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Impacts of physical exercise during the gestational period

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Summary
Physical Exercise (PE) is characterized as any organized, planned and repetitive physical activity, whose objective is to improve health and the ability of human beings to carry out daily activities. Currently, many doctors recommend PE because it can contribute positively to pregnant women, with a small number of cases in which professionals prevent healthy pregnant women, who are already practicing, from continuing with the exercises. Many pregnant women are contraindicated in the practice when they have some associated pathology that could pose risks to the pregnancy. Thus, this article aimed to describe the impacts of practicing submaximal PE for women during pregnancy. A search for articles published between 2003 and 2022 was carried out on the aforementioned topic, highlighting the main physiological aspects altered by the inclusion of a more physically active routine during the gestational period. With this review, the benefits arising from controlled submaximal exercises for the gestational routine and the postpartum period with scientifically proven efficacy were observed. The evidence positively corroborates the impacts of practicing physical exercise during the gestational period with the supervision of a trained professional and medical guidance. **Key words:**Physical exercise; Gestational period; Pregnant women; Health.

Abstract
Physical Exercise (PE) is characterized as all organized, planned, and repetitive physical activity, whose objective is to improve the health and capacity of the human being to perform daily activities. Currently, many doctors recommend PE because it can contribute positively to pregnant women, with a small number of cases in which professionals prevent healthy pregnant women, who are already practicing, from continuing with the exercises. Many pregnant women are contraindicated to the practice when they have some associated pathology that may pose risks to pregnancy. Thus, this article aimed to describe the impacts of submaximal PE practice for women in the gestational period. A survey of articles published between the years 2003 to 2022 was carried out on the mentioned theme, punctuating the main physiological aspects altered by the inclusion of a more physically active routine during the gestational period. With this review, the benefits arising from controlled submaximal exercises for the gestational routine and the postpartum period with scientifically proven efficacies were observed. The evidence positively corroborated the impacts of practicing physical exercise during the gestational period with the supervision of a trained professional and medical guidance.
Keywords: Physical Exercise; Gestational Period; Health in Pregnancy.

1. INTRODUCTION

Pregnancy is defined as the state of women and females in general, during the time in which the fetus develops. According to Papalia and Feldman (2013), pregnancy is an important phase in the lives of many women, it is characterized as the moment when fertilization occurs between the female and male gametes, which together create a cell, forming the zygote, it matches the period subsequent to fertilization and prior to childbirth, lasting approximately 40 weeks.

During pregnancy, a woman's life goes through several changes, whether anatomical, psychological or physiological. Hormonal changes can cause psychological disorders, which can be alleviated by practicing physical exercise (PE), however, before starting the practice, it is important to contact and help professionals accredited for prenatal care (ROCHA, ROCHA and COSTA, 2019).

From a historical perspective, many professionals were afraid to recommend the practice of PE during management periods. tational, as it was believed that any effort would increase the risk of premature birth, due to uterine stimulation (BATISTA et al., 2003). Currently, this scenario is changing, according to Chiarello and Dias (2020) many doctors recommend PE because it can contribute positively to pregnant women, with a reduced number of cases in which professionals prevent healthy pregnant women, who are already practicing, from continuing with the exercises. .

According to Mottola et al. (2018), PE is not associated with premature birth and other complications that will be presented by this review, however, it is important that before starting any practice, an accompaniment is carried out. medical treatment, as it will be the gynecologist and obstetrician (GO) who will determine the possibility of performing PE during this period. If there is any contraindication, the exercise should not be performed. Birsner and Bannerman (2020) report that professionals such as gynecologists, obstetricians and other pregnancy-related care providers should analyze women who present any medical complications before recommending participation in PE. The study of *Physical Activity Guidelines for Americans* (2018) corroborates the previous study, stating that women Those who already practiced PE before the gestational period can continue actively with the practice during pregnancy; in the case of women who wish to start, they should be guided to gradually increase the type, duration and intensity of the exercise, as long as they are authorized by the GO.

If the pregnant woman is authorized by her doctor to practice PE, it is advisable that she seek out a Physical Education professional, accredited to plan and prepare the work plan, determining the intensity of PE, as well as the other variables correlated to the training, following the individuality of each pregnant woman (MIRANDA et al., 2021).

