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[medisains] Submission Acknowledgement

Agus Santosa <jurnal.umpurwokerto@gmail.com> 14 January 2022 at 11:02
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The following message is being delivered on behalf of MEDISAINS.

XH8h88 Ayun Sriatmi:

Thank you for submitting the manuscript, "Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions" to MEDISAINS. With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

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[medisains] Editor Decision

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XH8h88 Ayun Sriatmi:

We have reached a decision regarding your submission to MEDISAINS, "Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions".

Our decision is: Revisions Required

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Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions

Original Article

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ABSTRACT

Introduction:

Objective:

Method:

Results:

Conclusion:

Utilization of antenatal care was still not optimal and one of which was influenced by mother behavior who were less supportive. Antenatal Classes (AC) had been held to increase knowledge, attitudes and practices of mother was felt not met the needs and was not in demand, so changes were needed. The aim of study was comparing effectiveness of Extended and Virtual models in AC to improve mother behaviors. It's a quasi-experimental study with non-equivalent control group pretest and posttest design. Population of all pregnant mothers in Semarang City with 181 samples from 6 PHC selected and divided into 3 groups. Data measurement was carried out 4 times (pre-post). Differences analysis with *independent t-test* to see differences between groups and *paired t-test* knowing trend of changes being occurred. Extended and Virtual models of AC increasing high-risk pregnancy prevention behaviors effectively. Although all groups an increasing, Extended and Virtual interventions more improving maternal behavior effectively even though Extended model had higher improvement than Virtual. There were differences in mother behaviors between Extended and control group, while in Virtual group only knowledge and practice were different. Attitudes, beliefs and intentions of mother in Virtual group were not different from control. Anticipating advances in internet-based information-communication technology digitally, Virtual model had great opportunity to be utilized because online/virtual methods had become necessity. Virtual model was solution to limited resources of PHC. It was necessary preparing facilities and infrastructure needs in stages for learning method and assistance for AC using Extended and Virtual models through planning mechanism.

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Commented [AS3]: Tujuanya ingin membandingkan berbagai kelas antenatal yang efektif untuk ibu hamil

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INTRODUCTION

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Kenapa kelas ibu hamil penting?apa manfaatnya?selama ini kelas ibu hamil seperti apa modelnya?apakah sudah pernah dilakukan penelitian seelumnya mengenai kelas ibu hamil?bedanya dengan penelitian ini apa?(tuliskan GAB analisis dengan penelitian sebelumnya), di paragraph akhir tuliskan tujuan penelitian ini

Every pregnant mother was obliged to carry out routine antenatal care because it's able detecting various risk factors for complications of pregnancy and childbirth.[1] Early examination of pregnancy was an effective intervention preventing maternal morbidity and mortality because every pregnancy had complications risk. Antenatal care (ANC) was a protective factor against incidence of pre-eclampsia and various maternal complications.[2] Although very important, antenatal care utilization was not optimal. In addition to factors of access and availability of facilities, antenatal care utilization was also influenced by behavioral factors including knowledge, attitudes and perceptions of mothers who were less supportive.[3–5] On the other hand, several studies had shown that practicing of preventing pregnancy complications have not been implemented adequately.[6] Compliance of mother consumed Fe tablets as anemia prevention was still low. Habits, culture

and negative myths were factors driving unhealthy practices such as abstaining from certain foods, traditional pregnancy care with herbal ingredients that eliminate access to nutrients and nutrients needed by pregnant mother which trigger vulnerability

The purpose Antenatal Classes (AC) was increasing knowledge, attitudes and practices of mothers in maintaining healthy pregnancies through group learning process. Maternal participation in AC was dominant factor in increasing antenatal visits.[7] Study of Sasnitiari et-al had proven relationship between maternal participation in AC with better knowledge, positive attitudes in recognizing signs and symptoms of danger pregnancy.[8] Although objectives were good, several studies have shown that AC implementation in Indonesia was not optimal because its average of attendance was 29.5%-62.5% as study in Jepara,[9] Bogor,[8] Denpasar,[10] and Semarang City.[11] Strategy for implementing AC has also proven difficult seizing opportunities, so changes were needed.[12] These studies showed the low participation of mothers in AC, as well as proving that AC has not been an option and not been as interest to pregnant mother. Mother's reason was reluctant to take part in AC was mainly because activity time did not match mother's free time, remote access, uninterested material, monotonous and boring methods.[11]

Implementing a change of AC method which had been considered less optimal was a strategy increasing its utilization. Advances in information and communication technology could be used as well as opportunities to increase network interactions during AC implementation. The Extended model and Virtual model were necessity because internet had become necessity for community, including pregnant mother. Various applications have been developed meeting the needs of health services, including for monitoring and evaluation functions. The virtual classroom training model had proven effectively in increasing knowledge and skills of maternal and child health management in India,[13] while increasing satisfaction.[14]

The Extended class method was conventional AC implementation method that was strengthened through a pregnancy monitoring model and communication discussions using social media in form of WhatsApp groups between mother and health workers (midwife). Virtual class method was a pure AC method used virtual applications in delivery of material and explanations, discussions, interactions, communication and counseling, including monitoring pregnancy mechanism. This study aim comparing effectiveness using Extended and Virtual class methods in improving behavioral domain of mother including knowledge, attitudes, beliefs, intention and practices in preventing pregnancy complications.

METHOD

Study Design

It's a type of quantitative survey research with *a quasi-experimental method* and *non-equivalent control group pretest and posttest design* approach.

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Setting and Respondents

The population was all pregnant mother in Semarang city. Sample size was calculated using formula of two proportion hypothesis test sample. Subjects were divided into three groups. Total sample was 181 people, divided into 60 people for Extended intervention group, 60 for Virtual group and 61 for control group (Conventional). Respondents were selected from 6 PHC that represent regional areas in Semarang City and which hold the most Antenatal Classes, namely PHC of Bandarharjo, Gayamsari, Tlogosari Wetan, Rowosari, Purwoyoso and Gunungpati.

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Kel 1 virtual
Kel 2 exstended
Kel 3 convensional antenatal class

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Experimental Procedures

Intervention for implementing Extended and Virtual class consists of various activities including health education, formation of peer-groups, assistance in group chat discussions through communication in WhatsApp groups, assistance through regular group member meetings to monitor pregnancy and health status. What distinguishes the two groups was routine meetings in Extended class were carried out in form of direct face-to-face meetings with health workers who were also used for pregnancy check-ups and counseling, while the Virtual class intervention all activities use "online" method through social media. Measurements were carried out 4 times in 3-month period of study including pretest at the beginning measurement and 3 times posttest at the end of each month which was measured with lag time for a month from previous measurement. Homogeneity test was conducted ensuring variation of sample was homogeneous before the

measurement took place.

The Variable, Instrument, and Measurement

The variables covered 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, as well as observations using instruments and checklists seeing practices of preventing pregnancy complications.

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Statistical Analysis

Univariate analysis with frequency distribution. Bivariate analysis in measuring mean value differences of variables between two groups, *Independent T-test* was used different because data were normally distributed. This analysis was carried out at the last measurement stage (after posttest-3). To measure the difference in the change in the group mean value at each measurement stages, a *Paired T-test* was used.

Ethical Consideration

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

RESULTS

Commented [AS10]:

Figure 1 showed there was tendency increasing mean score of mother's knowledge positively in three groups at each stage of the measurement time. Although mean score was relatively same in first measurement (pretest), but in last measurement period (posttest-3), the average knowledge score of mothers from Extended class increased the most (31.87) followed by Virtual class (30.32). Extended and Virtual intervention class also had higher difference in scores than control group. The attitudes of pregnant mother from three classes showed increasing trend. Increasing attitude scores of control group (Conventional) was much flat in its pattern than two intervention groups (Extended and Virtual classes) which appeared to be more acute, especially after a month of intervention time period (*see Figure 2*). Extended class had highest increase (101.35), followed by Virtual (99.39) and control (96.36).

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In Figure 3, it could be seen that trend of pregnant mother's confidence in Extended class after being given intervention experienced a significant increase in the last measurement (posttest-3), followed by Virtual class. Although there was an increase in all groups, increasing in self-confidence in control group was much lower than two intervention groups. Figure 4 showed slightly different pattern of change. It could be seen that until second month of intervention there was tendency of stagnant (fixed) pattern of increase, especially in control group which tended to be horizontal and until last measurement, it was also very small increase. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. The increase of pregnant mother intentions in Extended class was higher than Virtual class.

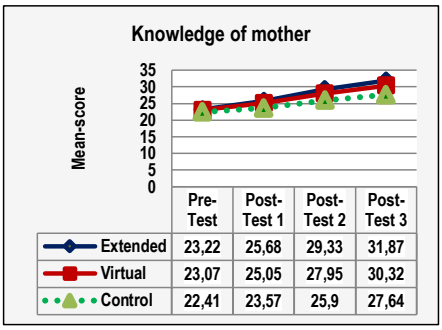

Figure 1.
Trend of Knowledge Change of Mothers in Different Groups of Antenatal Class

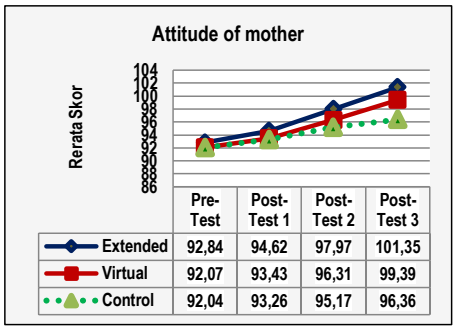

Figure 2.
Trend of Attitude Change of Mothers in Different Groups of Antenatal Class

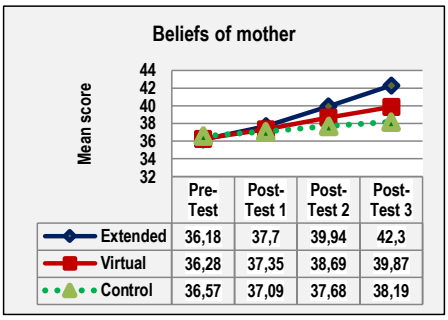

Figure 3.
Trend of Beliefs Change of Mothers in Different Groups of Antenatal Class

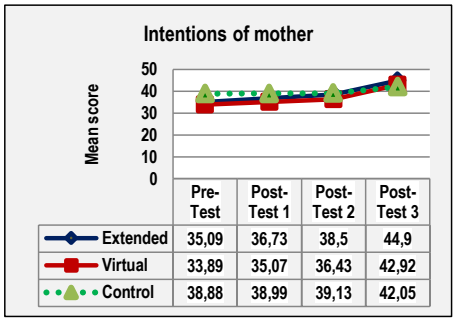

Figure 4.
Trend of Intentions Change of Mothers in Different Groups of Antenatal Class

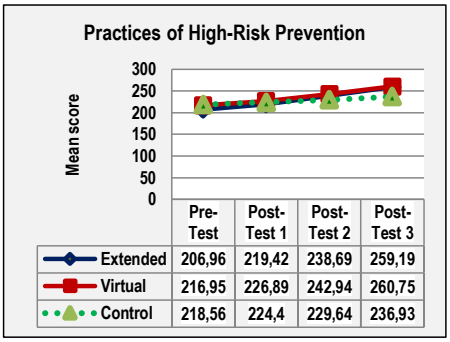

Figure 5.
Trend of Practices Change of High-Risk Prevention in Different Groups of Antenatal Class

Figure 5 showed linear or relatively similar pattern in practices of mothers in preventing high-risk pregnancy for three groups. Even though average score had increased, but it's not too high and forms parallel line. Entering third month, it was proven that average practices score of two intervention groups was able to exceed average score of control group that it's pretest score was indeed higher. Even though at final measurement, average Virtual class score was highest (260.75) but for overall, average change was highest in Extended class (52.23), followed by Virtual class (43.80) and control class was lowest (18.38).

Based on results description, it could be concluded that Extended model and Virtual model of antenatal class intervention could improve mother's behavior, including knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies. Although during measurement time period there was an increase in mother's behavior in intervention and control groups, improvement and behavior change in intervention group was better than control group. The results also showed increasing in behavior of Extended class intervention higher than Virtual class intervention. Group of mothers who were given Extended class intervention showed better behavior improvement, followed by Virtual class.

Furthermore, Table 1 showed that statistically it was proven difference in mean score of mother's behavior (knowledge, attitudes, beliefs, intentions and practices) in initial to final measurement (pretest and posttest-3) after being tested using *Paired T-test* with p value=0.000 for all groups (intervention and control). At difference in mean score, it appear that Extended class intervention had highest value for all behavioral domains and the lowest was Conventional class which was control group. In simple terms, these results could prove that Extended intervention in antenatal classes for mother was most effective. Although Virtual intervention was also effective and better than control group, it improvement was not as high as Extended class.

