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Evolution of overweight pregnant women in the Primary Health Care in the city of Macaé-RJ between 2010-2018

Evolução do excesso de peso em gestantes usuárias da Atenção Primária à Saúde do município de Macaé-RJ entre 2010-2018

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Abstract

Introduction The study aims to investigate the prevalence rate and the time trend of excess weight in pregnant women receiving Primary Health Care in Macaé, between 2010 and 2018. **Method:** A quantitative, time series study was conducted with the open access database of the Food and Nutritional Surveillance System (Sisvan WEB), relative to the nutritional diagnosis of pregnant women > 20 years old, receiving Primary Health Care in the city of Macaé, between 2010 and 2018. Analyses were made of 4,279 records of pregnant women over a nine-year period. The study variables were: year of data collection and registration; low weight; adequate weight; overweight; obesity; excess weight (overweight and obesity). Trend analysis of excess weight was performed using simple linear regression models, considering the significance level of 5%. **Results:** Prevalence of overweight in pregnant women was high and rising: 2010 (40.2%), 2011 (37.5%), 2012 (46.8%), 2013 (48.8%), 2014 (50.9%), 2015 (51.8%), 2016 (54.4%), 2017 (57.6%) and 2018 (55.8%). All analyses showed a significant and growing trend, especially for the excess weight outcome, whose annual increase speed ($\beta = 2.35$; $p\text{-value} < 0.001$) was higher than the other outcomes, when analyzed separately. **Conclusion:** Prevalence of excess weight in pregnant women receiving Primary Health Care in the city of Macaé was high and growing during the study period.

Keywords: Excess weight. Pregnant women. Time Series.

Resumo

Introdução: O estudo visa investigar a taxa de prevalência e a tendência temporal do excesso de peso em gestantes usuárias da Atenção Primária à Saúde de Macaé, entre 2010 e 2018. **Método:** Realizou-se estudo quantitativo, de série temporal, com a base de dados do Sistema de Vigilância Alimentar e Nutricional (Sisvan WEB), de acesso público, referente ao diagnóstico nutricional de gestantes ≥ 20 anos usuárias da Atenção Primária à Saúde do município de Macaé, no período de 2010 a 2018. Analisaram-se 4.279 registros de gestantes no período de nove anos. As variáveis estudadas foram: ano de coleta e registro dos dados; baixo peso; peso adequado; sobrepeso; obesidade; excesso de peso (sobrepeso e obesidade). A análise de tendência do excesso de peso foi realizada por meio de modelos de regressão linear simples, considerando-se o nível de significância de 5%. **Resultados:** As prevalências do excesso de peso em gestantes foram elevadas e ascendentes: 2010 (40,2%), 2011

(37,5%), 2012 (46,8%), 2013 (48,8%), 2014 (50,9%), 2015 (51,8%), 2016 (54,4%), 2017 (57,6%) e 2018 (55,8%). Em todas as análises, detectou-se a tendência significativa e crescente, podendo-se destacar o desfecho do excesso de peso, que apresentou velocidade de incremento anual ($\beta_1=2,35$; $p\text{-valor}<0,001$) superior aos demais desfechos analisados em separado. **Conclusão:** Conclui-se que é elevada e crescente a prevalência do excesso de peso em gestantes usuárias da Atenção Primária à Saúde do município de Macaé no período estudado.

Palavras-chave: Excesso de Peso. Gestantes. Série Temporal.

