

Development of The Delivery Assistance Module as an Innovation to Facilitate Delivery in the Archipelago**Nurniati Tianastia Rullyni¹** (corresponding author), **Utami Dewi²**, **Rahmadona³**¹Department of Midwifery / Center of Excellence on Island Community, Poltekkes Kemenkes Tanjungpinang, Indonesia; nurniati@poltekkes-tanjungpinang.ac.id²Department of Midwifery / Center of Excellence on Island Community, Poltekkes Kemenkes Tanjungpinang, Indonesia³Department of Midwifery / Center of Excellence on Island Community, Poltekkes Kemenkes Tanjungpinang, Indonesia; rahmadona@poltekkes-tanjungpinang.ac.id

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ABSTRACT

The family's active role during labor as an act of maternal love can reduce the incidence of labor complications and achieve safe delivery. This study aimed to determine the effect of the delivery companion module on the duration of labor in women giving birth in the archipelago region. The design in this study used a quasi-experimental with post-test only control group design. The sampling technique uses the hypothesis test of two independent population means of 34 maternal mothers. The research was conducted at the Bidan Praktik Mandiri (BPM) in Tanjungpinang City, from March to May 2022. The research tools used were observation sheets and partographs. To determine whether there is an influence of the independent variable and the dependent variable, statistical analysis of the Independent Sample t-Test is used. The results showed a significant effect of the delivery companion module on the length of labor in normal delivery mothers ($p=0.00$). Labor accompanied by a husband with a delivery companion module can shorten the delivery process compared to without a delivery companion module. Using the delivery companion module as a health promotion media is recommended to shorten the delivery process.

Keywords: module childbirth assistant; length of labor**INTRODUCTION**

Health problems that occur in mothers during the delivery process can impact their aspects of life regarding maternal morbidity and mortality. Childbirth is a critical period in which 10.7 million women die. About 25-50% are related to health problems, childbirth, and the puerperium. According to WHO (2015), mothers who live in developing countries have a 23 times greater risk of death compared to mothers who live in developed countries due to factors related to pregnancy and childbirth ⁽¹⁾. The maternal mortality rate in Indonesia until now is still very high compared to other countries in ASEAN. In 2007 the incidence number was 228 cases of death per 100,000 live births. In 2012 maternal mortality rate increased to 359 per 100,000 live births ⁽²⁾. Direct causative factor maternal mortality in Indonesia is still dominated by hemorrhage, eclampsia, prolonged labor, and infection. Bleeding (42%), Eclampsia/Preeclampsia (13%), Abortion (11%), Infection (10%), prolonged labor/labour (9%), and other causes. Factor indirect cause of maternal death because the factor is too late and too ⁽²⁾.

One of the factors that influence labor is maternal psychology. Many mothers experience psychological problems in facing childbirth (anxiety and emotional state). Through the Making Pregnancy Safer (MPS) program, it is expected to increase the active role of the family during pregnancy and childbirth to reduce the incidence of childbirth complications as an effort to achieve safe delivery by paying attention to aspects of mother and baby care in adequate delivery care during labor. WHO recommends that birth attendants are of the mother's own choice ⁽³⁾.

"Loving Mom care" is care that respects the mother's culture, beliefs, and desires. The basic principle of maternal care is to include the husband and family during labor and delivery of the baby. Currently, the husband's participation in reproductive health is still low, and there is insufficient support for the delivery process. The absence of the husband's assistance during childbirth impacts maternal anxiety resulting in excessive levels of catecholamines, causing decreased blood flow to the uterus, weak uterine contractions, decreased blood flow to the placenta, reduced oxygen available to the fetus and can increase the length of labor.

