Artificial Intelligence formulated this projection for compatibility purposes from the original article published at Global Journals. However, this technology is currently in beta. *Therefore, kindly ignore odd layouts, missed formulae, text, tables, or figures.*

Obesity in Pregnant Adolescents: Clinical Correlates, Maternal and Fetal Outcomes

Cecília Ogando Alfama¹, Amanda Vilaverde Perez², Mariana Sbaraini³, Marianna
 Sperb⁴, Rafaela da Silveira Correa⁵ and Edimárlei Gonsales Valerio⁶

¹ Universidade Federal do Rio Grande do Sul (UFRGS)

Received: 15 December 2019 Accepted: 5 January 2020 Published: 15 January 2020

8 Abstract

⁹ To evaluate the relationship between pregestational obesity and maternal and fetal outcomes ¹⁰ in pregnant adolescents.Methods: Cross-sectional study conducted among puerperal teenagers ¹¹ of a university hospital in Southern Brazil. Structured questionnaires on sociodemographic ¹² and obstetric data were applied.Results: We evaluated 500 puerperal adolescents with a mean ¹³ age of 17.77 \pm 1.36. Of these, 31.2

14

5

6

15 *Index terms*— obesity, adolescent, pregnancy outcomes.

16 1 Introduction

dolescence is a period marked by transitions and search for new experiences, such as sexual awakening, making
girls more susceptible to unwanted pregnancy. Poverty and socioeconomic inequalities can further increase rates
of teenage motherhood, mostly due to knowledge gaps and lack of informations about contraception.

In Brazil, 547,564 babies are born annually to adolescent mothers, accounting for 18% of all births and 11.43% 20 of births in the South region 1. Adolescence is a period of woman's life when major physical, cognitive, and social 21 transformations occur, marking the transition from childhood to adulthood. Adolescent pregnancy is a public 22 health problem and may be related to the occurrence of maternal-fetal complications such as preeclampsia, 23 prematurity, infections, low fetal weight, among others 2,3. There is closely intertwined between maternal 24 nutritional status before and during gestation and neonatal outcomes 4. Pregnancy before the age of 15 years 25 old can be harmful to maternal and fetal health since both are under physical development and can compete for 26 nutrients. This competition may increase the odds of low neonatal weight, micronutrient deficiencies, and fetal 27 growth restriction 5. 28

Obesity is a complex and multifactorial disease with rising prevalence worldwide 6. In the last decades, rates of weight excess among Brazilian adolescent girls have nearly tripled 7. Pregestational obesity is a risk factor for excessive weight gain during pregnancy and is associated with complications such as diabetes, postpartum hemorrhage, infections, thromboembolic events, and disturbs in childbirth 8. It can also cause hypertensive syndromes, which lead to poor perinatal outcomes 9. Maternal obesity is also associated with neonatal events such as fetal macrosomia, increased admission in the neonatal intensive care unit, congenital disabilities, hypoglycemia, low Apgar score, and death 10.

The combination of adolescent pregnancy and obesity can further impact health outcomes in both generations. Therefore, this study aims to evaluate the relationship between pregestational weight excess and the occurrence of maternal and fetal outcomes among A pregnant adolescents in a university hospital in Southern Brazil.

39 2 II.

$_{40}$ 3 Methods

⁴¹ Between November 2014 to March 2016, we conducted a cross-sectional study carried out among puerperal ⁴² adolescents (10 to 19 years old) that attended a university hospital in southern Brazil. We interviewed the adolescents in the postpartum period, after theysigning a free and informed consent form and answered
questionnaires on socio-demographic, gestational and perinatal data. Ethics Committee of Hospital de Clínicas
de Porto Alegre approved the project. (protocol number 14-0491).

Pregestational nutritional status was analyzed using Anthroplus software, and body mass index (BMI) z-score

47 from 1 to -1 was considered eutrophic and ?+1 weight excess 14 . We evaluated gestational BMI according to

the Atalah curve published in 1997 15. Weight gain during pregnancy was defined suitable from 12.5-18 kg for

those with initial low weight, 11.5-16 kg for eutrophic, 7-11.5 kg for overweight, and 5-9 kg for those obese, as recommended by the IOM (Institute of Medicine) 16.

