Revista ARACÊ
ISSN: 2358-2472

IMPACT OF SEDENTARY BEHAVIOR ON MATERNAL AND FETAL OUTCOMES IN PRIMIPAROUS PREGNANCY

https://doi.org/10.56238/arev7n2-074

Submitted on: 01/07/2025 **Publication date:** 02/07/2025

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ABSTRACT

Objective: Sedentary behavior is a risk factor for the development of diseases, physical activity is a means of change, and can help in prevention and provide benefits to mother and baby, thus the need to analyze the impact of these factors on the pregnancy of primiparous women. Methods: Cross-sectional observational study, carried out at the Darcy Vargas Maternity Hospital, Joinville-SC, from August to December 2020. Sample composed of primiparous puerperal women who answered a validated questionnaire (QAFG) on physical activity; The primary outcomes analyzed were: gestational weight gain, gestational diabetes mellitus (GDM), hypertensive disease of pregnancy (HPD), mode of delivery, prematurity, newborn weight (NB) and neonatal ICU. The adjusted odds ratio was calculated, with a confidence interval of 95%; The group of sedentary patients was used as the standard. Results: The 492 patients were divided into 4 groups: sedentary puerperal women (n=76/15.4%), light physical activity (152/30.9%), moderate (202/41.0%) and vigorous physical activity (n=62/12.6%). When compared to the sedentary group, the light physical activity group showed protection against the development of GDM with 0.4 OR (95%CI 0.2-0.8) and admission to the neonatal ICU with 0.2 OR (95%CI 0.1-0.7). The moderate group also reduced the chance of developing GDM with a CR of 0.4 (95%CI 0.2-

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ISSN: 2358-2472

0.9) and admission to a neonatal ICU with a CR of 0.3 (95%CI 0.1-0.9); The vigorous group did not have significant results. Conclusion: Sedentary behavior, when compared to the practice of light and moderate physical activity during primiparous pregnancy, increased the chances of developing GDM and the need for hospitalization in the neonatal ICU.

Keywords: Physical Activity. Exercise. Sedentary lifestyle. Gestation. Gestational Outcomes.

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ISSN: 2358-2472

INTRODUCTION

Sedentary behavior is prone to the development of several chronic non-communicable diseases, being one of the main causes of mortality in the world; development of diseases can be harmful to the gestational period, can directly affect the health of the mother and baby; which makes it important for the pregnant woman to practice physical activity and if possible under the guidance of a health professional. [1] [2]

The practice of physical activity has shown efficiency, providing benefits to health as a whole, promoting physical, metabolic, physiological and emotional improvements [2,3]

Physical activity is any movement that spends energy, from walking to cleaning the house, among other daily tasks; Physical exercise, being a physical activity, differs by having regularity and programming, the intensity with which physical activity is done is related to the effort caused to the body during its practice, one of the ways to perceive this effort is by speaking and raising the heart rate; This perception of effort favors the control of the intensity with which the activity is being done . [4,5] [6]

It is recommended that pregnant women without contraindications do at least 150 minutes of moderate physical activity per week, so that health benefits are maintained and the pregnant woman does not fall into sedentary behavior [7]

The health benefits that can be offered through the practice of physical activity in the mother and baby become increasingly enlightened and evident, and can provide more security in the information and encouragement offered to the pregnant woman. [2,3,8–11]

Analyzing the consequences that sedentary behavior can cause on maternal and fetal outcomes, understanding whether being active can favor the results of these outcomes, helps to improve information for health professionals, increasing security in guidance and support for the development of guidance programs on physical activity during pregnancy.

MATERIAL AND METHODS

The study carried out was observational, cross-sectional, carried out with the puerperal women of the Darcy Vargas Maternity Hospital in the city of Joinville through data collection on the performance of physical activity to verify its impact on the outcomes analyzed. Data related to physical activity were obtained directly from the postpartum women, while sociodemographic data and data on outcomes were taken from the maternity hospital records.

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The inclusion criteria used were all primiparous puerperal women, over 18 years of age, single pregnancy, without associated pathology and who signed the Informed Consent Form (ICF) and the exclusion criteria were for patients who gave up participating in the research after signing the ICF.

