

The Effects of Module in Normal Postpartum Mothers Empowerment Concerning Postpartum Exercise on Diastasis Recti Abdominis in Puskesmas Garuda Bandung

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Abstract

Indonesian health demographic survey in 2012 indicated maternal mortality rate in Indonesia was 359 per 100,000 live births, mostly caused by postpartum complications, one of them is weak abdominal muscles. The issue could be prevented and addressed with early ambulation, namely postpartum exercise. This research is aimed at analyzing the effects of module in normal postpartum mothers empowerment concerning postpartum exercise on diastasis recti abdominis. This research is quasi-experimental, pre-post test two group design. The population is normal postpartum mothers with diastasis recti abdominis at least 2.5 cm using consecutive sampling in which 60 samples were obtained, namely 30 subjects of treatment group and 30 subjects of control group. Measuring ruler was used to measure diastasis recti abdominis, these variables were measured before and after the provision of module for 6 weeks. The data was analyzed using Mann Whitney test. The statistical analysis results indicated diastasis recti abdominis in the treatment group decreased faster than the control group (p-value = 0.000) ($p < 0.05$). The conclusion was the modul usage by normal postpartum mothers could reduce diastasis recti abdominis. Normal postpartum mothers were suggested taking postpartum exercise for recovering the strength of abdominal muscles to prevent bleeding following childbirth.

Keywords: *Normal Postpartum, Module, Postpartum Exercise*

I. INTRODUCTION

Maternal mortality rate (MMR/AKI) is the indicator of people's health status of a country. One of MDGs targets in 2015 is to decrease MMR to be 102 per 100,000 live births (Indonesian Ministry of National Development Planning, 2012). In fact, based on the health demographic survey in Indonesia in 2012, the number has been increased namely 359 per 100,000 live births (the Ministry of Health of the Republic of Indonesia (*Kemenkes RI*), 2015), thus it requires hard work to reach the target even though the antenatal and delivery care services by trained health personnel have been sufficiently great. According to the Ministry of Health of the Republic of Indonesia (2015), most of maternal mortality occurs due to postpartum complication, namely bleeding (30.3%), hypertension in pregnancy (27.1%), infection (7.3%). Therefore, postpartum service is important as one of the strategies to decrease MMR (Syaifuddin, 2009). Postpartum care may increase mothers' health status, avoid and overcome complications (WHO, 2005).

Ricci (2013) and Reeder et al (2015) explained that during pregnancy, abdominal muscles stretch. After giving birth, it should be back to the initial condition, however if the rectus abdominis muscle stretches or is separated, the abdominal organs are not supported as it should be. The affecting factors are obesity, multipara and macrosomia (big baby) (Lowdermilk & Perry, 2007). Other factors are age and parity (Ambarwati, 2010). Diastasis recti can also cause back pain, pelvic floor dysfunction, hernia, cosmetic defects. Spitznagle *et al* in 2007 conducted research on the prevalence of diastasis recti to urogynecological patients, and it was found out that 66 percent had support related to pelvic dysfunction (SPFD), stress diagnosis, urinary incontinence, fecal incontinence and pelvic organ prolapse.

According to Scott (2006), percentage of diastasis recti in the third semester of pregnancy is 66 percent, immediately following labor is 53 percent and two months following labor is 36 percent. Based on the prevalence percentage, there are sufficiently great numbers of women suffering

diastasis recti, thus it requires effort to avoid and minimize such event. Recommended rest, diet, exercise or sports, proper body mechanics, and good posture can recover tonus of the abdominal wall muscle. Exercise is one of the efforts to restore muscle strength to normal. According to Reeder, et al (2015), postpartum exercise accelerates recovery, prevents complications, and strengthens back muscles, pelvic floor and abdominal muscles. Abdominal muscles strengthening is beneficial to tighten the uterine wall, accelerate the involution of uterus and accelerate lochia production. The benefits of a speedy and good physical recovery for mothers are better feeling, to be healthier, stronger, and make it possible for them to take care of and raise their babies. Meanwhile, babies receive better care and fulfilled needs from their mothers (Ambarwati, 2010). According to Huliana (2003), the proper exercise after giving birth is "Postpartum Exercise". Postpartum exercise is done once a day and it is suggested to be done between meals, in the morning or evening, and each movement can be done for five to ten times and one movement is added each day until the tenth day. Postpartum exercise is done continuously until the end of the sixth week.

