# ANXIETY, PHYSICAL ACTIVITY LEVELS, AND HISTORY OF PREGNANCY LOSS IN A PUBLIC MATERNITY HOSPITAL IN RONDÔNIA, NORTHERN BRAZIL

## ANSIEDADE, NÍVEIS DE ATIVIDADE FÍSICA E HISTÓRICO DE PERDA GESTACIONAL EM UMA MATERNIDADE PÚBLICA EM RONDÔNIA, NORTE DO BRASIL

## ANSIEDAD, NIVELES DE ACTIVIDAD FÍSICA E HISTORIAL DE PÉRDIDA DE EMBARAZO EN UNA MATERNIDAD PÚBLICA DE RONDÔNIA, NORTE DE BRASIL

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## ABSTRACT

A high-risk pregnancy is a cycle in which the life or health of the mother and/or the fetus and/or the newborn has a greater chance of being affected. To analyze the relationship between anxiety and physical activity and the history of pregnancy loss in high-risk pregnant women. Descriptive, quantitative, and documentary study, with a sample of 339 high-risk pregnant women admitted to the maternity ward at Hospital de Base with high blood pressure and/or diabetes. Data was collected using the following research instruments: a sociodemographic questionnaire, the International Physical Activity Questionnaire, the Beck Anxiety Inventory (BAI), and a form for recording other information. In the relationship between anxiety and pregnancy loss, in the group of pregnant women with a history of pregnancy loss, the level of severe anxiety predominated. In pregnant women without a history of loss, there was a higher prevalence of mild anxiety. In the relationship between the level of anxiety and the level of physical activity, it was observed that anxiety levels were independent of the practice of physical activity. Similarity was observed between the anxiety classification and the physical activity level of pregnant women, and the absence of similarity between the variable anxiety and the history of pregnancy loss. Pregnant women with a history of previous losses showed the most severe level of anxiety. The physical activity variable demonstrated a low influence on the anxiety level of pregnant women. These

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findings indicate that, although the development of anxiety is multifactorial, the fact that the pregnancy was not planned and having a history of previous pregnancies (Euclidean Similarity Index) may be factors of greater influence and chance of developing the condition.

**Keywords:** Public Health. Active Life. Healthy Habits. Mental Health. Psychology of Physical Exercise.

## RESUMO

Uma gestação de alto risco é um ciclo em que a vida ou a saúde da mãe e/ou do feto e/ou do recém-nascido tem maior chance de ser afetada. Analisar a relação entre ansiedade e atividade física e o histórico de perda gestacional em gestantes de alto risco. Estudo descritivo, quantitativo e documental, com amostra de 339 gestantes de alto risco internadas na maternidade do Hospital de Base com hipertensão arterial e/ou diabetes. Os dados foram coletados utilizando os seguintes instrumentos de pesquisa: questionário sociodemográfico, Questionário Internacional de Atividade Física, Inventário de Ansiedade de Beck (BAI) e formulário para registro de outras informações. Na relação entre ansiedade e perda gestacional, no grupo de gestantes com histórico de perda gestacional predominou o nível de ansiedade grave. Nas gestantes sem histórico de perda, houve maior prevalência de ansiedade leve. Na relação entre o nível de ansiedade e o nível de atividade física, observou-se que os níveis de ansiedade eram independentes da prática de atividade física. Observou-se similaridade entre a classificação de ansiedade e o nível de atividade física das gestantes, e ausência de similaridade entre a variável ansiedade e o histórico de perdas gestacionais. Gestantes com histórico de perdas prévias apresentaram o nível de ansiedade mais grave. A variável atividade física demonstrou baixa influência no nível de ansiedade das gestantes. Esses achados indicam que, embora o desenvolvimento da ansiedade seja multifatorial, o fato de a gestação não ter sido planejada e ter histórico de gestações anteriores (Índice de Similaridade Euclidiano) podem ser fatores de maior influência e chance de desenvolvimento do quadro.

**Palavras-chave:** Saúde Pública. Vida Ativa. Hábitos Saudáveis. Saúde Mental. Psicologia do Exercício Físico.

## RESUMEN

Un embarazo de alto riesgo es un ciclo en el que la vida o la salud de la madre, el feto o el recién nacido tienen mayor probabilidad de verse afectadas. Analizar la relación entre la ansiedad y la actividad física, y el antecedente de pérdida gestacional en gestantes de alto riesgo. Estudio descriptivo, cuantitativo y documental, con una muestra de 339 gestantes de alto riesgo ingresadas en la sala de maternidad del Hospital de Base con hipertensión arterial y/o diabetes. Los datos se recolectaron mediante los siguientes instrumentos de investigación: un cuestionario sociodemográfico, el Cuestionario Internacional de Actividad Física, el Inventario de Ansiedad de Beck (BAI) y un formulario para registrar otra información. En la relación entre la ansiedad y la pérdida gestacional, en el grupo de gestantes con antecedente de pérdida gestacional, predominó el nivel de ansiedad severa. En las gestantes sin antecedente de pérdida, hubo mayor prevalencia de ansiedad leve. En la relación entre el nivel de ansiedad y el nivel de actividad física, se observó que los niveles de ansiedad fueron independientes de la práctica de actividad física. Se observó similitud entre la clasificación de ansiedad y el nivel de actividad física de las embarazadas, y ausencia de similitud entre la variable ansiedad y el historial de aborto

espontáneo. Las embarazadas con antecedentes de abortos espontáneos mostraron el nivel más severo de ansiedad. La variable actividad física mostró una baja influencia en el nivel de ansiedad de las embarazadas. Estos hallazgos indican que, si bien el desarrollo de la ansiedad es multifactorial, el hecho de que el embarazo no fuera planificado y el historial de embarazos previos (Índice de Similitud Euclidiana) podrían ser factores de mayor influencia y probabilidad de desarrollar la afección.

