

# The Influence of the Biological Father's Participation in Antenatal Genetic Group Counseling on Pregnant Females' Scores on Tests of Vital Knowledge Relating to Pregnancy

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## Research Article

**Keywords:** knowledge score, paternal attendance, genetic counseling

**Posted Date:** April 11th, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-1510941/v1>

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# Abstract

**Background:** Antenatal counseling has increased females' awareness of preventable complications related to pregnancy and childbirth. This study was conducted to compare the ratio of pregnant women who have knowledge score improvement after prenatal genetic group counseling, with a focus on pregnant women who attend counseling with/without their partner, to identify other possible factors that influence the knowledge improvement and to evaluate the knowledge score regarding common genetic diseases such as Thalassemia and trisomy 21 and their knowledge of pregnancy care such as ultrasonographic structural screening and cesarean delivery.

**Methods:** A prospective cohort study was conducted. Pregnant women who attended antenatal genetic group counseling (AGGC) were assessed for their knowledge level by using a self-questionnaire prior to and immediately after genetic group counseling.

**Results:** 553 pregnant women were enrolled. 310 and 243 participants attended the AGGC without and with their partner, respectively. The ratio of the participants who had increased their overall knowledge score was significantly higher in the AGGC for those who were with their partner than without. The improvement was not significantly different when other clinical factors were considered. No variable apart from the AGGC with or without one's partner was identified as influencing the improvement in overall knowledge. The median of the knowledge score regarding trisomy 21 among all the participants was lower than for the other topics and did not improve after the AGGC.

**Conclusion:** Paternal involved in the AGGC positively influenced the pregnant females' knowledge score when comparing the scores prior to and immediately after the AGGC.

**Trial registration:** Srinakharinwirot University (SWUEC/E-471/2563) and Thai Clinical Trials Registry (TCTR 20210324002)

## Background

Physicians and other medical providers counsel patients to provide them with the most important information and advice. During the antenatal period, the ideal counseling focuses on the essential obstetric issues regarding the pregnant person and her fetus.<sup>1</sup> In Thailand, the content of antenatal counseling commonly includes the structure of the fetus at various stages; trisomy-21 screening or diagnosis; thalassemia-carrier screening; appropriate nutritional intake; the lifestyle for good maternal and fetal health; and how to prepare for the delivery. How to conduct the most effective antenatal counseling is an important focus among the 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 females 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 patients' knowledge and satisfaction, as well as in reducing pain and anxiety before the second-trimester genetic amniocentesis here in Thailand.<sup>2</sup>

The present study focuses on the influence of the biological father'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.<sup>3</sup> The influence of the male's role on the pregnant female's level of knowledge after antenatal counseling has not previously been evaluated. Our study was conducted to precisely assess this factor. The primary objective was to compare the ratio of pregnant females with their increased knowledge of key medical issues as a result of having the biological father being involved in the counseling. The second objective was to identify the other possible factors affecting such an enhancement. The third goal was to present the scores in published form.

## Methods

This prospective cohort observational study was conducted among pregnant females who were scheduled for AGGC at the Antenatal Outpatient Unit, Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University in Bangkok, Thailand, between May and December, 2021. Exclusion criteria were fetal malformation detected before the AGGC and pregnant individuals who could not read or write Thai and pregnant women who denied to participation. The study was approved by the institute's ethics committee (SWUEC/E-471/2563) and was registered with the Thai Clinical Trials Registry (TCTR 20210324002). Informed consent from all the participants was obtained. All of them received a self-administrated questionnaire and were asked to complete that questionnaire two times – prior to and immediately after attending the AGGC, which was conducted face-to-face in group sessions using PowerPoint. The content of the slides and the counseling script were created by the team of the Maternal Fetal Medicine staff at the Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University. Crucial information for pregnant females was included in the questionnaire. Each AGGC took approximately 30 minutes. The AGGC was conducted by a second-year resident (the first author listed in this study) in the Department of Obstetrics and Gynecology, Faculty of Medicine, Srinakharinwirot University, under the Royal Thai College of Obstetricians and Gynecologists' curriculum. The counselor was standardized 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 end of the counseling section. The participants' demographic data and possible factors influencing her knowledge of key medical factors were collected, including her 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 pre-conceptional health service (laboratory testing or folic supplements), and history of child anomalies or genetic disease. Visual analogue scales (VAS) were examined to subjectively demonstrate the level of the participant's attitudes and the level of cost-effectiveness perception regarding the AGGC.

