) scores, compliance with iron tablet consumption, and readiness for childbirth and complications among pregnant women in Denpasar, Bali, Indonesia.

Methods: This randomized controlled trial included 71 pregnant women in the treatment group and 74 pregnant women in the control group. The treatment group application-based antenatal education based on SCT, while the control group attended a conventional pregnancy class. Iron tablet consumption was verified by counting the remaining iron tablets. Information on participants' lifestyles was collected using the HPLP II questionnaire with the help of an assistant. The collected data were statistically analyzed using IBM SPSS ver. 24.0.

Results: The antenatal education intervention effectively increased the HPLP II score by 0.32 points (2.62 ± 0.331 before the intervention and 2.94 ± 0.273 after). Meanwhile, the control group had a 0.13-point increase ($p = 0.001$), from 2.67 ± 0.336 to 2.80 ± 0.275. There was no significant difference in iron tablet consumption ($p = 0.333$) or readiness for delivery and complications ($p = 0.557$) between the treatment and control groups.

Conclusion: Application-based antenatal education with SCT effectively increased the HPLP II scores of pregnant women in Denpasar, Bali. Although there was no significant difference in iron tablet consumption or readiness for delivery and complications, the values increased to a greater extent in the treatment group than in the control group. This education model is more suited to urban pregnant women who employed and have good internet access.

Keywords: Lifes style; Prenatal education; Social cognitive theory

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Introduction

Pregnancy and childbirth are complex processes associated with physiological, psychological, and emotional changes [1,2]. Lifestyle during pregnancy has a tremendous impact on the health of the mother and the baby. The term "lifestyle" encompasses a broad range of phenomena, including the mother's and her family's responsibility for health, nutrition intake during pregnancy, physical activities, interpersonal relationships, stress management, and spirituality [3]. Antenatal education is a factor that influences lifestyle during pregnancy is antenatal education [4].

Studies in several countries have shown that there are many problems in antenatal education related to its technical aspects or results. The individual face-to-face method in Indonesia still faces some problems, such as limited information, poor planning, and little to no follow-up [5]. The participants' attendance was also low due to time, transport, and financial constraints, as well as the lack of a classroom [6,7]. Conventional classes have shown low effectiveness for improving pregnant women's health and psychosocial status, as well as babies' health [4,8].

Antenatal education involves efforts to improve pregnant women's knowledge and behavior. Moreover, it could be reinforced further with a proper model to modify behavior. The social cognitive theory (SCT) model is a model that views human behavior as molded by 3 components: individual (self-efficacy), environment, and behavior [9–13]. One way to increase self-efficacy is social modeling. A pregnant woman who sees other mothers succeed in their pregnancies by engaging in a healthy lifestyle can increase her confidence in doing the same. A model can influence another person by his/her behavior and way of thinking [10].

Environmental factors are also important in changing a person's behavior; for instance, providing infrastructure or new resources can ease the new behavior [10]. The application of digital technology as a medium for education on antenatal behavior is one example. Computer applications have been extensively used for antenatal education due to their ability to solve constraints of time, distance, fee, and access, as well as limited human resources. Pregnant women can conveniently access information in the form of text, pictures, videos, discussion forums, and other relevant features [14]. Shamizadeh et al. [15] reported that a physical activity intervention with an SCT model effectively reduced diabetes risk. An intervention using the SCT framework could increase the physical activity and improve the diet of cancer patients [16]. Abdi et al. [17] observed that digital media were effective for a lifestyle intervention. An SCT model intervention could contribute to teenagers' self-efficacy to practice a healthy lifestyle, reduce snacking, maintain body mass index (BMI), and reduce waist circumference [18].

The availability of antenatal care in Indonesia has been reported to be quite good (86%) [19]. However, the participation rate of pregnant women was only 19.2% [20]. Furthermore, face-to-face or individual-based learning is not considered effective by the authorities [5]. As described above, many applied education methods still have problems in terms of implementations and results, so innovations to address this issue are direly needed. Antenatal education and the SCT model are expected to overcome various problems in educational methods. Thus, this study aimed to determine the effect of a web application-based antenatal education program using an SCT model on Health Promoting Lifestyle Profile II (HPLP II) scores, compliance with iron tablet consumption, and readiness for childbirth and complications among pregnant women in Denpasar City, Bali, Indonesia.