**Palabras clave:** Salud Pública. Vida Activa. Hábitos Saludables. Salud Mental. Psicología del Ejercicio Físico.



## INTRODUCTION

Although pregnancy is a natural phenomenon, this process is not uniform, does not occur similarly for all women, and may vary according to lifestyle and general health conditions. Nagai *et al*. (2022) define the pregnancy process as a physiological event inherent to the health of a woman who chooses motherhood. To this end, the authors emphasize that pregnancy promotes changes in metabolic processes and that, in some pregnant women, these changes may result in unfavorable clinical conditions for the health of the mother, fetus, or newborn, which is called high-risk pregnancy. Júnior and Almeida (1972) define "pregnancy risk" as the opportunity for physical, psychological, and social harm to which the pregnant woman and the fetus are exposed. For the authors, this is not a pregnancy within a state of physiological normality, but it cannot be seen as a pathological state either. Cesar (1998) also adds that the concept of pregnancy risk arises to identify degrees of vulnerability in the periods of pregnancy, childbirth, puerperium, and the life of the child in its first year.

Another definition found in the literature considers high-risk pregnancy to be the pregnancy cycle in which the life or health of the mother and/or fetus and/or newborn have a greater chance of being affected than the average of the population considered (Brazil, 2012). It implies changes and unfavorable evolution that can be translated into situations that deviate from a predictable pattern of the pregnancy process, which physiologically is considered a normal stage. Around 10 to 20% of pregnant women are more likely to have an unfavorable outcome (Brazil, 2010). For Nagai *et al*. (2022), some factors contribute to an unfavorable gestational prognosis, among which the following can be highlighted: maternal age, harmful

sociodemographic conditions, previous reproductive history, obstetric disease in the current pregnancy, and previous or acquired health problems during the gestational evolution, such as hypertension, diabetes, obesity, among others. Sampaio *et al*. (2018) also add that clinical and obstetric conditions, isolated or associated with other complications, can contribute to unfavorable prognoses. Among such complications, the authors highlight arterial hypertension, diabetes mellitus, and obesity, among others.

With a high incidence rate in Brazil and worldwide, hypertension manifests itself in pregnant women of all ages and is the main cause of obstetric maternal death (De Souza *et al*., 2020). Pregnant women in this condition also have a higher risk of developing gestational diabetes and type 2 diabetes (Melo *et al*., 2016). Among the numerous complications of high blood pressure during pregnancy, spontaneous abortion is identified (Silva *et al*., 2017). On the other hand, the prevalence of diabetes is also high. It varies from 1 to 14% depending on the population studied and the diagnostic criteria used (Reichelt, 1998). In general, a concern in high-risk pregnancies is pregnancy loss. According to Teodózio *et al*. (2020), pregnancy loss is a frequent occurrence in Brazil. According to the authors, in 2017, 30,620 fetal deaths were recorded, with the largest number of these deaths occurring among women aged 20 to 29; 40% of the recorded cases occurred between the 28th and 36th week of pregnancy. It is estimated that these rates are even more significant due to miscarriages and other occurrences not officially mentioned. (Teodózio *et al*., 2020).

For Teodózio *et al*. (2020), there is no precise definition in the literature for the term pregnancy loss. Therefore, the authors use the term “gestational loss” to refer to miscarriages and fetal deaths, that is, losses of babies that occur during pregnancy. According to Antunes *et al*. (2020), a worrying situation during pregnancy, especially in high-risk pregnancies, is spontaneous abortion. Studies of global, regional, and subregional levels and trends indicate that a quarter of all pregnancies in the world between 2010-2014 ended in spontaneous abortion. Significant increases occurred in Latin America and the Caribbean (Antunes *et al*., 2020). Miscarriage is the most common gestational adversity and is often of unknown etiology. In most pregnant women, the causes are multifactorial, with genetic and non-genetic causes, which may be interconnected. Among the genetic factors, chromosomal abnormalities and polymorphisms stand out, as non-genetic causes, infectious agents, socioeconomic, environmental, occupational causes, life history, and endocrine and thrombophilic disorders stand out. It is estimated that 25% of miscarriages would be preventable if the risk factors could be mitigated. However,

approximately 50% of miscarriages have unknown causes (Oliveira *et al*., 2020).

For Oliveira *et al*. (2020), the definition of miscarriage is when there is an involuntary interruption of pregnancy up to 20-22 weeks of gestation. Its recurrent form is characterized by losing three or more consecutive pregnancies. It also adds that approximately 15 to 20% of pregnancies end in spontaneous abortion, the majority within the first 13 weeks of gestation. In the literature, divergences were found between authors regarding the delimitation of gestational age and other parameters, such as weight and height, to define spontaneous abortion. The World Health Organization (WHO) defines fetal death as that which occurs before the complete expulsion or extraction of the product of conception from the mother's body, regardless of the duration of the pregnancy. The National Center for Health Statistics of the United States establishes that the term fetal death should be used from the 20th complete week of pregnancy. Some authors, however, report fetal death only in advanced gestational periods or use criteria that include the weight or height of the conceptus (Sampaio & Souza, 2010).