Maternal clinical variables evaluated were menarche, age at first sexual intercourse, number of gestations/parity, type of delivery, number of prenatal visits, previous and gestational diseases such as hypertension, diabetes, gestational hypertension and diabetes, obesity, anemia, and preeclampsia. According to the World

Health Organization (WHO) criteria, the birth is preterm when it occurs before 37 weeks 17. We classified

55 hypertensive disorders according to the recommendation of ACOG (American Congress of Obstetricians and 56 Gynecologists) 18.

Fetal variables collected were gestational age at birth, sex, weight, length, hospitalization in the neonatal intensive care unit (ICU), and complications such as respiratory dysfunction and Apgar score. We evaluated gestational age at birth using the Capurro method.

Data were analyzed using SPSS (Statistical Package for the Social Sciences) version 18.0 (SPSS Inc., Chicago, IL, EUA®). Categorical variables are presented by absolute number (n) and percentage (%), symmetric continuous variables by the mean and standard deviation (SD), and continuous variables asymmetric by the median and interquartile range [25-75 percentile]. We used a Chi-square test for categorical variables and ttest for quantitative variables. We considered, for all analyses, a significance level of 5% (p<0.05) and a 95% confidence interval.

66 4 III.

67 5 Results

We evaluated five hundred adolescents and their respective newborns. Maternal mean age was 17.77 ± 1.36 years, with the mean age at first sexual intercourse at 14.8 ± 1.5 years. 57.6% (n=235) had a family income of 1.5 to 3 minimum wages, and 63% had white skin color. Primiparous women composed 83.4% of the sample, and 84.8% (n=420) were single with a partner. Regarding pregestational nutritional status, 31.2% (n=156) were weight excess. Table 1 shows other characteristics of the sample.

Table 2 shows the association of pregestational body mass index classification with maternal and fetal outcomes. Mothers with pregestational weight excess were more likely to attend fewer prenatal consultations (24.7% vs. 36.3%, p=0.007) and have excessive weight gain during pregnancy than the others (62.2% vs. 32.9%, p<0.001). Prevalence of gestational hypertension (5.1% vs. 1.7%, p=0.037) and gestational diabetes (4.5% vs. 1.5%,

p=0.045) were higher in the weight excess group when compared to the lean/eutrophic group. The proportion of birth by cesarean was also significantly higher in weight excess adolescents (24.4% vs. 17.2%, p=0.04).

Children of weight excess mothers had a longer length (48.3 cm vs. 47.5 cm, p=0.018) and weight (3.199 kg vs.
3.040 kg, p = 0.020) at birth, as observed in figures 1 and 2, respectively. Prematurity, neonatal ICU admission,
respiratory dysfunctions, and Apgar score were not associated with pregestational weight excess.
IV.

83 6 Discussion

Pregnancy in women before the age of 19 years is characterized by poorer outcomes when compared to those aged 20-24 years 19. One explanation for this is that teenage mothers are smaller, due to uncompleted growth at conception. Competition for nutrients can occur between the still developing mother and the fetus, causing developmental impairment in one or both parts. The deficiency of nutrients and energy due to gestation can further impair growth and make adolescent mothers more prone to metabolic imbalances such as obesity and cardiovascular diseases in adulthood 20.

Obesity is a growing public health problem. In the United States, the prevalence of overweight in girls aged 90 12 to 19 years was 4.7% in 1970, increasing to 15.4% in 2002 21. In Brazil, weight excess affects more than 91 23% of teenage women 7. Obesity during adolescence can persist in adulthood, increasing the risk of associated 92 diseases such as hypertension, diabetes mellitus, osteoarthritis, and cardiovascular disease 22. Furthermore, 93 94 maternal obesity is associated with adverse obstetric outcomes, such as increased cesarean rates, preeclampsia and, 95 gestational diabetes. A menarche is a late event in the pubertal process that is related to genetic, environmental, 96 and nutritional factors. Literature shows that adolescents with a higher risk of obesity in adulthood are those 97 with early menarche and those with a short period between menarche and first parturition 37. We also observe this correlation in our study, as weight excess young women had menarche at an earlier age. 98 During pregnancy, women with overweight and obesity should gain a maximum of 11,5 and 9 kg, respectively 99

