



## Feeding practices in the first 6 months after delivery: Effects of gestational hypertension



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### ABSTRACT

**Objective:** To identify the effects of gestational hypertension on feeding practices in the first 6 months after delivery.

**Study design:** A prospective cohort study enrolling 168 mother-newborn pairs (Gestational hypertension group  $n = 42$ , Normotensive group  $n = 124$ ). The gestational hypertension diagnosis criteria was established as a systolic pressure of  $\geq 140$  mmHg or a diastolic pressure of  $\geq 90$  mmHg after 20 weeks of gestation, while its severity was categorized according to blood pressure, proteinuria, clinical and laboratory analysis. Demographic, clinical and social information were collected from the patient's medical records. In order to collect information about the newborn's feeding practices and possible difficulties in breastfeeding the mothers were interviewed via telephone 30, 60, 120 and 180 days after delivery.

**Main outcome measures:** Feeding practices (eg. exclusive breastfeeding, predominant breastfeeding, complementary breastfeeding and bottle-feeding) within the first 6 months after delivery.

**Results:** The mothers with Gestational hypertension displayed greater difficulties in maintaining exclusive breastfeeding over time, when compared to normotensive mothers. There was a greater introduction of milk formulas in the group of women with gestational hypertension, and they presented greater difficulties in maintaining exclusive breastfeeding over time when compared to the group of normotensive mothers at hospital admission ( $p \leq 0,0001$ ). The group with gestational hypertension reported higher frequencies of predominant breastfeeding practices and presented shorter durations of breastfeeding after 6 months after delivery.

**Conclusions:** Women with gestational hypertension are at risk of using complementary breastfeeding and breastfeeding for shorter durations.

### 1. Introduction

Breastfeeding is recognized worldwide as the best method of nutrition for infants [1]. It is proven to give nutritional health benefits to the child, as well as in the brain [2], cognitive [3], neurological, immune [4], psychological [4] development, increased intellectual quotient [5,6], the formation of bonds between mother and baby [7], among others. To this end, exclusive breastfeeding is recommended up to the sixth month of the baby's life and after this period of time, to continue complementary breastfeeding until the child is two years old or older [8].

The World Health Organization (WHO) defines breastfeeding in

categories as: Exclusive breastfeeding that involves only maternal human breast milk direct from the breast or expressed from the breast with no other liquids or solids, except drops or syrups containing vitamins, mineral supplements or medicines; Predominant breastfeeding: human breast milk predominates, but the child may receive water or water-based drinks, fruit juices, oral rehydration salts solution, drops or syrups of vitamins, minerals and medicines; Breastfeeding: the child receives human milk (straight from the breast or pumped); Complementary breastfeeding: the child receives breast milk and other foods or liquids, solids and semi-solids including non-human milk and formula; Bottle-feeding: any liquid including breast milk or semi-solid food from a bottle with nipple/teat or any food, liquid including non-

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human milk and formula [8].

Despite the benefits, only 35% of infants worldwide are exclusively breastfed until the fourth month of life [7]. Early weaning occurs due to multiple factors, such as low socio-economic conditions [9] low levels of schooling, psychosocial problems [10,11], postpartum depression [12,13] and working mothers [14]. However, there are very few studies that address the theme of breastfeeding in the maternal population with gestational hypertension and its complications which can affect 6–8% of pregnant women [15]. Gestational hypertension is one of the most serious diseases specific to pregnancy, increasing the maternal and perinatal morbidity and mortality rate, and represents a serious public health problem [15].

Preeclampsia is characterized by hypertension, proteinuria and edema, potentially leading to intra-uterine growth restriction and preterm birth [16]. Women with preeclampsia have a higher difficulty starting breastfeeding than normotensive women who have recently given birth [17]. It is possible that this condition is associated with prematurity, premature separation of the newborn and disease comorbidities [18,19].

Considering that gestational hypertension needs to be better understood in relation to its repercussions in exclusive breastfeeding, this study aims to identify the associations of gestational hypertension with the interruption of exclusive breastfeeding in the first 6 months of life.

## 2. Methods

A prospective cohort study conducted in a large teaching hospital located in Canoas, in the metropolitan region of Porto Alegre, in the south of Brazil. The sample consisted of new mothers diagnosed with gestational hypertension, the controls (normotensive new mothers), and their newborns, admitted to the maternity ward in the study period, from January 4th 2015 to January 10th 2017. For this, women who had recently given birth and who had a diagnosis of gestational hypertension, preeclampsia, superimposed, preeclampsia or chronic hypertension, eclampsia and HELLP, over 20 weeks of gestation and the control group (normotensive with gestational age paired) and their newborns (admitted in the Rooming-in and Neonatal Intensive Care Unit) were included. New mothers under 18 years age, with a diagnosis of fetal malformation, dead fetus, diagnosed with psychiatric illness and human immunodeficiency virus positive women or who had another reason for the absolute contraindication to breastfeeding were excluded from the study population. Due to problems with prenatal records and lack of information, such as gestational age due to menstruation or ultrasound, it was decided to maintain gestational age according to the Capurro evaluation.