The study in question was initiated after the approval of the Research Ethics Committee (CEP), opinion No. 4,169,080 and its development occurred in compliance with the requirements of Resolution 466/12 of the National Health Council of the Ministry of Health (BRASIL, 2012), which regulates research related to human beings. All patients were oriented and clarified about the objectives of the research and informed about the right to refuse at any time, without any harm or penalty for her and the baby, maintaining the integrity, guarantee and privacy of the information obtained during the research; no intervention was performed. All the information acquired was under the responsibility of the researcher, it was used for the development of scientific production, in the dissemination of the results no patient was identified. The data collected is kept in absolute secrecy and will be kept for five years, and later will be rendered useless (shredded and recycled).

The researcher and the research team used the Physical Activity Questionnaire for Pregnant Women (QAFG) as an instrument for the interview, derived from the [12] *Preqnancy Physical Activity Questionnaire* (PPAQ), which was translated and adapted to the Brazilian population, in which it seeks to make its use feasible from an operational point of view, considering in each question, the time spent on each activity per day (none, less than 30´, from 30´ to 1 hour, from 1 hour to 2 hours, from 2 hours to 3 hours and more than 3 hours), each answer is represented by METs ([13] *metabolic equivalent of task*), which represents the volume of oxygen consumed (metabolic consumption) during the activity; The questions refer to the type, duration and frequency of physical activities that were performed during pregnancy, and their reference is in accordance with the last trimester of domestic activities, commuting, entertainment and/or exercise and work that were performed.

The METs that resulted from each activity performed represents the sum of the duration of these activities per day, which were multiplied by seven (days of the week) and divided by 31, which represents the 31 assertive activities of the questionnaire, and thus being able to arrive at an average measurement of energy spent weekly (MET/hour per week). Questions 15, 16, 20, 21, 22, 23, 24, 25 and 26 were not multiplied by seven, because they present the value in weekly form, they were only added to the others to be

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divided. The estimate of QAFG intensity in relation to light, moderate and vigorous intensity activities results from the average MET/hour per week for the total activity. The TEM classification is represented by the values: sedentary when MET results in < 1.5, mild when it results in 1.5 to < 3.0 METs, moderate when it results in 3.0 to 6.0 METs, and vigorous when it results in > 6.0 METs.

According to the results, the patients who participated in the research were divided into 4 groups: sedentary, those who practiced light, moderate and vigorous activities; the primary outcomes analyzed were: mode of delivery, gestational weight gain, prematurity, newborn weight, gestational diabetes mellitus (GDM), hypertensive disease of pregnancy (DHEG) and neonatal ICU. The odds ratio calculation was adjusted, using a 95% confidence interval. The group of sedentary patients was used as the standard.

Birth weight was classified according to the criteria of the World Health Organization (WHO): underweight (children weighing less than 2500 g), underweight (2500 g to 2999 g), adequate weight (3000 g to 3999 g) and overweight (4000 g or more), respecting the World Health Assembly, resolutions WHA20.19 and WHA43.24, according to article 23 of the WHO constitution.

Gestational weight gain was classified according to the criteria established by the IOM (*Institute of Medicine*, 2009), which considers pre-pregnancy BMI as follows: - underweight pregnant women (BMI <19.8), recommended gain is 13kg to 18kg; - normal weight (BMI ≥19.8 to ≤ 26), recommended gain is 11kg to 16kg; - overweight (BMI ≥ 26 to ≤ 29), Recommended gain is 7kg to 11kg; - for obese women (BMI > 29), recommended gain is 5kg to 9kg

Simultaneously with the data collection, the data was double-digitized in an electronic database, so that agreement and possible typing errors could be verified. For the statistical analysis of the data, the Statistical *Package for the Social Sciences* (SPSS, IBM) software, version 21.0, was used. All variables were analyzed in detail, for the continuous variables (numerical) studied, means and standard deviations were calculated; For the qualitative variables, absolute and relative frequencies were calculated. Student's t-test was used when the distribution was normal, to verify the hypothesis of equality between the means of the groups*;* when the normality test was refused, the non-parametric *Kruskal Wallis* test was used, considering the existence of 3 distinct groups. The normality test used was the *Kolmogorov-Smirnov test* , and to prove the homogeneity of the groups in

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relation to the proportions, the Chi-square test or Fisher's exact test were used for frequencies below 5.

