

# Impact of Online Husband Class on Pregnancy Care Behavior

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**Abstract Background:** The role of husbands as the primary source of support in maternal and infant health is well-documented. However, there is still room for improvement in regards with their practical behaviour during the pregnancy care, including their participation in antenatal classes. The primary reasons of the husband's low participation in antenatal classes are time constraints and inconvenience. This study aims to determine the impact of online antenatal class methods implementation in regards with the husbands' behaviour in pregnancy care. **Materials and Methods:** A quasi-experimental study was conducted in Magelang City, Central Java with sample size of 170 husbands. The utilized data collection is validated and reliable questionnaires. Independent T-tests were used to assess the difference between the intervention and control groups. General Linear Model Repeated Measures (GLM-RM) tests were conducted to determine changes in the value of variables at three measurements. **Results:** The results demonstrated that the intervention group exhibited higher values than the control group in three measurements. The online husband class intervention was found to enhance their knowledge by 4.269 points, their belief by 1.940 points, the attitude by 5.442 points, their intention by 3.492 points, and lead to practice by 12.00 points compared to the control group. **Conclusion:** The participation of the husband in online antenatal classes positively influences the quality of pregnancy care behaviors. Online methods in antenatal classes for husbands are an effective strategy to

increase husbands' engagement in antenatal education programs, and improve pregnancy care behaviors. This can inform in designing antenatal care programs that involve husbands.

**Keywords** Online, Class, Behaviour, Pregnancy, Husband

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## 1. Introduction

The role of husbands in maternal and infant health is crucial as the main support system [1]. Husbands' support encompasses a multitude of indicators, including physical, financial, emotional, and social support. These forms of support have been demonstrated to be essential for favourable pregnancy outcomes [2]. Husbands' support during pregnancy is proven in reducing anxiety and stress in mothers. The provision of robust support from a husband equips the mother with enhanced abilities to overcome pregnancy-related challenges and fosters adaptability through a positive attitude that extends into the postpartum period [3]. In patriarchal societies, societal norms often restrict the husband's involvement in pregnancy and childbirth, perceiving these duties as solely the woman's responsibility[4]. Nevertheless, husbands typically serve as the primary decision-maker in the family, thus significantly

influencing maternal and infant health outcomes. It is therefore essential to ensure that husbands possess adequate knowledge, awareness, and participation in maternal and child health [5]. It is necessary for husbands to have adequate knowledge in order to enable them in making the right decisions, reduce unfounded fears and bad habits during the pregnancy phase [6], [7].

Antenatal classes play a pivotal role in enhancing the knowledge, skills, and confidence of couples, equipping them with the tools to make informed decisions, and fostering positive birth experiences [8]. These classes offer an invaluable opportunity to acquire positive knowledge, beliefs, and practices for mothers, husbands, and families at a crucial stage in the parenting journey [7]. Despite their importance, the role of husbands in antenatal classes remains limited. It is evident that interventions and designs are necessary to enhance spousal participation and improve the attachment between mother, husband, and fetus [9]. As the significance of fathers in attachment becomes increasingly recognized, interventions to involve husbands early in pregnancy are essential [10]. Spouse-centred antenatal education programs have demonstrated effectiveness in facilitating parental adjustment [9].

Antenatal classes are delivered through various methods, including large group sessions, small interactive group sessions, individual sessions [8] or online platforms via mobile or computer-based applications [11], [12]. These classes are becoming increasingly diverse, offering options for mother-only, father-only, or hetero classes, all of which have a positive impact on parents and babies alike [12].

In recent years, mobile health apps have gained global popularity due to their convenience, accessibility regardless of time and location, and effectiveness in achieving desired outcomes. This includes prenatal husband program apps. This activity is recognized as an important public health effort, with a positive impact on couples' knowledge, attitudes, and behaviours regarding maternal and infant health [13]. A study in Turkey found that husbands experienced anxiety during their wives' pregnancies, with 92.5% prevalence of online information-seeking behaviour observed among them [14]. Similarly, studies in China revealed that online antenatal education increased pregnant women's exposure to antenatal classes, their frequency of learning, and their awareness of self-health management [15]. Another study on hybrid methods (combining online and offline components) of antenatal education for couples demonstrated a reduction in the rate of cesarean sections, postpartum depression, and fetal macrosomia, as well as an increase in self-efficacy [16].