The diagnosis of gestational hypertension was considered with a systolic blood pressure level of 140 mmHg and/or a diastolic blood pressure level of 90 mmHg or higher, after 20 weeks of gestation, the diagnosis and the severity of the disease was based on the blood pressure levels, proteinuria, clinical and laboratory findings, according to the criteria established by the International Society for the Study of Hypertension in Pregnancy (ISSHP), classified as preeclampsia categorized by changes in blood pressure and the presence of proteinuria; when severe preeclampsia when diastolic blood pressure mmHg systolic  $\geq 110$  mmHg or systolic  $\geq 160$  mmHg; proteinuria equal/higher than 3,0 g in 24 h or 3+ in urinary tape; oliguria; serum creatinine levels higher than 1,2 mg/dL; signs of hypertensive encephalopathy; epigastric or right hypochondrium pain; clinical and/or laboratory coagulopathy evidence; thrombocytopenia ( $< 150,000$ /dL); elevated liver enzymes and bilirubin. Preeclampsia together with chronic hypertension: characterized by the emergence of preeclampsia in women with chronic hypertension. Eclampsia: with the presence of tonic-clonic seizures; HELLP, characterized by hemolysis, elevated liver enzymes and thrombocytopenia and White coat hypertension when blood pressure in the clinic or office is recorded by a nurse rather than by a physician, preferably using repeated blood pressure reading [20].

The gestational age was adjusted for the cases of newborns who, due to medical indication, received nothing orally or used other feeding practices without sucking the breast. When the mother was allowed to breastfeed their newborn again, the age was adjusted.

The sample calculation was performed with the use of the WINPEPI (PEPI for Windows) program. For a difference of 5% and a power of 80%, considering a prevalence of 7.5% of preeclampsia found previously by Gaio et al. (2001) [21] in the Brazilian population; the sample size was calculated to contain 160 participants, 40 recent mothers with preeclampsia and 120 without preeclampsia.

The main outcome measure was the conditions of breastfeeding and newborn feeding during hospitalization and a 6 month follow-up period after birth, collected through a form which was developed to evaluate the practices of breastfeeding and feeding of the baby.

In Rooming-in, the mothers were informed about the research, and were asked for their authorization. The selection of the mothers and newborn medical records was done by convenience sample, in accordance with the criteria, including gestational age paired samples. The access to the selected records occurred from the patient care records through electronic consultation. After hospital discharge, telephone contact was made with the mother during the baby's first 30 days, 60 days, 120 days and 180 days, with the objective of following the child's feeding habits and possible breastfeeding difficulties. The collected information was recorded in the data collection form and inserted in an Excel program database. The data were collected by the researchers after training in a pilot project.

In data analysis, continuous variables were expressed as averages  $\pm$  standard deviation of the mean (SD) or medians (md) and 95% confidence intervals (CI 95%, upper and lower limits), defined by Shapiro-Wilk's normality test. Categorical variables were described by absolute frequencies ( $n$ ) and ( $n\%$ ). The comparative analysis between continuous variables were performed by the Student  $t$  test for independent variables or by the Mann-Whitney test, where applicable. To evaluate the relation between categorical variables, the Pearson's Chi-square test was applied. In case of statistical significance, the standardized residuals test was adopted. The Pearson Chi-square test with residual adjustment was used to evaluate the association between categorical variables and Generalized Estimates Equation (GEE) analysis considering time (30, 60, 120 and 180 days) and groups (hypertensive and normotensive) in relation to practices of breastfeeding (exclusive, predominant, complementary and bottle-feeding). The Poisson regression models, for each time measurement (30, 60, 120 and 180 days after delivery), included the following variables: mode of delivery (vaginal or cesarean), parity, gestational age, and maternal hypertension categories (normotensive or hypertensive).

To assist the analysis, we used the SPSS software, version 18.0, and the statistical significance was set at 5% ( $p \leq 0.05$ ) for all the analyses.

Maternal parameters were characterized in Tables 1 and 2 and perinatal variables, in Tables 3 and 4.

For this study, the ethical issues set out in Brazilian Ministerial Resolution No. 466/2012 were considered, which deals with research on humans [22]. The survey was conducted after the approval of the ethics and Research Committee (CEP) of the Hospital Mãe de Deus under the opinion paragraph 756160.

## 3. Results

Women ( $N = 286$ ) were submitted to an initial assessment. 118 out of the 286 did not meet the inclusion criteria or ceased participation in the study because of the impossibility of contact. Therefore, the sample was composed of 168 women, namely, 126 normotensive women and 42 hypertensive women (Supplemental Fig. 1).

In the studied population, there was a predominance of white women (74.4%), with completed high school education (38.1%), multiparous, mostly belonging to the normotensive group (62.7%), ( $p \leq 0.009$ ), with vaginal birth being the most frequently performed in

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