

# Milk consumption and mucus production in children with asthma

Gurkaran Thiara Ran D. Goldman MD FRCPC

## Abstract

**Question** Many parents of children with asthma are becoming increasingly reluctant to add milk to their children's diet because they believe it will worsen their children's asthma owing to increased mucus secretion. Recognizing the importance of milk as part of a healthy diet in supporting growth and calcium consumption, is it advisable to restrict milk in the diet?

**Answer** Dating back to the 12th century, milk has been proscribed for patients with asthma. However, to this very date studies have not been able to provide a definitive link for this recommendation. As there is a need for more conclusive evidence to determine the effect of milk among children with asthma and further understanding of mechanisms involved in mucus production, milk should not be eliminated or restricted. Health Canada recommends 2 servings of milk (0.5 L) a day for children 2 to 8 years of age and 3 to 4 servings of milk a day (0.75 to 1 L) for children 9 to 13 years of age for unrestricted healthy development.

Dating back to the 12th century the Jewish physician Moses Maimonides wrote about asthma and associated the intake of milk with potential exacerbation of asthma.<sup>1</sup> Traditional Chinese medicine also suggests that milk is a mucus-forming food and recommends that it be avoided.<sup>2</sup> This might have been owing to the assumption that milk stimulates mucus production in the respiratory tract, resulting in increased airway resistance and aggravation of asthma.<sup>3</sup>

The widespread notion that children with asthma should avoid milk has been further strengthened in recent decades. In Spock's famous book, *Dr Spock's Baby and Child Care*, he suggests that asthma and other respiratory problems can be aggravated by milk intake and recommends removing milk altogether from the diet.<sup>4</sup>

This belief is upheld still today among many parents despite very little scientific evidence linking milk consumption and asthma.<sup>5</sup> In New York, parents waiting in a pediatric pulmonology office completed a questionnaire pertaining to the relationship between milk and mucus production.<sup>6</sup> Of 330 participants, 193 (58%) believed drinking milk increased mucus production, 72 (22%) did not believe so, and 65 (20%) were uncertain. Those who believed drinking milk increased mucus production reported receiving the information from family members (30%), pediatricians (10%), or other physicians (19%).

## Milk-mucus theory

A study from Australia examined whether believers in the "milk-mucus theory" had more asthma-related symptoms than nonbelievers. A group of 169 participants

(70 believers, 99 nonbelievers) was asked to describe exactly what they felt or what happened when they drank milk.<sup>7</sup> Most (84%) believers said that they experienced throat clearing, compared with only 20% of nonbelievers; 20% of believers reported difficulty breathing compared with only 1% of nonbelievers.<sup>7</sup> In a subsequent survey of 130 subjects, believers reported drinking considerably less liquid milk than nonbelievers and reported more respiratory symptoms, particularly those related to bronchitis, hay fever, or asthma.<sup>7</sup>

Pinnock and Arney further tested the "milk-mucus theory" in a randomized, double-blind trial of 125 subjects who received 300 mL of milk (60 of 125) or soy-based placebo (65 of 125), and 43 and 29 of whom believed in the "theory," respectively.<sup>8</sup> Believers in the milk-mucus effect more often reported "coating over mouth," "swallow a lot," and "saliva thicker" compared with nonbelievers for both liquids. These indications were measured at time zero, at 5 minutes, at 4 hours, and at breakfast the next day. The investigators concluded there was no difference in sensory responses between the soy-based placebo and milk.<sup>8</sup>

## Milk consumption and mucus

To test the link between consumption of milk and mucus production, investigators from New York examined 21 subjects (11 with asthma and 10 without

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asthma). Subjects ingested 16 ounces of whole milk, skim milk, and water (each on a separate day), and forced expiratory volume in 1 second (FEV<sub>1</sub>), forced expiratory flow at 50% of vital capacity, and pulmonary diffusing capacity of carbon monoxide (DLCO) were measured at 30-minute intervals for 3 hours.<sup>3</sup> Consuming whole milk and skim milk was not associated with any significant change in FEV<sub>1</sub> or forced expiratory flow at 50% of vital capacity. However, in those with asthma, DLCO decreased progressively over the 3 hours by 6.8% (SD 1.4%) per hour after consumption of whole milk but not after consumption of water or skim milk. In the group without asthma, no significant effects were observed in DLCO.<sup>3</sup> While the investigators found no clear change in airway resistance to alter airflow parameters, they did suggest that milk lipids can alter gas exchange in those with asthma.<sup>3</sup>

In Melbourne, Australia, half of 20 subjects (13 women, 7 men) claimed their asthma worsened with consumption of dairy products.<sup>9</sup> Subjects complied with a 2-week dairy-free diet and then received 300 mL of milk as a part of the active challenge. A positive reaction was defined as a 15% reduction in both FEV<sub>1</sub> and peak expiratory flow (PEF) on the "active challenge day," compared with results obtained at the same time on the "placebo day." Nine subjects showed FEV<sub>1</sub> or PEF changes greater than 15%: 4 of them showed changes after both active and placebo treatment; 2 after placebo only; and 3 after active treatment alone. No definitive link between milk consumption and the prevalence of asthma-related symptoms was demonstrated.<sup>9</sup>

In a prospective single-blinded study in Malaysia, 13 children (aged 3 to 14 years) received a milk-free diet for 8 weeks and 9 children continued their normal diets.<sup>10</sup> Children on the milk-free diet had a PEF rate notably higher than 5 children in the control group. Although an interesting finding, a much larger, and possibly blinded study is needed to determine the effect of such an elimination diet.

