Original Research Article

ASSESSMENT OF MILK CONSUMPTION AND LACTOSE INTOLERANCE AMONGSELF PERCEIVED LACTOSE INTOLERANT STUDENT OF ABIA STATE POLYTECHNIC, ABA, NIGERIA.

ABSTRACT:

Objective: The study assessed milk consumption and prevalence of lactose intolerance among self-perceived lactose intolerant students of Abia State Polytechnic, Aba.

Subject and Methods: The study involved 121 self-reported lactose intolerants students from which 76 students with confirmed cases of lactose intolerant were selected from two purposively selected departments namely: Food Science and Technology (F.S.T) and Hospitality Management Technology (H.M.T) Abia State Polytechnic Aba. Questionnaires were used to collect information on dairy consumption and self- perceived intolerance to milk; while milk tolerance test was used to investigate the incidence of lactose tolerance among the student

Result: Results show that the prevalence of lactose intolerance among the students were higher(79%) although perceived lactose intolerance was 89%. The majority of the students consumed milk and dairy products: 100%, 82%, 72% and 100% for milk, ice cream, yoghurt and flavored dairy products respectively. The frequency and serving portion consumed per daywere small. The percentages were 24%, 17%, 16% and 15%: for milk, ice cream, yoghurt and flavored dairy products respectively. None of the subjects consumed up to 2 serving of milk per day.

Conclusion: The result shows that a high percentage of the students still consume milk and dairy products, irrespective of their lactose intolerance. This suggests that lactose intolerance could not stop the subjects from consuming milk and dairy products. The low frequency of daily consumers of milk and dairy products coupled with small portion sizes of milk and dairy products indicates that dairy consumption among the subjects was poor and inappropriate. Inappropriate consumption of milk and dairy products would fail to meet the nutritional needs of the consumer.

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Key Words; Assessment, milk consumption, lactose intolerance, self-perceived

INTRODUCTION

Dairy has been a part of the human diet, from birth to old age, since the millennium (He*et al*., 2017). This is because milk contains an array of macro and micro nutrients, including calcium, potassium, magnesium, zinc, iron, riboflavin, folate, and vitamins that benefit human health (Weaver and Haney, 2010). Milk and dairy products may contribute to these essential nutrients that benefit health only when consumed according to the recommended dietary guidelineswww.tandfondine.com,(2018)

The current recommended daily intake for people 8 years and above is 2-3 cups of milk. However, several factors, including lactose intolerance, may prevent many people from consuming milk according to this recommendation. Individuals with lactose intolerance (LI) lack the enzyme lactase that helps split the sugar (lactose) in milk completely (Mayo clinic Staff, 2020) into its absorbable components, glucose and galctose (my. Cleveland clinic.org, 2021). Decline in lactase secretion is a natural phenomenon that occurs shortly after weaning (NIDDK, 2014). Approximately 70% of the world's adults are lactase deficient (Forsgard, 2019). Upon consuming milk, lactose deficient individuals may experience various gastrointestinal symptoms, such as gas, bloating, which can be very discomforting (Mayo clinic staff, 2020).

There is now a wealth of knowledge in the scientific literature connecting milk consumption and the development of human disease and disorders like Lactase intolerance. Although research on the impact of dairy on the disease process is still conflicting, milk consumption has plummeted in most developed countries in the face of ongoing debate. Paradoxically, milk consumption is rising in developing countries (www.fao.org.2012).

Evidence obtained several decades ago showed that the prevalence of lactose intolerance is high in Nigeria, especially among the Ibos (Olutuboso&Adadevoh, 1971). Current data on lactose intolerance prevalence among Ibo's is lacking and, as such, the burden of lactose intolerance, its risks, and its effect on milk and dairy product intake is unknown. This study therefore investigates dairy consumption and the prevalence of lactose intolerance among self-perceived lactose intolerance students at Abia State Polytechnic, Aba.

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MATERIALS AND METHODS

Study area

The study was carried out in a purposively selected higher institution, namely, Abia State Polytechnic, Aba. Abia State Polytechnic is one of the biggest higher institutions in Abia with a high student population. The prevalence of lactose intolerance is high in Nigeria, like in most of the black African population (Swallow, 2003), and incidentally, the demand for milk is growing in Aba, like in most urban and rural areas in developing countries (www.fao.org,2013).