Research of Rullynil, et al (2014) and Siregar (2014) indicated that postpartum exercise affected the high decrease of fundus uteri ($p = 0.00$). The results of research of El-Mekawy, *et al* in 2013 stated that abdominal exercise and the use of abdominal belts are statistically no difference but abdominal exercise leads to significant increase in muscle strength compared with belt usage. Postpartum exercise is taken in six weeks, while the normal postpartum mother was treated at the health center for as long as three days, the postpartum exercise should be done at home. The success of postpartum exercise depends on the readiness of postpartum mothers and in order for the postpartum mothers to do postpartum exercise independently, they must be provided with knowledge and skills to understand and to be skilled in doing postpartum exercise and also to be positive about the postpartum exercise. Knowledge and skills can be obtained through module learning, since basically learning through a module is to learn independently (Sungkono, 2013).

Based on the result of interview with four postpartum mothers, the media used in postpartum exercise is only leaflet, which makes them less interact directly with the media to form the understanding and experience of skills learned. Postpartum mothers need easy-to-learn and interesting module so that the understanding and experience of concepts and skills concerning learned postpartum exercise can be implemented properly. To the author's knowledge from previous studies, there has been no module concerning postpartum exercise which can be used by the postpartum mothers to do postpartum exercise at home.

II. METHOD OF RESEARCH

This is Quasi-Experimental research with pretest - posttest two group designs (Grove *et al*, 2013). The research involved two groups, namely the treatment group which was given intervention for six weeks, and the control group which was not given intervention (intervention was given after the research was completed). Each group was measured before the intervention (pretest) and after the intervention (posttest). Independent variable is module in family empowerment concerning postpartum exercise, and dependent variable is diastasis recti abdominis, and intermediate variable is mother's knowledge, attitude and skill. This research was conducted at Garuda Public Health Center of Bandung Municipality in July to October 2016.

The population is normal postpartum mothers who gave birth at the Garuda Public Health Center of Bandung Municipality, from July to December 2015, namely 860 postpartum mothers with monthly average of 72 people. The sampling method is consecutive sampling, with inclusion criteria: normal postpartum mother at least 6 hours of postpartum, minimum diastasis recti abdominis of 2.5 cm, and exclusion criteria: postpartum mothers with action (SC, FE, VE), postpartum mothers with complications (DM, hypertension, bleeding/anemia). Based on the formula of Lemesshow, *et al* (1997 in Suyatno, 2010), total samples obtained were 33 respondents for the treatment group and 33 respondents for the control group. The number of normal postpartum mothers who met the criteria were 66 mothers (33 mothers of the treatment group and 33 mothers of the control group), 3 mothers were dropped out: one mother did not take postpartum exercise because her child was hospitalized

and two mothers moved out of town when the research was carried out. Thus, the final total samples were 30 mothers of the treatment group and 30 mothers of the control group.

The research was begun by consulting the module made by the researchers to three lecturers of health promotion course consisting of two masters of health promotion and one master of public health, and two lecturers of maternity nursing course consisting of one master of maternity nursing and one master of reproduction health. The input summary is as follows: the image on the cover should be replaced with appropriate image, the points which must be considered in doing postpartum exercises should be removed due to inappropriate contents, images in seventh and eighth pages should be replaced with appropriate images, and there should be an evaluation sheet. After being revised, the module was subsequently tested to 10 normal postpartum mothers at Garuda Public Health Center, and the result indicated that the module contents can be understood and it has interesting layout. Similarly, the questionnaire on validity test was sent out at Garuda Public Health Center of Bandung Municipality, and since the test sample and the research sample could not be the same, the module and questionnaire test were conducted on July 29-31, 2016 to ten mothers. In questionnaire concerning knowledge, r count value > 0.632 (0.667- 0.937), and reliability > 0.9 . In questionnaire concerning attitude, r count > 0.632 (0.779-0.956), and reliability > 0.9 . Questionnaire concerning skill was in accordance with SOP.