⁹⁹ During pregnancy, women with overweight and obesity should gain a maximum of 11,5 and 9 kg, respectively ¹⁰⁰ 26. Adolescent mothers are more likely to have inappropriate weight gain compared with adult women 36, ¹⁰¹ and over 60% of teenage mothers have excessive weight gain. In our study, 31.2% of them had pregestational ¹⁰² overweight, and the majority of those gained gestational weight above the recommended for their BMI before pregnancy, corroborating with previous findings ??1,34. The weight gain can be explained because the body of adolescents has to work to both meet their own growth needs and those of the fetus.

Prenatal consultations provide the necessary medical support during pregnancy, and performing them correctly is necessary to prevent possible complications associated with maternal and fetal health. Pregnant women with weight excess were significantly more likely to have inadequate prenatal care, having less than the six visits recommended by the Brazilian Ministry of Health 32. Adolescent mothers may not attend gestational care due to fear or non-acceptance of the pregnancy; therefore, professionals should be rightly trained to guide and stimulate them about gestational care 32.

Regarding maternal outcomes, we found a significant association of maternal weight excess with hypertension and gestational diabetes mellitus (GDM), corroborating literature previous findings. Sukalich et al. showed that cesarean delivery, preeclampsia, and gestational diabetes were more frequent in pregnant women with a BMI greater than 25, as well as labor induction and cephalic-pelvic disproportion 36. Another study also demonstrated that maternal weight excess and excessive weight gain during pregnancy were associated with an increased risk of gestational hypertension 46. The association between obesity and GDM can be explained by more propensity of decreased insulin sensitivity before and during gestation in these women 47,42.

In our study, 24.4% of overweight adolescents had cesarean deliveries. A study with obese teenage mothers at hospitals in the United States 42 and Colombia 20 found similar results. High prevalence of cesarean deliveries may be related to higher fetal weight in mothers with a still-developing body structure 43. Furthermore, we stand out that our study obtained a mean number of the cesarean sections below the national average reported by the Brazilian National Health System Database of 2011 44. This finding may be related to the fact that these adolescents were in a tertiary hospital that prioritizes vginal delivery and has specific institutional protocols regarding medical indications of cesarean.

Excessive weight gain during pregnancy and pregestational weight excess can result in newborns with bigger weight and length 46, ??8, ??9. These findings are in agreement with our study since a significant association of maternal weight excess and anthropometric variables of the babies was found. Pregnant women who are overweight, obesity, or underweight can still have babies of adequate birth weight, provided that they gained appropriate weight during pregnancy 11. V.

131 7 Conclusion

Adolescence is a period of transition in which girls are still in the stage of physical and psychological growth. Gestation alone, at this stage, is already a risk factor for adverse outcomes. Our study demonstrates that these adverse outcomes are potentiated when gestation in adolescence is associated with obesity. Excessive weight increase during pregnancy is also associated with adverse maternal and fetal outcomes, such as preeclampsia, increased rate of cesarean section, and macrosomia. These findings highlight the necessity of further studies in the adolescent population, which accounts for 20% of all deliveries.

This study has a few limitations. Among the significant results, such as the association between obesity and gestational hypertension, confusion factors may be involved. Also, we obtained pre-pregnancy informati from participants' reports, depending on memories.

Our study contributes to a better understanding of pregestational weight excess in teenage mothers. The 141 assessment of the initial nutritional status is essential to adjust weight gain during pregnancy, to minimize possible 142 harms to the mother-child binomial. Although historically, the concern with teenage motherhood involves low 143 weight gain and nutritional deficits, increasing rates of obese pregnant adolescents make interventions in eating 144 habits is necessary to change this paradigm. Therefore, educational programs orientating this population about 145 contraception, pregnancy, and healthy eating habits should be implemented, as well as actions encouraging early 146 prenatal care. Acknowledgments: We would like to express our deepest gratitude to the participants for their 147 time and patience throughout this study. 148

¹⁴⁹ Financial disclosure: The authors have no financial relationships relevant to this article to disclose. ¹

 $^{1^{\}odot}$ 2020 Global Journals Obesity in Pregnant Adolescents: Clinical Correlates, Maternal and Fetal Outcomes



Figure 1: Figure 1 :



Figure 2: Figure 2 :

1

Average

Standard deviation

[Note: * According to criteria by WHO. ** Before 37 weeks of gestation.]