Furthermore, it is important to conduct research to ascertain the effectiveness of husbands' involvement and participation in active online antenatal classes, as well as the impact on husbands' practice in supporting appropriate pregnancy care behaviors.

## 2. Materials and Methods

### 2.1. Study Design and Sample Size

The study was conducted in Magelang City, a region in Central Java Province, Indonesia, which has experienced low levels of husband involvement in antenatal classes over the past three years. Magelang City is strategically located on the main route between Semarang and Yogyakarta and is home to the world-renowned Borobudur Temple. In 2022, the sex ratio was 97.74. The male population of Magelang City primarily works in the construction and manufacturing industries. The research was conducted from late 2021 to mid-2022.

This study employed a quantitative methodology with a quasi-experimental pre-post with control group design. The subjects were husbands of pregnant women participating in antenatal classes in Magelang City, Central Java, Indonesia. A total of 170 husbands from 17 randomly selected antenatal class organizing villages met the inclusion and exclusion criteria. The sample size was calculated based on Lemeshow's hypothesis testing formula for 2 or more proportions. Subsequently, the sample was divided into two groups: an intervention group comprising 90 respondents and a control group comprising 80 respondents. The determination of the intervention and control group respondents was conducted randomly, with the use of a computerized system, following the collection of the data.

The preparation of the Online Husband Class program went through the R&D stage, developed by researchers who obtained input from experts (midwifery and public health lecturers) and practitioners (midwives and doctors). The program was applied in accordance with the guidelines that had been prepared. The Online Class Intervention for Husbands was conducted by forming an online class through a WhatsApp group, with each class consisting of 10 husbands as participants. The material was provided in the form of online modules and learning videos, with the assistance of one midwife facilitator who had undergone previous training. The class was held for four weeks, covering four themes: Theme 1 focused on Husband Support (including a husband support module and a husband readiness video), Theme 2 on Pregnancy (including a pregnancy module and a pregnancy examination video), Theme 3 on Labor (including a labor module and a video on pain reduction during labor), and Theme 4 on Postpartum and Child Care (including postpartum and child care modules and videos on oxytocin massage and daily baby care). Each week, material on one theme was provided, followed by question-and-answer sessions, quizzes, experience sharing, and discussions in the online class. The material focused on the specific needs of husbands, which were not addressed in conventional antenatal classes designed for pregnant women. The control group received only simple materials through leaflets. The intervention was conducted between pretest,

posttest 1, and posttest 2 to assess the retention of information.

The instruments used in the study included husband class manuals, facilitator handbooks, online modules, and learning videos. Data collection to measure pregnancy care behavior variables was conducted using a questionnaire developed by researchers in collaboration with midwifery and health promotion experts. The questionnaire's validity was tested using the Pearson Product Moment test, and its reliability was assessed using the Cronbach Alpha test, both of which confirmed that the questionnaire was valid and reliable. The questionnaire was distributed online in the class via Google Forms and completed by the respondents.

## 2.2. Variables

The dependent variable was pregnancy care behaviour, which encompasses knowledge, beliefs, attitudes, intentions, and practices. This variable was measured on three measurements: pretest, posttest 1 (conducted one week after the intervention), and posttest 2 (in the third week after the intervention). Confounding variable characteristics included education, age, occupation, source of information, and utilization of health facilities.

## 2.3. Data Analysis

Bivariate analysis was conducted using the *Independent T-Test* to determine differences between the intervention and control groups. The General Linear Model Repeated Measures (GLM-RM) test was employed to ascertain changes in variable values at three time points. This was achieved by determining the fix model following a confounding test. Prior to completing the questionnaire, respondents were provided with informed consent for approval. This research has been deemed ethically sound by the Diponegoro University Health Research Ethics Committee (No. 376/EA/KEPK-FKM/2022).

