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The effect of the SUMPING E-module as a labor companion on the duration of labor in independent midwife practice

Utami Dewi,¹ Rahmadona,¹ Nurniati Tianastia Rullyni,¹ Rully Hevrialni²

¹Vocational Midwifery Study Program, Politeknik Kesehatan Kemenkes Tanjungpinang, Tanjungpinang; ²Vocational Midwifery Study Program, Politeknik Kesehatan Kemenkes Riau, Pekanbaru, Indonesia

Correspondence: Utami Dewi, Vocational Midwifery Study Program, Poltekkes Kemenkes Tanjungpinang, Tanjungpinang, Indonesia.

E-mail: utami.dewi@poltekkes-tanjungpinang.ac.id

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Availability of data and materials: all data generated or analyzed during this study are included in this published article.

Abstract

Reducing the incidence of childbirth complications requires family participation, especially from husbands, consistent with government policies and strategies aimed at reducing childbirth complications in Indonesia through the Making Pregnancy Safer (MPS) program. The approach to increasing husbands' involvement in reproductive health includes providing them with information and involving them in all efforts to improve reproductive health. One activity husbands can undertake to improve maternal and child health is accompanying their wives during labor and supporting referrals when

necessary. The purpose of this study was to determine the effect of labor assistance using the SUMPING (Supporting Husband as a Companion) E-Module compared to labor assistance without using the SUMPING E-Module on the duration of labor. The research design was a quasi-experiment with a control group that only underwent the post-test. The instruments used included a checklist and a partograph sheet. Data collection occurred during the post-test. The study involved 120 respondents, all of whom were birth attendants (husbands) at PMB Tanjungpinang. Analysis was conducted using the Independent Samples t-test. Statistical tests using the independent samples t-test revealed a significant difference ($p=0.000$) in the length of labor between those with full and those with non-full assistance in the treatment group. In the control group, there was no significant difference ($p=0.039$) between husbands who provided full assistance and those who did not. Husband support can shorten the duration of labor. Husbands who had access to the SUMPING E-Module reported greater involvement in assistance during labor than those without the SUMPING E-Module.

Introduction

Disorders during pregnancy can lead to infant mortality and maternal deaths.¹ Maternal mortality can be prevented through early detection, including during the period preceding pregnancy.² The Maternal Mortality Ratio (MMR) is a fundamental indicator of obstetric or health services for women of reproductive age; more than 90% of maternal deaths are caused by complications that often occur during or around childbirth. Complications of

childbirth are deviations from the norm that directly result in morbidity and mortality in mothers and infants due to disturbances caused directly by childbirth.³

In general, maternal mortality decreased from 390 to 305 per 100,000 KH live births between 1994 and 2015. Although maternal mortality was decreasing, it did not reach the Millennium Development Goals (MDGs) target of 102 per 100,000 KH by 2015. It is also far from the Sustainable Development Goals (SDG) target of reducing MMR to less than 70 per 100,000 KH by 2030 and the 2024 National Medium-Term Development Plan (RPJMN) target of 183 per 100,000 KH.⁴

Third-trimester primigravida mothers typically experience anxiety.⁵ At the time of delivery, the major causes of maternal mortality are hemorrhage, eclampsia, infection, prolonged labor, obstructed labor, and miscarriage. Prolonged labor, including a prolonged first stage, may increase the risk of Postpartum Hemorrhage (PPH) by causing uterine atony in the third stage (after the infant is delivered). Uterine atony occurs when the relaxed myometrium fails to constrict the uterine blood vessels. Regular contractions over several hours of labor will exhaust the uterine muscles and thereby reduce their contractility over time, causing uterine dysfunction.⁶

