Impact of Exercise during Pregnancy on Fetal and Maternal Related Outcomes in Al-Zahraa Teaching Hospital in Al-Najaf City

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***Abstract*-** The study is a descriptive and analytic study was carried out to find out the impact of exercise during pregnancy on fetus and maternal outcomes, and to determine the statistical significant differences between exercise and pregnancy outcomes. A purposive sample of (100) pregnant women was selected from Al-Zahraa Teaching Hospital in Al-Najaf Al-Ashraf governorate. Data was collected through the interview of pregnant women. Questionnaire format was designed and contained four parts, demographic variable, reproductive variable, newborn variable, pregnancy physical activity questionnaire for pregnant women .Validity and reliability of the questionnaire were determined by conducting a pilot study .Descriptive and inferential statistical procedures were used to analyze the data. The result of the study revealed that the highest percentage of the age of mother was ranged between (21-25) years, the highest percentage of them were institute graduated and above, most of them were housewives with sufficient economic status. The result indicate that there are significant relationship between exercise and demographic characteristics (age of mother, economic status, level of education, occupation), significant relationship between exercise and reproductive history (parity, mode of delivery, number of alive children), non-significant relationship between exercise and complication during and after pregnancy , and significant relationship between exercise and newborn history (weight of baby).

Objectives: To assess exercise during pregnancy through application of Pregnancy Physical Activity Questionnaire PPAQ, to assess fetal and maternal outcomes, to determine the impact of exercise on fetal and maternal outcomes, and to determine the factors affecting fetal and maternal outcomes such as demographic data and reproductive history.

Recommendation: Encourage the pregnancies women on the exercise during pregnancy especially in the third trimester, and establishing program about sport club to teaching pregnant women the type of exercise during pregnancy that is important to reduce the proportion of caesarean section.

***Index Terms*-** exercise, pregnancy, fetal and maternal outcomes.

I. INTRODUCTION

Every year, 125 million women are pregnant (1). Pregnancy is a period of increased wellness and health care awareness .Thus, Pregnant are more likely to make changes in lifestyle that really can lead to better health behavior .The advantages of these changes not only impact the mother's health, but also the mode of delivery and the well-being of the newborn (2) . Pregnancy is an important stage in women's lives where it is the time when many social, mental , behavioral and physiological changes occur (3). In women's lives, Gestation presents psychologically and physical changes that really can impact the awareness of the individual living standards. Furthermore, several pregnant women feel unappealing and heavy, and could also find it difficult with certain motions and regular daily activities (4). exercise is one of that important factors that helps pregnant women to give birth naturally and enhance the health of the mother and the child , and the exercise can be prepared by pregnant before and during pregnancy (1). Labor is painful, and for most pregnant women the onset is full of fairness. Moreover, women often experience perineum trauma while giving birth. Some studies suggest that the physical activity of the mother may lead to shorter labor, less medical procedures, as well as less labor exhaustion. Been in shape doesn't decrease pain, but it certainly helps to give you the stamina you need to get through labor (5). On the other hand, Women often experience perinea trauma at birth, particularly through their first delivery. The trauma of perineum is defined, either spontaneously or due to an episiotomy, Like any genital harm during childbirth. In its extent, episiotomy is equivalent to a spontaneous perinea tear of the second degree . Perinea trauma is correlated with short-term and long-term morbidity during childbirth. Injure to perinea can lead to urinary and fecal incontinence, painful contact, constant perinea pain, and weakness of the pelvic muscles. It has been shown that an episiotomy is not only un successful but also dangerous at times. Potent proof is now well established to support restricting the use of episiotomy. However, more than half of the females who give birth without the need for an episiotomy still are suffering from a wound which really requires multilayer closing. Treatments are required to reduce the danger of episiotomy and perineal tears. In addition, Females with undamaged perineum recorded fewer perineal pain directly following delivery and enhanced sexual performance three months after delivery (5). Physical activity during pregnancy can make a positive contribution to perineal trauma. Many trials have also shown that a woman or her partner performed a perineal massage a few weeks before delivery to elevate elasticity and minimize the risk of episiotomy trauma or accidental tears (5) . There are controversies about the practice of leisure time and the outcome of pregnancy. Some research has shown that exercise during pregnancy can affect maternal outcomes positively (6). Some trials have verified that exercise may lower the risk of cesarean section during pregnancy (6) . Over

