ACTA SCIENTIFIC NUTRITIONAL HEALTH

Volume 3 Issue 6 June 2019

Research Article

# The Prevalence of Lactose Malabsorption and Intolerance among Syrians

**Louay Labban* and Rawaa Al Tajjar**

*Department of Nutrition, Faculty of Health Sciences, University of Kalamoon, Syria*

***Corresponding Author:** Louay Labban, Department of Nutrition, Faculty of Health Sciences, University of Kalamoon, Syria

**Received:** April 05, 2019; **Published:** May 10, 2019

## Abstract

As there was no data available on the prevalence of lactose intolerance in Syria, this study aimed to determine the prevalence of lactose intolerance and to identify the symptoms in an apparently healthy population in Syria. Three hundred fifty four subjects, ranging in age from 2 years to over 40 years, were tested for lactose malabsorption and intolerance. After 2 hours from ingesting an amount of lactose 73.2% of the subjects were identified as lactose malabsorbers. Prevalence of lactose malabsorption increased with age, i.e., (0%) of the children aged between 2 and 3 years, whereas it was (86.7%) in 3-10 years, (88.6%) in 11-18 years, (95.4%) in 19-40 and (95.3%) in ages over 40 years. Clinical manifestations of lactose intolerance were shown in almost all subjects; of those who were lactose malabsorbers, The main symptoms of lactose intolerance that have been recognized were bloating (28%), abdominal cramps (48.8%), diarrhea (54.1%), Dermatitis Herpetiformis (12%), mouth ulcers (8%) and vomiting (3%). Among the lactose malabsorbers, the lowest prevalence of clinical symptoms occurred among the children less than 3 years old and the highest in adults 19-40 and over 40 years respectively. The prevalence rate was higher also among males (75%) compared with females (71.3%) and among city dwellers (78.3%) comparing with villages inhabitants (68.1%).

**Keywords:** Lactose; Syria; Village

## Introduction

Milk is very important food from the age of infants and beyond. It is considered the primary source of nutrients for newborn before they are able to eat other types of food. Milk products contain high quality proteins, calcium, phosphorus, magnesium, and potassium [1]. In addition milk contains vitamins such as riboflavin (vitamin B2) as well as vitamins A and D and other essential nutrients which are critical to good health and have a role prevention of chronic diseases [2]. Research supports milk's benefits for hypertension, bone health, osteoporosis and even certain types of cancer [3]. Human milk contains, on average, 1.1% protein, 4.2% fat, 7.0% lactose , and supplies 72 kcal of energy per 100 grams, Cow milk contains, on average, 3.4% protein, 3.6% fat, and 4.6% lactose, 0.7% minerals and supplies 66 kcal of energy per 100 grams, human milk has the highest lactose percentage at around 9%. Unprocessed cow milk has 4.7% lactose [4].

The gastrointestinal Symptoms of the classical lactose intolerance after ingesting large amounts of lactose-containing food may include gas, bloating, abdominal cramps, and pain sometimes associated with watery diarrhea and, on occasion, with nausea and vomiting [5]. Lactose intolerance can be defined as the failure to breakdown the major sugar found in milk. Lactose intolerance is caused by a lactase deficiency, which is produced by the lining of the small intestine [6]. Lactase function is to break down lactose into glucose and galactose, before being absorbed into the blood [7]. Symptoms associated with lactose intolerance are not seen on all people with lactase deficiency because people sometimes mix between lactose intolerance with cow's milk allergy because the manifestations of symptoms can be the same [8,9]. Lactose intolerance symptoms begin about 30 minutes to 2 hours after ingesting lactose containing foods. The symptoms of lactose intolerance differ in severity due to many factors, such as the amount of lactose ingested, person's age, ethnicity, and

digestion rate. Lactose intolerance can be hard to diagnose based on symptoms alone [10]. People sometimes get confused between symptoms of lactose intolerance and other digestive problems including irritable bowel syndrome which can cause similar symptoms [11]. Lactose intolerance has three types. The first type is the primary lactose intolerance which is the normal result of aging for some people). In infancy and childhood when milk is the main source of food, the body produces great amounts of lactase and then decreases as diet becomes less dependent on milk. The second type (the secondary lactose intolerance) occurs when lactase production decreases due to illness, surgery or injury to small intestine. This form occurs because of certain diseases, such as celiac disease, gastroenteritis or an inflammatory bowel disease and Crohn's disease. Luckily, this type of lactose intolerance may be completely curable and can last only a few weeks unless if it's caused by a long-term illness, it may be permanent [12].

