International Journal of Public Health Science (IJPHS)
Vol. 11, No. 3, September 2022, pp. 868~876
ISSN: 2252-8806, DOI: 10.11591/ijphs.v11i3.20756

The influence of smart mother classes toward stress, childbirth self-efficacy and birth outcomes

Runjati Runjati, Sri Rahayu, Dhita Aulia Octaviani
Poltekkes Kemenkes Semarang, Semarang, Indonesia

Article Info

Article history:

Received Nov 27, 2021
Revised Apr 30, 2022
Accepted Jun 20, 2022

Keywords:

Birth's outcomes
Confidence in labor
Coping skills
Stress

ABSTRACT

Coping efforts during pregnancy are significant in influencing better pregnancy and birth outcomes. This study aimed to prove the influence of smart mother classes (SMC) on stress, childbirth self-efficacy (CBSE), and birth outcomes. This research used an experimental design, pre and post-test control group design. The population was all pregnant women at 28-35 weeks of pregnancy in Semarang City, Indonesia. The sample was chosen by cluster random sampling, where 35 health centers in 12 regions were randomized as six regions (n=60) as intervention group (antenatal class and coping skill as smart mother classes) while the other six regions (n=60) as the control group (antenatal class only). Each region runs one class with 10 pregnant women. The groups were treated four times in four weeks. The measurement was before the treatment, fourth week, and at birth. This study used repeated-measures ANOVA. The results showed that the SMC was influenced significantly in reducing stress ($p=0.012$), and increasing CBSE but not statistically significant ($p>0.05$). The SMC also had a significant impact on the outcomes of birth ($p<0.05$), except the time of the first stage of labor ($p>0.05$). The study suggested a need for the provision of continuity and holistic midwifery care.

Corresponding Author:

Runjati Runjati
Poltekkes Kemenkes Semarang
Jl. Tirto Agung, Pedalangan, Banyumanik, Semarang
Email: runjati@yahoo.com

1. INTRODUCTION

Pregnancy can cause susceptibility to increased anxiety and stress including physiological and hormonal changes, physical discomfort, uncertainty, fear of possible complications during pregnancy and birth, concerns about the baby's or mother's health, significant life changes, and exacerbation or recurrence of psychiatric disorders that already exist [1]. Causes of stress and anxiety include a negative perspective on life, genetic predisposition, infection, young age, lack of sleep, physical demands, low coping system, low socioeconomic status, psychological violence, low nutritional value, environmental exposure, and low social support [2].

Stress and anxiety that occur during pregnancy affect the neurohormonal and immune systems. These factors can worsen pregnancy outcomes. This stress and anxiety stimulates the hypothalamic-pituitary-adrenal axis (HIPAA) system and adrenocorticotropin-releasing hormone (ACTH), autonomic nervous system (ANS), and corticotropin-releasing hormone (CRH), which stimulates the adrenal fetal to produce cortisol and causes a change in the cervix and myometrium, and increases placental CRH production which affects placental dysfunction and inflammatory cytokine production which causes a decrease in placental and fetal growth [2]. Prenatal stress causes inflammation and changes in endocrine markers during pregnancy, which are associated with premature birth and short gestational periods. Prenatal stress interferes with the

endocrine, immune, inflammatory, and nervous adaptation systems that normally support healthy pregnant women [3].

The impact of stress and anxiety during pregnancy is closely related to an increase in adverse pregnancy and birth outcomes. For example, if stress occurs in the early stages of pregnancy, miscarriage may occur [4]. Women with stress levels higher than their coping ability are significantly more likely to experience at least one pregnancy complication, preterm birth (PTB), shorter gestational periods, and low birth weight babies [5]. Stress before and during pregnancy is closely associated with poor obstetric outcomes [6]. Maternal stress is associated with negative consequences for mothers and babies, including increased pregnancy-related symptoms (such as nausea and vomiting), higher alcohol and tobacco use, more medical visits, obstetric complications, shorter pregnancy, delays in the development of fetal nerves, and problems with children's emotional behavior [7]. Stress can also contribute to increasing the risk of preterm birth and preeclampsia through stimulation of the sympathetic nervous system [8]. Furthermore the percentage of anxiety, stress, and depression during pregnancy is approximately 20%. It is associated with a range of physical problems such as congenital malformations, reduced birth weight, and gestational age, and neurodevelopmental, cognitive, and emotional and behavioral problems. The risk of childhood behavioral problems due to prenatal stress is between 10% and 15%, and the variance in cognitive development due to prenatal stress is approximately 17% [9]. So, there is a need to develop methods of intervention during pregnancy that are integrated with antenatal care. It should be affective to reduce maternal anxiety and depression. In the longer term should improve outcomes for infants and children.