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SUBJECT

The entire 150 students in the Departments of Food Science and Technology (F.S.T) and Hospitality Management Technology (H.M.T) at Abia Polytechnic, Aba, were recruited for the study. Out of those, students numbering 121, aged between 17 and 30 years, students with no history of chronic disease, including stomach ulcers and irritable bowel syndrome (IBS), and students with a history of gastrointestinal symptoms after milk intake were selected for the study. Students who do not consume milk and do not meet the other inclusion criteria were excluded from the study.

A total of 96 students with confirmed cases of lactose intolerance emerged after a milk tolerance test was carried out on the 121 self-reported lactose intolerant students. From the 96 confirmed cases of lactose intolerance, a sample size of 76 was drawn after excluding a student that didn't consent to participate in the study. Informed consent was obtained and ethical approval was obtained from the Ethical Committee of Abia State University Teaching Hospital, Aba.

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SAMPLE SELECTION PROCEDURE

A purposive sampling technique was employed to select the study site, namely Abia State Polytechnic, Aba. The 121 self-reported lactose intolerance students aged 17 to 30 years were drawn from two purposively selected departments, namely the food science and technology (FST) and the hospitality management technology (HGMT) departments.

Preliminary visits were made to the school and to the department to seek permission from the school authorities and consent from the students after the purpose and nature of the study had

been explained to them. Suitable times were arranged with the heads of the department for the study.

Fasting for 12 hours, drinking a glass of milk (500mls), and monitoring the subject's 2 hour post-prandial blood glucose level were used to investigate the prevalence of lactose intolerance among the 121 self-reported lactose intolerance students. A total of 76 lactose intolerant students were identified from 96 verified cases of lactose intolerance.

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METHOD OF DATA COLLECTION

A well-structured and validated questionnaire was used to collect information on the subjects' socioeconomic status, history of diet-related chronic disease, prevalence of self-reported lactose intolerance, and milk and dairy product consumption. A milk tolerance test was also utilized to gather information on the actual prevalence of lactose intolerance.

DATA ANALYSIS

SPSS version 17 was used to analyze the data frequency. Mean and percentage were derived using description statistics.

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RESULTS

Socio-Demographic and Health Characteristic of the Subjects

Table 1 shows the socio-demographic and health characteristics of the subjects. Only 35% of the subjects were males, while the majority (69%) were females. The age range of 17-30 years was the highest (85%). Only 3% of the subjects were below 17.

The blood pressure, blood sugar, and cholesterol levels of the majority of the students were reported to be within normal ranges of 98%, 100%, and 99% for blood pressure, blood sugar, and blood cholesterol respectively. The percentage of students with a history of ulcers and irritable bowel syndrome was low: 11% and 10% for ulcers and irritable bowel syndrome respectively. The percentage of subjects that had stomach symptoms after milk and dairy product intake was high (81%).

Table 1: Socio-Demographic and Health Characteristics of the Entire Student.

VARIABLES	N	%
Male	52	35
Female	98	69
Total	150	100
Age (years)		
<17	4	3
17-30	128	85
>30	18	12
Total	150	100
Blood press		
Normal	147	98
Abnormal	3	2
Total	150	10
Blood Sugar		
Normal	150	100
Abnormal	-	0%
Cholesterol		
Normal	149	99
Abnormal	1	1
Total	150	100
Intolerance		
Yes	121	81
No	29	19
Total	150	100

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Ulcer		
No	134	89
Yes	16	11
Total	150	100
Irritable Bowel Syndrome		
No	140	93
Yes	10	7
Total	150	100

Consumption of milk and Dairy Product among the students

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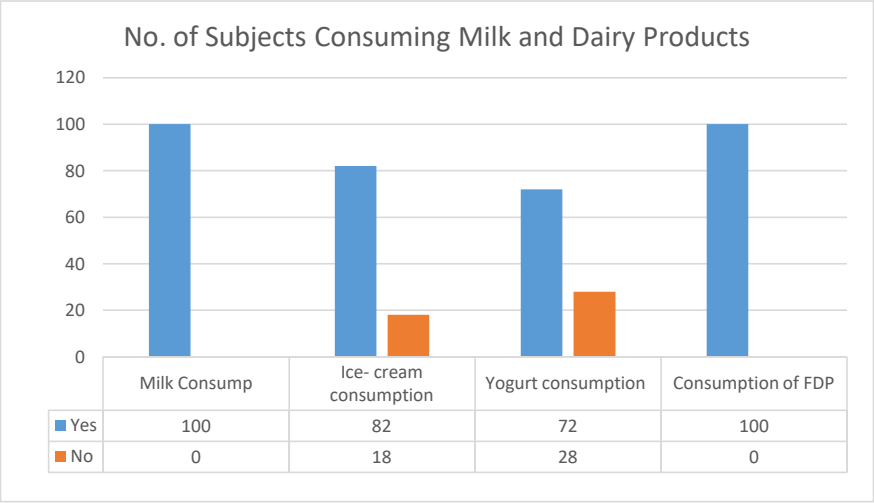
Figure 1 is the distribution of milk and dairy product consumption among the lactose intolerant students. The entire (100%) subjects consumed milk and flavored dairy products, only 82% and 72% of the subjects consumed ice – cream and yoghurt respectively.