Figure 3: Table 1 :

$\mathbf{2}$

Underweight/EutrophyWeight excess 1	P value
Mean age at menarche, years 12.38 ± 1.67 11.62 ± 1.63	< 0.001*
Apgar score	
1st minute 7.85 ± 1.94 7.95 ± 1.57	0.594
5th minute 9.03 ± 1.58 9.06 ± 1.01	0.833
Number of prenatal care consults	
< 6 consults 122 (36.3) 38 (24.7)	0.007
? 6 consults $214(63.7)$ $116(75.3)$	
Weight gain during pregnancy	
Insufficient $124 (36.2) 23 (14.7)$	
Adequate $106(30.9)$ $36(23.1)$	< 0.001*
Excessive $113(32.9)$ $36(62.2)$	
Pathology during pregnancy	
No 95 (27.7) 44 (28.2)	0.494
Yes 248 (72.3) 112 (71.8)	
Gestational hypertension	
No 228 (98.3) 148 (94.9)	0.037^{*}
Yes $6(1.7)$ $8(5.1)$	
Preeclampsia	
No 127 (95.1) 146 (93.6)	0.316
Yes $17(4.9)$ 10(6.4)	
Gestational diabetes	
No 339 (98.5) 149 (95.5)	0.045^{*}
Yes $5(1.5)$ 7 (4.5)	
Anemia during pregnancy	
No 216 (63) 108 (69.2)	0.104
Yes $127(37)$ $48(30.8)$	
Type of delivery	
Vaginal 285 (82.8) 118 (75.6)	0.040*
Cesarean $59(17.2)$ $38(24.4)$	
Labor complications*	
No 313 (91) 140 (89.7)	0.385
Yes 31 (9) 16 (10.3)	
Gestational age	
Preterm 45 (13.4) 23 (14.7)	0.393
Full term 297 (86.6) 133 (85.3)	
Newborn complications**	
No 245 (71.2) 108 (69.2)	0.703
Yes 98 (28.5) 48 (30.8)	

Figure 4: Table 2 :

7 CONCLUSION

¹⁵⁰ .1 Conflict of interest:

