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Models of antenatal classes for pregnant mothers

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ABSTRACT

Introduction: Although it has proven to be helpful, the attendance of pregnant mothers in Antenatal Classes (AC) was still low, so an ineffective breakthrough application of AC was needed according to the mother's wishes and interests.

Objective: The study aimed to compare various models of practical AC for pregnant mothers to improve behavior prevention of high-risk pregnancies.

Method: This study is quasi-experimental with a nonequivalent control group and pre-posttest design. The population of all pregnant mothers in Semarang City, with 181 samples, was divided into three groups (Extended, Virtual and Conventional). Measurements were carried out four times to see the mean score increasing, and the results of the last measurement were analyzed using the One Way ANOVA test to compare the effectiveness of these three groups.

Results: There was an increase in the mean value of all dimensions of the behavior of high-risk prevention based on its measurement stages. The extended model has the highest improvement, followed by the Virtual model. Statistically, there was a better chance in all behavioral dimensions after the intervention. There were differences in all dimensions of maternal behavior between the extended and the conventional model. In contrast, only knowledge and practice differed in the virtual model but not in attitudes, beliefs, and intentions.

Conclusion: Extended and virtual models of AC effectively improved high-risk prevention behaviors better than conventional models. Although the increase was not as high as the extended model, the virtual model has an excellent opportunity to be developed as a strategy to overcome time constraints for mothers and health providers.

INTRODUCTION

Routine Antenatal Care (ANC) examinations can prevent pregnancy morbidity and mortality.[1,2] Although it is essential, the utilization of ANC is not optimal due to the lack of access and facilities. It is also influenced by knowledge, attitudes, behavior, and the mother's perception of pregnancy which can affect pregnancy. Triggers vulnerabilities in pregnancy.[3–6] Through Antenatal Classes (AC), it is hoped that this problem can be resolved because it aims to increase knowledge, attitudes, and practices in maintaining a healthy pregnancy. AC is also expected to increase antenatal visits, increasing knowledge and positive attitudes in recognizing dangerous pregnancy signs and symptoms.[7,8] Research has shown that pregnant women who come to AC can access correct and reliable information, increase self-confidence, and desire to meet other people in the same situation, and minimize anxiety. They see AC as a way to help them prepare for parenthood.[9] Although the goals are good, several studies show that the implementation of air conditioning in Indonesia is not optimal, with an average of 29.5%-62.5%,[10-12] There is a tendency for pregnant women to be less interested of AC. Data from the National Health Indicators Survey in 2016 stated that most mothers in Indonesia (81.8%) did not participate in the AC program implemented by the government.[13]

Many factors have been shown to influence maternal attendance and participation in AC. A preliminary study

showed that the factors of time, perception, and the way AC activities were felt were not as expected because they were not following the mother's free time availability. Submission of material is made in a monotonous, boring, and unclear manner. Several studies have also found that the lack of knowledge and support from family, especially husbands, is also an obstacle to AC participation because the AC application system has not followed the guidelines from the Ministry of Health.[14-16] So that a change in the strategy of implementing AC is required.[17]

Advances in information and communication technology can be used to change the implementation of AC. The extended or virtual model is expected to anticipate time constraints for mothers and midwives. The Extended AC method is a conventional AC implementation method strengthened through a pregnancy monitoring model and discussions using social media such as WhatsApp groups between mothers and midwives as facilitators. The virtual AC method uses virtual applications to deliver materials and explanations, discussions, interactions, communication, and counseling, including pregnancy monitoring mechanisms. In previous studies, the virtual classroom training model has effectively increased maternal and child health management knowledge and skills and satisfaction.[18,19]

In its implementation, the current conventional model still shows a gap between expectations and reality; 40% has not been applied correctly.[20] In the conventional method, the media used is only leaflets, and those who follow virtual AC use WhatsApp media.[21] Previous research revealed the importance of face-to-face classes to help pregnant women transition to becoming parents.[9] However, it is recognized that distance, geographical location, and occupation are obstacles in holding face-to-face classes.[13,17]

Previous research has shown that using WhatsApp groups to support pregnant women is very effective because the time is flexible, and information can be accessed quickly. However, one of the obstacles is the ability of the facilitator to filter the information that will be shared in groups.[22] Although it gives positive results, analysis has not been carried out to compare the effectiveness of various models of applying AC for mothers, so this research is critical and needs to be done. This study aims to compare the effectiveness of using the extended and virtual class AC method in improving the domain of maternal behavior, including knowledge, attitudes, beliefs, intentions, and practices in preventing high-risk pregnancies.

