

**Assessment of potential differences in general
breastfeeding knowledge and comfort with
breastfeeding in public among college
students**

Hilary Gisselle Carrera Arcia

Escuela Agrícola Panamericana, Zamorano

Honduras

November, 2019

ZAMORANO
FOOD SCIENCE AND TECHNOLOGY MAJOR

**Assessment of potential differences in general
breastfeeding knowledge and comfort with
breastfeeding in public among college
students**

Special graduation project presented as partial requirement to obtain the Food Science and
Technology Bachelor Degree

Presented by:

Hilary Gisselle Carrera Arcia

Zamorano, Honduras

November, 2019

Assessment of potential differences in general breastfeeding knowledge and comfort with breastfeeding in public among college students

Hilary Gisselle Carrera Arcia

Abstract. Knowledge about, and being comfortable with looking people breastfeed in public is essential to support efforts to improve breastfeeding rates in the United States and other developing countries. Culturally, people from countries with higher breastfeeding rates than the US may have higher levels of knowledge about the breastfeeding and comfort than those born in the US. The purpose of this study was to evaluate differences in breastfeeding knowledge and comfort looking at when in public, between domestic (91.24%) and international (8.76%) college students, in Louisiana State University. A cross-sectional survey study was developed among 761 college students; 18 years old and above, were web-based surveyed with a 78 questions, questionnaire. Data was analyzed with SPSS (Statistical Package for the Social Sciences). No significant differences were found in breastfeeding knowledge ($P = 0.054$) and comfort ($P = 0.052$) between international students and US citizens students. US students had a slightly higher mean knowledge score (184.96 ± 26.74 vs. 178.18 ± 25.39). Race, age, gender, marital status, breastfeeding experience and having been breastfed as child, all showed significant differences ($P < 0.001$). International students in the US are not contributing with either a higher level of knowledge or comfort, none that could be transmitted. Parenting or breastfeeding education programs focused in college students should provide knowledge and comfort baseline levels at which to begin efforts.

Key words: Countries, domestic, international, range, score, survey.

Resumen. El conocimiento sobre la lactancia materna y sentirse cómodo viendo a las personas amamantar en público es esencial para apoyar los esfuerzos en relación a mejorar las tasas de lactancia en los EE.UU. y en otros países en desarrollo. El propósito de este estudio fue analizar las diferencias en el conocimiento sobre la lactancia materna y la comodidad al observar a mujeres amamantar en público, entre estudiantes universitarios nacionales (91.24%) e internacionales (8.76%), en la Universidad Estatal de Luisiana. Un estudio transversal a conveniencia fue aplicado a 761 estudiantes de 18 años de edad y mayores, fueron sometidos a una encuesta vía web basada en 78 preguntas. No hubo diferencias significativas en el conocimiento sobre la lactancia materna ($P = 0.054$) ni en la comodidad ($P = 0.052$) entre los estudiantes estadounidenses y los internacionales. Los estudiantes estadounidenses obtuvieron un puntaje promedio de conocimiento ligeramente más alto (184.96 ± 26.74 vs. 178.18 ± 25.39). En los datos analizados con SPSS (Statistical Package for the Social Sciences), se observaron diferencias significativas tanto en el conocimiento como en la comodidad por raza, edad, sexo, estado civil, previa experiencia de amamantar y haber sido amamantados cuando eran niños ($P < 0.001$). Hasta la fecha, este es el primer estudio que evalúa y analiza las diferencias en el conocimiento y la comodidad sobre la lactancia materna entre los estudiantes universitarios nacionales e internacionales que estudian en los Estados Unidos.

Palabras clave: Encuesta, internacionales, nacionales, países, puntuación, rango.

TABLE OF CONTENT

Cover page	i
Signature Page	ii
Abstract	iii
Table of Contents	iv
List of Tables, Figure and Appendix	v
1. INTRODUCTION	1
2. METHODOLOGY	3
3. RESULTS AND DISCUSSION	7
4. CONCLUSIONS	24
5. RECOMMENDATIONS	25
6. REFERENCES	26
7. APPENDIX	28