Materials and Methods

Research Design

This research was an experimental study using a randomized controlled trial design. The treatment group comprised pregnant women who received web application-based antenatal education using an SCT model. The control group comprised pregnant women who attended antenatal education classes for pregnant women at midwife clinics and Denpasar City health centers. The classes for pregnant women were an antenatal education program. The samples were recruited from all pregnant women who received pregnancy examinations at midwifery independent practices and public health centers in Denpasar City. The inclusion criteria were as follows: (1) parity 1 to 4 and a healthy condition, (2) gestational age of 13 to 20 weeks after the intervention, (3) having and being able to use a smartphone, (4) an educational level of junior high school or higher, and (5) voluntary agreement to participate in the research. The exclusion criterion was unwanted pregnancy.

Study outcomes

This present study evaluated readiness for childbirth and complications, HPLP II scores, and compliance with iron tablet consumption.

Sample size

The sample size was calculated based on a previous study that used a website-based education intervention for breastfeeding [21,22]. Compared to the previous study, this study developed an application with differences in terms

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of features, methods for promoting behavior changes, and the topic of the intervention. The calculation yielded a total number of 53 participants per group with a significance level of 5% and a power of 80%. The sample size was increased based on an anticipated drop-out rate of 20% (11 people). Thus, the sample was designed to include 64 individuals in each group.

Randomization

There were 11 health centers and 15 midwife clinics that provided classes for pregnant women. The health centers did not charge fees, whereas the midwife clinics asked for payments, as health centers are managed by the government, while midwife clinics are private institutions in Denpasar. Fifty pregnant women visited the health centers each month. Six health centers and 4 midwife clinics were selected randomly. The midwives contacted pregnant women who met the inclusion criteria to ask whether they would be willing to participate in this study. Simple random sampling was used to determine the treatment group and the control group. All participants provided informed consent before randomization. This study was approved by the Research Ethics Commission of the Faculty of Medicine, Udayana University (2019.03.1.0889).

The antenatal education model

The application of an SCT model for antenatal education had several stages, including (1) reviewing literature studies field studies were used to determine the implementation and ongoing problems of antenatal education; (2) designing an antenatal education model by the research team; (3) conducting an expert specialist doctor, midwives, and nutritionists; (4) conducting model trials involving midwives at health centers to assess the feasibility of service programs; and (5) improving the model according to input from the implementing midwives. Thus, a final antenatal education model was obtained.

Intervention

The web application-based antenatal education program was designed based on the SCT model, including social persuasion and social modeling [12]. According to the concept of the SCT model, individuals received the intervention using social persuasion and social modeling; the environment was considered to be the antenatal education app, and the behavioral factor was changes in individuals and the environment after the intervention [12].

After informed consent and randomization, the pregnant women in the treatment group were given a pretest during the antenatal care visit. The pretest, including the HPLP II, readiness for delivery and pregnancy-related complications, and iron tablet consumption, was given by a trained midwife. The subjects were trained to use the application after the pretest and then given an explanation about the study intervention, including the schedule for face-to-face meetings, and the application, which gave pregnant women access to the necessary information and had features enabling interactive education. Face-to-face discussions were held during antenatal care and an midwives provided an explanation, suggestions, and discussion regarding accessing the information in the application. The intervention included at least 4 face-to-face meetings during antenatal care and 10 instances of accessing the provided discussion feature in the application, including 4 times during face-to-face meetings. The minimum number of face-to-face sessions was based on the frequency of classes for pregnant women in Indonesia [23]. The intervention was carried out in a 3-month period, and the post-test was administered after that. Thirty iron tablets (60 mg) were administered at each antenatal visit, 1 tablet was taken per day and consumption was evaluated at each antenatal care visit.