Sample was determined by finding subjects which met the research criteria. In order for the control group not to be exposed by the treatment group and the research result to not be bias, the treatment group was first researched until it fulfilled the quota of 33 subjects, followed by research on the control group by noting that the control group subject lived at least in different RW and did not know the treatment group.

Measurements of knowledge, attitude, age, parity using questionnaire were conducted on the first day before postpartum mothers took postpartum exercise by asking the mothers to fill out questionnaire of knowledge, attitudes and characteristics in 30 minutes. Subsequently, the mothers' skill on postpartum exercise was measured using an observation sheet referring to ten postpartum exercise movements. Then, the measurement was ended with measuring diastasis recti abdominis using ruler. The methods were as follows: 1) position the mother lying on her back without a pillow; 2) place the fingertip of one of your hands on the midline of the abdomen with the tip of the index finger right below the umbilicus and put the other fingers longitudinally toward the pubic symphysis; 3) ask mother to raise her head and put her chin on her chest. Make sure the mother's hands not push into bed to assist her, as this prevents the use of abdominal muscles; 4) when the mother attempts to put her chin between her breasts, press your fingertips gently close to her abdomen. You will feel the abdominal muscles like two rubber bands approaching the midline from both sides; 5) measure the gap using a ruler when the muscles are contracted. Write down the gap distance; 6) ask mother to lower her head; 7) when lowering the head, the abdominal muscles will move further apart and less distinguishable when the muscles relax. Your fingertips will follow the rectus muscles separating into the lateral side of each abdomen; 8) measure the distance between the two rectus muscles during relaxation. 9) write down the measurement results (Mariah and Alfiyati 2012 in Ernawati, 2013).

The first step of research on the treatment group was training on the module usage. The researcher presented material concerning the concept of postpartum exercise and demonstrated the movement of postpartum exercise for 1st day to the 10th day, and the postpartum mothers were given time to study the module, then the mothers demonstrated the movement of postpartum exercise for 1st day. Following the training, the mothers were provided with the module as a guide for doing postpartum exercise for the 2nd day until the end of the 6th week both at the public health center and home and provided with a log book to document the postpartum exercises taken every day. The second step was observation of postpartum mothers in doing postpartum exercise from the 2nd day to 10th day assisted by their families or cadre both at the community health center and home, not only because there was one new movement every day from the 2nd day to the 10th day, but also to ensure that the postpartum exercise was performed by the postpartum mothers and their movements were correct

and documented in the log book. Postpartum exercise was conducted at home using a bed or mat. The third step was making sure that the movement of postpartum exercise in the 11th day to the end of the 6th week exactly the same as the 10th day, and in order to ensure that the postpartum exercise was done by postpartum mothers, the researchers assisted by mothers' family or cadre carried out direct observation and documented it through the log book. In the end of the 6th week, the postpartum exercise implementation period was evaluated, followed by the measurement of knowledge, attitude, skills and diastasis recti abdominis of the treatment group and control group using the same measuring instrument. Especially for the control group, after the evaluation they were provided with module and were taught about the postpartum exercise.

In order to analyze the diastasis recti abdominis, and knowledge, attitude, skill before and after provided with module on postpartum exercise, the test on data normality was taken, considering the total samples were less than 50, to find out the data normality based on Skewness value divided by the standard error, in which if ≤ 2 , the data was normally distributed (Hastono, 2007), since one of the data of Skewness value divided by the standard error > 2 , then the data is abnormally distributed, so that to analyze the difference of diastasis recti abdominis, knowledge, attitude, and skill before and after being provided with module on postpartum exercise in the treatment group and the control group, Wilcoxon test was taken and in order to analyze the relationship of knowledge, attitude, skill, age and parity of mothers with diastasis recti abdominis, Spearman Rank Correlation test was taken with coefficient interval and level of relation namely 0.00 – 0.199 very low, 0.20 - 0.399 low, 0.40 - 0.599 medium, 0.60 - 0.799 strong, 0.80 - 1 very strong (Sugiyono, 2011). Meanwhile, in order to analyze the effect of module on normal postpartum mother empowerment concerning postpartum exercise on diastasis recti abdominis, Mann Whitney test was taken, with the test decision in which if $p \text{ value} < 0.05$ statistically there is significant difference, but if $p \geq 0.05$ it means that there is no meaningful difference.