Studies indicate that the emotional aspect of high-risk pregnant women manifests itself mainly through anxiety as a basal emotional mechanism. This mechanism extends throughout the pregnancy until the baby's birth (Brasil, 2010). For Silva *et al*. (2017), the evidence suggests that the probability of suffering from anxiety during pregnancy increases in the face of some situations, such as psychiatric comorbidity, stressful events, social disadvantage, history of spontaneous abortion, and fetal death, among others. Anxiety in high-risk pregnancies expresses fear, anguish, and even the process of accepting gestational risk. Several factors can predispose anxiety during pregnancy. Among these are complications in previous pregnancies (Wilhelm, 2014), the experience of threatened miscarriage early in pregnancy, and receiving a diagnosis of malformation before birth (Vicente *et al*., 2016).

The level of anxiety depends on the psychological characteristics of each pregnant woman, who often has difficulty adapting to this situation. The news of a high-risk pregnancy causes these women to (re)organize their lives, and this adjustment process can increase the anxiety they feel (Wilhelm, 2014). For Araújo *et al*. (2007), the relationship between the beneficial effects of physical exercise and mood disorders is shown in several studies that address the theme of mental health and physical activity. For the authors, regular practice of aerobic physical exercises can produce antidepressant and anxiolytic effects, protecting the body from the harmful effects of stress on physical and mental health. Hass *et al*. (2005) also emphasize that the benefits of practicing physical activities during pregnancy are the same as those outside of

pregnancy, with the advantage that these are enhanced by reaching different areas of the mother's body. On the other hand, the lack of regular physical activity is one of the factors associated with a greater susceptibility to diseases during pregnancy.

Research indicates that among the positive psychobiological effects of this practice is its ability to increase the levels of the main neurotransmitters involved in the neural pathways of pleasure, such as endorphins and dopamine (Mello *et al*., 2005). These increased levels favor muscle relaxation and tension relief, providing satisfaction and well-being to the woman.

Considering the above, the present research aimed to analyze the relationship between the variable anxiety and physical activity and the history of pregnancy loss in high-risk pregnant women admitted to the public maternity hospital in the State of Rondônia.

## METHODS

The study is classified as descriptive, quantitative, and documentary. The field research was conducted at Dr. Ary Tupinambá Pena Pinheiro Base Hospital (HB). Opened in 1983, this hospital unit in Porto Velho, the capital of Rondônia, serves as a state reference for tertiary care in various medical and surgical specialties. It operates as a teaching hospital and serves many of the population from the 52 cities of Rondônia, the states of Acre, lower Amazonas and Mato Grosso, and the neighboring country, Bolivia (Carvalho, 2015).

### Participants

The research population comprises women stratified as high-risk pregnant women admitted to the HB Maternity Hospital with the following prevalent diseases: high blood pressure and/or diabetes. Pregnant women were selected non-probabilistic through convenience sampling, following the following inclusion criteria: age over 18 years, diagnosis of high blood pressure and/or diabetes, and being hospitalized in the HB maternity ward during the collection period. The sample comprised 339 women. The invitation to participate in the research occurred during the approach of patients hospitalized in the maternity ward, and the confidentiality and autonomy of the participants were ensured by signing the Free and Informed Consent Form (FICF).

**Procedure/Test Protocol/Skill Test Trial/Measure/Instruments**

Four instruments were used for data collection: sociodemographic questionnaire, International Physical Activity Questionnaire (IPAQ – short version), Aaron Beck Anxiety Inventory (BAI), applied with the translation already validated in Portuguese and finally the form used to record information from the pregnant women's medical records.

The sociodemographic questionnaire and the form the authors wrote aimed to identify some sociodemographic characteristics of the study population and the current and previous clinical/obstetric conditions before pregnancy. The IPAQ was used to identify sedentary and physically active pregnant women. The BAI was used to assess the anxiety status of pregnant women. The sociodemographic questionnaire and the Anxiety Inventory were applied directly to each pregnant woman. The form was completed using information from each patient's electronic medical records.

**Data Collection and Analysis / Statistical Analysis**

The data were analyzed using the R programming language integrated with R Studio, the SigmaPlot 14.5 software (Academic Perpetual License—Single User—ESD Systat® USA), and the Past 4.03 software (Windows version). Data analysis followed a model proposed by different authors (Altman, 1991; Fruchterman & Reingold, 1991; Cohen, 1992; Silberzahn & Uhlmann, 2015; Yang *et al*., 2020; Wu *et al*., 2021; Zhu *et al*., 2022; Cuperlovic-Culf *et al*., 2023) as described below:

Step 1. Data wrangling was performed, i.e., the organization and checking of the database, organizing the variables into columns and observations into rows;

Step 2. Calculation of descriptive statistics for the quantitative variable age, presenting measures of position (mean), dispersion (standard deviation, standard error, and amplitude), and shape (skewness and kurtosis) of the data;

Step 3. Calculate frequency distribution (absolute and relative) for nominal, ordinal, and binary categorical variables with the creation of the frequency diagram. In this case, the objective was to characterize the sample.