According to Silva et al. (2020) PE brings benefits to the lives of all individuals regardless of gender, including preventing injuries, strengthening muscles, improving mental health, reducing chronic diseases and mortality. lity. In view of this, the present study aimed to carry out a literature review regarding the impacts that this practice can generate in the life of a pregnant woman, highlighting the main physiological aspects altered by the inclusion of a more physically active routine during this period and the benefits arising from controlled submaximal exercises for the gestational routine and the postpartum period. However, it emerges as a desire of researchers ment the list of publications that deal with this topic in order to corroborate interventions with already scientifically proven effectiveness and, eventually, stimulate fieldwork with targeted representative samples to the public subject of this review.

2 MATERIAL AND METHOD

This is an observational and descriptive investigation into the impacts of practicing submaximal PE for women during pregnancy. To compose this review, a bibliographic survey was carried out between the months of March and September 2022 in the databases *American College Of Obstetricians And Gynecologists* (ACOG), Virtual Health Library (VHL), *World Health Organization* (WHO), Medline and the search for data on Google Scholar for scientific articles published between 2003 and 2022 using descriptors alone or in combination in English, Spanish and Portuguese: Physical exercise; Gestational period; Pregnant women; Health.

To select the material, three steps were carried out as described by Martelli et al. (2014). The first was characterized by the research of the material with the selection of 49 works. The second included reading the titles and summaries of the works, aiming for greater approximation and knowledge, excluding those that did not have relationship and relevance with the topic. After this selection, the texts that were available in full were searched, totaling 33 works, which were included in the review.

The inclusion and exclusion criteria for articles are based on the quality of publications obtained from the search for articles, the date of publication, articles and publications older than five years are not used, except when

whether it is historical data or conceptual information and the relevance of articles and research to the topic in question. During reading and evaluation, articles that presented the eligibility criteria were selected and included in the research by consensus.

3 RESULTS AND DISCUSSION

3.1 Pregnancy

Many women suspect they arepregnantthrough a delay in menstruation. In the first month, the woman probably still does not identify her pregnancy, being able to confirm it when she completes two months, that is, four weeks and half to nine weeks (PAPALIA; FELDMAN, 2013). Corroborating this study, Sedicias (2020) says that the gestational period begins to be declared after the first day of the woman's last menstruation, considering that day by health professionals find it difficult to know when exactly ovulation and the conception of a new life occurred. The beginning of the first trimester of pregnancy is marked by the phase in which the egg is fertilized and implanted in the uterus, causing the woman's body to produce the hormone*beta HCG*so that the fetus can develop.

At the beginning of the second trimester, amniotic fluid is present inside the placenta, with the function of protecting the baby from external impacts. In the third trimester, the baby is, in most cases, already fitted into the maternal pelvis, making the uterus prominent (URBANETZ, 2021). According to Sedicias (2020), in the first trimester, more precisely between the second month and the end of the third month, hormonal changes begin, which can significantly alter the dynamics of a pregnant woman's life, including with regard to the practice of PE. In addition to the hormone, physiological and psychological changes begin to appear, these changes suggest special care on the part of the pregnant woman, health professionals and close family members (ROCHA et al., 2019). Pereira (2020) reports that the physiological changes that are present in the three trimesters of the gestational period are related to hormonal factors that are fundamental for the adaptations of the organism and the fetus to their new condition.

Cruz et al. (2021) describe that pregnancy, in most cases, presents no complications, making the gestational period successful. However, some pregnant women may experience problems, due to complications during the period or pre-existing illnesses. Some possible risks are related to obesity, urinary tract infection, diabetesgestational and high blood pressure, which may lead to pre-eclampsia oreclampsia(COSTA et al. 2019).

According to Bisner and Bannerman (2020), pregnancy results in anatomical and physiological changes, including weight gain, which causes a change in the body's line of gravity that can result in hyperlordosis, presenting pregnant women with discomfort. postural. Corroborating this study, Silva et al. (2020),
They complete by saying that pregnancy is the period in which a woman's body adapts to serve as a shelter and offer development for a new life. It goes through changes, such as changes in balance, coordination and movement control.

Regardless of whether or not you are having a high-risk pregnancy, all pregnant women need to take greater care prenatal care, as a way of preventing possible complications (DUTRA et al., 2018). According to American *College of Obstetricians and Gynecologists*(ACOG, 2021), currently, with new studies, doctors are recommending PE to pregnant women, in order to provide possible benefits.