the previous two decades, there has been growing interest in the potentially positive impacts of regular exercise during childbirth for both mom and children **(7)**. Many writers have noted that exercises can encourage those advantages in reproductive results, such as reduced cesarean sections, reduced gestational diabetes mellitus incidence, and reduced gestational weight gain. Furthermore, fetal advantages include reduced fat mass, increased tolerance of stress and sophisticated neurocognitive development (7). Most women think that when they spend their free time lying down and not Having any habits or physical activity that will positively affect the results of their pregnancy , this issue has stirred up controversy , researchers have conducted studies proving that exercise may positively affect pregnancy outcomes (8). newly many research had suggested to doing daily physical activity during pregnancy, the researchers detect that the exercise has positive effect on the pregnancy outcome especially mild to moderate types during their final month of pregnancy and advice the pregnant women to doing it without any harmful effect (9) . it is still recommended by guidelines for the pregnant women to do some physical activity for 150 min / week . in spite of these recommendations, it is estimated that less than 15% of pregnant women are eager to do that (10).

II. METHODOLOGY

Design of the study: A cross-sectional retrospective study design was conducted to achieve objectives stated before. During the period from 1th February 2019 until 25th February 2019.

Setting of the study: The study was done in Al-Najaf City/ Al-Najaf Health Directorate/ Al-Zahraa Teaching Hospital.

Sample of the study: A non-probability (Accidental Sample) of 100 mothers will include in the study.

The Instrument of the Study: The final form of the instrument of the study consists of four parts:

Part 1: Demographic Data: A socio-demographic data consists of (7) items, which they are age, residence area, occupation, economic status, level of education, body mass index and smoking.

Part 2: Reproductive history: A reproductive history consists of (11) items, which they are age of marriage, infertility period, gravidity, parity, abortion, mode of current delivery, if cesarean section what indication of it, obstructed labor, prolong labor, number of alive children, complication of current pregnancy, chronic diseases during current pregnancy, complication after pregnancy.

Part 3: Clinical data about the current neonate: It is consisting of (4) items, which they are if the baby alive or dead, birth weight, gestational age, APGAR score.

Part 4: Exercise questionnaire (pregnancy physical activity questionnaire): They were (31) question that are used to assess pregnancy physical activity at three domains (at home, going place and exercise for fun or for exercise, at work).

III. STUDY RESULTS:

Table (1) Distribution of study Sample according to Demographic Data

Demographic Data	Rating and Intervals	Frequency / Percentage
Age / years	<= 20	20
	21- 25	30
	26- 30	26
	31- 35	17
	36 and more	7
	Total	100
Residence area	Urban	80
	Rural	20
	Total	100
Occupation	Housewife	68
	Employee	21
	Student	11
	Total	100
Economic status	Sufficient	87
	Sufficient to some extent	11
	Insufficient	2
	Total	100
Levels of education	Doesn't read and write	8
	Read and write	16
	Primary school graduated	20
	Secondary school graduated	22
	Institute graduated and above	34

	Total	**100**
BMI	**Underweight**	**2**
	Normal	**63**
	Overweight	**35**
	Total	**100**
Smoking	**Active**	**17**
	Passive	**46**
	Un exposed	**37**
	Total	**100**

Table(1) clarifies the demographic data of a total of (100) pregnant who enrolled in the study the high percentage of women at age group between (21-25) (30%), majority of them (80%) live in urban residential area, housewife (68%), socio-economically are sufficient (87%), Institute graduated and above (34%), normal BMI (63%) , and (46%) of study sample about smoking are passive .

