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Exercising During Pregnancy and Labor Outcome

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Abstract: ***Background:*** *There is a direct link between healthy mothers and healthy infants. Exercise and appropriate nutrition are important contributors to maternal physical and psychological health. The benefits and potential risks of exercise during pregnancy have gained even more attention. Exercise programs remain a way of life for almost one quarter of women planning a pregnancy.*
The aim was to *evaluate the effect of exercising during pregnancy on labor outcomes.*
Methods: *the study used a randomized controlled trial research design.*
Setting*: The study was conducted at the antenatal clinic of Mansoura New General Hospital from April 2017 to April 2019. The study sample was of 104 pregnant females admitted to the antenatal clinic in the previously mentioned setting.*
Tools*: Two tools were used for data collection I: structured interview questionnaire this tool will include two parts: Part one: Demographic data of women (age, level of education, occupation, residence, marital status, and medication in use, etc.). Part two: Antenatal exercising card And Periodical gestational weight gains (GWG). II: Labor outcomes: which include maternal outcome and fetal outcome.*
Results: *showed that, all of the study subjects had exercising during pregnancy with statistically significant correlation with better labor outcome either maternal or fetal.*
Recommendation, *study recommended performing exercises during pregnancy in order to have better labor outcomes*
Key words: *exercise, pregnancy, labor outcome.*

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I. Introduction

The prenatal period is a unique physiological window during which many adaptations of the mother's body are required to secure the well-being of the fetus. The success of these adaptations or interventions can have major consequences for the long-term health of the child[1]. Exercise is defined as a planned, structured, and repetitive subset of physical activity that improves or maintains physical fitness, overall health or well-being as an intended intermediate or final objective. Pregnant, healthy women are recommended to do 30 min or more of light to moderate exercise a day on almost daily basis. Exercise during pregnancy was shown to be associated with reduced back pain, improved health perception, and weight gain control[2]. Physical exercise has become more popular among women of fertile age, and many now seek medical advice on whether they can continue exercising during pregnancy. The answer to this question demands that the influence of exercise on the mother and the fetus be well understood. Recommendations regarding exercise during pregnancy have long been based more on social and cultural notions or 'common sense' rather than concrete scientific evidence[3]. A physically inactive lifestyle is known to be associated with increased prevalence of chronic diseases such as cardiovascular disease, type 2 diabetes, osteoporosis and cancer. The proportion of pregnant women with overweight or obesity is increasing rapidly across the world and this excess weight is associated with increased risk of health problems during pregnancy and in connection with childbirth. Pregnancy leads to significant physiological changes in the body and thus many pregnant women are worried about being physically active or exercising during this period[4]. Diet and physical activity during pregnancy holds promise as a simple, effective intervention to improve maternal and infant health outcomes. For this reason, the American College of Obstetrics and Gynecology (ACOG) recommends that pregnant women engage in 30 min of physical activity at least 5 days per week[5]. Specific psychological and social factors have been identified as barriers to adequate physical activity during pregnancy. Fatigue, physical discomfort, and fear of harming the fetus are the most common reasons for low activity levels. Interventions that focus on patient education and motivation can help women meet ACOG's physical activity recommendations [6]. Due to the extensive benefits of prenatal exercise for

cardio-vascular, mental, and metabolic health and the low rates of adherence to physical activity recommendations in pregnancy, it is important to determine the extent to which health care providers are providing appropriate advice and also to examine the evidence of the beneficial effect of exercise on mother and fetus[7].

II. The study's aim

Evaluate the effect of exercising during pregnancy on labor outcomes.

III. Subjects & method

3.1 **-Research Design:** A randomized Controlled Trialresearch design was used in this study.

3.2 **-Setting**: This Study was conducted at Antenatal clinic of Obstetrics & Gynecology Specialist center and labor unit at Mansoura New General Hospital.

3.3 **Participants:** It consisted of 104 pregnant women, who fulfilling the inclusion criteria admitted to the previously mentioned setting.

3.4 **Tools:** two tools were used in this study as the following:

3.4.1- **Tool I:**Structured Interview Questionnaire, it includedtwo parts; Part I: demographic data of women, menstrual, obstetrics and gynecology history, and pregnancy related data.Part II: antenatal exercising card and periodical gestational weight gains (GWG).