INTRODUCTION

Excess weight, understood as overweight and obesity, has shown a high and growing prevalence in recent decades, thus becoming a relevant public health problem that affects both developed and developing countries.¹

Data from the International Association for the Study of Obesity in 2012 estimated almost 1.5 billion excess weight adults in the world, of whom 475 million had their most advanced stage, i.e., obesity.² In 2016, the World Health Organization (WHO) updated such data to 1.9 billion people with excess weight, corresponding to 39.0% of the world's adults with excess weight, of whom 650 million are obese.³

In Brazil, according to nation-wide surveys carried out by the Brazilian Institute of Geography and Statistics (IBGE) between 1974 and 2009, excess weight in adults (> 20 years old) almost tripled in men (from 18.5 to 50.1%) and nearly doubled in women (from 28.7 to 48.0%), reaching very close prevalence rates.^{4,5} In the subsequent decade, owing to discontinued research activity by IBGE, prevalence values reported by the Surveillance System of Risk and Protective Factors for Chronic Diseases by Telephone Survey (Vigitel), carried out only in Brazilian metropolitan regions, pointed to a growing increase by 51.0%, 52.5%, 53.8% and 54.0%, for the years 2012, 2014, 2016 and 2018, respectively.⁶

In women, this tendency to increased excess weight remained as indicated in the following surveys: the 2006 National Demographic and Health Survey of Children and Women (PNDS) revealed 43.0% of excess weight in females; the latest Household Budget Survey (POF 2008-2009), 48.0%, and the last Vigitel (2018), 53.9%. In Vigitel 2018, the Metropolitan Region of Rio de Janeiro had the highest prevalence of excess weight in females, reaching 58.4%.⁷⁻⁹

There is also high prevalence of excess weight during pregnancy, around 25.0 to 30.0%,¹⁰⁻¹² which is one of the risk factors most frequently present in obstetric practice.¹³⁻¹⁵ In the context of maternal health, this prevalence is worrying, since pregnant women have increased nutritional needs that, if not monitored properly, may intensify pregnancy weight gain.¹⁶⁻¹⁸ In addition, obesity during pregnancy is associated with morbidities such as gestational diabetes, hypertensive disorders, cardiovascular complications, thromboembolic events, cesarean sections and surgical complications at delivery; and neonates are more likely to have congenital malformations, low Apgar score, macrosomia, hypoglycemia and eventual neonatal death.^{5,19}

Despite the existence of clinical protocols for nutritional care and recommendation of weight gain according to one's previous nutritional condition, excess gestational weight is increasingly common. This phenomenon is facilitated by sociocultural constructions that encourage the adoption of inappropriate eating practices ("eating" for two) and the praise of the belly as an appreciation of life and femininity.^{16,20-23} Therefore, nutritional surveillance during pregnancy is essential, since abnormal or excess weight accumulation can compromise maternal and fetal health.¹⁶⁻¹⁸ In the municipality of Macaé, located in the northern region of the state of Rio de Janeiro, there is nutritional surveillance of pregnant women through the Food and Nutrition Surveillance System (Sisvan). However, only as of 2008 have there been greater efforts of the municipality's management to monitor nutritional status at this stage of life.

In view of the lack of epidemiological studies in this field and the relevance of the theme, the aim of the present study was to investigate the prevalence rate and the time trend of excess weight in pregnant women receiving Primary Health Care (PHC) in the city of Macaé, between 2010 and 2018.

METHODS

This is a quantitative, time series study, which used the database of Sisvan Web, for nutritional diagnosis of pregnant women > 20 years old receiving PHC, from the city of Macaé, between 2010 and 2018. The economy of this municipality, located in the northern region of the state of Rio de Janeiro, is based on the production of oil and other fossil fuels, commerce, higher education and tourism.²⁴ It has an estimated population of 256,672 people, 48.9% of whom are employed. Average monthly income among those who have formal employment is 6.4 minimum wages. However, 31.5% of the population has a monthly income of <½% minimum wage/person.²⁵

In the time series of the study, the data of 4,279 pregnant women were recorded by Sisvan Web. In the first year of the time series (2010), there were 262 pregnant women and, at the end (2018), 677. There was variation in the number of annual registrations, especially in 2015, when there was a reduction in follow-up for 197 pregnant women; however, these variations did not affect the results, as the analysis was based on proportions.