The questionnaire consisted of five items. Each item consisted of 10 true-or-false questions (total score = 50) that were described as follows: (i) General knowledge focused on general obstetric health care such as nutrition, exercise, vaccinations, defecation, sexual intercourse, sleep, and relaxation. (ii) Ultrasonographic knowledge focused on information about antenatal ultrasonographic examinations, including a fetal-structural-abnormality-detection rate, accuracy, limitations, and safety. (iii) Trisomy-21 knowledge focused on various methods of prenatal trisomy-21 screening and diagnosis, such as the individual trisomy-21 risks of

each individual, the screening and diagnostic-procedures options, the limitations of the screening test, and any diagnostic, procedures-related risks. (iv) As regards thalassemia, we focused on their 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. (v) Delivery knowledge focused on the route of delivery preparation, the benefits and risks of each delivery route, especially involving immediate and long-term cesarean delivery-related risks. Our questionnaire was created by our researchers' team especially 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, Srinakharinworot 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 required sample size was estimated by using the two-independent-means formula, 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 AGGC 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 (IQR) 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, while 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. Then, the ratio of the participants who had a score increase or no increases were compared using the Chi-square test according to their demographic data, including that they had attended the AGCC either with or without their partner. We used logistical-regression analysis to identify possible factors behind the score improvements to estimate the odds ratios and their 95% confidence intervals (CI). A p value < 0.05 was considered statistically significant.

## Results

Five hundred and fifty-three pregnant individuals were enrolled. 310 and 243 participants attended the AGGC without or with their partner, respectively. Before the AGGC, the participants' demographic and clinical data were similar in the two groups, except for their 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 median (IQR) of the overall knowledge scores before and after the AGGC were 32 (29–36) and 36 (31–39) in the AGGC with their partner and 36 (31–39) and 35 (30–36) in the AGGC without their partner, respectively.

**Table 1:** Patients' demographic characteristics (n=553)

Characteristics	Without husband (n=310)	With husband (n=243)	Total (n=553)	P-value
Age (years), median (IQR)	28 (25-33)	28(24-32.5)		0.625**
Religion, n(%)				0.023*
• Buddhist	177 (41.4)	251 (58.6)	428 (100)	
• Muslim and others	66 (52.8)	59 (47.2)	125 (100)	0.056*
Occupation, n(%)				
• employee				
• housewife	84 (53.5)	73 (46.5)		
• government officer				
• agriculture	54 (72)	21 (28)	157 (100)	
• other	56 (51.9)	52 (48.1)	75 (100)	
Living place, n(%)				
• Nakhonnayok-Pathumthani	7 (58.3)	5 (41.7)	108 (100)	
• Bangkok and others	109 (54.2)	41.7 (92)		
Level of education, n (%)				
• Less than primary school-bachelor's degree	263 (57.7)	193 (42.3)	12 (100)	0.097*
• Higher than a bachelor's			201 (100)	
Maternal income, n(%)	47 (48.5)	50 (51.5)		
• Less than to 30,000 baht per month				0.412*
• More than 30,000			456 (100)	
Nulliparous, n (%)	297 (55.7)	236 (44.3)	97 (100)	
• Yes				
• No	13 (65)	7 (35)		
Nulligravida, n (%)				
• Yes			533 (100)	0.358*
• No	297 (55.7)	236 (44.3)		
History of abortion				
• Yes	13 (65)	7 (35)	20 (100)	
• No				0.123*
Gestational age, n(%)				
• First trimester	232 (55)	190 (45)		
• Second to third trimester	78 (59.5)	53 (40.5)	533 (100)	
Level of husband's education, only in with partner gr n (%)			20 (100)	0.064*
• Less than primary school – bachelor's degree	119 (52)	110 (48)		
• Higher than bachelor's degree	191 (59)	133 (41)	422 (100)	
Previous genetic counseling n (%)				0.554*
• yes			131 (100)	
• no	99 (50.8)	96 (49.2)		
Preconceptional care, n(%)	211 (58.9)	147 (41.1)		