## 3. Result

Table 1 presents the results of the study, which demonstrate the distribution of each characteristic. The majority of respondents in both groups (80% and 75%) had a middle-to-high level of education, with an average age of 31.32 in the intervention group and 29.96 in the control group. In terms of employment characteristics, the majority of respondents in the intervention group were private employees (50% and 45%), while the source of information

was through social media (50%) and health workers (46.3%) in the control group. With regard to the utilization of health care facilities, both the intervention and control groups mostly utilized public health centres (46.7% and 47.5%). The Levene's test for homogeneity indicated that the characteristics of both groups were homogeneous ( $p > 0.05$ ).

Table 2 illustrates that there are statistically significant differences between the two groups on the posttest 1 and posttest 2 scores for all behavioural variables. The mean difference value in the second measurement indicates that the difference in the practice variable has the highest score between the intervention group and the control group, followed by the attitude, knowledge, intention, and belief variables. The difference value based on the level of change score that occurs is as follows: knowledge variable, 2.963; belief variable, 1.508; attitude variable, 4.775; intention variable, 3.478; and practice variable, 4.437. Upon calculation based on the level of change that occurs from the pretest measurement to the posttest 2, it is evident that the attitude variable exhibits the greatest difference value ( $\Delta$ ), followed by the practice, intention, knowledge, and attitude variables.

Table 3 presents the results of a multivariate analysis conducted on behavioural variables, which were found to be influenced by several potential confounding variables. These included characteristics of respondents, such as age, education, occupation, utilization of health facilities, and sources of health information. All of these variables were then tested for their influence on the value of the pregnancy care behaviour variable using the General Linear Model Repeated Measures (GLM-RM) test. Table 3 presents the fixed model table for five variables of pregnancy care behaviour. The statistical analysis demonstrated that none of the potential confounding variables exhibited a confounding effect (change in value exceeding 10%).

Referring to Table 3, changes that occur can be seen from the intervention dimension and the time dimension. In the intervention dimension, it was found that in the final measurement (posttest 2), the online husband class intervention could significantly increase ( $p < 0.05$ ) the knowledge score 4.269 (3.815 - 4.723), belief 1.940 (0.891 - 2.989), attitude 5.442 (4.416 - 6.467), intention 3.492 (2.552 - 4.431) and practice 12.00 (10.499 - 13.509) higher than the control group. In terms of temporality, it can be observed that the scores of all behavioural variables exhibited an upward trend following the intervention, with the greatest increase observed one week after the intervention (posttest 1) and three weeks after the intervention (posttest 2).

**Table 1.** Husbands Characteristics

Characteristic	Intervention	Control	p
	Mean ±SD n (%)	Mean ±SD n (%)	
Education			
1. Lower	18 (20%)	20 (25%)	0.657*
2. Middle-Higher	72 (80%)	60 (75%)	
Age	31.32 ±5.714	29.96 ±5.912	0.672*
Mean	31.32	29.96	
S.D	5.714	5.912	
Occupation			0.638*
1. Labor	17 (18.9%)	20 (25%0	
2. Private employees	45 (50%)	36 (45%)	
3. Self-employees	20 (2.2%)	19 (23.8%)	
4. Official employees	8 (8.9%)	5 (6.3%)	
Source of Health Information			0.823*
1. Health Workers	39 (43.3%)	37 (46.3%)	
2. Maternal & Child Health Book	6 (6.7%)	10 (12.5%)	
3. Social Media	45 (50%)	33 (41.3%)	
Medical Facility			0.806*
1. Public Health Centre	42 (46.7%)	38 (47.5%)	
2. Midwife	37 (41.1%)	31 (38.8%)	
3. Doctor	10 (11.1%)	11 (13.8%)	
4. Hospital	1 (1.1%)	0	

