Research Article

Influence of Excessive Maternal Weight in Pregnancy on Mother's and Newborn Health

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Abstract

Excessive weight gain during pregnancy is associated with higher risks of complications in the mother and in the newborn. We carried out this work, the objective of which was to study the influence of excessive maternal weight gain during pregnancy. This was a prospective study carried out in Dakar over a period of 5 months. We included all women with a normal body mass index in early pregnancy. These parturients were divided into two groups: the first group consisted of women whose weight gain during pregnancy was normal between 11.5 and 16 kg and the second group were those who had an excessive weight gain greater than 16 kg. We analyzed maternal data and neonatal parameters. During the period, 194 women had a normal weight gain (PNP) and 104 an excessive weight gain (PEP), i.e., a prevalence of PEP of 10.5%. There were no differences in the two groups for marital status, geographic origin, level of education, drinking habits, maternal size and pathologies during pregnancy ($p>0.05$). On the other hand, maternal age, parity and absence of a professional activity were significantly associated with excessive weight gain during pregnancy. Regarding neonatal data, we did not note any significant difference with regard to gender, trophicity, Apgar score, stillbirth, postnatal transfer and neonatal mortality between the 2 groups.

Keywords: Weight; Pregnancy; Newborn; Mother; Dakar

1. Introduction

Pregnancy is a period when significant changes are observed in all the body's systems with an increase in the basal metabolism necessary for fetal growth. The main consequence of all these changes is an increase in maternal weight gain observed during the gestational period [1]. Many other factors also influence weight gain such as environment in favor of obesity, pre-pregnancy body mass index (BMI), age, parity, smoking, socio-economic status and co-morbid conditions [2-3]. In 1990, the Institute of Medicine (IOM; now known as the National Academy of Medicine) offered recommendations for optimal weight gain during pregnancy. These guidelines were updated in 2009 to incorporate World Health Organization (WHO) criteria for maternal BMI and recommended less gestational weight gain for women with obesity [4]. Excessive weight gain (EWG) is associated with higher risks of complications, including the occurrence of premature birth, macrosomia, perinatal asphyxia, cesarean delivery, stillbirth, neonatal referral and neonatal death [5-7]. Few studies have specifically investigated the effects of excessive weight gain in a population of patients of normal weight before pregnancy [8, 9]. In Sub-Saharan Africa, this subject remains very poorly documented. We therefore found it interesting to study the influence of excess weight gain during pregnancy on the mother and newborn in women with a normal body mass index before pregnancy.

2. Methodology

This was a prospective comparative, descriptive and analytical study carried out in the maternity and neonatal departments of the Abass Ndao hospital center. This university hospital center is a level III reference structure. With a capacity of 65 beds, the maternity department performs an average of 3,500 deliveries per year and the neonatal department receives an average of 1,500 newborns per year. The study took place over a period of five (5) months from November 1, 2016 to March 31, 2017.

The study population consisted of parturients received in the maternity department of the Abass Ndao hospital during the period of the study and who met the inclusion criteria. We included all women with a normal BMI in early pregnancy. These parturients were divided into two groups: The first group consisted of women whose pregnancy weight gain was normal between 11.5 and 16 kg. The second group were those who had excessive weight gain greater than 16 kg. They focused on socio-demographic parameters, namely maternal age, marital status, geographical origin, professional activity, level of education, consumption habits (tea, tobacco), anthropometric and obstetric parameters which are parity, size, pathologies observed during pregnancy (malaria, arterial hypertension, pre-eclampsia, diabetes, urinary tract infections, retroplacental hematoma (HRP), anemia, placenta previa) and finally on the parameters of the newborn consisting of the sex, trophicity, Apgar score at 5 minutes, transfer to neonatology, stillbirth and neonatal death. The maternal age considered was that calculated at childbirth. Maternal height was subdivided into two groups: women who were <150 cm tall and those who were ≥ 150 cm tall. The patients were questioned during the first consultation on their weight before pregnancy; when she didn't know him; the weight of the first prenatal consultation made before the end of the first trimester (before the 12th week of amenorrhea) was collected in the follow-up log.

The BMI was calculated from the Quételet formula [BMI = P (kg) / T (m²)]; Parturients with a BMI between 18.5 and 24.9 kg/m² were considered normal. Weight gain was considered normal when it was between 11, 50 and 16 kg and excessive beyond. Data were collected and analyzed with SPSS software version 17.0. Quantitative variables were given

according to the mean ± the standard deviation with the number of cases. Qualitative variables were given with number and percentage for each category. Statistical comparisons made use of the chi-square test or Fisher's exact test for small samples for percentages. For comparisons of means, Student's t test was used. The differences were considered significant when p was <0.05.

3. Results

During the period of our study, 983 women gave birth in the maternity ward of the Abass NDAO hospital center. Among these parturients, we were able to determine the BMI in 500 parturients. Three hundred and four (304) of them had a normal body mass index in early pregnancy BMI between 18.5 and 24.9 with an incidence of 60.8%. According to our inclusion criteria in the two groups, 194 had a normal weight gain (NWG) and 104 an excessive weight gain (EWG), that is to say a prevalence of NWG of 10.5% compared to the total number of deliveries. Maternal socio-demographic and obstetrical characteristics are reported in Tables 1 and 2. There were no differences in the two groups for marital status, geographic origin, level of education, consumption habits, maternal size and pathologies during pregnancy (p>0.05). On the other hand, maternal age and parity of absence from a professional activity were significantly associated with excessive weight gain during pregnancy. Regarding neonatal data, we did not note any significant difference with regard to sex, trophicity, Apgar score, stillbirth, postnatal transfer and neonatal mortality between the 2 groups (Table 3).