3.2 Impacts of physical exercise during pregnancy

According to the guidelines of the World Health Organization (WHO, 2021), PE is characterized as any organized, planned and repetitive physical activity, the objective of which is to improve the health and capacity of human beings. in carrying out daily activities. To increase physical, mental and social well-being, Souza et al. (2021) state that all pregnant women should be encouraged to practice PE during pregnancy when they do not have clinical reasons that contraindicate such practice. According to Birsner and Bannerman (2020), PE should be recommended for at least 30 minutes a day with light intensity, or at most moderate intensity, and it is ideal not to go more than two days without doing it. Santos and Borges (2021) report that PE is related to hormonal changes, in which high blood glucose levels occur.

The practice of PE helps to reduce insulin resistance, reinforcing that many women, who do not often practice, they end up developing diabetes mellitus during the gestational period. The results corroborate Rocha et al. (2019), who state that pregnant women who have diabetes mellitus during pregnancy, along with a balanced diet and exercise, are less exposed to complications and risk manifestations of this disease during this period and are even able to live with a more severe version. relief from such a clinical condition.

There is an increase in the number of pregnant women seeking to practice PE, in an attempt to stay healthy during pregnancy. Some of these women begin the practice following medical recommendations, as they are overweight and sedentary, however there are still doubts and fears on the part of doctors and some mothers (BERNARDO et al., 2018). In a survey conducted by Coser and Fonseca (2021), they conducted an interview with pregnant women undergoing prenatal care, seeking to analyze whether PE was practiced before and during the gestational period and stated that 18.5% of pregnant women who practiced with or without supervision, they stopped the practice when they became pregnant, because they were afraid of the impacts that PE could have on their life or on the fetus, as shown in figure 1, at the end of the research, the authors stated that half of the participants started the gestational period with a adequate weight, however, as the months went by, the majority found themselves with an inadequate weight, as shown in figure 2, showing signs of obesity and a sedentary lifestyle.

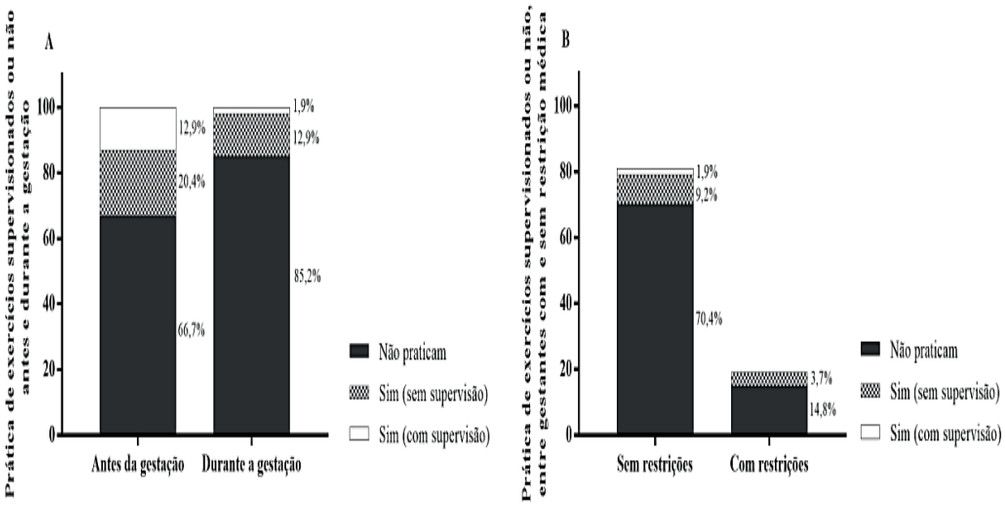

Figure 1: PE practice guided or not (before and during pregnancy). Source: Coser and Fonseca (2021)