Figure 1 Milk and Dairy Product Consumption of the Subject.



Prevalence of Lactose intolerance among the students

Table 2 shows that the prevalence of self-reported lactose intolerance was higher (81%) than the prevalence of 79% obtained after milk tolerance test was carried out on the subject.

TABLE 2: PREVALENCE OF LACTOSE INTOLERANCE AMONG THE STUDENTS

Variables	**N**	**%**
Entire students	150	100
Self-reported cases	121	81
Confirmed cases	96	79

Lactose intolerance Diagnosis

Table 3 shows that mean fasting and mean 2hours post prandial plasma glucose of lactose tolerant and intolerant students. The 2 hours postprandial plasma glucose of the lactose tolerant was higher (4.14±6.91) than the 2 hours post prandial plasma glucose of (3.92±9.04) of lactose intolerance subjects.

TABLE 3: MEAN FASTING AND THE MEAN 2HOURS POST PRANDIAL PLASMA GLUCOSE OF LACTOSE TOLERANT AND INTOLERANCE STUDENT

Variable	Fasting		2hrs Post Prandial
	N	$\bar{x}$	N	$\bar{x}$
Tolerant	25	2.854±4.9	25	4.14±6.91
Intolerant	96	2.85±7.01	96	3.92±8.15

Table 4 presents the frequency of consumption of milk and dairy product. The frequency of consumption of milk and dairy product ranged from daily to occasionally. Daily consumers' of milk and dairy products were few (24%, 17%, 16%, and 15%) for milk, ice cream, yoghurt and flavoured dairy products respectively. Greater percentages (60%, 58%, 33% and 39%) consumed milk, ice- cream, and yoghurt and flavored dairy products respectively, between 2 to 4 times weekly. Majorities of the students consumed <1servings (47%, 52% and 42%) for milk, ice – cream and yoghurt respectively on each consumption occasion. However, majority (47%) consumed one (1) serving portion of flavored dairy product on each occasion of consumption.

TABLE 4: FREQUENCY OF MILK AND DAIRY PRODUCT CONSUMPTION OF THE STUDENT

VARIABLE	**MILK**		**ICE CREAM**		**YOGHURT**		**FLAVOURED DAIRY PRODUCT**	
Frequency Consumption	n	%	n	%	n	%	n	%
Daily	18	24	11	17	9	16	11	15
2-4 weekly	46	60	36	58	22	40	30	39
B1-weekly	4	5	10	16	6	11	18	24
Occasionally	8	11	5	8	18	33	17	22
Total	76	100	62	100	55	100	76	100
Serving portion/day								
<1 serving	49	64	42	68	42	66	40	53
1 serving	27	36	20	32	13	24	36	47
>2 serving	Nil	0	Nil	0	Nil	0	Nil	0
Total	76	100	62	100	55	100	76	76

1 serving of milk = 1 cup (240m/s), 1 serving of ice cream = 120m/s, serving of yoghurt = 240m/s, 1 serving of FDP = 240m/s.

DISCUSSION

The result of the high (81%) prevalence of self-reported lactose intolerance rather than the 79% lactose intolerance prevalence obtained after milk tolerance does not agree with results obtained from old studies. Nicklas*et al.* (2011) and Jarvis*et al.* (2002) both found a higher prevalence of self-reported lactose intolerance than the prevalence they obtained after a lactose tolerance test. The possible explanation for the result of this present study could be that the quality of milk administered to the subjects in this study was higher than the quality of milk the subjects habitually consumed. Milk is a delicate food that often undergoes physical, chemical, and nutritional changes during processing and subsequent storage (Ahmed &Shakoori, 2002).

Consumption of contaminated milk dairy products results in gastrointestinal symptoms among other serious health issues (F.A.O&W.H.O 2003).

