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SHORT REVIEW

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Sugar consumption during pregnancy: what are the consequences for mother and child?

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Introduction

Found in fruits and vegetables, fructose is an important low glycemic index carbohydrate. For this reason, the food industry has increasingly explored the creation of products with the addition of fructose as an alternative for those aspiring for weight reduction or control. However, high fructose intake by pregnant women has been associated with the presence of metabolic syndromes during pregnancy, which may result in changes in fetal homeostasis, interfering with its development, and also leading to persistent physiological changes such as chronic diseases in adulthood. It can be observed that the theme is an important public health problem [1].

The metabolism of fructose takes place in the liver, where it will be converted into glucose and other substrates where it will later be released into the bloodstream. Unlike glucose, fructose has an enzyme with no negative feedback that allows all fructose to be ingested and metabolized. Thus, during this process there is degradation of adenosine triphosphate (ATP) and consequently an increase in adenosine monophosphate (AMP), with this imbalance being the main responsible for most of the deleterious effects. In addition, it is known that the formation of excess AMP contributes to the generation of uric acid, which can lead to oxidative stress, cell dysfunction and the reduction of an important anti-inflammatory factor, which is fundamental for the development of metabolic syndromes [2,3].

Therefore, this study aimed to analyze the current scientific literature on the effects of high consumption of sugars such as fructose and glucose by pregnant women and their influence on fetal development and the long-term results for the offspring.

Methods

This is a systematic literature review based on the following scientific question: What are the consequences of high sugar intake during pregnancy and after birth? Articles selected for the study had to meet the following eligibility criteria: (1) be published in a national or international journal; (2) be in the period from 2000 to 2021; (3) be available free of charge in full. Articles that did not answer the scientific question proposed by the study were excluded. The articles were searched by the Scielo, PUBMED and Academic Google platforms. The keywords were used: pregnancy, glucose, effects, fructose.

Results and Discussion

A total of n=1425 articles were found, with n=235 from the PubMed platform, n=1190 from the google academic platform and n=0 from the Scielo platform. Of the articles that met the inclusion criteria, n=1154 were found in total, of these only n=1110 were from Google Academic, and n=44 from PubMed. From these articles, n=12 (PubMed n=10; google academic n=2) were used in this review. The other 1143 publications were not used and 271 publications did not meet the eligibility criteria. Knowing that fetal supplementation is done through the placenta and that the amount of fructose ingested by the pregnant woman, both during pregnancy and during breastfeeding, has had direct consequences on the fetus and its development into adulthood. There is also evidence that, regardless of gestational weight gain and/or obesity, excessive sugar consumption during pregnancy is associated with pregnancy complications.

Of the various types of sugar, fructose is believed to be particularly harmful [2,4,6]. For example, consumption of >5 sugar-sweetened cola sodas per week increased the risk of gestational diabetes by 22%. Note that this study did not include a juice test in the analysis, and the results were very specific for sugar-sweetened cola drinks in particular [3,4,6]. Another study also examined the relationship between sugar-sweetened soft drink consumption before pregnancy and future risk of GDM and found a positive association that persisted even after controlling for potential confounders, including family history of diabetes, BMI, total intake. of energy and fiber intake [3,6]. Among the conclusions analyzed, it was possible to observe that the increase in fructose in fetal circulation is related to changes in the maternal uterine endometrium wall in relation to low hormone production, and coexisting with a relationship with fetal hyperinsulinemia due to changes in cell function -β from the offspring pancreas.

This, consequently, contributes to glucose and insulin intolerance, with subsequent metabolic changes in offspring who are likely to be obese. Furthermore, insulin resistance contributes to the emergence of some diseases in pregnant women, such as: pre-eclampsia and gestational diabetes, which can trigger seizures, abortion, premature birth, fetal malformations and obesity [3]. In addition to the changes in the functioning of the endocrine system already mentioned, some research suggests that a child's taste preferences are formed even inside the mother's uterus, interfered by the mother's diet. Therefore, if during pregnancy the pregnant woman had a diet based on excess sugars such as fructose, this may interfere in the future with the quality of the child's diet, in addition to further increasing the chances of progressing to childhood obesity [4].

Another no less relevant concern is the discovery of excess fructose during pregnancy and its relationship with the airways. With the increase of fructose in the fetal circulation, pulmonary restriction occurs. The mechanisms behind this event are not known for sure, but what is known is that there is a relationship to nitric oxide and the increase in oxo-nitrosative stress, which can influence the triggering of bronchiolitis and promote the evolution to asthma, among others lower airway pathologies [5]. Furthermore, sugar consumption, during pregnancy and in childhood, can negatively contribute to the child's cognition, affecting areas responsible for motor, spatial and visual abilities in the middle of childhood. Furthermore, a wealth of animal evidence supports these findings about adverse cognitive effects. However, the adequate consumption of fruits and healthy eating prevents adverse effects, being related to improvements in the child's cognition [6].

Conclusion

Knowing the various negative effects already mentioned, such as: obstetric emergencies, obesity, fetal airway compromise, chronic diseases, and childhood cognitive impairment, current studies have warned us about the exacerbated consumption of sugars, above 25g/day (recommended by the Organization Health), reinforcing the importance of a controlled and balanced diet containing adequate varieties of nutrients, without excesses, being a determining factor for the benefit not only of the mother but also of her child during fetal development until adulthood.

Keywords: Sugar Consumption. Pregnancy. Fructose. Glucose.

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Data sharing statement

No additional data are available.

Conflict of interest

The authors declare no conflict of interest.

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