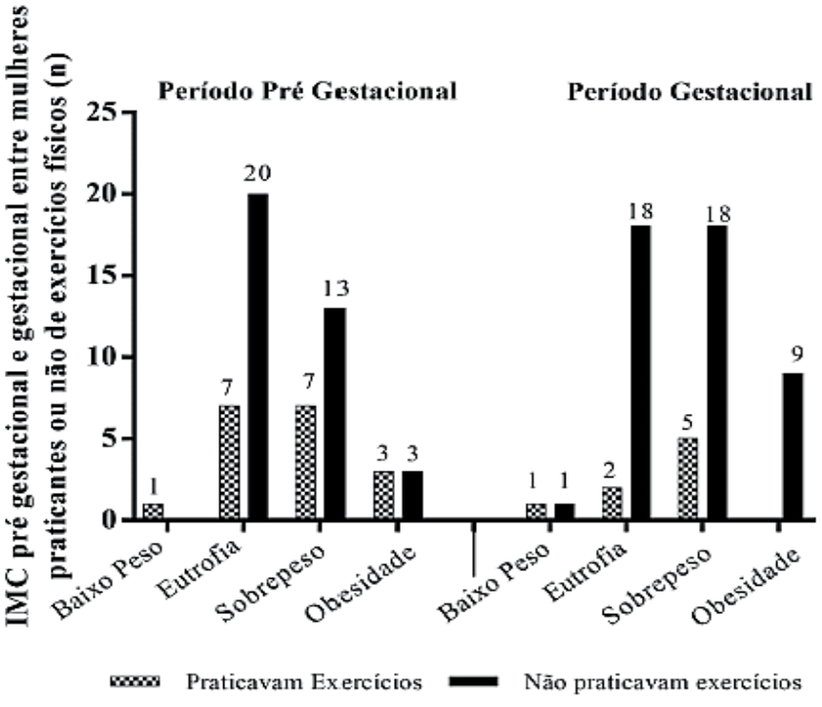

Figure 2. Comparison between pre-pregnancy and gestational BMI classification between women who did not exercise and those who practiced physical exercise before and during pregnancy:
BMI: Body Mass Index. N: number.
Source: Coser and Fonseca (2021)

Sedentary behavior is determined by the WHO as the time in which there is low energy expenditure. The pregnant woman should limit this time and replace it with light or moderate intensity PE (WHO, 2020). However, according to Mottola et al. (2018), sedentary women, who did not practice PE before pregnancy, should only start after the professionals' approval, starting gradually and increasing the intensity as the gestational period progresses; on the other hand, active women, who do not present complications, must remain in practice and accompanied by the GO.

Based on the research by Silva et al. (2020), PE practice aims to prevent and improve symptoms. pregnant doses. In contrast, Rocha et al. (2019) state that exercise is contraindicated in the case of more physiologically compromising diseases, such as high blood pressure, obesity accompanied by risk factors, uterine bleeding, heart failure, thrombosis, among others, after all, they can pose a risk to pregnancy. Mottola et al. (2018) absolutely contraindicates the practice when the pregnant woman has a ruptured membrane, pre-eclampsia, severe cardiovascular, respiratory or systemic disorders, high order multiple pregnancy, among other aspects, in some cases pregnant women who present these symptoms and even so they continue practicing PE, they can worsen the pregnancy.

For women who do not have contraindications, the*American College of Obstetricians and Gynecologists* suggests participation in low-impact physical exercises that pose a risk of falls and require little balance skills, such as those reported below (ACOG, 2021).

3.3 Exercises recommended during pregnancy without contraindications

The practice of PE should be recommended for different audiences, in which different results are obtained, reflecting affecting health and quality of life, and with this the search for gyms is increasing more and more (BRITO et al., 2021). According to Lopes and Gonçalves (2019), PE offers physical, social and mental benefits to the practitioner; it should be included at different times in life, even during pregnancy. However, before practicing any PE, it is worth highlighting that the pregnant woman must be evaluated by the GO. They are responsible for encouraging the patient to continue, start or stop the safe practice, figure 3 (BIRSNER AND BANNERMAN, 2020).

- Caminhada
- *Spinning*
- Exercícios aeróbios
- Dança
- Alongamento
- Hidroginástica
- Exercício de resistência sem impacto.

Figure 3. Examples of exercises considered safe and beneficial.
Source: Birsner and Bannerman (2020) Modified by the authors.