Another explanation could relate to the amount of milk the self-reported lactose intolerance usually consumes in relation to the amount of milk administered for the testing for lactose intolerance prevalence. Large doses of milk have been linked to lactose malabsorption (Vesa*et al*., 2002; EFSA, 2010). Consumption of milk exceeding the limit of the resident lactose activity may lead to lactose malabsorption (EFSA, 2010) and according Makiviuokko*et al*., 2006 the clinical value of lactose intolerance and the prevalence of lactose intolerance depends largely on the dosage of milk tolerable to the lactose malabsorber. Thus, the amount of milk consumed and the prevalence of lactose intolerance among individuals.

Furthermore, the fact that the majority of the milk and dairy products consumed indicate that gastrointestinal symptoms did not cause the subjects to avoid milk consumption. Factors such as the availability and affordability of milk powder in Aba, the perceived health benefits of drinking milk, and widespread ignorance about the nutrition consequences of lactose intolerance could all be reasons why the subjects continued to consume milk.

The other findings, that the frequency and portion sizes of dairy the subjects habitually consumed was lower than the recommended 3 cups of dairy per day, show that the consumption of milk by the subjects was appropriate, a short fall from the dietary recommendation for milk. Heaney (2013), in a similar study, observed milk avoidance and irregularity in milk consumption and stated that milk avoidance and irregularity in milk consumption would amount to not consuming the recommended 3 cups of milk per day.

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Scientific evidence has shown that milk and dairy products may contribute the desired essential nutrient to the diet of an individual only when consumed according to the recommended dietary guidelines (www.tandfond.com, 2013). Consuming less than the recommended amount and frequency means inappropriate intake which cannot meet the nutritional needs of the consumer. Generally, people with lactose intolerance are unable to consume milk appropriately because of their inability to digest milk properly.

CONCLUSION

The high prevalence of lactose intolerance among the subjects may be one of the possible reasons for the irregularity and consumption of small portion sizes of milk found in this study. Lactose intolerants are often advised not to eliminate milk totally from their diets but to include small quantities of dairy in the diet, (Matter *et al*., 2012), but this amounts to consuming milk approximately, which has few nutritional benefits and even makes the intolerant think that the small amount of milk is sufficient. If taking a small amount of milk does not have much impact on the health of lactose intolerant people, then the place of milk in the diet of lactose intolerant people needs further clarification.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

REFERENCE

ForsgardR.A (2019). Lactose digestion in human intestinal Lactose appears to be constitutive whereas the colonic microbiome adaptable. The American Journal of Clinical Nutrition, volume 110, issue 2 pages 273-279. Availbale @https://doc.org//0.109311ajen/ng2014

FAO (2012). Milk availability, Trends in Production and Demands and Medium Term Outlook

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He M, Sun J, Jiang ZQ, Yang YX (2017). Effects of cow's milk beta-casein variants on symptoms of milk intolerance in Chinese adults: A multicentre, randomised controlled study. *Nutr J*.; 16(1):72 doi: 10.1186/s12937-017-0275-0.

Mayo clinic staff (2002). Lactose intolerance available. www.mayoclinic.org my. Cleverland clinic.org.2015.

(My cleverland.clinic.org, 2020) Lactose intolerance (Clever land Clinic, 2021).

Matter R, de Campos Mazo DF, CarnilloFJ (2012). Lactose Intolerance: Diagnosis Genetic and Clinical Factors. Clinical experimental Gastroenterology doi:19.214/CEq.s3268

JasrvisJk, Miller GD (2002). Overcoming the barrier of Lactose intolerance to reduce health disparities Journal of the National medical Associations.

www.tanfonline.com (2018). Cows milk consumption and health professional grades. https://doi.org/0.1080/073152.1491016

Weaver C.M Haney E.M (2010). Nutritional Basis of skeletal growth in osteoporosis in Men (second edition) available @ www.sciencedirect.com

Matter R, de Campos Mazo DF, CarnilloFJ (2012). Lactose Intolerance: Diagnosis Genetic and Clinical Factors. Clinical experimental Gastroenterology doi:19.214/CEq.s3268 .

Makivuokko H, Saarinen M, Ouwehand (2006). Effectof lactose on colon MIcrobia Community, Structure and Function in a four – stage Semi Continuous Culture SystemBioscience Biotechnology. 70 (9). 20562063

Doi : 10. 1271/bbb.600.22.

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