The features available in the application comprised (1) information about pregnancy danger signs, a healthy lifestyle during pregnancy, nutrition for mothers and babies, pregnancy checks, pregnancy development, labor, and post-birth care; (2) brainstorming with peer groups, peer models, and staff; and (3) videos from peer models describing their experiences of the process of pregnancy and childbirth. Social persuasion and social modeling were applied to pregnant women. This study was conducted in 4 meetings. Social persuasion was performed by providing explanations, suggestions, advice, guidance, and discussions with pregnant women and their husbands [13]. Social modeling was applied by giving pregnant women information about successful experiences of pregnancy and childbirth and allowing them to have discussions with peer models in the application [10]. The peer models were pregnant women who had good experiences of pregnancy and childbirth and also had been examined in the same place as the treatment group.

Class for conventional pregnant women

The class for pregnant women was a face-to-face antenatal education program implemented in health service agencies in Denpasar City, Bali. The minimum frequency of antenatal care was 4 times during pregnancy [24]. The class activities for pregnant women were conducted at least 4 times. At each 120-minute meeting, participants received 3 materials. The first meeting was held at the time of the participant's initial presentation to the clinic, regardless of the specific gestational age. The activity process consisted of a general

explanation, brainstorming, evaluation, and physical activities. The materials were about pregnancy, childbirth, postpartum depression, family planning, and baby care.

Data Collection

Research assistants conducted interviews with pregnant women who met the inclusion criteria. Then, pregnant women were asked to answer the HPLP II questionnaire. The treatment group was given training on how to use the application and the intervention process. The control group comprised pregnant women who attended classes. The post-test was conducted to assess the outcomes. The interview guide for preparedness for labor and complications consisted of 8 questions referenced from Jhpiego. The HPLP II questionnaire is based on Walker et al. [3]. The HPLP II is used to assess a person's health behavior pattern using 6 indicators: (1) spiritual development, (2) interpersonal relationships, (3) nutrition, (4) physical activity, (5) responsibility for health, and (6) stress management. A total of 52 statement items were measured according to a Likert scale: 1, never; 2, sometimes; 3, often; 4, routinely. The final score was obtained by calculating the average individual responses. This questionnaire has been tested in a cross-sectional study to measure HPLP II in nursing students in Jakarta, Indonesia. The results showed that r=0.883 to 0.893, with α=0.934 [25]. The midwives reviewed the data on compliance with iron tablet consumption after asking the pregnant woman. This information was then documented in the medical record.

Statistical Analysis

The collected data were analyzed using the paired t-test to determine the effectiveness of the intervention to increase HPLP II. The McNemar test was used to evaluate the effectiveness of the intervention on increasing awareness and iron consumption. Analysis of covariance was conducted to evaluate the differences in HPLP II values between the groups and the influence of covariates. The chi-square test was used to compare readiness for childbirth and complications between the treatment and control groups and differences in iron tablet consumption. The statistical tests were performed in IBM SPSS ver. 24.0 (IBM Corp., Armonk, NY, USA).

Results

Table 1 presents the general characteristics of the subjects in this study. The majority of the pregnant women were 20 to 35 years old (86.7%), and the lowest proportion was <20 years old (4.2%). The youngest participant was 16 years old, while the oldest was 40 years old, and the mean age was 27±5.47 years. Most participants had a basic and middle-level education (67.7%), while the rest had a higher education (23.3%). More than half of the subjects were working (67.5%) and the rest were unemployed (32.5%). Most subjects (79.2%) had an income above the regional minimum salary with a mean income of Indonesian Rupiah 4,610,000.00. The percentage of multigravida women was 60%, and the percentage of women during the third trimester was also 60%. Significant differences were not found in any of the recorded parameters ($p>0.05$).

Figure 1 presents the research flow during data collection. There were 214 pregnant women who met the inclusion criteria, but 6 refused to participate in the present study. All participants provided informed consent. Ten patients in the treatment group were not included due to transfer to another place ($n=4$) and refusal ($n=6$), and 2 patients in the control groups were excluded due to transfer into another place ($n=1$) and refusal ($n=1$). Thus, the final treatment and control groups comprised 92 and 101 participants, respectively. After the intervention process, there were 71 participants in the treatment group and 74 participants in the control group.