Table 1 The Differences Behavior of Mother (Knowledge, Attitudes, Beliefs, Intentions and Practices) Before and After Intervention Based on Differences Antenatal Class Groups

Groups	Variables	Different Mean Score	SD	Sig.	95%CI	
					Lower	Upper
Extended Antenatal Class	a. Knowledge	8.65	2.45	0.000*	7.89	9.41
	b. Attitude	8.51	3.88	0.000*	7.51	9.51
	c. Belief	6.12	4.61	0.000*	4.93	7.32
	d. Intention	9.81	3.88	0.000*	8.81	10.81
	e. Practices	52.23	17.77	0.000*	47.64	56.82
Virtual Antenatal Class	a. Knowledge	7.25	2.36	0.000*	6.64	7.86
	b. Attitude	7.32	3.28	0.000*	6.47	8.17
	c. Belief	3.59	3.99	0.000*	2.56	4.62
	d. Intention	9.03	4.18	0.000*	7.95	10.11
	e. Practices	43.80	13.54	0.000*	40.30	47.30
Conventional Antenatal Class (*control group*)	a. Knowledge	5.23	2.69	0.000*	4.54	5.92
	b. Attitude	4.32	4.37	0.000*	3.20	5.44
	c. Belief	1.62	3.06	0.000*	0.84	2.40
	d. Intention	8.17	3.63	0.000*	7.24	9.10
	e. Practices	18.38	13.47	0.000*	14.93	21.83

*Significant with p-value<0,05 through *Paired T-test*
Source: Primary Data

Through difference test conducted in Extended class intervention and control group (conventional) it was found that mother behavior from that two groups was statistically proven significant differently in all domains, including: knowledge, attitudes, beliefs, intentions and practices (*see Table 2*). The mean score obtained by mothers in Extended class was higher than control group for all variables which were significant different statistically. It could be concluded there were differences in the behavior of mothers between Extended class and control group after intervention period. Table 2 also showed mean score of Virtual class intervention was higher in all variables after last measurement (Posttest-3) than control group. Although mean score for mothers in Virtual class intervention was higher, statistically only the knowledge and practices of high-risk prevention were significantly different (p value <0.05). Variables of attitude, belief and intention did not differ in that two groups because p-value≥0.05. Thus, it could be concluded there was statistically significant difference in knowledge and practices in prevention of high-risk pregnancy between mothers who received Virtual class intervention compared to control group, while attitude, belief and intention variables did not differ from control group.

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Table 2 Differences and Comparison of Mothers Behavior Between Intervention Class (Extended and Virtual) and Control After Last Measurement (Posttest-3)

Variables	Groups of Antenatal Class	Mean	SD	Mean Diff.	Sig.	95%CI	
						Lower	Upper
Knowledge	Extended	31.87	4.07	4.23	0.000*	2.64	5.82
	Conventional	27.64	4.73				
Attitude	Extended	101.35	7.20	4.99	0.005*	1.53	8.48
	Conventional	96.36	11.53				
Belief	Extended	42.30	4.49	4.11	0.000*	2.30	5.92
	Conventional	38.20	5.49				
Intention	Extended	44.90	4.11	2.85	0.002*	1.10	4.60
	Conventional	42.05	5.52				
Practices of preventing high-risk complication	Extended	259.19	17.88	22.26	0.000*	16.62	27.90
	Conventional	236.93	13.01				
Knowledge	Virtual	30.32	3.92	2.66	0.001*	1.11	4.24
	Conventional	27.64	4.73				
Attitude	Virtual	99.39	5.82	3.03	**0.071**	-0.26	6.32
	Conventional	96.36	11.53				
Belief	Virtual	39.87	3.66	1.68	**0.050**	-0.00	3.35
	Conventional	38.20	5.49				
Intention	Virtual	42.92	3.91	0.87	**0.318**	-0.85	2.59
	Conventional	42.05	5.52				
Practices of preventing high-risk complication	Virtual	260.75	12.85	23.82	0.000*	19.17	28.47
	Conventional	236.93	13.00				

*Significant with p-value<0,05 through *Independent T-test*
Source: Primary Data

penyajian data sudah baik, namun laporan artikel tidak seperti laporan tesis yang semua bisa dituliskan, bisakah penyajian hasil diringkas supaya singkat namun jelas, kami melihat ada banyak tabel dan banyak gambar,mungkin cukup grafik yang di dalamnya ada analisis statistiknya contoh:

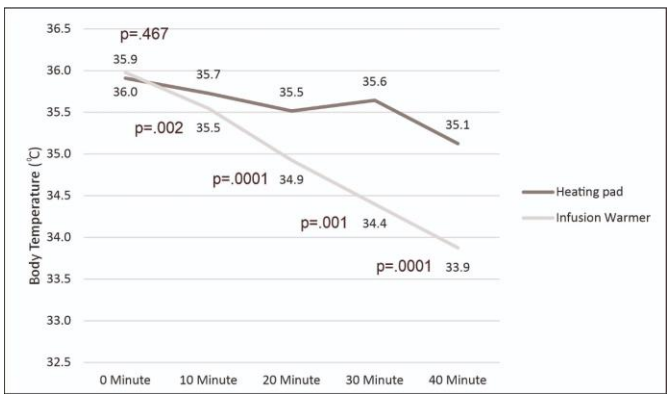

Figure 2. Differences in Body Temperature Decline During Surgery Between The Heating Pad Group and The Infusion Warmer Group

DISCUSSION

Overall high-risk prevention behaviors change in a positive direction and increase at each stage of measurement carried out. The two intervention models, both Extended and Virtual had been shown effectively in improving maternal behavior better than conventional model as control group. Viewed based on mean score of changes that occur, it was proven that Extended class intervention was higher than Virtual intervention, so it could be said that Extended class intervention was more effective.

Program effectiveness could be interpreted as the success of program achieving its objectives and could be implemented properly. Effectiveness was measure that give an idea of how far target could be achieved and as expected. Antenatal Classes Program was effective when the objectives were achieved, namely increasing knowledge, changing attitudes and behavior of mothers in maternal health. Referring to this, it was proven 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 effectiveness of two intervention models, results of study also indicate a large opportunity to change and increase positive behavior of pregnant mother. It could be seen from description of trend or tendency of assessment results which continues increasing at each stage of measurement. Through good pregnancy care behavior, the risk of dangerous complications could be anticipated and avoided early on. It was in line with determinants of maternal mortality concept from McCarthy & Maine 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.[15] Pregnancy complications, childbirth, postpartum, delays in handling staff, parity and factors of working mothers actually increased risk of maternal death.[16]

Although both intervention models were effective improving mother's behavior, Extended class intervention had greater chance of increasing than Virtual class intervention. This difference was thought to be result of different forms of health education given in antenatal class. In Extended class model, health education and counseling were carried out face-to-face between midwife as facilitator and mothers as participants. In Virtual model, although material provided was the same, it was delivered via video sharing by 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 results of study proved that health education with virtual methods had not been able improving behavior such as Extended model. These results strengthen the notion that weaknesses of virtual or online model, especially in its inability developing optimal attitudes due to direct absence of health workers and could not be replaced yet by information technology.

Direct personal interaction in form of face-to-face gave more profound impression when compared to when information was conveyed indirectly through certain media supporting such as video. The deep impression that appears in these interactions could be related to compliance in carrying out certain activities. Some advantages in discussion interactions through the face-to-face direct model include: being able to see directly expressions and responses of other related parties, feelings and emotions were more visible and integrated, discussions become more open so it was more efficient and effective for delivering persuasive messages to change their attitudes, behavior and opinions.[17]

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 reasons for answering research findings that proved attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from control group. The opposite condition occurred in Extended class which proved the attitudes, beliefs and intentions of mothers were significantly different from controls. In social psychology theory, strong trust was formed from long and continuous process of social relations. Trust was also formed and developed through learning process that was carried out individually and socially in interaction of various activities with other people. The adhesive that strengthens level of trust was determined by guaranteeing stability of social relations, one of which was obtained through intensity of ongoing contact. This condition was certainly more common in Extended class than Virtual class, between pregnant women as trustors (people who believe) and Midwives or other health workers as trustees (people who could be trusted). The logical consequence of trust level was in behavioral intention of mother 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, interaction between pregnant mothers on regular basis with a structured, scheduled and intense frequency would form a personal social bond in community. In Virtual class, this bond tended not to be formed due to the lack of access to interaction between mothers and health workers so that social and emotional bonds become more difficult to be formed. This dimension of social ties

directly affected behavior of mothers because culturally they would be considered as "bad, violated, disrespectful and unethical" when they did not comply with advice of health workers who were considered "people who know" because of their skill and competence. It also the basis for understanding why Extended class intervention had greater chance of getting access to social distance and psychological distance than Virtual class intervention which was currently still considered a new form of learning (new technology).

Although Virtual model was still considered weaker than Extended model, for future period of time, it was possible that Virtual model was the best choice. In era of advances in digital technology, all human activities will always be oriented and based on information-communication technology, including in health services. Therefore, opportunity using virtual or digital technology in learning class for pregnant mothers remain very large. Internet-based information communication technology finally had become main choice to anticipate resource limitations, so in the future using of virtual models would be right solution for health service providers. For millennial mothers, using of social media as medium of health communication about pregnancy and childbirth through Instagram and WhatsApp had become a necessity.[18] Wenerda's study also showed that WA-groups were often used by new parents who discussed many themes, especially on maternal and child health, immunization, advice and support for all members, family planning, breastfeeding, delivery costs and child care.[19]

This understanding was in line with Nieuwboer et-al study on the role of parents in childcare which showed that new technologies (web-based or online)) was opportunity sharing social support, consult with professionals, as well as tools in training to improve parental competencies.[20] Internet and web have also proven to be important sources of information for pregnant women in Australia.[21] Today's technology played a role in providing new definition of proximity, because through internet, proximity was no longer defined as real distance. New parents could find friendship and closeness to communicate through internet and WAG. It was one advantages of using digital.[19] The current Covid-19 pandemic situation also proved that using virtual models was best choice in health services, including maternal health, although it must be admitted that the results were not optimal. Hasriani & Nurjanna's study in Sidrap regency showed there was no significant differences in behavior change of mothers in antenatal class group using leaflets or with virtual.[22] However, another study by Dasuki & Zamani showed the using of cellular phones have capacity supporting service improvement in maternal health and human development. Factors that influence the use of cellphones by pregnant mothers were mainly personal, social and environmental factors.[23]

CONCLUSIONS AND RECOMMENDATION

The model intervention with Extended and Virtual class were able and effective increasing maternal behavior in terms of knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies, although increasing of Extended model was higher than Virtual model. Of five behavioral domains, intentions and practices were domains of behavior that have slowest increase because intentions were influenced by a person's beliefs and beliefs, which it changed take longer time than knowledge. Although the average value was higher, domain of attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from Conventional class due to differences in social distance and psychological distance in form of less formed social bonds in Virtual class than in Extended class. In future developments, Virtual class model had great opportunity to be utilized due to advances in information communication technology based on web, digital and internet so the using of online/virtual methods in health services become a necessity. The virtual model was solution to limited resources of PHC in implementation of Antenatal Classes which was still an obstacle. It was necessary preparing the needs for facilities and infrastructure in stages for development of learning methods and assistance for Antenatal Classes using both Extended and or Virtual models through planning mechanism by the PHC and Health Office.

REFERENCES

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[medisains] Editor Decision

Agus Santosa <jurnal.umpurwokerto@gmail.com> 29 March 2022 at 09:52
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The following message is being delivered on behalf of MEDISAINS.

XH8h88 Ayun Sriatmi:

We have reached a decision regarding your submission to MEDISAINS, "Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions".

Our decision is: Revisions Required

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Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions

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ABSTRACT

Utilization of antenatal care was still not optimal and one of which was influenced by mother behavior who were less supportive. Antenatal Classes (AC) had been held to increase knowledge, attitudes and practices of mother was felt not met the needs and was not in demand, so changes were needed. The aim of study was comparing effectiveness of Extended and Virtual models in AC to improve mother behaviors. It's a quasi-experimental study with non-equivalent control group pretest and posttest design. Population of all pregnant mothers in Semarang City with 181 samples from 6 PHC selected and divided into 3 groups. Data measurement was carried out 4 times (pre-post). Differences analysis with *independent t-test* to see differences between groups and *paired t-test* knowing trend of changes being occurred. Extended and Virtual models of AC increasing high-risk pregnancy prevention behaviors effectively. Although all groups an increasing, Extended and Virtual interventions more improving maternal behavior effectively even though Extended model had higher improvement than Virtual. There were differences in mother behaviors between Extended and control group, while in Virtual group only knowledge and practice were different. Attitudes, beliefs and intentions of mother in Virtual group were not different from control. Anticipating advances in internet-based information-communication technology digitally, Virtual model had great opportunity to be utilized because online/virtual methods had become necessity. Virtual model was solution to limited resources of PHC. It was necessary preparing facilities and infrastructure needs in stages for learning method and assistance for AC using Extended and Virtual models through planning mechanism.