Furthermore, the coping efforts made during pregnancy significantly influence better pregnancy and birth outcomes by minimizing or preventing the negative effects of emotional, behavioral, cognitive, and physiological responses to stress. Coping ability serves to select and implement appropriate stress management measures and as a defense resource for pregnant women and children against the potentially harmful effects of prenatal stress exposure [5]. Coping responses were associated with more favorable indicators of psychological well-being. Coping ability during pregnancy through positive assessment by creating positive meaning and focusing on personal development was associated with better outcomes for mothers and babies, fewer depressive symptoms, and fewer pregnancy-related problems [10], [11]. While one of the efforts to prevent problems and complications during pregnancy is by improving their knowledge and preparing them for childbirth through antenatal classes which are conducted regularly. Antenatal classes in Indonesia as part of the ministry of health program are integrated as part of antenatal care. Antenatal classes focus on the knowledge and skills related to pregnancy, birth, and postnatal care [12]. Thus, it is hoped that Antenatal classes can reduce mothers' anxiety and stress about childbirth. However, antenatal classes are more focused on knowledge and skills related to pregnancy and birth and postnatal care but they do not address the ability to manage emotional aspects and the ability to develop coping ability during pregnancy [13].

Previous research on antenatal class and coping skills training only measured stress levels, CBSE, cortisol, IgG levels, and the condition of the mother before delivery. These studies can improve stress and childbirth self-efficacy during pregnancy [14], [15]. Studies that measure the condition of the mother until the delivery process by looking at the outcome of labor has never been conducted. Therefore, this study aimed to prove the influence of smart mother class (SMC): coping skill and antenatal classes, toward maternal stress and beliefs about childbirth (CBSE), and birth outcomes.

2. RESEARCH METHOD

This study used an experimental design with a pre-post-test control group design. The study population included pregnant women at 28-35 weeks of pregnancy in Semarang City, Indonesia based on the Independent practice of midwives (PMB) and clinic region in Semarang City. The Inclusion criteria were a normal pregnancy without complications and a history of health problems. The sample was chosen using cluster random sampling, where 12 regions were chosen randomly from 35 health centers, then randomized to be six regions as intervention groups and six regions as control groups. Each region ran one class with 10 pregnant women, and the mothers were randomly assigned to each region. Thus, there were 12 classes which included six groups/regions of classes to be members of an experimental group (n=60) and six groups/regions of classes to be members of a control group (n=60). The groups were treated four times in four weeks and measured three times: before the treatment, in the fourth week after the last treatment, and during the delivery process.

The pregnant women in the control group were given standard antenatal education (SAE) and the experimental group was given a combination of coping skill training and standard antenatal education as a SMC method to reduce stress, increase CBSE, and improve birth outcomes. The intervention in the control group used the SAE developed by the ministry of health [12]. For the experimental group, the intervention for coping skill training used the module that was developed based on previous research and combined with SAE [14], [15]. The independent variables of this study were SAE and SMC, and the dependent variables are the level of

stress, CBSE, and birth outcomes. The stress level was measured using the perceived stress scale (PSS) [16]–[18], and the mother's confidence in her ability to face labor was measured using the CBSE instrument [19]. The birth outcomes were measured by the length of 1st stage and 2nd stage of labor, types of birth, rupture of the perineum, APGAR score, and labor difficulties or complications.

The intervention was performed for 4 weeks and measured in the first week before the intervention and the fourth week after the intervention. The third measurement was carried out when the mother was in labor to measure the stress level and CBSE, and after labor to determine the outcome of labor. The enumerator collected the data for each class before the intervention, four weeks after the intervention, and during and after the delivery to evaluate birth outcomes. Ethical Clearance was obtained from the Bioethics Commission of the Faculty of Medicine, Sultan Agung Islamic University Semarang number 510/VIII/2019/Bioethics Commission. Data were analyzed using T-test, Mann U Whitney to compare the characteristics and outcomes between the groups. Data were analyzed using repeated-measures ANOVA post hoc LSD to measure changes in PSS and CBSE after the intervention between groups.

2.1. Normality test data

The results of the normality test showed that most of the data were normally distributed. However, the characteristics of age, gestation (gestational age), and family support were not distributed normally in both groups. The detail information is shown in Table 1.