III. RESULTS

A. *Difference*

Table 1 Difference of Knowledge, Attitude and Diastasis Recti Abdominis of Normal Postpartum Mothers Before and After Intervention (n = 30)

Variable	Group	Mean Rank		Z	P value
		Negative	Positive		
Knowledge	Treatment	2.75	15.91	-4.592 ^b	0.000
	Control	13.78	9.94	-2.032 ^c	0.042
Attitude	Treatment	6.00	16.18	-4.537 ^b	0.000
	Control	9.08	10.42	-1.635 ^b	0.102
Skill	Treatment	0.00	15.15	-4.914 ^b	0.000
	Control	0.00	1.00	-1.000 ^b	0.317
Diastasis Recti Abdominis	Treatment	15.50	0.00	-4.785 ^c	0.000
	Control	11.50	0.00	-4.156 ^c	0.000

There was significant difference or increase in the attitude and skill of mothers who were provided with module ($p < 0.05$), while there was no difference in mothers who were not provided with module ($p \geq 0.05$). There was significant difference in the knowledge of mothers and diastasis recti abdominis either who were provided with module or not ($p \text{ value} < 0.05$), however based on the mean rank, the knowledge of mothers who were provided with module was improved, likewise the diastasis recti abdominis of mothers who were provided with module significantly decreased.

B. Relation

Table 2 Relation of Knowledge, Attitude, Skill, Age, Parity of Normal Postpartum Mothers and Diastasis Recti Abdominis (n = 30)

No.	Independent Variable	P value	r
1.	Knowledge	0.418	0.154
2.	Attitude	0.611	0.097
3.	Skill	0.582	0.105
4.	Age	0.234	0.224
5.	Parity	0.863	0.033

There was no significant relation of knowledge, attitude, skill, age and parity to the decrease in diastasis recti abdominis ($p \text{ value} \geq 0.05$). The correlation coefficient values of knowledge, attitude, skill and parity were between $r = 0.00 - 0.199$ indicating very low correlation, meanwhile r value of variable age was between $0.20 - 0.399$ indicating low correlation. This suggested that the age factor of normal postpartum mothers had better relation to decreased diastasis recti abdominis compared to other factors.

C. Effect

Table 3 The Effects of Module in Normal Postpartum Mothers Empowerment concerning Postpartum Exercise on Diastasis Recti Abdominis.

Diastasis recti abdominis	Mean Rank	Z	P (Delta)
Treatment	45.50	- 6.679	0.000
Control	15.50		

There was significant difference in diastasis recti abdominis of normal postpartum mothers who were either provided with module or not ($p < 0.05$). Based on the statistical test, it can be concluded that the use of module in postpartum exercise by normal postpartum mothers at least for 6 weeks can decrease diastasis recti abdominis.

VI. DISCUSSIONS

A. Difference of Knowledge, Attitude, Skill and Diastasis Recti Abdominis Before and After Intervention

The knowledge increase in this study is consistent with Notoatmodjo's opinion that knowledge can be gained through module learning, since basically, learning with module system provides an opportunity to learn independently according to individual learning acceleration (Sungkono, 2013). The increase in knowledge of normal postpartum mothers concerning postpartum exercise in this research is possible since the module has been through the test phase, layout, systematics, language, material, composition and module material completeness tests, thus module used during this research is the module which has been revised. This is in accordance with the opinion of the normal postpartum mother during the posttest that the module layout is interesting, the material in the module is sufficiently good, clear, and understandable and it is supported by the normal postpartum mothers' job which is 100 percent a housewife. These conditions allow normal postpartum mothers to have sufficient time to study the module, thus they have better ability to understand the module in postpartum exercise.

Normal postpartum mothers should have knowledge of postpartum exercise, because it will affect the implementation of postpartum exercise. Normal postpartum mothers who have good level of knowledge will have good understanding of the benefits and effects of postpartum exercise, thus

they will have positive attitude to the postpartum exercise concept. Attitude is a person's tendency to act or behave (Suryabudhi, 2003).