Multinomial logistic regression models were constructed with the intention of analyzing the influence of physical activity during pregnancy of primiparous women on the adverse outcomes that were analyzed (cesarean section, excessive weight gain, gestational diabetes mellitus, pregnancy-specific hypertensive disease, prematurity, low birth weight, LGA newborns, and neonatal ICU). The confounding factors used were: maternal age, alcoholism, smoking and other drugs. Thus, through the Odds Ratio (OR) calculation, the relevance of the effect of the variables was estimated, which was adjusted according to confounding factors and their respective 95% confidence intervals (95%CI); the values were considered significant when *P<0.05.*

RESULTS

According to the objective of the study to analyze the impact of sedentary behavior on maternal and fetal outcomes in primiparous pregnancy, 492 puerperal women participated in the research; according to the results of the questionnaire, the patients were divided into 4 groups, composed of 76 sedentary puerperal women (15.4%), 152 puerperal women in the light physical activity group (30.9%), 202 in the moderate physical activity group (41%) and 62 in the vigorous physical activity group (12.6%).

Regarding maternal characteristics, significant differences were found in relation to age, BMI classification, paid activity, education and smoking; In relation to the other parameters, no difference was found (Table 1).

Table 1: Maternal characteristics related to the degree of physical activity during pregnancy

	Sedentary (n=76)	Mild (n=152)	Moderate (n=202)	Vigorous (n=62)	P
Age	23,1 (4,8)	24,0 (5,0)	24,3 (5,0)	25,4 (4,8)	0,014
Pre-pregnancy BMI	24,8 (5,8)	25,1 (6,4)	25,9 (5,1)	25,6 (4,9)	0,092
BMI Rating					0.017b
Low Weight	10 (13,2)	8 (5,3)	7 (3,5)	1 (1,6)	
Normal Weight	33 (43,4)	85 (55,9)	92 (45,5)	34 (54,8)	
Overweight	22 (28,9)	36 (23,7)	65 (32,2)	20 (32,3)	
Obesity	11 (14,5)	23 (15,0)	38 (18,9)	7 (11,2)	
Weight Gain	13,0 (8,4)	12,8 (6,4)	14,2 (6,7)	14,2 (6,6)	0,351
Weight Gain Classification					0.158b
Down	17 (22,4)	43 (28,3)	33 (16,3)	14 (22,6)	
Normal	31 (40,8)	46 (30,3)	68 (33,7)	16 (25,8)	
Excessive	28 (36,8)	63 (41,4)	101 (50,0)	32 (51,6)	
Race					0.132b

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White	54 (72,0)	126 (82,9)	167 (83,1)	53 (85,5)	
Negress	5 (6,7)	3 (2,0)	6 (3,0)	4 (6,5)	
Brown	16 (21,3)	23 (15,1)	28 (13,9)	5 (8,1)	
Paid Activity	24 (31,6)	61 (40,1)	84 (58,4)	47 (75,8)	0.000b
Schooling					0.000b
Primary	19 (25,0)	15 (9,9)	18 (8,9)	2 (3,2)	
Secondary	53 (69,7)	111 (73,0)	139 (68,8)	43 (69,4)	
Superior	4 (5,2)	26 (17,1)	45 (22,3)	17 (27,4)	
Marital Status					0.147b
Married woman	15 (19,7)	44 (28,9)	63 (31,2)	14 (22,6)	
Single	55 (72,4)	91 (59,9)	122 (60,4)	37 (59,7)	
Stable Union	6 (7,9)	17 (11,2)	15 (7,4)	11 (17,7)	
Divorced	0 (0,0)	0 (0,0)	2 (1,0)	0 (0,0)	
Prenatal Consultations	9,3 (3,5)	8,5 (2,6)	9,1 (2,7)	8,7 (3,6)	0,287
MS Adequacy	70 (92,1)	130 (85,5)	181 (89,6)	55 (88,7)	0.466b
WHO Adequacy	56 (73,7)	107 (70,4)	151 (74,8)	41 (66,1)	0.548b
DMG	19 (25,0)	19 (12,5)	31 (15,3)	9 (14,5)	0.104b
DHEG	9 (11,8)	17 (11,2)	21 (10,4)	5 (8,1)	0.894b
Previous DM	2 (2,6)	2 (2,6)	1 (0,5)	0 (0,0)	0.349c
HAS prior	3 (3,9)	10 (6,6)	11 (5,4)	1 (1,6)	0.473c
Smoking	4 (5,3)	1 (0,7)	7 (3,5)	5 (8,1)	0.041c
Alcoholism	1 (1,3)	0 (0,0)	2 (1,0)	2 (3,2)	0.200c

[a] Mean and standard deviation, absolute numbers and percentages; [bKruskal] *wallis test*; [cFisher]'s Exact Test; BMI – Body Mass Index; GDM – Gestational Diabetes Mellitus; DHEG – Pregnancy-Specific Hypertensive Disease; DM – Diabetes Mellitus; SAH – Systemic Arterial Hypertension.