Table 1. Result of normality test

Variable	Group	
	SMC *P* *	SAE *P* *
Age	0.259	0.042
Gestation	0.032	0.033
Family support	0.000	0.000
PSS Score 1	0.567	0.727
PSS score 2	1.236	1.145
PSS score 3	0.887	1.099
CBSES score 1	0.782	0.137
CBSES score 2	1.168	0.616
CBSES score 3	0.900	0.212

Kolmogorov-Smirnov Z

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Subject characteristics

The descriptive data obtained in the two groups showed that the average age of the mothers in the intervention group was 28 years (18-38 years) and 27 years (19-38) years in the control group. The gestation periods were 27-35 weeks with an average of 32 and 31 weeks. The education level was almost similar in both groups, where the majority of the mothers had secondary education levels: 53% in the control group that provided standard antenatal education (SAE) only and 58% in the experimental group provided the SMC. In terms of family support, the data showed that both groups received support from their families. The differences were found in occupation, where the majority of the mothers in the experimental group were housewives (62%) while in the control group were mostly employees (50%) as shown in Table 2 characteristics of pregnant women.

To compare differences between the two groups, the Mann-Whitney U test was conducted and the result was $p>0.05$ in age, gestation periods, family support, type of occupation, and level of education which means that there were no differences in the gestation periods, family support, type of work, and education level in the two groups. So, it can be concluded that the respondent characteristic in the two groups is homogeneous.

3.1.2. Basic characteristics of stress level, and readiness to face labor or childbirth self-efficacy (CBSE)

The basic characteristics of anxiety levels, stress levels, coping abilities, and readiness for labor (CBSE) before the intervention were measured as shown in Table 3. The results of the differential analysis (*Levene Test*) on the stress level and readiness to face childbirth (CBSE) before treatment showed a value of $p>0.05$. Thus, it can be concluded that there were no differences in the initial condition before intervention in either group.

Table 2. Characteristics of pregnant women

Characteristics	SMC n=60		SAE n=60		p
	n (%)	The median (min-max)	n (%)	The median (min-max)	
Age		28 (18–38)		27 (19–38)	0.10*
Gestation		32 (27–35)		31 (27–35)	0.25*
Level of education					0.218*
Basic/elementary	12 (2)		10 (17)		
Intermediate/secondary	35 (58)		32 (53)		
High	13 (22)		18 (30)		
Occupation					0.236*
Housewife	37 (62)		27 (45)		
Employee	20 (33)		30 (50)		
Teacher	2 (3)		2 (3)		
Student	1 (2)		1 (2)		
Family support		9 (7–10)		9 (7–10)	1.12*

**Mann Whitney U test*

Table 3. Describes the basic characteristics of anxiety levels, stress levels, coping abilities, and readiness for labor (CBSE)

Variable	Group		p.
	SMC mean ± SD	SAE mean ± SD	
Stress level pre	17.22±4.02	17.17±4.28	0.676 *
CBSES score pre	49.03±5.68	49.90±5.40	0.497 *

**) Levene test*

3.1.3. The effect of SMC on the stress of pregnant women

Differential analysis between the two groups was conducted using the repeated ANOVA test with post hoc LSD as shown in Table 4 and Figure 1 the differences in stress scores before and after the intervention by a group. The results indicated that these treatments could reduce the stress scores of pregnant women. Pregnant women who were given treatments had a stress level of 0.070 lower than that of pregnant women who were not given treatment (control groups) but the difference was not significant (p=0.918). In the third measurement at birth, pregnant women who were given treatment had a stress level of 1.427 lower than pregnant women who were not given treatment (p=0.012). Thus, it was concluded that treatment could significantly reduce the stress levels in pregnant women.

Table 4. Differences in stress scores before and after the intervention by a group

Group	Stress score pre mean ± SD	Stress score post four weeks mean ± SD	p	Stress score at birth mean ± SD	p
SMC	17.22±4.02	16.91±3.89		17.40±3.59	
SAE	17.17±4.28	16.98±4.32		18.82±2.66	
SMC		-0.070	0.918	-1.427	0.012

Pre vs post: Repeated measured ANOVA, post hoc LSD

3.1.4. Proving the effect of pregnant mothers class actions and coping skills on maternal belief in facing childbirth self-efficacy (CBSE) in pregnant and childbirth women

Differential analysis between the two groups in three measurements was performed using the Repeated ANOVA test with post hoc LSD as shown in Table 5 and Figure 2, and the differences in CBSE scores before and after the intervention by the group. The results showed that the effect of treatment on the second measurement compared to the first measurement before treatment showed that pregnant women who were given treatment (experimental group) had a CBSE score of 0.655 higher than pregnant women who were not given treatment (control group) but the difference was not significant (p =0.537). In the third measurement at birth, pregnant women who were given treatment had a CBSE score of 1.097 higher than pregnant women who were not given treatments but the difference was not significant (p=0.305).