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BAGAIMANA DENGAN PENELITIAN SEBELUMNYA?

INTRODUCTION

Every pregnant mother was obliged to carry out routine antenatal care because it's able detecting various risk factors for complications of pregnancy and childbirth.[1] Early examination of pregnancy was an effective intervention preventing maternal morbidity and mortality because every pregnancy had complications risk. Antenatal care (ANC) was a protective factor against incidence of pre-eclampsia and various maternal complications.[2] Although very important, antenatal care utilization was not optimal. In addition to factors of access and availability of facilities, antenatal care utilization was also influenced by behavioral factors including knowledge, attitudes and perceptions of mothers who were less supportive.[3–5] On the other hand, several studies had shown that practicing of preventing pregnancy complications have not been implemented adequately.[6] Compliance of mother consumed Fe tablets as anemia prevention was still low. Habits, culture and negative myths were factors driving unhealthy practices such as abstaining from certain foods, traditional pregnancy care with herbal ingredients that eliminate access to nutrients and nutrients needed by pregnant mother which trigger vulnerability

The purpose Antenatal Classes (AC) was increasing knowledge, attitudes and practices of mothers in maintaining healthy pregnancies through group learning process. Maternal participation in AC was dominant factor in increasing antenatal visits.[7] Study of Sasnitiari et-al had proven relationship between maternal participation in AC with better knowledge,

positive attitudes in recognizing signs and symptoms of danger pregnancy.[8] Although objectives were good, several studies have shown that AC implementation in Indonesia was not optimal because its average of attendance was 29.5%-62.5% as study in Jepara,[9] Bogor,[8] Denpasar,[10] and Semarang City.[11] Strategy for implementing AC has also proven difficult seizing opportunities, so changes were needed.[12] These studies showed the low participation of mothers in AC, as well as proving that AC has not been an option and not been as interest to pregnant mother. Mother's reason was reluctant to take part in AC was mainly because activity time did not match mother's free time, remote access, uninterested material, monotonous and boring methods.[11]

Implementing a change of AC method which had been considered less optimal was a strategy increasing its utilization. Advances in information and communication technology could be used as well as opportunities to increase network interactions during AC implementation. The Extended model and Virtual model were necessity because internet had become necessity for community, including pregnant mother. Various applications have been developed meeting the needs of health services, including for monitoring and evaluation functions. The virtual classroom training model had proven effectively in increasing knowledge and skills of maternal and child health management in India,[13] while increasing satisfaction.[14]

The Extended class method was conventional AC implementation method that was strengthened through a pregnancy monitoring model and communication discussions using social media in form of WhatsApp groups between mother and health workers (midwife). Virtual class method was a pure AC method used virtual applications in delivery of material and explanations, discussions, interactions, communication and counseling, including monitoring pregnancy mechanism. This study aim comparing effectiveness using Extended and Virtual class methods in improving behavioral domain of mother including knowledge, attitudes, beliefs, intention and practices in preventing pregnancy complications.

METHOD

Study Design

It's a type of quantitative survey research with *a quasi-experimental method* and *non-equivalent control group pretest and posttest design* approach.

Setting and Respondents

The population was all pregnant mother in Semarang city. Sample size was calculated using formula of two proportion hypothesis test sample. Subjects were divided into three groups. Total sample was 181 people, divided into 60 people for Extended intervention group, 60 for Virtual group and 61 for control group (Conventional). Respondents were selected from 6 PHC that represent regional areas in Semarang City and which hold the most Antenatal Classes, namely PHC of Bandarharjo, Gayamsari, Tlogosari Wetan, Rowosari, Purwoyoso and Gunungpati.

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Experimental Procedures

Intervention for implementing Extended and Virtual class consists of various activities including health education, formation of peer-groups, assistance in group chat discussions through communication in WhatsApp groups, assistance through regular group member meetings to monitor pregnancy and health status. What distinguishes the two groups was routine meetings in Extended class were carried out in form of direct face-to-face meetings with health workers who were also used for pregnancy check-ups and counseling, while the Virtual class intervention all activities use "online" method through social media. Measurements were carried out 4 times in 3-month period of study including pretest at the beginning measurement and 3 times posttest at the end of each month which was measured with lag time for a month from previous measurement. Homogeneity test was conducted ensuring variation of sample was homogeneous before the measurement took place.

The Variable, Instrument, and Measurement

The variables covered 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, as well as observations using instruments and checklists seeing practices of preventing pregnancy complications.

Statistical Analysis

Univariate analysis with frequency distribution. Bivariate analysis in measuring mean value differences of variables between two groups, *Independent T-test* was used different because data were normally distributed. This analysis was carried out at the last measurement stage (after posttest-3). To measure the difference in the change in the group mean value at each measurement stages, a *Paired T-test* was used.

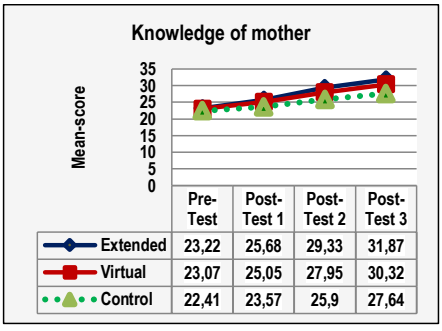
Ethical Consideration

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

RESULTS

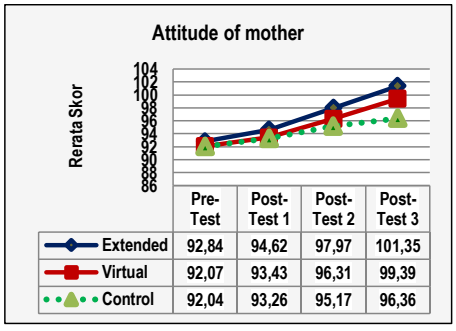
Figure 1 showed there was tendency increasing mean score of mother's knowledge positively in three groups at each stage of the measurement time. Although mean score was relatively same in first measurement (pretest), but in last measurement period (posttest-3), the average knowledge score of mothers from Extended class increased the most (31.87) followed by Virtual class (30.32). Extended and Virtual intervention class also had higher difference in scores than control group. The attitudes of pregnant mother from three classes showed increasing trend. Increasing attitude scores of control group (Conventional) was much flat in its pattern than two intervention groups (Extended and Virtual classes) which appeared to be more acute, especially after a month of intervention time period (*see Figure 2*). Extended class had highest increase (101.35), followed by Virtual (99.39) and control (96.36).

In Figure 3, it could be seen that trend of pregnant mother's confidence in Extended class after being given intervention experienced a significant increase in the last measurement (posttest-3), followed by Virtual class. Although there was an increase in all groups, increasing in self-confidence in control group was much lower than two intervention groups. Figure 4 showed slightly different pattern of change. It could be seen that until second month of intervention there was tendency of stagnant (fixed) pattern of increase, especially in control group which tended to be horizontal and until last measurement, it was also very small increase. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. The increase of pregnant mother intentions in Extended class was higher than Virtual class.



	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	23,22	25,68	29,33	31,87
Virtual	23,07	25,05	27,95	30,32
Control	22,41	23,57	25,9	27,64

Figure 1.
Trend of Knowledge Change of Mothers in Different Groups of Antenatal Class



	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	92,84	94,62	97,97	101,35
Virtual	92,07	93,43	96,31	99,39
Control	92,04	93,26	95,17	96,36

Figure 2.
Trend of Attitude Change of Mothers in Different Groups of Antenatal Class

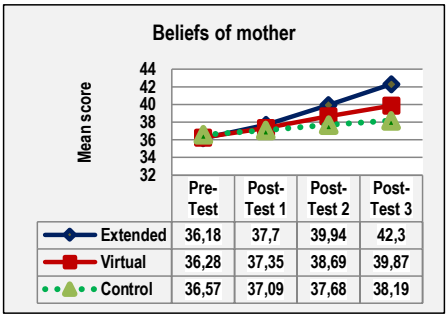


Figure 3.
Trend of Beliefs Change of Mothers in Different Groups of Antenatal Class

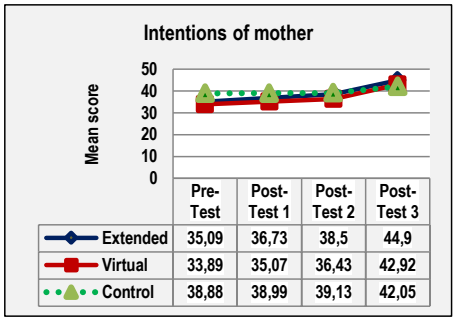


Figure 4.
Trend of Intentions Change of Mothers in Different Groups of Antenatal Class

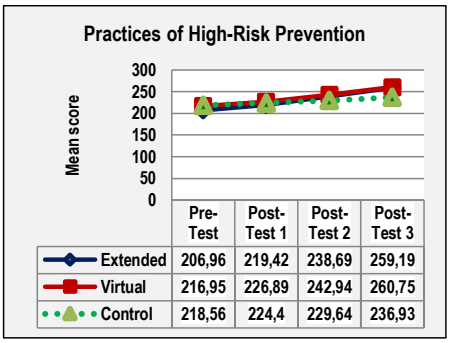


Figure 5.
Trend of Practices Change of High-Risk Prevention in Different Groups of Antenatal Class

Figure 5 showed linear or relatively similar pattern in practices of mothers in preventing high-risk pregnancy for three groups. Even though average score had increased, but it's not too high and forms parallel line. Entering third month, it was proven that average practices score of two intervention groups was able to exceed average score of control group that it's pretest score was indeed higher. Even though at final measurement, average Virtual class score was highest (260.75) but for overall, average change was highest in Extended class (52.23), followed by Virtual class (43.80) and control class was lowest (18.38).

Based on results description, it could be concluded that Extended model and Virtual model of antenatal class intervention could improve mother's behavior, including knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies. Although during measurement time period there was an increase in mother's behavior in intervention and control groups, improvement and behavior change in intervention group was better than control group. The results also showed increasing in behavior of Extended class intervention higher than Virtual class intervention. Group of mothers who were given Extended class intervention showed better behavior improvement, followed by Virtual class.

Furthermore, Table 1 showed that statistically it was proven difference in mean score of mother's behavior (knowledge, attitudes, beliefs, intentions and practices) in initial to final measurement (pretest and posttest-3) after being tested using *Paired T-test* with p value=0.000 for all groups (intervention and control). At difference in mean score, it appear that Extended class intervention had highest value for all behavioral domains and the lowest was Conventional class which was control group. In simple terms, these results could prove that Extended intervention in antenatal classes for mother

was most effective. Although Virtual intervention was also effective and better than control group, it improvement was not as high as Extended class.

Table 1 The Differences Behavior of Mother (Knowledge, Attitudes, Beliefs, Intentions and Practices) Before and After Intervention Based on Differences Antenatal Class Groups

Groups	Variables	Different Mean Score	SD	Sig.	95%CI	
					Lower	Upper
Extended Antenatal Class	a. Knowledge	8.65	2.45	0.000*	7.89	9.41
	b. Attitude	8.51	3.88	0.000*	7.51	9.51
	c. Belief	6.12	4.61	0.000*	4.93	7.32
	d. Intention	9.81	3.88	0.000*	8.81	10.81
	e. Practices	52.23	17.77	0.000*	47.64	56.82
Virtual Antenatal Class	a. Knowledge	7.25	2.36	0.000*	6.64	7.86
	b. Attitude	7.32	3.28	0.000*	6.47	8.17
	c. Belief	3.59	3.99	0.000*	2.56	4.62
	d. Intention	9.03	4.18	0.000*	7.95	10.11
	e. Practices	43.80	13.54	0.000*	40.30	47.30
Conventional Antenatal Class (*control group*)	a. Knowledge	5.23	2.69	0.000*	4.54	5.92
	b. Attitude	4.32	4.37	0.000*	3.20	5.44
	c. Belief	1.62	3.06	0.000*	0.84	2.40
	d. Intention	8.17	3.63	0.000*	7.24	9.10
	e. Practices	18.38	13.47	0.000*	14.93	21.83

*Significant with p-value<0,05 through *Paired T-test*
Source: Primary Data

Through difference test conducted in Extended class intervention and control group (conventional) it was found that mother behavior from that two groups was statistically proven significant differently in all domains, including: knowledge, attitudes, beliefs, intentions and practices (*see Table 2*). The mean score obtained by mothers in Extended class was higher than control group for all variables which were significant different statistically. It could be concluded there were differences in the behavior of mothers between Extended class and control group after intervention period. Table 2 also showed mean score of Virtual class intervention was higher in all variables after last measurement (Posttest-3) than control group. Although mean score for mothers in Virtual class intervention was higher, statistically only the knowledge and practices of high-risk prevention were significantly different (p value <0.05). Variables of attitude, belief and intention did not differ in that two groups because p-value≥0.05. Thus, it could be concluded there was statistically significant difference in knowledge and practices in prevention of high-risk pregnancy between mothers who received Virtual class intervention compared to control group, while attitude, belief and intention variables did not differ from control group.