The data were accessed in October 2019, through reports generated by the Sisvan Web site, using restricted access²⁶ through the link <<http://sisaps.saude.gov.br/sisvan/relatoriopublico/index>>. The study variables were: (a) year of data collection and registration; (b) low weight; (c) adequate weight; (d) overweight; (e) obesity; (f) excess weight. Variables (b) to (e) were generated by Sisvan Web in nutritional diagnosis reports by body mass index/gestational age, based on the Atalah curve, which is recommended by the Ministry of Health.²⁷ The variable (f) excess weight was the sum of variables (d) and (e).

The database was built on the *software* Microsoft Excel for Windows® version 2010 and analyzed in the *software* Statistical Package for the Social Sciences (SPSS) version 20.0®. In the descriptive analysis, the data were characterized by their absolute and percentage frequencies. The differences between annual frequencies and between the diagnostic categories of body mass index / gestational age (in proportions) were checked by the chi-square test. Trend analysis of excess weight was performed using simple linear regression models, according to the equation: $Y = \text{£}0 + \text{P1X}$, where £ 0 could be interpreted as an average annual prevalence and £ 1 represents a linear effect (speed of increase or decrease over time). Proportions relative to the total data collected in each year were used to generate prevalence. A trend was considered as significant when the estimated model presented a significant p-value. The significance level of 5% was considered in all analyses.

Annual prevalence of overweight, obesity and excess weight were separately considered as an outcome variable (Y) and years of study, as an independent variable (X). The transformation of the variable year of data collection into the year-centralized variable (year minus the median point of the study period) was necessary, since in linear regression models with data monitored over time, the terms of the equation are often highly correlated. Therefore, expressing the independent variable as a deviation from its median substantially reduces the autocorrelation between them.

This is a study with secondary public domain data with authorization from the central level, without the possibility of subject identification, in accordance with Resolution No. 466/2012 of Brazil's National Health Council/Ministry of Health.²⁸ For this reason, it did not need consideration by a Research Ethics Committee.

RESULTS

Table 1 shows the percentage distribution of 4,279 pregnant women (> 20 years) receiving PHC in Macaé, according to year and body mass index per gestational week (BMI/gestational age), between 2010

and 2018, with statistical significance between the annual prevalence rates, according to BMI categories ($p < 0.001$).

It should be noted that the prevalence of excess weight until 2015 was below 10.0%, and as of 2016, they were above this percentage: 2016 (16.9%), 2017 (20.8%), 2018 (17.4%), as shown in Table 1.