Table (2)) Distribution of study Sample according to Reproductive History

Reproductive history	Rating and Intervals	Frequency / Percentage
Age of marriage / years	**<= 15**	**8**
	16- 18	**24**
	19- 21	**40**
	22- 24	**23**
	25+	**5**
	Total	**100**
Type of Infertility	**None**	**86**
	Primary	**9**
	Secondary	**5**
	Total	**100**
Gravidity	**<= 3**	**73**
	4- 6	**24**
	7+	**3**
	Total	**100**
Parity	**<= 3**	**84**
	4- 6	**14**
	7+	**2**
	Total	**100**
Number of Abortion	**None**	**75**
	1- 2	**25**
	Total	**100**
Mode of delivery	**Normal delivery**	**74**
	Caesarean section	**26**
	Total	**100**
Type of Cesarean section	**Emergency**	**15**
	Elective	**11**
	Total	**100**
Obstetric labor	**No**	**83**
	Yes	**17**
	Total	**100**
Prolonged labor	**No**	**85**
	Yes	**15**
	Total	**100**
Number of a live children	**1-3**	**84**
	4-6	**14**

	7+	2
	Total	100

table (2) shows that the reproductive history of (100) pregnant who enrolled in this study. In related to the age at marriage the high percentage of pregnant women between (19-21) years old where (40%) , the majority of pregnant are (86%) for none Infertility period , (73%) of gravidity are (less than or within 3) , (84%) of parity are (less than or within 3) , (57%) with no abortion, (74%) with normal delivery, (15%) of Cesarean section causes are emergency , (83%) are no Obstetric labor , (85 %) are no Prolonged labor and (84%) of study sample are having (1-3) children.

Table (3)) Distribution of study Sample according to Complications and Chronic Diseases

Complications and chronic diseases	Rating	Frequency / Percentage
Complications of current pregnancy	None	60
	Anemia	7
	Anemia + Oligohydrominious	2
	Anemia + Oligohydrominious + Cervical incompetency	1
	Anemia + Cervical incompetency	3
	Anemia + Antepartum hemorrhage	1
	Anemia +HT+GDM	1
	Anemia + GDM	2
	Oligohydrominious	1
	Oligohydrominious + Cervical incompetency	1
	Cervical incompetency	10
	Cervical incompetency + HT	2
	Cervical incompetency + GDM	2
	Antepartum hemorrhage	5
	Pregnancy induced hypertension	1
	HT + GDM	1
	Total	100
Chronic diseases during pregnancy	None	96
	Chronic hyper tension	1
	DM	3
	Total	100
Complications after delivery	None	75
	Bleeding	17
	Bleeding + Pre-eclampsia / eclampsia	6
	Pre-eclampsia / eclampsia	2
	Total	100

Table (3) show the majority of study subject of complication of current pregnancy are (60%) none , (96 %) not having any chronic disease during pregnancy ,and (75%) not having any Complications after delivery.

Table (4)) Distribution of study Sample according to Neonate Clinical Data

Clinical data	Rating and Intervals	Frequency / Percentage
Baby conditions	A live	100
	Dead	0.0
Baby weight / kg	<= 3	34
	3.01+	66
	Total	100
Gestational age / weeks	<= 31	5
	32- 34	3
	35- 37	20
	38- 40	61
	41+	11
	Total	100
Apgar score	Low	0.0
	Moderate	20
	High	80
	Total	100

Table (4) clarifies the neonatal clinical data , where most of them (100%) of baby condition are live, the majority of neonate are (66%) for baby weight are (3.01 and above) kg, (61%) of gestational age are within (38-40) weeks, and (80%) are high level of apgar score .

Table (5) assessment of exercises

Main domain	Levels of exercises	Frequencies / percentages
At home	Mild Exercise	51
	Moderate Exercise	30
	Hard exercise	19
	Total	100
Going Places	Mild Exercise	100
	Moderate Exercise	0.0
	Hard exercise	0.0
	Total	100
At Work	Mild Exercise	97
	Moderate Exercise	2
	Hard exercise	1
	Total	100

table (5) summarizes that the assessment of each domain in the exercise scale for the pregnancy every domain assessed as mild exercise.

Table (6) overall assessment of exercises

Main domain	Levels of exercises	Frequencies / percentages
Overall assessment of pregnancy exercises	Mild Exercise	93
	Moderate Exercise	3
	Hard exercise	4
	Total	100

Table (6) shows that the overall assessment of exercise for pregnant women is mild with the percentage (93%).