Treatment Effect on HPLP II

Table 2 presents the results for changes in HPLP II before and after treatment. We found increases in the mean HPLP II scores in the treatment and control groups. The mean

Table 1. Characteristics of research subjects in the treatment group and control group

Characteristic	Group		*p*
	Treatment ($n=71$)	Control ($n=74$)	
Age (y)			0.921
<20 and >35	10 (14.1)	10 (13.5)	
20–35	61 (85.9)	64 (86.5)	
Occupation			0.672
Employed	33 (46.5)	37 (50.0)	
Unemployed	38 (53.5)	37 (50.0)	
Education			0.942
Intermediate	56 (78.9)	58 (78.4)	
Higher education	15 (21.1)	16 (21.6)	
Salary (US$)			0.388
<178.24	8 (11.3)	12 (16.2)	
≥178.24	63 (88.7)	62 (83.8)	
Gravidity			0.932
Primigravida	35 (49.3)	37 (50.0)	
Multigravida	36 (50.7)	37 (50.0)	

Data are presented as *n* (%). The *p*-values are based on the chi-square test; $p<0.05$ is considered to indicate a statistically significant difference.
US$, United States dollar.

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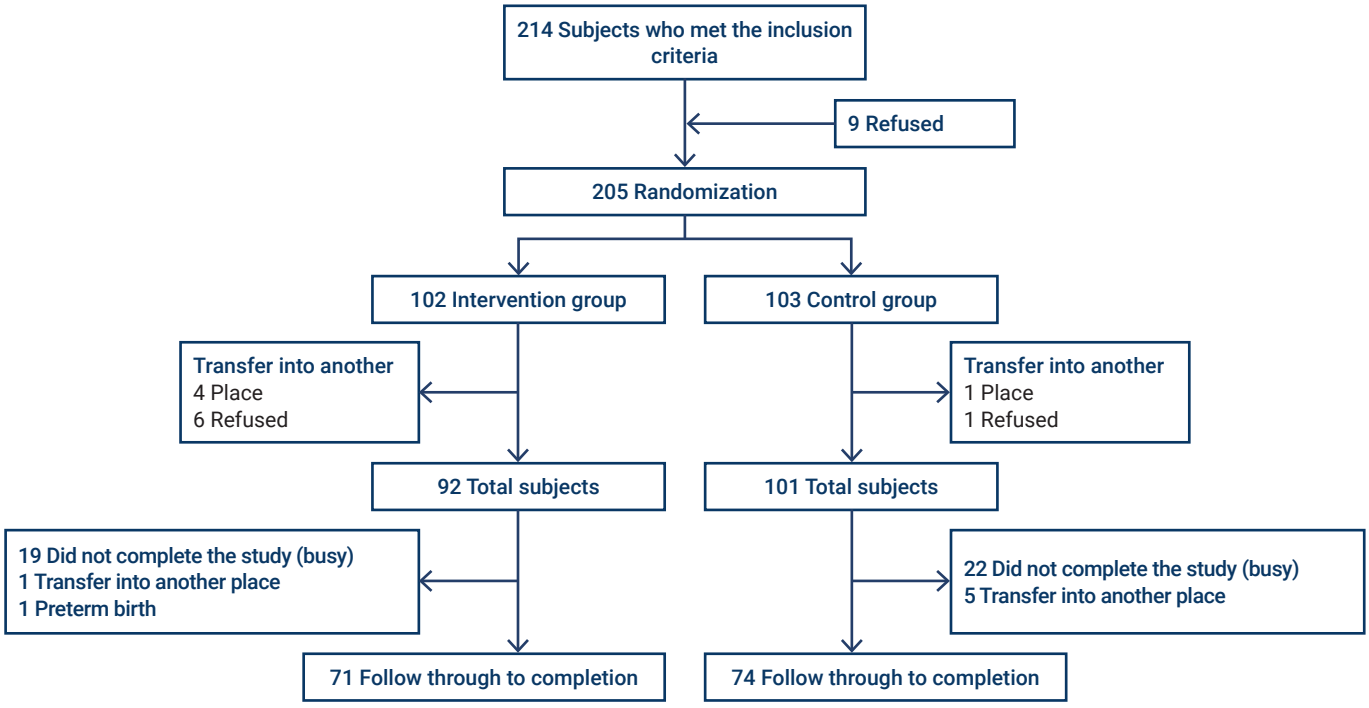

Figure 1. Research flow.

