

Antenatal Multimodal Intervention and Hemodynamic Response in Pregnant Women who Experience Back Pain

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Abstract --- Pregnancy is a physiological process experienced by a woman which gives rise to an adaptation response to the body that often causes complaints. The study aimed to determine the effectiveness of multimodal antenatal interventions for back pain and hemodynamic responses in pregnant women. This study used a Quasy Experimental design with a pre and posttest with a control group design. Data were collected using a Numeric Rating Scale and observation sheet. The number of samples, 76, consisting of 38 in group 1 and 38 in group 2, were taken by purposive sampling technique. The data obtained were processed using the Wilcoxon test and the Mann–Whitney U-Test. There is an influence between Antenatal Multimodal Interventions in the form of exercise and acupressure on pain, and hemodynamic response, with $p < 0.05$. There is a relationship between the use of maternity belts and pain, but there is no effect on the hemodynamic response. Conclusion, Multimodal Antenatal Intervention is more effective in reducing back pain and stabilizing the hemodynamic response in pregnant women compared to the use of maternity belts.

Keywords --- Antenatal Multimodal Intervention; Haemodynamic; Pregnant Women; Back Pain

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I. INTRODUCTION

Pregnancy is a stage of maturity awaited by a family. This physiological process experienced by a woman often causes complaints due to hormonal changes that occur in the body. One complaint felt by almost 50% of mothers during pregnancy is back pain [1].

Complaints of back pain experienced by pregnant women occur due to physical changes during pregnancy such as changes in body size, weight gain and Intrauterine fetal growth which causes additional body mass for the mother. Uterus enlargement causes the abdominal wall to be stretched to adjust to the development of the fetus in the uterus. This stretch causes the abdomen to become more prominent, thus affecting the mother's posture which changes into lordosis [2].

Changes in lordosis posture in pregnant women cause the shoulders to be pulled back due to the enlargement of the protruding abdomen and to compensate for maintaining body balance. This condition results in an increase in the curvature of the vertebrae towards being excessive, a relaxation of the sacroiliac joints and triggers back pain. Complaints of back pain generally begin during the second trimester of pregnancy. Complaints of back pain will have an impact on pregnant women's quality of life due to complaints of pain that is often felt [3].

²The back pain felt by pregnant women affect daily activities because of difficulties when changing places or changing positions, difficulty in walking, sleep disorders and emotional disturbances [4]. An understanding of the ergonomic position, avoiding maladaptive movements, improper pelvic movements and avoiding unbalanced bodyweight should be given to the mother during the pregnancy period [5]. Providing appropriate care in the routine period can reduce pain and malposition due to back pain [6].

Some studies suggest that back pain affects activity, as has the research conducted by [7] which states that multiparous mothers experience significant sleep disorders compared to primiparous mothers. In all pregnant women with back pain, 57.7% experienced disruption of activity and 77.5% felt bored undergoing an increasingly older pregnancy. Mothers with back pain experience pain in the legs, the presence of neurological disorders and disorders of bowel or urine elimination [1].

These complaints need to be addressed both pharmacologically and non-pharmacologically. Pharmacological management is done by giving analgesic drugs, while non-pharmacological treatment can be done by giving distraction, relaxation, massage, acupuncture and exercise therapy [8]. Pharmacological management in pregnant women must be done carefully to avoid the side effects that may arise [9].

A preliminary study conducted in the Bandarharjo village of Semarang obtained data that 72% of pregnant women experience back pain. Complaints are felt to be increasing after doing activities. According to a survey with interviews conducted on 10 pregnant women 60% of pregnant women overcome back pain by resting, 30% with a massage and 10% by giving warm balm. Pregnant women were interviewed for routine pregnancy examinations and classes of pregnant women, but the program provided did not include interventions to overcome back pain .

Low back pain in pregnant women can be minimized through several interventions. These can be carried out alone or combined . Interventions carried out by combining several actions are called multimodal interventions. Actions by combining interventions carried out in the antenatal period to reduce complaints are included in the multimodal Antenatal intervention. Types of multimodal antenatal interventions that can be done to reduce complaints of back pain include combining exercise and acupressure. Back pain in pregnant women can be reduced by exercise during the pregnancy period. Giving pregnancy exercises in the pregnancy period can reduce back pain and lumbar disorders during pregnancy [10]. The exercises performed to reduce back pain in pregnant women are combined with acupressure. Acupressure interventions can be used to reduce pain because acupressure can repair

barriers that block energy, circulation and nutrition [11]. Research on efforts to overcome back pain complaints in pregnant women with multimodal interventions has been widely done, but the extent of the hemodynamic response from the mother and fetus when given multimodal Antenatal intervention should be known.

II. METHOD

This research was conducted in Semarang, Central Java in 2019 using the Quasy Experimental design with a pre and post-test with the control group. Data were collected using the Numeric Rating Scale Instrument to measure the scale of back pain in pregnant women and an observation sheet to monitor the hemodynamic response, namely blood pressure and fetal heart rate. The population in this study were pregnant women who experienced back pain. The number of samples in the study was 76 divided into two groups, group 1 had 38 people and group 2 had 38. The samples were taken by a purposive sampling technique.