The third type is congenital lactose intolerance as it's possible for infants to be born with lactose intolerance. This type is inherited from generation to generation due to the presence of autosomal recessive [13]. Unfortunately, Infants with this type of lactose intolerance to milk when they are breastfed and as a result they have diarrhea from birth and therefore they require lactose-free infant formulas [14]. Hydrogen breath, stool acidity and lactose tolerance tests are used to diagnose lactose intolerance [15].

The Hydrogen breath test detects hydrogen in the breath as lactose fermentation occurs in the colon produces hydrogen which exhaled. Elevated levels of hydrogen in the breath, designates maldigestion of lactose [16].

In infants and young children, the lactose tolerance and hydrogen breath tests are not given to them but stool acidity test is used to diagnose lactose intolerance. Fermented lactose in the colon produces lactic acid which can be detected in a stool sample [17,18].

The third test to diagnose lactose intolerance requires fasting prior to the test and then the patient is given a lactose containing liquid. After that, blood sample is collected to check the person's blood glucose level. When lactose reaches the intestine, the lactase enzyme breaks it down into glucose and galactose [19]. Galactose is converted in the liver to glucose and raises the person's blood glucose level and this indicates lactose tolerance. On the other hand, if the blood glucose level does not rise, the lactose is incompletely broken down and a diagnosis of lactose intolerance is confirmed [20].

Medical nutrition therapy lactose intolerance is easy to treat. Lactase production cannot be improved by any type of treatments. However, symptoms can be controlled through avoiding lactose containing foods [21]. Older children and adults do not have to avoid lactose completely, but they can alleviate symptoms through management and food substitutions [22]. The level of dietary control needed with lactose intolerance depends on how much lactose a person's body can handle [23].

Lactase enzyme treatment is another way to manage lactose intolerance. This enzyme is available without a prescription to help people digest lactose containing foods [24]. There are also lactose free milk and milk products at most supermarkets. This milk is equal to regular milk in terms of the nutrients [25]. As lactose intolerance can cause gastrointestinal and health problem, the aim of this study was to indentify the prevalence of lactose intolerance among Syrians and to compare this prevalence between city and villages inhabitants and among different age groups.

## Materials and Methods

The study recruited 354 individuals from different parts of Syria both city and villages areas. Prior to the study, adult participants and children caregivers were consented to follow the procedures of the study including measuring their fasting blood glucose. The recruits' age was from less than 3 to over 40 years old as shown in table 1.

| Age group (years) | Number | Percentage |
|---|---|---|
| Less than 3 | 2 | 0.6 |
| 3-10 | 15 | 4.2 |
| 11-18 | 35 | 9.8 |
| 19-40 | 196 | 55.4 |
| Over 40 | 106 | 30 |
| Total | 354 | 100 |

**Table 1:** Age distribution among participants.

The number of recruited individuals from big cities such as Damascus and the surrounding villages is shown in table 2.

| The recruitment area | Number | Percentage |
|---|---|---|
| Damascus city | 200 | 56.5 |
| Villages | 154 | 43.5 |

**Table 2:** Geographic areas of the participants.

There were 170 male participants and 184 female participants in the study group. Table 3 shows the percentage of the males and females in the study.

| Gender | Number | Percentage |
|---|---|---|
| Males | 170 | 48 |
| Females | 184 | 52 |