yes			229 (100)	0.036*
no	61 (58.7)	43 (41.3)		
Previous child with anomaly or genetic disorder, n (%)	249 (55)	200 (44.5)	324 (100)	0.897*
• yes			195 (100)	
• no	1 (0.4)	239 (99.6)		
VAS attitude, median (IQR)			358 (100)	
VAS cost-effective, median (IQR)	0 (0)	4 (100)		
			104 (100)	0.062*
	278 (57.6)	205 (42.4)		
	32 (45.7)	38 (54.3)	449 (100)	
	194 (55.6)	155(44.4)		0.771*
	116 (56.9)	88(43.1)	240 (100)	
	15(41.7)	21(58.3)	4 (100)	0.072
	295(57.1)	222(42.9)		
	10 (9.5-10)	10 (9.4-10)	483 (100)	0.090**
	10 (8.8-10)	10 (8.5-10)	70 (100)	0.097**
			349(100)	
			204(100)	
			36(100)	
			517(100)	

\*Mann-Whitney U test    \*\* Chi-Square test

IQR: Inter-quartile range

VAS: visual analogue scale

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. The improvement was not significantly different when considering other clinical factors. Table 3 presents the logistic regression analysis for factors that may have influenced the overall knowledge scores. However, no variable apart from attending the AGGC with or without one's partner was identified as influencing the score (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).

**Table 2:** Ratio of the participants who have an overall knowledge score increase vs. no increase after AGGC, according to the clinical factors

Factor		Not increase	Increase	Total	Prevalence rate ratio	95% CI	p-value*
Group	With partner	72(29.6)	171(70.4)	243(100)	1.179	1.043-1.333	0.009
	Without partner	125(40.3)	85(59.5)	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	Nakhon nayok-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)				
Previous genetic	Yes	177(36.6)	306(63.4)	483(100)	0.887	0.754-1.044	0.187

counselling	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)			

\* Chi-Square test

Table 3  
Possible factors affecting an improved score after AGGC

Factor		Crude OR	95%CI	P-value	Adjusted OR*	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		
*Adjust with maternal income, level of maternal education, religion, group, history of abortion, gestational age (trimester)							

Lastly, Table 4 presents the median (IQR) of the overall knowledge score and the scores categorized as each topic of all the participants. The median (IQR) of the overall knowledge score of all participants was 33 and 35 scores prior to and immediately after the AGGC. The median of the knowledge score regarding trisomy 21 was the lowest and did not improve after the AGGC.

Table 4  
Median (interquartile range) of the knowledge score of all participants (n = 553)

	Before	after
Overall score	33 (30–36)	35 (32–39)
General knowledge	8 (6–8)	8 (7–9)
Ultrasonographic knowledge	6 (5–7)	7 (6–8)
Trisomy 21 knowledge	6 (5–7)	6 (5–8)
Thalassemia knowledge	7 (5–7)	8 (6–9)
Delivery knowledge	6 (6–8)	7 (6–8)

## Discussion

Patients' understanding of essential medical information is very important. A previous study found that antenatal counseling enhanced pregnant people's obstetric knowledge and their awareness of preventable complications related to pregnancy and childbirth.<sup>(4)</sup> Our study is the first to evaluate the influence of the biological father's participation in AGGC on the knowledge-score increases in Thailand, a developing country. We found that pregnant women who attended the AGGC with their partner got higher scores. We hypothesized that attending the AGGC with their partner may have reduced these women's stress. 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 females 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 couple-counseled females group was better than among those who were counseled alone.<sup>(5)</sup> The effects of counseling on the fathers' stress regarding pregnancy and childbirth complications have been shown in a previous study.<sup>(6)</sup> 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 participation of the male partner in such counseling.<sup>(7)</sup>

The advantage of the present study is its focus on antenatal counseling. We included several important antenatal topics. Enhanced knowledge will help pregnant females 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.

Among all the possible factors, only paternal involvement influenced the overall knowledge scores. This distinguishes our study from previous ones. There are several factors which influenced the effectiveness of second-trimester genetic amniocentesis counseling, such as the counseling methods, the educational level of the pregnant person, and her previous experience with genetic counseling.<sup>(2)</sup> This 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. 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. This result is similar to that of a previous study in Thailand which 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.<sup>(8)</sup>

As regards the counseling style, our study involved the group, face-to-face style and PowerPoints with an explanatory script. This is different from a previous study which 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.<sup>(9)</sup> The top advantage of VAI is repeatability without human needed. Pregnant individuals attending antenatal counseling with their partner using the repeatable counseling style is the most effective method. We plan to prove our hypothesis in a future study.