Regarding the characteristics of the newborns, no difference was found regarding gestational age (GA) at birth, weight adequacy, macrosomia, mode of delivery, prematurity and neonatal ICU (Table 2).

Table 2: Characteristics of the newborn related to the degree of physical activity during pregnancy.

	Sedentary (n=76)	**Mild (n=152)**	**Moderate (n=202)**	**Vigorous (n=62)**	**P**
Weight	3.150,2 (501,6)	3.189,1 (607,7)	3.234,6 (490,8)	3.273,7 (570,9)	0,441
IG	38,9 (2,1)	38,4 (2,2)	38,9 (1,9)	38,9 (2,0)	0,188
Weight Adequacy					0.696b
SGA	7 (9,2)	19 (12,5)	16 (7,9)	5 (8,1)	
AIG	64 (84,2)	118 (77,6)	166 (82,2)	49 (79,0)	
GIG	5 (6,6)	15 (9,9)	20 (9,9)	8 (12,9)	
Macrosomic	2 (2,6)	9 (5,9)	11 (5,4)	6 (9,7)	0.362c
Route of delivery					0.718b
Normal delivery	49 (54,5)	86 (56,6)	118 (58,4)	37 (59,7)	
Cesarean	27 (35,5)	66 (43,4)	84 (41,6)	25 (40,3)	
Prematurity	6 (7,9)	21 (13,8)	12 (5,9)	5 (8,1)	0.078b
Low Birth Weight	5 (6,6)	14 (9,2)	11 (5,4)	3 (4,8)	0.497c
Neonatal ICU	11 (14,5)	12 (7,9)	13 (6,4)	3 (4,8)	0.117c

[a] Mean and standard deviation, absolute numbers and percentages; [b] *Kruskal wallis test;* [c] Fisher's Exact Test *;* GA – Gestational Age; SGA – Small for Gestational Age; AGA – Adequate for Gestational Age; GIG – Large for Gestational Age; ICU – Intensive Care Unit.

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When analyzing the odds ratio calculations (Table 3), patients who did light physical activity, when compared to sedentary patients, showed protection against the development of gestational diabetes mellitus (GDM) with OR 0.4 (95%CI 0.2-0.8) and the need for admission to the neonatal intensive care unit (NICU) with OR of 0.2 (95%CI 0.1-0.7). the practice of light physical activity seems to have a protective effect on these outcomes.

Table 3: Odds ratio of patients who performed light physical activity during pregnancy, compared to sedentary patients

	n/N	P	RC	95%CI
Cesarean	66/152	0,341	1,350	0,728-2,500
Excessive weight gain	63/152	0,572	1,191	0,649-2,185
DMG	19/152	0,010	0,361	0,166-0,786
DHEG	17/152	0,664	0,818	0,330-2,028
Prematurity	21/152	0,218	2,298	0,611-8,641
BPN	14/152	0,243	2,652	0,516-13,639
GIG	15/152	0,239	2,018	0,627-6,489
Neonatal ICU	12/152	0,014	0,230	0,071-0,744

Confounding factors: Age, Smoking, Alcoholism, and Other Drugs.

In relation to Table 4, which compared patients who practiced moderate physical activity with sedentary patients, it was found that patients in the moderate group reduced the chance of developing GDM with OR of 0.4 (95%CI 0.2-0.9) and admission to the neonatal ICU with OR 0.3 (95%CI 0.1-0.9), thus, the practice of moderate physical activity also seems to be a protective factor against these outcomes; on the other outcomes, no findings were found.