3.4.2- **Tool II:**Labor outcomes,this tool consisted of 2 parts; part I (fetal outcome) consisted of weight of newborn and Apgar score,part II (maternal outcome) included gestational age at delivery, body mass index at delivery, place of labor, time of hospital admission, cervical dilation (cm) & effacement at admission, station at admission, oxytocin use in spontaneous labor, epidural analgesia use, duration of first stage, duration of second stage, duration of third stage, and type of labor. Questions were in the form of multiple-choice questions (MCQ), one point for each correct answer, zero point for an incorrect answer.

IV. Methods

- An official approval for conducting the study was obtained from the research ethics committee of faculty of Nursing of Mansoura University
- An oral consent was obtained from each participant in this study after explaining the study's aim. Participants were assured that the information is confidential and used for study purpose only.
- The participants had the right to withdraw from the study at any time without giving any reasons
- A pilot study was applied on 10% (10) participant of total numberto test the simplicity, clarity of the questions and time frame needed for practicing exercises. The participants of the pilot study were excluded from the study group. Minor modifications were done accordingly.

V. Results

The data collected were analyzed statistically and the results are categorized as following parts:The collected data were analyzed statistically and the results were categorized into the following parts:

Part I: Characteristics of the studied women. (Table 5.1 Figure 5.1).

Part II: Average weight and average Apgar score of the newborn (Table 5.2).

Part III: Maternal outcomes in both groups (Table 5.3).

Table (5.1)shows the characteristics of the studied women. The age of the studied women ranges from 19.0 to 40.0 years, with averages 27.7 ± 2.6 years in intervention group and 28.6 ± 5.1 years in control group with no significant difference ($P > 0.05$). The highest percentage of age groups is between 25.0 to 30.0 years in both groups. Half of control group and 63.5% of the intervention group are from rural areas. Nearly three quarters of both groups have duration of marriage 3 years and above. Educational level ranges from basic and less (9.6%), secondary (57.7%) and university (32.7%) in intervention group and these percentages are 13.5%, 59.6% and 26.9% respectively in control group. Nearly two thirds of both groups are not working and most of those who are working need muscular and mind efforts and full time. Both groups reported that monthly income is enough (88.5%) in intervention group and 84.6% in control group and most of the studied women is supported by her couple (92.3% in intervention group and 86.5% in control group. Both groups are matched as regard previous characteristics by means no significant difference between intervention and control groups as regard age, residence, duration of marriage, educational level, occupation, nature and status of work, monthly income and people support.

Table (5.1): *Distribution of the studied pregnant women according to their general* Characteristics (n=104).

Characters	Items	Intervention group (52)		Control group (52)		Significance test
		No	%	No	%	
Age	< 20	2	3.8	1	1.9	χ^2 = 0.860, P0.850
	20 -	11	21.2	12	23.1	
	25 –	25	48.1	22	43.3	
	30 +	14	26.9	17	32.7	
Residence	Urban	33	63.5	26	50.0	χ^2 = 1.920, P0.160
	Rural	19	36.5	26	50.0	
Duration of marriage	< 1 year	1	1.9	4	7.7	χ^2 = 1.900, P0.386
	1 - < 3 years	10	19.3	9	17.8	
	3+	41	78.8	39	75.0	
Educational level	Basic & less	5	9.6	8	13.5	χ^2 = 0.990, P0.609
	Secondary	30	57.7	31	59.6	
	University	17	32.7	14	26.9	
Occupation	Working	17	32.7	20	38.5	χ^2 = 0.320, P0.539
	Not working	35	67.3	32	61.5	
Nature of work	Ms effort	3	17.6	1	5.0	FET, P 0.315
	Ms / mind effort	14	82.4	19	95.0	
Status of work in pregnancy	Fulltime	11	64.7	12	60.0	χ^2 = 2.910, Mont Carlo Exact P0.233
	Part time	6	35.3	5	25.0	
	Left work	0	00.0	3	15.0	
Monthly Income	Not enough	6	11.5	8	15.4	χ^2 = 0.330, P0.565
	Enough	46	88.5	44	84.6	
People support	Couple	48	92.3	45	86.5	χ^2 = 0.915, P0.339
	Parents	4	7.7	7	13.5	