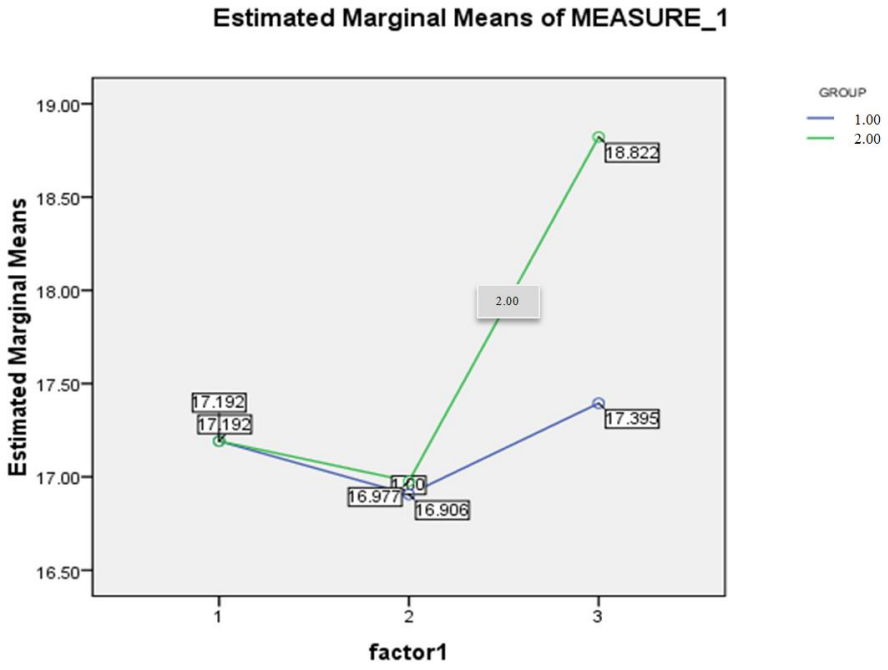

Figure 1. Stress score diagram before and after the intervention in the experimental (1) group (n =60) and the control (2) group (n =60)

Table 5. Differences in CBSE scores before and after the intervention by a group

Group	CBSE Score pre mean ± SD	CBSE Score post 4 weeks mean ± SD	p	CBSE score at birth mean ± SD	p
SMC	49.03±5.68	50.58±6.382		50.42±5.83	
SAE	49.90±5.40	50.40±6.17		49.77±7.03	
SMC		0.655	0.537	1.097	0.305

Pre vs post-Repeated Measured Anova, post hoc LSD

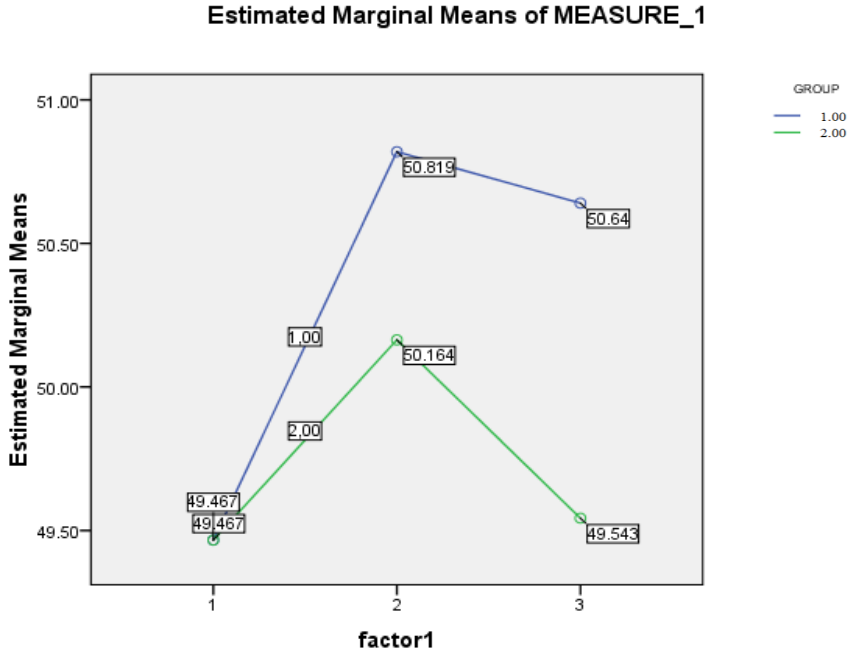

Figure 2. CBSE score diagram before and after the intervention in the experimental (1) group (n=60) and the control (2) group (n=60)

3.1.5. The effect of smart mother classes (SMC) toward labor outcomes

Labor outcomes measured included the length of 1st stage and 2nd stage, type of labor, APGAR score, perineal tears, and labor difficulties. The study resulted in labor outcomes between SMC and SAE groups, as shown in Table 6.