Table 4: Odds ratio of patients who performed moderate physical activity during pregnancy, compared to sedentary patients

	n/N	P	RC	95%CI
Cesarean	84/202	0,412	1,281	0,709-2,313
Excessive weight gain	101/202	0,118	1,582	0,890-2,809
DMG	31/202	0,031	0,455	0,223-0,929
DHEG	21/202	0,481	0,729	0,303-1,753
Prematurity	12/202	0,846	0,872	0,219-3,465
BPN	11/202	0,267	2,503	0,495-12,651
GIG	20/202	0,390	1,644	0,530-5,105
Neonatal ICU	13/202	0,027	0,295	0,100-0,870

*Confounding factors: Age, Smoking, Alcoholism, and Other Drugs.

Table 5 compares the group of patients who performed vigorous physical activity with the group of sedentary patients.

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Table 5: Odds ratio of patients who performed vigorous physical activity during pregnancy, compared to sedentary patients

	n/N	P	RC	95%CI
Cesarean	25/62	0,806	1,100	0,515-2,348
Excessive weight gain	32/62	0,100	1,839	0,890-3,803
DMG	9/62	0,119	0,468	0,180-1,217
DHEG	5/62	0,332	0,545	0,160-1,858
Prematurity	5/62	0,443	1,911	0,365-10,014
BPN	3/62	0,747	1,415	0,172-11,604
GIG	8/62	0,121	2,818	0,760-10,451
Neonatal ICU	3/62	0,054	0,208	0,042-1,028

*Confounding factors: Age, Smoking, Alcoholism, and Other Drugs.

DISCUSSION

The study in question showed that patients who had sedentary behavior during pregnancy were 60% more likely to develop gestational diabetes mellitus (GDM) compared to patients who did light and moderate physical activity and also increased the chances by 80% and 70% of their babies to need hospitalization in the neonatal intensive care unit (NICU), respectively, light and moderate activities; in relation to the vigorous physical activity group, no difference was found; it is understood that sedentary behavior increases the risk for the development of GDM and the need for hospitalization in the neonatal ICU.

Sedentary behavior is a risk factor for the development of diseases and health complications, 47% of the adult population does not correspond to the recommendations of the World Health Organization (WHO), in practicing at least 150 minutes of moderate physical activity per week, it is worth noting that 31.7% of the total are women and Brazil is the most sedentary country in Latin America. Our study showed 15.4% of patients with sedentary behavior, it is necessary to be aware that the practice of physical activity is related to the change of sedentary habits and according to our result, it can help to improve health conditions, which is important to be encouraged.[1,7,12]

The WHO considers every movement valid! and according to our result, the physical activity performed by most participants (84.5%) was daily tasks, such as cleaning the house or at work; the recommendations of the [1,7] *American College of Obstetricians and Gynecologists* (ACOG), Canadian and WHO guidelines is that if there are no contraindications, pregnant women practice aerobic and strengthening activities during pregnancy and after childbirth, it may have more maternal benefits and fewer neonatal adverse effects[1,9,15]

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WEIGHT GAIN

Weight gain during pregnancy, if not controlled, can cause excessive weight or even obesity, which are risk factors for the development of pathologies, considered by the WHO the "epidemic of the 21st century", and is one of the main public health problems; overweight and/or obese pregnant women are predisposed to an increase in maternal and neonatal complications during pregnancy and in the postpartum period. Having a healthy lifestyle could prevent and or improve these health conditions [16,15] .

Our study did not find any relevant results on excessive weight gain.

In the study by Barakat et al, it was noticed that pregnant women who had supervised physical exercise intervention of moderate intensity showed a reduction in weight gain in relation to the control group that received prenatal information. It appears that the intervention of scheduled exercises during pregnancy helps prevent excessive weight gain. [17,18] These studies show that sedentary behavior does not benefit pregnant women in weight control, and may increase the chances of excess weight.

Pregnant women who become overweight increase the risk of developing gestational diabetes, hypertension, preeclampsia, cesarean delivery, reduction in intrauterine growth, have a greater chance of hemorrhages in the puerperium and a greater occurrence of premature birth; In addition, the chances of the newborn having fetal macrosomia, birth trauma, dyslipidemia, neonatal hypoglycemia, neural tube defects, higher risk of meconium aspiration, inadequate weight and even a higher probability of lifelong health complications. [19]

Physical exercise is a fundamental tool to improve lifestyle, and can act significantly in the weight control of pregnant women, offering benefits to the health of the mother and baby, helping to reduce and prevent complications that can occur during pregnancy. [20]

