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Original Article

The Influence of the Partner's Involvement in Antenatal Genetic Group Counseling on Pregnant individuals' Scores on Tests of Vital Knowledge Relating to Pregnancy

Teerawat Anansirikasem, MD[1] Kittipong Kongsomboon, MD, MBA, PhD[2]
Tharangrut Hanprasertpong, MD[1]

[1] Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University, Ongkharak, Nakornnayok, Thailand
[2] Department of Preventive and Social Medicine, Faculty of Medicine, Srinakharinwirot University, Ongkharak, Nakornnayok, Thailand

Address for correspondence Tharangrut Hanprasertpong, MD, Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University, Ongkharak, Nakornnayok 26120, Thailand (e-mail: tharangrut@hotmail.com).

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Abstract

Objective Physicians and other medical providers counsel patients to provide them with most important information and available medical service options. How to provide the most effective antenatal counseling is an important focus among experts. Our study focuses on the influence of the partner's involvement during antenatal genetic group counseling (AGGC). This study aimed to compare the ratio of pregnant individuals who have knowledge score improvement after AGGC, with a focus on pregnant individuals who attend counseling with/without their partner and to identify other possible factors that could influence the knowledge improvement.

Study Design A prospective cohort study was conducted. Pregnant individuals were assessed for their knowledge by using a self-questionnaire prior to and immediately after AGGC.

Results A total of 553 pregnant women were enrolled; 310 and 243 participants attended the AGGC without and with their partner, respectively. The ratio of the participants who increased their overall knowledge score was significantly higher after the AGGC for those who were with partner compared with those without. The medians (Q1–Q3) of the overall knowledge scores before and after the AGGC were 32 (29–36) and 36 (31–39) in the AGGC with their partner, respectively, and 33 (30–36) and 35 (32–39) in the AGGC without their partner, respectively. Knowledge of trisomy-21 screening of all participants got the lowest score and less improvement when compared with other topics.

Conclusion Partner's involvement in the AGGC was associated with a higher ratio of the participants who increased their overall knowledge score when comparing the scores prior to and immediately after the AGGC.

Keywords
- counseling
- knowledge
- partner

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Physicians and other medical providers counsel patients to provide them with most important information and available medical service options. During antenatal period, the ideal counseling focuses on the several obstetric issues regarding the pregnant person and their fetus.[1] In Thailand, the content of antenatal counseling commonly includes the ultrasound screening of the fetus at various stages, trisomy-21 screening or diagnosis, thalassemia carrier screening, appropriate nutritional intake, lifestyle for good maternal and fetal health, and how to prepare for the delivery. Pregnant women in Thailand receive antenatal care from a variety of medical providers and in settings ranging from community health center or clinic to tertiary hospital. Thalassemia screening has generally been implemented as a national policy aiming to reduce and prevent maternal and neonatal mortality and morbidity. Nearly all pregnant individuals are screened for thalassemia carrier status and have their fetus assessed for risk of severe thalassemia including homozygous beta thalassemia, beta-E thalassemia disease, and homozygous alpha-1 disease. The effectiveness of thalassemia screening and morbidity and mortality prevention depend on the gestational age at the first antenatal care visit. The Thai government encourages pregnant individuals to access antenatal care before 12 weeks of gestation. At present, pregnant individuals mainly receive antenatal care knowledge from an antenatal booklet that they receive during the first antenatal visit. For aneuploidy screening, there is no definite guideline. The Royal Thai College of Obstetrics and Gynecologists recommends offering aneuploidy screening to all pregnant individuals. For resource-limited settings, biochemical screening is mainly available, whereas noninvasive prenatal testing is easily accessible in private hospitals or in urban areas. How to provide the most effective antenatal counseling is an important focus among experts. Such counseling can be done one-to-one, in groups, online, and via leaflets, and it involves doctors specializing in maternal fetal medicine, general obstetricians, general practitioners, and/or midwives. Of course, pregnant individuals have different levels of education, family income, and medical awareness, along with various religious affiliations, or perhaps none at all. Our previous study found that both computer-assisted instruction and distributing leaflets are effective counseling methods in terms of improving the parents' knowledge and satisfaction regarding genetic testing process as well as reducing anxiety before the second-trimester genetic amniocentesis.[2]

The present study focuses on the influence of the partner's involvement during antenatal genetic group counseling (AGGC). A previous study from Myanmar reported that the majority of antenatal decision-making was influenced by the husband.[3] The influence of the partner's involvement on the pregnant individuals' level of knowledge after antenatal counseling has not previously been evaluated in Thailand. Our study was conducted to precisely assess this factor. The primary objective was to compare the ratio of pregnant individuals with increased knowledge of key medical issues when the partner was involved in the counseling. The second objective was to identify other possible factors affecting the increased scores. The third goal was to present the scores in published form.