Figure (5.1): BMI in intervention and control group at the three visits

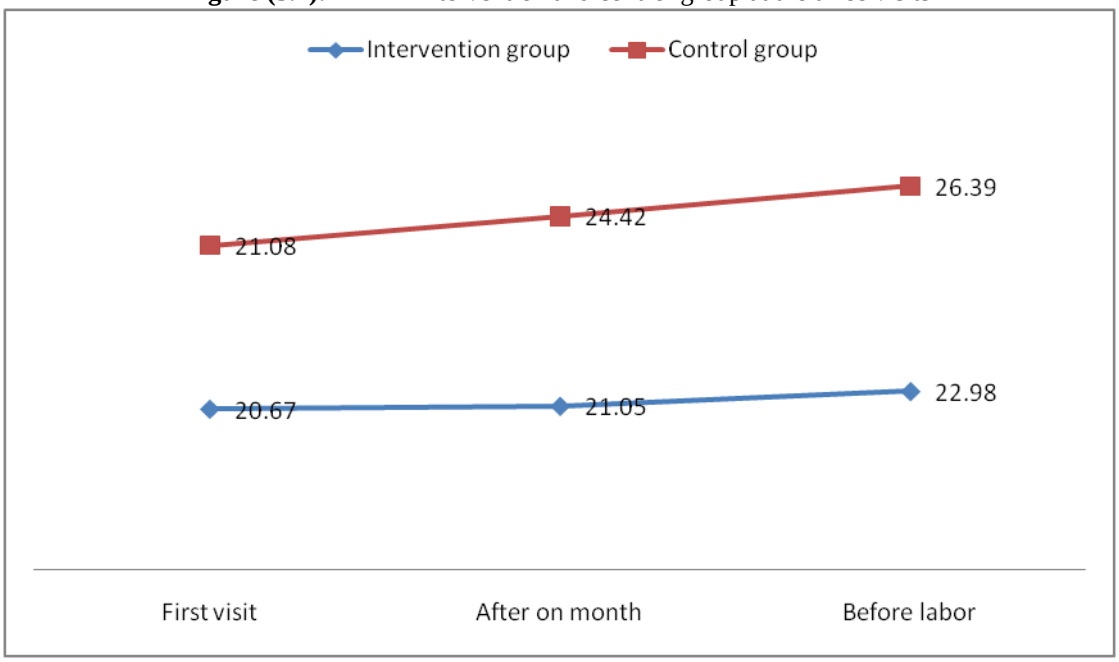

Figure (5.1) showed that the women in intervention and control had nearly same BMI in the first visit. But in the following visit, the increase in BMI in intervention group is less than in control group and the average BMI was 21.05 ± 1.56 kg/m2 in intervention group which is significantly lower than in control group (24.42 ± 4.41 kg/m2) (P0.000). Also, in the third visit (just before labor), the increase in BMI in intervention group is less than in control group and the average BMI was 22.98 ± 1.54 kg/m2 in intervention group which is significantly lower than in control group (26.39 ± 4.46 kg/m2) (P0.000). There is no significant difference in both groups as regard time of visits (pregnancy age in weeks).

Table (5.2.1) showed significant lower average Apgar score and lower birth weight of infants in control group compared to intervention group (P 0.000).

Table (5.2.1) Average weight and average Apgar score of the newborns

Variables	Intervention group (52)		Control group (52)		Significance test.
	Mean	± SD	Mean	± SD	
Apgar Score	7.94	± 1.02	4.67	± 1.74	t=11.671, P0.000
Newborn weight (kg)	3.02	± 0.34	2.44	± 0.37	t=8.393, P0.000

Table (5.3) showed the important maternal outcomes in both groups. It is noticed that gestational age at delivery and place of delivery are not significantly differ in both groups. Most of women in intervention group (86.5%) had average BMI at delivery, while this percentage is 38.5% in control group that had overweight & obese by percentage (61.6%) and the difference is significant (P 0.000). Women in intervention group showed differ significantly than women in control group in time of hospital admission, cervical dilatation, and station at admission, oxytocin use, epidural use and duration of first and third stage. Duration of second stage did not significantly differ. Most of women in intervention group were delivered by spontaneous unassisted vaginal delivery (82.7%), and LSCS was 11.5%. While, nearly half of women in control group (48.1%) were delivered by low forceps assistance vaginal delivery and LSCS was 48.1%. The type of delivery was significantly differing in both groups (P 0.000).