Intervention procedures, Group 1 is pre-tested which includes pain scale, maternal blood pressure and fetal heart rate. In group 1, exercise and acupressure treatment were given. Pregnancy exercises are combined with acupressure by pressing the area between the second and third lumbar vertebrae. Pregnancy Gymnastics is done for 30 minutes followed by relaxation and acupressure for 30 minutes. The intervention was carried out for four weeks. After a four-week intervention, a post-test was performed on pain, maternal blood pressure and fetal heart rate. While in group 2, the study subjects were treated using a maternity belt. Before the intervention, a pre-test of pain, maternal blood pressure and fetal heart rate was performed. The use of maternity belts is done for 1-2 hours every day which is carried out for four weeks. After four weeks of treatment, a post-test was performed on pain, maternal blood pressure and fetal heart rate.

Data collected were analyzed using SPSS, a univariate analysis in the form of descriptive statistics and a bivariate analysis using the Wilcoxon test and the Mann–Whitney U-Test.

III. RESULT

Multimodal Antenatal Research Interventions in pregnant women who experience back pain complaints obtain the following results:

Table 1. Identification of back pain and hemodynamic response in pregnant women in the Semarang Central Java region (n = 76)

Variable	Group 1		Group 2	
	n	(%)	n	(%)
Back Pain				
Low	0	0	0	0
Moderate	12	31.6	15	39.5
Severe	26	68.4	23	60.5
Blood Pressure				
Hypotension	21	55.3	22	57.9
Normal	7	18.4	7	18.4
Hypertension	10	26.3	9	23.7
Fetal Heart Rate				
Bradycardia	14	36.8	17	44.7
Normal	24	63.2	21	55.3
Tachycardia	0	0	0	0
Total	38	100.0	38	100.0

Table 1 shows that all subjects in both group 1 and group 2 mostly experienced severe pain with a percentage of 58.455 or a total of 26 people in group 1 and 60.5% or a total of 23 people in group 2. Research subjects in group 1 mostly experienced hypotension with a total of 55.3% or 21 people. In group 2, most of the research subjects experienced hypotension in the amount of 57.9%. The table also shows that in group 1 most of the study subjects had

a normal fetal heart rate of 63.2% while in study group 2 the majority of pregnant women, 55.3%, also had a normal fetal heart rate.

Table 2. The differences in back pain, blood pressure, fetal heart rate in pregnant women in group 1 in Semarang Region Central Java (n = 38)

Variable		N	Mean Rank	Sum of Ranks	P-value
Back pain	Negative Ranks	38 ^a	19.50	741.00	0.000
	Positive Ranks	0 ^b	.00	.00	
	Ties	0 ^c			
Blood Pressure	Negative Ranks	8 ^a	14.50	116.00	0,023
	Positive Ranks	20 ^b	14.50	290.00	
	Ties	10 ^c			
Fetal Heart Rate	Negative Ranks	2 ^a	8.50	17.00	0,03
	Positive Ranks	14 ^b	8.50	119.00	
	Ties	22 ^c			

Table 2 shows that in group 1, all subjects, 38 people, experienced a decrease in back pain after an intervention, with a p-value of 0,000. This shows there is a difference between pre-test and post-test pain, so it can be concluded that there is an effect of providing pregnancy exercises and acupressure on pain in pregnant women. Most of the subjects experienced hypotension after 20 people had blood pressure increase, 8 had blood pressure reduction and 10 had blood pressure in a fixed category, with a p-value of 0.023. This shows that there is a difference between pre-test and post-test blood pressure, so it can be concluded that giving pregnancy exercise intervention and acupressure affects blood pressure in pregnant women. 14 study subjects experienced an increase in fetal heart rate, 2 a decrease and 22 had a fixed fetal heart rate with a p-value of 0.003. This shows that there is a difference between DJJ pre-test and post-test, so it can be concluded that giving intervention of pregnancy exercises and acupressure affects DJJ for pregnant women.

Table 3. The differences in back pain, blood pressure, fetal heart rate in pregnant women in group 2 Semarang Central Java (n = 38)

Variable		N	Mean Rank	Sum of Ranks	P-value
Back pain	Negative Ranks	12 ^a	6.50	78.00	0.001
	Positive Ranks	0 ^b	.00	.00	
	Ties	26 ^c			
Blood Pressure	Negative Ranks	2 ^a	3.00	6.00	0.655
	Positive Ranks	3 ^b	3.00	9.00	
	Ties	33 ^c			
Fetal Heart Rate	Negative Ranks	0 ^a	.00	.00	0.083
	Positive Ranks	3 ^b	2.00	6.00	
	Ties	35 ^c			

Table 3 shows that in group 2 12 people experienced a decrease in pain and 26 people whose degree of pain remained the same with a p-value of 0.001. This shows that there is a difference between pre-test and post-test pain, so it can be concluded that there providing maternity belt intervention impacts pain in pregnant women.