METHOD

Study Design

It was a quasi-experimental study with a nonequivalent control group pre-posttest design.[23]

Setting and Respondents

The population was all pregnant mothers. The total sample was 181 pregnant mothers divided into three groups randomly: group 1 extended model (60 respondents), group 2 virtual model (60 respondents), and group 3 conventional model (61 respondents). Respondents were selected from six public health centers representing regional areas in Semarang City and holding the most AC in that area, namely the public health centers of Bandarharjo, Gayamsari Tlogosari Wetan, Rowosari, Purwoyoso, and Gunungpati. Inclusion criteria were mothers with the gestational age of 12-32 weeks and were not included in the high-risk pregnancy group, had made their first ANC, had an android-based communication device with SMS/WhatsApp/Line features, accepted informed consent, and settled in research areas based on their Identity Card. Exclusion criteria were pregnant mothers who had chronic disease history, were sick during the study, and indicated illiteracy.

Experimental Procedures

Intervention for implementing extended and virtual class consists of various activities, including health education, peer-group formation, assistance in group chat discussions through communication in WhatsApp groups, and assistance through regular group member meetings to monitor pregnancy and health status. What distinguishes the two groups was that routine meetings in Extended class were carried out in direct face-to-face meetings with health workers who were also used for pregnancy check-ups and counseling. In contrast, all activities use the online method through social media in the virtual class intervention. The conventional model of AC became only providing explanation material in the form of face-to-face using MCH Handbook as a learning medium.[24] The intervention was carried out for three months with the provision and explanation of material once a month for all groups individually. The difference in its intervention was in the face-to-face learning mechanism using MCH Handbook (for the extended and the conventional model) and using video media for the virtual model. In addition, pregnant mothers were provided with regular assistance and monitoring through WhatsApp group discussions for both intervention models, while the conventional group was not provided. Variables measurements were carried out four times in the three months of the study, including a pretest at the beginning of measurement and three times posttest at the end of each month, which was measured with lag time for a month from the previous measurement.

The Variable, Instrument, and Measurement

The variables covered the behavioral domain, including knowledge, attitudes, beliefs, intentions, and practices of mothers in preventing pregnancy complications. Primary data collection through structured interviews using questionnaires that have been tested for validity and reliability and observations using instruments and checklists seeing

practices of preventing pregnancy complications. Measurement of variables using interval scale based on the total score obtained from the research instrument, so the mean value for each variable from each measurement was obtained. All pregnant mothers from all groups are measured four times within a month after the previous measurement, namely pretest, posttest-1, posttest-2, and posttest-3.

Statistical Analysis

Univariate analysis was carried out descriptively with frequency distribution to see the trend of changes in pregnant mothers' behavior during the intervention period—the One Way ANOVA Test and Post Hoc are used to analyze the effectiveness of each model.

Ethical Consideration

This study had been declared to have passed the ethical review through certificate Number 39/EA/KEPK-FKM/2019 from the Health Research Ethics Committee, Faculty of Public Health Universitas Diponegoro. All respondents also stated their agreement by signing the informed consent form.

