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Ingestion of cow's milk and in lactose tolerance-eating habits in university students

Abstract

Objective: Milk consuming has decreased drastically in all the world during the last decades. The objective of this study was to investigate the average consumption of milk in Brazilian university students.

Methods: Descriptive, cross-sectional, observational and prospective study involving undergraduate medical students. An online questionnaire was submitted by the Undergraduate Teaching Committe to 312 students. Questions regarding age, gender, frequency and amount of whole milk intake and of lactose-free milk and non-lactose derivatives, and bowel movements and fecal appearance (Bristol Scale) were included. We analysed consuming frequencies according to age, gender and adequacy to Health Ministry recommendation.

Results: 312 students sent their answers, age range 16-48years, 80.5% ≤24years, 57% women. 72% reported consumption of whole milk and about 50% consumption of ≥250ml a day, 11% ingested milk without lactose and 17% reported not ingesting milk. Among non-consumers, 32% consumed dairy products daily, 35% sporadically and 17% did not ingest milk or dairy products. 70% informed daily bowel habit, 24% 3x/week and 6%≤3x/week (68% women). Regarding to faecal aspect, 50% considered Bristol 3, and of these, 72% consumed milk with lactose. 11% described their stools as softened to diarrhea, with 46% of them failing to ingest or ingest lactose-free milk, 40% indicated hard to pass.

Conclusions: Milk consumption lower than dietary recommendations was observed in 30% of the students. Women over the age of 24 represented the demographic profile with the lowest percentages of milk consumption.

Keywords: lactose intolerance, cow's milk, dairy, lactose-intolerant, lactose-free milk

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Introduction

Ingestion of milk is critical for human infants, providing essential energy, protein and micronutrient requirements to ensure anthropometric growth, development of cognitive and perceptive functions and bone mass formation1. In the adult diet, milk is not an essential food, but its nutritional importance can be attested by epidemiological studies whose levels of evidence allow us to recommend its consumption for the prevention of chronic cardiovascular diseases, some forms of cancer, obesity, diabetes and bone mass composition disorders.[1–6] It is possible that there is a reduction in the consumption of milk by the population assessed, and it is worrying that young people will replace this form of diet with industrialised juices, soft drinks, etc. Low milk consumption can have a negative impact on bone health, since calcium is essential during the growth and development phases of muscle, skeletal and endocrine. One of the possible reasons has been concern about lactose intolerance.

Lactose is the sugar present in mammalian milk, its chemical characteristics of solubility make it ideal for the synthesis and secretion of milk, contributing to the energy supply without adding osmotic charge, a characteristic necessary to facilitate tolerance in neonates and infants.[7] Its ingestion enhances the absorption of calcium, phosphate, magnesium and manganese in animals and humans.[8]

The curve of lactase production throughout the life of mammals has a characteristic profile, the concentrations are maximum in the term newborn and show a progressive decline from the time of weaning, reaching minimum levels in adults.[9] In the human population, about 70% of individuals show this decline in the synthesis.[10] The symptoms of lactose intolerance are not directly related to levels of enzyme production, so poor lactose digestion does not always result in symptoms.[11] Data show that individuals who identify themselves as being intolerant may actually be persistent in lactase production.[12,13] On the other hand, individuals who are not persistent in lactase synthesis may consume small amounts of dairy products without presenting symptoms, since lactose works as a prebiotic, inducing adaptation of the colonic microcomb to digest lactose.[14]

During the last decades, there has been a growing concern of populations about the consumption of food, cow's milk in particular, is pointed as a possible trigger for several symptoms and diseases.[15–17] This perception may have led to a voluntary decrease in milk consumption. This limitation can have negative results in the nutritional state since the daily intake of milk contributes to the intake of nine essential nutrients, such as calcium, potassium and vitamin D and avoiding the use of dairy products can increase the susceptibility to chronic diseases.[18,19]

Considering the lack of data on milk consumption in the Brazilian population, we have developed a preliminary study to investigate the consumption of milk and dairy products in Brazilian university students.

Methods

Descriptive, observational, prospective and cross-sectional study with young university students from the first to the sixth year of

medical degree. Students were invited to answer a closed online questionnaire sent by the Undergraduate Education Commission containing a total of 9 questions, described below:

A. Gender

B. Age

C. Ethnicity: White, Black, Eastern, India

D. Ingestion of milk

a. Do not ingest milk

b. Ingest lactose-free milk

c. Ingest milk with lactose

E. Amount of milk ingested per day

a. 1 liter

b. ½ liter

c. 1 glass (250mL)

d. ½ glass (250mL)

F. Frequency of milk/derivatives intake

a. Daily

b. 2-5 x/week

c. 1x/week

d. Daily yogurt or cheese

e. Yogurt or sporadic cheese

G. Intestinal habit - how often do you usually bowel movements?

Daily

a. Every two days

b. Less than 3x/week

Choose a number on the Bristol scale, more compatible with the appearance of your stool:

Do you wish to receive dietary guidance?

a. Yes

b. No

This study follows National Health Council Resolution 466/12 as well as the principles set out in the Declaration of Helsinki as amended in Hong Kong in 1989. The research received approval for its conduct, by the Institution's Research Ethics Committee, Opinion Number: 2,240,090 on August 25, 2017.