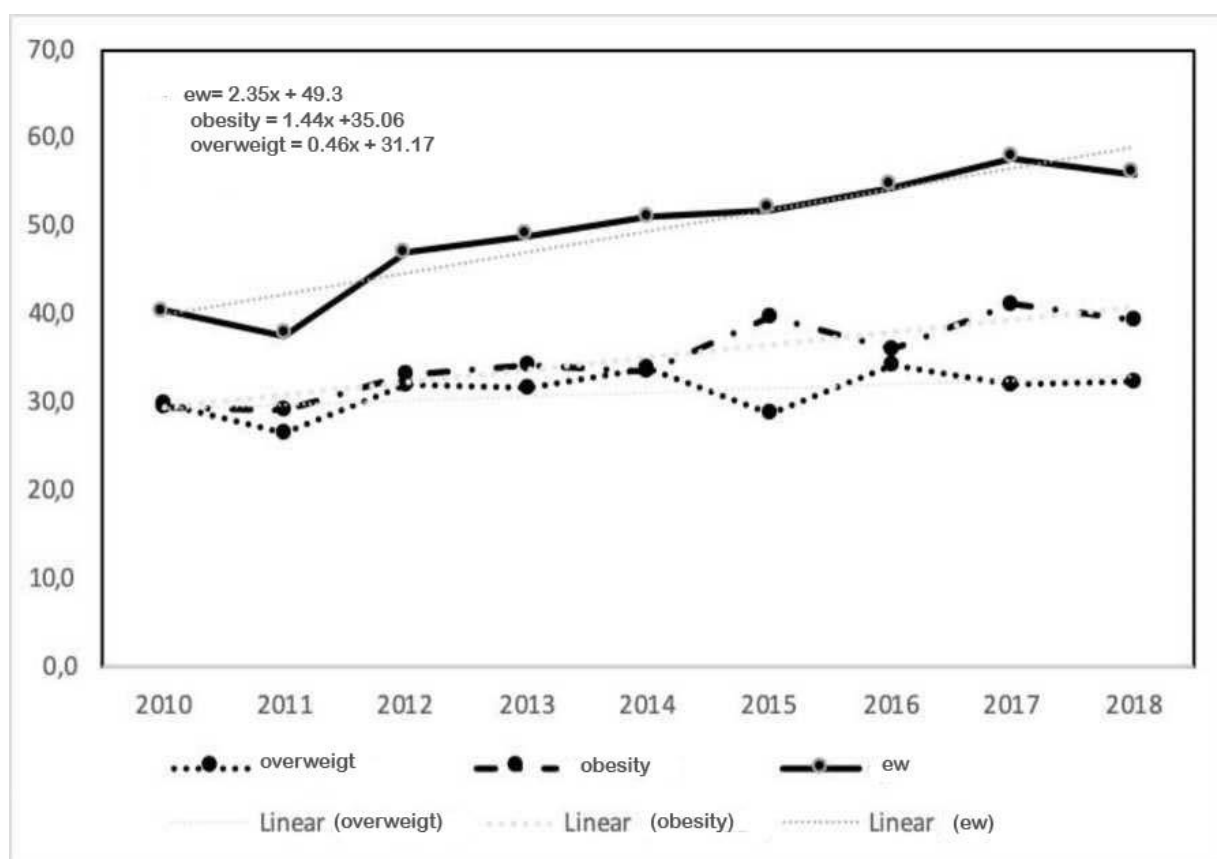
Table 1. Percentage distribution of gestational body mass index (BMI / gestational week) according to year, of pregnant women > 20 years old, receiving Primary Health Care in Macaé, 2010-2018. Sisvan Web (n = 4,279).

Year	BMI gestational					Total n (%)
	Low weight n (%)	Adequate n (%)	Overweight n (%)	Obesity n (%)	Excess weight* n (%)	
2010	67(10.7)	91(6.1)	61(5.2)	45(4.5)	106(4.9)	264(6.2)
2011	114(18.2)	218(14.7)	109(9.3)	90(9.0)	199(9.2)	531(12.4)
2012	71(11.4)	121(8.1)	95(8.1)	74(7.4)	169(7.8)	361(8.4)
2013	63(10.1)	150(10.1)	112(9.6)	91(9.1)	203(9.4)	416(9.7)
2014	51(8.2)	134(9.0)	110(9.4)	82(8.2)	192(8.9)	377(8.8)
2015	24(3.8)	71(4.8)	50(4.3)	52(5.2)	102(4.7)	197(4.6)
2016	79(12.6)	228(15.3)	204(17.5)	162(16.2)	366(16.9)	673(15.7)
2017	83(13.3)	249(16.7)	229(19.6)	222(22.2)	451(20.8)	783(18.3)
2018	73(11.7)	226(15.2)	198(17.0)	180(18.0)	378(17.4)	677(15.8)
Total	625(100.0)	1,488(100.0)	1,168(100.0)	998(100.0)	2,166(100.0)	4,279(100.0)

When analyzing the prevalence of excess weight in each study year, 40.2% was detected in 2010; 37.5% in 2011; 46.8% in 2012; 48.8% in 2013; 50.9% in 2014; 51.8% in 2015; 54.4% in 2016; 57.6% in 2017; 55.8% in 2018 (data not shown in the Table).

Figure 1 shows the trend of excess weight, overweight and obesity in the study period. All analyses showed a significant and growing trend in the study phenomenon. Emphasis should be given to the excess weight (ew) outcome, which presented a higher annual increase speed ($P1 = 2.35$; p -value < 0.001) than the other outcomes that were analyzed separately (Figure 1).

