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BÁRBARA ISABEL MENDES PENEDO RODRIGUES GASPAR

***Depression and anxiety associated to the diagnosis of  
gestational diabetes***

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INÊS ROSENDO CARVALHO E SILVA CAETANO, MD, PHD

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# **Depression and anxiety associated to the diagnosis of gestational diabetes**

Depressão e ansiedade associados ao diagnóstico de diabetes gestacional

Trabalho final do 6º Ano do Mestrado Integrado em Medicina com vista à atribuição do grau de Mestre.

## **Autores e Afiliações**

Bárbara Isabel Mendes Penedo Rodrigues Gaspar<sup>1</sup>- baba.gaspar@gmail.com

Orientadora: Professora Doutora Inês Rosendo Carvalho e Silva Caetano<sup>1,2</sup> - inesrcs@gmail.com

<sup>1</sup>Faculty of Medicine, University of Coimbra, Portugal

<sup>2</sup>USF Coimbra Centro, Portugal

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## Abbreviations

GD - Gestational Diabetes

WHO - World Health Organization

CHTMAD - Centro Hospitalar de Trás-os-Montes e Alto Douro

CHTV - Centro Hospitalar Tondela Viseu

MBB - Maternidade Bissaya Barreto

MDM - Maternidade Daniel de Matos

CHUC - Centro Hospitalar e Universitário de Coimbra

CHL - Centro Hospitalar de Leiria

PDSS–24 – Short version of Postpartum Depression Screening Scale

PASS - Perinatal Anxiety Screening Scale

ERDP–24 - Versão reduzida da escala de rastreio de depressão pós-parto

ERAP - Escala de rastreio de ansiedade perinatal

SEDI - Socioeconomic Deprivation Index

DSM- IV - Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition

ICD-10 - Classification of Diseases and Related Health Problems 10th revision

*SPSS - Statistical Package for the Social Sciences*

DM - Diabetes Mellitus

SD - Standard Deviation

n- Sample number

USF – Unidade de Saúde Familiar

## **Abstract**

**Introduction:** Due to the hormonal, psychological and social changes, pregnancy is a susceptible period for the development of depression and anxiety. Gestational diabetes is a common complication in pregnancy that can increase the development of these mental disorders in pregnant women. This topic is especially relevant since the criteria for the diagnosis of gestational diabetes is controversial and different between countries. The aim of this study is to compare the risk of depression and anxiety in pregnant women with and without the diagnosis of gestational diabetes. There is already some literature about this topic, but it shows inconsistent findings.

**Materials and Methods:** A retrospective cohort study was conducted where questionnaires were applied to pregnant women with and without Gestational Diabetes. Data was collected between the 1<sup>st</sup> of September 2018 and 8<sup>th</sup> of January 2021 in 5 hospitals from the interior to the coast in the central and northern regions of Portugal. The questionnaire included questions about socio-demographic, obstetric and personal history variables. To measure the risk of depression and anxiety, two scales were applied: the portuguese short version of the postpartum depression screening scale (PDSS-24) and the perinatal anxiety screening scale (PASS). Descriptive and inferential analysis was performed in order to understand the relationship between the existence of gestational diabetes and the risk of depression and anxiety during pregnancy.

**Results:** The final sample included 530 pregnant women with an average gestational age of 33,84 weeks, 181 that had gestational diabetes diagnosis and 349 that did not have gestational diabetes. Statistically there was no association between the diagnosis of Gestational Diabetes and the subsequent risk of depression ( $p = 0.266$ ), risk of anxiety ( $p = 0.864$ ) and the degree of severity of anxiety symptoms ( $p = 0.777$ ).

**Conclusion:** This study did not demonstrate the existence of a relationship between the diagnosis of gestational diabetes and the risk of depression and anxiety during pregnancy. It is proposed that in future studies the questionnaires should be complemented by clinical assessment regarding depression and anxiety and qualitative data in order to better understand this diagnosis impact in pregnant women, data should be collected in the Primary Health Care structures to have a sample more related to the populational reality and the sample should have a greater representation of lower socioeconomic classes.

## **Keywords**

Gestational Diabetes; Depression; Anxiety; Pregnancy

## Resumo

**Introdução:** Devido às alterações hormonais, psicológicas e sociais, a gravidez é um período suscetível ao desenvolvimento de depressão e ansiedade. A Diabetes Gestacional é uma complicação comum na gravidez que pode aumentar o desenvolvimento de distúrbios do foro psiquiátrico nas grávidas. Este tema é especialmente premente visto que os critérios para o diagnóstico de diabetes gestacional são díspares entre países e controversos. Este estudo tem como objetivo comparar o risco de depressão e ansiedade na grávida com e sem o diagnóstico de Diabetes Gestacional. Apesar de já existirem alguns estudos sobre este tema, os resultados apresentam-se inconsistentes.

**Materiais e Métodos:** Foi realizado um estudo de coorte retrospectivo onde foram aplicados questionários a grávidas com e sem Diabetes Gestacional. Os dados foram recolhidos entre 1 de setembro de 2018 e 8 de janeiro de 2021 no Centro Hospitalar de Trás-os-Montes e Alto Douro, Centro Hospitalar Tondela-Viseu, nas duas maternidades que compõem o Centro Hospitalar e Universitário de Coimbra, Maternidade Bissaya Barreto e Maternidade Daniel de Matos, e no Centro Hospitalar de Leiria. O questionário englobou questões sobre variáveis sociodemográficas, obstétricas e de antecedentes pessoais. Para a medição do risco de depressão e ansiedade foram aplicadas duas escalas: a versão reduzida da escala de rastreio de depressão pós-parto (ERDP-24) e a escala de rastreio de ansiedade perinatal (ERAP). Foi realizada a análise descritiva e inferencial de forma a perceber a relação entre a existência de diabetes gestacional e o risco de depressão e ansiedade durante a gravidez.

**Resultados:** A amostra final incluiu 530 grávidas com uma idade gestacional média de 33,84 semanas, 181 que tinham diagnóstico de diabetes gestacional e 349 que não tinham diabetes gestacional. Não foi encontrada associação estatisticamente significativa entre o diagnóstico de Diabetes Gestacional e o posterior risco de depressão ( $p=0,266$ ), o risco de ansiedade ( $p=0,864$ ) e o grau de severidade de sintomas ansiosos ( $p=0,777$ ).

**Conclusão:** Neste estudo não se comprova a existência de uma relação entre o diagnóstico de diabetes gestacional e o risco de depressão e ansiedade durante a gravidez. É proposto que em futuros estudos os questionários sejam complementados por avaliação clínica quanto à depressão e ansiedade e por dados qualitativos para se perceber melhor o impacto deste diagnóstico nas grávidas, que sejam também recolhidos dados nas estruturas de Cuidados de Saúde Primários para se obter uma amostra mais próxima da realidade populacional e que se tenha uma amostra com maior representatividade das classes socioeconómicas mais baixas.

## Palavras-Chave

Diabetes Gestacional; Depressão; Ansiedade; Gravidez.