Table 6. Birth outcomes

Birth outcomes	SMC n=60 n (%)	SAE n=60 n (%)	p
Length of 1st stage			0.748 *
≤3 hours	19 (32%)	25 (42%)	
3-12 Hours	39 (65%)	39 (48%)	
> 12 hours	2 (3%)	0 (0%)	
Length of 2nd stage			0.011 *
≤ 30 minutes	51 (85%)	51 (85%)	
30 Minutes -1 hour	9 (15%)	6 (10%)	
> 1 hour	0 (0%)	3 (5%)	
type of labor			0.011 **
Spontaneous	49 (81.7%)	38 (63.3%)	
Operation/SC	11 (18.3%)	22 (36.7%)	
Apgar score			0,000 *
≤ 7	0 (0%)	4 (6.7%)	
8-10	60 (100%)	56 (93.3%)	
perineal tears			0.283 **
SC	11 (18.3%)	22 (36.7%)	
There are no tears	5 (8.3%)	3 (5%)	
Grade I	12 (20%)	4 (6.7%)	
Grade II	32 (53.3)	31 (51.7%)	
Labor difficulties			0.000 **
No complications	47 (78.3%)	29 (48.3%)	
With complications	13 (21.7%)	31 (51.7%)	

* T-Test, ** Mann U Whitney

Birth Outcomes consisted of the 1st stage of labor, the 2nd stage of labor, types of labor, perineal tears, complications of labor, and Apgar scores. The length of the stage in both groups was similar, mostly showing that the length of labor in the first stage ranged from three hours to 20 hours (65% and 48%) which was the normal length of the first stage of labor. The differential analysis between the two groups using a t-test obtained a $p>0.05$ (0.748) so that there was no difference in the length of the first stage between the experimental group and the control group.

The length of the 2nd stage of labor in both groups was mostly less than 30 minutes, but there were three respondents (5%) in the control group who had more than 1-hour of process, which showed a prolonged the 2nd stage of labor. The result of the t-test score obtained a $p<0.05$ (0.011) so thus, it was concluded that there were differences in the length of the 2nd stage of labor in the experimental and the control group.

During the delivery, it was found that most of the experimental group showed better outcomes, with 49 respondents (81.7%) having a spontaneous type of labor and only 11 respondents (18.3%) having sectio caesarea (SC). In the control group, 38 respondents (63.3%) were having spontaneous labor and the remaining 22 respondents (36.7%) gave birth by SC. Differential analysis between the two groups was done by using different Mann U Whitney and obtained $p<0.05$ (0.025) so that it was concluded that there were differences between the experimental group and the control group in the birth outcome based on the type of delivery. In terms of the APGAR scores, it was found that all the 60 respondents (100%) in the experimental group had APGAR scores of 8 to 10 and none had APGAR scores of ≤7. In the control group, however, 4 respondents (6.7%) had APGAR scores ≤7, while the remaining 56 respondents (93.3%) had APGAR scores of 8 to 10. The result of the Mann U Whitney test obtained a p-value <0.001 (0.000) so that it was concluded there was a difference in the score of the experimental group and the control group.

In the rupture of the perineal, it was found that more than half of the respondents in both groups experienced grade 2 perineal tears. In detail, in the experimental group, there were 11 (18.3%) respondents in labor by SC, 5 respondents (8.3%) experienced no tears, 12 respondents (20%) experienced grade 1 perineum tears, and 32 respondents (53.3%) with grade 2 perineum tears. Differential analysis between the two groups was done by implementing the Mann-Whitney U test and obtained $p>0.05$ (0.283) so that it was concluded there were no differences between the experimental group and the control group in the birth outcomes based on the type of perineal tears.

Difficulties in labor include gemelli, serotinus, retentions of the placenta, breech presentation, early rupture of membrane, uterine inertia, prolonged labor, pre-eclampsia, cephalic pelvic disproportion (CPD),

Placenta previa, the mother who is unable to push hard, latitude and induction of labor. The study showed that the majority of the mothers (78.3%) in the experimental group experienced no complications. In contrast, more than half of respondents (51.7%) in the control group gave birth with various complications. Differential analysis between the two groups was done by implementing the Mann U Whitney test and obtaining a $p<0.001$ (0.000) so that it was concluded that there were differences between the experimental group and the control group in the birth outcome based on complications of labor.

3.2. Discussion

The PSS instrument defines scores of which are 0-13 mild stress, 14-26 moderate stress, and 27-40 severe stress [6]. The study showed that mothers experience mild stress during pregnancy, but the stress score in the intervention group was lower than that in the control group. At birth, the mother had an increased stress score even though the intervention group had a lower stress score than that in the control group with a score different 1.427.