Table 2 Differences and Comparison of Mothers Behavior Between Intervention Class (Extended and Virtual) and Control After Last Measurement (Posttest-3)

Variables	Groups of Antenatal Class	Mean	SD	Mean Diff.	Sig.	95%CI	
						Lower	Upper
Knowledge	Extended	31.87	4.07	4.23	0.000*	2.64	5.82
	Conventional	27.64	4.73				
Attitude	Extended	101.35	7.20	4.99	0.005*	1.53	8.48
	Conventional	96.36	11.53				
Belief	Extended	42.30	4.49	4.11	0.000*	2.30	5.92
	Conventional	38.20	5.49				
Intention	Extended	44.90	4.11	2.85	0.002*	1.10	4.60
	Conventional	42.05	5.52				
Practices of preventing high-risk complication	Extended	259.19	17.88	22.26	0.000*	16.62	27.90
	Conventional	236.93	13.01				
Knowledge	Virtual	30.32	3.92	2.66	0.001*	1.11	4.24
	Conventional	27.64	4.73				

Attitude	Virtual	99.39	5.82	3.03	**0.071**	-0.26	6.32
	Conventional	96.36	11.53				
Belief	Virtual	39.87	3.66	1.68	**0.050**	-0.00	3.35
	Conventional	38.20	5.49				
Intention	Virtual	42.92	3.91	0.87	**0.318**	-0.85	2.59
	Conventional	42.05	5.52				
Practices of preventing high-risk complication	Virtual	260.75	12.85	23.82	0.000*	19.17	28.47
	Conventional	236.93	13.00				

*Significant with p-value<0,05 through *Independent T-test*
Source: Primary Data

DISCUSSION

Overall high-risk prevention behaviors change in a positive direction and increase at each stage of measurement carried out. The two intervention models, both Extended and Virtual had been shown effectively in improving maternal behavior better than conventional model as control group. Viewed based on mean score of changes that occur, it was proven that Extended class intervention was higher than Virtual intervention, so it could be said that Extended class intervention was more effective.

Program effectiveness could be interpreted as the success of program achieving its objectives and could be implemented properly. Effectiveness was measure that give an idea of how far target could be achieved and as expected. Antenatal Classes Program was effective when the objectives were achieved, namely increasing knowledge, changing attitudes and behavior of mothers in maternal health. Referring to this, it was proven 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 effectiveness of two intervention models, results of study also indicate a large opportunity to change and increase positive behavior of pregnant mother. It could be seen from description of trend or tendency of assessment results which continues increasing at each stage of measurement. Through good pregnancy care behavior, the risk of dangerous complications could be anticipated and avoided early on. It was in line with determinants of maternal mortality concept from McCarthy & Maine 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.[15] Pregnancy complications, childbirth, postpartum, delays in handling staff, parity and factors of working mothers actually increased risk of maternal death.[16]

Although both intervention models were effective improving mother's behavior, Extended class intervention had greater chance of increasing than Virtual class intervention. This difference was thought to be result of different forms of health education given in antenatal class. In Extended class model, health education and counseling were carried out face-to-face between midwife as facilitator and mothers as participants. In Virtual model, although material provided was the same, it was delivered via video sharing by 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 results of study proved that health education with virtual methods had not been able improving behavior such as Extended model. These results strengthen the notion that weaknesses of virtual or online model, especially in its inability developing optimal attitudes due to direct absence of health workers and could not be replaced yet by information technology.

Direct personal interaction in form of face-to-face gave more profound impression when compared to when information was conveyed indirectly through certain media supporting such as video. The deep impression that appears in these interactions could be related to compliance in carrying out certain activities. Some advantages in discussion interactions through the face-to-face direct model include: being able to see directly expressions and responses of other related parties, feelings and emotions were more visible and integrated, discussions become more open so it was more efficient and effective for delivering persuasive messages to change their attitudes, behavior and opinions.[17]

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 reasons for answering research findings that proved attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from control group. The opposite condition occurred in Extended class which proved the attitudes, beliefs and

Commented [WU5]: BANDINGKAN PENELITIAN-PENELITIAN SEBELUMNYA DENGAN PENEMUAN TERBARU DARI HASIL PENELITIAN INI.

JANGAN TERUS MENGULANG DENGAN HASIL PENELITIAN TERUS.

FOKUSKAN DAN JANGAN TERLALU BERTELE2 DALAM PEMBAHASANNYA

intentions of mothers were significantly different from controls. In social psychology theory, strong trust was formed from long and continuous process of social relations. Trust was also formed and developed through learning process that was carried out individually and socially in interaction of various activities with other people. The adhesive that strengthens level of trust was determined by guaranteeing stability of social relations, one of which was obtained through intensity of ongoing contact. This condition was certainly more common in Extended class than Virtual class, between pregnant women as trustors (people who believe) and Midwives or other health workers as trustees (people who could be trusted). The logical consequence of trust level was in behavioral intention of mother 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, interaction between pregnant mothers on regular basis with a structured, scheduled and intense frequency would form a personal social bond in community. In Virtual class, this bond tended not to be formed due to the lack of access to interaction between mothers and health workers so that social and emotional bonds become more difficult to be formed. This dimension of social ties directly affected behavior of mothers because culturally they would be considered as "bad, violated, disrespectful and unethical" when they did not comply with advice of health workers who were considered "people who know" because of their skill and competence. It also the basis for understanding why Extended class intervention had greater chance of getting access to social distance and psychological distance than Virtual class intervention which was currently still considered a new form of learning (new technology).

Although Virtual model was still considered weaker than Extended model, for future period of time, it was possible that Virtual model was the best choice. In era of advances in digital technology, all human activities will always be oriented and based on information-communication technology, including in health services. Therefore, opportunity using virtual or digital technology in learning class for pregnant mothers remain very large. Internet-based information communication technology finally had become main choice to anticipate resource limitations, so in the future using of virtual models would be right solution for health service providers. For millennial mothers, using of social media as medium of health communication about pregnancy and childbirth through Instagram and WhatsApp had become a necessity.[18] Wenerda's study also showed that WA-groups were often used by new parents who discussed many themes, especially on maternal and child health, immunization, advice and support for all members, family planning, breastfeeding, delivery costs and child care.[19]

This understanding was in line with Nieuwboer et-al study on the role of parents in childcare which showed that new technologies (web-based or online)) was opportunity sharing social support, consult with professionals, as well as tools in training to improve parental competencies.[20] Internet and web have also proven to be important sources of information for pregnant women in Australia.[21] Today's technology played a role in providing new definition of proximity, because through internet, proximity was no longer defined as real distance. New parents could find friendship and closeness to communicate through internet and WAG. It was one advantages of using digital.[19] The current Covid-19 pandemic situation also proved that using virtual models was best choice in health services, including maternal health, although it must be admitted that the results were not optimal. Hasriani & Nurjanna's study in Sidrap regency showed there was no significant differences in behavior change of mothers in antenatal class group using leaflets or with virtual.[22] However, another study by Dasuki & Zamani showed the using of cellular phones have capacity supporting service improvement in maternal health and human development. Factors that influence the use of cellphones by pregnant mothers were mainly personal, social and environmental factors.[23]

CONCLUSIONS AND RECOMMENDATION

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The model intervention with Extended and Virtual class were able and effective increasing maternal behavior in terms of knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies, although increasing of Extended model was higher than Virtual model. Of five behavioral domains, intentions and practices were domains of behavior that have slowest increase because intentions were influenced by a person's beliefs and beliefs, which it changed take longer time than knowledge. Although the average value was higher, domain of attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from Conventional class due to differences in social distance and psychological distance in form of less formed social bonds in Virtual class than in Extended class. In future developments, Virtual class model had great opportunity to be utilized due to advances in information communication technology based on web, digital and internet so the using of online/virtual methods in health services become a necessity. The virtual model was solution to limited resources of PHC in implementation of Antenatal Classes which was still an obstacle. It was necessary preparing the needs for facilities and infrastructure in stages for development of learning

methods and assistance for Antenatal Classes using both Extended and or Virtual models through planning mechanism by the PHC and Health Office.

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[medisains] Editor Decision

Agus Santosa <jurnal.umpurwokerto@gmail.com> 13 April 2022 at 09:14
Reply-To: "Ns. Agus Santosa, S.Kep., M.Kep" <ns.agus@gmail.com>
To: XH8h88 Ayun Sriatmi <ayunsriatmi@gmail.com>
Cc: Sri Suwitri <witkusdali@gmail.com>, Zahroh Shaluhiyah <shaluhiyah.zahroh@gmail.com>, Sri Achadi Nugraheni <s.a.nugraheni.undip@gmail.com>

The following message is being delivered on behalf of MEDISAINS.

XH8h88 Ayun Sriatmi:

We have reached a decision regarding your submission to MEDISAINS, "Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions".

Our decision is: Revisions Required

one week revision deadline

Ns. Agus Santosa, S.Kep., M.Kep
Universitas Muhammadiyah Purwokerto
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MEDISAINS - VOL. XX NO. XX (XXXX) XXX-XXX

MEDISAINS
Jurnal Ilmiah Ilmu - Ilmu Kesehatan

Behavior Changes of High-Risk Prevention After Extended and Virtual Model of Antenatal Class Interventions for Pregnant Mothers

Original Article

Commented [AS1]: Judul sebaiknya dibuat menarik pembaca, kami merekomendasikan judul cukup"Models of Antenatal Classes for Pregnant Mothers"

ARTICLE INFORMATION

Received:
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Extended and Virtual Model; Antenatal Class; Mothers Behavior

CORRESPONDENCE

Phone:
E-mail:

ABSTRACT

Introduction: Although it's proven to be useful, the attendance of pregnant mothers in antenatal classes (AC) was still low, so new breakthrough in effective application of AC was needed according to mother's wishes and interests.

Objective: The study aimed comparing various models of effective antenatal classes for pregnant mothers.

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Method: It's a quasi-experimental study with non-equivalent control group pretest and posttest design. Population of all pregnant mothers in Semarang City with 181 samples and divided into 3 groups of AC (Extended, Virtual and Conventional). Data measurement was carried out for 4 times (pre-post). Independent T-test was conducted determining differences between intervention and control groups, while analysis of change level for each groups used Paired-T test.

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

Conclusion: Extended and Virtual models of AC were effective improving high-risk prevention behaviors better than conventional models. Although the increase was not as high as Extended model, the Virtual model has great opportunity to be developed as strategy overcome of time constraints for mothers and health providers.

INTRODUCTION

Every pregnant mother was obliged to carry out routine antenatal care because it's able detecting various risk factors for complications of pregnancy and childbirth.[1] Early examination of pregnancy was an effective intervention preventing maternal morbidity and mortality because every pregnancy had complications risk. Antenatal care (ANC) was a protective factor against incidence of pre-eclampsia and various maternal complications.[2] Although very important, antenatal care utilization was not optimal. In addition to factors of access and availability of facilities, antenatal care utilization was also influenced by behavioral factors including knowledge, attitudes and perceptions of mothers who were less supportive.[3–5] On the other hand, several studies had shown that practicing of preventing pregnancy complications have not been implemented adequately.[6] Compliance of mother consumed Fe tablets as anemia prevention was still low. Habits, culture and negative myths were factors driving unhealthy practices such as abstaining from certain foods, traditional pregnancy care with herbal ingredients that eliminate access to nutrients and nutrients needed by pregnant mother which trigger vulnerability

The purpose Antenatal Classes (AC) was increasing knowledge, attitudes and practices of mothers in maintaining healthy pregnancies through group learning process. Antenatal Classes was implemented by gathering a number of pregnant mothers to study and share information together about their pregnancies with health workers (midwives) as facilitators. Mother's participation in AC was expected increasing regular antenatal visits and other healthy behavior practices. Maternal participation in AC was dominant factor in increasing antenatal visits.[7] Study of Sasnitiari et-al had proven relationship between maternal participation in AC with better knowledge, positive attitudes in recognizing signs and symptoms of danger pregnancy.[8] A qualitative study conducted by Spiby et-al showed that the purpose of pregnant mothers attending Antenatal Classes was to access correct and reliable information, increase self-confidence, and a desire to meet other people with same situation to minimize anxiety and they see that antenatal classes as a way to help them preparing become parents..[9]

Although objectives were good, several studies have shown that Antenatal Classes implementation in Indonesia was not optimal because its average of attendance was 29.5%-62.5% as study in Jepara,[10] Bogor,[8] Denpasar,[11] and Semarang City.[12] There was a tendency for pregnant mothers lacking interest in AC activities. A preliminary study conducted by researchers on 23 pregnant mothers showed that factors of time, perception and method of AC activities were felt to be not as expected because they did not match the availability of mother's free time, methods and delivery of health material were monotonous, boring and unclear. The practices of high-risk prevention behaviors also have not been implemented consistently yet. It was indicated there were problems in AC implementation so far. On the other hand, study of Nurdiyan et-al in Agam District showed that implementation system for antenatal classes for pregnant mothers was not in accordance with guidelines implementation for Antenatal Classes from Ministry of Health, so various efforts were needed to optimizing antenatal classes implementation.[13]