After approval from doctors, the Physical Education professional must choose the most appropriate practice that meets the individual profile of the pregnant woman, being necessary to know the prescription guidelines for recommendations and have a starting point in preparing the PE (BALDO et al., 2020). According to Tarevnic et al (2019), in a field research, they point out that water activities during pregnancy represent a practice in search of improved health, contributing to the well-being of the pregnant woman and the fetus. Among the benefits, Resende et al. (2019), state that PE in the aquatic environment allows improvements in the quality of sleep, physical or mental changes in the individual who

can affect the routine. In alignment with the study above, Azevedo and Soares (2022) mention the increase in resistance *endurance*, reduction of depressive symptoms in pregnant women, prevention of hypertension, control of premature birth and weight loss, both for the pregnant woman and the fetus.

Rosa et al. (2019) in their research show a hypertensive pregnant woman and a normotensive pregnant woman, both in the third trimester of pregnancy and describe in the results that the practice of PE in an aquatic environment brought to the hypertensive pregnant woman a decrease in the values of heart rate and blood pressure and promoted a cardiorespiratory improvement. According to Pereira et al. (2020), another exercise recommended for pregnant women is strength training, which is also safe, as long as the pregnant woman does not have any contraindications and is accompanied by duly accredited professionals in the field. The prescription must meet the individuality of each pregnant woman, allowing for a minimum of discomfort related to this period, promoting a lower risk of hypertension, diabetes and pre-eclampsia, reducing depressive symptoms and pain related to pregnancy. Weight training can be an excellent choice for strengthening the lower back, where there is a significant increase in symptoms arising from lordosis, also helping against pain in the knees, hips and the emergence of herniated discs (ROCHA et al., 2019).

According to Oki (2022), the Pilates Method (PM) is considered a practice that can provide excellent results.
ults for women who are in the gestational period, as it is capable of helping with psychological and physical changes. Among the benefits it is worth mentioning: prevention or reduction of pain and discomfort; strengthening muscles, to improve posture and the pelvic floor; promoting body awareness, as well as flexibility, balance control, among others. Mendo and Jorge (2021), state that MP can contribute to controlling the progression of abdominal diastasis, consequently strengthening muscles, reducing the feeling of fatigue, improving posture, flexibility and functional capacity of this group.

But after all, what would be the best exercise for pregnant women? According to Silva et al. (2020), there is no best exercise, it is only good when it makes the pregnant woman feel comfortable, happy, determined, and is capable of improving her self-esteem and health. This prevents changes caused during this period. The importance of continuing the chosen practice and protocol is highlighted, since the exercises will be beneficial from the point at which they become frequently performed stimuli. According to Birsner and Bannerman (2020), exercises must be interrupted in some cases, as shown in figure 4, with these symptoms the doctor must be contacted immediately.

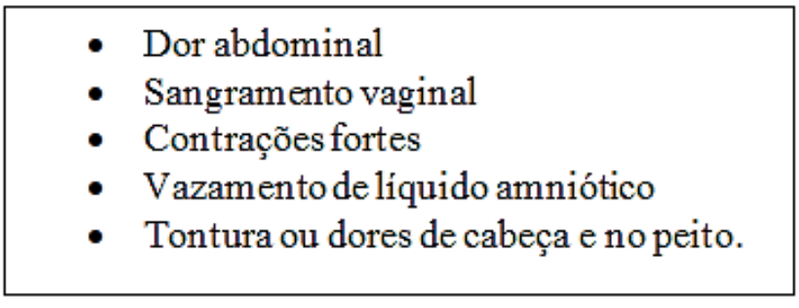

Figure 4. Warning signs to stop the exercise. Source:
Birsner and Bannerman (2020) Modified by the authors.

FINAL CONSIDERATIONS

According to the data presented, the search for physical exercise during the gestational period has increased, as many women are looking for ways to reduce and prevent symptoms arising from complications.
during the gestational period. During the gestational period, a woman can practice PE, as long as it is approved by the GO, after it is proven that she does not have any contraindications. This practice can contribute positively to pregnant women, avoiding injuries and pre-dispositions to diseases that may appear.

Regardless of the modality chosen, the pregnant woman must be guided by a Physical Education professional,
This will prepare the training according to the trimester the pregnant woman is in and the intensity of the exercise so that it is individualized, seeking benefits for the pregnant woman. Studies contraindicate exercises that have large impacts, that require balance and higher altitude, or any other that poses risks.