151 The authors have no conflicts of interest to disclose.

152 .2 Contributor statement

- 153 JV, EGV, RCS, VLB conceived/designed the study and worked on data collection. CA and MV worked on
- data collection. MLOR, JV, VLB and RCS carried out the initial analyses and drafted the initial manuscript.
- AVP and MS finalized the manuscript, and MS translated it. All authors critically reviewed and revised the manuscript. All authors approved the final manuscript as submitted.
- 157 [Obstet Gynecol], Obstet Gynecol 96 p. .
- 158 [Ma et al.], R C Ma, M I Schmidt, W H Tam, H D Mcintyre, P M Catalano.
- 159 [Nielsen et al. ()], J N Nielsen, K O O'brien, F R Witter, S C Chang, J Mancini, M S Nathanson. 2006.
- [Patias Nd E Dias and Sexarca ()], Acg Patias Nd E Dias, Sexarca. Psico-USF 2014. 19 (1) p. . (informação
 e uso de métodos contraceptivos: comparação entre adolescentes)
- 162 [Martins et al. ()] A constelação da maternidade na gestação adolescente: um estudo de casos, Lwf Martins , G
 163 B Frizzo , Amp Diehl . 2014. 25 p. .
- [Stevens-Simon and Mcanarney ()] 'Adolescent pregnancy. Gestational weight gain and maternal and infant
 outcomes'. C Stevens-Simon , E R Mcanarney . American Journal of Diseases of Children 1992. 146 p.
 .
- 167 [Martins ()] Associação de gravidez na adolescência e prematuridade. Rev Bras GinecolObstet, M G Martins.
 168 2011. p. .
- 169 [Barros ()] Avaliação nutricional antropométrica de gestantes adolescentes no município do Rio de Janeiro, D
- C Barros . 2009. 2009. 129. (Tese (doutorado). Fundação Oswaldo Cruz, Escola Nacional de Saúde Pública
 Sergio Arouca)
- 172 [Raposo et al. ()] 'Complicações da Obesidade na Gravidez'. L Raposo , C Ferreira , M Fernandes , S Pereira ,
 173 P Moura . Arq Med Porto 2011. 25 (3) p. .
- [Fazio E De et al. ()] 'Consumo dietético de gestantes e ganho ponderal materno após aconselhamento nutri cional'. S Fazio E De , Rmy Nomura , Mcg Dias , M Zugaib . *Rev Bras Ginecol Obstet* 2011. 33 (2) p.
 .
- 177 [Restrepo-Mesa et al. ()] 'Embarazo adolescente: caracter?sticas maternas y su asociacion con el peso al nacer
 178 del neonato'. S L Restrepo-Mesa , Zapata Lopez , N , Parra Sosa , BE . Arch Latinoam Nutr 2014. 64 p. 99.
- [Santos Mma De et al. ()] 'Estado nutricional prégestacional, ganho de peso materno, condições da assistência
 pré-natal e desfechos perinatais adversos entre puérperas adolescentes'. S Santos Mma De , M R Baião , D C
 Barros , De , A Pinto A De , Plm Pedrosa . *Rev Bras de Epidemiol* 2012. 15 (1) p. .
- Barros, De, A Finto A De, Fini Fedrosa. *Nev Dras de Epidemioi* 2012. 15 (1)
- [Gunderson et al. ()] 'Excess gains in weight and waist circumference associated with childbearing: The Coronary
 Artery Risk Development in Young Adults Study (CARDIA)'. E P Gunderson , M A Murtaugh , C E Lewis
 , C P Quesenberry , D S West , S Sidney . International Journal of Obesity & Related Metabolic Disorders:
- Journal of the International Association for the Study of Obesity 2004. 28 p. .
- 186 [Gama] Fatores associados à cesariana entre primíparas adolescentes no Brasil, S G N Gama . p. .
- 187 [Silva A De Aa et al. ()] 'Fatores associados à recorrência da gravidez na adolescência em uma maternidade
 188 escola: estudo caso-controle'. Silva A De Aa , I C Coutinho , L Katz , Asr Souza . Cad Saúde Pública 2013.
 189 29 (3) p. .
- [Fonseca Mrcc Da et al. ()] 'Ganho de peso gestacional e peso ao nascer do concepto: estudo transversal na
 região de Jundiaí'. Fonseca Mrcc Da , R Laurenti , C R Marin , M C Traldi . Brasil. Ciência e Saúde Coletiva
 2014. 19 (5) p. .
- [Assunção Pl De et al. ()] 'Ganho ponderal e desfechos gestacionais em mulheres atendidas pelo Programa de
 Saúde da Família em Campina Grande, PB (Brasil)'. Assunção Pl De , O Melo As De , Ssr Gondim , Mhd
 Benício , Mmr Amorim . *Revista Brasileira de Epidemiologia* 2007. 10 (3) p. .
- [Santos Nl De et al. ()] 'Gravidez na adolescência: análise de fatores de risco para baixo peso, prematuridade e
 cesariana'. A C Santos Nl De , Com Costa , Mtr Amaral , G O Vieira , E B Bacelar . *Ciênc. saúde coletiva*2014. 19 (3) p. .
- [High gestational weight gain does not improve birth weight in a cohort of African American adolescents American Journal of Cli
 'High gestational weight gain does not improve birth weight in a cohort of African American adolescents'.
 American Journal of Clinical Nutrition 84 p. .
- 202 [Bubach ()] Idade da menarca, composição corporal e fatores de risco cardiometabólicos em mulheres adultas
- *jovens: análises nas Coortes de Nascimento de Pelotas de*, S Bubach . 1982 e 1993. 2017. 2017. 203 f. Tese
 (Doutorado) Universidade Federal de Pelotas