Table (5.3) maternal outcomes in both groups

Variables	Items	Intervention group (52)		Control group (52)		Significance test
		No	%	No	%	
Gestational age at delivery	< 28 weeks	0	0.0	0	0.0	χ^2 = 2.039, P0.494
	28-36	0	0.0	1	1.9	
	37-41	52	100.0	50	96.2	
	>41	0	0.0	1	1.9	
Body Mass Index at delivery	< 18 .5	0	0.0	0	0.0	χ^2 =27.740, P0.000
	18.5-24.9	45	86.5	20	38.5	
	25.0-29.9	7	13.5	25	48.1	
	≥30.0	0	0.0	7	13.5	
Place of delivery	Mansoura new general H	41	78.8	38	73.1	χ^2 = 6.964, P0.073
	Mansoura University H	8	15.4	3	5.8	
	Perviate H	1	1.9	4	7.7	
	Others	2	3.8	7	13.5	
Time of hospital admission	Morning	22	42.3	19	36.5	χ^2 =13.570, P0.001
	Afternoon	29	55.8	19	36.5	
	Evening	1	1.9	14	26.9	
Cervical effacement or dilatation	Cx is no effaced nor dilated	6	11.5	24	53.3	χ^2 =21.796, P0.000
	Cx is fully effaced & dilated to 1cm	34	65.4	19	42.2	
	Cx is dilated to 5cm	12	23.1	2	4.4	
	Cx is fully dilated to 10 cm	0	0.0	0	0.0	
Station at admission	1) -3:-1	24	46.2	42	93.3	χ^2 =24.694, P0.000
	2) Zero	28	53.8	3	6.7	
	3) 1:3	0	0.0	0	0.0	
Oxytocin use in spontaneous labor	Yes	0	0.0	25	73.5	χ^2 =53.905 P0.000
	No	52	100.0	9	26.5	
Epidural analgesia use	Yes	6	11.5	23	47.9	χ^2 =16.42 P0.000
	No	46	88.5	25	52.1	
Duration of first stage	6-8 hours	46	100.0	2	7.4	χ^2 =64.776, P0.000
	9-12 hours	0	0.0	23	85.2	
	13-16 hours	0	0.0	2	7.4	
	>16 hours	0	0.0	0		
Duration of second stage	10-30 minutes	46	100.0	26	96.3	χ^2 =1.765, P0.184
	1-2 hours	0	0.0	1	3.7	
	>2 hours	0	0.0	0	0.0	
Duration of third stage	10-20 minutes	46	100.0	21	77.8	χ^2 =11.366, P0.001
	<20 minutes	0	0.0	6	22.2	
Type of labor	Vaginal delivery	1	1.9	0	0.0	χ^2 =69.593, P0.000
	Spontaneous unassisted delivery	43	82.7	2	3.8	
	Low forceps assistance	2	3.8	25	48.1	
	Ventouse assisted	0	0.0	0	0.0	
	LSCS	6	11.5	25	48.1	

VI. Discussion

Some non-pharmacological interventions have been shown to assist with relief of labor pain and/or the progression of labor[8]. One of these interventions was the exercise. Chang, 2011[9] in his study showed that performing proper exercises during the last weeks of pregnancy and labor decreases C-section rate.

Beginning with socio-demographic characteristics as a baseline for comparison, significant differences were not elicited in both groups as regarding age, residence, duration of marriage, educational level, occupation,

nature of work, status of work in pregnancy, monthly income, and people support. This was on line with a study by Mirzakhani et al., 2015[10]; who illustrated that no significant differences were found regarding age groups, education, occupation type, income, and BMI.

Both groups were matched as regard socio-demographic characteristics. It was found that the age of the studied women ranges from 19.0 to 40.0 years, with averages 27.7 ± 2.6 years in intervention group and 28.6 ± 5.1 years in control group with no significant difference (P > 0.05). The highest percentage of age groups was between 25.0 to 30.0 years in both groups. Half of control group and 63.5% of the intervention group were from rural areas. Nearly three quarters of both groups had duration of marriage 3 years and above.