Table (7) relationship between the overall assessment of exercises and the mothers' demographic data

Demographic data	Chi-square Value	d.f.	p-value
Age / Years	22.038	8	.005 HS
Residence Area	5.108	2	.078 NS
Occupation	12.814	6	.046 S
Economic Status	18.095	4	.001 HS
Levels Of Education	18.719	8	.016 S
BMI	5.975	4	.201 NS
Smoking	6.316	4	.177 NS

Table (7) presents highly significant relationship between exercise and the age and economic status at p-value less than 0.01, and significant relationship between exercise and level of education and occupation at p-value less than 0.05, On the other hands there is a non-significant relationship with other demographic data.

Table (8) relationship between the overall assessment of exercises and the mothers' reproductive history

Reproductive history	Chi-square Value	d.f.	p-value
Age Of Marriage	6.837	8	.554 NS
Gravidity	9.946	4	.041 S
Parity	19.710	4	.001 HS
Number Of Abortion	2.509	2	.285 NS
Mode Of Delivery	7.232	2	.027 S
Obstetric Labor	1.542	2	.463 NS
Prolonged Labor	1.328	2	.515 NS
Number Of A Live Children	19.710	4	.001 HS

table (8) presents a highly significant relationship between the exercise and the parity, number of a live children at p-value less than 0,01 , and significant relationship between the gravidity, mode of delivery at p-value less than 0.05, On the other hands there is a non-significant relationship with other reproductive data.

Table (9) relationship between the overall assessment of exercises and the complications and chronic diseases

Complications and chronic diseases	Chi-square Value	d.f.	p-value
Complications of the current pregnancy	37.027	30	.176 NS
Chronic Diseases	.314	4	.989 NS
Complications after delivery	4.226	6	.646 NS

Table (9) presents no significant relationship between exercise and the complication and chronic disease during pregnancy.

Table (10) relationship between the overall assessment of exercises and the neonate clinical data

Clinical data	Chi-square Value	d.f.	p-value
Baby Weight / kg	6.158	2	.046 S
Gestational Age / weeks	6.899	8	.548 NS
Apgar Score	.420	2	.811 NS

table (10) presents a significant relationship between exercise and the baby weight at p-value less than 0.05, On the other hands a non-significant relationship with other neonate clinical history.

Table (11) Correlation between the mothers' exercises and some significant associated variables

Overall assessment of exercises	Number of a live children	Gravidity	parity	Baby weight
Pearson Correlation	.369**	.325**	.369**	.094
p-value	.000	.001	.000	.353
N	100	100	100	100
**. Correlation is significant at the 0.01 level (2-tailed).				

Table (11) presents a highly significant correlation between the exercise and the Number of a live children , Gravidity, parity at p-value (0.001) ,and significant correlation between exercise and baby weight at p-value (0,01).

Table (12) mean difference (independent sample t-test) of the pregnant exercises and the mode of delivery

Mode of delivery	N	Mean	Std. Deviation	t-value	d.f.	p-value
Normal	51	35.5882	9.60245	1.254	98	.213 NS
CS	49	33.3265	8.36508			

Table (12) shows that there is a non-significant difference in exercise according to the mode of delivery at p-value more than 0.05. but regarding to the mean difference that study results indicate that the pregnant with normal delivery perform exercise more than those pregnant with CS.

IV. Discussion:

5.1. Demographic data of the pregnant women: The current study included a total number of (100) pregnant women who participate in this study, their percentage age was 30% with the most age group of the participant were (21-25) years, same result by (11) who did find that ages between (21-25) are the most age group among participants . Furthermore, most percentage 80%of participants were living in an urban area, this result matches with the result of (12) who mentioned that most participant are living in urban residential area. Moreover, most of participant was housewives by 68%. This result comes along with (13) housewives were the major group of the participant. Regarding socio-economic status, high percentage of study sample are with Sufficient socio-economic status by 87%. this result matches with the result of (14) who stated that the majority of the participants having sufficient socio-economic status.In addition, the levels of education for 34% of the participants was Institute graduated and above.Body mass index for the 63% of the pregnant women is between (20-25) which is considered normal (15). in their study which indicated that the majority of participant are with normal weight. And about smoking of 46% of the pregnant women is passive. This result agrees with (13) who reported that "High percentage of participants are passive smokers"