Figure1. Trend of excess weight, overweight and obesity in nine years of follow-up of pregnant women > 20 years old, receiving Primary Health Care in Macaé, 2010-2018. Sisvan Web (n = 4,279).



Note: p-value <0.001

DISCUSSION

In this study, prevalence of excess weight in pregnant women was high, and the trend for overweight in the municipality of Macaé was significant and increasing in the study period.

The findings are in line with the worldwide epidemiological scenario, which shows a growing number of individuals with excess weight. As highlighted in the *The Lancet Commission Report*,²⁹ excess body weight affects more than 2 billion people worldwide, and the current economic costs of obesity are estimated at around 2.8% of the world's gross domestic product (GDP).²⁹ In view of this reality, the report reveals that we face one of the greatest challenges of our era, and introduces the new concept of "global syndemic", highlighting the three interrelated pandemics (obesity, malnutrition and climate change), which share causalities and exert mutual interference in society.²⁹

This scenario is worrying among pregnant women, since the literature points to the association of gestational excess weight with increased development of diabetes, pre-eclampsia and maternal weight retention. In addition, it is related to fetal macrosomia and excess birth weight, which can substantially affect nutritional status and child health.³⁰

There are no trend studies in Brazil pointing out the contribution and originality of the results. However, there are relevant sectional studies, such as that of Furlan and collaborators,³¹ investigating the nutritional diagnosis of 52 pregnant women receiving health care at community health centers in the northern region of Rio Grande do Sul, in 2018. This study reported 30.8% overweight and 28.8% obesity, adding up to 59.6%

prevalence of excess weight in pregnant women. In the same year, the present study found prevalence of 55.8%.

The study by Silva and collaborators,³² with 298 mothers admitted to a maternity hospital in Joinville-SC between May and June 2013, found 28.1% (n = 84) of overweight and 17.8% (n = 53) of obesity, adding up to 45.9% prevalence of excess weight. In the same year, Shub and collaborators³³ found prevalence of 50.0% of pregnant women with excess weight. The present study found prevalence of 48.8% in 2013 - a similar result to that of the studies mentioned above.

Nunes,¹³ in a cross-sectional study with 3,405 postnatal women from the Southeast Region, using data from a national cohort between 2011 and 2012, with a hospital basis called "Born in Brazil: national survey on childbirth and birth", found about 31.0% of women with excess pre-gestational weight (overweight and obesity).

Nucci and collaborators¹⁰ found prevalence of 24.7% in pregnant women using the Unified Health System (SUS) in six Brazilian capitals between 1991 and 1995, while Fonseca and collaborators³⁴ found 34.7% of pre-pregnancy excess weight and 36.9% of excess weight gain in pregnant women hospitalized for delivery in Jundiaí-SP.

The only study found in Macaé, carried out by Diniz and collaborators³⁵ in a public referral hospital in the city, in the second half of 2014, detected 41.7% of excess weight mothers at the beginning of pregnancy (15.6% overweight and 26.1% obesity) and 34.8% excess weight gain during pregnancy.

The findings point to a worrying scenario of overweight, both in pregnant women from different regions of Brazil and in Macaé. One hypothesis raised was about women's self-perception of their body image during pregnancy. Pires and collaborators,²¹ in a study conducted with pregnant women with nutritional diagnosis of excess weight and receiving PHC at two community health centers in the city of Macaé in 2017, found that the interviewees had "naturalized" and "accepted" their excess gestational weight, owing to their pregnancy status and in favor of their baby's health.