## Introduction

Gestational diabetes (GD) is defined by the World Health Organization (WHO) as a carbohydrate intolerance resulting in hyperglycaemia with onset or first recognition during pregnancy.<sup>1</sup> The diagnosis criteria of gestational diabetes are controversial and different between countries. In Portugal, in 2011, the criteria for GD were changed and nowadays it is used an adaptation of the criteria from the International Association of Diabetes and Pregnancy. The screening is done through the fasting plasma glucose in the first prenatal visit. If normal, an oral glucose tolerance test with 75g of glucose between the 24<sup>th</sup> and 28<sup>th</sup> weeks' gestation is performed.<sup>2</sup> Since this change, the incidence of GD has doubled, which proved to be advantageous, due to a reduction in macrosomia but, at the same time, it looked also disadvantageous, by the increase in small for gestational age newborns and risk of hypoglycaemia and hyperbilirubinemia.<sup>3</sup>

In 2018, gestational diabetes in Portugal had a 8,8% prevalence between the users of the Portuguese National Health Service, with an increased in the cases of advanced maternal age (above 40 years old).<sup>4</sup> Fetal macrosomia, neonatal hypoglycaemia, neonatal respiratory distress, preterm and caesarean delivery, preeclampsia, birth trauma and hyperbilirubinemia are some of the common complications associated with the rise of the mother's levels of plasma glucose.<sup>5,6</sup> For the pregnant, there is also an increased risk of developing type 2 diabetes after the pregnancy<sup>7</sup> and, for the child, an increased risk of insulin resistance and obesity.<sup>6</sup> To avoid these adverse effects, the control of the plasma glucose levels should be a priority. This can be done with frequent self-monitoring of blood glucose<sup>8</sup>, individualized nutritional diet and physical exercise.<sup>2</sup> If pharmacologic therapy is needed, metformin or insulin can be used.

During pregnancy, gestational diabetes is one of the most frequent complications<sup>9</sup> and it is likely to affect the mental health status of the pregnant women. It is thought that the control of the plasma glucose levels could also be essential for decreasing the appearance of psychological changes.<sup>8</sup> Due to the hormonal, psychological and social changes, pregnancy is one of the most susceptible periods to the development of psychological disorders, namely depression and anxiety. There are evidences of an association between depression and chronic medical illnesses, such as diabetes.<sup>10</sup> Despite that, the existing literature that associate depression with Gestational Diabetes show inconsistent findings.

Even though depression is a current increasing disease, it continues to be a disease with scarcity of diagnosis and consequently with no effective treatment.<sup>11</sup> According to the systematic review conducted by Yin et al. the prevalence of antenatal depression is 20,7%.<sup>12</sup>

It occurs mainly in pregnant women with low social support, pre-pregnancy depression or an unplanned pregnancy.<sup>12</sup> It can also occur in unemployed pregnant women or single mothers.<sup>12</sup> The relevance of this diagnosis is highlighted by the fact that this condition can evolve into postpartum depression and affect the correct development of the offspring.<sup>11</sup> Furthermore, it has been shown that depressive symptoms have an association with the existence of previous anxiety in pregnant women with GD.<sup>13</sup> In these women, one reason for the appearance of anxiety during pregnancy is the fear of repercussions for the baby.<sup>14</sup>

The aim of this study is to compare the risk of depression and anxiety in pregnant women diagnosed with gestational diabetes to those without this diagnosis and to understand which other variables are related to this psychopathological risk. This research can be highly significant because, if there is a correlation, it could be important to screen depression and pathological anxiety in pregnant women with GD, mainly in those with high risk factors. Also, it would be an important factor to take in consideration when defining screening strategies to assess GD that could cause more women to be diagnosed than the ones that would benefit from specific follow up and treatment, as we should consider this consequence as a possible harm from this (over)diagnosis.



## **Materials and Methods**

### **Study Group**

A retrospective cohort study was performed using questionnaires (Attachment I) answered by pregnant women, preferably from the 3rd trimester, with and without GD previous diagnosis. These pregnant women were the ones that attended medical appointments in the different hospitals under study. They were invited to answer the questionnaire when they were waiting or were leaving their appointments. A little explanation was given about the study by the main investigator or collaborating team at the hospital. In first place, the informed consent (Attachment I) was presented and, for anonymity and confidentiality to be ensured, the questionnaires and the informed consent were not placed in the same order.

### **Data Collection**

The data was collected from the 1<sup>st</sup> of September 2018 until the 8<sup>th</sup> of January 2021 in the following hospitals: Centro Hospitalar de Trás-os-Montes e Alto Douro (CHTMAD), Centro Hospitalar Tondela Viseu (CHTV), Maternidade Bissaya Barreto (MBB) and Maternidade Daniel de Matos (MDM), the two maternities of the Centro Hospitalar e Universitário de Coimbra (CHUC), and Centro Hospitalar de Leiria (CHL). Ethics committee approvals were granted in all these hospitals: CHL (Attachment II), CHTMAD (Attachment III), CHTV (Attachment IV) and CHUC (Attachment V).

### **Data Measurements**

The questionnaire was composed by three sections. In the first one, personal and clinical information were asked and the second and third parts consisted in two scales: short version of Postpartum Depression Screening Scale (PDSS–24) and Perinatal Anxiety Screening Scale (PASS).

The first section of the questionnaire included sociodemographic variables such as age (years), education level (years of studies), occupation, current professional situation and reasons if not working, monthly income (above or below the minimum wage) and whether the pregnant woman lived alone or not.

Regarding obstetric variables, it was questioned the gestational age (weeks), the number of previous pregnancies, births and abortions, whether the pregnancy was planned or not and whether complications arose from this pregnancy. It was also collected information regarding the existence of Diabetes Mellitus before pregnancy and respective medication, the existence of gestational diabetes, the trimester of diagnosis and medication, if applicable. Lastly, it was

also asked about depression, anxiety or any other disease diagnosed before pregnancy and respective medication.

The Portuguese Classification of Occupations 2010 was used to categorize the pregnant women occupations. They were classified by the following categories: armed forces, representatives of the legislative power, specialists in intellectual and scientific activities, intermediate level technicians, administrative staff, workers in the personal, protection and security services and salespeople, skilled workers in agriculture, fisheries and forestry, skilled workers in industry, machine operators and assembly workers, unskilled workers, housewives, students, unemployed or without information.<sup>15</sup>

The Socioeconomic Deprivation Index (SEDI) was used to characterize the socioeconomic context of the sample. This index is obtained based on the monthly income, number of years of education and whether the pregnant woman lives alone or not.<sup>16</sup> Since the majority of these pregnant women were already covered by a compulsory education of 9 years<sup>17</sup>, there was the need to adapt the cut-off value of the number of years of education from 4 to 9 years. In order to calculate the index, it is assigned 1 point if the monthly income is below the minimum wage and 0 if it is above. If the number of years of education is less or equal to 9 years, it is assigned 1 point and if it is higher, 0 points are assigned. If the pregnant woman lives alone, it corresponds to 1 point whereas if the pregnant woman does not live alone it corresponds to 0 points. By adding the result of these three variables it is obtained a score from 0 to 3. This score should be interpreted as the lower the value, the higher the socioeconomic status.

The second section was constituted by the PDSS–24 scale that was validated for Portugal for screening depression in pregnancy by Pereira et al.<sup>18</sup> To apply this scale, the pregnant woman was asked to, based on the previous month, rate the presented statements, with the *Likert* scale from 1 (strongly disagree) to 5 (strongly agree). The PDSS scale has 7 main dimensions: Sleep and eating disturbances, anxiety and insecurity, emotional lability, mental confusion, loss of self, guilt/shame and suicidal thoughts.<sup>18</sup> The scale has a minimum score of 24 and a maximum of 120, being that the higher the value the higher the level of depression. To classify pregnant women with and without risk of depression it was used a cut-off value. Following the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM- IV), the indicated cut-off value is 44 whereas the cut-off value according to the International Statistical Classification of Diseases and Related Health Problems 10th revision (ICD-10) is 43.<sup>18</sup> In this study were used the DSM-IV criteria.