The smooth delivery process can be seen from the length of the labor process with no obstacles and complications during delivery. The incidence of maternity women who share a delivery process is relatively high; this can be seen from the second stage of labor that crosses the alert line on the partograph observation sheet. This is because many maternity mothers experience excessive fear and anxiety, so they interfere with contractions which can hinder the labor process. Conditions of anxiety and fear trigger the release of the hormone adrenaline, which will constrict blood vessels and reduce the flow of blood that carries oxygen to the uterus, resulting in a decrease in uterine contractions, which can hinder the delivery process. ⁽⁴⁾

The presence of a birth attendant can minimize the occurrence of complications during labor; the labor time will be shorter, increase the mother's satisfaction of experiencing childbirth, reduce the potential for vacuum extraction labor, forceps, and Sectio Caesarea, reduce the intensity of pain, reduce the use of analgesics and oxytocin, improve mental health, and prevent postpartum depression ⁽⁵⁾. Meanwhile, unaccompanied labor will cause tension and result in his disruption and hinder the delivery process. Childbirth assistants play an essential role during the delivery process because they can reduce the need for analgesic drugs during labor ⁽⁶⁾. Yulizar & Zuhrotunida's research (2018) states a significant relationship between birth attendants and the length of the second stage of childbirth ⁽⁷⁾. Maternal mothers who are not accompanied during the delivery process are 10 times more likely to experience a prolonged second stage than those who are

accompanied during the delivery process. A similar study was conducted by Unitarian and Astarina (2017), which stated that there was a relationship between the husband's assistance and the length of the second stage of labor⁽⁸⁾.

The presence of a husband can make labor shorter, reduce pain, decrease birth canal tears, and have a better APGAR value.⁽⁶⁾ The presence of a birth attendant can cause feelings of pleasure, which will become impulses to neurotransmitters to the limbic system and then forwarded to the limbic system. The amygdala then goes to the hypothalamus to stimulate the ventromedial nucleus and the surrounding area, which can cause a feeling of calm. Finally, anxiety decreases so that the mother feels comfortable⁽⁹⁾. With a sense of comfort, the levels of catecholamines in the blood become normal. Normal levels of the hormone catecholamines in the blood will cause smooth muscles to relax and vasodilation of blood vessels so that the supply of blood and oxygen to the uterus increases and the pain that the mother feels is also reduced⁽¹⁰⁾.

Essential care is needed for maternity mothers to optimize uterine contractions in assisting the delivery process, one of which is by caring for mothers, including presenting companions during childbirth. Childbirth assistance is one aspect of maternal care. Care for mother and baby is based on mutual respect for the mother's culture, beliefs, and desires. One of the principles of maternal care is to include husband and family during childbirth⁽⁸⁾.

For this reason, the role of a companion in the delivery process is essential. Facilitators are individuals or institutions that assist. Between the two parties (companion and being accompanied), there is equality, partnership, cooperation, and togetherness without sharp class boundaries (class or social status). The purpose of mentoring is empowerment or strengthening. Mentoring is done by giving attention, conveying messages, encouraging, inviting, providing ideas/solutions, delivering services/assistance, giving advice, mobilizing, and cooperating⁽¹¹⁾. Mentoring is the behavior of the presence of a person or friend who always provides physical and psychological support actively and continuously in following the entire process of childbirth from the first stage to the fourth stage, especially the husband's assistance when the wife gives birth.

Total coverage of deliveries in the Riau Islands province was 92.24% of 46,257 targeted numbers in 2018, and 91.94% of 45,375 targeted numbers in 2019. With a total MMR of 202.53 per 100,000 live births in 2018 and 130.86 per 100,000 live births in 2019. (Riau Islands Province Health Office, 2019). As for Tanjungpinang city, the total coverage of deliveries was 93.36% of 4,249 deliveries in 2018 and 92.63% of 4,153 deliveries in 2019⁽¹²⁾.

Based on an initial survey conducted at BPM Tanjungpinang City on January 10, 2022, to 12 maternity mothers, not all deliveries were accompanied by their husbands as birth attendants but accompanied by other families, and based on interviews with midwives at BPM Tanjungpinang City, there were no health promotion media in the form of a delivery companion module for maternity assistants to facilitate the delivery process.

