THE EFFECTS OF ANTENATAL PELVIC FLOOR MUSCLES EXERCISES ON THE LENGTH OF THE SECOND STAGE OF LABOR AMONG PRIMIGRAVIDA WOMEN ATTENDING SULAIMANI MATERNITY TEACHING HOSPITALS FOR DELIVERY

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ABSTRACT

Background

The role of pelvic floor muscle training in decreasing urinary incontinence problems is well established but its effects on labor and newborn outcomes need more study.

Objectives

To evaluate the effect of pelvic floor muscle exercises on the length of the second stage of labor among primigravida women.

Methods

This is a quasi-experimental study done from February to November 2019, which recruited 160 Primigravida Women aged between 18-35-year-old and matched the inclusion criteria. The participants were qualified and included in the study with 18 weeks of gestational age. Thus study group started the training as 6 sessions of 2-hour training established and distributed through 20 weeks. Then, all participants were observed during labor by the researcher. Subsequently, the collected data got processed, and the experimental and the control group delivery outcomes got compared.

Results

Highly significant difference regarding education (70.0% of the study group had Institute-College degree while the rate in the control group was 39.0%), occupation (62.0% of the study group and 87.0% of the control group were housewives), economic status (80.0% of the study group were economically satisfied while this rate in the control group was 8.8.0%). There was a significant difference regarding the duration of the second stage of labor (p=0.05) and the third stage of labor (p=0.001), while there was a difference at the edge of significance (p=0.056) between both groups in the first stage of labor.

Conclusion

This quasi-experimental study found a significant effect of pelvic floor exercise on the length of the second stage of labor.

Keywords: *Labor; Primigravida; Pelvic floor muscle training; The second stage of labor.*

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INTRODUCTION

It is recalled that during normal pregnancy and birth, virtually every organ system undergoes anatomical physiological and biochemical changes. Maternal physiologic adaptations are attributed to the hormones of pregnancy and mechanical pressures arising from the enlarging uterus and other tissues [1-2]. A woman with healthy musculature, who does not put on excessive weight, adapts to these changes. However, for some women, the changes here may cause problems [3]. As the area of interest in a survey, the prior studies showed that women in the Kurdistan region of Iraq suffer from various health, social, and cultural problems due to inadequate access and utilization of health services. Providing health services does not constitute an answer by itself, therefore we need to educate the women and guide them to go through their health challenges step by step [4]. Hereof the study done by Atiya K Muhammad (2013) shows that women's knowledge concerning the practice of physical exercise during pregnancy is inadequate and they do not believe in the positive effect of exercises during pregnancy [5].

The birth canal is supported with several layers of tissues that together form the pelvic floor. The most important is the levator-ani muscle which during the first and second stage of labor undergoes a process of spectacular elongation to allow for the fetus to pass through the birth canal [6]. Women with a prolonged second stage of labor which is the most active stage of the labor [7] are prone to spontaneous perineal damage, and antepartum pelvic floor exercise is one of the Alternative primary prevention strategies for childbirth injuries to the pelvic floor, [8-10] also studies suggested that the pelvic floor exercise program was associated with significantly higher intact perineum and a lower rate of prolonged second stage labor than women allocated to no training who received standard care only [11-19]. The second stage of labor and the factors affecting the length and quality of this stage is a matter of interest to help women experience an easier delivery. Also, decreasing the length of the second stage of labor would help to decrease emergency cesarean sections and perineal damages [20]. With that aim, this study scrutinized some of the pregnancy-modified pelvic floor exercises which were hypothesized to be effective in shortening the second stage of the labor.