Reducing the incidence of labor complications requires the involvement of the family, especially the husband, who can provide strong emotional support during labor. This support can help reduce stress and anxiety, which can contribute to the risk of complications. Family support can be provided in the form of informative, emotional, instrumental, and assessment support.⁷ Family support for pregnant women provides benefits for both the mother and fetus. Provided support makes mothers feel strong and able to overcome perceived obstacles.⁸ Women who receive support not only have lower rates of cesarean section but are also more likely to give birth spontaneously, with shorter

labor processes. Husbands can assist by providing physical support, such as massage, helping the mother move or change position, and creating a comfortable environment. This assistance can help reduce physical tension and increase the mother's comfort.⁹ Self-efficacy is an important factor that plays a role in dealing with stress.¹⁰ Several studies have reported that a husband's support positively impacts encouraging pregnant women to attend ANC visits.¹¹ The husband's role also positively affects the delivery process and the choice of skilled birth attendants.¹²

This aligns with government policies and strategies aimed at reducing the incidence of childbirth complications in Indonesia through the Making Pregnancy Safer (MPS) program.^{13,14} The MPS program emphasizes that increasing husbands' participation in reproductive health involves equipping husbands with information and involving them in every effort to improve reproductive health. One activity husbands can undertake to improve maternal and child health is accompanying their wives during labor and providing support for referrals when needed.^{15,16}

It is hoped that in the era of the Fourth Industrial Revolution 4.0, health services provided to the community will also evolve alongside the community's development.¹⁷ The Fourth Industrial Revolution 4.0 is characterized by rapid technological advancement, as exemplified by the internet, which greatly facilitates human life. This revolution impacts not only the technology sector but also the health sector, with e-health being one example, focusing on technology-based health services.¹⁸

In response to these challenges, e-modules are a type of educational media presented in the form of electronic modules that are more interactively packaged. E-modules, also known as self-study media, incorporate self-study instructions. They can be filled with

materials such as PDFs, videos, and animations, enabling users to engage in learning actively.^{19,20}

As part of digital literacy in midwifery care, an E-Module for delivery assistance in midwifery services must be compiled. Based on the foregoing, the researcher wishes to conduct research on the effect of husband participation on labor duration.

Materials and Methods

The design of this study is a quasi-experimental study utilizing the post-test method with a control group (post-test-only control group design). This research design aims to observe the effect of intervention or treatment in the form of providing E-modules for labor assistance to husbands of laboring mothers.²¹

The study population includes all labor assistants who accompanied laboring mothers at Independent Practice Midwife (IPM) Tanjungpinang City. The samples in this study were selected from among the birth attendants at IPM Tanjungpinang City and divided into two groups: the intervention group and the control group. The determination of the sample size in this study was based on the consideration that, for statistically analyzed and normally distributed data, a minimum sample size of 30 is required. Therefore, the sample was set at 60 individuals for each treatment group and control group, resulting in a total sample size of 120 individuals.

Sampling in this study employed the purposive sampling technique, which intentionally considers specific criteria to meet the research objectives. These considerations are outlined in the inclusion criteria, which include the labor companion possessing a smartphone, accompanying a multiparous laboring mother from the active phase (4 cm)

to the third stage of placenta delivery, assisting in normal labor, willing to participate as a research subject, and possessing literacy skills. Exclusion criteria encompassed cases where the laboring mother is referred to in the middle of the labor process or experiences complications.

The variables in this study comprised independent variables, namely E-Module and without E-Module, while the dependent variable is the duration of the labor process (from active phase I to phase III) in hours, as recorded in the partograph. Additionally, external variables include age, education, and occupation.

The researcher intervened in part of the existing sample, while another part of the sample remained untouched for comparison, aiming to determine the treatment effect. This study comprised two groups: the treatment group and the control group. The treatment group received an intervention in the form of an E-module accompanying childbirth, whereas the control group received health education services at the Independent Practice of Midwives. To assess the duration of the labor process (stages I-III), hours were recorded using a partograph (post-test). The observed change in this study is the duration of the labor process from stage I to stage III (until the placenta is delivered) in laboring women accompanied by a labor companion (husband) with the E-Module compared to those without the E-Module.

Data analysis in this research was conducted in several stages. Firstly, univariate analysis was performed to describe the distribution and proportion of each research variable, presented in the form of frequency distribution tables and percentages. Bivariate analysis, conducted using a computer, aimed to observe the relationship between the independent variable (E-module of labor companion) and the dependent variable (duration of labor

process). Prior to the statistical test, a normality test was conducted on the data. The parametric test used was the Independent Samples T-test. This study received ethical approval with number 06/PHB/KEPK/33/10.21 from the health research ethics committee of Stikes Patria Husada Blitar.