Anxiety, stress, and depression in pregnancy are critical situations because they affect the wellbeing and health outcomes of the mother and fetus and thus trigger postpartum depression [20]. Healthy pregnant women show low-stress levels and stable conditions of cortisol, catecholamines, and blood pressure [4]. The mother's adaptability during pregnancy is closely related to their coping skills which distinguish the psychological and physiological effects of stress [21]. The results of the study were in line with the theory that stress is a process in which environmental stimuli (e.g. stressful events in life) exceed the ability of an individual to cope with the cause of psychological and biological changes that may put a person at risk of disease caused by stress. Subsequently, stress induces physiological responses that seek to maintain homeostasis [10]. It can be explained that SMC provides knowledge and skill to manage stress and skill for the mother to find homeostasis by exercising coping ability. The physiological response to stress which has been shown to directly affect pregnancy outcomes is the production of neuroendocrine cells and immunity as an inflammatory process [22]. Furthermore, the study also found an association between anxiety, stress, and hormonal processes such as cortisol and the physiological mechanisms through which pregnancy anxiety may exert its effects on birth and infant outcomes [23]. Maternal stress during pregnancy can increase maternal cortisol levels, which can reduce fetal growth compared to the control group [24].

Furthermore, the results of the study follow the theory that childbirth self-efficacy (CBSE*)* is a belief in one's ability to face birth, an important marker of coping skills for someone to face labor and birth [25]. Self-efficacy is a mother's belief in her ability to deal with or overcome a particular situation and plays an important role in behavioral learning. Self-efficacy has two main aspects namely outcome expectancy (OE) and efficacy expectancy (EE). Outcome expectancy (OE) refers to the belief that certain behaviors produce certain outcomes. OE is a belief that can enhance the experience of childbirth resulting from the specific behavior performed. Efficacy expectancy (EE) is an individual's perception of their ability to perform specific coping behaviors during labor [19]. The SMC combines standard antenatal class and coping skills to provide mothers with not only knowledge of pregnancy care and facing childbirth but also the ability to practice ability in the situation of labor. Furthermore, the SMC treated mothers to develop the belief that certain behaviors will produce a certain outcome and develop the ability to perform specific coping during labor. However, the control groups could not perform specific coping during labor.

The theory also explains that maternal stress can increase the risk of labor complications and influence the condition of the birth canal and babies. Pregnant women express anxiety and stress during pregnancy until before the birth process which causes stressors. Individual responses to stressors in the form of anxiety and moments when facing anxiety and stress are determined by copying, the oriented and intra-physical efforts to manage the environment, and internal needs and conflicts regarding it [26]–[28]. Coping is defined as a cognitive change and behavioral effort aimed at meeting the needs or demands of a particular situation that is considered as stress. Pregnant women need to do this by changing their logic to master, tolerate, reduce, or minimize pressure, to find security during pregnancy and birth [29], [30]. In addition, the decrease in stress levels, as well as an increase in confidence in the face of childbirth (CBSE) and improved coping skills, will also affect the outcome of labor such as length of the second stage of labor, types of labor, difficulties at birth and APGAR score of the baby. This can be seen from the results of the study that labor outcomes in the experimental group that was given the antenatal class and coping skills were better than those in the control group that was only given the antenatal class. It can be explained that the physiological stress response has been shown to directly impact obstetric outcomes during labor. The well-being of an infant as the outcome of birth is affected by the psychological condition of the mother, when the mother is subjected to psychosocial stress during her pregnancy, it can put the wellbeing of children at risk [31]. Mothers exposed to stressful conditions were more prone to preterm birth than those without stress. Thus, it affects the outcomes of birth. The mother who has intervention SMC has better outcomes of birth rather than those in the control group. Thus, it is crucial to managing stress during pregnancy that would have better

pregnancy outcomes, birth, and postpartum, and children's health status. It can be concluded that coping ability during pregnancy can be a predictor of the outcome of the pregnancy and afterward health outcome of mother and children.

The limitation of the study is that the result could not be generalized to all pregnant women but it could describe the condition of pregnant women. The study implies that all pregnant women are recommended to be provided not only the standard antenatal classes but also the need to be combined with coping skills as part of holistic midwifery care.

4. CONCLUSION

The SMC: coping skill and antenatal education has a significant effect (p=0.012) in decreasing stress during pregnancy and labor rather than SAE and also has the effect of increasing CBSE during pregnancy and labor. Further, more pregnant women who received SMC had a better birth outcome regarding the second stage of labor, types of birth, APGAR score, and fewer complications during birth.

REFERENCES

[1] A. Wenzel and S. Stuart, *Anxiety in childbearing women: Diagnosis and treatment.* American Psychological Association, 2011.