7 CONCLUSION

- [Nomura et al. ()] 'Influência do estado nutricional materno, ganho de peso e consumo energético sobre o crescimento fetal, em gestações de alto risco'. Rmy Nomura , L V Paiva , V N Costa , A W Liao , M
 [Nomura et al. ()] 'Influência do estado nutricional materno, ganho de peso e consumo energético sobre o crescimento fetal, em gestações de alto risco'. Rmy Nomura , L V Paiva , V N Costa , A W Liao , M
- 207 Zugaib . Rev. Bras. Ginecol. Obstet 2012. 34 (3) p. .
- [Brasil and Da Saúde ()] Instituto Sírio-Libanês de Ensino e Pesquisa. Protocolos da Atenção Básica: Saúde das
 Mulheres, Ministério Brasil, Da Saúde. 2016. Brasilia.
- 210 [De et al. (2017)] Nascidos vivos brasil, Sistema De , Sobre , Vivos . <http://tabnet.datasus.gov.br/ 211 cgi/tabcgi.exe?sinasc/cnv/nvuf.def>.Acessoem 10 jul. 2017.
- [Silva et al. ()] 'Obesidade materna e suas consequências na gestação e no parto: uma revisão sistemática'. J C
 Silva , S Ferreira B Da , Ikm Willeman , M R Silva . *FEMINA* 2014. 42 (3) p. .
- [Seligman et al. ()] 'Obesity and gestational weight gain: cesarean delivery and labor complications'. L C
 Seligman , B B Duncan , L Branchtein , Dsm Gaio , S S Mengue . *Rev Saúde Pública* 2006. 40 (3) p.
 .
- 217 [Sukalich et al. ()] 'Obstetric outcomes in overweight and obese adolescents'. S Sukalich , M Mingione , C Glantz 218 . Am J Obst Gyn 2006. 195 p. .
- ²¹⁹ [Brasil and Da Saúde ()] Perspectivas e desafios no cuidado às pessoas com obesidade no SUS: resultados do
 ²²⁰ laboratório de inovação no manejo da obesidade nas redes de Atenção a Saúde 1, Ministério Brasil, Da Saúde
 ²²¹ . 2016. Brasília. (Série Técnica Redes Integradas a Atenção à Saúde)
- Instituto Brasileiro De Geografia E Estatística ()] *Pesquisa de orçamentos familiares*, Instituto Brasileiro De Geografia E Estatística . http://www.ibge.gov.br/home/presidencia/noticias/imprensa/
 ppts/0000000108.pdf> 2010. 2017. p. 17.
- Instituto Brasileiro De Geografia E Estatística (2015)] Pesquisa Nacional de Saúde do Escolar, Instituto
 Brasileiro De Geografia E Estatística . <http://biblioteca.ibge.gov.br/visualizacao/livros/
 liv97870.pdf>.Acessoem 2015. 08 jul.2017.
- [Ganchimeg et al. ()] 'Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study'. T Ganchimeg , E Ota , N Morisaki , M Laopaiboon , P Lumbiganon , J Zhang .
 BJOG 2014. 121 (1) p. . (Suppl)
- [Hedley et al. ()] 'Prevalence of overweight and obesity among US children, adolescents, and adults'. A Hedley ,
 C Ogden , C Johnson , L Curtin , K Flegal . JAMA 1999-2002. 2004. 291 p. .
- [Pinheiro M De et al. ()] 'Prevalência do excesso de peso e fatores associados em mulheres em idade reprodutiva
 no Nordeste do Brasil'. M Pinheiro M De , J S Oliveira , V S Leal , Pic Lira , De , N P Souza . *Rev Nutr*2016. 29 (5) p. .
- [Magalhães Ei Da et al. ()] 'Prevalência e fatores associados ao ganho de peso gestacional excessivo em unidades
 de saúde do sudoeste da Bahia'. S Magalhães Ei Da , D S Maia , Cfa Bonfim , M P Netto , J A Lamounier ,
 S Rocha D Da . *Rev bras epidemiol* 2015. 18 (4) p. .
- [Atalah et al. ()] 'Propuesta de um nuevo estandar de evaluacion nutricional em embarazadas'. S E Atalah , C
 L Castillo , R S Castro . *Rev Med Chile* 1997. 125 p. .
- [Brasil and Ministério Da Saúde (2011)] Rede Interagencial de Informações para a Saúde. DATASUS [Internet]
 (BR), Brasil, Ministério Da Saúde. //tabnet.datasus.gov.br/cgi/tabcgi.exe?idb2012/f08.
 def>.Acessoem23 2011. Jun. 2017. (Indicadores e Dados Básicos -Brasil)
- [Freedman et al. ()] 'Relationship of childhood obesity to coronary heart disease risk factors in adulthood: The
 Bogalusa heart study'. D S Freedman , L K Khan , W H Dietz , S R Srinivasan , G S Berenson . *Pediatrics*2001. 108 p. .
- [Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy Hypertension in Pregnancy Hypertension in Pregnancy Hypertension in
 'Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in
- 249 Pregnancy'. *Hypertension in pregnancy*, 2013. 2013. 122 p. . (Obstetrics and gynecology)
- [Gaillard et al. ()] 'Risk Factors and Outcomes of Maternal Obesity and Excessive Weight Gain During
 Pregnancy'. R Gaillard , B Durmus , A Hofman , J P Mackenbach , Eap Steegers . *Obesity* 2013. 21 (5)
 p. .
- [Schieve et al. ()] L A Schieve , M E Cogswell , K S Scanlon . Prepregnancy body mass index and pregnancy
 weight gain: associations with preterm delivery, 2000.
- [Brasil and Ministério Da Saúde ()] 'Secretaria de Atenção à Saúde. Departamento de Ações Programáticas
 Estratégicas. Área Técnica de Saúde da Mulher'. Brasil, Ministério Da Saúde. Pré-natal e Puerpério: atenção
 qualificada e humanizada, (Brasília-DF) 2006.
- [Carvalhaes Ma De et al. ()] 'Sobrepeso prégestacional associa-se a ganho ponderal excessivo na gestação'.
 Carvalhaes Ma De , Bl , B Gomes C De , M B Malta , S J Papini , Cmg Parada , L De . *Rev Bras*
- 260 Ginecol Obstet 2013. 35 (11) p. .