Geographically, the Tanjungpinang area, the Riau Islands, where most of the people are coastal communities, have different characteristics from others. This difference is due to the close relationship with the economic characteristics of the region, cultural background, and the availability of supporting facilities and infrastructure. The social conditions of coastal communities and access conditions limit their social services, such as health and education services. This is the importance of empowerment as a tool to achieve specific goals. Empowering the community means creating opportunities for the district to determine their needs, plan, and carry out their activities, which ultimately makes permanent independence in community life itself in the field of Health with a mentoring approach, which is felt to be very necessary. With these conditions, it is essential to have connectivity that is able to reach digitalization practices to remote areas of the country through the industry 4.0 roadmap. In the era of the industrial revolution 4.0, it is hoped that health services to the community will also follow the development of the community conditions themselves. At this time, the Industrial Revolution 4.0 was an era where technology was progressing rapidly, as proofed by the internet, which makes human life easier. Industrial revolution 4.0 not only has an impact on the technology sector but also on the health sector. However, the geographical condition of the archipelago, and the number of islands that are separated from the main island, make it difficult for internet service providers.^(13,14)

For the current conditions, the role of the media is huge in health promotion. The media can make the target more interested and make it easier to absorb information.⁽¹⁵⁾ Various kinds of media that can be used for health promotion have their own advantages and disadvantages. The benefits of visual aids are very effective, transparent, and can help in decision making and change risky behavior.⁽¹⁶⁾

There are printed and non-printed health promotion media. Some media have been developed into modules. A module is a learning tool in written or printed form that is systematically arranged. It contains learning materials, methods, aim, core competencies, basic competencies, and indicators of competency achievement. Instructions for independent learning activities provide opportunities to test yourself through the exercises presented in the module⁽¹⁷⁾. Learning media is anything that can channel messages and stimulate the audience's thoughts, feelings, and willingness to encourage the creation of a learning process in the audience. Learning media used in learning activities can affect the effectiveness of learning, including in midwifery services. A module can be used as an alternative to health promotion, especially for birth attendants, as part of literacy in maternity midwifery care. This study aimed to determine the effect of the delivery companion module on the duration of labor. Based on what has been described above, the researchers are interested in researching "Development of Childbirth Assistance Modules as Innovations for the Length of Labor in the Tanjungpinang City Archipelago Region in 2022".

METHODS

This study used a quasi-experimental with a posttest-only control group design. The population in this study were all husbands of mothers who gave birth normally in the Bidan Praktik Mandiri (BPM) of Tanjungpinang City. Sample calculation was carried out using a hypothesis test formula on the average of two independent populations, resulting in a total sample of 34 husbands of mothers who gave birth normally from March to May 2022. The independent variable in this study was the delivery companion module, while the dependent variable was the length of labor. The research

instrument used is observation and partograph sheets. Data collection was carried out by calculating the length of time of delivery in 1st, 2nd, and 3rd stage, in the intervention group, that is, the husbands who played the role of a birth attendant. The Independent Sample T-Test with a significant degree of 95% (α 0.05) was used for data analysis.

RESULTS

The research data had been taken from March to May 2022 for 34 husbands of mothers giving birth at BPM Tanjungpinang City. The data was divided into 2 groups; group A was given treatment with the delivery assistance module, and group B was not given the treatment of the delivery assistance module. The results of the study as follows:

Table 1. Distribution of respondents based on demographic characteristics

Characteristics of respondents	Mean	Minimum-Maximum
Age		
Intervention group	31.68	23-45
Control group	29.18	20-40
Education		
Intervention group		
-Higher	31	91.2
-Lower	3	8.8
Control group		
-Higher	32	94.1
-Lower	2	5.9
Work		
Intervention group		
-Employed	29	85.3
-Unemployed	5	14.7
Control group		
-Employed	31	91.2
-Unemployed	3	8.8

Based on the table 1, it was found that the average age of birth attendants in the intervention group was 31.68 years old. The youngest was 23 years old, and the oldest was 45. The control group's average age of birth attendants was 29.18 years old. The youngest was 20, and the oldest age was 40. The education level of birth attendants in the intervention group was mostly higher (91.2%), and most of them were employed (85.3%). While in the control group, most of them are highly educated (94.1%), and employed (91.2%)

Table 2. Distribution of respondents based on length of delivery

Labor time	Mean	SD	Minimum-Maximum
1st stage			
Intervention group	4.36	1.29	2.00-7.20
Control group	5.52	1.57	1.00-8.00
2nd stage			
Intervention group	14.68	5.23	5-28
Control group	21,12	8.40	5-35
3rd stage			
Intervention group	8.82	3.47	5-15
Control group	10.65	4.11	5-17
1st, 2nd, and 3rd stage			
Intervention group	4.66	1.32	2.38-7.40
Control group	5.98	1.60	1.30-8.35

Based on table 2, the analysis results showed that the average length of the first stage of labor in the intervention group was 4.36 hours with a standard deviation of 1.29 hours. The fastest duration of the first stage of labor was 2.00 hours, and the longest first stage was 7.20 hours late. The average length of the second stage was 14.68 minutes, with a standard deviation of 5.23 minutes. The fastest second stage was 5 minutes, and the longest was 28 minutes. The average length of the third stage was 8.82 minutes, with a standard deviation of 3.47 minutes. The fastest third stage was 5 minutes and the longest third stage was 15 minutes.