Table 2. Results of HPLP II analysis before and after treatment

Parameter	Treatment group			Control group			Mean	Adjusted mean	*p*	Observed power
	Before	After	Difference	Before	After	Difference				
Mean	2.62	2.94	0.32	2.67	2.80	0.13				
Minimum	1.81	2.29		1.70	2.02					
Maximum	3.35	3.97		3.40	3.40					
Standard deviation	0.331	0.273		0.336	0.275					
Paired t-test	0.000			0.000						
HPLP II										
Treatment							2.94	2.94	0.001	0.896
Control							2.80	2.79		

HPLP II, Health Promoting Lifestyle Profile II.
The *p*-values are based on the paired t-test, The *p*-value is based on analysis of covariance, with $p < 0.05$, considered to indicate statistical significance.

score of the treatment group before and after treatment was 2.62 and 2.94, respectively, showing an increase of 0.32 points. The mean score of the control group before and after treatment was 2.67 and 2.80, respectively, showing an increase of 0.13 points. The difference between the treatment and control groups was statistically significant ($p < 0.001$). The analysis showed that application-based antenatal education with the SCT model effectively increased HPLP II scores in the treatment and control groups, with a larger difference in the treatment group than in the control group. The mean score of HPLP II (2.94) in the treatment group was higher than in the control group (2.80). There was a significant difference in the mean HPLP II score ($p = 0.001$) between the treatment (2.94) and control (2.79) groups. This study showed that application-based antenatal education with the SCT model was more effective in increasing HPLP II scores than conventional classes. As shown in Table 3, no variables were significantly associated with changes in the HPLP II ($p > 0.05$).

Treatment Effect on Readiness for Childbirth and Complications

Table 4 shows that increased readiness for childbirth was found in both groups and according to all indicators. There was a significant increase ($p < 0.05$) in readiness for labor and complications in the treatment (59% increase) and

Table 3. Effects of covariates on HPLP II results

Independent covariate	F	*p*	Observed power
Age	3.347	0.069	0.443
Occupation	0.739	0.392	0.137
Education	2.039	0.156	0.294
Salary	1.139	0.289	0.185
Gravidity	0.525	0.470	0.111

HPLP II, Health Promoting Lifestyle Profile II.

control (56.8% increase) groups (Table 5). Table 6 shows no difference in readiness for childbirth ($p = 0.557$) between the treatment (94.4%) and control (91.9%) groups.

Treatment Effect on Iron Tablet Consumption

As shown in Table 7, there was a significant increase ($p > 0.05$) in compliance with iron tablet consumption in treatment (31% increase) and control (12.2% increase). No significant

Table 4. Overview of readiness for childbirth and complications

No.	Variable	Treatment group ($n = 71$)	Control group ($n = 74$)
Before			
1	Ability to explain spontaneously the 3 danger signs of pregnancy	49 (69.0)	47 (63.5)
2	Ability to explain spontaneously the 3 danger signs of labor	25 (35.2)	25 (33.8)
3	Ability to explain spontaneously the 3 signs of danger of the puerperium	25 (35.2)	26 (35.1)
4	Ability to explain spontaneously the 3danger signs of newborns	23 (32.4)	17 (23.0)
5	Plan to prepare financial resources for childbirth	64 (90.1)	71 (95.9)
6	Knowledge of the financial support system in the community	36 (50.7)	36 (48.6)
7	Preparing transportation and knowing the transportation system	35 (49.3)	34 (45.9)
8	Knowledge of the blood donation system	35 (49.3)	39 (52.7)
After			
1	Ability to explain spontaneously the 3 danger signs of pregnancy	58 (81.7)	59 (79.7)
2	Ability to explain spontaneously the 3 danger signs of labor	48 (67.6)	48 (64.9)
3	Ability to explain spontaneously the 3 signs of danger of the puerperium	46 (64.8)	43 (58.1)
4	Ability to explain spontaneously the 3 danger signs of newborns	46 (64.8)	47 (63.5)
5	Plan to prepare financial resources for childbirth	71 (100)	74 (100)
6	Knowledge of the financial support system in the community	64 (90.1)	64 (86.5)
7	Preparing transportation and knowing the transportation system	62 (87.3)	59 (79.7)
8	Knowledge of the blood donation system	63 (88.7)	61 (82.4)

Data are presented as *n* (%).