**Table 3:** Gender distribution of the participants.

The recruits were subject to lactose tolerance test in order to diagnose lactose intolerance. They were required to fast overnight before the test and then they were given a lactose containing liquid and, in this study, they were given a cup of milk (250 ml) which contained 12g of lactose [26]. Blood glucose levels were then measured before lactose ingestion and after a two hour period to determine their blood glucose level by using home blood glucose meter (rapid meter with strips). This test indicated how well the body was able to digest lactose. Normally, when lactose reaches the digestive system, the lactase enzyme breaks lactose down into glucose and galactose and after that the liver converts the galactose into glucose, which enters the bloodstream and raises the blood glucose level. If, however lactose is incompletely broken down, the blood glucose level does not rise, and diagnosis of lactose intolerance is confirmed. Any symptoms resulted from lactose ingestion was recorded by the adult participants or by their care givers for infants and children. Statistical analysis was done using SPSS software and the significance level was set at (P < 0.5%).

## Results and Discussion

The data collected from this study have shown that the mean of the prevalence of lactose intolerance in all age and gender groups was 73.2% and this percentage represents the prevalence of lactose intolerance in Syria as shown in table 4.

| Age group (years) | Total Number | Not diagnosed with LI (%) | Diagnosed With LI (%) |
|---|---|---|---|
| Less than 3 | 2 | 2 (100%) | 0 (0%) [d] |
| 3-10 | 15 | 2 (13.3%) | 13 (86.7%) [c] |
| 11-18 | 35 | 4 (11.4%) | 31 (88.6%) [b] |
| 19-40 | 196 | 9 (4.6%) | 187 (5.4) [a] |
| Over 40 | 106 | 5 (4.7%) | 101 (95.3%) [a] |
| Total | 354 (100%) | 22 (26.8) | 332 (73.2%) |

**Table 4:** The mean of the prevalence of lactose intolerance among age groups.

[a, b, c, d] Different letters denote significant difference at P < 0.05

Table 4 showed that the highest percentage of individuals with lactose intolerance (95.4%) and (95.3%) was among the age group 19-40 years and among the group over 40 years respectively and there was no significant difference (p<0.05) among these two groups. It is followed by the age group of 11-18 years (88.6%) and age group 3-10 years (86.7%). In the group less than 3 years, lactose intolerance was nonexistent (0%). These finding proved that lactose intolerance rates increase with age which is normal and in agreement with the research work done with regard to this issues [28,29].

With regard to the prevalence between genders, there was significant difference (p < 0.05) between males and females. Lactose intolerance was higher in males (75%) compared with females (71.3%). Lactose intolerance was higher among participants from Damascus city (78.3%) compared with the prevalence of lactose intolerance among participants lived in villages (68.1%) and the difference was statistically significant (p < 0.05). The results are predictable as participants from villages include milk and milk products in their daily meals as they keep animals for their milk comsumption.

With regards to the reported symptoms of lactose intolerance among participants, (48.8%) of them had abdominal discomfort and pain after 30-60 minutes from ingesting milk, and (28.0%) had bloating, whereas (54.1%) had diarrhea. The percentage of participants who had *Dermatitis Herpetiformis* was (12%) whereas vomit-

ing was seen among (3%) and mouth ulcers in (8%). The findings were similar to those obtained by other studies [31-34]. These data are shown in figure 1.