## Conclusions

We have shown that paternal involvement is the sole factor responsible for enhancing the pregnant patients' scores. Also, their knowledge of trisomy-21 screening got the lowest score among the survey topics. This needs to be focused on and improved. Finally, several counseling sessions are more effective than a single one.

## Abbreviations

AGGC: antenatal genetic group counseling

VAS: Visual analogue scales

CI: confidence interval

VAI: video-assisted instruction

HIV: human immunodeficiency virus

## Declarations

### Ethics approval and consent participate

Srinakharinwirot University ethics committee (SWUEC/E-471/2563)

Thai Clinical Trials Registry (TCTR 20210324002)

Informed consent from all the participants was obtained.

All methods were performed in accordance with the relevant guidelines and regulations.

## Availability of data and materials

The dataset used and/or analysed during the current study are available from the corresponding author on reasonable request

## Competing interest

The authors declare that they have no competing interest

## Funding

Srinakharinwirot University

## Authors' contributions

**TH:** design of the work, proposal development, grant application, acquisition, analysis, interpretation of data, manuscript preparation

**TA:** design of the work, proposal development, acquisition, analysis, interpretation of data, manuscript preparation

**KK:** proposal development, analyzed

**All authors read and approved the final manuscript**

## Acknowledgements

The authors would like to thank International College for Sustainability, Srinakharinwirot University for English editorial assistance.

## References

1. Stembalska A, Slezak R, Pesz K, et al. Prenatal diagnosis - principles of diagnostic procedures and genetic counseling. *Folia Histochem Cytobiol* 2007; 45 Suppl 1:S11-6.
2. Hanprasertpong T, Rattanaprueksachart R, Janwadee S, Geater A, Kor-anantakul O, Suwanrath C, et al. Comparison of the effectiveness of different counselling methods before second trimester genetic amniocentesis in Thailand. *Prenat Diagn.*2013;33:1189–93.
3. Wai KM, Shibanuma A, Oo NN, Fillman TJ, Saw YM, Jimba M, et al. Are husbands involving in their spouses' utilization of maternal care services?: A cross-sectional study in Yangon, Myanmar. *PLoS One.*2016;10(12): e 0144135. doi10.1371/journal.pone.0144135.
4. Jennings L, Yebadokpo AS, Affo J, Agbogbe M. Antenatal counselling in maternal and newborn care: use of job aids to improve healthcare worker performance and maternal understanding in Benin. *BMC Pregnancy and Childbirth.*2010;10:75.doi: 10.1186/1471-2393-10-75.
5. Semrau K, Kuhn L, Vwalika C, Kasonde P, Sinkala M, Kankasa C, et al. Women in couples antenatal HIV counseling and testing are not more likely to report adverse social events. *AIDS.*2005;19:603–9.

6. Mohammadpour M, Mohammad-Alizadeh S, Malakouti J, Mirghafourvand M. The effect of counseling on fathers' stress and anxiety during pregnancy: a randomized controlled clinical trial. *BMC Psychiatry*. 2021;21(208).doi: 10.1186/s12888-021-03217-y
7. August F, Pembe AB, Mpenbeni R, Axemo P, Darj E. Men's knowledge of obstetric danger signs, birth preparedness and complication readiness in rural Tanzania. *PLoS ONE*. 2015;10(5):e0125978. Published online 2015 May 7. doi:10.1371/journal.pone.0125978
8. Pruksanusak N, Suwanrath C, Kor-Anantakul O, Prasartwanakit V, Leetanaporn R, Suntharasaj T, et al. A survey of the knowledge and attitudes of pregnant Thai women towards Down syndrome screening. *J Obstet Gynaecol Res*. 2009;35:876–81.
9. de Leeuw RA, van der Horst SFB, de Soet AM, van Hensbergen JP, Bakker PCAM, Westerman M, et al. Digital vs face-to-face information provision in patient counselling for prenatal screening: A noninferiority randomized controlled trial. *Prenat Diagn*. 2019;39:456–63.