\*p value ≥ 0.05 with Levene’s test for homogeneity

**Table 2.** Result of Bivariate Analysis of Behavioral Variables

Variables	Measurements	Mean ±SD		Mean Diff.	Sig.
		Intervention (n=90)	Control (n=80)		
Knowledge	Pretest	13.16 ±2.093	11.85 ±2.087	1.306	0.000*
	Posttest 1	16.66 ±1.508	12.79 ±2.004	3.868	0.000*
	Posttest 2	17.94 ±0.987	13.68 ±1.914	4.269	0.000*
Belief	Pretest	23.54 ±4.450	23.11 ±3.910	0.432	0.505
	Posttest 1	25.64 ±3.703	23.79 ±3.652	1.857	0.001*
	Posttest 2	26.38 ±3.584	24.44 ±3.310	1.940	0.000*
Attitude	Pretest	48.07 ±4.213	47.40 ±4.353	0.667	0.312
	Posttest 1	53.97 ±3.456	48.85 ±4.048	5.117	0.000*
	Posttest 2	55.27 ±2.963	49.83 ±3.798	5.442	0.000*
Intention	Pretest	43.41 ±4.318	43.43 ±4.065	0.014	0.983
	Posttest 1	47.04 ±2.952	44.15 ±3.845	2.894	0.000*
	Posttest 2	48.27 ±2.388	44.78 ±3.738	3.492	0.000*
Practice	Pretest	88.77 ±7.266	81.20 ±7.152	7.567	0.000*
	Posttest 1	94.88 ±4.690	84.46 ±6.168	10.415	0.000*
	Posttest 2	97.77 ±3.620	85.76 ±6.130	12.004	0.000*

\*p value <0.05 with Independent T- Test

**Table 3.** Result of Multivariate Analysis with GLM-RM

Dependent Variable		B	Std. Error	t	Sig.	95% CI	
						Lower	Upper
<b>Knowledge</b>							
Pretest	Intercept	11,850	0,234	50,706	0,000	11,389	12,311
	[Group=1]	1,306	0,321	4,065	0,000	0,671	1,940
	[Group=2]	0 <sup>a</sup>					
Posttest 1	Intercept	12,788	0,197	65,029	0,000	12,399	13,176
	[Group=1]	3,868	0,270	14,312	0,000	3,335	4,402
	[Group=2]	0 <sup>a</sup>					
Posttest 2	Intercept	13,675	0,167	81,729	0,000	13,345	14,005
	[Group=1]	4,269	0,230	18,566	0,000	3,815	4,723
	[Group=2]	0 <sup>a</sup>					
<b>Belief</b>							
Pretest	Intercept	23,113	0,470	49,164	0,000	22,184	24,041
	[Group=1]	0,432	0,646	0,669	0,505	-0,844	1,707
	[Group=2]	0 <sup>a</sup>					
Posttest 1	Intercept	23,788	0,411	57,830	0,000	22,975	24,600
	[Group=1]	1,857	0,565	3,285	0,001	0,741	2,973
	[Group=2]	0 <sup>a</sup>					
Posttest 2	Intercept	24,438	0,387	63,210	0,000	23,674	25,201
	[Group=1]	1,940	0,531	3,652	0,000	0,891	2,989
	[Group=2]	0 <sup>a</sup>					
<b>Attitude</b>							
Pretest	Intercept	47,400	0,478	99,067	0,000	46,455	48,345
	[Group=1]	0,667	0,658	1,014	0,312	-0,632	1,965
	[Group=2]	0 <sup>a</sup>					
Posttest 1	Intercept	48,850	0,419	116,647	0,000	48,023	49,677
	[Group=1]	5,117	0,576	8,890	0,000	3,980	6,253
	[Group=2]	0 <sup>a</sup>					
Posttest 2	Intercept	49,825	0,378	131,785	0,000	49,079	50,571
	[Group=1]	5,442	0,520	10,472	0,000	4,416	6,467
	[Group=2]	0 <sup>a</sup>					
<b>Intention</b>							
Pretest	Intercept	43,425	0,470	92,449	0,000	42,498	44,352
	[Group=1]	-0,014	0,646	-0,022	0,983	-1,288	1,261
	[Group=2]	0 <sup>a</sup>					
Posttest 1	Intercept	44,150	0,380	116,086	0,000	43,399	44,901
	[Group=1]	2,894	0,523	5,537	0,000	1,863	3,926
	[Group=2]	0 <sup>a</sup>					
Posttest 2	Intercept	44,775	0,346	129,304	0,000	44,091	45,459
	[Group=1]	3,492	0,476	7,337	0,000	2,552	4,431
	[Group=2]	0 <sup>a</sup>					