Results

Table 1 indicates that husbands of working mothers in the treatment group had a low education level (Elementary to Junior high school) (55%). The majority of respondents in this group did not work (65%). Conversely, the majority of respondents in the control group had a higher education level (Senior high school to University) (63.3%) and were employed (65%).

According to Table 2, the average age of the birth attendant husband in the treatment group was 29.33 years, with a variation of 5.41 years. The youngest was 20 years old, and the oldest was 42 years old. In the control group, the average age was 29.45 years, with a variation of 5.82 years, and the youngest was 21 years old while the oldest was 43 years old.

Table 3 shows that in the treatment group, which included husbands who received the SUMPING E-module, 50 people (83.3%) provided full assistance during labor, while 10 people (16.7%) did not. In the control group, which included husbands who did not receive the SUMPING E-module, 26 people (43.3%) fully accompanied their wives during labor, while 34 people (56.7%) did not.

Table 4 shows that the average length of labor in the treatment group was 3.40 hours, with a variation of 1.04 hours. The shortest duration was 1.20 hours, and the longest was

5.30 hours. In the control group, the average length of labor was 5.61 hours, with a variation of 1.73 hours. The shortest labor time was 3.25 hours, while the longest was 8.55 hours.

According to Table 5, the average length of labor in the treatment group, given the SUMPING E-Module, was shorter at 3.16 hours with a variation of 0.94 hours compared to husbands who did not provide full assistance, which was 4.63 hours with a variation of 0.53 hours. The T-test result was $p=0.000$, indicating a statistically significant difference in the average length of labor between husbands who provide full assistance during the delivery process and those who do not.

In the control group that did not receive the SUMPING E-Module, the average length of labor was 5.08 hours, with a variation of 1.81 hours, compared to husbands who did not fully assist, with an average of 6.01 hours and a variation of 1.58 hours. The T-test result was $p=0.039$, indicating no statistically significant difference in the average length of labor between husbands who fully and partially assist in the length of the labor process.

Discussion

After statistical testing revealed that the average length of labor with assistance using the SUMPING E-module was shorter than the average length of labor with assistance without using the SUMPING E-module, this pseudo-experimental study was conducted to examine the effect of the E-module of delivery assistance (SUMPING E-Module) on the length of the labor process using a post-test only with control group design.

The findings of this study were in line with those of several other studies, including one by Sumakul and Terok¹⁶ that showed that husband assistance affects the length of the first

stage ($p=0.023$) and the second stage ($p=0.028$) of labor. Yulizar and Zuhrotunida²² found a significant relationship ($p=0.011$) between the husband's assistance during the delivery process and the length of the second stage of labor in their study. Research by El Fattah *et al.* in Egypt also showed that assistance and support during labor can significantly ($p=0.001$) reduce the length of labor and increase cervical dilatation. Similarly, a study by Mohammed Eid *et al.*²³ found that full companion support during labor has a significant effect ($p=0.001$) on labor progress and maternal satisfaction. A study conducted in a teaching hospital in China by Wang *et al.*²⁴ found that continuous support from the husband during labor reduced the length of labor and the incidence of emergency cesarean section.

Labor is a significant event in a woman's life, and each woman's experience with childbirth is unique. This often leads to anxiety, discomfort, and an increase in the intensity of labor pain.²⁵ Anxiety, discomfort, and labor pain lead to an increase in the release of catecholamine hormones, which disrupt blood flow to the uterus, weaken uterine contractions, and slow the labor process.²⁶ Furthermore, anxiety, pain, and discomfort during labor increase the risk of labor complications such as maternal fatigue, increased oxytocin use, assisted delivery, cesarean section, neonatal asphyxia, and fetal death.^{27,28}