Materials and Methods

This prospective cohort observational study was conducted among pregnant individuals who were scheduled for AGGC within 1 to 2 weeks after the first visit at the Antenatal Outpatient Unit, Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University in Nakornnayok, Thailand, between May and December 2021. Our AGGC was routinely provided for all pregnant individuals every Friday. Pregnant individuals attended AGGC with or without their partner depending on their convenience. Exclusion criteria were fetal malformation detected before the AGGC, pregnant individuals who could not read or write Thai, and pregnant individuals who declined participation. The study was approved by the institute's Ethics Committee (approval number: SWUEC/E-471/2563) and was registered with the Thai Clinical Trials Registry (TCTR; registration number: 20210324002). Consent was obtained from all participants. During AGGC, the pregnant individuals who attended the AGCC with their partner could discuss with their partner as they wished. Before AGGC started, all received a self-administrated questionnaire and were asked to complete that questionnaire by themselves without partner consultation twice—prior to and immediately after attending the AGGC—which was conducted face-to-face in group sessions using PowerPoint.

The questionnaire consisted of five items. Each item consisted of 10 true-or-false questions (total score = 50) that were described as follows: (1) general knowledge focused on general obstetric health care such as nutrition, exercise, vaccinations, bowel health, sexual intercourse, sleep, and relaxation; (2) ultrasound knowledge focused on information about antenatal ultrasonographic examinations, including fetal structural abnormality detection rate, accuracy, limitations, and safety; (3) trisomy-21 knowledge focused on various methods of prenatal trisomy-21 screening and diagnosis, such as the individual trisomy-21 risk of each individual, the screening and diagnostic–procedures options, the limitations of the screening test, and any diagnostic, procedures-related risks; (4) regarding thalassemia, we focused on basic knowledge of this disease, the carrier incidence in Thailand, the screening and diagnostic processes, and the adverse pregnancy outcomes if a fetus is affected by severe thalassemia disease; and (5) delivery knowledge focused on the mode of delivery and associated risks and benefits, including immediate and long-term risks of cesarean section. Finally, the visual analogue scales were examined to subjectively demonstrate the level of the participant's attitudes and the level of cost-effectiveness perception regarding the usefulness of attending AGGC at the last part of questionnaire. Our questionnaire was created by our researchers' team specifically for this study. The validity of the questionnaire was evaluated by six Maternal Fetal Medicine staff experts in the Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot

University. The content validity was calculated as 96%. Using Cronbach's alpha coefficient, the reliability of the questionnaire was calculated from a pilot study with 30 volunteers at 0.80. The difficulty and discrimination were calculated as 0.7 and 0.26, respectively. The content of the slides and the counseling scriptwere created by the Maternal Fetal Medicine staff at the Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University. The information that corresponding to the questionnaire was included in the presentation. Each AGGC took approximately 30 minutes with the same script with same topic presentation sequence (general knowledge, ultrasound knowledge, trisomy-21 knowledge, thalassemic knowledge, and delivery knowledge, respectively). The AGGC was conducted by a second-year resident (T.A.) in the Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University, under the Royal Thai College of Obstetricians and Gynecologists' curriculum. The standardized presentation was developed by the team of the Maternal Fetal Medicine staff at the Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University. Everyone in the AGGC was given the opportunity to ask questions at the end of the counseling session. The participants' demographic data and possible factors influencing knowledge of key medical factors were collected, including maternal age, occupation, race, religion, education, gravida, parity, history of abortion, history of receiving information about genetic or antenatal care (previous attendance in genetic or antenatal counseling or reading relevant information by themselves), history of receiving preconceptional health service (laboratory testing or folic supplements), and history of child with anomalies or genetic disease.

The required sample size was estimated by using the two independent means formula of overall knowledge score in each group, with the expectation that the participants had attended the AGGC either with or without their partner at an equal 1:1 ratio. From a pilot study, we found that the mean overall knowledge scores among those who attended the AGGC with or without their partner were 29.13 and 30.46, respectively. The standard deviations for the overall knowledge scores of those who attended the AGCC with or without their partner were 5.04 and 5.68, respectively. To achieve an alpha of 0.05, a beta of 0.20, and allowing for 5% lost or missing data, it was determined that at least 538 participants were required.