Many factors have been shown influencing the presence and participation of mothers in AC, including lack of knowledge and family support, especially husbands[14] In addition, Maharani et-al's study also showed that mothers' knowledge of early information about AC, the timing of its implementation was not in accordance with mother's time availability and perceptions of pregnancy vulnerability contribute to low maternal visits in antenatal classes.[15] The study of Fuada et-al through SWOT analysis proved that AC implementation so far still have many obstacles because of its position in quadrant III which was negative (weak) but have a very high chance so that its strategic recommendation was to "change strategy".[16] Strategy for implementing AC has also proven difficult seizing opportunities, so changes were needed.[16] These studies showed the low participation of mothers in AC, as well as proving that AC has not been an option and not been as interest to pregnant mother. Mother's reason was reluctant to take part in AC was mainly because activity time did not match mother's free time, remote access, uninterested material, monotonous and boring methods.[12]

Implementing a change of AC method which had been considered less optimal was a strategy increasing its utilization. Advances in information and communication technology could be used as well as opportunities to increase network interactions during AC implementation. Therefore, this study try to develop a new model in AC implementation through 2 (two) separate models, namely Extended model and Virtual model. These two models were expected being able to anticipate the constraints of time lacking for mothers and midwives as facilitators, as well as obstacles in monitoring follow-up using information technology networks through social media, which so far tend to never be done in AC implementation. The Extended model and Virtual model were necessity because internet had become necessity for community, including pregnant mother. Various applications have been developed meeting the needs of health services, including for monitoring and evaluation functions. The virtual classroom training model had proven effectively in increasing knowledge and skills of maternal and child health management in India,[17] while increasing satisfaction.[18]

The Extended class method was conventional AC implementation method that was strengthened through a pregnancy monitoring model and communication discussions using social media in form of WhatsApp groups between mother and health workers (midwife). Virtual class method was a pure AC method used virtual applications in delivery of material and explanations, discussions, interactions, communication and counseling, including monitoring pregnancy mechanism. This study aims to compare effectiveness using Extended and Virtual class methods of Antenatal Classes in improving behavioral domain of mother including knowledge, attitudes, beliefs, intention and practices in preventing pregnancy complications.

METHOD

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Study Design

It was a quasi-experimental study with nonequivalent control group pretest and posttest design.

Setting and Respondents

The population was all pregnant mother ~~in Semarang city~~. Sample size was calculated using formula of two proportion hypothesis test sample. ~~Subjects were divided into three groups~~. Total sample was 181 people, and divided into 3 groups, namely: group 1 Extended model as many as 60 people; group 2 Virtual model with 60 people and group 3 Conventional model which was a control group as many as 61 people. Respondents were selected from 6 (six) Public Health Centre (PHC) that represent regional areas in Semarang City and which hold the most Antenatal Classes in that area, namely the PHC of Bandarharjo, Gayamsari, Tlogosari Wetan, Rowosari, Purwoyoso and Gunungpati. Inclusion criteria were mothers with gestational age of 12-32 weeks and were not included in high-risk pregnancy group, had made their first antenatal care, 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 chronical disease history, were sick during study and indicated illiteracy.

Experimental Procedures

Intervention for implementing Extended and Virtual class consists of various activities including health education, formation of peer-groups, assistance in group chat discussions through communication in WhatsApp groups, assistance through regular group member meetings to monitor pregnancy and health status. What distinguishes the two groups was routine meetings in Extended class were carried out in form of direct face-to-face meetings with health workers who were also used for pregnancy check-ups and counseling, while the Virtual class intervention all activities use "online" method through social media. Measurements were carried out 4 times in 3-month period of study including pretest at the beginning measurement and 3 times posttest at the end of each month which was measured with lag time for a month from previous measurement. ~~Homogeneity test was conducted ensuring variation of sample was homogeneous before the measurement took place.~~

The Variable, Instrument, and Measurement

The variables covered 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, as well as observations using instruments and checklists seeing practices of preventing pregnancy complications. Measurement of variables using interval scale based on the total score obtained from research instrument so the mean value for each variable from each measurement was obtained. All pregnant mothers from all groups be measured four times within a month after previous measurement, namely pre-test, post-test1, post-test2 and post-test3. ~~The measurement results were tested statistically to determine its significance of difference.~~

Statistical Analysis

Univariate analysis with frequency distribution. Bivariate analysis in measuring mean value differences of variables between two groups used Independent T-test because data were normally distributed. This analysis was carried out at the last measurement stage (after posttest-3) to see effectiveness of each given model compared to control (Conventional model), between Extended model and control, also Virtual model with control. ~~To measure the difference in the change in the group mean value at each measurement stages, a Paired T-test was used. This test was carried out to see level of difference or level of change that occur at each measurement for all variables.~~

Ethical Consideration

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

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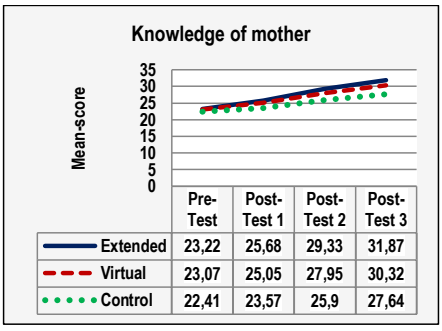
RESULTS

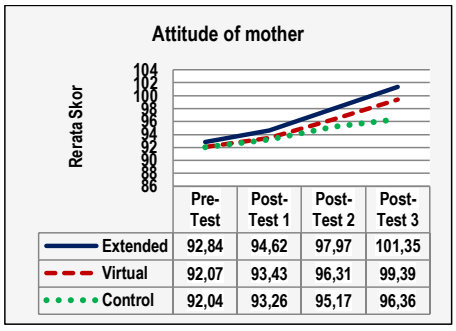
Figure 1 showed there was tendency increasing mean score of mother's knowledge positively in three groups at each stage of the measurement time. Although mean score was relatively same in first measurement (pretest), but in last measurement period (posttest-3), the average knowledge score of mothers from Extended class increased the most (31.87) followed by Virtual class (30.32). Extended and Virtual intervention class also had higher difference in scores than control group. The attitudes of pregnant mother from three classes showed increasing trend. Increasing attitude scores of control group (Conventional) was much flat in its pattern than two intervention groups (Extended and Virtual classes) which appeared to be more acute, especially after a month of intervention time period (*see Figure 2*). Extended class had highest increase (101.35), followed by Virtual (99.39) and control (96.36).

In Figure 3, it could be seen that trend of pregnant mother's confidence in Extended class after being given intervention experienced a significant increase in the last measurement (posttest-3), followed by Virtual class. Although there was an increase in all groups, increasing in self-confidence in control group was much lower than two intervention groups. Figure 4 showed slightly different pattern of change. It could be seen that until second month of intervention there was tendency of stagnant (fixed) pattern of increase, especially in control group which tended to be horizontal and until last measurement, it was also very small increase. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. The increase of pregnant mother intentions in Extended class was higher than Virtual class.



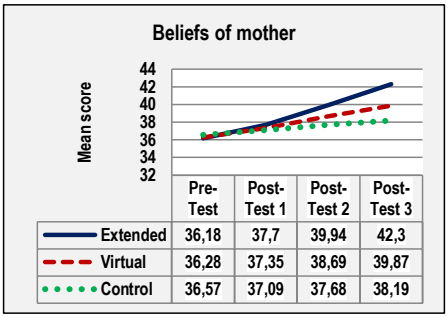
	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	23,22	25,68	29,33	31,87
Virtual	23,07	25,05	27,95	30,32
Control	22,41	23,57	25,9	27,64

Figure 1.
Trend of Knowledge Change of Mothers in Different Groups of Antenatal Class



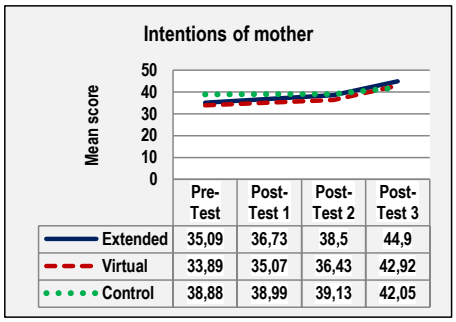
	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	92,84	94,62	97,97	101,35
Virtual	92,07	93,43	96,31	99,39
Control	92,04	93,26	95,17	96,36

Figure 2.
Trend of Attitude Change of Mothers in Different Groups of Antenatal Class



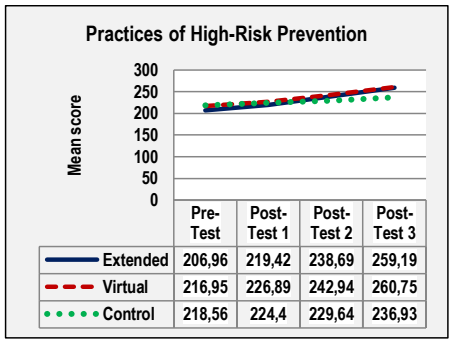
	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	36,18	37,7	39,94	42,3
Virtual	36,28	37,35	38,69	39,87
Control	36,57	37,09	37,68	38,19

Figure 3.
Trend of Beliefs Change of Mothers in Different Groups of Antenatal Class



	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	35,09	36,73	38,5	44,9
Virtual	33,89	35,07	36,43	42,92
Control	38,88	38,99	39,13	42,05

Figure 4.
Trend of Intentions Change of Mothers in Different Groups of Antenatal Class



	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	206,96	219,42	238,69	259,19
Virtual	216,95	226,89	242,94	260,75
Control	218,56	224,4	229,64	236,93

Figure 5.
Trend of Practices Change of High-Risk Prevention in Different Groups of Antenatal Class

Figure 5 showed linear or relatively similar pattern in practices of mothers in preventing high-risk pregnancy for three groups. Even though average score had increased, but it's not too high and forms parallel line. Entering third month, it was proven that average practices score of two intervention groups was able to exceed average score of control group that it's pretest score was indeed higher. Even though at final measurement, average Virtual class score was highest (260.75) but for overall, average change was highest in Extended class (52.23), followed by Virtual class (43.80) and control class was lowest (18.38).

Based on results description, it could be concluded that Extended model and Virtual model of antenatal class intervention could improve mother's behavior, including knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies. Although during measurement time period there was an increase in mother's behavior in intervention and control groups, improvement and behavior change in intervention group was better than control group. The results also showed increasing in behavior of Extended class intervention higher than Virtual class intervention. Group of mothers who were given Extended class intervention showed better behavior improvement, followed by Virtual class.

~~Furthermore, Table 1 showed that statistically it was proven difference in mean score of mother's behavior (knowledge, attitudes, beliefs, intentions and practices) in initial to final measurement (pretest and posttest-3) after being tested using *Paired T-test* with p-value=0.000 for all groups (intervention and control). At difference in mean score, it appear that Extended class intervention had highest value for all behavioral domains and the lowest was Conventional class which was control group.In simple terms, these results could prove that Extended intervention in antenatal classes for mother~~

was most effective. Although Virtual intervention was also effective and better than control group, it improvement was not as high as Extended class.

Table 1 The Differences Behavior of Mother (Knowledge, Attitudes, Beliefs, Intentions and Practices) Before and After Intervention Based on Differences Antenatal Class Groups

Groups	Variables	Different Mean Score	SD	Sig.	95%CI	
					Lower	Upper
Extended Antenatal Class	Knowledge	8.65	2.45	0.000*	7.89	9.41
	Attitude	8.51	3.88	0.000*	7.51	9.51
	Belief	6.12	4.61	0.000*	4.93	7.32
	Intention	9.81	3.88	0.000*	8.81	10.81
	Practices	52.23	17.77	0.000*	47.64	56.82
Virtual Antenatal Class	Knowledge	7.25	2.36	0.000*	6.64	7.86
	Attitude	7.32	3.28	0.000*	6.47	8.17
	Belief	3.59	3.99	0.000*	2.56	4.62
	Intention	9.03	4.18	0.000*	7.95	10.11
	Practices	43.80	13.54	0.000*	40.30	47.30
Conventional Antenatal Class (*control group*)	Knowledge	5.23	2.69	0.000*	4.54	5.92
	Attitude	4.32	4.37	0.000*	3.20	5.44
	Belief	1.62	3.06	0.000*	0.84	2.40
	Intention	8.17	3.63	0.000*	7.24	9.10
	Practices	18.38	13.47	0.000*	14.93	21.83

*Significant with p-value<0,05 through *Paired T-test*
Source: Primary Data

Through difference test conducted in Extended class intervention and control group (conventional) it was found that mother behavior from that two groups was statistically proven significant differently in all domains, including: knowledge, attitudes, beliefs, intentions and practices (*see Table 2*). The mean score obtained by mothers in Extended class was higher than control group for all variables which were significant different statistically. It could be concluded there were differences in the behavior of mothers between Extended class and control group after intervention period. Table 2 also showed mean score of Virtual class intervention was higher in all variables after last measurement (Posttest-3) than control group. Although mean score for mothers in Virtual class intervention was higher, statistically only the knowledge and practices of high-risk prevention were significantly different (p value <0.05). Variables of attitude, belief and intention did not differ in that two groups because p-value≥0.05. Thus, it could be concluded there was statistically significant difference in knowledge and practices in prevention of high-risk pregnancy between mothers who received Virtual class intervention compared to control group, while attitude, belief and intention variables did not differ from control group.