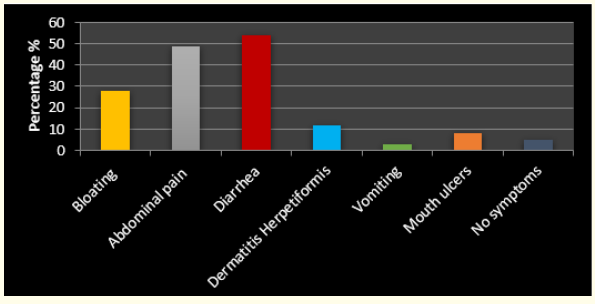


**Figure 1:** Symptoms of lactose intolerance reported among participants.

## Conclusion

The study concluded that (72.3%) of the participants in this study had problems in digesting lactose. The percentage represents the mean of the prevalence of lactose intolerance in Syria. More people in cities cannot digest lactose properly and males and older people suffer more than females and younger ones. This data could be an indicator of many nutrients deficiency especially calcium which can lead to osteoporosis and other health problems. People who have trouble digesting lactose can learn which dairy products and other foods they should avoid and which ones they can eat without discomfort. Many people can enjoy milk, ice cream, and other such products if they eat them in small amounts or eat other food at the same time. Others can use lactase liquid or tablets to help digest the lactose. Even older women at risk for osteoporosis and growing children who must avoid milk and foods made with milk can meet most of their dietary needs by eating greens, fish, and other calcium-rich foods that are free of lactose. A carefully chosen diet, with calcium supplements if the doctor or dietitian recommends them, is the key to reducing symptoms.

## Recommendations

Avoidance of hidden lactose although milk and foods made from milk are the only natural sources of lactose, it is often added to prepared foods. People with very low tolerance for lactose should know about the many food products that may contain even small amounts of lactose, such as bread, other baked goods, processed breakfast cereals, instant potatoes, soups, and breakfast drinks. Some products labeled non-dairy, such as powdered coffee creamer and whipped toppings, may actually include ingredients that are derived from milk and therefore contain lactose. Learn to read food labels with care, looking not only for milk and lactose, but also for words such as whey, curds, milk by-products, dry milk solids, and non-fat dry milk powder. If any of these words are listed on a label, the product contains lactose. Lactose is also used in more than 20 percent of prescription drugs and about 6 percent of over-the-counter medicines. Many types of birth control pills contain lactose, as do some tablets for stomach acid and gas. However, these products typically affect only people with severe lactose intolerance.

## Bibliography

1. Lanou AJ., *et al*. "Calcium, dairy products, and bone health in children and young adults: a reevaluation of the evidence". P*ediatrics* 115 (2005): 736-743.

2. Sonneville KR., *et al*. "Vitamin D, calcium, and dairy intakes and stress fractures among female adolescents". *Archives of Pediatric and Adolescent Medicine* 166 (2012): 595-600.

3. Feskanich D., *et al*. "Calcium, vitamin D, milk consumption, and hip fractures: a prospective study among postmenopausal women". *American Journal of Clinical Nutrition* 77 (2003): 504-511.

4. Gartner LM., *et al*. "Breastfeeding and the use of human milk". *Pediatrics* 115 (2005): 496-506.

5. Pennington JAT and Douglass JS. "Bowes and Church's Food Values of Portions Commonly Used". 18th ed. Baltimore, MD: Lippincott Williams and Wilkins (2005).

6. Saukkonen T., *et al*. "Significance of cow's milk protein antibodies as risk factor for childhood IDDM: Interaction with dietary cow's milk intake and HLA-DQB1 genotype. Childhood Diabetes in Finland Study Group". *Dibetologia* 41 (1998): 72-78.

7. Kimpimaki T., *et al*. "Short-term exclusive breastfeeding predisposes young children with increased genetic risk of type I diabetes to progressive beta-cell autoimmunity". *Diabetologia* 44 (2001): 63-69.

8. Eidelman AI and Schanler RJ. "Policy statement: Breastfeeding and the use of human milk". *Pediatrics* 129 (2012): 827-841.

9. Qin L., *et al*. "Milk consumption is a risk factor for prostate cancer in Western countries: Evidence from cohort studies". *Asia Pacific Journal of Clinical Nutrition* 16 (2007): 467-476.

10. Song Y., *et al*. "Whole milk intake is associated with prostate cancer-specific mortality among U.S. male physicians". *Journal of Nutrition* 143 (2013): 189-196.

11. Kroenke CH., *et al*. "High-and low-fat dairy intake, recurrence, and mortality after breast cancer diagnosis". *Journal of the National Cancer Institute* 105 (2013): 616-623.