The demographic and clinical characteristics of the patients within each group were examined by tabulating the percentages or medians and interquartile range and comparing the differences between both groups by using the Mann–Whitney *U*-and chi-square test. Changes in their overall knowledge scores were categorized into increased or no increase, according to the differences in those scores prior to and immediately after the AGCC. An increase was defined as the difference in the overall knowledge score, prior to and immediately after the AGCC, being more than or equal to 1, whereas no increase was defined as the difference between the overall knowledge score, prior to and immediately after the AGCC as being less than or equal to 0. The ratio of the participants who had a score increase or no increase were compared using the chi-square test according to their demographic data, including if they had attended the AGCC either with or without their partner. We used logistic regression analysis to identify possible factors behind the score improvements to estimate the odds ratios (ORs) and their 95% confidence intervals (CIs). All possible predictive variables were initially included. Possible predictive variables identified from p-value of <0.25 in univariate analysis. A p-value of <0.05 in multiple logistic regression analysis was considered statistically significant. Finally, we used Wilcoxon's signed-rank test to compare the knowledge score before and after AGGC, according to group with and without partner's involvement. A p-value < 0.05 was considered statistically significant.

Results

A total of 553 pregnant individuals were enrolled; 310 and 243 participants attended the AGGC without or with their partner, respectively. All enrolled participants completed the questionnaire twice: prior to and immediately after attending the AGGC. All participants who attended without a partner had a partner, but they were unavailable to attend AGGC. The participants' demographic and clinical data were similar in the two groups, except for the gestational age when they attended the AGGC (►**Table 1**). Participants in the AGGC without a partner attended at a gestational age significantly earlier than those who were with their partner. The medians (Q1–Q3) of the overall knowledge scores before and after the AGGC were 32 (29–36) and 36 (31–39) in the AGGC with their partner, respectively, and 33 (30–36) and 35 (32–39) in the AGGC without their partner, respectively.

Table 1 Patients' demographic characteristics ($n = 553$)

Characteristics	Without partner's involvement ($n = 310$)	With partner's involvement ($n = 243$)	Total ($n = 553$)	p-Value
Age (y), median (Q1–Q3)	28 (25–33)	28(24–32.5)		0.625[b]
Religion, *n* (%)				0.023[a]
• Buddhist	251 (58.6)	177 (41.4)	428 (100)	
• Muslim and others	59 (47.2)	66 (52.8)	125 (100)	

(*Continued*)

Table 1 (*Continued*)

Characteristics	Without partner's involvement ($n = 310$)	With partner's involvement ($n = 243$)	Total ($n = 553$)	*p*-Value
Occupation, *n* (%)				0.056[a]
• Employee	84 (53.5)	73 (46.5)	157 (100)	
• Housewife	54 (72)	21 (28)	75 (100)	
• Government officer	56 (51.9)	52 (48.1)	108 (100)	
• Agriculture	7 (58.3)	5 (41.7)	12 (100)	
• Other	109 (54.2)	92 (45.8)	201 (100)	
Living place, *n* (%)				0.097[a]
• Nakhonnayok–Pathumthani	263 (57.7)	193 (42.3)	456 (100)	
• Bangkok and others	47 (48.5)	50 (51.5)	97 (100)	
Level of education, *n* (%)				0.412[a]
• Less than primary school–bachelor's degree	297 (55.7)	236 (44.3)	533 (100)	
• Higher than a bachelor's	13 (65)	7 (35)	20 (100)	
Maternal income, *n* (%)				0.358[a]
• Less than to 30,000 baht per month	297 (55.7)	236 (44.3)	533 (100)	
• More than 30,000	13 (65)	7 (35)	20 (100)	
Nulliparous, *n* (%)				0.123[a]
• Yes	232 (55)	190 (45)	422 (100)	
• No	78 (59.5)	53 (40.5)	131 (100)	
Nulligravida, *n* (%)				0.064[a]
• Yes	119 (52)	110 (48)	229 (100)	
• No	191 (59)	133 (41)	324 (100)	
History of abortion				0.554[a]
• Yes	99 (50.8)	96 (49.2)	195 (100)	
• No	211 (58.9)	147 (41.1)	358 (100)	
Gestational age, *n* (%)				0.036[a]
• First trimester	61 (58.7)	43 (41.3)	104 (100)	
• Second to third trimester	249 (55.5)	200 (44.5)	449 (100)	
Level of husband's education, only in with partner gr *n* (%)				0.897[a]
• Less than primary school– bachelor's degree	1 (0.4)	239 (99.6)	240 (100)	
• Higher than bachelor's degree	0 (0)	4 (100)	4 (100)	
Previous genetic counseling *n* (%)				0.062[a]
• Yes	278 (57.6)	205 (42.4)	483 (100)	
• No	32 (45.7)	38 (54.3)	70 (100)	
Preconceptional care, *n* (%)				0.771[a]
• Yes	194 (55.6)	155(44.4)	349 (100)	
• No	116 (56.9)	88(43.1)	204 (100)	
Previous child with anomaly or genetic disorder, *n* (%)				0.072
• Yes	15 (41.7)	21 (58.3)	36 (100)	
• No	295 (57.1)	222 (42.9)	517 (100)	
VAS attitude, median (Q1–Q3)	10 (9.5–10)	10 (9.4–10)		0.090[b]
VAS cost-effective, median (Q1–Q3)	10 (8.8–10)	10 (8.5–10)		0.097[b]