The research results indicated that the provision of module can improve the attitude of postpartum normal mothers concerning the importance of doing postpartum exercise. The results are consistent with the result of Binarwati's research that learning through demonstration method has an impact on the changes in behavior. Positive attitude will be actualized if someone has good knowledge. However, if someone does not have good knowledge, the attitude formed is negative. In accordance with the opinion of Notoatmodjo, 2003 in Wijayanti and Purwandari (2006), knowledge is a highly important domain for the formation of one's actions.

Furthermore, Annanto (1993 in Salawati, 2009), explained that attitude is formed gradually through the social learning process due to personal experience with certain object. Attitude is affected by information given by others who already have or form certain attitude towards a particular object also from direct experience. A person who obtains accurate information will automatically gain direct experience with the object. Eventually, a normal postpartum mother will trust the information which results in a change in attitude.

Attitude and changes in attitude are obtained through a learning process which not only affects one's beliefs, but also affective reactions and behavioral tendencies. Changes in attitude can be in the form of addition, redirection or modification of one or more components, meaning that there may be one or two components of changes in attitude, however the other components remain the same. The factors of experience in which 66.67 percent of the normal postpartum mothers in the treatment group in this research are multiparas or had given birth more than once and the age maturity in which 93.33 percent aged over 20 years highly affect a person's change in attitude.

The increase in skill average of normal postpartum mothers who were provided with module is related to increase in knowledge and attitude of normal postpartum mothers concerning postpartum exercise. It is also supported by the environmental factor of home, in which all of the normal postpartum mothers work as housewives so that they have enough time to do postpartum exercise. The research results are in accordance with the research of Remita, *et al* (2000) which concluded that knowledge proved to have a relation with the mother's behavior.

Benefits of postpartum exercise in general according to Maryunani and Sukaryati (2011) are as follows: 1) to assist the recovery of uterine, abdominal and hip muscles which are traumatized and accelerate these parts to back to their normal condition; 2) to assist the normalization of loose joints due to pregnancy and childbirth, and prevent further weakening and stretching; 3) the psychological benefit is to increase the ability to face stress and relax thereby reducing postpartum depression.

According to the researchers, if the normal postpartum mother has proper knowledge, she will have better action in applying postpartum exercise because if her behavior is based on positive knowledge and attitude, she will be skilled in doing postpartum exercise independently. The statement is supported by the negative mean rank data of the treatment group which is 15.50 while the control group is 11.50 meaning that there is decrease in diastasis recti abdominis of mothers provided with the module in postpartum exercise compared with those who were not provided with the module.

The provision of module to the normal postpartum mothers proved to increase knowledge, attitudes and skill, and decrease diastasis recti abdominis so that the module in postpartum exercises can be considered as one of the models that should be provided to normal postpartum mothers with diastasis recti abdominis, especially diastasis recti abdominis in a minimum of 2.5 cm.

B. Relation of Knowledge, Attitude, Age, Parity of Normal Postpartum Mothers and Diastasis Recti Abdominis

The data of the research result indicated that there are only two normal postpartum mothers in the treatment group who are less than 20 years old or 6.7 percent, 23 mothers who are between 20 and

35 years old or 76.6 percent, and five mothers who are over 35 years old or 16.7 percent which means that there is better decrease in diastasis recti abdominis of the normal postpartum mothers who take postpartum exercises in their prime vitality namely between 20 and 35 years old.

The results of this research are consistent with the opinion of Ambarwati (2010), that reproductive function of a mother who is less than 20 years old has not developed perfectly so that the birth canal is easily torn, muscle contraction is still not good, especially the uterine muscle so it is susceptible to bleeding, while a mother between 20 and 35 years old has reached her prime vitality so that the muscle contraction and the uterus is also recovered quickly due to great regeneration process of the cells of uterus and for a mother who is more than 35 years old, the muscles elasticity has begun to decrease thus it will affect muscle recovery, especially the uterine muscles which requires longer period.