Step 4. Observation of the behavior of the anxiety level variable and classification of the level of physical activity and history of pregnancy losses using the horizontal bar histogram

(relative frequencies);

Step 5. Assignment of quantitative scores to the categorical data for analysis of the Euclidean similarity index; Creation of the distance matrix (Euclidean similarity index);

Step 6. Using the Python programming language, within the Google Collaboratory platform, the following libraries were imported: pandas, numpy, seaborn, matplotlib.pyplot and plotly. Express. After that, the file was loaded in Excel and the data was visualized, checked and organized (data wrangling). After that, the data was explored (creation of a matrix containing the amount of null data per variable); Analysis of variables (Function to analyze the variables; Function to analyze the variables with distinction by 'Anxiety Condition'; creation of a variable modifying the data to dictionary (key:value); Application of the .replace() method to rename the values); Creation of a new DataFrame to receive the dummy variables (new dataframe receiving a variable; new variables added; exclusion of null values; creation of dummy variables; exclusion of redundant variables; transformation of numeric boolean values into dummy variables) and the application of the chi-square test to verify possible associations between the variables.

The age normality test was applied to explain the sample based on age and gestational period variables. This method was chosen because it involves qualitative data.

Three organizational models were used to classify pregnant women's physical activity levels. Model 1, which follows the test protocol (IPAQ-short version), considers individuals as Sedentary, irregularly active A, irregularly active B, Active; model 2 classifies individuals as Sedentary, irregularly active A and B, Active; and finally, model 3, which distributes each individual as Sedentary and Active.

An exploratory analysis was performed using the cluster similarity test. This analysis allowed us to evaluate the similarity of the behavior of the variables studied based on the generation of clusters. This research was approved by the Research Ethics Committee of the Federal University of Rondônia Foundation (Approval number: CAEE n 5.825.169), following the ethical criteria established in resolution 466/12 of the National Research Ethics Committee (CONEP).

## RESULTS

The study included 339 pregnant women aged 29.6 years (Standard Deviation ± 6.61; Standard Error ± 0.36; the amplitude of 27 [between 18 and 45]; asymmetry of 0.08; kurtosis of -0.91 and non-normal distribution with $P < 0.05$ for the Shapiro-Wilk, Anderson-Darling, Lilliefors, and Jarque-Bera tests. For this age, the term emerging adulthood was adopted, according to Papalia and Martorell (2022). Of these, eight (2.3%) were in the 1st trimester, 44 (13%) in the second trimester, and 287 (84.7%) in the 3rd trimester, representing the preponderant gestational age.

Regarding the gestational risk markers defined for this study, it was observed that 19.5% of the sample had hypertensive disorders, 57.8% were classified as diabetic, and 22.7% had diabetes and hypertension simultaneously.

Regarding the women's reproductive history, Table 1 shows the number of previous pregnancies, with a prevalence of multi-gestational pregnancy (54.0%), followed by scunges (24.8%). Among the gestational risk factors prior to the current pregnancy, those with a history of obstetric complications predominated (52.5%). Gestational hypertension as a risk factor was observed in 1.5% of the women and gestational diabetes in 3.0% of them. These results are presented in Table 2.

Table 1. Classification of pregnant women according to the number of pregnancies.

| **Previous pregnancies** | **AF** | **RF** |
|---|---|---|
| Primigravida | 72 | 21.2 |
| Secondary | 84 | 24.8 |
| Multigesta | 183 | 54.0 |
| | **339** | **100** |

AF-Absolute Frequency; RF-Relative Frequency.
Source: own authorship.

Table 2. Gestational risk markers by obstetric history.

| **Previous gestational risk markers** | **AF** | **RF** |
|---|---|---|
| Nulliparous | 70 | 20.6 |
| No history of obstetric complications | 161 | 47.5 |
| Previous prematurity | 9 | 2.6 |
| Severe pre-eclampsia, HELLP syndrome | 7 | 2.1 |
| Perinatal death explained and unexplained | 5 | 1.5 |
| Gestational hypertension | 5 | 1.5 |
| Gestational diabetes | 10 | 3.0 |
| Grand multiparity | 11 | 3.2 |
| Previous uterine surgery (including two or more previous cesarean sections) | 24 | 7.1 |
| Habitual abortion | 4 | 1.2 |

| | | |
|---|---|---|
| More than one previous gestational complication | 31 | 9.1 |
| Other obstetric complications | 2 | 0.6 |
| | **339** | **100** |

AF-Absolute Frequency; RF-Relative Frequency.
Source: own authorship.

Among the clinical complications, the results of which are presented in Table 3, 58.4% of the pregnant women had no clinical history. There was more than one clinical complication prior to the current pregnancy; type 1 or 2 diabetes was observed in 7.7%, and chronic arterial hypertension in 11.5% of the sample.

Table 3. Characteristics of pregnant women by clinical history.

| **Pre-existing clinical complications** | **AF** | **RF** |
|---|---|---|
| No clinical history prior to pregnancy | 198 | 58.4 |
| Heart diseases | 5 | 1.5 |
| Type 1 or 2 diabetes | 26 | 7.7 |
| HIV | 1 | 0.3 |
| Serious psychiatric illnesses | 5 | 1.5 |
| Chronic arterial hypertension | 39 | 11.5 |
| More than one clinical complication prior to the current pregnancy | 36 | 10.6 |
| Obesity | 16 | 4.7 |
| Others | 13 | 3.8 |
| | **339** | **100** |
| **Clinical history** | | |
| No | 198 | 58.4 |
| Yes | 141 | 41.6 |
| | **339** | **100** |

AF-Absolute Frequency; RF-Relative Frequency.
Source: own authorship.