Abbreviations: Q, quartile; VAS, visual analogue scale.
[a]Mann–Whitney *U*-test.
[b]Chi-square test.

►Table 2 presents the ratio of the participants who had an overall knowledge score increase and those who had no increase after the AGGC, according to the clinical factors. The number of participants with an increased overall knowledge score was significantly higher among those who attended the AGGC with their partner. ►Table 3 presents the logistic regression analysis for factors that influenced ratio of the participants who had an overall knowledge score increase and those who had no increase after the AGGC. No variable apart from attending the AGGC with or without one's partner was identified as influencing the ratio (crude OR: 1.605, 95% CI: 1.123–2.293, $p = 0.009$; adjusted OR: 1.564, 95% CI: 1.091–2.244, $p = 0.015$). Lastly, ►Table 4 presents the comparison of median (Q1–Q3) of the overall knowledge score and the scores categorized by each topic before and after AGGC, according to group with and without partner's involvement. The medians (Q1–Q3) of the overall knowledge score of all participants were 33 and 35 scores prior to and immediately after the AGGC, respectively. The median of the knowledge score regarding trisomy-21 was the lowest and did not improve after the AGGC.

Discussion

Patients' understanding of essential medical information is very important. A previous study found that antenatal counseling enhanced pregnant individuals' obstetric knowledge and their awareness of preventable complications related to pregnancy and childbirth.[4] Our study is the first to evaluate the influence of the partner's involvement in AGGC on the knowledge score increase in Thailand, a developing country. We found that pregnant women who attended the

Table 2 Ratio of the participants who have an overall knowledge score increase versus not increase after antenatal genetic group counseling, according to the clinical factors

Factor		Not increase	Increase	Total	Prevalence rate ratio	95% CI	*p*-Value[a]
Group	With partner	72 (29.6)	171 (70.4)	243 (100)	1.179	1.043–1.333	0.009
	Without partner	125 (40.3)	185 (59.7)	310 (100)			
Religion	Buddhist	159 (37.1)	269 (62.9)	428 (100)	0.903	0.788–1.035	0.166
	Muslim and others	38 (30.4)	87 (69.6)	125 (100)			
Living place	Nakhonnayok–Pathumthani	164 (36)	292 (64)	456 (100)	0.971	0.828–1.137	0.717
	Bangkok and others	33 (34)	64 (66)	97 (100)			
Level of education	Less than a bachelor's degree	190 (35.6)	343 (64.4)	533 (100)	0.990	0.713–1.374	0.953
	Higher than a bachelor's degree	7 (35)	13 (65)	20 (100)			
Maternal income	Less than to 30,000 baht per month	156 (37)	266 (63)	422 (100)	0.917	0.800–1.052	0.237
	More than 30,000	41 (31.3)	90 (68.7)	131 (100)			
Nulliparous	Yes	74 (32.3)	155 (67.7)	229 (100)	1.091	0.964–1.235	0.172
	No	123 (38)	201 (62)	324 (100)			
Nulligravida	Yes	62 (31.8)	133 (68.2)	195 (100)	1.095	0.966–1.241	0.165
	No	135 (37.7)	223 (62.3)	358 (100)			
Abortion	Yes	38 (36.5)	66 (63.5)	104 (100)	0.983	0.866–1.196	0.829
	No	159 (35.4)	290 (64.6)	449 (100)			
Gestational age	First trimester	60 (31.6)	130 (68.4)	190 (100)	1.099	0.969–1.246	0.151
	Second to third trimester	137 (37.7)	226 (62.3)	363 (100)			
Previous genetic counselling	Yes	177 (36.6)	306 (63.4)	483 (100)	0.887	0.754–1.044	0.187
	No	20 (28.6)	50 (71.4)	70 (100)			
Preconceptional care	Yes	131 (37.5)	218 (62.5)	349 (100)	0.923	0.815–1.046	0.219
	No	66 (32.4)	138 (67.6)	204 (100)			
Previous child with anomaly or genetic disorder	Yes	9 (25)	27 (75)	36 (100)	1.179	0.965–1.439	0.169
	No	188 (36.4)	329 (63.6)	517 (100)			