Table 3 continued

Practice							
Pretest	Intercept	81,200	0,806	100,699	0,000	79,608	82,792
	[Group=1]	7,567	1,108	6,828	0,000	5,379	9,755
	[Group=2]	0 <sup>a</sup>					
Posttest 1	Intercept	84,463	0,608	138,985	0,000	83,263	85,662
	[Group=1]	10,415	0,835	12,470	0,000	8,766	12,064
	[Group=2]	0 <sup>a</sup>					
Posttest 2	Intercept	85,763	0,555	154,625	0,000	84,668	86,857
	[Group=1]	12,004	0,762	15,748	0,000	10,499	13,509
	[Group=2]	0 <sup>a</sup>					

### 4. Discussion

Antenatal classes have been implemented by health care providers to guide and educate pregnant women and couples [17]. These classes aim to provide pregnancy-related information to couples, including information related to pregnancy, childbirth, and parenthood [18]. Antenatal classes have been demonstrated to have a positive impact on the process of pregnancy and childbirth. This includes a reduction in anxiety, a reduction in labor complications, an increase in confidence, and a reduction in the need for obstetric interventions [17], [19]. Antenatal education for husbands is a very important issue. Husband involvement in maternal and child health is not limited to antenatal care; it is also important in antenatal education. Spouses, in this case husbands, have requested that antenatal education programs be inclusive and more specific to meet their individual and community needs [12]. One obstacle to husbands' participation in antenatal classes is the long waiting times that require them to leave work. Another obstacle is the lack of services that are specifically designed for husbands [20]. The use of virtual antenatal education methods can be developed to anticipate low husband participation [21].

The use of online applications for health interventions has been shown to offer several advantages, including greater accessibility to health services regardless of time and space constraints [22]. Another study demonstrated a significant decrease in fear of childbirth in the group that accessed the mobile health application for 8 weeks (-20.9 [95% CI -33.8 to -27.97],  $p < 0.001$ ) and had a lower cesarean section rate ( $p = 0.03$ ). The group that accessed the mobile health application for eight weeks exhibited a significant decrease in fear of childbirth (-20.9 [95% CI -33.8 to -27.97],  $p < 0.001$ ) and a lower cesarean section rate ( $p = 0.03$ ) [22].

The results showed that online husband's antenatal class intervention significantly improved knowledge about pregnancy care, as shown by increase in mean score in Table 1. This finding aligns with the study that there was a

significant difference in fear of childbirth before and after virtual education ( $21.54 \pm 37.03$  [ $p < 0.001$ ]) [23]. An Australian study demonstrated that the utilization of online training modules by physicians can enhance their knowledge about nutrition, thereby enhancing their confidence in providing nutritional advice during pregnancy care (56%,  $42.6 \pm 7.5$ ). The system is less resource-intensive, more cost-effective, and more flexible in terms of training pace, time, and location [24].

The digitalization of antenatal education will provide opportunities for fast, flexible, and tailored access to the educational resources that meet their individual needs, thereby enabling them to experience the full range of benefits that antenatal education has to offer [25]. A study on the impact of online educational interventions on medical students found that those who received the intervention demonstrated increased knowledge, self-efficacy, and motivation [26]. A study in China compared the effectiveness of online and offline antenatal classes and found that more participants participated in online learning and that pregnant women were exposed to the educational material earlier in their pregnancy. A study comparing online and offline antenatal classes found that more participants participated in online learning (34.5% vs. 23.5%,  $p = 0.000$ ) and that pregnant women were exposed earlier in pregnancy (37% vs. 31.1%,  $p = 0.000$ ) [15]. The lack of participation of fathers in antenatal education is due to a number of obstacles, including conflicting work schedules and the lack of group antenatal education in the workplace, particularly for vulnerable groups of fathers (such as those working abroad, in prison, with new immigration status, or lacking family support) [27], it is possible to reduce the impact of these barriers by offering flexible and convenient service times or programs that are easily accessible to husbands [28].