Table 4 presents the results regarding the history of pregnancy loss of pregnant women. A greater representation was observed in pregnant women with no loss history, making up 62.8% of the sample. Among those who had previous pregnancy loss, the variable history of abortion stood out, representing 33.3% of the study population.

Table 4. History of abortion in high-risk pregnant women.

| **History of pregnancy loss** | **AF** | **RF** |
|---|---|---|
| No history | 213 | 62.8 |
| Abortion | 113 | 33.3 |
| Abortion and fetal death | 5 | 1.5 |
| Fetal death | 8 | 2.4 |
| | **339** | **100** |
| **History of pregnancy loss** | | |
| No | 213 | 62.8 |
| Yes | 126 | 37.2 |
| | **339** | **100** |

AF-Absolute Frequency; RF-Relative Frequency.
Source: own authorship.

Regarding the level of physical activity of the sample, according to model 1 of the methodological procedure of this study, 35.4% of pregnant women are irregularly active B, 24.5% are sedentary, 22.4% classified themselves as active, and 17.7% fall into the irregularly active category A. In model 2 of the analysis, 52.2% fell into the irregularly active group, and in the last model, 75.5% of women were classified as active (Table 5).

Table 5. Classification of pregnant women's physical activity level by IPAQ.

| **Classification of physical activity level** | **AF** | **RF** |
|---|---|---|
| Active | 76 | 22.4 |
| Irregularly active A | 60 | 17.7 |
| Irregularly active B | 120 | 35.4 |
| Sedentary | 83 | 24.5 |
| | **339** | **100** |
| **Classification 2** | | |
| Sedentary | 83 | 24.5 |
| Irregularly active A and B | 180 | 52.2 |
| Active | 76 | 22.4 |
| | **339** | **100** |
| **Classification** 3 | | |
| Sedentary | 83 | 24.5 |
| Active | 256 | 75.5 |
| | **339** | **100** |

AF-Absolute Frequency; RF-Relative Frequency.
Source: own authorship.

The results described in Table 6 were obtained from the anxiety inventory analysis. Of the total sample, 31.6% of pregnant women presented mild anxiety, 29.6% were classified as having moderate anxiety, 24.5% presented severe anxiety, and 14.3% represented women with minimal anxiety.

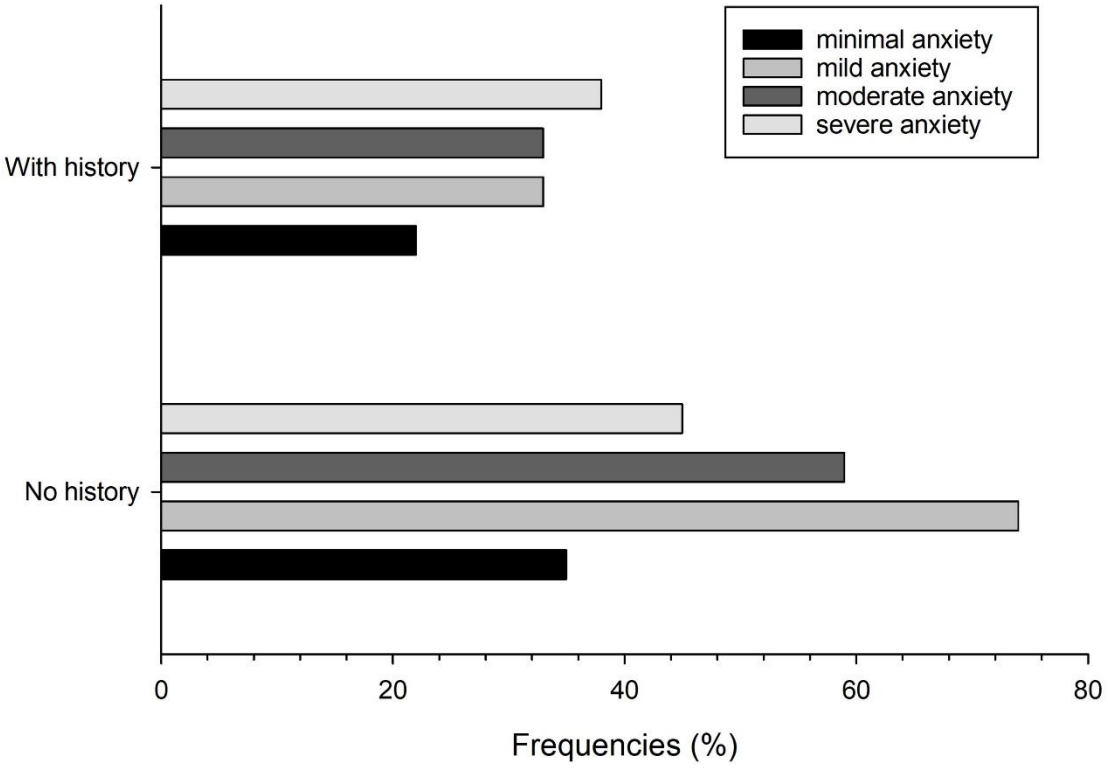
Table 6. Sample stratification on the anxiety scale.

| **Anxiety level classification** | **AF** | **RF** |
|---|---|---|
| Minimal anxiety | 57 | 14.3 |
| Mild anxiety | 107 | 31.6 |
| Moderate anxiety | 92 | 29.6 |
| Severe anxiety | 83 | 24.5 |
| | **339** | **100** |

AF-Absolute Frequency; RF-Relative Frequency.
Source: own authorship.