5.2. Data related to reproductive history of the pregnant women: Highest percentage 30% of age of marriage is between (21-25) years, in addition the most of the participants were non infertility period by 86%.Moreover, to that most of participant show the majority of the gravidity was less than or within 3; less than or within 3 parity. These results are supported by (14) their

results show that most of the subjects of the study are multigravida and multipara. In addition, this study shows that most study samples do not have abortions by 75%. This result supported by (13) they state the highest percentage of participated women are without case of abortion. In addition, the majority of the last delivery method for these participants was vaginal delivery compared with caesarean sections by 74%. This result agrees with (16) they mentioned that the majority of study sample was normal vaginal delivery. In addition, the majority of these participant was non-obstetric labor by 83%, and the majority of these participant was non prolonged labor by 85%.Moreover, to that most of participant show the majority of the number of a live child 1-3 by 84%.

5.3. Data related to Complications and Chronic Diseases: Majority of the participants are with no complications of current pregnancy such as (Anemia, Oligohydramnious, cervical incompetence, Antepartum hemorrhage, Pregnancy induced hypertension, Gestational diabetes mellitus) by 60% as of what has been found by this study, which in consistency to (17),(18) these studies found that their pregnant women have no complications during pregnancy period. Moreover, to that the majority of these participants are with no chronic diseases during pregnancy such as (Thyroid disease, Chronic hypertension, Heart disease, Asthma, Diabetes mellitus) by 96%. This result comes along with (18) they stated that the majority of participants are with no past medical history In addition, the majority of these participant are with no Complications after delivery such as (Bleeding, Pre-eclampsia or Eclampsia, End organ, Embolism) by 75%.

5.4. Data related to Neonate Clinical Data: Study results show that all neonate is alive by 100%, in addition, the majority of baby weight are above (3.01+) by 66%, and the majority of Gestational age are from (38 to 40) weeks by 61%. these results agree with (19) in their study which indicated that the majority of gestational age more than 36 weeks, all of birth are alive, and birth weight from 2.5-4.5**,**moreover, the majority of the Apgar score of the neonate is 80% high.

5.5. Assessment of the exercise of the pregnant women: From the (31) question about the pregnancy physical activity questionnaire, these questions are divided into 3 domain and the assessment of each domain in the exercise scale for the pregnancy every domain assessed as mild exercise.

5.6. The overall assessment of exercise : The overall assessment of pregnancy exercises is mild with percentage 93% as what mentioned earlier, the reason of this result is maybe due to that the majority of participants(68%) were house wives and they are doing housekeeping works and the lower level of education is the most important factor as the majority of the women were (66%) secondary school graduated and lower level of education so that is a reasonable result Fell, et al., 2010 ; Mudd, et al., 2010 ; Peterson, et al., 2006 ; Ning, et al., 2004 ; Rutkowska, et al., 2003, these researchers are agree and had conclude same point that the lower level of education is an important and effective factor participating in mild level of exercise (20),(21),(22),(23),(24) .