RESULTS

Figure 1a showed a tendency to increase the mean score of mother's knowledge positively in three groups at each stage of the measurement time. Although the mean score was relatively the same in the first measurement (pretest), in the last measurement period (posttest-3), the average knowledge score of mothers from the extended class increased the most (31.87), followed by the virtual class (30.32). Extended and virtual classes also had a higher difference in scores than the conventional group. The attitudes of the pregnant mother from three classes showed an increasing trend. Increasing attitude scores of the conventional group were much flat in their pattern than the extended and virtual classes, which appeared to be more acute, especially after a month of the intervention period (Figure 1b). The extended class had the highest increase (101.35), followed by virtual (99.39) and control (96.36).
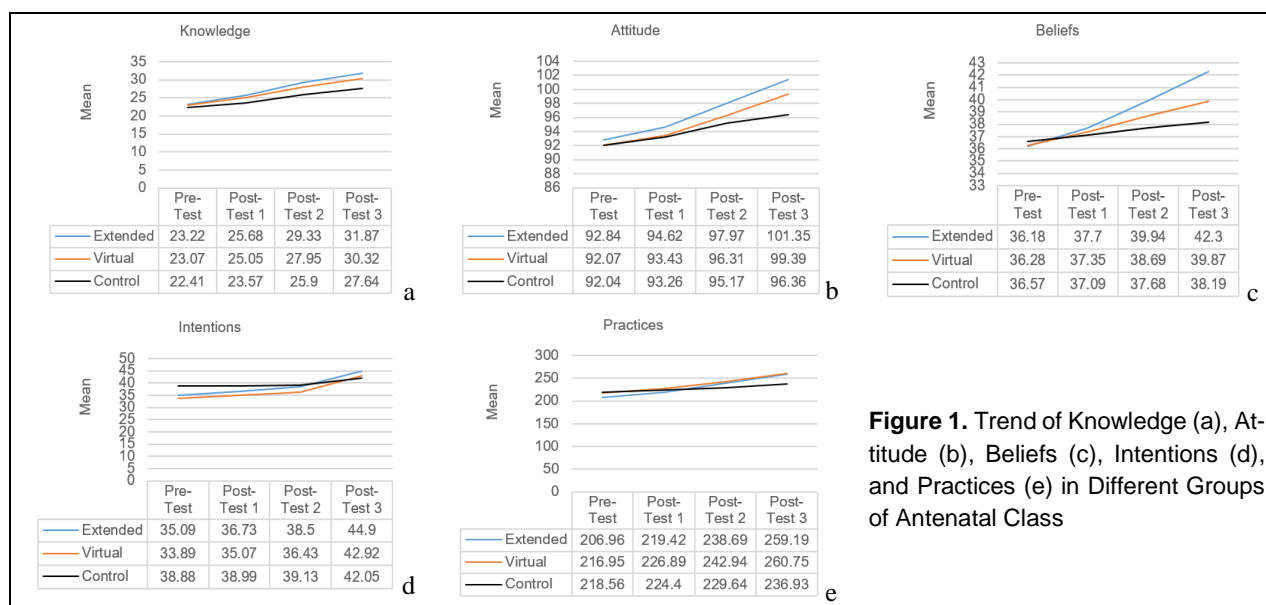
In Figure 1c, it could be seen that trend of pregnant mothers' confidence in extended class experienced a significant increase in the last measurement (posttest-3), followed by virtual class. Although there was an increase in all groups, increasing self-confidence in the conventional group was much lower than in the extended and virtual groups. Figure 1d showed a slightly different pattern of change. It could be seen that until the second month of intervention, there was a tendency for the stagnant (fixed) pattern of increase, especially in the conventional group. Until the last measurement, it was also a minimal increase. A different pattern was seen in the extended and virtual groups that experienced increasing significantly after two months. The increase of pregnant mothers' intentions in extended class

was higher than in virtual class. Figure 1e showed a linear or relatively similar pattern in practices of mothers to prevent high-risk pregnancy for three groups. Even though the average score has increased, it is not too high and forms a parallel line. In the third month, it was proven that the average practices score of the extended and virtual groups exceeded the average score of the conventional group.

Based on the results of the ANOVA test, it was proven that three models of AC showed significant differences in all domains, including knowledge, attitudes, beliefs, intentions, and practices in preventing the high risk of complications due to $p<0.05$. Based on the results of multiple comparison analyses using the Post Hoc test (Table 1), it was proven that the knowledge of mothers in the extended and virtual model was significantly different from the conventional group ($p <0.05$). However, the extended models than the virtual models were insignificant ($p=0.117$). From the knowledge dimension, both extended and virtual models effectively increased mothers' knowledge better than conventional.

Although it was proven that three models showed significant differences in attitudes dimensions (The ANOVA test), the Post Hoc analysis test it was shown no difference between extended and virtual models ($p=0.422$), as well as between the virtual model and the conventional group ($p=0.128$). However, there was a significant difference ($p=0.004$). The result of the ANOVA test showed that mothers' beliefs were significantly different among the three models. Statistically, using Post Hoc analysis, it was also proven the differences in beliefs of pregnant mothers between extended with virtual models ($p=0.012$) and between the extended model with a conventional group ($p=0.000$). However, there was no difference between the virtual and conventional groups ($p=0.116$). These results indicated that the extended model had the highest effectiveness in increasing the confidence of pregnant mothers.

It was known that the mean score of mothers' intentions was higher in the virtual model than in the conventional group, but it was not statistically different ($p=0.549$). On the other hand, it was proven that there was a significant difference between the mean score of mothers' intentions in the extended model compared to the virtual ($p=0.049$) and conventional model ($p=0.002$). These results also proved that the extended model has the highest effectiveness in increasing pregnant mothers' intentions. Table 1 also showed that although the mean score of mothers' practices in preventing high-risk pregnancy between extended and virtual models increased, but its no significant difference ($p=0.831$). The extended and virtual models were significantly different from the conventional group ($p<0.05$). These results showed that extended and virtual class interventions effectively improved maternal practices in preventing high-risk pregnancies better than the conventional model.