The third section, the PASS scale, was validated to screen anxiety disorders in the perinatal period by Somerville et al<sup>19</sup> and is being validated for the Portuguese population.<sup>20</sup> There are four main factors on which this scale is based: Acute anxiety and adjustment, general worry

and specific fears, perfectionism, control and trauma and social anxiety.<sup>19</sup> Based on how often the pregnant woman experienced the described symptoms in the previous month, she was asked to classify each statement with the Likert Scale, from 0 (Never) to 3 (Often). The final punctuation can be from 0 to 93 where higher values indicate more severe anxiety and the cut-off value to detect women with anxiety disorders is 26.<sup>19</sup> Furthermore, it is possible to rank the level of anxiety symptoms in minimal, mild-moderate or severe. These categories are formed having into account the final score: the minimal group goes from 0 to 20, the mild-moderate group includes scores from 21 to 41 and the severe anxiety group includes scores from 42 to 93.<sup>21</sup>

### **Sample Calculation**

In order to obtain the most appropriate sample size for the study, the epitools website (<https://epitools.ausvet.com.au/cohortss>) was used with a desired power of 0,8 and a confidence level of 0,95. The expected incidence in unexposed (0,352) corresponds to the percentage of pregnant women without GD with depression. This value was obtained by subtracting the percentage of pregnant women without GD and depression from the statistical population.<sup>22</sup> The assumed relative risk (1,384) was calculated by dividing the percentage of women with depression and with GD by the percentage of women with depression but without GD.<sup>22</sup> Thus, the target sample size was calculated as 206 for each group, pregnant women with and without GD.

### **Data Analysis**

A statistical analysis was carried out using the program *Statistical Package for the Social Sciences (SPSS) version 26.0 for Macintosh Operating system®*.<sup>23</sup> Due to the large extent of the sample, we decided to use parametric tests to perform the inferential analysis.

In order to get a better understanding of the sample collected, a descriptive analysis was performed to characterize the sample. Additionally, the inferential analysis was made using the Chi-Square test for nominal variables and averages' comparison tests for quantitative variables. These tests were used to understand if both groups, with and without GD, presented significant differences based on demographic and clinical variables. Using the Student's T-Test, we evaluated whether there was a relation between GD and the average total score of depression and anxiety scales. Applying the Chi-Square test, we analysed if there was an association between GD and the risk of depression, the risk of anxiety and the severity of anxiety symptoms. Furthermore, using both tests mentioned above, we explored the association between the risk of depression and anxiety and the demographic and clinical variables. Using the variables with statistical significance in the previous analysis we

performed a logistic regression to understand the impact of these variables in the risk of depression and anxiety. A *P* value was considered statistically significant whenever it was less than 0.05.

## Results

### Sample Characterization

#### Sociodemographic Characterization

From the 541 surveys collected, 6 questionnaires belonging to women with previous Diabetes Mellitus (DM) and 5 incomplete surveys were excluded, obtaining the final sample. It is composed by 530 surveys being 167 surveys (31,5%) from MBB, 140 surveys (26,4%) from MDM, 106 surveys (20%) from CHTV, 70 surveys (13,2%) from CHTMAD and 47 surveys (8,9%) from CHL. 34,2% (n=181) of the final sample were pregnant women with GD while 65,8% (n=349) were pregnant women without GD.

The average age of the respondents was  $32,36 \pm 5,43$  years old, with a minimum age of 18 and a maximum of 45 years old. The average number of years of education was  $13,48 \pm 3,33$  varying between 2 and 24 years.

The occupations of the pregnant women were categorized, being the most frequent: workers in the personal, protection and security services and salespeople (24,7%; n=130); specialists in intellectual and scientific activities (24,1%; n=127) and intermediate level technicians (12,3%; n=65). From the whole study group, only 30,4% (n= 161) were working, being the two main reasons for not being active the medical discharge (79,3%, n= 291) and unemployment (12,5%, n=46). For 23,2% (n=119) of the pregnant women, the monthly income was below the minimum wage and only 2,8% (n=15) of the women surveyed lived alone. The SEDI score divided the sample in 4 groups: the one with the highest socioeconomic status (0 points) was composed by 17,4% (n=88) of the sample, the majority of the inquired pregnant women were included in the second group (1 point) with a percentage of 70,5% (n=356), the third (2 points) and fourth (3 points) groups had 11,9% (n=60) and 0,2% (n=1) of the sample, respectively.

#### Obstetric characterization

The average gestational age was  $33,84 \pm 3,89$ , being between 16 and 41 weeks. The number of previous pregnancies goes from 0 to 8 with an average of  $1,90 \pm 1,16$  and the average number of children was  $0,62 \pm 0,85$ , being the maximum 5 and the minimum 0. It was concluded that 27,4% (n=144) have already had at least one abortion and that in 80,3% (n=425) of the cases the current pregnancy was planned. Moreover, 15% (n=79) of the pregnant women reported having developed complications during this pregnancy, the most frequent being placental abruption (n=21), vaginal bleeding (n=7), invasive prenatal tests (n=5) and gestational hypertension (n=5).

Within the pregnant women with GD diagnosis group, 51,5% (n=69) were diagnosed in the first trimester whereas 48,5% (n=65) were diagnosed in the second one. Medication for GD was prescribed in 32,4% (n=57) of the cases being 49,1% (n=28) of them with insulin.

#### Personal medical history characterization

Previous depression was found in 4,2% (n=22) of the respondents, of which 85,8% (n=18) were still medicated for this disease. 13,3% (n=70) of the pregnant women had previous anxiety being that 27,2% (n=16) on medication. The presence of other diseases was referred by 19,2% (n=101) of the inquired women where the most frequent were thyroid disease (n=40), respiratory disease (n=22) and autoimmune disease (n=5).

#### Scales of Depression and Anxiety

Trough the PDSS-24 we obtained that 41.4% (n=215) of the women had risk of depression, corresponding to a total score greater than or equal to 44 in this scale. Using the PASS, it was possible to conclude that 38,5% (n= 199) of them had risk of anxiety (PASS  $\geq$  26). Dividing by severity of anxiety, it was registered a percentage of 47% (n=243) of pregnant women with minimal anxiety, 41,6% (n=215) experiencing mild-moderate anxiety and 11,4% (n=59) with severe anxiety symptoms.

#### **Comparison between the group with and without Gestational Diabetes**

The 2 groups, with and without GD, were compared based on demographic and clinical variables. From all the 18 comparisons performed, only 7 were statistically significant: women with GD were older, with a lower gestational age, a higher number of previous pregnancies and consequently more children. This group also had a higher number of women having had at least one abortion. Furthermore, when comparing both groups based on SEDI score, women with GD had a higher score that corresponds to a lower socioeconomic status and this group had more women with 9 or less years of education (Table 1).

Table 1. Comparison of continuous and dichotomous variables between groups with and without GD.

Continuous Variables		Gestational Diabetes		Total	Student's T-Test
		With GD	Without GD		
Pregnant women age	Average ± SD	34,23 ± 5,32	31,4 ± 5,23	32,36 ± 5,43	<b>p&lt; 0,001</b>
Years of Education		13,17 ± 3,63	13,65 ± 3,16	13,48 ± 3,33	p=0,117
Gestational Age		32,63 ± 4,08	34,46 ± 3,63	33,84 ± 3,89	<b>p&lt; 0,001</b>
Number of pregnancies		2,16 ± 1,35	1,76 ± 1,02	1,90 ± 1,16	<b>p&lt; 0,001</b>
Number of children		0,81 ± 1,05	0,52 ± 0,71	0,62 ± 0,85	<b>p&lt; 0,001</b>
Number of abortions		0,44 ± 0,72	0,32 ± 0,66	0,37 ± 0,68	p=0,054
SEDI		1,02 ± 0,59	0,91 ± 0,52	0,95 ± 0,55	<b>p=0,026</b>
Dichotomous Variables		With GD	Without GD	Q-Square Test	
Work	Yes	29,3% (n=53)	30,9% (n=108)	p=0,693	
	No	70,7% (n=128)	69,1% (n=241)		
Monthly income above the minimum wage	Yes	77,4% (n=137)	76,5% (n=257)	p=0,816	
	No	22,6% (n=40)	23,5% (n=79)		
Live alone	Yes	2,8% (n=5)	2,9% (n=10)	p=0,942	
	No	97,2% (n=176)	97,1% (n=338)		
Planned Pregnancy	Yes	77,9% (n=141)	81,6% (n=284)	p=0,309	
	No	22,1% (n=40)	18,4% (n=64)		
Previous Depression	Yes	6,1% (n=11)	3,2% (n=11)	p=0,113	
	No	93,9% (n=170)	96,8% (n=336)		
Previous Anxiety	Yes	13,8% (n=25)	13% (n=45)	p=0,786	
	No	86,2% (n=156)	87% (n=302)		
Previous Diseases	Yes	17,2% (n=31)	20,3% (n=70)	p=0,397	
	No	82,8% (n=149)	79,7% (n=275)		
Pregnancy complications	Yes	12,8% (n=23)	16,2% (n=56)	p=0,299	
	No	87,2% (n=157)	83,8% (n=290)		
Unemployment	Yes	5,5% (n=10)	10,3% (n=36)	p=0,063	
	No	94,5% (n=171)	89,7% (n=313)		
Abortions	Yes	32,8% (n=59)	24,6% (n=85)	<b>p=0,045</b>	
	No	67,2% (n=121)	75,4% (n=261)		
Years of Education ≥ 9 years	Yes	77,2% (n=139)	87,7% (n=299)	<b>p=0,002</b>	
	No	22,8% (n=41)	12,3% (n=42)		