Meanwhile, the average length of the first stage labor in the control group was 5.52 hours with a standard deviation of 1.57 hours. The fastest first stage was 1.00 hours, and the longest was 8.00 hours late. The average length of the second stage was 21.12 minutes with a standard deviation of 8.40 minutes. The fastest second stage was 5 minutes and the longest was 35 minutes late. The average length of the third stage was 10.65 minutes, with a standard deviation of 4.11 minutes. The fastest third stage was 5 minutes, and the longest was 17 minutes late.

The average length of labor in the first, second and third stage in the intervention group was 4.66 hours with a standard deviation of 1.32 hours. The fastest labor duration was 2.38 hours, and the longest was 7.40 hours late. In comparison, the control group's average labor length was 5.98 hours with a standard deviation of 1.60 hours. The fastest labor duration in the control group was 1.30 minutes, and the delay was 8.35 minutes.

Based on table 3, it can be seen that the average length of the first stage of labor in the intervention group was 4.36 hours with a standard deviation of 1.29 hours, while for the control group, the average length of the first stage of labor was 5.52 hours with a standard deviation of 1.57 hours. The statistical test results showed a p-value = 0.01, meaning

that at 5% alpha, there was a significant difference in the average length of the first stage of labor in the intervention group and the control group.

Table 3. Distribution of average delivery length in the intervention group and the control group

Variable	Mean	SD	SE	p-value
1 st stage duration				
Intervention group	4.36	1.29	0.22	0.01
Control group	5.52	1.57	0.26	
2 nd stage duration				
Intervention group	14.68	5.23	0.89	0.00
Control group	21.12	8.40	1.44	
3 rd stage duration				
Intervention group	8.82	3.47	0.59	0.05
Control group	10.65	4.11	0.70	
1 st , 2 nd , and 3 rd stage duration				
Intervention group	4.66	1.32	0.22	0.00
Control group	5.98	1.60	0.27	

The average length of the second stage of labor in the intervention group was 14.68 minutes with a standard deviation of 5.23 minutes, while for the control group, the average length of the second stage of labor was 21.12 minutes with a standard deviation of 8.40 minutes. The statistical test results obtained a p-value = 0.00, meaning that at 5% alpha, there was a significant difference in the average length of the second stage of labor in the intervention group and the control group.

Furthermore, the average length of the third stage of labor in the intervention group was 8.82 minutes with a standard deviation of 3.47 minutes, while for the control group, the average length of the third stage of labor was 10.65 minutes with a standard deviation of 4.11. The statistical test results obtained a p-value = 0.05, meaning that at 5% alpha, there was a significant difference in the average length of the third stage of labor in the intervention group and the control group.

Lastly, the average length of the first, second, and third stage of labor in the intervention group was 4.66 hours with a standard deviation of 1.32 hours, while for the control group, the average length of the first, second, and third stage of labor was 5.98 hours with a standard deviation of 1.60 hours. The statistical test results obtained a p-value = 0.00, meaning that at 5% alpha, there were a significant difference in the average length of the first, second and third stages of labor in the intervention group and the control group.

Table 4. Differences in the mean duration of the 1st, 2nd, 3rd stage of labor in the intervention group and the control group

Effect		p
Length of labor (1st, 2nd, 3rd stage)	Pillai's trace	0.00
	Wilks lambda	
	Hotelling's trace	
	Roy's largest root	
The duration of the 1st, 2nd, 3rd stage of labor between groups (intervention and control)	Pillai's trace	0.00
	Wilks lambda	
	Hotelling's trace	
	Roy's largest root	

The statistical test results showed a significant difference in the average length of labor between the intervention group and the control group (p=0.00). There is progress in the labor process, Both in the intervention and control groups. However, the average duration of the first, second, and third stages was faster in the intervention group than in the control group.