- [Oliveira Ca De et al. ()] Síndromes hipertensivas da gestação e repercussões perinatais. Rev Bras Saúde Materno
 Infantil, Oliveira Ca De , C P Lins , Ram Sá , De , H C Netto , R G Bornia . 2006. 6 p. .
- [Castilho et al. ()] 'Tendência secular da idade da menarca avaliada em relação ao índice de massa corporal'. S
 D Castilho , C D Pinheiro , C A Bento , A Barros-Filho A De , M Cocetti . Arq Bras Endocrinol Metabol
- 265 2012. 56 p. .
- [Haeri et al. ()] The Effect of Teenage Maternal Obesity on Perinatal Outcomes. American College of Obstetricians and Gynegologists, S Haeri , I Guichard , A M Baker , S Saddlemire , K A Boggess . 2009. 113 p.
 .
- [Groth ()] 'The long term impact of adolescent gestational weight gain'. S W Groth . Res Nurs Health 2008. 31
 p. .
- [Weight gain during pregnancy: reexamining the guidelines ()] Weight gain during pregnancy: reexamining the guidelines, 2009. Washington, D.C: The National Academies Press. Institute of Medicine
- 273 [Cad Saúde (2007)] WORLD HEALTH ORGANIZATION. Growth reference data for 5-19 years, Pública Cad
- 274
 Saúde . v.30, supl.1. <http://www.who.int/growthref/en/>.Acessoem 2014. 2007. 23 mar.2017. 14

 275
 p. .
- [Vitalle Ms De et al. ()] 'Índice de massa corporal desenvolvimento puberal e sua relação com a menarca'. S Vitalle Ms De , C Y Tomioka , Y Juliano , Oms Amancio . *Rev Assoc Med Bras* 2003. 49 (4) p. .
- 278 [Gonçalves et al. ()] 'Índice de massa corporal e ganho de peso gestacional como fatores preditores de compli-
- cações e do desfecho da gravidez'. C V Gonçalves , A M Sassi , J Á Cesar , N B Castro , De , A P Bortolomedi *Rev Bras Ginecol Obstet* 2012. 34 (7) p. .