Regarding a decrease in blood pressure, 3 people experienced a decrease in blood pressure and 33 people had a steady blood pressure with a p-value of 0.655. This shows that there is no difference between pre-test and post-test blood pressure, so it can be concluded that providing maternity belt intervention does not affect blood pressure in pregnant women. 3 subjects experienced an increase in fetal heart rate and 35 people had a fixed fetal heart rate with a p-value of 0.083. This shows that there is no difference between pre-test and post-test heart rate, so it can be concluded that there is no effect of providing maternity belt intervention on fetal heart rate in pregnant women.

Table 4. Effectiveness of Multimodal Antenatal Intervention on Back Pain, Blood Pressure, Fetal Heart Rate of pregnant women in Semarang, Central Java (n = 76)

Variable	N	Mean Rank	Sum of Ranks	Z
Back Pain				
Group 1	38	23.79	904.00	
Group 2	38	53.21	2022.00	
Total	76			-6.292
P-Value				0.000
Blood Pressure				
Group 1	38	44.59	1694.50	
Group 2	38	32.41	1231.50	
Total	76			-2.789
P-Value				0.005
Fetal Heart Rate				
Group 1	38	44.50	1691.00	
Group 2	38	32.50	1235.00	
Total	76			-3.354
P-Value				0.001

Table 4 shows that in group 1 the average rating is 23.79 lower than the mean of group 2, which is 53.21, with a P-value of 0.00 and the calculated Z value obtained -6.292. This means that the combination of pregnancy exercise and acupressure is more effective in reducing back pain in pregnant women compared to the use of maternity belts. Group 1 has an average rating of 44.59, higher than the second rank of 32.41, with a P-value of 0.005 and a calculated Z value of -2.789. This means that the intervention of pregnancy exercises and acupressure is more effective in stabilizing blood pressure in pregnant women than using maternity belts.

Group one has an average ranking of 44.50, higher than the second rank average, which was 32.50 with a P-value of 0.001 and the calculated Z value obtained -3,354. This means that in pregnant women interventions with pregnancy exercises and acupressure are more effective in stabilizing fetal heart rates than using maternity belts.

IV. DISCUSSION

The results showed that Antenatal Multimodal Interventions in the form of pregnancy exercises and acupressure given to pregnant women with back pain were more effective in reducing pain compared to interventions using maternity belts. Gymnastics or exercise is exercise or gestures that are done to reduce back pain. Exercise or physical exercise done during the pregnancy period can minimize complaints of back pain felt by pregnant women [12]. The exercise carried out during the antenatal period is one of the non-pharmacological interventions for overcoming problems that occur during pregnancy. Exercise in the form of stretching movements has been proven to significantly reduce complaints of back pain [8].

Types of exercise that can be done by pregnant women to reduce pain include abdominal exercise movements. This exercise, if done routinely, can improve blood circulation and also stimulate the endorphin hormone in the brain so the muscles of the body, including the waist muscles, relax and the sensation of pain will be reduced [9].

Giving exercise to pregnant women can be done within a period of between 4 to 6 weeks [8]. Gymnastics in pregnant women with back pain can be done 1 to 2 times a week [13]. Providing routine exercise can prevent neuroplasty damage that may occur due to back pain for a long time [14].

In addition to pregnancy exercises, the action taken to reduce back pain in pregnant women is to put pressure on the area of hipbone points. Acupressure is a non-pharmacological intervention in the form of pressure exerted at certain points. Emphasis is made based on the Acupressure Point Guide to reduce back pain [15].

The hemodynamic response in pregnant women is also greatly affected by the provision of Antenatal Multimodal Interventions in the form of pregnancy exercises and acupressure. Complaints of pain can be reduced in pregnant women who do gymnastics or exercise because when the body is doing a rattling there will be relaxation and increased blood circulation which decreases pain [5].

Pain is correlated with hemodynamic responses experienced such as blood pressure and fetal heart rate. Pain associated with the work or function of the autonomic nervous system (Autonomic Nervus System) that affects the

work of the sympathetic nervous system has an impact on changes in heart rate variability and peripheral effects on vascular reactivity [16]. Back pain is a stress to maintain homeostasis felt by the mother during the pregnancy period. Stress conditions cause the sympathetic nervous system to become more hyperactive and can cause changes in heart rate variability as a psychological response to perceived stress [17]. When stress from pain is long-lasting and recurrent, it will increase the impact on parasympathetic nerve response and heart rate variability [18] [18][17][16]

V. CONCLUSION

There is a correlation between Antenatal Multimodal Interventions in the form of exercise and acupressure on pain, and hemodynamic response. There is a relationship between the use of maternity belts on pain, but not on the hemodynamic response. Multimodal Antenatal Intervention is more effective in reducing back pain and stabilizing the hemodynamic response in pregnant women compared to the use of maternity belts.

Multimodal Antenatal Interventions can be used as an alternative to reduce back pain complaints in pregnant women as they are relatively safe for both the mother and fetus, as evidenced by the acquisition of good hemodynamic response data in both the mother and fetus.

The paper can be used as a reference to develop research in the field of health, especially in pregnant women to combine psychological aspects in the provision of intervention.

CONFLICT OF INTEREST

In this study, there were no conflicts of interest with the parties involved in the research activity process.

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