## Association between Gestational Diabetes and the risk of depression and anxiety

Table 2 presents the Qui-square tests results, where it is possible to conclude that no statistically significant correlations were found between the diagnosis of GD and the risk of depression ( $p=0,266$ ), the risk of anxiety ( $p=0,864$ ) and severity of anxiety ( $p=0,777$ ).

As seen in the table 3, the Student's T tests performed using the average total score of depression and anxiety scales instead of the cut-off value, also did not demonstrate any statistical significance.

Table 2. Percentage of risk of depression, risk of anxiety and severity of anxiety symptoms distributed by groups with and without GD.

		Gestational Diabetes		Total	Qui-Square Test
		With GD	Without GD		
Risk of Depression	with	38,1% (n=67)	43,1% (n=148)	41,4% (n=215)	p=0,266
	without	61,9% (n=109)	56,9% (n=195)	58,6% (n=304)	
Risk of Anxiety	with	38% (n=68)	38,8% (n=131)	38,5% (n=199)	p=0,864
	without	62% (n=111)	61,2% (n=207)	61,5% (n=318)	
Severity of Anxiety	Minimal	47,5% (n=85)	46,7% (n=158)	47% (n=243)	p=0,777
	Mild-Moderate	42,5% (n=76)	41,1% (n=139)	41,6% (n=215)	
	Severe	10,1% (n=18)	12,1% (n=41)	11,4% (n=59)	

Table 3. Average total scores of depression and anxiety scales distributed by groups with and without GD.

	Gestational Diabetes		Total	Student's T-Test
	With GD	Without GD		
Average Total Score of PDSS – 24 ± SD	41,61 ± 12,46	42,01 ± 12,48	41,87 ± 12,46	p=0,727
Average Total Score of PASS ± SD	23,75 ± 14,24	24,17 ± 14,66	24,02 ± 14,5	p=0,759

## Association between the risk of depression and anxiety and potential confounding variables

To understand if there were other variables that influenced the results, we studied if there was an association between the risk of depression and anxiety and the sociodemographic and clinical variables/possible confounders. Table 4 shows that the risk of depression and the risk of anxiety are significantly related to planned pregnancy ( $p=0,047$ ,  $p=0,004$ ), previous depression ( $p<0,001$ ,  $p<0,001$ ), previous anxiety ( $p=0,001$ ,  $p<0,001$ ) and gestational age ( $p=0,013$ ,  $p=0,041$ ). There is also a significant relation between the risk of anxiety and complications during pregnancy ( $p<0,001$ ) and the fact that the pregnant woman is not working ( $p=0,020$ ). Lastly, the risk of depression also related with the number of years of education ( $p=0,048$ ).



Table 4. Association between the risk of depression and the risk of anxiety with dichotomous and continuous variables.

Continuous Variables		Risk of Depression	Without Risk of Depression	Student's T-Test	Risk of Pathological anxiety	Without Risk of Pathological Anxiety	Student's T-Test
Pregnant women age	Average ± SD	32,03 ± 5,77	32,49 ± 5,16	p=0,335	31,87 ± 5,69	32,66 ± 5,26	p=0,109
Number of Years of Education		13,15 ± 3,27	13,74 ± 3,34	<b>p=0,048</b>	13,34 ± 3,27	13,60 ± 3,34	p=0,398
Gestational Age		34,34 ± 3,78	33,47 ± 3,92	<b>p=0,013</b>	34,24 ± 3,64	33,52 ± 4,03	<b>p=0,041</b>
Number of pregnancies		1,92 ± 1,20	1,87 ± 1,10	p=0,643	1,85 ± 1,14	1,89 ± 1,14	p=0,702
Number of children		0,62 ± 0,89	0,61 ± 0,83	p=0,905	0,58 ± 0,83	0,63 ± 0,86	p=0,513
Number of abortions		0,39 ± 0,70	0,34 ± 0,64	p=0,416	0,39 ± 0,69	0,33 ± 0,65	p=0,375
SEDI		0,94 ± 0,58	0,96 ± 0,52	p=0,755	0,92 ± 0,56	0,96 ± 0,53	p=0,395
Dichotomous Variables				Qui-Square Test			Qui-Square Test
Work	Yes	25,6% (n=55)	33,6% (n=102)	p=0,051	24,6% (n=49)	34,3% (n=109)	<b>p=0,020</b>
	No	74,4% (n=160)	66,4% (n=202)		75,4% (n=150)	65,7% (n=209)	
Monthly income above the minimum wage	Yes	73,3% (n=151)	79,8% (n=237)	p=0,088	72,9% (n=140)	79,4% (n=246)	p=0,096
	No	26,7% (n=55)	20,2% (n=60)		27,1% (n=52)	20,6% (n=64)	
Live alone	Yes	3,7% (n=8)	2,3% (n=7)	p=0,345	3,5% (n=7)	2,5% (n=8)	p=0,503
	No	96,3% (n=207)	97,7% (n=296)		96,5% (n=191)	97,5% (n=310)	
Planned Pregnancy	Yes	76,2% (n=163)	83,2% (n=253)	<b>p=0,047</b>	74,2% (n=147)	84,6% (n=269)	<b>p=0,004</b>
	No	23,8% (n=51)	16,8% (n=51)		25,8% (n=51)	15,4% (n=49)	
Previous Depression	Yes	8,5% (n=18)	0,7% (n=2)	<b>p&lt;0,001</b>	8,1% (n=16)	1,6% (n=5)	<b>p&lt;0,001</b>
	No	91,5% (n=195)	99,3% (n=302)		91,9% (n=181)	98,4% (n=313)	
Previous Anxiety	Yes	19,2% (n=41)	8,9% (n=27)	<b>p=0,001</b>	22,3% (n=44)	7,9% (n=25)	<b>p&lt;0,001</b>
	No	80,8% (n=172)	91,1% (n=277)		77,7% (n=153)	92,1% (n=293)	
Previous Diseases	Yes	20,2% (n=43)	18,5% (n=56)	p=0,628	20,8% (n=41)	17,1% (n=54)	p=0,291
	No	79,8% (n=170)	81,5% (n=247)		79,2% (n=156)	82,9% (n=262)	
Pregnancy Complications	Yes	18,8% (n=40)	12,8% (n=39)	p=0,064	22,8% (n=45)	10,1% (n=32)	<b>p&lt;0,001</b>
	No	81,2% (n=173)	87,2% (n=265)		77,2% (n=152)	89,9% (n=285)	
Unemployment	Yes	10,2% (n=22)	7,6% (n=23)	p=0,288	9% (n=18)	7,5% (n=24)	p=0,544
	No	89,8% (n=193)	92,4% (n=281)		91% (n=181)	92,5% (n=294)	
Abortions	Yes	28,6% (n=61)	26,5% (n=80)	p=0,590	28,9% (n=57)	25,3% (n=80)	p=0,368
	No	71,4% (n=152)	73,5% (n=222)		71,1% (n=140)	74,7% (n=236)	
Years of Education ≥ 9 years	Yes	82,7% (n=172)	85,8% (n=260)	p=0,338	83,7% (n=164)	85,3% (n=267)	p=0,619
	No	17,3% (n=36)	14,2% (n=43)		16,3% (n=32)	14,7% (n=46)	
Insulin	Yes	14,1% (n=9)	15,9% (n=17)	p=0,748	19% (n=12)	13,5% (n=15)	p=0,333
	No	85,9% (n=55)	84,1% (n=90)		81% (n=51)	86,5% (n=96)	