[2] G. Latendresse, R. J. Ruiz, and B. Wong, "Psychological distress and SSRI use predict variation in inflammatory cytokines during pregnancy," *Open Journal of Obstetrics and Gynecology*, vol. 3, no. 1A, pp. 184–191, 2013, doi: 10.4236/ojog.2013.31A034.

[3] M. E. Coussons-Read, "The psychoneuroimmunology of stress in pregnancy," *Current Directions in Psychological Science*, vol. 21, no. 5, pp. 323–328, Oct. 2012, doi: 10.1177/0963721412453720.

[4] L. M. Christian, "Physiological reactivity to psychological stress in human pregnancy: Current knowledge and future directions," *Progress in Neurobiology*, vol. 99, no. 2, pp. 106–116, Nov. 2012, doi: 10.1016/j.pneurobio.2012.07.003.

[5] F. Wakeel, L. E. Wisk, R. Gee, S. M. Chao, and W. P. Witt, "The balance between stress and personal capital during pregnancy and the relationship with adverse obstetric outcomes: findings from the 2007 Los Angeles Mommy and Baby (LAMB) study," *Archives of Women's Mental Health*, vol. 16, no. 6, pp. 435–451, Jun. 2013, doi: 10.1007/s00737-013-0367-6.

[6] W. P. Witt, K. Litzelman, E. R. Cheng, F. Wakeel, and E. S. Barker, "Measuring stress before and during pregnancy: a review of population-based studies of obstetric outcomes," *Maternal and Child Health Journal*, vol. 18, no. 1, pp. 52–63, Jan. 2014, doi: 10.1007/s10995-013-1233-x.

[7] J. H. Goodman *et al.*, "CALM Pregnancy: results of a pilot study of mindfulness-based cognitive therapy for perinatal anxiety," *Archives of Women's Mental Health*, vol. 17, no. 5, pp. 373–387, Jan. 2014, doi: 10.1007/s00737-013-0402-7.

[8] C. Lilliecreutz, J. Larén, G. Sydsjö, and A. Josefsson, "Effect of maternal stress during pregnancy on the risk for preterm birth," *BMC Pregnancy and Childbirth*, vol. 16, no. 1, Jan. 2016, doi: 10.1186/s12884-015-0775-x.

[9] V. Glover and J. Barlow, "Psychological adversity in pregnancy: what works to improve outcomes?," *Journal of Children's Services*, vol. 9, no. 2, pp. 96–108, Jun. 2014, doi: 10.1108/jcs-01-2014-0003.

[10] M. J. Galanakis, A. Palaiologou, G. Patsi, I.-M. Velegraki, and C. Darviri, "A literature review on the connection between stress and self-esteem," *Psychology*, vol. 07, no. 05, pp. 687–694, 2016, doi: 10.4236/psych.2016.75071.

[11] C. M. Guardino and C. D. Schetter, "Coping during pregnancy: a systematic review and recommendations," *Health Psychology Review*, vol. 8, no. 1, pp. 70–94, Jan. 2013, doi: 10.1080/17437199.2012.752659.

[12] Kemenkes RI, Guidelines for conducting classes for pregnant women (In Indonesia: *Pedoman pelaksanaan kelas ibu hamil)*. Bakti Husada, 2011.

[13] C. S. Brixval, S. F. Axelsen, S. G. Lauemøller, S. K. Andersen, P. Due, and V. Koushede, "The effect of antenatal education in small classes on obstetric and psycho-social outcomes - a systematic review," *Systematic Reviews*, vol. 4, no. 1, Feb. 2015, doi: 10.1186/s13643-015-0010-x.

[14] Runjati, H. Susanto, D. R. Sawitri, and S. Thaufik, "The effect of antenatal class plus coping skill training on the level of stress and childbirth self-Efficacy," *Advanced Science Letters*, vol. 23, no. 4, pp. 3329–3333, Apr. 2017, doi: 10.1166/asl.2017.9125.

[15] Runjati, H. Susanto, D. R. Sawitri, and S. Thaufik, "The impact of antenatal coping skill training (ACST) towards cortisol and igg serum level among pregnant women," *Hiroshima Journal of Medical Sciences*, vol. 67, pp. 21–28, 2018.

[16] J. F. Wang and A. A. Billings, "Psychometric evaluation of the wang pregnancy stress scale: revised for taiwanese women," *Journal of Nursing Measurement*, vol. 23, no. 3, pp. 409–424, 2015, doi: 10.1891/1061-3749.23.3.409.

[17] S. Cohen, "Perceived Stress Scale," *Mindgarden*, 1994. http://www.mindgarden.com/products/pss.htm.