Antenatal care programs should include antenatal education programs to increase knowledge, awareness and active participation during the prenatal period [29]. Studies in India state that online health education is an effective method for increasing knowledge and resistance to

knowledge gained [30]. Online education allows participants to have high flexibility and greater adaptation of learning styles, which in turn increases knowledge and motivation [31]. Husbands who are well-informed are 3.40 times more likely to give birth at the puskesmas and 4.38 times more likely to give birth at the hospital compared to giving birth at home, which carries a greater risk. As for husbands with good knowledge, it can be reasonably assumed that husbands who are more knowledgeable about health issues are more likely to accompany pregnant women to access health information and improve communication between spouses about maternal and child health. This has a positive impact on the well-being of the family [30].

The purpose of this study was to assess the effectiveness of online antenatal classes for husbands for knowledge improvement. The results of this study showed that the intervention could improve knowledge on two-times measurements. Online education approaches have been demonstrated to enhance participant competence in cognitive, psychomotor, and affective domains, and appear to be as effective as face-to-face and blended delivery [32]. Online classes are becoming an increasingly important aspect of education in the modern world as technology and the internet continue to advance [31], [33].

The involvement of husbands and families in antenatal education represents an opportunity to encourage early and adequate ANC [34]. The principles of health education through antenatal classes are designed to facilitate such involvement. The perception of innovation towards the new design of online husband classes must align with the perception of excellence, indicating that the innovation is superior, beneficial, and more flexible. Additionally, beliefs about the innovation must align with the needs and context of its users [35]. The importance of health in pregnancy affects pregnancy care-seeking behaviour [36]. Studies in Ghana have found that people will not seek care from traditional or biomedical systems if there is no belief that this care meets their needs [36].

The results showed that online husband classes can increase beliefs about prenatal care. Online learning has become an important mode of education around the world, providing flexible, accessible and engaging educational opportunities, and organizers can also reach a wider audience [37], [38]. Participants can learn despite busy work and have sufficient time to interpret, understand and respond to the material provided so as to increase knowledge [39]. Good knowledge will lead to good beliefs about pregnancy care. Positive beliefs about antenatal care will reduce barriers to involvement in pregnancy care.

The involvement of husbands and families in antenatal education can be an opportunity to encourage early and adequate pregnancy care [34]. The principles of health education through antenatal classes are designed to facilitate such involvement. Perceptions of innovation towards the new design of online husband classes must meet the perception of excellence that the innovation is

better, beneficial and more flexible, in addition to beliefs about the innovation according to the needs and context of its users [35]. Beliefs about the importance of health in pregnancy will affect pregnancy care-seeking behaviour [37]. Studies in Ghana found, people will not seek care from traditional or biomedical systems, if there is no belief that this care meets their needs [36]. Studies in Ghana found, people will not seek care from traditional or biomedical systems, if there is no belief that this care meets their needs [36]. The results indicated that online husband classes can enhance beliefs about prenatal care. Online learning has emerged as a significant mode of education globally, offering flexible, accessible, and engaging educational opportunities. Organizers can also reach a broader audience [37], [38]. Participants can learn despite busy schedules and have sufficient time to interpret, understand, and respond to the material provided, thereby increasing their knowledge [40]. Having good knowledge will lead to positive beliefs about pregnancy care. The formation of positive beliefs about antenatal care will result in a reduction of barriers to involvement in pregnancy. The implementation of positive maternity care beliefs is expected to facilitate the involvement of husbands in maternal and child health. This is anticipated to occur through the reduction of barriers associated with patriarchal norms and gender roles in society, unpaid work, and the lack of awareness regarding health services [39], [41], [42].

## 5. Conclusions

There are notable differences in the pregnancy care behaviours observed between the intervention and control groups across all measurement variables. The intervention group exhibited superior performance in knowledge, beliefs, attitudes, intentions, and pregnancy care practices compared to the control group. It is evident that the husband's participation in online antenatal classes can positively influence the quality of pregnancy care behaviors.

Online methods in antenatal classes for husbands are an effective strategy to increase husbands' engagement in antenatal education programs, and improve pregnancy care behaviors. This can inform in designing antenatal care programs that involve husbands. This is based on the effectiveness of this method that considers the specific needs and barriers of husbands. In addition, online methods can keep up with the evolving information and communication technology in the health sector.

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## Conflict of Interest

We declare that there are no conflicts of interest in this research.

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