[a]Chi-square test.

Table 3 Possible factors affecting an improved score after antenatal genetic group counseling

Factor		Crude OR	95% CI	*p*-Value	Adjusted OR[a]	95% CI	*p*-Value
Maternal income	More than 30,000 baht per month	1.287	0.847–0.237	0.237	1.362	0.890–2.085	0.155
	Less than to 30,000	1			1		
Religion	Muslim and others	1.353	0.882–2.077	0.167	1.339	0.866–2.073	0.190
	Buddhist	1			1		
Group	With partner	1.605	1.123–2.293	0.009	1.564	1.091–2.244	0.015
	Without partner	1			1		
Nulligravida	No	1.299	0.897–1.879	0.166	1.253	0.862–1.820	0.237
	Yes	1			1		

Abbreviations: CI, confidence interval; OR, odds ratio.
[a]Adjusted with maternal income, level of maternal education, religion, group, history of abortion, gestational age (trimester).

Table 4 Comparison of median (Q1–Q3) of the knowledge score before and after antenatal genetic group counseling, according to group with and without partner's involvement

	Without partner's involvement ($n = 310$)			With partner's involvement ($n = 243$)		
	Before	After	*p*-Value[a]	Before	After	*p*-Value[a]
Overall score	33 (30–36)	35 (32–39)	<0.001	32 (29–36)	36 (31–39)	<0.001
General knowledge	8 (7–8)	8 (7–9)	<0.001	7 (6–8)	8 (7–9)	<0.001
Ultrasonographic knowledge	6 (5–7)	7 (6–8)	0.008	6 (5–7)	7 (6–8)	<0.001
Trisomy 21 knowledge	6 (5–7)	6 (5–7)	0.279	6 (5–6)	6 (5–7)	0.002
Thalassemia knowledge	7 (6–8)	8 (6–9)	0.052	7 (6–8)	7 (6–9)	<0.001
Delivery knowledge	7 (5–8)	7 (6–8)	<0.001	6 (5–7)	7 (6–8)	<0.001

[a]Wilcoxon's signed-rank test.

AGGC with their partner got higher scores. We hypothesized that attending the AGGC with their partner may have reduced women's stress and could be an indicator of other important factors like their overall support system. Minimized stress may enhance one's ability to absorb new knowledge. Our finding is similar to one relating to antenatal counseling regarding the human immunodeficiency virus (HIV). That study found that couple-counseled pregnant individuals were more likely to accept HIV testing than those who were counseled alone, and with no significant difference in reported adverse events, including physical violence, divorce, and verbal abuse. Moreover, compliance with antiretroviral drug prescription among the group counseled as couples was better than among those who were counseled alone.[5] The effects of counseling on the partner's stress regarding pregnancy and childbirth complications have been shown in a previous study.[6] There has also been a study of partners' involvement in such counseling in a rural community in Tanzania. In that case, it was found that a small proportion of partners had a good level of knowledge of obstetric danger signs, preparations for childbirth, and readiness to deal with complications. Consequently, the community advocated the partner's involvement in such counseling.[7]

The advantage of the present study is its focus on antenatal counseling. We included several important antenatal topics. Enhanced knowledge will help pregnant individuals and their family to make better decisions involving obstetric care in both the antenatal and delivery stages. Moreover, our study included a new, updated questionnaire that was carefully tested for validity, reliability, difficulty, and discrimination. However, our study focused on a change in score by only 1 point and many not reflect less knowledge but rather simple mistakes and may explain the lower score for some participants. A greater change in the score may be more relevant for interpretation. Moreover, knowledge in itself is not as important as how it can be applied by the pregnant individuals to improve pregnancy outcome for both them and their babies. Higher knowledge score on a questionnaire may not necessarily reflected better antenatal care decision. Our study does not directly demonstrate this point. This is a disadvantage of our study.