Regarding the level of anxiety and the relationship with the history of pregnancy loss, it was noted that in the group of pregnant women with a history of pregnancy loss, the level of severe anxiety predominated. In pregnant women without a history of loss, there was a higher prevalence of mild anxiety (Figure 1).

Figure 1. History of pregnancy loss and its relationship with anxiety levels.



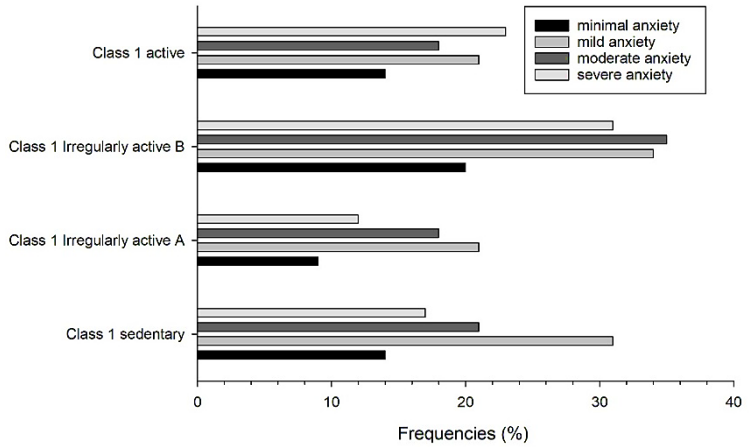

Source: authors.

Figure 2 shows that when analyzing the variable level of anxiety and its relationship with the level of physical activity, according to analysis model 1, women classified as active presented a severe level of anxiety, and those irregularly active B presented moderate anxiety. Those

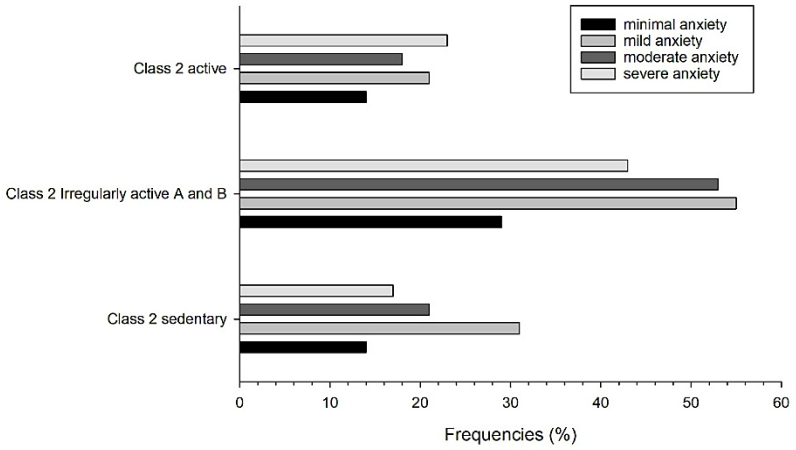
irregularly active A and sedentary presented mild anxiety, respectively. In model 2, pregnant women irregularly active A and B presented mild anxiety. In the last model, those classified as physically active presented a predominance of mild anxiety.

Figure 2. Behavior of variables related to the level of anxiety and level of physical activity of pregnant women.