In this field, the study of Shub and collaborators³³ showed that 24.0% of pregnant women identified themselves as having excess weight, that is, most of them considered their weight to be normal.³⁰ This result corroborates the socio-cultural constructions that encourage the naturalization of excess weight and inappropriate eating practices during pregnancy, in addition to non-adherence and lack of continuity of prenatal nutritional care.^{21,22}

In this sense, monitoring of nutritional status is essential in women of childbearing age, since excess weight is also found in the pre-pregnancy period and aggravated during pregnancy by unsafe eating practices in terms of quality and quantity.^{4,9,22} The addition of several meals throughout the day, justified by the increase in nutritional needs ("eating for two") and emotional factors ("cravings"), permeates the daily lives of pregnant women and is encouraged by their partners and family members.²¹

The use of data from Sisvan Web is an important tool for Food and Nutrition Surveillance, and fundamental for the design and evaluation of public policies on food and nutrition, and the organization of nutritional care in all stages of life, including pregnancy.^{27,37} However, some limitations must be considered in the analysis of consolidated secondary data. For example, quality of the recorded data (lack of standardization in collection and typing);³⁸ absence of information for some parameters relevant to the analysis of interest (maternal age, pre-gestational weight, parity and gestational week at the time of body measurements, for example)²⁷ and variation in data coverage over time.³⁹⁻⁴²

In this perspective, variation in the coverage of follow-up over the years can be mentioned as a limitation of the study. Vulnerable employment relationships and high turnover of PHC teams, especially in 2015, decreased the coverage of the Food and Nutrition Surveillance in the city of Macaé.⁴² Rolim and collaborators⁴³ reported a similar finding. However, despite the aforementioned limitations, the low cost of data collection and the possibility of temporal analysis of the information^{36,40} are advantages when Sisvan's consolidated reports are used.^{40,41,43}

Given the increasing importance of the information produced by the Health Information Systems, they cannot, therefore, be neglected by their managers. Also, efforts should be made to enhance the quality of this information and improve health indicators, especially in the scope of Food and Nutrition.^{27,40-44}

In addition, it should be noted that obesity has been an important object of intervention in the field of public policies in Brazil, with emphasis on the National Food and Nutrition Policy (published in 1999 and revised in 2012). Through its guidelines within the scope of SUS, and the Health Care Network for People with Chronic Diseases, this policy has sought to reorganize and advise initiatives aimed at prevention and treatment of chronic diseases in the population.⁴⁵

In the field of Maternal Health, the 4th edition of Caderneta da Gestante ("Pregnant Women' Booklet") was published in 2018 by the Ministry of Health.⁴⁶ It is an important instrument for monitoring prenatal care, and its objectives include nutritional monitoring, especially monitoring of gestational weight gain. It is part of Rede Cegonha,⁴⁷ whose purpose is to implement a health care network to ensure that all Brazilian women have the right to reproductive planning and humanized care during pregnancy, childbirth and the postnatal period, abortion and to children under two years old, as well as to structure and organize maternal health care in Brazil.

However, this entire structure needs improvements, ranging from awareness and professional qualification, to the production of reliable data³⁸ for feeding the Sisvan database. While using such information,³⁷⁻⁴⁰ managers must seek solutions and support actions to deal with the obesity/pregnancy factor, which is a serious problem in our society and has a negative impact on the health of women and their conceptus. They should also increase investments to help reorganize health services, with regard to health care network and lines,⁴⁵ as well as to improve prenatal care services, on the basis of actions by the Ministry of Health, such as Rede Cegonha.

CONCLUSION

In this study, the findings show the high and growing prevalence of excess weight in pregnant women receiving Primary Health Care in the city of Macaé. Actions and strategies need to be devised in the field of public policies to help mothers, who are exposed to different factors relative to weight gain and excess weight, with a view to reversing the scenario experienced by pregnant women in that municipality.

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Contributors

Pires CC and Capelli JCS participated in the project design, analysis, data interpretation, writing and critical review of the article. Carmo CN participated in the analysis, data interpretation and critical review of the article. Carvalho MF, Lima FF, Monteiro LS, Sperandio N and Pereira S participated in data interpretation, article writing and critical review of the article. All authors approved the final version to be published and are responsible for all aspects of the work in ensuring the accuracy and integrity of any part of the work.

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