Obesity Research & Clinical Practice (2017) 11, 276—286

ORIGINAL ARTICLE

Relationship between dairy product intake during pregnancy and neonatal and maternal outcomes among Portuguese women

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Received 22 March 2016; received in revised form 28 June 2016; accepted 4 July 2016

KEYWORDS
Dairy product intake;
Pregnancy;
Neonatal outcomes;
Maternal outcomes

Summary
Background: The role played by dairy product intake during pregnancy on neonatal outcomes has raised interest in the last few years. However, studies on this association remain scarce. Thus, the aim of this study was to determine the association between dairy product consumption during pregnancy and neonatal and maternal outcomes.
Methods: A prospective study was conducted with 98 pregnant women, aged 18—40, from the city of Porto, Portugal. Socio-demographic and lifestyle characteristics were assessed through a questionnaire. Dairy product consumption was assessed with a three-day food diary completed during the first and second trimesters. Postpartum medical records were examined for neonatal and maternal outcomes. Multivariate linear regression analyses were performed to assess the association between dairy intake and neonatal and maternal outcomes, adjusting for dietary variables and maternal characteristics.

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http://dx.doi.org/10.1016/j.orcp.2016.07.001

Results: Compared to the first trimester pregnant women had higher energy intake and lower calcium, iodine and yogurt intake in the second trimester ($P < 0.05$). Total dairy and yogurt intake in the first trimester were positively associated with head circumference and placental weight (respectively $\beta = 0.002$, $P = 0.014$, $\beta = 0.333$, $P = 0.012$). Change in total dairy intake between the second and first trimester was negatively associated with maternal weight gain during pregnancy ($\beta = -0.007$, $P = 0.020$).
Conclusion: The findings of this study suggest that dairy product intake during pregnancy may have an effect on neonatal head circumference, placental weight, and gestational weight gain.

Introduction

Adequate maternal dietary intake ensures optimal nutritional needs to reach normal fetal growth and development. Therefore during pregnancy a balanced diet is recommended and should include plenty of complex carbohydrates, fruits and vegetables, moderate consumption of dairy products and protein, and limited amounts of low-nutrient, energy-dense foods [1]. Findings from the Auckland Birthweight Collaborative study have shown that women with higher scores on the ''traditional'' food pattern (characterised by fruit, vegetables, peas/maize, dairy food/yogurt and water) in early pregnancy were less likely to deliver a small-for-gestational-age baby [2]. Accordingly, it has been described that improved maternal diet quality reduces the risk of fetal growth restriction [3] and preterm birth [4]. On the other hand, a recent randomised controlled efficacy trial showed that women's dietary micronutrient quality improvement, achieved through a daily snack providing additional green leafy vegetables, fruit, and milk, before conception and throughout pregnancy had no overall effect on birth weight [5].

Dairy products likely contribute to dietary quality [6] during pregnancy, as they are an important source of high-quality protein, magnesium, vitamin B12, zinc, riboflavin, and calcium. In the last decades, the effect of dairy products, especially milk, on health has raised public health awareness. Evidence from a recent non-systematic review reported that milk consumption during pregnancy increases gestational weight gain, placental, fetal, and birth weight and the authors suggest that dietary recommendations for milk consumption during pregnancy have to be re-evaluated [7].

Furthermore, although evidence from prospective studies is limited, it seems that moderate milk consumption relative to no or very low intake is positively associated with fetal growth and infant birth weight in healthy Western populations [8]. On the other hand, higher intake of total dairy products, cheese, yogurt, and calcium during pregnancy may reduce the risk of infantile allergic disorders [9]. Therefore, the effect of dairy product consumption during pregnancy on neonatal and maternal outcomes still remains unknown. Additionally, little is known about the effect of changes in dairy consumption during pregnancy as well as in isolate trimesters on neonatal and maternal outcomes.

The study of neonatal outcomes, such as birth weight, length, and head circumference, is important since these latter have been considered reliable indicators of fetal growth and health later in life [10—13]. Likewise, placental weight has been correlated to adverse outcomes such as stillbirth, neonatal death, low Apgar score, seizures, or respiratory morbidity [14]. Another important indicator is gestational weight gain, which has also been associated with women's future health and offspring health [15].

Thus, the study aims to determine the association between dairy product intake during pregnancy and neonatal and maternal outcomes.

Materials and methods

Sampling

Data for this study came from a prospective study of pregnant women attending outpatient obstetrics clinics at São João Hospital in Porto, Portugal. Women were invited to participate when they came in for their first ultrasound evaluation screening. The recruitment was made consecutively from July 2010 to May 2012. From those who agreed to participate, data were collected in the first trimester between the tenth and twelfth weeks of gestation (at the time of baseline assessment), in the second trimester between the twentieth and twenty-second weeks (at the time of the second ultrasound) and again in the immediate