To understand the impact of each of the variables that were significantly associated with the risk of depression and anxiety we performed a logistic regression. Firstly, we found that, in this sample, the existence of previous depression increased almost 12 times the risk of depression in pregnancy and that the existence of previous anxiety approximately doubled this risk. It is also demonstrated that the gestational age is a worsening factor, with an increase of the risk of depression in around 6,6% each week of pregnancy. The number of years of education is the only protective independent factor for the risk of depression (Table 5).

Regarding the risk of anxiety, the only protective factor found was the existence of a planned pregnancy. Gestational age also had a negative impact, showing that the risk of anxiety increased 5,7% for each additional week of pregnancy. Previous depression increased the risk of anxiety about 3,8 times and previous anxiety increases about 2,7 times. Also, pregnancy complications as perceived by the pregnant women independently doubled the risk of anxiety (Table 5).

*Table 5. Relative risk of the variables with statistical significance, after logistic regression.*

	<b>Risk of Depression</b>		
	<b>Significance (p-value)</b>	<b>Relative Risk (RR)</b>	<b>± CI 95%</b>
Gestational Age	p=0,011	1,066	1,015-1,120
Previous Depression	p=0,001	11,950	2,657-53,743
Previous Anxiety	p=0,010	2,100	1,193-3,696
Number of Years of Education	p=0,035	0,942	0,890-0,996
	<b>Risk of Anxiety</b>		
	<b>Significance (p-value)</b>	<b>Relative Risk (RR)</b>	<b>± CI 95%</b>
Gestational Age	p=0,028	1,057	1,006-1,111
Planned Pregnancy	p=0,013	0,555	0,348-0,884
Previous Depression	p=0,019	3,775	1,245-11,447
Previous Anxiety	p=0,001	2,683	1,528-4,711
Pregnancy Complications	p=0,002	2,262	1,345-3,802

## Discussion

In this study we found no significant association between GD and the risk of depression, the risk of anxiety and the severity of anxiety symptoms. These results are in accordance with a recent study performed with a large sample in a city in the north of England which concluded that there was no evidence of an association between GD and common mental disorders during pregnancy.<sup>24</sup> On the other hand, a recent systematic review and meta-analysis concluded that there seems to be an increased risk of antenatal depression and possibly an increased risk of anxiety in women with GD.<sup>25</sup> Therefore, it is perceived that there is no consensus in literature<sup>6</sup> being one of the possible reasons the fact that depression and anxiety during pregnancy may have a multi-factorial etiology.<sup>13</sup> Furthermore, there are other reported causes, such as the lack of consensus on the best cut-off for the different instruments used to measure depression and anxiety and also the existence of different criteria to define GD.<sup>25</sup> Due to this, it becomes difficult to understand the isolated relationship between GD and depression and anxiety during pregnancy.

Regarding the sample, it is worth mentioning that approximately half of the pregnant women with GD were diagnosed in the first trimester and the remaining in the second trimester, so it is a representative sample of both cases that can occur. Concerning these women with GD, only 15,5% were medicated with insulin. Draffin et al.<sup>26</sup> realized that beginning insulin therapy causes an increase in anxiety and fear and, therefore, it would be important in a future research to study more pregnant women under insulin treatment, since a larger sample of these women could change the results. As noted in Langer & Langer,<sup>8</sup> controlling blood glucose levels is associated with lower levels of anxiety. This may have an impact on our study, since the studied women were all being followed in hospitals, making us predict that they would have more controlled metabolic values.

In the attempt to realize which were the possible variables that could be confounding or influencing the results, a comparison between both groups, with and without GD, was done. From this, it was noticed that in this sample, women with GD were older, they have had more pregnancies and consequently had more children and also, they have higher probability of having abortions. With this differences between the groups and with inconsistency in the literature<sup>27</sup>, it was checked whether these variables influenced the existence of depression and anxiety, but this relationships were not verified.

The group of pregnant women with GD had lower gestational age and when relating the gestational age with depression and anxiety, it is possible to observe that women with lower gestational age presented less risk of depression and anxiety and this was independent from other studied factors when using multivariate analysis. This last association is predictable since

women with higher gestational age may develop greater concern when approaching the date of delivery. With the logistic regression model, it was noticed that for each additional week of gestation the pregnant woman has a 6,6% increase in the risk of depression and a 5,7% increase in the risk of anxiety. Taking this into account, if the group of pregnant women with GD correspond to women in an early stage pregnancy and if depression and anxiety are more present in women at the end of pregnancy, this may have an impact on the results of the study and it may be a confounding factor. Specifically about anxiety, these findings can be associated with other problems found by Teixeira et al. which says that primiparous women develop a higher level of anxiety in early pregnancy while multiparous women develop higher anxiety in the 3<sup>rd</sup> pregnancy trimester.<sup>28</sup> As seen above, since the pregnant women with GD had more previous pregnancies, they are expected to develop more anxiety in late pregnancy. As in this sample, the women with higher number of previous pregnancies are the ones with a lower gestational age, being another factor that supports the possible interference of obstetric variables in the results.

There is an association between the diagnosis of GD and a lower socioeconomic status, as well as, specifically, with a lower education level. Both associations are in accordance with several studies.<sup>29,30</sup> The first mentioned cause, is the fact that women with lower education level are expected to be less careful with the prevention, presenting less healthy lifestyles and more risk behaviours. Additionally, less socioeconomic status may mean less quality or less access to health services.<sup>29</sup> In this sample, not all socioeconomic classes were uniformly represented. Most of the pregnant women were from the two first groups of SEDI score, in other words, from the highest socioeconomic status. The high level of education visible in this sample, the low number of people living alone and the high number of people who earn more than the minimum wage are main contributing factors for this result. It would be important to have a more representative sample of all socioeconomic classes. Further from affecting GD, the lower level of education also affects the presence of depression symptoms. Having a greater number of years of education has proved to be protective for the development of depression during pregnancy.

In accordance with our results, Wilson et al.<sup>24</sup> demonstrated that there was no association between previous common mental disorders and the diagnosis of gestational diabetes. However, when relating these previous mental disorders with the risk of depression and anxiety during pregnancy, it was confirmed that they have a strict relationship. Further from being demonstrated by this study, it is also corroborated by Martini et al.<sup>31</sup>. Both the presence of pre-gestational depression and anxiety have been shown to interfere with the further development of depressive and anxious symptoms during pregnancy. Through the logistic regression model, it was noticed that previous depression increases almost 12 times and

previous anxiety approximately 2 times the risk of the pregnant woman presenting depression during pregnancy. On the other hand, the risk of anxiety in pregnancy can be increased by almost 4 times if the pregnant woman had depression before pregnancy and 2,7 times if she had pre-gestational anxiety. These results underline the extreme importance of identifying these pregnant women and referring them for follow-up by a specialist.