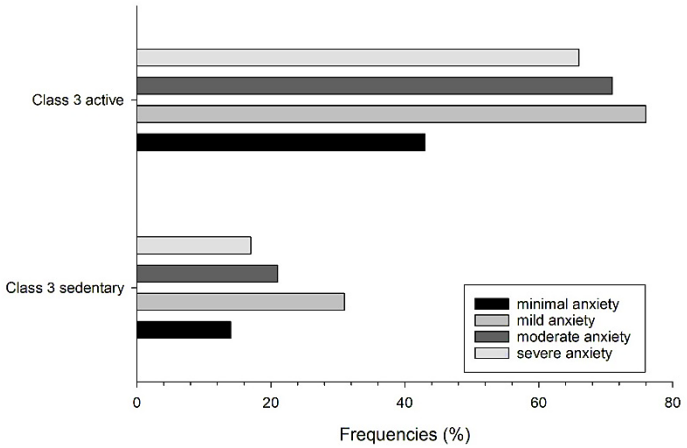
A




B



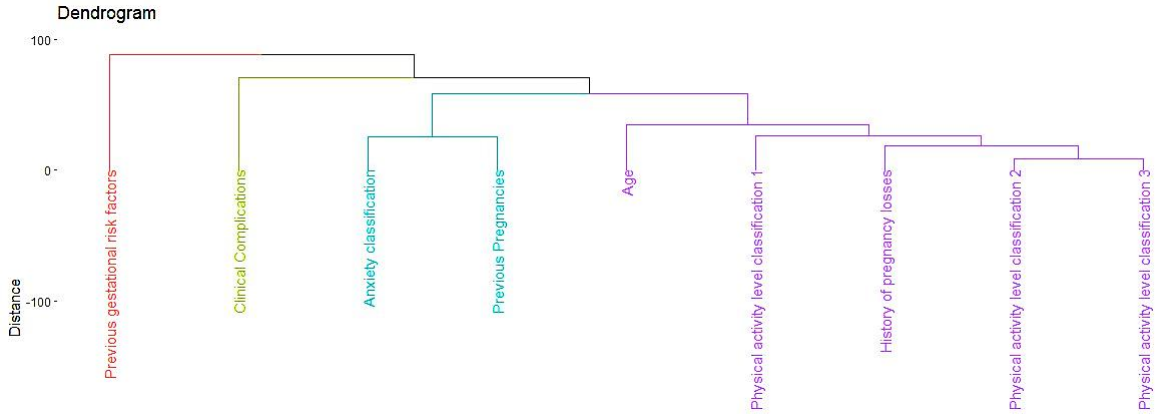

C




Source: authors. (A) analysis model 1, (B) model 2, and (C) model 3.

Figure 3 illustrates the similarity between the classification of anxiety and the level of physical activity of pregnant women and the lack of similarity between the variables anxiety and history of pregnancy losses.

Figure 3. The similarity between the main study variables after transforming categorical data into quantitative scores using the Euclidean similarity index forming three clusters.




Source: authors.

Regarding the association between qualitative variables, the variable that showed the greatest association with anxiety according to the chi-square test was the fact that the pregnancy was unplanned (Chi-Square Statistic: 18.9299; p-value: 0.0003; Degrees of Freedom: 3). These findings indicate that, although the development of anxiety is multifactorial, the fact that the pregnancy was unplanned may be the factor with the greatest influence and chance of developing the condition.

## DISCUSSION

The study sample's age characteristics are similar to those of other studies, such as that carried out with high-risk pregnant women in Rio Branco, State of Acre (Sampaio & Rocha Leal, 2018). In the state of Acre, the average age of the women studied was 28 years (SD = 7.43), while here, we identified the average age of 29.6 years (Standard Deviation ± 6.61). The results obtained in this research show that there is a prevalence of diabetic pregnant women followed by women with diabetes and hypertension simultaneously. This result differs from the research by Nagai *et al*. (2022). According to the authors, the most frequent diagnoses according to the medical records of high-risk pregnant women at the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto were arterial hypertension followed by diabetes mellitus.

In the study by Kerber and Melere (2017), carried out with 459 women at the Tacchini hospital in the municipality of Bento Gonçalves/RS, the authors identified that 11.1% of pregnant women had a medical diagnosis of hypertensive syndrome; in the present study, the prevalence was 19.5%. Related to diabetes, the study by Massucatti, Pereira, and Maioli (2012) evaluated 396 medical records of high-risk pregnant women, identifying 5.8% of women with this disorder, a figure much lower than that found in the maternity ward of Porto Velho, which was 47.8%.

The prevalence of GDM in the Brazilian Unified Health System (SUS) is 7.6%, with 94% of cases presenting decreased glucose intolerance and only 6% meeting the diagnostic criteria for non-gestational diabetes (Reichelt *et al*., 1998). Regarding the prevalence of pregnant women with diabetes and hypertension simultaneously, Reichelt *et al*. (1998) identified a relative frequency of 17.6%, while in the present study, the prevalence of these two disorders was 22.7%. The predominant gestational age in the study was in the third trimester (84.7%). This superiority of hospitalization in the third trimester of pregnancy is similar to other studies, although they observed different relative frequencies. In the study by Da Paz *et al*. (2022), the frequency was 77%; Sampaio, Rocha, and Leal (2018) found 57.3%; and finally, Rodrigues *et al*. (2017) identified 82.4% of the population studied in the third trimester.

Regarding the reproductive history of pregnant women, 54% of the sample were multigravidae. A similar result was observed in the study by Sampaio *et al*. (2018), in which 47.8% of women, representing the majority, had three or more pregnancies, and in the studies by Rodrigues *et al*. (2017), in which 64% were multigravidae. In the category of clinical history, chronic arterial hypertension (CAH) was the most observed in this study population (11.5%).

These results are similar to the study by Sampaio *et al*. (2018), in which CAH was the second most frequent previous clinical condition, representing 8% of the women evaluated. This clinical condition, when complicated, which occurs in approximately 5% of cases, can generate cardiac and/or renal alterations and evolve into pre-eclampsia. Depending on the situation, there may even be a need to terminate the pregnancy before fetal maturity (Sampaio *et al*., 2018).

Regarding previous gestational risk factors, nulliparous pregnant women stood out, representing 20.6% of the sample. This result differs from the research carried out by Xavier *et al*. (2013), in which 46% of women reported one or two births. Still, regarding the variable risk factors due to obstetric history, habitual abortion was the second variable in the reproductive history category, with the lowest representation (1.2%). This result is similar to that observed in the research by Xavier *et al*. (2013), in which habitual abortion corresponds to 2.9% of the sample, meaning that the risk is less present among high-risk pregnant women.