Table 5. Changes in readiness variables for childbirth before and after treatment

Variable	Group	Before	After	Difference	*p*
Treatment ($n = 71$)	Less preparation	46 (64.8)	4 (5.6)	42 (59.2)	0.000
	Good preparation	25 (35.2)	67 (94.4)	42 (59.2)	
Control ($n = 74$)	Less preparation	48 (64.9)	6 (8.1)	42 (56.8)	0.000
	Good preparation	26 (35.1)	68 (91.9)	42 (56.8)	

Data are presented as *n* (%). The *p*-values are based on the McNemar test ($p < 0.05$).

Table 6. Differences in readiness for childbirth between the treatment and control groups

Readiness for labor and complications	Group		COR	95% CI	*p*
	Treatment ($n = 71$)	Control ($n = 74$)			
Less preparation	4 (5.6)	6 (8.1)	0.677	0.183–2.506	0.557
Good preparation	67 (94.4)	68 (91.9)			

Data are presented as *n* (%). The *p*-value is based on the chi-square test.
COR, crude odds ratio; CI, confidence interval.

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Table 7. Changes in compliance with iron tablet consumption before and after treatment

Variable	Group	Before	After	*p*
Compliance with iron tablet consumption	Treatment (*n* = 71)	46 (64.8)	68 (95.8)	0.000
	Control (*n* = 74)	59 (79.7)	68 (91.9)	0.035

Data are presented as *n* (%). The *p*-values are based on the McNemar test ($p < 0.05$).

Table 8. Comparison of compliance with iron tablet consumption after treatment

Iron tablet consumption (%)	Group		COR	95% CI	*p*
	Treatment (*n* = 71)	Control (*n* = 74)			
< 80	3 (4.2)	6 (8.1)	0.500	0.120–2.081	0.333
≥ 80	68 (95.8)	68 (91.9)			

Data are presented as *n* (%). The *p*-value is based on the chi-square test.
COR, crude odds ratio; CI, confidence interval.

difference in compliance with iron tablet consumption was found between the treatment (95.8%) and control (91.9%) groups (Table 8).

Discussion

This study aimed to determine the effectiveness of application-based antenatal care with an SCT model in increasing HPLP II, iron tablet consumption, and readiness for delivery and pregnancy complications. The mean HPLP II scores showed a significant increase in the treatment and control groups. It was higher in the treatment group than in the control group. There was also a significant difference in the mean HPLP II score between the treatment and control groups. These findings show that the implementation of the antenatal education intervention with the SCT model is more effective in increasing HPLP II than the conventional classroom education method for pregnant women. The initial scores of the HPLP II were not significantly different between the 2 groups. The intervention using application-based antenatal education with an SCT model increased the HPLP II scores. According to SCT, a person's behavior is the result of dynamic interactions between individuals (cognitive), their environment, and their behavior. The basis of behavior change according to the SCT is increased self-efficacy. Self-efficacy is a strong predictor initiating a healthy lifestyle during pregnancy [26,27]. This study used social modeling and persuasion to increase self-efficacy. The intervention addressed the environment by providing the pregnant women with web-based antenatal education as a medium through which they could seek out health- and pregnancy-related information. Behavioral change was facilitated by giving participants a new structure or resource to make it easy to engage in the new behavior [10].

This application was more practical than conventional media, such as books, since it can be accessed easily using a smartphone. The application created an opportunity for pregnant women to access validated information according to their needs. Furthermore, the discussion feature in the application could enhance users' understanding of the provided information. Social persuasion in this study was done by giving suggestions, advice, and guidance about all the relevant health education provided by the application, which was done 4 times during antenatal care visits. Social persuasion has been found to increase pregnant women's motivation to reach their goals [10]. Social modeling was done by telling the success stories of other pregnant women who engaged in a healthy lifestyle. Moreover, a peer model was also provided through the discussion group inside the application. According to Bandura, seeing another person with similar experiences succeed in pregnancy can increase a person's confidence level. If a person believes that he or she can create a desirable output, then he or she will have the initiative to act [10].