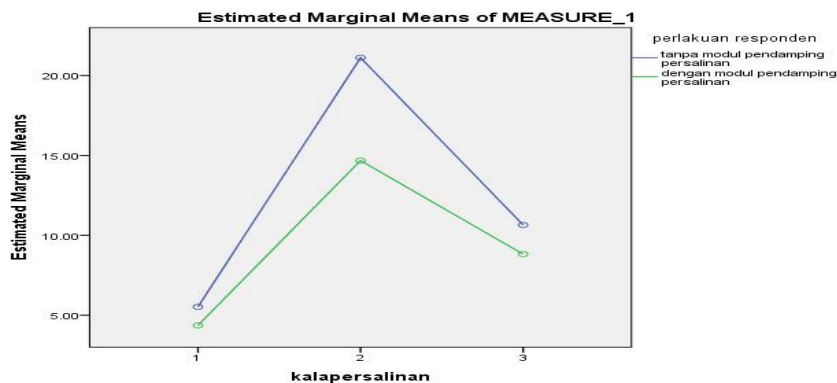


Figure 1. GLM Statistical test of labor duration in the intervention and control groups

There was progress in the intervention and the control group of the first, second, and third labor stages. Even so, there was a difference in the average duration of labor in the first, second, and third stages in the two groups; this is shown in the picture above.

DISCUSSION

Based on the study results, there was a significant difference in the average length of the first, second, and third stages of labor in the group that was given the intervention of the delivery companion module and the group that was not given the delivery companion module. This study's results align with Yulizar (2018), which states that there is a significant relationship between the husband's assistance during the labor process and the length of the second stage of labor. Primiparous mothers who are not accompanied by their husbands have 10 times the chance to experience a prolonged second stage compared to those who are accompanied by their husbands.⁽⁷⁾

This has a psychological effect where mothers who receive good husband assistance will feel emotional support because the mother's psychological factor affects childbirth. Childbirth assistance can be carried out by a husband, family member, or someone of the mother's choice who is experienced in the birthing process. A companion's presence at the time of delivery can have a positive effect on labor in the sense that it can reduce pain and shorten the delivery. In addition, the presence of a birth attendant can provide a sense of comfort, security, enthusiasm, and emotional support and encourage mothers⁽¹⁸⁾. During the mentoring, the husband responds to all maternal wishes, both physically and emotionally, providing attention, touch, and support in the labor process⁽¹⁹⁾.

A companion's presence during labor can divert the mother's attention to the contractions that arise from the beginning of delivery. In the first stage, the active phase is the most tiring due to the onset of adequate uterine contractions. This phase requires adequate contractions (power) to initiate labor and psychological comfort⁽¹⁸⁾. The contraction mechanism begins with increased mechanical nociceptors, uterine, and cervical chemoreceptors stimulation. In the first stage, cervical dilatation and effacement occur. Pain occurs from the distention of the lower uterine segment radiating to the abdominal wall, lumbosacral back area, iliac crest, gluteal, thigh, and lower back. It occurs like cramps, and the pain spreads and is difficult to localize. Furthermore, somatic pain is more dominant at the end of the first stage and the beginning of the second stage due to distension and pulling in the pelvic structures, pelvic floor, and perineum. Labor pain usually causes fear and anxiety, resulting in increased sympathetic nerve work. This can stimulate the release of catecholamines (epinephrine and norepinephrine). As a result, blood flow to the uterus, blood flow, and blood pressure decreased⁽²⁰⁾⁽²¹⁾.