It was reported that the group of pregnant women who had planned their pregnancy had a lower risk of anxiety and depression and that a planned pregnancy has a positive impact as a protector of the appearance of anxious symptoms. The fact that the pregnant woman is not working and the occurrence of complications during pregnancy has been shown to be related with an increase in anxiety symptoms. These complications more than double the risk of anxiety in pregnancy. Thus, it is thought that, since the questionnaires were only applied in hospital settings, there could have been a selection bias. In portuguese hospitals women with higher risk pregnancies have much more frequent follow-ups while low-risk pregnancies are followed in primary health care centres. Based on these results and in Thiagayson et al. that demonstrated that depression and anxiety can be more prevalent in women with high-risk pregnancy<sup>32</sup>, it would be important to apply the same questionnaires in primary health care centres.

The PDSS-24 scale, used to measure depression in this study, despite being validated and reproducible, does not make the diagnosis of depression, only says if there is a risk or not of developing this complication. Therefore, results are likely to be overestimated and it would be necessary for these pregnant women to be clinically evaluated by a doctor to understand the true prevalence of depression in this sample. This is in line with other studies that report higher prevalence of depression when using symptom scales.<sup>33</sup> Since anxiety was also measured by symptom scale (PASS), there is likely to be an overestimation of the percentage of pregnant women with anxiety in this sample. This fact is strengthened by the lower prevalence of anxiety found in other studies comparing to the present one.<sup>34-36</sup>

Lastly, since no relationship has been demonstrated between GD and depression and anxiety, it is suggested to investigate other psychosocial impacts that GD may have on pregnant women through qualitative studies instead of using quantitative scales, that were not developed to understand this particular impact.

## Conclusion

This study showed no evidence of an association between the diagnosis of GD and the risk of depression and anxiety.

It was revealed that pregnant women with GD had lower gestational age, were older, had more pregnancies and consequently more children, and also higher probability of having abortions. They were also the ones with lower socioeconomic status and lower education level that can affect the lifestyles and the access to the health services.

Secondarily, we found that there are variables that protect or aggravate the risk of experiencing anxiety and depression during pregnancy. Pregnancy planning has proved to be protective for anxiety while the greater education level has been shown to decrease the risk of depression. Regarding the variables with negative impact, the existence of previous depression and anxiety and the higher gestational age aggravate both the risk of anxiety and the risk of depression. In addition, the existence of complications during pregnancy revealed to only aggravate the risk of anxiety.

Based on the limitations of this study it is suggested that in future research, questionnaires should also be applied in primary health care centres so that there is less influence from other pregnancy complications. It is also proposed that in the future a sample with a greater variety of socioeconomic classes and a higher percentage of pregnant women under insulin therapy should be studied and that groups of women with and without GD should be more homogeneous in what concerns gestational age.

Additionally, it is recommended that, in combination with the questionnaires, a medical evaluation should be made to understand which pregnant women actually have a diagnosis of depression or pathological anxiety. Finally, it is suggested to perform qualitative research on this matter to understand other possible social or psychological impacts that GD may have on the lives of these pregnant women.

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# Attachments

## Attachment I. Informed Consent and Questionnaire

### **Consentimento informado, livre e esclarecido para participação em estudos de investigação**

**Título do estudo:** Depressão e ansiedade associados ao diagnóstico da diabetes gestacional na gravidez

**Enquadramento:** Este estudo observacional feito no CHL insere-se no âmbito da dissertação de Mestrado em Medicina da Universidade de Coimbra de Bárbara Isabel Mendes Penedo Rodrigues Gaspar, orientada pela Doutora Inês Rosendo Carvalho e Silva Caetano.

**Informação geral e objetivos do estudo:** Este projeto tem como objetivo investigar a relação da depressão e ansiedade com a diabetes gestacional. No estudo serão incluídas grávidas no 3º trimestre da gravidez e que se dirijam à consulta de obstetria no CHL no período de recolha dos dados. O estudo será executado com recurso a dados obtidos através da resposta a questionários que avaliam as variáveis em estudo. Pretende-se esclarecer a associação entre a perturbação psicológica (depressão e/ou ansiedade) e o diagnóstico de diabetes gestacional, fazendo-se a comparação com grávidas com diabetes pré-gestacional e grávidas não-diabéticas. Todas as grávidas da amostra irão responder ao mesmo questionário sobre sintomas de depressão e ansiedade, sobre a sua gravidez, existência de diabetes e outras doenças mentais prévias.

**Riscos e potenciais inconvenientes:** Não estão previstos riscos para quem participa. O preenchimento dos questionários leva alguns minutos.

**Potenciais benefícios:** Este estudo tem a vantagem de estudar a diabetes gestacional e permitir um melhor conhecimento do seu impacto psicológico. Além disso, a informação que será recolhida irá contribuir para alertar os profissionais de saúde para a importância de rastrear, acompanhar e tratar a ansiedade ou depressão associadas ao diagnóstico de diabetes gestacional, melhorando a qualidade de vida materna.

**Condições e financiamento:** A sua participação será voluntária, anónima e pode retirar o seu consentimento em qualquer altura sem qualquer consequência para si, sem precisar de explicar as razões, sem qualquer penalidade ou perda de benefícios. O próprio investigador financiará o estudo e não há remuneração a investigadores ou participantes pelo seu contributo. Este estudo mereceu parecer favorável da Comissão de Ética do Centro Hospitalar de Leiria (CHL).

**Confidencialidade:** Os questionários serão feitos em anonimato, sem dados que possam identificar a pessoa em causa. Os seus registos manter-se-ão confidenciais de acordo com os regulamentos e leis aplicáveis.

Agradeço a sua participação voluntária neste estudo.

Leia com atenção toda a informação constante neste consentimento. Se tiver questões sobre este estudo deve contactar: Bárbara Gaspar, estudante de Medicina da UC, telemóvel: 915457649 email: [uc2015235314@student.uc.pt](mailto:uc2015235314@student.uc.pt)

A investigadora: Bárbara Isabel Mendes Penedo Rodrigues Gaspar

Assinatura: \_\_\_\_\_ Data: \_\_\_\_ / \_\_\_\_ /2020

*Declaro ter lido e compreendido este documento, bem como as informações verbais que me foram fornecidas pela pessoa que acima assina. Foi-me garantida a possibilidade de em qualquer altura recusar participar neste estudo sem qualquer tipo de consequências. Desta forma, aceito participar neste estudo e permito a utilização dos dados que de forma voluntária forneço, confiando em que apenas serão utilizados para esta investigação e nas garantias de confidencialidade e anonimato que me são dadas pela investigadora.*

Nome da utente: \_\_\_\_\_ Data: \_\_\_\_ / \_\_\_\_ /2020

Assinatura: \_\_\_\_\_

## ESTUDO – Depressão e ansiedade associados ao diagnóstico da Diabetes Gestacional na gravidez



Data da consulta: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ (dia/mês/ano)

Maternidade/Hospital \_\_\_\_\_

- Idade: \_\_\_\_\_ anos
- Número de anos de formação: \_\_\_\_\_ anos (ex: 12ºano = 12 anos)
- Qual a sua profissão? \_\_\_\_\_
- De momento está a trabalhar? Sim  Não

Se não, qual a razão? \_\_\_\_\_

- Salário igual ou superior ao salário mínimo? Sim  Não
- Vive sozinha? Sim  Não
- Idade gestacional atual: \_\_\_\_\_ semanas
- Quantas vezes esteve grávida (incluindo esta gravidez)? \_\_\_\_\_
- Quantos partos teve (excluir abortos)? \_\_\_\_\_
- Quantos abortos teve? \_\_\_\_\_
- A sua gravidez foi planeada? Sim  Não
- Tinha diabetes prévia à gravidez? Sim  Não

Se sim, que tipo de diabetes? Tipo 1  Tipo 2

Se sim, que medicação fazia imediatamente antes de engravidar? \_\_\_\_\_

- Foi-lhe diagnosticada diabetes nesta gravidez? Sim  Não

Se sim, quando soube?