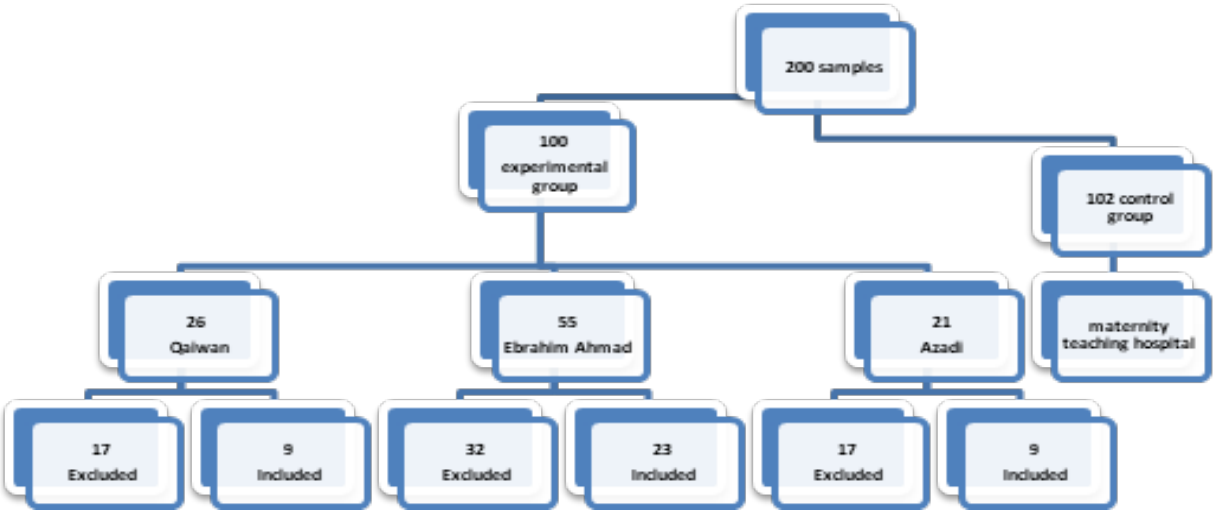
SUBJECTS AND METHODS

Study Design

A quasi-experimental study was implemented to assess the effects of antenatal pelvic floor muscle training on the length of the second stage of labor with a sample of 160 Primi-gravida Women Attending Sulaimani health centers (Ebrahim Ahmad health center, Azadi health center, Qaiwan Health center) during the period of 27th of February 2019 and 28th of November 2019.

The study was conducted in Sulaimani Maternity Teaching Hospital and three governmental health care centers. The sampling started in Ebrahim Ahmad health center, Azadi health center, Qaiwan Health center at the same time in January 2019. During the sampling time, the training room preparation is started by the trainer (the researcher).

Subsequently, the training course started for the study group in Ebrahim Ahmad health center from February to August 2019. All the mothers followed up on the delivery time and observed it during the labor stages.



A sampling of the participants

The nonprobability purposive sampling method was used to select 202 participants among prime-gravida women attending Ebrahim Ahmad health center, Azadi health center, Qaiwan Health center for prenatal care. The samples were separated from the control and study groups due to their interest to attend the classes. Before initiation of the courses, 40 mothers got excluded from the study group due to personal or medical reasons, and subsequently during the training process 20 more cases drop out due to different reasons.

Eligibility criteria

Primi-gravida women were encouraged to participate in the study by specific inclusion criteria such as Age between 18 to 35, Body mass index not exceeding 30, Singleton gestation, Gestational age between 18-24 weeks, and Mother's desire for vaginal delivery. Afterward, qualification was done based on the standard checklist named Physical Activity Readiness Medical Examination checklist for pregnancy (PARmed-X for pregnancy) and participants medically authorized Physical Activity Readiness Medical Examination checklist for pregnancy). The questionnaire got filled, subsequently, the study group and control group separated, also women carrying exclusion criteria (Chronic heart or lung disease, poorly controlled diabetes, Hypertension, Hyperthyroidism, Epilepsy, Severe anemia, History of abortion) had excluded by the midwife instructor (the researcher) and deemed eligible Thus, they received a written informed consent, which illuminated one by one by the instructor.

The study instruments

To assess the participant's daily physical activity and qualify their health condition and eligibility PARmed-X pregnancy checklist got used as a guideline for health screening before participation in a prenatal fitness class or other exercises. The study questionnaire included five parts:

Socio-demographic characteristics, Obstetrics History, PARmed-X for Pregnancy is a guideline for health screening before participation in a prenatal fitness class or other exercises which in this study used to evaluate the participant to avoid any unmentioned medical condition or presence of any concealed contraindications. conferring to the PARmed-X Checklist Participants were questioned regarding the physical activity they performed at home and occupation, Contact information for special situations, The consent part is a modified version of the informed Consent Form Template for Clinical Studies by WHO] Research Ethics Review Committee, and, Labor and Postnatal Health checklist.