[18] F. Karam *et al.*, "Reliability and validity of the 4-item perceived stress scale among pregnant women: Results from the OTIS antidepressants study," *Research in Nursing & Health*, vol. 35, no. 4, pp. 363–375, Apr. 2012, doi: 10.1002/nur.21482.

[19] I.-M. Carlsson, K. Ziegert, and E. Nissen, "Psychometric properties of the Swedish childbirth self-efficacy inventory (Swe-CBSEI)," *BMC Pregnancy and Childbirth*, vol. 14, no. 1, Jan. 2014, doi: 10.1186/1471-2393-14-1.

[20] Y. A. Kartal and U. Y. Oskay, "Anxiety, depression and coping with stress styles of pregnant women with preterm labor risk," *International Journal of Caring Sciences*, vol. 10, no. 2, pp. 716–725, 2017.

[21] C. D. Schetter and L. Tanner, "Anxiety, depression and stress in pregnancy," *Current Opinion in Psychiatry*, vol. 25, no. 2, pp. 141–148, Mar. 2012, doi: 10.1097/yco.0b013e3283503680.

[22] G. Fink, "Stress: Concepts, definition and history," in *Reference Module in Neuroscience and Biobehavioral Psychology*, Elsevier, 2017.

[23] H. S. Kane, C. D. Schetter, L. M. Glynn, C. J. Hobel, and C. A. Sandman, "Pregnancy anxiety and prenatal cortisol trajectories," *Biological Psychology*, vol. 100, pp. 13–19, Jul. 2014, doi: 10.1016/j.biopsycho.2014.04.003.

[24] L. M. Ellman *et al.*, "Maternal cortisol during pregnancy and offspring schizophrenia: Influence of fetal sex and timing of exposure," *Schizophrenia Research*, vol. 213, pp. 15–22, Nov. 2019, doi: 10.1016/j.schres.2019.07.002.

[25] L. Schwartz, J. Toohill, D. K. Creedy, K. Baird, J. Gamble, and J. Fenwick, "Factors associated with childbirth self-efficacy in Australian childbearing women," *BMC Pregnancy and Childbirth*, vol. 15, no. 1, Feb. 2015, doi: 10.1186/s12884-015-0465-8.

[26] S. Rabiepoor, M. Abedi, E. Saboory, and H. R. Khalkhali, "Stress during pregnancy affected neonatal outcomes and changed cortisol and leptin levels both in mothers and newborns," *Journal of Neonatal-Perinatal Medicine*, vol. 12, no. 2, pp. 209–219,

Jun. 2019, doi: 10.3233/npm-1818.
[27] G. K. Madhavanprabhakaran, M. S. D'Souza, and K. S. Nairy, "Prevalence of pregnancy anxiety and associated factors," *International Journal of Africa Nursing Sciences*, vol. 3, pp. 1–7, 2015, doi: 10.1016/j.ijans.2015.06.002.
[28] N. M. Ahmed, E. A. Fadel, and N. F. H. Khedr, "Stressors and social support among pregnant women," *IOSR Journal of Nursing and Health Science*, vol. 6, no. 4, pp. 52–58, 2017, doi: 10.9790/1959-0604035258.
[29] S. M. S. Baqutayan, "Stress and coping mechanisms: A historical overview," *Mediterranean Journal of Social Sciences*, vol. 6, no. 2S1, pp. 479–488, 2015, doi: 10.5901/mjss.2015.v6n2s1p479.
[30] N. T. L. Gaol, "Teori Stres: Stimulus, Respons, dan Transaksional," *Buletin Psikologi*, vol. 24, no. 1, p. 1, Jun. 2016, doi: 10.22146/bpsi.11224.
[31] R. Vijayaselvi, M. M. Beck, A. Abraham, S. Kurian, A. Regi, and G. Rebekah, "Risk factors for stress during antenatal period among pregnant women in Tertiary Care Hospital of Southern India," *Journal of Clinical and Diagnostic Research*, vol. 9, no. 10, pp. 1–5, 2015.

BIOGRAPHIES OF AUTHORS

Runjati Runjati s an Associate Professor of Poltekkes Kemenkes Semarang, in Midwifery Department. I am also interested in the midwifery area, maternal and child health, and women's health. She can be contacted at email: runjati@yahoo.com.

Sri Rahayu is an Asociate Professor of Poltekkes Kemenkes Semarang. I am interested in midwifery-focused maternal and child health and complementary care. She can be contacted at email: yayoekSR_74@yahoo.com.

Dhita Aulia Octaviani is Assistant Professor of the Department of Midwifery, Poltekkes Kemenkes Semarang. I am interested in the midwifery area, including maternal and child health. She can be contacted at email: dhitaaulia@poltekkes-smg.ac.id.