C. *The Effects of Module in Normal Postpartum Mothers Empowerment concerning Postpartum Exercise on Diastasis Recti Abdominis*

The results indicated a decrease in diastasis recti abdominis in normal postpartum mothers who were either provided with module concerning postpartum exercise for 6 weeks or not, however there was greater decrease to those who were provided with module, which can be indicated by average difference after intervention between the treatment group and the control group, namely 30.5 mm. The results are consistent with the opinion of Ricci (2013) that the abdominal wall muscles are stretched by enlarged uterus during pregnancy. The strain leads to the lack or loss of muscle tone resulting in the stretching of longitudinal muscle or abdominal rectus muscle in the abdomen called diastasis recti abdominis. Following delivery, muscle tone is reduced and the abdominal muscles are soft and mushy. Mothers are highly recommended to do the exercise after giving birth so that the abdominal muscle strength is recovered, by providing appropriate nursing care namely exercise of abdominal muscle strengthening by doing postpartum exercise.

This is also in line with the theory of Guyton (2010) stating that in the early stages of heavy physical work, one part of the aerobic energy abilities of a person's muscle will be decreased. In heavy muscle work, most of the oxygen reserves are used for aerobic metabolism thus once the muscle work is ended, the oxygen reserves must be replaced immediately. Exercise performed on certain muscles will cause an increase in muscle blood flow so that the transport of oxygen and nutrients to the muscles will also increase, this will give maximum strength to the muscles, thus the size of muscle fibers increases or myofibrillar hypertrophy thereby the muscle diameter becomes bigger. As a result, muscular endurance and strength are improved (Kalangi, 2014). Definition of the strengthening of transversus abdominis muscle is an exercise by providing stimulus on the musculus transverses abdominis by contracting the muscle so that the muscular strength and endurance are improved which eventually may increase the intra-abdominal pressure. The benefit of transversus abdominis muscle strengthening is to tighten the uterine wall, accelerate the involution of uterus and accelerate lochia production. (Merlyn, 2006 in Nurmawati *et al.*, 2014).

According to Hamdan (2003), one of the activities recommended for postpartum mothers is the strengthening of abdominal muscles. The strengthening of abdominal muscle is an exercise performed by normal postpartum mothers to keep the abdominal muscles stronger after the labor. Sloane (2003) mentioned that muscle pumping is a method or technique of muscle pumping to move blood and blood vessels to a series of tubes in which blood flows, thus the blood flows smoothly to the heart and the whole body.

The results are consistent with the results of research by Surtiati and Nawati (2010), in which postpartum exercise done by postpartum mothers has an effect on physical recovery nine times better for mothers who were provided with postpartum exercise intervention compared to those who were not provided with such intervention. Physical exercise in the form of postpartum exercise leads to faster physical recovery of postpartum mothers. This statement indicates that physical recovery includes diastasis recti abdominis. Research of Lestari (2009), stated that the faster the mother to mobilize the faster the involution process. It is also supported by the research by Emily (2010) study

which stated that postpartum exercise is highly effective in improving mothers' welfare and reducing long-term issues during postpartum period. The postpartum exercise will stimulate the contraction of abdominal muscle so that the diastasis recti abdominis can be decreased faster due to the increase of muscle strength. Physical exercise in the form of postpartum exercise may cause a stimulation to increase chemical activation, thus mitochondrial metabolism occurs to produce ATP as the energy for contracting.

Based on the abovementioned explanation, it is concluded that normal postpartum mothers provided with module concerning postpartum exercise are motivated to do postpartum exercise systematically meaning that the method, sequence, number of movement are correct, and continuously meaning that the postpartum exercise is done continuously for six weeks thus it has an effect on the decrease in diastasis recti abdominis.

V. CONCLUSIONS

Based on the abovementioned explanation of the research results, we may conclude the following:

1. Knowledge, attitude, skill and diastasis recti abdominis of normal postpartum mothers before and after being provided with module in postpartum exercise in the treatment group are better than the control group.
2. There is a poor relation between the age of normal postpartum mothers and the decrease in diastasis recti abdominis.
3. It is proven that the provision of module in the empowerment of normal postpartum module concerning postpartum exercise has a significant effect on the decrease in diastasis recti abdominis.

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