This study proposed to investigate the impact that physical exercise has on pregnant women's lives, since the articles studied presented information that there is improvement in postural conditions, low back pain, chronic and pathological diseases, psychological changes, muscle strengthening, among other benefits. Pregnant women who have complications such as: pre-eclampsia, eclampsia, twin pregnancy, cardiovascular or respiratory diseases, among others already mentioned, should avoid the practice of PE, as there may be risks to their health and that of the baby.

This information covered is extremely important, as it contributes to the knowledge of women who find themselves in these conditions or wish to increase their knowledge of this topic and to people who work in the health sector. In order to prove the effectiveness of different types of physical exercise during pregnancy, it is recommended that new studies be carried out that deeply amplify and address this topic.

REFERENCES

AMERICAN**College of Obstetricians and Gynecologists-Acog,**2021. Available at:https://www.acog.org/womens-- health/faqs/exercise-during-pregnancy/ . Accessed on: September 7th. 2022.

AZEVEDO, EB; SOARES, LF Aquatic Activities/Exercises and their Effects on Pregnant Women and Newborns: a Systematic Review.**Essays and Sciences Magazine**, v.26, n.1, p.117-129, 2022.

BALDO, LO; RIBEIRO, PRQ; MACEDO, AG; LOPES, CA; ROCHA, RAM; OLIVEIRA, DM Pregnancy and Physical Exercise: recommendations, care and prescription.**Electronic Journal of Undergraduate and Postgraduate Education**, vol. 16, no. 03, 2020.

BATISTA, DC CHIARA, VL; GUGELMIN, SA; MARTINS, PD Physical activity and pregnancy: health of non-athlete pregnant women and fetal growth.**Bras Magazine. Maternal and Child Health.**Recife, vol. 3, n.2, p. 151-158, Apr./Jun. 2003.

BERNARDO, SCA; SILVA, PK A; VÍNCULO, LS The guided practice of physical exercise during pregnancy and the benefits for the mother and infant.**Physical Education and Health Magazine.**Goiânia, v.1, n.1, December 5th to 7th, 2018.

BISNER, ML; BANNERMAN, CG Physical Activity and Exercise Surging Pregnancy and the Postpartum.**Period. Acog committee opinion,**vol. 135, n.4, p. E178-e188, April 2020.

BRITO, GC BERNALDINO, ES; ALMEIDA, EA; SANTOS, LJAM; ANTUNEZ, BF; SILVA, OG et al. Adherence to bodybuilding in gyms in Brazil. CPAQV Magazine –**Center for Advanced Research in Quality of Life,** Vol.13, n. 1, p. 1-7, 2021.

CHIARELLO, VB; DIAS, RG Physical exercise during pregnancy and the impact on the quality of life of post-natal women - childbirth.**Health Scientific Magazine,**vol.2, n.1, p. 35-46, 2020.

COSER, MP; FONSECA, V. Nutritional anthropometric status and prevalence of physical exercise among pregnant women treated at a medical care center during prenatal care.**Brazilian Journal of Development,**Curitiba, vol. 7, n.1, p.5513-5526, 2021.

COSTA, LD; HOESEL, T.C.; TEIXEIRA, GT; TREVISAN, MG BACKES, MTS; SANTOS, EKA Perceptions of pregnant women admitted to a high-risk reference service.**REME**–Rev. Mineira de Enfermagem, 2019.

CRUZ, MM; CASTRO, ACG; ALCÂNTARA, F.; P.CAUS, HQA; SILVA, JMS; NEVES, JM et al.. Pregnancy-induced hypertension: predisposing factors, risks to women's health and treatment.**Brazilian Journal of Development,** Curitiba, v.7, n.10, p. 21082-21098, 2021.

DUTRA, GRSF; DUTRA, LC; FONSECA, GKS JUNIOR, MBN; LUCENA, EES Prenatal Care and Hypertensive Gestational Syndromes: A Systematic Review.**Brazilian Journal of Gynecology and Obstetrics,**v. 40, n. 8, p. 471-476, jun. 2018.

LOPES, CR;GONÇALVES, LC ... Bodybuilding practice in pregnant women.**Carioca Education Magazine Physical,**v. 14, no. 1, p. 72 – 73, 2019.

MARTELLI, A.; ZAVARIZE, SF; HUNGER, MS; DELBIM, LR Clinical and pathophysiological aspects of rhabdomyolysis after intense physical exertion.**Biological & Health,**v. 4, no. 13, 12 Nov. 2014.