GESTATIONAL DIABETES MELLITUS (GDM)

Sedentary behavior is one of the risk factors for the development of GDM, which appears during pregnancy caused by carbohydrate intolerance. In our study, when we compared a sedentary lifestyle with light and moderate intensity physical activity, the risks increased by 60% for the development of GDM; We observed that physical activity can be one of the means of prevention for this occurrence. [1,21]

The cause of prevalence of hyperglycemia in pregnancy is related to the development of GDM, according to the *International Diabetes Federation* (IDF, 2019),

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83.6% of cases make up this condition. The increase in hormones occurs in women for a better development of the baby during pregnancy and the placenta is an important hormonal source, the production of the hormone lactogen causes a reduction in the action of insulin, consequently impacting the increase in insulin production by the pancreas so that glycemic control occurs, but in the body of some women this process does not happen as it should, causing hyperglycemia and developing gestational diabetes. [22] [23]

Physical exercise is an independent factor of cell signaling, which triggers a cascade of reactions activating the process that sensitizes cell receptors, allowing glucose to enter the cell without necessarily having the action of insulin; Another important mechanism is that muscle contraction causes the release of substances, called myokines; Irisin, for example, acts on several organs of the body, including the pancreas, its action increases insulin secretion, the self-regeneration capacity of Beta cells and the lifespan of these cells; important reflection on how physical exercise can help control and prevent gestational diabetes.[24–26]

The development of GDM can cause adverse effects on the health of the mother and baby in the short and long term; increases the prevalence of pre-ecclanmpsia, occurrence of prolidramnios, increased risk of cesarean section, macrosomia, neonatal hypoglycemia, birth trauma, hyperbilirubinemia, need for admission to the Neonatal ICU, and increased risk of stillbirth; Delayed breastfeeding can occur and affect the health of both; in addition, there is a chance that the mother will develop type 2 diabetes soon after delivery or a few years later and the child is more likely to be obese, develop DM2 and have cardiovascular diseases.[23]

HYPERTENSIVE DISEASE OF PREGNANCY (HEDG)

PEHD is one of the main causes of maternal morbidity and mortality, and sedentary behavior can cause cardiovascular and metabolic diseases, such as obesity and GDM, which are also risk factors for the development of PEHD.[8]

Our study did not present relevant results on PEHD, however, the physical activities that were performed and mentioned by the patients were daily activities and were not done with programming, guidance and regularity, which may be a controversy in the results. An updated meta-analysis identified that light and moderate exercise, preferably supervised and initiated in the first trimester, has benefits in the incidence of hypertension in pregnancy. [27]

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The International Society for the Study of Hypertension in Pregnancy strongly recommends, as long as there are no contraindications, the practice of physical exercises to prevent gestational hypertension and preeclampsia. The Brazilian Society of Cardiology for Pregnant Women suggests that pregnant women with hypertensive syndrome do not take routine rests and recommends aerobic, strength and flexibility physical exercises; Women who were already active can continue moderate-intensity exercise. [28,29]

Another meta-analysis analyzed the practice of regular and supervised physical exercise in healthy, non-active, overweight, obese, susceptible to hypertension and high-risk hospitalized pregnant women and found a reduction in systolic and diastolic blood pressure during pregnancy, thus suggesting the practice of it as prevention and control. [30]

MODE OF DELIVERY

Worldwide, 94.5% of live births, 21.1% were by cesarean section, with an estimated increase to 29% by 2030. Cesarean delivery can be essential to save lives, but excessive, unnecessary and inexperienced use can cause increased morbidity and mortality.[15,31]

Our study did not find significant differences in the mode of delivery of the group that had sedentary behavior in relation to the groups that did physical activity. In the study by Silveira et al.; In the sample analyzed, the group that had a physical exercise program had higher occurrences of vaginal deliveries than the group that remained sedentary; which seems to be positive the practice of exercise on the mode of delivery.[32]

One of the benefits of physical activity during pregnancy is a higher incidence of vaginal delivery, but it is understood that the practice of physical exercise favors the occurrence of this mode of delivery. In a prospective cohort study, it was observed that sedentary behavior increased the chances of cesarean section and the practice of light and moderate physical activity reduced the chances of unplanned cesarean delivery.[15,33]