Figure 1. Trend of Knowledge (a), Attitude (b), Beliefs (c), Intentions (d), and Practices (e) in Different Groups of Antenatal Class

Table 1. Post Hoc Analysis

Groups	Knowledge*	Attitude*	Belief*	Intention*	Practices*
Extended	31.87 ± 4.07[ad]	101.35 ± 7.20[ad]	42.30 ± 4.49[ab]	44.90 ± 4.11[ab]	259.19 ± 17.88[ad]
Virtual	30.32 ± 3.92[a]	99.39 ± 5.82[c]	39.87 ± 3.66[c]	42.92 ± 3.91[c]	260.75 ± 12.85[a]
Conventional	27.64 ± 4.73	96.36 ± 11.53	38.20 ± 5.49	42.05 ± 5.52	236.93 ± 13.01

*Values represented by mean ± SD; [a] $p < 0.05$ vs.conventional; [b] $p < 0.05$ vs.virtual; [c] $p > 0.05$ vs.conventional; [d] $p > 0.05$ vs virtual

DISCUSSION

Overall high-risk prevention behaviors change positively and increase at each stage of measurement carried out. The extended and virtual were shown to be more effective in improving maternal behavior than the conventional model. These results indicate that AC implementation, which was strengthened by forming discussion groups and communication through WhatsApp and assistance through regular face-to-face meetings for monitoring pregnancy status, was considered the best choice for pregnant mothers. These results also showed that direct health counseling by the facilitator (midwife) was the key to increasing pregnant mothers' knowledge, attitudes, beliefs, intentions, and practices. Strengthening through mentoring and discussion in WhatsApp groups was an added value to the success of the extended model. Previous showed that using cell phones could facilitate pregnant mothers' three abilities, such as increasing choices that encourage quality prenatal care, increasing access to services while maintaining their routine activities, and increasing health literacy and social interactions.[24]

Program effectiveness could be interpreted as the program's success in achieving its objectives and could be implemented properly. Effectiveness was a measure that gives an idea of how far the target could be achieved and as expected. Antenatal Classes Program was effective when the objectives were achieved, namely increasing knowledge and changing attitudes and behavior of mothers in maternal health. This study proved that both extended and virtual interventions were effective, increasing maternal behavior in preventing high-risk pregnancies, including knowledge, attitudes, beliefs, intentions, and practices. In addition to the effectiveness of the two intervention models, the study results also indicate a significant opportunity to change and increase the positive behavior of the pregnant mother. It could be seen from the description of the trend or tendency of assessment results which continues to increase at each measurement stage. Through good pregnancy care behavior, the risk of dangerous complications could be anticipated and avoided early on. It was in line with the determinants of maternal mortality concept, which placed maternal health status, reproductive status, access to health facilities, and health care behavior factors as determinants of pregnancy status, which could directly lead to complications and maternal deaths.[25] Pregnancy complications, childbirth, postpartum, delays in handling staff, parity, and factors of working mothers increased risk of maternal death.[26]

Although both intervention models effectively improved the mother's behavior, the extended class had a greater chance of increasing than the virtual class. This difference was thought to result from different forms of health education given in AC. In the extended class model, health edu-

cation and counseling were face-to-face between the midwife as facilitator and mothers as participants. Although the material provided was the same in the virtual model, it was delivered via video sharing by the mother's handphone without direct interaction and contact with health workers (face to face). These two models also provided assistance interventions by health workers through group WhatsApp discussions. The study results proved that health education with virtual methods had not been able to improve behavior such as in the extended model. These results strengthen the notion that weaknesses of virtual or online models, especially in their inability to develop optimal attitudes due to the direct absence of health workers and could not be replaced yet by information technology.