Course instruction

The courses processed from February to August 2019 with the following details according to the guidelines of the Ministry of health and medical education of Iran (as the researcher passed the Prenatal educator and coaching course in Iran), as follows:

The participants were classified into 6 different groups by their gestational age and each group gathered in a different Viber group for follow-ups and communication.

6 sessions of 2-hour training established and distributed through 6 months following the guidelines along this line, there was one month between the first and second session, two weeks between the second, third, fourth, fifth session, and one week between the fifth and sixth session, each session included 1 hour of theory educating and 1 hour of exercise, plus, a 15-minute break in-between which healthy snacks including fruits, healthy sweets, and preservative-free bottled waters, prepared for the mothers with the aim of healthy nutrition encouragement.

Each education session included different topics respectively: changes during pregnancy and how to cope with them, pregnancy self-care, pregnancy nutrition, and weight gain, mental health, and fathers' role, pregnancy warning signs, getting ready for delivery, comparison of vaginal delivery, and cesarean, postpartum care and nutrition and in the exercise part a routine exercise plan repeated including warm-up, sited knee swing, butterfly, swing butterfly, half-bridge, cat-cow, child's pose, and Kegel exercises.

Each participant was handed a booklet including pregnancy care and nutrition advice, a weekly exercise schedule, and a CD containing a video instructing the practical way to do the exercises properly.

Participants were asked to do the exercises following the instructions and fill the weekly schedule available in the booklet and send a picture of their schedule to the instructor at the end of each week to check their commitment and progress.

During each theory session, a different topic got presented and the approved exercises were repeated each session with some modification due to the mother's body adjustments.

At the end of each session, each of the mothers got the chance to ask their questions and receive a Leopold maneuver and FHR auscultation by the sonic aid as they wish.

In the last session, mothers were asked to contact the trainer in case of any questions or if they faced any difficulty during their pregnancy. Also, they were asked to continue their exercise routines until 38 weeks and call the trainer while they had the plan to go to the maternity hospital for delivery.

Due to the mothers' EDD, they received a follow-up phone call to check on their delivery date and time and by this coordination, the instructor could attend the delivery process.

The post-test questionnaire was filled for each woman during and after the delivery.

Through the data collection and training process, 20 participants got excluded due to repeated failure to participate in the training sessions, elective cesarean section, and other personal reasons. The analytical sample, therefore, was reduced to 40 women.

At the same time control group mothers were followed up for their delivery process and the labor process and postnatal form got filled for each one by one.

Before the outset of the course, the Ebrahim Ahmad clinic exercise hall got equipped with the needed materials by the researcher's fund.

The adopted equipment includes:

· Interlocking foam Tiles, Exercise Mats, Exercise cushions, Swedish ball, Fetoscope

· Guiding Booklets and CDs, PowerPoint slides, Videos, relaxing music

Descriptive statistics

To achieve the early stated objectives, the data of the study were analyzed through the use of the statistical package of social sciences (SPSS) version 22 through descriptive and inferential statistical analyses.

There were criteria of probability levels to determine the significance of the test [Highly significant ($p \leq 0.001$), Significant ($p \leq 0.05$), and not significant ($p > 0.05$)].

Limitations of the Study

By that, the topic of the study was not a common topic, it was novel for the participants and even health care staffs and challenging for the researcher and faced some barriers and difficulties which mentioned as following:

Problems that related to Samples

Limitation of fitting samples, inadequate number of primigravida women with no medical issues who were interested in participating in the program, and vaginal delivery.

Dropping out of several cases during the program, because of the " apathy, job situations, traveling, social problems or family permission, elective cesarean section, etc."

Uncooperative participants. (Giving wrong phone number or not answering the phone calls, didn't inform the researcher at delivery time.)

Place and Facilitation

Air conditioner systems: The hall, which was dedicated to the training had few deficits such as air conditioner systems. Split air conditioners were not working well, not enough warmth during the winter and not enough cool air during the summer, despite the appliances prepared by the researcher mothers couldn't tolerate the cold or warm environment. Among other things, the sound produced by the air conditioner affected the training quality.

Restrooms: there weren't clean and suitable toilets available for the participants to use, even though the researcher carried out some cleaning programs for the training hall and the toilets by herself, the clinic service staff did not cooperate about the cleanness maintenance.

Electricity shortage: during some sessions, the electricity broken off disrupted the slideshows during the training.