Characteristics	**EWG** **n = 110**	**NWG** **n = 194**	**P**
Maternal age			
<20 years	11 (10)	52 (26.8)	**0.0005**
20 - 35 years	13 (11.8)	31 (16)	NS
> 35 years old	86 (78.2)	111 (57.2)	**0.0002**
Marital status			
Brides	107 (97.3)	178 (91.8)	NS
Single	3 (2.7)	16 (8.2)	
Geographic origin			
Urban	28 (25.5)	66 (34)	NS
Suburban	81 (73.6)	127 (65.5)	NS
rural	1 (0.9)	1 (0.5)	NS
Educational level			
Educated	82 (74.5)	136 (70.1)	NS
Not educated	28 (25.4)	58 (29.8)	
Professional activity			
Yes	39 (35.5)	46 (23.7)	**0.028**
No	71 (64.5)	148 (76.3)	
Spending habits			

Tea	90 (81.8)	60 (82.5)	NS
Tobacco	0	0	

EWG: excessive weight gain; NWG: normal weight gain; NS: not significative

Table 1: General maternal characteristics.

Characteristics	**EWG** **n = 110 (%)**	**NWG** **n = 194 (%)**	**P**
Parity			
Primiparous	35 (31.8)	91 (46.9)	**0.01**
Multiparous	75 (68.2)	103 (53.1)	
Maternal height			
<150cm	6 (5.5)	8 (4.4)	NS
≥ 150cm	104 (94.5)	186 (95.9)	
Pathologies during pregnancy			
Pregnancy hypertension	5 (4.5)	12 (6.2)	NS
Preeclamsia / Eclampsia	8 (7.3)	9 (4.6)	NS
TPB	6 (5.5)	7 (3.6)	NS
RPH	1 (0.9)	2 (1)	NS
Gestational Diabetes	1 (0.9)	1 (0.5)	NS
Malaria	16 (14.5)	31 (16)	NS
Anemia	13 (11.8)	25 (12.9)	NS

EWG: excessive weight gain; NWG: normal weight gain; RPH: retroplacental hematoma; Hypertension: arterial hypertension; TPB: threat of premature birth

Table 2: General characteristics of pregnancy.

Characteristics	**EWG** **n = 110 (%)**	**NWG** **n = 194 (%)**	**P**
Sex			
Male	57 (51.8)	102 (52.6)	NS
Feminine	53 (48.2)	92 (47.4)	NS
Trophicity			
Hypotrophicity	22 (20)	26 (13.5)	NS
Normal	77 (70)	153 (79)	NS
Macrosoma	11 (10)	14 (7.3)	NS
Apgar at 5 minutes			
<7	5 (4.5)	18 (9.3)	NS

≥ 7	105 (95.5)	176 (90.7)	NS
Stillbirth	4 (3.6)	11 (5.7)	NS
Neonatal transfer	39 (36.8)	52 (28.6)	NS
Neonatal death	1 (0.9)	2 (1.1)	NS

EWG: excessive weight gain; NWG: normal weight gain

Table 3: Neonatal characteristics.

4. Discussion

In our study, we had an estimated prevalence of excessive weight gain of 10.5%. Our results are superior to those of Deruelle et al. in France who had a prevalence of excessive weight gain at 4% [10]. Moreover, they are vastly inferior to those of Christ W et al from 1997-2000 which were estimated at 39.09% [11]. We found that women under the age of 20 and those aged 35 and over had significantly more excess weight. These observations are in line with those of Deruelle P et al. who noted that the youngest women had the highest weight gains [10]. Moreover, women aged 35 and over are usually described as being at greater risk of excessive weight gain during pregnancy [12]. The significant influence of marital status on the weight gain found in our work is not reported in most of the work. However, the hypothesis that single mothers are mostly first-time mothers could be raised. Thus, by making a correlation, we noticed that the "married" multiparas compared to the "single" first-time mothers had a higher excess weight gain (68.2% vs. 31.8%). The results of Chris W. [11] approach in the same direction with an excessive weight gain more frequent in large multiparas. Our results are different from those of Naviliat Audrey who, in his population, found a predominance of primiparas and second pares [13]. Otherwise, the excessive weight gain noted in women without professional activity is reported by several studies. Indeed, Valat in his work found that women who did not work were generally sedentary and bored a lot. Thus, to overcome their boredom, they tended to snack more often and this situation was then a factor of excessive weight gain [14]. Regarding the complications of pregnancy, we found no relationship between the occurrence of complications with excessive weight gain. Our results are different from those of previous studies which found a risk of the occurrence of more important maternal vascular complications in the event of excessive weight gain [1, 15]. Regarding newborns, there was no significant difference between children born to mothers with normal weight gain and those with excessive weight gain ($p>0.05$). However, in a systematic review, the authors reported that gestational weight gain beyond recommendations was associated with low risk of intrauterine growth retardation and preterm delivery, but a higher risk of macrosomia and birth by caesarean section regardless of BMI [16]. Nevertheless, Ndiaye et al in their work on the influence of excess maternal weight on birth weight showed a weak influence of pre-gestational maternal corpulence on the weight of newborns from normal pregnancies [17]. In addition, weight gain did not influence the stillbirth rate in our work. Wiswanathan et al. [18] analyzed three studies that looked at the association between maternal weight gain and infant mortality. They suggest that there was a protective effect of weight gain on perinatal mortality but not on stillbirth.

5. Conclusion

The excess weight gain in women with a normal BMI in early pregnancy is not very important. It is especially

linked to maternal age, parity and lack of activities. It has no influence on the course of pregnancy or on the health of the newborn.

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