Among the possible factors, only partner involvement influenced the overall knowledge scores. This is in contrast to our previous study of counseling before second-trimester genetic amniocentesis, where several factors were shown to influence the effectiveness of second-trimester genetic amniocentesis counseling, such as the counseling methods, the educational level of the pregnant individuals, and her previous experience with genetic counseling.[2] The different of these findings may have resulted from the different of components of knowledge between both studies and the counseling styles. Some topics, such as general obstetric health care

and delivery, may be too basic, depending on the patient's educational level and experience with counseling. This is in contrast to a difficult and complicated topic such as trisomy-21 screening. The knowledge score improvement regarding trisomy-21 screening was limited among all the participants. It may be because some pregnant individuals did not retain information about trisomy-21 screening if it was not applicable in case of AGGC attended after they had undergone and/or declined prenatal screening already. This result is similar to that of a previous study in Thailand that found that most pregnant Thais have an inadequate knowledge of the trisomy-21 screening test. Though most of them had a positive attitude, their knowledge was very limited especially before the education session or material provided.[8] Attention to other non-measured variables in the regression model that included maternal income, religion, and nulligravida. We hypothesized that at present, Thai government provided welfare support for pregnant women in Thailand in nearly all medical services involving pregnancy. As a result, it could be reduced the participant's concern and the biased perception of various information in need of payment. For religion, it was very interesting and lucky for our country. Although there were the differences of religion, but the lifestyle and various medical beliefs were quite similar whether to fetal abnormalities screening and termination in cases of fetal malformation detected. We believed that this reason could be explained the lack of effect of religion on AGGC. Ultimately, despite any pregnancies, our pregnant women still concerned and gave an importance to antenatal care. Thus, their perceptions of AGGC were not influenced by their gravidity.

In regard to the counseling style, our study involved the group, face-to-face style and PowerPoints presentation. This is different from a previous study that compared video-assisted instruction (VAI) with the face-to-face method. In that one, it was found that VAI was better in terms of knowledge improvement, time consumption, and cost saving.[9] The top advantage of VAI is repeatability without staff input required. Based on our finding, we recommend that the partner should be invited to the AGGC session. Attention on the topic presentation sequence, the standardized presentation performed with same script and same topic sequence (in order of general knowledge, ultrasonographic knowledge, trisomy-21 knowledge, thalassemic knowledge, and delivery knowledge topic). The sequence of presentation may have influenced the pregnant individuals' knowledge score in each topic. Our study did not evaluate this. It was a limitation of our study and planned a further study. Regarding the question and answer at the end of AGGC session, it was possible to be a confounding among session. Anyway, most of our participants did not ask any question accompanies with our randomly appointed the participant (similar to cluster sampling) into the AGCC with unknown of their partner's involvement status. Thus, we thought that the effect was too low until we did not analyze the result per session.

Conclusion

We have shown that partner's involvement is a factor in associating pregnant individuals' scores. Also, their knowledge of trisomy-21 screening got the lowest score among the survey topics. This needs to be focused on and improved.

What's Already Known?

- Computer-assisted instruction and distributing leaflets are effective counseling methods in terms of improving the patients' knowledge and satisfaction before the second-trimester genetic amniocentesis in Thailand.

What Does This Study Add?

- Partner's involvement in the antenatal genetic group counseling (AGGC) positively influenced the ratio of the participants who had increased their overall knowledge score when comparing the scores prior to and immediately after the AGGC with participants who had attended without their partner.
- Knowledge of trisomy-21 screening in most pregnant Thais was very limited, especially before the education session and also less improvement when compared with other survey topics such as ultrasonographic, thalassemia, and delivery topics.

How This Study Could Improve Clinical Practice?

- Our knowledge supported the health care providers by suggesting the partners to join the antenatal counseling with the pregnant individuals. Partner's involvement positively improved the pregnant individuals' knowledge.

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Conflict of Interest
None declared.

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