Results

The questionnaire was sent to 488 students, 312 answered, with age variation between 16-48 years, 57% women and 80.5% ≤24years. Of those interviewed, 72% reported consumption of lactose milk (55% female and about 50% with consumption of 1 or more cups/day), 11% consumption of lactose free milk only and 17% not drinking milk. Among non-drinkers, 32% ingest dairy products daily, 35% ingest sporadically (≤1x/week) and 17% do not ingest either derivatives. These data are presented in Graph 1. Regarding the frequency of bowel movements: 70% daily bowel habit, 24% 3x/week and 6% ≤3x/week (68% women). Regarding the appearance of feces, 50% of individuals considered Bristol 3 appearance, and of these, 72% consumed milk with lactose. 11% described their feces as Bristol 4 or 5 (softened diarrhoeal feces), with 46% of these individuals not ingesting or drinking milk without lactose. 40% indicated appearance of stool compatible with cold (Bristol 1 or 2).

Discussion

The strength of this study lies in being, as far as the authors could identify, the first assessment of the habit of drinking cow's milk among Brazilian university students. The option to use an online questionnaire was based on the convenience of access to students' e-mail addresses provided by the medical course office. A selective assessment of milk consumption was also chosen rather than a complete dietary record. The use of a non-standardised questionnaire may constitute a flank for introducing biases, but it seemed sufficient for a preliminary descriptive evaluation of milk consumption.

In recent decades, the association between food consumption and disease development has been widely studied.[20–23] The observation of the dissemination of this research by the lay media makes it clear that scientific information not consistently established by clinical trials has been reported as significant. With regard to cow's milk, its association with nonspecific gastrointestinal symptoms that would be determined by lactose secondary intolerance due to adult hypolactasia is reported.

According to the Ministry of Health's Food Guide for the Brazilian population, a healthy diet should include 3 portions of milk per day.[24] As a result, around 25% of the young and adult university respondents to our survey are exposed to the risks of nutrient deficiency provided by cow's milk.

What would be the reason for these individuals to go on a milk-free diet? Would those people have admitted symptoms as a result of lactose intolerance? What are the percentages of lactose-intolerant young men/adults in our environment?

We found in the scientific literature three studies that evaluated lactose tolerance in the Brazilian population. In Adriana Sevá Pereira's study, 1981, 80 adult individuals, students from the Faculty of Medical Sciences of Unicamp and residents of the city of Campinas, São Paulo, conducted the lactose overload test (TTL) with a dose of 50g of sugar. It was observed that out of 40 Caucasians, 50% had poor lactose digestion, in 20 blacks 85% had poor digestion, and among the 20 Mongoloids 100% had poor digestion.[25] In the 1980s, lactose malabsorption was researched in school-age children in a low-income population in the city of Campinas, São Paulo. The lactose overload test was performed on 100 children from six months to five years of age. The prevalence of lactose malabsorption was 24%, and there was a tendency for this prevalence to increase as children get older. The prevalence was higher among children described as black and brunette. Malnutrition was present in 60% of the population studied.[26] Finally, Pretto, in 200227, conducted a cross-sectional study with 225 individuals aged 8 to 18years, students of public schools in the city of Porto Alegre, in which the malabsorption of lactose was diagnosed through the expired hydrogen test after ingestion of 250mL of industrialized whole cow milk. Lactose malabsorption was evidenced in 19/225 cases (8.4%).

One fact may explain the different percentages of malabsorbers of lactose seems to be the methodology of the test applied in the evaluation. In the first two studies, the diagnosis was made as usual in

medical research, with the ingestion of a lactose load corresponding to the quantity present in 1000mL of milk, while in the test carried out by Pretto and collaborators it was performed with 250mL milk, 12grams of lactose. The lactose loads used in medical tests use, by protocol, excessive amounts that generate overdiagnosis of intolerance, the actual intolerance is less likely in amounts of lactose of the order of a single portion of milk. Lactose loads of less than 6g do not cause symptoms, even in highly intolerant individuals.[28] Understanding this ratio of quantity is useful in the diagnosis of patients who report abdominal discomfort. Nicklas et al.,[29] in an analysis of a nationally representative group of Americans with European, African and Latin ancestry, reported that only 12-13% had real symptoms of lactose intolerance, and that the actual prevalence of lactose malabsorption detected by the test was several times higher. In a report from the Italian population,[30] a lack of correlation between lactose maldigestion and lactose intolerance was observed in 102 patients, maldigestion was detected in 18% of individuals and lactose intolerance in 29%, indicating that many individuals declared themselves intolerant but did not have maldigestion, and probably the symptoms they declared were due to other causes.

Scrimshaw & Murray evaluated 560 references with data on adult hypolactasia in the Latin American population and found that the prevalence of malabsorbers ranged from 45 to 100% of the adults tested, however, this data cannot be considered as a predictor of the ability to ingest lactose in the absence of symptoms, since most people classified as malabsorbers tolerate at least 1 glass of 240 mL of milk or the equivalent of 12grams of lactose in other products without any discomfort.[31,32]

With everything, it was possible to conclude that the consumption of milk below dietary recommendations was observed in 30% of the investigated population. Women over 24 represented the demographic profile with the lowest percentage consumption. This observation may indicate the need for a broad epidemiological assessment in Brazilian youth and children and, perhaps, the realization of educational programs regarding nutritional needs at this stage of life.

Conclusions

Milk consumption lower than dietary recommendations was observed in 30% of the students. Women over the age of 24 represented the demographic profile with the lowest percentages of milk consumption.

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Conflits of interest

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