MENDO, H.; JORGE, MSG Pilates method and pain during pregnancy: systematic review and meta-analysis.**Brazilian Society for the Study of Pain**, P. 276-282, São Paulo, 2021.

MIRANDA, LA; MOURA, ACR; KASAWARA, KT; SURITA, FG MOREIRA, MA NASCIMENTO, SL Exercise and Physical Activity Levels and Associated Factors Among High-Risk Pregnant Women.**Brazilian Journal of Gynecology and Obstetrics,**2021.

MOTTOLA, MF; DAVENPORT, MH RUCHAT MS DAVIES, AG; POITRAS, JV; GRAY, EC et al. Canadian guideline for physical activity throughout pregnancy.**Br J Sports Med Magazine**, 2018

OKI, ME**Pilates method and its application during pregnancy:**a literature review. Institute of Biosciences. Rio Claro, 2022.

PAPALIA, E.; FELDMAN, R.D.**Human development.**12th ed., p. 81, 2013.

PEREIRA, BM; SILVA, FAF; SILVA, RAR; DIAS, IBF; ELIAS, FCC; LEANDRO, MPG Strength training for pregnant women in the third trimester.**Magazine Center for Advanced Research in Quality of Life**, v.12, nº.3, p.2, 2020.

PEREIRA, NS; REGO, BAC; PINTO, LFR; BLANCO, KB The Benefits of the Pilates Method for Changes in the Gestational Period.**Cathedral Magazine**. V. 2, n. 4, p.51, year 2020.

RESENDE, CM; SAMPAIO, NLF; LOPEZ, RFA; SILVA, RAS Effects of water gymnastics on sweat quality in active and sedentary pregnant women.**Readings:**Physical Education and Sports, 2019.

ROCHA, JF; ROCHA, JRC COSTA, JBB Pregnancy and Physical Exercise: Quality of life for mother and baby. **Health Scientific Magazine.**v. 2, n.1, p. 53-64, Jan/Jun 2019.

ROSA, G. HENRIQUES, I.; SOUTINHO, IF; SILVA, GNM; MELLO, D.; PEREIRA, FD Physiological responses to aquatic exercise in pregnant women with hypertension and normotension: case control report.**Journal of Research in Aquatic Activities,**v. 3, n.5, p. 14-17, 2019.

SANTOS, AF dos, BORGES, GF Gestational diabetes and the effects of physical exercise in its prevention.**Readings:** Physical Education and Sports, 26(278), 186-199, 2021.

SEDICIAS, S. Pregnancy week by week: how the baby develops.**Rev. Your health.**P.1, 2020.

SILVA, MS; SILVA, EA SANTOS KS; NASCIMENTO, LS; MACHADO, SC; SILVA, TSL Physical exercise during pregnancy: The benefits for mother and baby.**Brazilian Journal of Development, Curitiba,**v. 6, no. 11, p.86454-86469, nov. 2020.

SOUZA, LMV FARIA LM; QUEIROZ, L.; MOTA, MG; SANTOS; JL; PAOLILLO, FR et al. High Intensity Exercise for Pregnant Women: A Brief Essay.**Magazine Center for Advanced Research in Quality of Life**, vol. 12, no. 3, p. 2-7, 2021.

TAREVNIC, R., BARRETO, AC BRASIL, RM; DAYS, IF; REIS, MS; NOVAES JS The acute effect of aquatic exercises on heart rate variability in pregnant women.**Motricidade Magazine,**vol. 15, no. 1, pp. 17-23, 2019.

US DEPARTMENT OF HEALTH AND HUMAN SERVICES. Physical Activity Guidelines for Americans, 2nd edition. Washington, DC: US**Department of Health and Human Services;**2018.

URBANETZ, AA**Febrasgo Gynecology and Obstetrics for the resident doctor**. 2nd Ed. São Paulo, 2021; chap. 58, p. 1094-1095.

WHO, Guidelines on Physical Activity and Sedentary Behavior.**World Health Organization**. 2020.

GLOBAL RECOMMENDATIONS ON PHYSICAL ACTIVITY FOR HEALTH.**World Health Organization.** 2021. Available at:https://www.who.int/health-topics/physical-activity#tab=tab_1 . Accessed on: May 7th. 2022.