One solution is to have a birth attendant accompany and guide the woman through the labor process. The World Health Organization (WHO) recommends that the birth attendant be chosen by the mother. However, since the husband's participation in accompanying childbirth is still low, the WHO recommendation is directed towards childbirth assistance by the husband, as he is the closest person to the mother and will be involved in childcare in the family.²⁶ The presence of the husband as a labor companion

is crucial because it can create a sense of security and comfort for the mother, increase her confidence, reduce anxiety about the labor process, alleviate the intensity of labor pain, minimize labor complications, and expedite the delivery process.^{29,30}

Paying attention, conveying messages, encouraging, inviting, providing thoughts/solutions, delivering services/assistance, offering advice, mobilizing, and cooperating are all ways to provide support. Husbands must possess knowledge and skills on what to do during labor to offer effective assistance.³¹ Therefore, in this study, husbands who accompanied childbirth were provided with informational media in the form of a summarizing e-module. This module could be utilized to learn about the childbirth process and the necessary steps to take while accompanying the childbirth process. An e-module is a tool or learning aid that systematically and engagingly contains materials, methods, limitations, and evaluation techniques designed electronically to attain expected competencies based on the complexity level.^{32,33}

In terms of benefits, electronic media, such as SUMPING e-modules, can render the learning process more interesting, interactive, and accessible from any location and at any time, thereby enhancing learning quality. Researchers developed this informational media in the form of e-modules so that husbands can independently acquire knowledge and foster positive behavior in assisting childbirth.^{34,35}

The study discovered that in the treatment group, where accompanying husbands received the SUMPING e-module, 83.3% demonstrated full assistance behavior, and the average duration of labor they assisted was shorter compared to husbands who did not exhibit full assistance behavior. The T-test results in this treatment group were also significant ($p=0.000$), indicating that the e-module influenced the husband's assistance behavior during the delivery process. In contrast, in the control group that did not receive the

SUMPING e-module, more husbands (56.7%) did not fully assist during labor. The T-test results were also insignificant ($p>0.005$), suggesting that not receiving the summarizing e-module resulted in a lack of information about childbirth assistance, thereby hindering the development of knowledge underlying full assistance behavior in the delivery process.

Conclusions

The SUMPING E-Module clearly demonstrates how a husband's role as a companion during labor can influence the length of the labor process. When husbands use the SUMPING E-Module as a part of their labor companion role, it significantly shortens the labor duration. This reduction alleviates anxiety and fatigue in the mother and decreases the risks of infection and dehydration. Additionally, it lowers the chances of complications for both the mother and child, which contributes to the reduction of maternal and infant mortality rates, including asphyxia and fetal death in the womb.

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Table 1. Characteristics of respondents based on education and occupation.

Respondent characteristics	Frequency	Percentage (%)
Education		
Treatment group		
- High		
(Senior high school-University)	27	45
- Low		
(Elementary-Junior high school)	33	55
Control group		
- High		
(Senior high school-University)	38	63.3
- Low		
(Elementary-Junior high school)	22	36.7
Occupation		
Treatment group		
- Employed	21	35
- Unemployed	39	65
Control group		
- Employed	39	65
- Unemployed	21	35

Table 2. Characteristics of respondents by age.

Respondent characteristics	Mean	SD	Minimum - Maximum
Age			
Treatment group	29.33	5.41	20-42
Control group	29.45	5.82	21-43

Table 3. Delivery assistance in treatment and control group.

Delivery Assistance	Treatment group given the SUMPING e-module		Control group not given the SUMPING e-module	
	f	%	f	%
Full	50	83.3	26	43.3
Partial	10	16.7	34	56.7
Total	60	100	60	100

Table 4. Length of labor in the treatment and control group.

Length of labor	Mean	SD	Minimum - Maximum
Treatment group	3.40	1.04	1.20-5.30
Control group	5.61	1.73	3.25-8.55

Table 5. Differences in length of labor in the treatment and control group.

Delivery assistance	Mean	SD	p
Treatment group			
- Full accompanying	3.16	0.94	0.000
- Not full accompanying (partial)	4.63	0.53	
Control group			
- Full accompanying	5.08	1.81	0.039
- Not full accompanying (partial)	6.01	1.58	

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