Time

The abundance of questions and lack of time commitment of some of the participants as mentioned faced some problems in the time management of the sessions.

Health workers

Lack of cooperation of labor ward staff during intrapartum for letting the mothers go through the labor stages normally, without intervention (oxytocin and episiotomy)

Crowded labor ward and not enough caregiver for pregnant women so they preferred to accelerate the labor progress by oxytocin or call it a progress arrest.

Encouraging the mothers to do a cesarean section without a reasonable indication by some of the obstetricians. (One or two loops of nuchal cord, labor progress failure, postdate diagnosis before 42 weeks)

RESULTS

It can be seen in the table (1) that about one-third (37%) of samples in the experimental group and nearly half (48.03%) of the samples in the control group were age between 20-25 years old. The table has also embraced that in the experimental group, the majority (70.0%) of participants has an Institute-College degree, however, less than half (39.20%) of the control group was primarily graduated.

It illuminates that more than half (62.5%) of the experimental group and the majority (87.3.0%) and control group were housewives. Also points out that the majority (80.0%) of the case group was economically satisfied, while only 8.8% of the control group were satisfied whereas, more than half (65 out of 102) of the control group were barely satisfied with economic status.

It can be considered in the table that more than half (55.0%, 59.8%) of respondents in both groups were moderately active.

It can be seen in the table (2) that 80.0% of the experimental group delivered their babies vaginally while the vaginal birth in the control group was 73.5%.

Also, it shows that almost all of the mothers in both groups who delivered vaginally received an episiotomy, and the rest delivered with a laceration. It can be comprehended from the table that 95% of mothers in the experimental group delivered babies with normal birth weight while the normal birth weight in the control group was 84.3%. As it is deduced from the table only 1.0 of 102 the control group cases performed exercise during pregnancy while all the experimental group cases had their routine exercise during their prenatal period.

Table (3) represents the intrapartum observations, including stages of labor, there was a significant association between pelvic floor muscles exercises performed and the length of second and third stages of labor while the first stage of labor duration is at the margin of significance with the PFME. It can be elicited from that there was a significant association between pelvic floor muscles exercises performed and the length of second and third stages of labor while the first stage of labor duration is at the margin of significance with the PFME.

Table (4) demonstrates that the majority of the experimental group (80.0%) and about 2/3 (73.5%) of the control group delivered vaginaly.

Table 1. Distribution of the study samples according to socio-demographic characteristics

Variables	Case group (n=40*)		Control group (n=102)	
	Frequencies	Percentages	Frequencies	Percentages
Age groups				
18-20 yr	7	17.5	34	33.3
20-25 yr	16	40.0	46	45.1
25-30 yr	12	30.0	18	17.6
30-35 yr	5	12.5	4	3.9
Mean ±SD	25.0±4.47		22.66±3.59	
Education level				
Illiterate	0	0.0	2	2.0
Elementary	4	10.0	40	39.2
High school	8	20.0	35	34.3
Institute-College	28	70.0	25	24.5
Occupations				
Housewife	25	62.5	89	87.3
Employee	12	30.0	9	8.8
Student	3	7.5	4	3.9
Economic state				
Nonesatisfy	1	2.5	28	27.5
Barely satisfy	7	17.5	65	63.7
Satisfied	32	80.0	9	8.8
Activity status				
Sedentary	18	45	40	39.2
Moderately active	22	55	61	59.8
Active	0	00.00	1	0.7
Total	40	100.0	102	100.0

Table 2. Distribution of the sample according to the delivery outcome.

Variables	Case group (n=40*)		Control group (n=102)	
	Frequency	Percentages	Frequency	Percentages
Mode of Delivery				
Cesarean	8	20.0	27	26.5
Vaginal	32	80.0	75	73.5
Instrumental	0	0	1.0	1
Episiotomy				
Yes	31/32	75.0	65/75	61.8
No	0	0	0	2.0
Laceration	1/32	2.5	5/75	4.9
Episiotomy + laceration	0	0	2/75	2.0
Newborn weight				
LBW	2	5.0	16	15.7
NBW	38	95.0	86	84.3
Exercise				
Yes	0	0	101	99.0
No	40	100	1.0	1.0
Total	40	100.0	102	100.0

Table 3. The association between PFME and the length of labor stages.