Nas análises do 1ºtrimestre (glicémia em jejum)

Nas análises do 2ºtrimestre (PTGO)

Está a fazer alguma medicação/ tratamento para a diabetes gestacional? Sim  Não

Se sim, qual? \_\_\_\_\_

- Quando engravidou estava com depressão? Sim  Não

Se sim, estava a fazer medicação para a depressão? Sim  Não

Se sim, qual? \_\_\_\_\_

- Quando engravidou estava com ansiedade? Sim  Não

Se sim, estava a fazer medicação para a ansiedade? Sim  Não

Se sim, qual? \_\_\_\_\_

- Tem alguma doença que conheça anterior à gravidez? Sim  Não

Se sim, qual? \_\_\_\_\_

Se sim, está a fazer alguma medicação/tratamento para essa doença(s)?

Sim  Não  Se sim, qual? \_\_\_\_\_

- Teve alguma complicação durante a gravidez? Sim  Não

Se sim, qual? \_\_\_\_\_

*Obrigada pela sua colaboração.*

## ESTUDO - Depressão e ansiedade associados ao diagnóstico de diabetes gestacional na gravidez



FACULDADE DE MEDICINA  
UNIVERSIDADE DE  
COIMBRA

### Escala de Rastreio de Depressão Pós-parto (ERDP-24)

A seguir encontra uma lista de afirmações que descrevem sentimentos que as mulheres grávidas podem ter **ANTES DO NASCIMENTO** do seu bebé. Coloque um **círculo** na resposta que melhor descreve o modo como se tem sentido durante o **ÚLTIMO MÊS**. **Por favor, indique o seu grau de concordância com cada frase.**

NO ÚLTIMO MÊS, EU...

	1	2	3	4	5
	Discordo muito	Discordo	Não concordo nem discordo	Concordo	Concordo muito
1. tive dificuldades em dormir.	1	2	3	4	5
2. senti-me completamente sozinha.	1	2	3	4	5
3. não consegui concentrar-me em nada.	1	2	3	4	5
4. senti-me um fracasso.	1	2	3	4	5
5. comecei a pensar que estaria melhor morta.	1	2	3	4	5
6. perdi o apetite.	1	2	3	4	5
7. senti-me verdadeiramente angustiada (oprimida).	1	2	3	4	5
8. tive medo de nunca mais voltar a ser feliz.	1	2	3	4	5
9. senti que estava a perder o juízo.	1	2	3	4	5
10. senti que estava a tornar-me uma estranha para mim própria.	1	2	3	4	5
11. senti que as outras grávidas eram melhores do que eu.	1	2	3	4	5
12. pensei que a morte seria a única solução para sair deste pesadelo.	1	2	3	4	5
13. acordei a meio da noite e tive dificuldade em voltar a adormecer.	1	2	3	4	5
14. tive medo de nunca mais ser a mesma pessoa.	1	2	3	4	5
15. senti-me culpada por não sentir o amor que devia ter pelo meu futuro bebé.	1	2	3	4	5
16. quis fazer mal a mim própria.	1	2	3	4	5
17. dei voltas na cama durante muito tempo a tentar adormecer (à noite).	1	2	3	4	5

18. tenho andado muito irritável.	1	2	3	4	5
19. tenho tido dificuldades em tomar decisões mesmo simples.	1	2	3	4	5
20. senti que o meu futuro bebé estaria melhor sem mim.	1	2	3	4	5
21. sabia que devia comer mas não consegui.	1	2	3	4	5
22. senti-me inquieta, tinha de andar de um lado para o outro.	1	2	3	4	5
23. tive dificuldades em concentrar-me numa tarefa.	1	2	3	4	5
24. só queria deixar este mundo.	1	2	3	4	5

1	2	3	4	5
Discordo muito	Discordo	Não concordo nem discordo	Concordo	Concordo muito

*Obrigada pela sua colaboração*



## *ESTUDO - Depressão e ansiedade associados ao diagnóstico de diabetes gestacional na gravidez*



FACULDADE DE MEDICINA  
UNIVERSIDADE DE  
COIMBRA

### Escala de Rastreio da Ansiedade Perinatal (ERAP)

**AO LONGO DO ÚLTIMO MÊS**, com que frequência experienciou o seguinte?

*Por favor, assinale a resposta que melhor descreve a sua experiência, em todas as questões.*

0 Nunca	1 Algumas vezes	2 Muitas vezes	3 Quase sempre	
1. Preocupar-me com a gravidez/bebé.	0	1	2	3
2. Medo que algo de mal aconteça ao bebé.	0	1	2	3
3. Sentir pavor por ter a sensação de que algo de mau está para acontecer.	0	1	2	3
4. Preocupar-me com muitas coisas.	0	1	2	3
5. Preocupar-me com o futuro.	0	1	2	3
6. Sentir-me assoberbada/esmagada.	0	1	2	3
7. Ter medos muito intensos sobre várias coisas (de agulhas, de sangue, do parto, da dor, etc...).	0	1	2	3
8. Ataques súbitos de medo ou desconforto intenso.	0	1	2	3
9. Pensamentos repetitivos difíceis de parar ou controlar.	0	1	2	3
10. Dificuldade em dormir, mesmo quando tenho a oportunidade para o fazer.	0	1	2	3
11. Ter de fazer as coisas de uma certa maneira ou ordem.	0	1	2	3
12. Querer que as coisas sejam perfeitas.	0	1	2	3
13. Precisar de ter as coisas sob controlo.	0	1	2	3
14. Dificuldade em parar de verificar ou de repetir as coisas, vezes sem conta.	0	1	2	3
15. Sentir-me sobressaltada ou facilmente assustada.	0	1	2	3
16. Preocupar-me com pensamentos que se repetem.	0	1	2	3
17. Estar alerta ou sentir necessidade de ter cuidado.	0	1	2	3
18. Ficar perturbada com memórias repetidas, sonhos ou pesadelos.	0	1	2	3
19. Preocupar-me com a possibilidade de fazer uma má figura em frente aos outros.	0	1	2	3
20. Medo de que os outros me irão julgar negativamente.	0	1	2	3
21. Sentir-me muito desconfortável em multidões.	0	1	2	3

22. Evitar situações sociais porque posso ficar nervosa.	0	1	2	3
23. Evitar coisas que me preocupam.	0	1	2	3
24. Sentir-me desligada, como se estivesse a ver-me a mim própria num filme.	0	1	2	3
25. Perder a noção do tempo e não conseguir lembrar-me do que aconteceu.	0	1	2	3
26. Dificuldade em adaptar-me a mudanças recentes.	0	1	2	3
27. Sentir que a ansiedade afeta a minha capacidade de fazer as coisas.	0	1	2	3
28. Ter pensamentos acelerados que dificultam a minha concentração.	0	1	2	3
29. Medo de perder o controlo.	0	1	2	3
30. Sentir-me em pânico.	0	1	2	3
31. Sentir-me agitada.	0	1	2	3

0	1	2	3
Nunca	Algumas vezes	Muitas vezes	Quase sempre

*Obrigada pela sua colaboração.*

## Attachment II. Ethics committee authorization from the Centro Hospitalar de Leiria

----- Forwarded message -----

De: **Sónia Guerra** <sonia.guerra@chleiria.min-saude.pt>  
Date: quinta, 8/11/2018, 17:17  
Subject: Autorização do estudo "Depressão, ansiedade e stress associados ao diagnóstico da diabetes gestacional na gravidez"  
To: castrorariana@gmail.com <castrorariana@gmail.com>

Exma. Sra. Dra. Mariana Castro,

No seguimento do Vosso pedido, sobre o estudo em epígrafe, informamos V. Exa. que o **Conselho de Administração**, na sua reunião de 2018.11.07, deliberou autorizar a sua realização conforme solicitado. Após conclusão do estudo, gostaríamos de receber um exemplar do trabalho final (preferencialmente em PDF, para o presente email).