5.7. The relationship between the overall assessment of exercises and the mothers' demographic data: There is a high significant relationship between the exercise and the age of mothers, previous studies supported this result, these studies indicated that high level of exercise was associated with younger age (25),(22) . There is significant relationship between exercise and occupation of the pregnant women's, this result is supported with some previous studies, like cross-sectional study which find that in comparison women who were not employed were more likely to be meeting exercise guidelines according to employed women (22) . On the other hand, a different study concluded that the women who are housewives and don't have a job are less practicing aerobic exercises than professionals' women in addition, professional women are practicing aerobic exercises for about twenty mints and more for 2 days per week and the percentages were about (42% for professionals women vs 22% for nonprofessionals women) (26) . The rest researches find no relationship between exercise and employment. **(20), (27)** found there is no relationship between exercise and occupation of the pregnant women. There is a high significant relationship between exercise and socioeconomic status , a study by **(28),(22),(23),(29)** found that there is appositive relationship between exercise and the economic status , referred that pregnant with high income households are more likely to be active. There is a significant relationship between exercise and the level of education , the pregnant women who have Institute graduated and above doing exercise during pregnancy , this is supported by some study (20), (22),(23),(21)(24) concluded that Increased level of education (e.g., high school, college or university) has been found to be an important predictor of increased participation in exercise. There is non-significant relationship between exercise and BMI of the pregnant women, this supported by some study (28),(27),(23),(30) found that there is no relationship between exercise and weight or BMI of pregnant women.

5.8. The relationship between the overall assessment of exercises and the mothers' reproductive history: There is a significant relationship between exercise and gravidity, also there is a high significant relationship between exercise and parity, this supported by some study, (28) find that higher level of exercises can be predicted and found if the women has at least one child in the house. There is a significant relationship between exercise and mode of delivery. This supported by a study, which it concluded that physical exercise increase frequency of the normal vaginal delivery and it will be more effective when the exercise is in the second and the third trimester for that It can be prescribed for health women while it was pregnant or not (31).There is a high significant relationship between exercise and number of alive children, this supported by a study that find the women have children in home are using and spending higher level of energy than the women who have no children especially in the fourth and seventh months of pregnancy. (28)

5.9. The relationship between the overall assessment of exercises and the neonatal clinical data: Wiebe et al., 2015 shows that there is a significant relationship between the exercise and the baby weight, (32) study concluded that exercise and activity provide protect infant birth weight from being overweight or low birth weight.

5.10. The correlation between the mothers' exercises and some significant associated variables: There is a high significant correlation between the exercise and the Number of a live children, there is significant correlation between exercise and baby weight, (32) researchers concluded that using scheduled exercise will have great and effective on the birth size and weight.

5.11. The relationship between the overall assessment of exercises and the mode of delivery: There is a non-significant difference in exercise according to the mode of delivery, but with respect to the mean difference that study results indicate that the pregnant with normal delivery perform exercise more than those pregnant with CS. This supported by Rajabi A *et al.*, 2018, study results clarify that exercises and activities are participating greatly in normal vaginal delivery and reduces the probability of cesarean section in addition, these result have great deal in providing a solid base for convincing staff members of health care system to provide a standard and regular physical activity and exercise (33).

V. Conclusion

1.The study confirms that the majority of pregnant women are from (21-25) years , urban residency, occupation is a housewife level of education is graduated from institute and above, sufficient economic status and normal body mass index, the study confirm that the majority of pregnant women are having 3 and above children and the majority of mode of last delivery is the vaginal delivery, also the majority of baby weight and APGAR score is normal , There were high significant relationships between The age of mother and exercise, there were high significant relationships between the economic status of pregnant women and exercise, there were significant relationship between the level of education of pregnant women and exercise, there were significant relationship between the occupation of pregnant women and exercise, there were non-significant relationship between the exercise and the body mass index of the pregnant, there were high significant relationships between the exercise and the number of parity and number of a live children, there were significant relationships between the exercise and the number of gravida and mode of delivery, there were significant relationships between the exercise and the baby weight, there were a non-significant difference in exercise according to the mode of delivery at p-value more than 0.05. but with respect to the mean difference that study results indicate that the pregnant with normal delivery perform exercise more than those pregnant with CS.

VI. Recommendation

Encourage the pregnancies women on the exercise during pregnancy especially in the third trimester.

Establishing program about sport club to teaching pregnant women the type of exercise during pregnancy that is important to reduce the proportion of caesarean section.

Further studies should be made to find the national prevalence of pregnant women made exercise during pregnancy and effect on outcomes

Emphasizing on a collaborative work between Iraqi ministry of youth and ministry of health to include this exercise curriculum a knowledge regarding type of exercise during pregnancy such as yoga ball .

Using different types of mass media to stimulate public awareness about benefit of using exercise during pregnancy.

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