On completing, as regard educational level; it ranged from basic and less (9.6%), secondary (57.7%) and university (32.7%) in intervention group and these percentages were 13.5%, 59.6% and 26.9% respectively in control group. Nearly two thirds of both groups weren't working and most of those who were working needed muscular and mind efforts full time. Both groups reported that monthly income was enough (88.5%) in intervention group and 84.6% in control group and most of the studied women was supported by their couples 92.3% in intervention group and 86.5% in control group. Both groups were matched as regard whole previous characteristics by means and no significant difference were found.

On the pace of a study by Schummers et al., 2015[11], the researcher examined analysis by BMI category according to the following categories: underweight (BMI<18.5), normal weight (BMI 18.5 to 25), overweight (BMI 25 to <30), and obese (BMI≥30).The results showed that the women in intervention and control had nearly same BMI in the first visit. But in the next visit, the increase in BMI in intervention group was less than in control group and the average BMI was 21.05 ± 1.56 kg/m2 in intervention group which is significantly lower than in control group (24.42 ± 4.41 kg/m2) (P0.000).

Also, in the third visit just before labor, the increase in BMI in intervention group was less than in control group and the average BMI was 22.98 ± 1.54 kg/m2 in intervention group which is significantly lower than in control group (26.39 ± 4.46 kg/m2) (P = 0.000). There was no significant difference in both groups as regard time of visits (pregnancy age in weeks).The proportion of women with an adverse maternal outcome increased with increasing maternal BMI. Less than one-third of non-overweight/non-obese women, 47.2% of overweight women, and 56.0% of obese women experienced an adverse maternal outcome (Short et al., 2018).

A study by Ferraro, Gaudet & Adamo, 2012 [12]titled "The Potential Impact of Physical Activity during Pregnancy on Maternal and Neonatal Outcomes" illustrated that neonates of the intervention group were better when compared to the control group.

Similarly, is the recent study. As when testing the Apgar score of the delivered infants in both groups, there was a significant better score of different items of Apgar score in infants of intervention group than infants of control group regarding activity, reflex irritability grimace, pulse rate, and skin color within p = 0.000 and p = 0.004 for respiratory efforts.

Ferraro, Gaudet & Adamo, 2012 [12]in their study concluded that physical activity and exercise during pregnancy seems to be protective against birth weight extremes. Observational data from a large birth cohort demonstrated that routine engagement in exercise during pregnancy protects the developing infant from birth weight extremes (i.e., Small of Gestational Age or Large of Gestational Age).

Finally, is the maternal outcome. In the present study it was found that gestational age at delivery and place of delivery are not significantly different in both groups. Most of women in intervention group (86.5%) had average BMI at delivery, while this percentage is 38.5% in control group that had overweight & obese by percentage (61.6%) and the difference is significant (P 0.000). The prevalence of maternal overweight and obesity is increasing and has important consequences for the health of mother and child at delivery (Price et al., 2018) [13].

On continuity to the present study, women in intervention group differed significantly than those in control group regarding time of hospital admission, cervical dilatation, and station at admission, oxytocin use, epidural use and duration of first and third stage. Duration of second stage did not significantly differ. Conversely, a newly done study by Mercier & Kwan, 2018 [14]concluded that exercise doesn't significantly affect epidural use, cervical dilation or decrease time in active labor.

Most of women in intervention group in the present study delivered by spontaneous unassisted vaginal delivery (82.7%), and LSCS was 11.5%. While, nearly half of women in control group (48.1%) were delivered by low forceps assistance vaginal delivery and LSCS was 48.1%. The type of delivery was significantly different in both groups (P 0.000). Farrag & Omar, 2018 [15]revealed highly statistically significant difference among groups related to mode of delivery in favor to the study group less cesarean section rate within p = 0.001.

VII. Conclusion

- It could be concluded that the outcomes of the current research support its hypothesis; breast cancer women receiving chemotherapy according to standardized nursing protocol attained better outcome and quality of health care compared to those under the conventional care.
- The applied standardized nursing protocol had no negative side effects or complications on cases. The completion of it had a great effect on quality of health care and patient's satisfaction.
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VIII. Recommendations

According to the results of the current research work, the researchers suggested the upcoming recommendations:

- Encourage to use the standardized protocol as one of the significant modalities to improve quality of life, gain better outcome and patient's satisfaction.
- Providing in-service training programs to health care providers concerning the use of standardized protocol and its benefits.
- Applying this protocol on health care providers with some adaptation.
- Replicate the study on a larger sample for generalizing the findings.

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