### Dietary implications of restricting milk in children

Health Canada recommends 2 servings of milk a day for children 2 to 8 years of age and 3 to 4 servings of milk a day for children 9 to 13 years of age.<sup>11</sup> However, pediatricians are confronted with an increasing number of unconventional feeding practices.<sup>12</sup> Because it is difficult to influence families' eating practices, physicians should be aware of risks associated with elimination diets such as restricting milk for children with asthma.<sup>12</sup>

In most Western countries, more than two-thirds of dietary calcium intake is from consumption of milk,<sup>13</sup> and in the United States, low consumption of milk is the primary reason for failing to meet calcium needs.<sup>14</sup> Consumption of milk in childhood can improve bone

density in adulthood.<sup>15</sup> Adults who consumed plenty of milk as children have better bone density than those who did not,<sup>15</sup> and avoiding milk might result in restricted growth and bone development.<sup>13</sup>

### Conclusion

Current evidence does not directly link milk consumption and asthma. Hence, physicians should continue to encourage parents to follow Health Canada's recommendation for regular consumption of milk for all children. 🌟

#### Competing interests

None declared

#### Correspondence

Dr Ran D. Goldman, BC Children's Hospital, Department of Pediatrics, Room K4-226, Ambulatory Care Bldg, 4480 Oak St, Vancouver, BC V6H 3V4; telephone 604 875-2345, extension 7333; fax 604 875-2414; e-mail [rgoldman@cw.bc.ca](mailto:rgoldman@cw.bc.ca)

#### References

1. Rosner F, Moses Maimonides' treatise on asthma. *J Asthma* 1984;21(2):119-29.
2. The Dairy Council [website]. *Mucus*. London, UK: The Dairy Council; 2012. Available from: [www.milk.co.uk/page.aspx?intPageID=65](http://www.milk.co.uk/page.aspx?intPageID=65). Accessed 2011 Dec 16.
3. Haas F, Bishop MC, Salazar-Schicchi J, Axen KV, Lieberman D, Axen K. Effect of milk ingestion on pulmonary function in healthy and asthmatic subjects. *J Asthma* 1991;28(5):349-55.
4. Spock B, Needham R. *Dr Spock's baby and child care*. 8th ed. New York, NY: Pocket Books; 1998. p. 340-1.
5. Wüthrich B, Schmid A, Walther B, Sieber R. Milk consumption does not lead to mucus production or occurrence of asthma. *J Am Coll Nutr* 2005;24(6 Suppl):547S-55S.
6. Lee C, Dozor J. Do you believe milk makes mucus? *Arch Pediatr Adolesc Med* 2004;158(6):601-3.
7. Arney WK, Pinnock CB. The milk mucus belief: sensations associated with the belief and characteristics of believers. *Appetite* 1993;20(1):53-60.
8. Pinnock CB, Arney WK. The milk-mucus belief: sensory analysis comparing cow's milk and a soy placebo. *Appetite* 1993;20(1):61-70.
9. Woods RK, Weiner JM, Abramson M, Thien F, Walters EH. Do dairy products induce bronchoconstriction in adults with asthma? *J Allergy Clin Immunol* 1998;101(1 Pt 1):45-50.
10. Yusoff NA, Hampton SM, Dickerson JW, Morgan JB. The effects of exclusion of dietary egg and milk in the management of asthmatic children: a pilot study. *J R Soc Promot Health* 2004;124(2):74-80.
11. Health Canada. *Canada's food guide*. Ottawa, ON: Health Canada; 2011. Available from: [www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php](http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php). Accessed 2010 Jan 5.
12. Grüttner R. Sociocultural aspects of child nutrition—food faddism [article in German]. *Monatsschr Kinderheilkd* 1986;134(6):414-8.
13. Black RE, Williams SM, Jones IE, Goulding A. Children who avoid drinking cow milk have low dietary calcium intakes and poor bone health. *Am J Clin Nutr* 2002;76(3):675-80.
14. Miller GD, Anderson JJ. The role of calcium in prevention of chronic diseases. *J Am Coll Nutr* 1999;18(5 Suppl):371S-2S.
15. Lehtimäki T, Hemminki J, Rontu R, Mikkilä V, Räsänen L, Laaksonen M, et al. The effects of adult-type hypolactasia on body height growth and dietary calcium intake from childhood into young adulthood: a 21-year follow-up study—the Cardiovascular Risk in Young Finns Study. *Pediatrics* 2006;118(4):1553-9.



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