Cesarean sections can present risks to mother and baby, such as heavy bleeding, infection, longer recovery time after delivery, delayed breastfeeding and greater risk of complications in other pregnancies. The search for more research involving the habit of doing physical activity as an aid to a more accessible moment of childbirth makes this understanding fundamental, thus providing more clarification and improving information on the subject.[21]

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PREMATURITY

Our study did not have a significant result on this outcome. The modifiable risk factors of preterm birth are related to lifestyle; contrary to what was believed, physical activity can have a protective effect on preterm birth, helping to prevent pregnancy complications, such as GDM, overweight, obesity, sedentary lifestyle, which are risk factors for prematurity.[34,35]

According to the World Health Organization (WHO), prematurity is considered one of the main causes of mortality in the world; It occurs when the baby is born before the proper development of the fetus, this situation happens before 37 weeks of gestation, it is estimated annually that 1 in 10 babies are born prematurely. Brazil occupies the 10th position in the world ranking, with 11.7% of preterm births, which corresponds to about 300 thousand premature births.[6,36,37]

It was believed that physical activity could cause a reduction in the circulation of the placenta and increase the production of catecholamines that stimulate the contraction of the myometrium; in the study by Ribeiro et al.; It was found that pregnant women who practiced physical exercise during pregnancy, in addition to not increasing, reduced the risk of premature birth.[37]

Wang et al., observed that exercises performed regularly and with guidance from the beginning of pregnancy did not present a risk on preterm birth. Beetham et al.; and Aune et al.; They also observed in their research that both the most intense activity in the 3rd trimester and prolonged leisure, respectively, showed a reduction in the risk of premature birth. Physical exercise offers mechanisms of action and production of substances capable of favoring fetal and maternal health and well-being, research is important to promote more clarification and mitigate sedentary behavior.[38–40]

NEWBORN WEIGHT

Low birth weight (LBW) seems to have a strong relationship with prenatal care, with large-scale consequences of fetal death, but it is considered that these deaths can be avoided. Our study did not find relevant results on low birth weight and high gestational age (LGA) newborns. According to information obtained by some studies, prematurity is one of the main contributors to LBW and the development of maternal comorbidities accentuates the risk of the baby being LGA; Risk factors can be avoided by lifestyle, including physical activity.[41,10,42]

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Of the 2.5 million newborns in the world who die each year, more than 80% of them are born with low birth weight.[21]

The study by Jones et al., observed that sedentary behavior can influence fetal growth and reduce the gestational age of delivery. For Moyer et al., the practice of exercise during pregnancy can promote a healthy environment in the uterus, positively influencing the development of organs, benefiting fetal health and well-being until childhood.[43,10]

The importance of women adopting a healthy lifestyle positively impacts the development of babies and their growth, not least because LBW babies have a higher risk of developing cardiovascular diseases, type 2 diabetes, metabolic syndrome and hypertension; GIG babies are at higher risk of obesity and developing type 2 diabetes; It was observed that benefits provided by exercise in the baby are related to cardiovascular development, nervous system, weight and body composition, which in some cases have greater lean mass.[10]

Adhering to behavioral changes for a healthy lifestyle by pregnant women would be a good strategy to prevent these occurrences and promote better delivery outcomes. Research is necessary for all health professionals to have access to information, thus promoting clarification and quality information and safety for this population.

NICU

Our study observed that sedentary behavior, when compared to levels of light and moderate physical activity, increased the chances of 80% and 70% respectively of the need for hospitalization in the intensive care unit (neonatal ICU), the relationship of these occurrences is strongly linked to situations such as GDM, DHEG, overweight, obesity and prematurity, situations modifiable by the habit of healthy lifestyle. [8,10,15,21,44,45]

CONCLUSION

Our research was an observational study, the number of populations, the fact that patients did not receive targeted guidance and physical activity planning may have influenced the outcome of the outcomes; however, a validated questionnaire was used as a research tool, which helped to identify and classify the intensities of the activities performed, minimizing this problem; In addition to the fact that there are few studies available on the subject, which is necessary to improve the scientific basis in the orientation of activities for pregnant women, it is relevant that prospective research and

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preferably with guidance and intervention of physical exercise take place, so that better findings can be found.

We understand that in primiparous pregnancy, having sedentary behavior instead of performing light and moderate physical activity increases the chance of the pregnant woman developing GDM and the newborn needing hospitalization in the neonatal ICU.

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