Direct personal interaction in the form of face-to-face gave a more profound impression when compared to when information was conveyed indirectly through particular media supports such as video. The deep impression in these interactions could be related to compliance in carrying out certain activities. Some advantages of discussion interactions through the direct face-to-face model are being able to see expressions and responses of other related parties directly, feelings and emotions were more visible and integrated, discussions become open, so it was more efficient and effective for delivering persuasive messages to change their attitudes, behavior, and opinions.[27] Direct interaction also impacted satisfaction levels; a previous study proves that physical dimensions and personal interactions were significantly related to maternal satisfaction in postpartum services.[28] Interactions between midwives and pregnant mothers create positive perceptions increasing trust and satisfaction. Personal interactions, privacy during consultations, attention, and availability of facilities significantly affected the quality of ANC.[29]

Psychologically, physical closeness and personal closeness become reinforcing elements in growing trust and confidence in certain behaviors. Good cooperation and partnerships were generally based on high trust. It was one of the reasons for answering research findings that proved attitudes, beliefs, and intentions of mothers in virtual classes were not significantly different from the conventional group. The opposite condition occurred in the extended class, which proved that mothers' attitudes, beliefs, and intentions were significantly different from conventional group. In social psychology theory, strong trust was formed from a long and continuous process of social relations. Trust was also formed and developed through the learning process carried out individually and socially in the interaction of various activities with other people. The adhesive that strengthens the level of trust was determined by guaranteeing the stability of social relations, one of which was obtained through the intensity of ongoing contact. This condition was undoubtedly more common in extended classes than in virtual classes, with pregnant women as trustors (people who believe) and Midwives or

other health workers as trustees (people who could be trusted). The logical consequence of the trust level was in the mother's behavioral intention, which was also getting higher, as explained by planned behavior change theory.

Trust and belief had implications for stronger intention to do or not do something. On the other hand, the interaction between pregnant mothers regularly with a structured, scheduled, and intense frequency would form a personal social bond in the community. In virtual class, this bond tended not to be formed due to the lack of access to the interaction between mothers and health workers, so social and emotional bonds become more difficult to be formed. This dimension of social ties directly affected the behavior of mothers because culturally, they would be considered "bad, violated, disrespectful and unethical" when they did not comply with the advice of health workers who were considered "people who know" because of their skill and competence. It is also the basis for understanding why extended class had a greater chance of getting access to social distance and psychological distance than virtual class, which was still considered a new form of learning (new technology).

Although the virtual model was still considered weaker than the extended model, the virtual model might have been the best choice for a future period. In the era of advances in digital technology, all human activities will always be oriented and based on information-communication technology, including health services. Therefore, the opportunity to use virtual or digital technology in learning class for pregnant mothers remain very large. Internet-based information communication technology has become the primary choice to anticipate resource limitations, so in the future, using virtual models would be the right solution for health service providers. Using social media as a medium of health communication about pregnancy and childbirth through Instagram and WhatsApp has become necessary for millennial mothers.[30] Previous studies also showed that new parents often used WhatsApp groups that discussed many themes, especially maternal and child health, immunization, advice, support for all members, family planning, breastfeeding, delivery costs, and child care.[31]

The study on parents' role in childcare showed that new technologies (web-based or online) were an opportunity to share social support, consult with professionals, and tools in training to improve parental competencies.[32] Internet and the web have also proven to be essential sources of information for pregnant women.[33] Today's technology played a role in providing a new definition of proximity because proximity was no longer defined as the accurate distance through the internet. New parents could find friendship and closeness by communicating through the internet and WhatsApp groups. It was one advantage of using digital.[31] The current Covid-19 pandemic situation also

proved that using virtual models was the best choice in health services, including maternal health. However, it must be admitted that the results were not optimal. The previous study showed no significant differences in behavior change of mothers in the antenatal class group using leaflets or virtual.[21] However, another study showed that the users of cellular phones could support service improvement in maternal health and human development. Factors that influence the use of cell phones by pregnant mothers are mainly personal, social, and environmental factors.[24] Another study also showed that using virtual applications in prenatal care was proven to be effective and did not reduce patient and health provider satisfaction.[34] But pregnant mothers could inevitably overcome time constraints by using virtual applications when they have to follow antenatal class directly and do not interfere with their routine daily work schedule.

Although not as good as the extended model, in future developments, the virtual model of AC had an excellent opportunity to be utilized due to advances in information communication technology based on the web, digital, and internet, so the using of online/virtual methods in health services become a necessity. On the other side, the virtual model or method was the solution to limited resources of public health centers in the implementation of AC which was still an obstacle so that the objectives of implementing the AC itself could be achieved optimally.

CONCLUSIONS AND RECOMMENDATION

ANC model with extended classes and virtual classes effectively improves maternal behavior regarding knowledge, attitudes, beliefs, intentions, and practices to prevent high-risk pregnancies more than conventional classes. However, the extended model is more potent than the other two models. The public health centers can choose one of the two models according to pregnant women's needs, interests, and the situation in their area.

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