Based on the analysis of the Beck Inventory, it was found that all pregnant women evaluated had some level of anxiety, with the classification of mild and moderate anxiety levels predominating in this study. These data differ from the research by Da Paz *et al*. (2022), in which high and moderate anxiety levels (according to the BAI) predominated in high-risk pregnant women admitted to the maternity ward of the Lauro Wanderley University Hospital. In the relationship between anxiety level and history of pregnancy loss, women with a history of loss were mostly classified as having severe anxiety. In the research carried out by Da Paz *et al*. (2022), using the Aaron Beck anxiety inventory, one in four women reported having had one or more miscarriages (25). Of these, 14 (56%) were classified as having moderate to high levels of anxiety. The authors also found that the level of anxiety was also influenced by the variable classification of high-risk pregnancy (number of miscarriages). For the authors, fear intensified in pregnant women with the occurrence of more than one episode of loss.

For De Souza and Liz (2020), the loss of a baby is generally an event experienced with great suffering by the woman, regardless of the gestational period. The experience of grief can be even more difficult when the pregnant woman does not receive appropriate support. Adequate support from the social network can also help women with their insecurities arising from a subsequent pregnancy, especially when the occurrence of some pathology accompanies this. To understand the complexity of experiences related to the pregnancy-puerperal period, is necessary to consider the interaction between several factors. Among these, De Souza and Liz (2020) highlight the history of abortion. Pregnancy loss is a recurring reality in hospital practice.

Considering the impact of the experience of loss on the woman's life and the implications for a future pregnancy, a better understanding of the experiences involving the new pregnancy of women with a history of abortion is necessary (De Souza; Liz, 2020).

Considering the classification of the IPAQ questionnaire used in this study, the level of physical activity was 35.4% for those classified as irregularly active B, 24.5% sedentary, followed by active pregnant women (22.4%) and irregularly active A (17.7%).

In the study, the behavior of the variable “level of anxiety” proved independent concerning the “level of physical activity." In model 1 of the analysis, according to the IPAQ/short version classification, pregnant women with a higher level of physical activity, active and irregularly active A, presented severe anxiety and mild anxiety, respectively. In the group of pregnant women with a lower level of physical activity, irregularly active B and sedentary women presented moderate and mild anxiety. Although research has demonstrated the benefits of physical activity during pregnancy, especially its antidepressant and anxiolytic effects, this study observed a low influence between the variables anxiety and physical activity. This independence can be understood by the fact that anxiety can also be related to other more determining factors specific to a high-risk pregnancy, such as the woman's own stratification in the gestational risk marker, the hospitalization process, current/previous clinical conditions, and obstetric history, among others. From this perspective, anxiety can be understood as a multifactorial state, and several factors can influence its level in a high-risk pregnancy. Antoniazzi, Siqueira, and Farias (2019) state that in high-risk pregnancy, the maternal experience becomes more challenging due to the emotional fragility that the mother finds herself in at that moment due to the increased risk and emotions that are triggered by her clinical condition. According to the authors, the complexity of feelings is even more remarkable, such as anxiety and stress, starting with the label of "high-risk pregnancy," which differs from pregnancies with a “normal” course.

The instrument used in this research was also applied in the studies by Rêgo *et al*. (2016) and Harrison *et al*. (2011) to measure pregnant women's physical activity levels. However, these authors did not follow the standard classification of the questionnaire. In the relationship between anxiety and physical activity, it was observed that although the IPAQ is an instrument for measuring the level of physical activity of populations from different countries and sociocultural contexts, validated internationally and in Brazil, and recommended by the World Health Organization (Thomaz *et al*., 2010), it is questioned in some studies about its application in pregnant women (Harrison *et al*., 2011).

In the analysis of the behavior of the variables studied according to the Euclidean similarity index model, similarity was observed between the classification of anxiety and previous pregnancies, with age, history of pregnancy losses and three types of classification of physical activity level being secondarily similar, reducing the importance of these variables in the diagnosis and prior classification of the chances of developing anxiety during pregnancy. As the data in this study are predominantly qualitative, it was necessary to generate scores to observe the data, which may have caused interference in the similarity of behavior between the variables. When an analysis is performed based on scores and not on quantitative data, the similarity may be less adjusted.

## CONCLUSION

The study aimed to analyze the relationship between the anxiety and physical activity variables and the history of pregnancy loss in high-risk pregnant women admitted to a public maternity hospital in the state of Rondônia. The average age of the pregnant women studied was 29.6 years, and most of them had a pregnancy history of 3 or more pregnancies, and 37.2% had a history of pregnancy loss. A prevalence of mild to moderate anxiety was observed in high-risk pregnant women admitted to the hospital unit, but the frequency distribution showed a predominance of severe anxiety in pregnant women with a history of pregnancy loss.

Although the behavior of the physical activity variable had a low influence on the relationship with the anxiety level of pregnant women, the study showed low adherence to physical activity among pregnant women. Most of them were classified as sedentary and irregularly active B. Regarding the level of anxiety and the relationship with the history of pregnancy loss, it was noted that in the group of pregnant women with a history of pregnancy loss, the level of severe anxiety predominated.

In conclusion, it is important to recognize that our research has some methodological limitations that deserve consideration. In this context, we highlight using the IPAQ questionnaire to assess pregnant women's physical activity levels. In this choice, it was considered an instrument recommended by the World Health Organization, without considering the existence of other instruments indicated for pregnant women. This consideration directly recognizes the limitations of the research without detracting from the work carried out while pointing to future investigations with pregnant women, aiming to improve the robustness and generalization of the

results. These findings indicate that, although the development of anxiety is multifactorial, the fact that the pregnancy was not planned (Chi-square association) and having a history of previous pregnancies (Euclidean Similarity Index) may be factors of greater influence and chance of developing the condition.

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