Commented [AS11]: Sesuaikan dengan uji tiga kelompok

Table 2 Differences and Comparison of Mothers Behavior Between Intervention Class (Extended and Virtual) and Control After Last Measurement (Posttest-3)

Commented [AS12]: Lakukan uji tiga kelompok

Variables	Groups of Antenatal Class	Mean	SD	Mean Diff.	Sig.	95%CI	
						Lower	Upper
Knowledge	Extended	31.87	4.07	4.23	0.000*	2.64	5.82
	Conventional	27.64	4.73				
Attitude	Extended	101.35	7.20	4.99	0.005*	1.53	8.48
	Conventional	96.36	11.53				
Belief	Extended	42.30	4.49	4.11	0.000*	2.30	5.92
	Conventional	38.20	5.49				
Intention	Extended	44.90	4.11	2.85	0.002*	1.10	4.60
	Conventional	42.05	5.52				
Practices of preventing high-risk complication	Extended	259.19	17.88	22.26	0.000*	16.62	27.90
	Conventional	236.93	13.01				
Knowledge	Virtual	30.32	3.92	2.66	0.001*	1.11	4.24
	Conventional	27.64	4.73				

Attitude	Virtual	99.39	5.82	3.03	**0.071**	-0.26	6.32
	Conventional	96.36	11.53				
Belief	Virtual	39.87	3.66	1.68	**0.050**	-0.00	3.35
	Conventional	38.20	5.49				
Intention	Virtual	42.92	3.91	0.87	**0.318**	-0.85	2.59
	Conventional	42.05	5.52				
Practices of preventing high-risk complication	Virtual	260.75	12.85	23.82	0.000*	19.17	28.47
	Conventional	236.93	13.00				

*Significant with p-value<0,05 through *Independent T-test*
Source: Primary Data

DISCUSSION

Overall high-risk prevention behaviors change in a positive direction and increase at each stage of measurement carried out. The two intervention models, both Extended and Virtual had been shown effectively in improving maternal behavior better than conventional model as control group. Viewed based on mean score of changes that occur, it was proven that Extended class intervention was higher than Virtual intervention, so it could be said that Extended class intervention was more effective. These results indicate that AC implementation which was strengthened by formation of 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 facilitator (midwife) was the key to increasing knowledge, attitudes, beliefs, intentions and practices of pregnant mothers. Strengthening through mentoring and discussion in WhatsApp groups was an added value for the success of Extended model. Dasuki & Zamani's study in Sub-Saharan Africa showed that using of cellphones could facilitate three abilities of pregnant mothers, 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.[19]

Program effectiveness could be interpreted as the success of program achieving its objectives and could be implemented properly. Effectiveness was measure that give an idea of how far target could be achieved and as expected. Antenatal Classes Program was effective when the objectives were achieved, namely increasing knowledge, changing attitudes and behavior of mothers in maternal health. Referring to this, it was proven 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 effectiveness of two intervention models, results of study also indicate a large opportunity to change and increase positive behavior of pregnant mother. It could be seen from description of trend or tendency of assessment results which continues increasing at each stage of measurement. Through good pregnancy care behavior, the risk of dangerous complications could be anticipated and avoided early on. It was in line with determinants of maternal mortality concept from McCarthy & Maine 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.[20] Pregnancy complications, childbirth, postpartum, delays in handling staff, parity and factors of working mothers actually increased risk of maternal death.[21]

Although both intervention models were effective improving mother's behavior, Extended class intervention had greater chance of increasing than Virtual class intervention. This difference was thought to be result of different forms of health education given in antenatal class. In Extended class model, health education and counseling were carried out face-to-face between midwife as facilitator and mothers as participants. In Virtual model, although material provided was the same, it was delivered via video sharing by 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 results of study proved that health education with virtual methods had not been able improving behavior such as Extended model. These results strengthen the notion that weaknesses of virtual or online model, especially in its inability developing optimal attitudes due to direct absence of health workers and could not be replaced yet by information technology.

Direct personal interaction in form of face-to-face gave more profound impression when compared to when information was conveyed indirectly through certain media supporting such as video. The deep impression that appears in these interactions could be related to compliance in carrying out certain activities. Some advantages in discussion interactions through the face-to-face direct model include: being able to see directly expressions and responses of other related

parties, feelings and emotions were more visible and integrated, discussions become more open so it was more efficient and effective for delivering persuasive messages to change their attitudes, behavior and opinions.[22] Direct interaction also had an impact on satisfaction levels, as Aisyah & Wahyono's study prove that physical dimensions and personal interactions were significantly related to maternal satisfaction in postpartum services.[23] Interactions between midwives and pregnant mothers create positive perceptions increasing trust and satisfaction. Studies in Ghana also showed that pleasant personal interactions, privacy during consultations, attention and availability of facilities significantly affected quality of antenatal care.[24]

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 reasons for answering research findings that proved attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from control group. The opposite condition occurred in Extended class which proved the attitudes, beliefs and intentions of mothers were significantly different from controls. In social psychology theory, strong trust was formed from long and continuous process of social relations. Trust was also formed and developed through learning process that was carried out individually and socially in interaction of various activities with other people. The adhesive that strengthens level of trust was determined by guaranteeing stability of social relations, one of which was obtained through intensity of ongoing contact. This condition was certainly more common in Extended class than Virtual class, between pregnant women as trustors (people who believe) and Midwives or other health workers as trustees (people who could be trusted). The logical consequence of trust level was in behavioral intention of mother 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, interaction between pregnant mothers on regular basis with a structured, scheduled and intense frequency would form a personal social bond in community. In Virtual class, this bond tended not to be formed due to the lack of access to interaction between mothers and health workers so that social and emotional bonds become more difficult to be formed. This dimension of social ties directly affected behavior of mothers because culturally they would be considered as "bad, violated, disrespectful and unethical" when they did not comply with advice of health workers who were considered "people who know" because of their skill and competence. It also the basis for understanding why Extended class intervention had greater chance of getting access to social distance and psychological distance than Virtual class intervention which was currently still considered a new form of learning (new technology).

Although Virtual model was still considered weaker than Extended model, for future period of time, it was possible that Virtual model was the best choice. In era of advances in digital technology, all human activities will always be oriented and based on information-communication technology, including in health services. Therefore, opportunity using virtual or digital technology in learning class for pregnant mothers remain very large. Internet-based information communication technology finally had become main choice to anticipate resource limitations, so in the future using of virtual models would be right solution for health service providers. For millennial mothers, using of social media as medium of health communication about pregnancy and childbirth through Instagram and WhatsApp had become a necessity.[25] Wenerda's study also showed that WA-groups were often used by new parents who discussed many themes, especially on maternal and child health, immunization, advice and support for all members, family planning, breastfeeding, delivery costs and child care.[26]

This understanding was in line with Nieuwboer et-al study on the role of parents in childcare which showed that new technologies (web-based or online)) was opportunity sharing social support, consult with professionals, as well as tools in training to improve parental competencies.[27] Internet and web have also proven to be important sources of information for pregnant women in Australia.[28] Today's technology played a role in providing new definition of proximity, because through internet, proximity was no longer defined as real distance. New parents could find friendship and closeness to communicate through internet and WAG. It was one advantages of using digital.[26] The current Covid-19 pandemic situation also proved that using virtual models was best choice in health services, including maternal health, although it must be admitted that the results were not optimal. Hasriani & Nurjanna's study in Sidrap regency showed there was no significant differences in behavior change of mothers in antenatal class group using leaflets or with virtual.[29] However, another study by Dasuki & Zamani showed the using of cellular phones have capacity supporting service improvement in maternal health and human development. Factors that influence the use of cellphones by pregnant mothers were mainly personal, social and environmental factors.[19] Another study by Marko et-al in USA also showed that using of virtual applications in prenatal care was also proven to be effective and did not reduce patient and health provider satisfaction.[30] But its certain that through using of virtual applications, pregnant mothers could overcome time constraints when they have to follow antenatal class directly at the same time did not interfere with his routine daily work schedule.

Of five behavioral domains, intentions and practices were domains of behavior that have slowest increase because intentions were influenced by a person's beliefs and beliefs, which it changed take longer time than knowledge. Although the average value was higher, domain of attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from Conventional class due to differences in social distance and psychological distance in form of less formed social bonds in Virtual class than in Extended class. In future developments, Virtual class model had great opportunity to be utilized due to advances in information communication technology based on web, digital and internet so the using of online/virtual methods in health services become a necessity. The virtual model was solution to limited resources of PHC in implementation of Antenatal Classes which was still an obstacle. To anticipate global changes and technology development based on IT, it was necessary preparing the needs for facilities and infrastructure in stages for development of learning methods and assistance for Antenatal Classes using both Extended and or Virtual models through planning mechanism by the Primary Health Center (PHC) and District Health Office.

CONCLUSIONS AND RECOMMENDATION

The model intervention with Extended and Virtual class were able and effective increasing maternal behavior in terms of knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies, although increasing of Extended model was higher than Virtual model. In subsequent developments and anticipating global changes, the virtual model of AC had great opportunity to be utilized due to advances in web, digital and internet-based technology of information and communication so the use of online/virtual methods in health services become a necessity. Public Health Centers could choose one of the two models according to needs, interest and situation of pregnant mothers in their area. Gradually, the PHC c also could equip required facilities and develop all antenatal class materials in virtual form.

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We have reached a decision regarding your submission to MEDISAINS, "Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions".

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Models of Antenatal Classes for Pregnant Mothers

Original Article

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ABSTRACT

Introduction: Although it's proven to be useful, the attendance of pregnant mothers in antenatal classes (AC) was still low, so new breakthrough in effective application of AC was needed according to mother's wishes and interests.

Objective: The study aimed comparing various models of effective antenatal classes for pregnant mothers to improve behavior prevention of high-risk pregnancy.

Method: It's a quasi-experimental study with non-equivalent control group pretest and posttest design. Population of all pregnant mothers in Semarang City with 181 samples and divided into 3 groups of AC (Extended, Virtual and Conventional). Measurements were carried out four times to see its mean score increasing and the results of last measurement were analyzed using One Way Anova test to compare effectiveness of these three groups.

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

Conclusion: Extended and Virtual models of AC were effective improving high-risk prevention behaviors better than conventional models. Although the increase was not as high as Extended model, the Virtual model has great opportunity to be developed as strategy overcome of time constraints for mothers and health providers.