12. Szilagyi A and Ishayek N. "Lactose Intolerance, Dairy Avoidance, and Treatment Options". *Nutrients* 10 (2018): 1994.

13. Pal S., *et al*. "Milk intolerance, beta-casein and lactose". *Nutrients* 7 (2015): 7285-7297.

14. Bond JH and Levitt MD. "Quantitative measurement of lactose absorption". *Gastroenterology* 70 (1976): 1058-1062.

15. Savaiano DA. "How much lactose is low lactose?". *Journal of the American Dietetic Association* 96 (1996): 243-246.

16. Vesa TH., *et al*. "Tolerance to small amounts of lactose in lactose maldigesters". *The American Journal of Clinical Nutrition* 64 (1996): 197-220.

17. Shrier I., *et al*. "Impact of lactose containing foods and the genetics of lactase on diseases: An analytical review of population data". *Nutrition and Cancer* 60 (2008): 292-300.

18. Lember M., *et al*. " Lactase non-persistence and milk consumption in Estonia". *World Journal of Gastroenterology* 12 (2006): 7329-7331.

19. Almon R., *et al*. "Lactase non-persistence as a determinant of milk avoidance and calcium intake in children and adolescents". *Journal of Nutritional Science* 2 (2013): e26.

20. He T., *et al*. "The role of colonic metabolism in lactose intolerance". *European Journal of Clinical Investigation* 38 (2008): 541-547.

21. Szilagyi A., *et al*. "Significant positive correlation between sunshine and lactase non persistence in Europe May implicate both in similarly altering risks for some diseases". *Nutrition and Cancer* 63 (2011): 1-9.

22. Brüssow H. "Nutrition, population growth and disease: A short history of lactose". *Environmental Microbiology* 15 (2013): 2154-2161.

23. Gilat T., *et al*. "Lactase in man: A non adaptable enzyme". *Gastroenterology* 62 (1972): 1125-1127.

24. Tishkoff SA., *et al*. "Convergent adaptation of human lactase persistence in Africa and Europe". *Nature Genetics* 39 (2007): 31-40.

25. Uchida N., *et al*. "Two novel mutations in the lactase gene in a Japanese infant with congenital lactase deficiency". *The Tohoku Journal of Experimental Medicine* 227 (2012): 69-72.

26. Robayo-Torres CC., *et al*. "Molecular differentiation of congenital lactase deficiency from adult-typehypolactasia". *Nutritional Review* 65 (2007): 95.

27. Sahi T. "Genetics and epidemiology of adult-type hypolactasia". *Scandinavian Journal of Gastroenterology* 29 (1994): 7-20.

28. Marton A., *et al*. "Meta-analysis: The diagnostic accuracy of lactose breath hydrogen or lactose tolerance tests for predicting the North European lactase polymorphism C/T-13910". *Alimentary Pharmacology and Therapeutics* 4 (2012): 429-440.

29. Sadre M and Karbasi K. "Lactose intolerance in Iran". *The American Journal of Clinical Nutrition* 32 (1979): 1948-1954.

30. Vesa TH., *et al*. "Tolerance to small amounts of lactose in lactose maldigesters". *The American Journal of Clinical Nutrition* 64 (1996): 197-201.

31. Suarez FL., *et al*. "A comparison of symptoms after the consumption of milk or lactose-hydrolyzed milk by people with self-reported severe lactose intolerance". *The New England Journal of Medicine* 333 (1995): 1-4.

32. Savaiano DA., *et al*. "Lactose intolerance symptoms assessed by meta-analysis: A grain of truth that leads to exaggeration". *Nutrition* 136 (2006): 1107-1113.

33. Jellema P., *et al*. "Lactose malabsorptionand intolerance: A systematic review on the diagnostic value of gastrointestinal symptoms and self-reported milk intolerance". *QJM* 103 (2010): 555-572.

34. Habte D., *et al*. "Lactose malabsorption in Ethiopian children". *Acta Paediatrica Scandinavica* 62 (1973): 649-654.

**Volume 3 Issue 6 June 2019**