Several studies have shown that the SCT model was effective for reducing diabetes risk [15] and intervening upon individuals' lifestyles when combined with digital media [17]. A lifestyle intervention with the SCT model effectively improved healthy lifestyle, reduced snacking behavior, and decreased BMI and waist circumference in teenagers [18].

These results are in line with a study by Evans et al. [28], who reported increases in pregnant woman's awareness of consuming vitamins and nutritious foods for fetal development after a health app intervention. Another study also found that a mobile health intervention effectively increased the presence of pregnant women at antenatal and postnatal care, as well as children's vaccination [29]. Huang et al. [22] similarly

found that women who received web-based breastfeeding education had higher mean breastfeeding knowledge scores, more positive attitudes about breastfeeding, and higher breastfeeding rates. The results of the post-test analysis showed no differences in the 2 variables. Conventional classes for pregnant women are a suitable method of education if they are implemented according to standards. A key problem in antenatal education in Indonesia is the low participation rate in antenatal care activities. A preliminary study conducted prior to the research described herein found that the participation of pregnant women in class activities in Denpasar City was very low (10%). Nationally, participation of pregnant women in class activities was found to be 19.2%, whereas 80% of public health centers were ready to hold classes for pregnant women [19]. In this study, the control group included pregnant women who attended conventional classes for pregnant women according to the extant standards, which indicates that both groups received equal treatment.

Conclusion

Web application-based antenatal education using an SCT model in Denpasar City, Bali, Indonesia effectively improved HPLP II scores in pregnant women, as shown by significantly better scores in the treatment group than in the control group. However, there were no significant differences in iron tablet consumption and readiness for labor and complications between the treatment group and the control group. Both antenatal education models were effective in improving pregnant women's behavior. The conventional model could be implemented in areas with a good participation rate, while the application-based model may be effective for busy pregnant women who have better internet access. This study is different from other studies, as it employed an SCT model with social modeling, social persuasion, and digital media innovation in antenatal education to change pregnant mothers' behavior. A limitation of this study is the duration of evaluation. Behavior changes were only observed for 3 months. To achieve more comprehensive and consistent behavior changes, it is advised to increase the length of the intervention to 6 months.

Notes

Ethics Approval

This study was approved by the Research Ethics Commission of the Faculty of Medicine, Udayana University (2019.03.1.0889) and performed in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained for publication of this study and accompanying images.

Conflicts of Interest

The authors have no conflicts of interest to declare.

Funding

None.

Availability of Data

The datasets are not publicly available but are available from the corresponding author upon reasonable request.

Authors' Contributions

Conceptualization: NWA, IMAW; Data curation: GNIP, AANJK; Formal analysis: IMAW; Funding acquisition: GNIP; Investigation: AANJK; Methodology: NWA; Project administration: GNIP; Resources: AANJK; Software: NWA; Supervision: IMAW; Validation: IMAW; Visualization: GNIP; Writing-original draft: NWA; Writing-review & editing: all authors.

References

1. Ricci SS. Essentials of maternity, newborn, and women's health nursing, 3rd ed. Philadelphia: Wolters Kluwer/Lippincott Williams and Wilkins; 2013.
2. Lewallen LP. Healthy behaviors and sources of health information among low-income pregnant women. Public Health Nurs 2004;21: 200–6.
3. Walker SN, Sechrist KR, Pender NJ. The health-promoting lifestyle profile: development and psychometric characteristics. Nurs Res 1987;36:76–81.
4. Brixval CS, Axelsen SF, Lauemoller SG, et al. The effect of antenatal education in small classes on obstetric and psycho-social outcomes-a systematic review. Syst Rev 2015;4:20.
5. Ministry of Health of the Republic of Indonesia. Operating proceduremother class. Jakarta: Ministry of Health of the Republic of Indonesia; 2014. Indonesian.
6. Murphy Tighe S. An exploration of the attitudes of attenders and non-attenders towards antenatal education. Midwifery 2010;26:294–303.
7. Fabian H. Women who do not attend parental education classes during pregnancy or after birth. Stockholm: Karolinska Institutet; 2008.
8. Catling CJ, Medley N, Foureur M, et al. Group versus conventional antenatal care for women. Cochrane Database Syst Rev 2015;(2): CD007622.
9. Bandura A. Health promotion from the perspective of social cognitive theory. Psychol Health 1998;13:623–49.
10. Glanz K, Rimer BK, Viswanath K, editors. Health behavior and health education: theory, research, and practice. 4th ed. San Francisco: Jossey-Bass; 2008.
11. Bandura A. Social learning theory. Englewood Cliffs: Prentice-Hall; 1977.
12. Bandura A. Social cognitive theory of mass communication. Media Psychol 2001;3:265–99.
13. Bandura A. Health promotion by social cognitive means. Health Educ Behav 2004;31:143–64.