Variables	Cases	Controls	Total	P-values
1st stage /Min				
Number	32	75	107	0.056
Mean	523.13 min	597.60 min*	575.33 min	
Std. deviation	124.03	202.25	185.01	
2nd stage/Min				
Number	32	75	107	0.05
Mean	50.62 min	65.20 min*	60.84 min	Sig.
Std. deviation	21.76	39.09	35.36	
3rd stage/Min	32	75	107	
Number	10.53 min	15.27 min*	13.85 min	0.001
Mean	3.84	7.25	6.76	Sig.
Std. deviation				

*** Min: minute**

Table 4. The association between PFME (Pelvic Floor Muscles Exercises) and delivery mode.

		Groups		Total	P-value
		Cases	Controls		
Mode of delivery	**Cesarean**	8	27	35	0.421
		20.0%	26.5%	24.6%	
	Vaginal	32	75	107	
		80.0%	73.5%	75.4%	
Total		40	102	142	
		100.0%	100.0%	100.0%	

DISCUSSION

In general, the present study evaluates the effect of pelvic floor exercises on the length of the second stage of labor among women who attending Sulaimani maternity teaching Hospital for delivery.

This study indicates a highly significant difference regarding age, education, occupation, economic status, among the experimental group, and the control group. Similarly, a significant distinction was observed regarding the second and the third stage duration between the study group and control group which means the experimental group, significantly experienced a shorter duration in those stages. While there was a difference at the edge of significance between both groups in the first stage of labor and no significant difference in activity status between participants of both groups. Also, no difference was found regarding delivery mode and episiotomy demand between the experimental group and control group which relies on the researcher's objective observations, external variables played an enormous role in the study result.

In the same direction with the current study, Heit M (2001) resulted that Women who participate in pelvic floor muscle training had a lower rate of prolonged second stage labor (24%, 95% confidence interval 16% to 33%; 22 out of 105 women were in danger (undelivered) at 60 minutes in the survival analysis) than women allocated to no training (38% (37/109), 28% to 47%). The duration of the second stage was not significantly shorter (40 minutes v 45 minutes, P = 0. 06) [11].

An article written by Du Y (2015), review study indicated that PFMT during pregnancy significantly shortened the first and second stage of labor, in the primigravida (WMD = -28.33, 95 % CI: -42.43 to -14.23, I (2) = 0.0 %, and WMD = -10.41, 95 % CI: -18.38 to -2.44, I(2) = 64.0 % respectively). When evaluating the effect on the rates of episiotomy, instrumental delivery, and perineal laceration, the meta-analysis showed that the results were not significant (OR = 0.75, 95 % CI: 0.54 to 1.02; OR = 0.84, 95 % CI: 0.61 to 1.17 and OR = 0.96, 95 % CI: 0.66 to 1.40 respectively) [21].

Disagreeing with this study, Bø K (2009) concluded that Pelvic floor muscle training before and during pregnancy does not affect labor and birth outcomes or complication rates [(22)].

There was no mutual result between Sanda B (2018) study's result and the current study, therefore, the intervention group had a longer first stage of labor compared with the control group (293 ± 202 min vs. 257 ± 181 min, p = 0.030). No differences between the randomized groups were seen for time spent in the second stage of labor, prolonged labor, or mode of delivery [(23)].

Gill, Cindy H (2006) found no significant differences between nulliparous exercisers and non-exercisers based on the frequency of exercise regarding the total length of labor, the length, and perceived difficulty of the second stage of labor, disagreeing with this study [(24)].

Also, another randomized controlled trial Fayiz F (2017) found a significant change between both groups in mean PFM strength at 36 WG ($p < 0.05$). A significant correlation was observed between PFM strength at 36 WG and mode of delivery (vaginal delivery: $r = 0.58$, $p < 0.05$; caesarean delivery: $r = –0.49$, $p < 0.05$) [(4)].

In conclusions, there was a significant association between pelvic floor muscle exercise performance and the length of the second and third stages of labor while the first stage of labor duration is at the margin of significance with the Pelvic Floor Muscles Exercises and no significance with the mode of delivery.

Recommendation

Pelvic Floor Muscle exercise is recommended for healthy pregnant women as a safe and inexpensive strategy for decreasing the labor length and experiencing a more pleasant pregnancy and labor.

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