Mais se informa que é dado conhecimento desta informação ao Diretor do Serviço de Ginecologia/Ostetria, Dr. António Santiago.

Com os melhores cumprimentos,

Sónia Guerra

Técnica Superior - Centro de Investigação/GEFOP

  
Centro Hospitalar de Leiria Accredited by Joint Commission International

Rua dos Ólhavos, Pozos | 2410-197 Leiria | Portugal

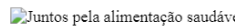
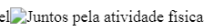
Tel: +351 244 817 000 Ext: 4002

[www.chleiria.pt](http://www.chleiria.pt)

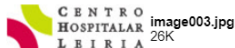
PENSE ANTES DE IMPRIMIR

 Novo portal SNS

 SNS+Proximidade

 Juntos pela alimentação saudável  Juntos pela atividade física

### 9 anexos



Attachment III. Ethics committee authorization from the Centro Hospitalar de Trás-os-Montes e Alto Douro



SNS SERVIÇO NACIONAL  
DE SAÚDE



Exm<sup>o</sup>(a). Senhor(a):  
Claudia Isabel Matos Dinis  
Faculdade de Ciências da Saúde

a33761@fcsaude.ubi.pt

---

ASSUNTO: *Ensaio Clínico/Projeto de Investigação*

---

V/ REFERÊNCIA

Após Parecer favorável emitido pela Comissão de Ética em reunião de 16.10.2019, o Conselho de Administração em 17.10.2019, autorizou a realização do estudo intitulado "Depressão e ansiedade associados ao diagnóstico de diabetes gestacional na gravidez".

Com os melhores cumprimentos,

Vila Real 21.10.2019

Doc n.º 348/2019 - C.A.

A PRESIDENTE DO CONSELHO DE ADMINISTRAÇÃO



Rita Castanheira

HV

Centro Hospitalar de Trás-os-Montes e Alto Douro E.P.E  
Avenida Nomesa, Lordelo | 5000-508 Vila Real  
TEL + 351 259 300 500 FAX + 351 250 300 503 EMAIL geri@chtmad.min-saude.pt www.chtmad.min-saude.pt

CHTMAD

## Attachment IV. Ethics committee authorization from the Centro Hospitalar Tondela-Viseu



Cláudia Isabel Matos Dinis <a33761@fcsaude.ubi.pt>

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### Submissão de projeto à Comissão de Ética

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Comissão de Ética <etica@hstviseu.min-saude.pt>  
Para: Cláudia Isabel Matos Dinis <a33761@fcsaude.ubi.pt>

22 de julho de 2019 às 12:31

Bom Dia Cláudia Dinis

O seu pedido de autorização para realização do seu estudo foi aprovado em reunião do dia 15 de Julho de 2019 pela Comissão de Ética do CHTV, no entanto o Conselho de Administração do CHTV solicitou que dirigisse um ofício (emitido pela UBI) ao Presidente do CA do CHTV solicitando autorização para realização do mesmo.

Com os melhores cumprimentos,

Catarina Norte

Unidade de Ensino, Inovação e Desenvolvimento Científico \* CACB

Gabinete de Apoio e Coordenação do Ensino P.G. \* Comissão de Ética para a Saúde

Centro Hospitalar Tondela-Viseu E.P.E. \* Unidade Hospitalar de Viseu

Av. Rei D. Duarte, 3504-009 VISEU, Portugal

Tel. Geral 232 420 500 - Extensão do Gabinete: 11317 | Fax: 232 420 591

etica@hstviseu.min-saude.pt \* www.hstviseu.min-saude.pt



[Citação ocultada]

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**Fwd: Pedido de recolha de dados**

1 mensagem

---

**Fernando Pimenta** <fpimenta@fcsaude.ubi.pt>  
Para: Cláudia Isabel Matos Dinis <a33761@fcsaude.ubi.pt>

29 de julho de 2019 às 12:24

----- Forwarded message -----

De: **António Cabral** <pcabral@ubi.pt>  
Date: segunda, 29/07/2019 à(s) 11:57  
Subject: Fwd: Pedido de recolha de dados  
To: Fernando Pimenta <fpimenta@fcsaude.ubi.pt>

----- Forwarded message -----

De: **sec.presidente** <sec.presidente@hstviseu.min-saude.pt>  
Date: segunda, 29/07/2019 à(s) 11:52  
Subject: Pedido de recolha de dados  
To: pcabral@ubi.pt <pcabral@ubi.pt>

Exmos Senhores

Encarrega-me o Conselho de Administração do Centro Hospitalar Tondela-Viseu, EPE, de informar V<sup>ª</sup>. Ex<sup>ª</sup>, que em reunião do Conselho, dia 24 de Julho de 2019, foi autorizado o pedido de recolha de dados para a realização do estudo "Depressão e ansiedade associados ao diagnóstico da diabetes gestacional na gravidez", à aluna Cláudia Isabel Matos Dinis, n.º. 33761.

Com os melhores cumprimentos,

Albertina Breia Jesus

Secretária - Conselho de Administração

CENTRO HOSPITALAR TONDELA-VISEU

Av. Rei D. Duarte, 3504-009 VISEU, Portugal

Telf. 232 420 500 | Fax. 232 420 591

[sec.presidente@hstviseu.min-saude.pt](mailto:sec.presidente@hstviseu.min-saude.pt)

[www.hstviseu.min-saude.pt](http://www.hstviseu.min-saude.pt)



## PARECER

**Projecto Investigação:** *Depressão, ansiedade e stress associados ao diagnóstico da diabetes gestacional na gravidez*

**Promotor:** Não se aplica

**Investigador:** Mariana da Cruz e Castro

**Serviço:** Obstetria da Maternidade Bissaya Barreto

### Parecer

Objectivos. Metodologia. Resultados esperados.  
Outros Centros ou Serviços envolvidos.

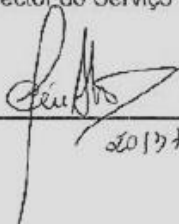
Com este estudo pretende-se avaliar a existência de depressão, ansiedade e stress materno em grávidas com diabetes gestacional, comparando com grávidas sem diabetes gestacional. Determinar esta relação é essencial para alertar os profissionais de saúde para a importância de rastrear, acompanhar e tratar a ansiedade, stress ou depressão associadas ao diagnóstico desta condição, melhorando a qualidade de vida materna. Além disso, também se pretende fazer uma reflexão sobre o impacto que este diagnóstico pode ter nas mulheres grávidas, quando se definem os critérios para diabetes gestacional, podendo acrescentar informação na ponderação do risco/benefício dos diversos pontos de corte diagnósticos.

O estudo observacional será executado com recurso a dados obtidos através da resposta a um questionário com escalas, validadas em Portugal, para avaliar a ansiedade, stress e depressão materna.

A amostra incluirá grávidas que recorram à consulta, no período definido, na Maternidade Daniel de Matos, Maternidade Bissaya Barreto e Centro Hospitalar de Leiria, e que aceitem participar no estudo. Será realizada a análise estatística para examinar se o diagnóstico de diabetes gestacional influencia as variáveis em estudo. O estudo será realizado em anonimato e cumprindo as normas éticas.

Trata-se de um estudo original no nosso país a realizar com a colaboração da Dra. Ana Raquel Neves, médica do serviço de Obstetria da Maternidade Bissaya Barreto, e que autorizo enquanto diretor do mesmo serviço.

O Director do Serviço



2017