INTRODUCTION

Every pregnant mother was obliged to carry out routine antenatal care because it's able detecting various risk factors for complications of pregnancy and childbirth.[1] Early examination of pregnancy was an effective intervention preventing maternal morbidity and mortality because every pregnancy had complications risk. Antenatal care (ANC) was a protective factor against incidence of pre-eclampsia and various maternal complications.[2] Although very important, antenatal care utilization was not optimal. In addition to factors of access and availability of facilities, antenatal care utilization was also influenced by behavioral factors including knowledge, attitudes and perceptions of mothers who were less supportive.[3–5] On the other hand, several studies had shown that practicing of preventing pregnancy complications have not been implemented adequately.[6] Compliance of mother consumed Fe tablets as anemia prevention was still low. Habits, culture and negative myths were factors driving unhealthy practices such as abstaining from certain foods, traditional pregnancy care with herbal ingredients that eliminate access to nutrients and nutrients needed by pregnant mother which trigger vulnerability. The purpose Antenatal Classes (AC) was increasing knowledge, attitudes and practices of mothers in maintaining healthy pregnancies through group learning process. Antenatal Classes was implemented by gathering a number of pregnant mothers to study and share information together about their pregnancies with health workers (midwives) as facilitators. Mother's participation in AC was expected increasing regular antenatal visits and other healthy behavior practices. Maternal participation in AC was dominant factor in increasing antenatal visits.[7] Study of Sasnitiari et-

al had proven relationship between maternal participation in AC with better knowledge, positive attitudes in recognizing signs and symptoms of danger pregnancy.[8] A qualitative study conducted by Spiby et-al showed that the purpose of pregnant mothers attending Antenatal Classes was to access correct and reliable information, increase self-confidence, and a desire to meet other people with same situation to minimize anxiety and they see that antenatal classes as a way to help them preparing become parents.[9]

Although objectives were good, several studies have shown that Antenatal Classes implementation in Indonesia was not optimal because its average of attendance was 29.5%-62.5% as study in Jepara,[10] Bogor,[8] Denpasar,[11] and Semarang City.[12] There was a tendency for pregnant mothers lacking interest in AC activities. Community data from National Health Indicator Survey by Ministry of Health in 2016 stated that most mothers in Indonesia (81.8%) did not participate in Antenatal Class program implemented by the government.[13] A preliminary study conducted by researchers on 23 pregnant mothers showed that factors of time, perception and method of AC activities were felt to be not as expected because they did not match the availability of mother's free time, methods and delivery of health material were monotonous, boring and unclear. The practices of high-risk prevention behaviors also have not been implemented consistently yet. It was indicated there were problems in AC implementation so far. On the other hand, study of Nurdiyan et-al in Agam District showed that implementation system for antenatal classes for pregnant mothers was not in accordance with guidelines implementation for Antenatal Classes from Ministry of Health, so various efforts were needed to optimizing antenatal classes implementation.[14]

Many factors have been shown influencing the presence and participation of mothers in AC, including lack of knowledge and family support, especially husbands[15] In addition, Maharani et-al's study also showed that mothers' knowledge of early information about AC, the timing of its implementation was not in accordance with mother's time availability and perceptions of pregnancy vulnerability contribute to low maternal visits in antenatal classes.[16] The study of Fuada et-al through SWOT analysis proved that AC implementation so far still have many obstacles because of its position in quadrant III which was negative (weak) but have a very high chance so that its strategic recommendation was to "change strategy".[17] Strategy for implementing AC has also proven difficult seizing opportunities, so changes were needed.[17] These studies showed the low participation of mothers in AC, as well as proving that AC has not been an option and not been as interest to pregnant mother. Mother's reason was reluctant to take part in AC was mainly because activity time did not match mother's free time, remote access, uninterested material, monotonous and boring methods.[12]

Implementing a change of AC method which had been considered less optimal was a strategy increasing its utilization. Advances in information and communication technology could be used as well as opportunities to increase network interactions during AC implementation. Therefore, this study tries to develop a new model in AC implementation through 2 (two) separate models, namely Extended model and Virtual model. These two models were expected being able to anticipate the constraints of time lacking for mothers and midwives as facilitators, as well as obstacles in monitoring follow-up using information technology networks through social media, which so far tend to never be done in AC implementation. The Extended model and Virtual model were necessity because internet had become necessity for community, including pregnant mother. Various applications have been developed meeting the needs of health services, including for monitoring and evaluation functions. The virtual classroom training model had proven effectively in increasing knowledge and skills of maternal and child health management in India,[18] while increasing satisfaction.[19] The Extended class method was conventional AC implementation method that was strengthened through a pregnancy monitoring model and communication discussions using social media in form of WhatsApp groups between mother and health workers (midwife). Virtual class method was a pure AC method used virtual applications in delivery of material and explanations, discussions, interactions, communication and counseling, including monitoring pregnancy mechanism.

Several previous studies on the current implementation of existing model of AC or conventional models showed a gap between expectations and reality, as seen in Kusbandiyah study in Malang which showed that AC have not been implemented properly by 40% implementors. The study also proved that the low understanding of standards, objectives and regulations, and the weak disposition factors (attitudes and character) of the implementors affected Antenatal Class implementation.[20] Hasriani & Nurjanna's study showed that there was no difference in knowledge and behavior to prevent high-risk pregnancies between pregnant mothers who followed AC using leaflet media and those who followed AC Virtual using WhatsApp media.[21] A study conducted by Spiby et-al showed the importance of face-to-face classes and antenatal education for pregnant mothers as a way to help them fully engage in transition period to be more ready becoming parents.[9] However, it was recognized that the distance, geographic location of mothers' homes and working mothers become obstacles in holding classes for pregnant mothers.[13,17] On the other hand, Patel et-al's study showed that using WhatsApp groups to support pregnant mother was very effective because the time was flexible and information could be accessed easily, although one of the obstacles was the ability of facilitator in filtering information that will be shared in

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groups.[22] Despite giving positive results, so far there's no analysis have been carried out to compare effectiveness of various models of Antenatal Class implementation for mothers, so this research was important and need to be done. This study aims to compare effectiveness using Extended and Virtual class methods of Antenatal Classes in improving behavioral domain of mother including knowledge, attitudes, beliefs, intention and practices in preventing high-risk pregnancy.

METHOD

Study Design

It was a quasi-experimental study with nonequivalent control group pretest and posttest design ~~through measurement of pretest before the intervention and posttest after intervention was given~~[23]

Setting and Respondents

The population was all pregnant mother. Sample size was calculated using formula of two proportion hypothesis test sample. Total sample was 181 people, and divided into 3 groups randomly, namely: group 1 Extended model as many as 60 people; group 2 Virtual model with 60 people and group 3 Conventional model which was a control group as many as 61 people. Respondents were selected from 6 (six) Public Health Centre (PHC) that represent regional areas in Semarang City and which hold the most Antenatal Classes in that area, namely the PHC of Bandarharjo, Gayamsari, Tlogosari Wetan, Rowosari, Purwoyoso and Gunungpati. Inclusion criteria were mothers with gestational age of 12-32 weeks and were not included in high-risk pregnancy group, had made their first antenatal care, 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 chronical disease history, were sick during study and indicated illiteracy.

Experimental Procedures

Intervention for implementing Extended and Virtual class consists of various activities including health education, formation of peer-groups, assistance in group chat discussions through communication in WhatsApp groups, assistance through regular group member meetings to monitor pregnancy and health status. What distinguishes the two groups was routine meetings in Extended class were carried out in form of direct face-to-face meetings with health workers who were also used for pregnancy check-ups and counseling, while the Virtual class intervention all activities use "online" method through social media The conventional model of Antenatal Class become control group, where this model was an existing model by only providing explanation material in form of face-to-face using MCH Handbook as a learning medium.24The intervention was carried out for three months with the provision and explanation of material once a month for all groups individually. The difference of its intervention was in face-to-face learning mechanism using MCH Handbook (for Extended model and control group) and using video media for Virtual model. In addition, pregnant mothers were provided with regular assistance and monitoring through WhatsApp Group discussions for both intervention models, while for control group was not provided. Variables measurements were carried out 4 times in 3-month period of study including pretest at the beginning measurement and 3 times posttest at the end of each month which was measured with lag time for a month from previous measurement.

The Variable, Instrument, and Measurement

The variables covered 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, as well as observations using instruments and checklists seeing practices of preventing pregnancy complications. Measurement of variables using interval scale based on the total score obtained from research instrument so the mean value for each variable from each measurement was obtained. All pregnant mothers from all groups be measured four times within a month after previous measurement, namely pre-test, post-test1, post-test2 and post-test3.

Statistical Analysis

Univariate analysis was carried out descriptively with frequency distribution to seeing trend of changes in pregnant mothers' behavior during intervention period. The statistical analysis was carried out at the last measurement stage (after posttest-3) to see effectiveness of each given model compared to control group (Conventional model), between Extended model and control, also Virtual model with control. Data analysis used a comparative test on more than 2 groups namely One Way Anova Test to distinguish the mean scores of more than 2 groups by comparing its variances. Measurements were carried out to compare effectiveness of these three groups.

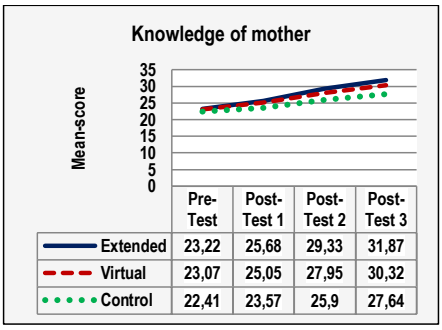
Ethical Consideration

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

RESULTS

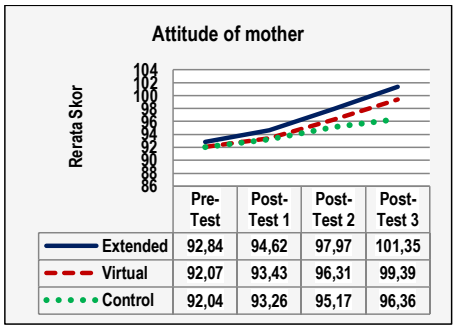
Figure 1 showed there was tendency increasing mean score of mother's knowledge positively in three groups at each stage of the measurement time. Although mean score was relatively same in first measurement (pretest), but in last measurement period (posttest-3), the average knowledge score of mothers from Extended class increased the most (31.87) followed by Virtual class (30.32). Extended and Virtual intervention class also had higher difference in scores than control group. The attitudes of pregnant mother from three classes showed increasing trend. Increasing attitude scores of control group (Conventional) was much flat in its pattern than two intervention groups (Extended and Virtual classes) which appeared to be more acute, especially after a month of intervention time period (*see Figure 2*). Extended class had highest increase (101.35), followed by Virtual (99.39) and control (96.36).

In Figure 3, it could be seen that trend of pregnant mother's confidence in Extended class after being given intervention experienced a significant increase in the last measurement (posttest-3), followed by Virtual class. Although there was an increase in all groups, increasing in self-confidence in control group was much lower than two intervention groups. Figure 4 showed slightly different pattern of change. It could be seen that until second month of intervention there was tendency of stagnant (fixed) pattern of increase, especially in control group which tended to be horizontal and until last measurement, it was also very small increase. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. A different pattern was seen in two intervention groups which experienced increasing significantly in the period after two months intervention. The increase of pregnant mother intentions in Extended class was higher than Virtual class.



	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	23,22	25,68	29,33	31,87
Virtual	23,07	25,05	27,95	30,32
Control	22,41	23,57	25,9	27,64

Figure 1.
Trend of Knowledge Change of Mothers in Different Groups of Antenatal Class



	Pre-Test	Post-Test 1	Post-Test 2	Post-Test 3
Extended	92,84	94,62	97,97	101,35
Virtual	92,07	93,43	96,31	99,39
Control	92,04	93,26	95,17	96,36

Figure 2.
Trend of Attitude Change of Mothers in Different Groups of Antenatal Class

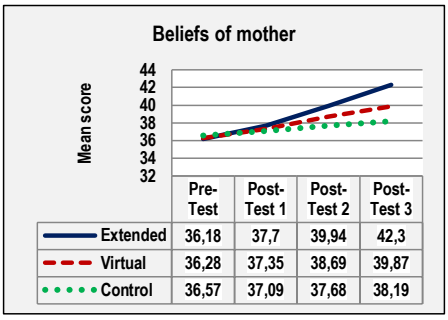


Figure 3.
Trend of Beliefs Change of Mothers in Different Groups of Antenatal Class

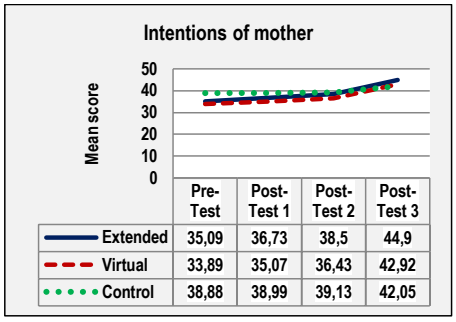


Figure 4.
Trend of Intentions Change of Mothers in Different Groups of Antenatal Class

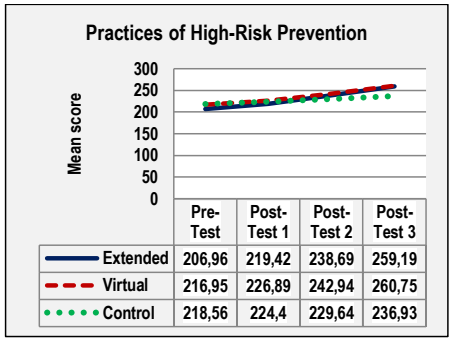


Figure 5.
Trend of Practices Change of High-Risk Prevention in Different Groups of Antenatal Class

Figure 5 showed linear or relatively similar pattern in practices of mothers in preventing high-risk pregnancy for three groups. Even though average score had increased, but it's not too high and forms parallel line. Entering third month, it was proven that average practices score of two intervention groups was able to exceed average score of control group that it's pretest score was indeed higher. Even though at final measurement, average Virtual class score was highest (260.75) but for overall, average change was highest in Extended class (52.23), followed by Virtual class (43.80) and control class was lowest (18.38).

Based on results description, it could be concluded that Extended model and Virtual model of antenatal class intervention could improve mother's behavior, including knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies. Although during measurement time period there was an increase in mother's behavior in intervention and control groups, improvement and behavior change in intervention group was better than control group. The results also showed increasing in behavior of Extended class intervention higher than Virtual class intervention. Group of mothers who were given Extended class intervention showed better behavior improvement, followed by Virtual class.