https://doi.org/10.24171/j.phrp.2021.0209

14. Waring ME, Moore Simas TA, Xiao RS, et al. Pregnant women's interest in a website or mobile application for healthy gestational weight gain. Sex Reprod Healthc 2014;5:182–4.
15. Shamizadeh T, Jahangiry L, Sarbakhsh P, et al. Social cognitive theory-based intervention to promote physical activity among prediabetic rural people: a cluster randomized controlled trial. Trials 2019;20:98.
16. Stacey FG, James EL, Chapman K, et al. A systematic review and meta-analysis of social cognitive theory-based physical activity and/or nutrition behavior change interventions for cancer survivors. J Cancer Surviv 2015;9:305–38.
17. Abdi J, Eftekhar H, Mahmoodi M, et al. Effect of the intervention based on new communication technologies and the social-cognitive theory on the weight control of the employees with overweight and obesity. J Res Health Sci 2015;15:256–61.
18. Hidayanti H. The use of social cognitive theory to develop and evaluate the effect of healthy lifestyle program among overweight adolescents [dissertation]. Jakarta: Universitas Indonesia; 2016.
19. Ministry of Health of the Republic of Indonesia. Health ProfileIndonesia in 2017 [Internet]. Jakarta: Ministry of HealthRepublic of Indonesia; 2018 [cited 2022 Mar 28]. Available from: https://pusdatin.kemkes.go.id/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-Indonesia-tahun-2017.pdf. Indonesian.
20. Ministry of Health of the Republic of Indonesia. National Health Indicator Survey 2016. Jakarta: Ministry of Health of the Republic of Indonesia; 2016. Indonesian.
21. Lwanga SK, Lemeshow S. Sample size determination in health studies: a practical manual. Geneva: World Health Organization; 1991.
22. Huang MZ, Kuo SC, Avery MD, et al. Evaluating effects of a prenatal web-based breastfeeding education programme in Taiwan. J Clin Nurs 2007;16:1571–9.
23. Ministry of Health of the Republic of Indonesia. Guidelines for implementing classes for pregnant women. Jakarta: Ministry of Health of the Republic of Indonesia; 2012. Indonesian.
24. Ministry of Health of the Republic of Indonesia. Regulation of the Minister of Health of the Republic of Indonesia number 97 Year 2014. Jakarta: Ministry of Health of the Republic of Indonesia; 2014. Indonesian.
25. Radiah R, Nursasi AY. Knowledge level and health promoting lifestyle in nursing students. UI Proc Health Med 2018;3:54–8.
26. Gaston A, Cramp A, Prapavessis H. Enhancing self-efficacy and exercise readiness in pregnant women. Psychol Sport Exerc 2012;13:550–7.
27. Fisher K, Kridli SA. The role of motivation and self-efficacy on the practice of health promotion behaviours in the overweight and obese middle-aged American women. Int J Nurs Pract 2014;20:327–35.
28. Evans WD, Wallace Bihm J, Szekely D, et al. Initial outcomes from a 4-week follow-up study of the Text4baby program in the military women's population: randomized controlled trial. J Med Internet Res 2014;16:e131.
29. Watterson JL, Walsh J, Madeka I. Using mHealth to improve usage of antenatal care, postnatal care, and immunization: a systematic review of the literature. Biomed Res Int 2015;2015:153402.