In research conducted by Maryanto (2012), the results of calculations in the average value of the labor length for mothers with birth attendants was 9.72, and for mothers without birth attendants was 11.41. This means there is an effect of childbirth assistance on the length of labor. The support of the birth attendant positively contributes to the mother providing psychological peace so that delivery can run smoothly. The mother will experience pain during labor due to uterine contractions, which cause cervical dilation and effacement. Mothers will also feel anxious and afraid in facing childbirth. The existence of anxiety in maternity can have an impact on increasing the secretion of adrenaline and ACTH (Adrenocorticotropic hormone) hormones. One of the effects of an increase in the hormone adrenaline is the constriction of blood vessels, causing the oxygen supply to the fetus to decrease. This decrease in blood flow can also cause the weakening of uterine contractions and result in a prolonged labor process. Meanwhile, an increase in ACTH can cause an increase in serum cortisol levels and blood sugar. This is in line with Wijaya, Wandini, & Wardiyah (2014), which stated that childbirth assistance affects the length of the second stage of labor. The average length of labor in the second stage of respondents whose husbands accompanied was faster than those who were not accompanied by their husbands⁽²²⁾. From the description above, it can be seen that the presence of the husband as a birth attendant is very influential on the course of the labor process, especially in accelerating the duration of the second stage. The presence of the husband can reduce anxiety in mothers when facing labor, so that it can cause their emotions to become more stable, calmer, feel happy, comfortable, relaxed, increase enthusiasm and confidence in maternity mothers to push and ultimately speed up the second stage process of labor. This study's results prove that 41.4% of the prolonged second-stage labor was experienced by mothers giving birth without their husband's accompany.

Similar results were also reported by a study conducted by Stern Holm, et al., proving that assistance during labor significantly could reduce the length of labor ($p=0.001$)⁽²³⁾. Research Hand A, et al (2020) stated that full support by birth attendants significantly affects labor progress ($p = 0.001$). The results of the research of Wang, et al (2018) also mention that continuous support by the husband during labor reduces the length of the labor process and the incidence of cesarean section⁽²⁴⁾. Research by Satrianegara, et al (2021) shows a significant relationship between the husband's support and the smooth delivery process ($p=0.008$)⁽²⁵⁾. Research by Asrita Sari, et al (2020) on the relationship between the husband's assistance in childbirth and the progress of the active phase of the first stage of labor resulted that; there was a relationship between husband's assistance in childbirth and the progress of active phase of the first stage labor, that mothers who their husbands did not accompany had a 3.56 times risk of experiencing slow delivery compared to mothers who were accompanied by their husbands.⁽²⁶⁾ A birth attendant is someone who can do much to help mothers during the labor process. A companion is the presence of someone who accompanies or is directly involved as a birth guide, which provides support during pregnancy, childbirth, and the postpartum period so that the labor process runs smoothly and provides comfort for the mother in labor⁽²⁷⁾.

The husband's support in the labor process will affect the mother's emotions; the calm emotions of the mother will affect the nerve cells to secrete the oxytocin hormone, which reacts to uterine contractions that lead to baby delivery. Oxytocin increases smooth muscle contraction by a mechanism of neurohypophysis secretion of oxytocin. This is greatly increased during labor, and Irritation or stretching of the uterine cervix causes a neurogenic reflex via the paraventricular and supraoptic nuclei of the hypothalamus, which can cause the neurohypophysis to increase its oxytocin secretion⁽²⁸⁾. Mothers who receive support from their husbands show shorter deliveries, reduce the need for oxytocin, analgesics, anesthetics, and birthing aids, and have a 50% lower chance of having a cesarean delivery⁽²⁹⁾.

The experience of giving birth can increase self-confidence and positive memories. Therefore, support from birth attendants can influence mothers in labor because they can do much to help during the delivery process. These

companions can encourage, and motivation, help create a comfortable atmosphere and support mothers to overcome physical discomfort⁽²⁷⁾.

During the mentoring, the husband also acts as a trainer, helping and actively assisting the mother during and after uterine contractions, encouraging her to rest between contractions, and reminding her to do breathing techniques. The presence of a husband near the mother becomes a friend who can provide emotional and moral support. Thus, mothers feel safe and comfortable, and their fears and worries are reduced, so they can change maladaptive behaviors into new constructive behaviors and coping⁽¹⁹⁾. If the fear can be reduced, the vegetative tension will decrease to prevent stiffness of the cervical muscles. The muscles of the cervix become soft, easy to thin, and open to speed up the labor process.⁽³⁰⁾

CONCLUSION

The study results show a significant effect of the delivery companion module on the length of labor in normal delivery mothers. The study recommends that assistance during the module delivery process affects the time the delivery process takes, so the participation of birth attendants is highly suggested during the delivery process.

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