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Through statistical analysis using ANOVA test, it's proven that behavioral dimensions included domains of knowledge, attitudes, beliefs, intentions and practices of mothers in preventing high-risk of pregnancy overall have significant differences in the three groups. It's shown from p-value obtained from analysis results was lower than 0.05 ($p<0.05$), so

statistically it could be concluded that there were differences in behavior of pregnant mothers after being given Extended or Virtual model of AC intervention compared to conventional model as a control (see Table 1). Based on the results of multiple comparison analysis using Post Hoc test, it's known that on knowledge variable, it was proven that the knowledge of mothers in Extended and Virtual model were significantly different from the knowledge of conventional group ($p < 0.05$). However, it's also known although the knowledge mean score of the Extended model was higher than mean score of Virtual models, the difference was not significant ($p=0.117$). From knowledge dimension, both interventions were effective increasing mothers' knowledge better than controls.

Although it was proven that three models showed significant differences in dimensions of maternal attitudes, through the multiple comparison analysis conducted, it was shown that mean score of attitude variable was not proven to be different between Extended and Virtual models ($p=0.422$), as well as between Virtual model and Conventional group ($p=0.128$). However, for mothers' attitude of Extended model with conventional one, there was significant difference in mean score ($p=0.004$). These results indicated that Extended model was better able improving mothers' attitude because the mean score was higher.

Table 1 also showed that maternal beliefs were significantly different among three models of AC. 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 Extended model with conventional group ($p=0.000$). However, between Virtual model and conventional group, turned out no difference in mothers' beliefs ($p=0.116$). These results indicated that Extended model had highest effectiveness in increasing the confidence of pregnant mothers. Although the mean scores of maternal's confidence was higher in Virtual model from conventional group, it did not tend to be different statistically. The same results were also seen in variable of maternal intention, which also proved a significant difference between mean score of maternal intentions in Extended and Virtual models ($p=0.049$) and the conventional group ($p=0.002$). Meanwhile, the mothers' attitude in Virtual model was not different from conventional group ($p=0.549$). These results also indicated that Extended model had highest effectiveness to increasing intention of pregnant mothers.

Through Anova test, its proven that statistically there was a difference in practices of mothers in preventing high risk pregnancies in the three groups because p-value=0.000 (see Table 1). These results also showed that practices of pregnant mothers in preventing high-risk pregnancy between Extended and Virtual models after intervention even though it had increased, but statistically did not show difference significantly ($p=0.831$), while with conventional group proved to be significantly different from Extended model ($p=0.000$) or Virtual model ($p=0.000$). These results clearly showed that both Extended and Virtual models of Antenatal Class interventions were effective in improving mothers' practices in preventing high-risk pregnancies better than conventional model as control group.

Table 1 The Differences Behavior of Mothers (Knowledge, Attitudes, Beliefs, Intentions and Practices) Based on Differences Groups of Antenatal Classes

Variables	Groups of Antenatal Class	Mean	SD	~~df~~	F	Sig.
Knowledge	Extended	31.87	4.07	~~2~~	15.286	0.000*
	Virtual	30.32	3.92			
	Conventional	27.64	4.73			
Attitude	Extended	101.35	7.20	~~2~~	5.233	0.006*
	Virtual	99.39	5.82			
	Conventional	96.36	11.53			
Belief	Extended	42.30	4.49	~~2~~	12.128	0.000*
	Virtual	39.87	3.66			
	Conventional	38.20	5.49			
Intention	Extended	44.90	4.11	~~2~~	6.163	0.003*
	Virtual	42.92	3.91			
	Conventional	42.05	5.52			
Practices of preventing high-risk complication	Extended	259.19	17.88	~~2~~	49.479	0.000*
	Virtual	260.75	12.85			
	Conventional	236.93	13.01			

*Significant with p-value<0,05 through *One Way Anova Test*
Source: Primary Data

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Groups	Knowledge *	Attitude *	Belief *	Intention *	Practices *
Extended	31.87 ± 4.07[ab]	101.35 ± 7.20[a]			
Virtual	30.32 ± 3.92[a]	99.39 ± 5.82[c]			
Conventional	27.64 ± 4.73	96.36 ± 11.53			

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

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Based on this explanation, the results analysis of this research indicated that intervention results of Extended model of AC showed differences with conventional group which became control group for all behavioral dimensions of mothers (5 dimensions) including: knowledge, attitudes, beliefs, intentions and practices of mothers in preventing high-risk pregnancy. While for the Virtual model of AC intervention although the mean score was also higher than conventional group, the significant difference was only in two dimensions, such as dimensions of knowledge and practices of preventing high-risk pregnancy. On the other hand, it was also proven that mothers' knowledge, attitudes and practices of high-risk pregnancy prevention between Extended model and Virtual model did not differ in its results. Therefore, it could be stated that two intervention models were effective to improve maternal behavior in preventing high-risk pregnancies better.

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DISCUSSION

Overall high-risk prevention behaviors change in a positive direction and increase at each stage of measurement carried out. The two intervention models, both Extended and Virtual had been shown effectively in improving maternal behavior better than conventional model as control group. Viewed based on mean score of changes that occur, it was proven that Extended class intervention was higher than Virtual intervention, so it could be said that Extended class intervention was more effective. These results indicate that AC implementation which was strengthened by formation of 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 facilitator (midwife) was the key to increasing knowledge, attitudes, beliefs, intentions and practices of pregnant mothers. Strengthening through mentoring and discussion in WhatsApp groups was an added value for the success of Extended model. Dasuki & Zamani's study in Sub-Saharan Africa showed that using of cellphones could facilitate three abilities of pregnant mothers, 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 success of program achieving its objectives and could be implemented properly. Effectiveness was measure that give an idea of how far target could be achieved and as expected. Antenatal Classes Program was effective when the objectives were achieved, namely increasing knowledge, changing attitudes and behavior of mothers in maternal health. Referring to this, it was proven 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 effectiveness of two intervention models, results of study also indicate a large opportunity to change and increase positive behavior of pregnant mother. It could be seen from description of trend or tendency of assessment results which continues increasing at each stage of measurement. Through good pregnancy care behavior, the risk of dangerous complications could be anticipated and avoided early on. It was in line with determinants of maternal mortality concept from McCarthy & Maine 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 actually increased risk of maternal death.[26]

Although both intervention models were effective improving mother's behavior, Extended class intervention had greater chance of increasing than Virtual class intervention. This difference was thought to be result of different forms of health education given in antenatal class. In Extended class model, health education and counseling were carried out face-to-face between midwife as facilitator and mothers as participants. In Virtual model, although material provided was the same, it was delivered via video sharing by 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 results of study proved that health education with virtual methods had not been able improving behavior such as Extended model. These results strengthen the notion that weaknesses of virtual or online model, especially in its inability developing optimal attitudes due to direct absence of health workers and could not be replaced yet by information technology.

Direct personal interaction in form of face-to-face gave more profound impression when compared to when information was conveyed indirectly through certain media supporting such as video. The deep impression that appears in these interactions could be related to compliance in carrying out certain activities. Some advantages in discussion interactions through the face-to-face direct model include: being able to see directly expressions and responses of other related parties, feelings and emotions were more visible and integrated, discussions become more open so it was more efficient and effective for delivering persuasive messages to change their attitudes, behavior and opinions.[27] Direct interaction also had an impact on satisfaction levels, as Aisyah & Wahyono's study prove 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. Studies in Ghana also showed that pleasant personal interactions, privacy during consultations, attention and availability of facilities significantly affected quality of antenatal care.[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 reasons for answering research findings that proved attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from control group. The opposite condition occurred in Extended class which proved the attitudes, beliefs and intentions of mothers were significantly different from controls. In social psychology theory, strong trust was formed from long and continuous process of social relations. Trust was also formed and developed through learning process that was carried out individually and socially in interaction of various activities with other people. The adhesive that strengthens level of trust was determined by guaranteeing stability of social relations, one of which was obtained through intensity of ongoing contact. This condition was certainly more common in Extended class than Virtual class, between pregnant women as trustors (people who believe) and Midwives or other health workers as trustees (people who could be trusted). The logical consequence of trust level was in behavioral intention of mother 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, interaction between pregnant mothers on regular basis with a structured, scheduled and intense frequency would form a personal social bond in community. In Virtual class, this bond tended not to be formed due to the lack of access to interaction between mothers and health workers so that social and emotional bonds become more difficult to be formed. This dimension of social ties directly affected behavior of mothers because culturally they would be considered as "bad, violated, disrespectful and unethical" when they did not comply with advice of health workers who were considered "people who know" because of their skill and competence. It also the basis for understanding why Extended class intervention had greater chance of getting access to social distance and psychological distance than Virtual class intervention which was currently still considered a new form of learning (new technology).

Although Virtual model was still considered weaker than Extended model, for future period of time, it was possible that Virtual model was the best choice. In era of advances in digital technology, all human activities will always be oriented and based on information-communication technology, including in health services. Therefore, opportunity using virtual or digital technology in learning class for pregnant mothers remain very large. Internet-based information communication technology finally had become main choice to anticipate resource limitations, so in the future using of virtual models would be right solution for health service providers. For millennial mothers, using of social media as medium of health communication about pregnancy and childbirth through Instagram and WhatsApp had become a necessity.[30] Wenerda's study also showed that WA-groups were often used by new parents who discussed many themes, especially on maternal and child health, immunization, advice and support for all members, family planning, breastfeeding, delivery costs and child care.[31]

This understanding was in line with Nieuwboer et-al study on the role of parents in childcare which showed that new technologies (web-based or online)) was opportunity sharing social support, consult with professionals, as well as tools in training to improve parental competencies.[32] Internet and web have also proven to be important sources of information for pregnant women in Australia.[33] Today's technology played a role in providing new definition of proximity, because through internet, proximity was no longer defined as real distance. New parents could find friendship and closeness to communicate through internet and WAG. It was one advantages of using digital.[31] The current Covid-19 pandemic

situation also proved that using virtual models was best choice in health services, including maternal health, although it must be admitted that the results were not optimal. Hasriani & Nurjanna's study in Sidrap regency showed there was no significant differences in behavior change of mothers in antenatal class group using leaflets or with virtual.[21] However, another study by Dasuki & Zamani showed the using of cellular phones have capacity supporting service improvement in maternal health and human development. Factors that influence the use of cellphones by pregnant mothers were mainly personal, social and environmental factors.[24] Another study by Marko et-al in USA also showed that using of virtual applications in prenatal care was also proven to be effective and did not reduce patient and health provider satisfaction.[34] But its certain that through using of virtual applications, pregnant mothers could overcome time constraints when they have to follow antenatal class directly at the same time did not interfere with his routine daily work schedule.

Of five behavioral domains, intentions and practices were domains of behavior that have slowest increase because intentions were influenced by a person's beliefs and beliefs, which it changed take longer time than knowledge. Although the average value was higher, domain of attitudes, beliefs and intentions of mothers in Virtual class were not significantly different from Conventional class due to differences in social distance and psychological distance in form of less formed social bonds in Virtual class than in Extended class. In future developments, Virtual class model had great opportunity to be utilized due to advances in information communication technology based on web, digital and internet so the using of online/virtual methods in health services become a necessity. The virtual model was solution to limited resources of PHC in implementation of Antenatal Classes which was still an obstacle. To anticipate global changes and technology development based on IT, it was necessary preparing the needs for facilities and infrastructure in stages for development of learning methods and assistance for Antenatal Classes using both Extended and or Virtual models through planning mechanism by the Primary Health Center (PHC) and District Health Office.

CONCLUSIONS AND RECOMMENDATION

The model intervention with Extended and Virtual class were able and effective increasing maternal behavior in terms of knowledge, attitudes, beliefs, intentions and practices in preventing high-risk pregnancies, although increasing of Extended model was higher than Virtual model. In subsequent developments and anticipating global changes, the virtual model of AC had great opportunity to be utilized due to advances in web, digital and internet-based technology of information and communication so the use of online/virtual methods in health services become a necessity. Public Health Centers could choose one of the two models according to needs, interest and situation of pregnant mothers in their area. Gradually, the PHC c also could equip required facilities and develop all antenatal class materials in virtual form.

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[medisains] Editor Decision

Agus Santosa <jurnal.umpurwokerto@gmail.com> 23 April 2022 at 12:20
Reply-To: "Ns. Agus Santosa, S.Kep., M.Kep" <ns.agus@gmail.com>
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The following message is being delivered on behalf of MEDISAINS.

XH8h88 Ayun Sriatmi:

We have reached a decision regarding your submission to MEDISAINS, "Behavior Changes of Pregnant Mothers After Extended and Virtual Models of Antenatal Classes Interventions".

Our decision is to: Accept Submission

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Models of antenatal classes for pregnant mothers

Ayun Sriatmi, Sri Suwitri, Zahroh Shaluhiyah, Sri Achadi Nugraheni

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