LIST OF TABLES, FIGURE AND APPENDIX

Tables	Page
1. Preliminary procedure of final data, number of questions removed and final questions related with Cronbach’s alpha.	6
2. Mean breastfeeding knowledge score in race.....	8
3. Mean comfort with viewing breastfeeding in public score in race.	8
4. Mean breastfeeding knowledge score in age.....	9
5. Mean comfort with viewing breastfeeding in public score in age.....	9
6. Mean breastfeeding knowledge score in gender.....	10
7. Mean comfort with viewing breastfeeding in public score in gender.	11
8. Mean breastfeeding knowledge score in marital status.	11
9. Mean comfort with viewing breastfeeding in public score in marital status.	12
10. Mean breastfeeding knowledge score in breastfeeding experience (breastfeeding and seeing other people doing it).....	12
11. Mean comfort with viewing breastfeeding in public score in breastfeeding experience (breastfeeding and seeing other people doing it).	13
12. Mean breastfeeding knowledge score in breastfed as a child.....	13
13. Mean comfort score in breastfed as a child.	14
14. Mean breastfeeding score in international status.....	14
15. Mean comfort with viewing breastfeeding in public score in international status.	15
16. Distribution of countries for international status divided into continents.	15
17. Mean long term benefits score about International status, age and gender.	16
18. Mean long term benefits score in race, marital status, breastfed as a child and breastfeeding experience.	17
19. Mean breastfeeding basics score about International status, age and gender.....	18
20. Mean breastfeeding basics score in race, marital status, breastfed as a child and breastfeeding experience.	18
21. Mean mom and breast milk misconceptions about International status, age and gender.	19
22. Mean mom and breast milk misconceptions in race, marital status, breastfed as a child and breastfeeding experience.	20
23. Mean breastfeeding misconceptions score about International status, age and gender.	21
24. Mean breastfeeding misconceptions score in race, marital status, breastfed as a child and breastfeeding experience.	21
25. Mean maternal benefits score about International status, age and gender.	22
26. Mean maternal benefits in race, marital status, breastfed as a child and breastfeeding experience.	23

Figure	Page
1. Consort Diagram for descriptive study.....	5

Appendix	Page
1. Study survey instrument.....	28

1. INTRODUCTION

Breastfeeding is the baseline of the infant's diet during the first months of life (Karanci and Yenal 2014). Breast milk incorporate a balanced mixture of carbohydrates, fats, and proteins with acceptable amounts of vitamins. During the first two weeks, breast milk is called colostrum or early milk. It contains substances (e.g. immunoglobulins) that provide some immunity from infection (Kent 2016). Breastfeeding provides the best nutrition for infant's growth and development (Mohammadi 2017). Breastfeeding knowledge is important for parents and parents to be; they should have a basic understanding how it works (Hamid and Yahya 2018). Breastfeeding knowledge not only involves knowing the benefits that can be obtained by doing it, it is also about understanding those benefits. Breastfeeding knowledge also includes knowing what the best practices are, how to engage in them, how long the milk can be kept in a conservation system, and by what steps it should be thawed after freezing (Karanci and Yenal 2014). It also includes the maternal knowledge of health benefits such as, reducing the risk for breast and ovarian cancer, reduced risk of hemorrhage after delivery, stress reduction, delay in ovulation, reduced blood pressure, reduced risk of postpartum depression, possibly greater postpartum weight loss and greater infant bonding (Lessen and Kavanaugh 2015). In the same way, there are benefits for infants such as reduce the risk of gastroenteritis, necrotizing enterocolitis, ear infections, respiratory infects, diarrhea, intestinal hemorrhage, abdominal colic, asthma, diabetes and obesity (Mohammadi 2017; AWHONN 2015).

Breastfeeding knowledge can be measured using different instruments (Laanterä *et al.* 2010). The most common are questionnaire surveys. The different type of questions are related to basic knowledge about breastfeeding (Brahmbhatt *et al.* 2016). The number of questions varies depending on the researcher and the focus of their research. The literature on breastfeeding knowledge is not focused on a specific population; it could be women or men that want to be parents, pregnant women, nurses and doctors, or college students. In the literature, there are multiple measures of breastfeeding knowledge (Tamim *et al.* 2016). The available questionnaires that are used to measure breastfeeding knowledge tend to be older and not widely utilized. Not all surveys that measure breastfeeding knowledge are valid measures (Shaw and Devgan 2018). All questionnaires that claim to measure breastfeeding knowledge are not exclusive measures of the concept (Jolly *et al.* 2013; Natan *et al.* 2018). These surveys include questionnaire items related to attitudes, beliefs, intentions, and perceptions of breastfeeding.

It is recommended that questionnaires have above a 0.70 Cronbach's alpha level to be "acceptable" (IDRE 2019). In previous studies, breastfeeding knowledge was measured among 580 college students in India (Bramhbhatt *et al.* 2016). Approximately sixty six percent of the students had adequate breastfeeding knowledge. Another study assessed breastfeeding knowledge among 377 undergraduate university in Malaysia. As a result, more than half (77.7%) had a low level of breastfeeding knowledge. When asked about agreement with breastfeeding in public, 43.7% believed that mothers should not breastfeed in public (Hamid and Yahya 2018).

Comfort with breastfeeding in public was measured among 515 college students in the United States (Spear 2007). Seventy seven percent reported that they considered breastfeeding an intimate act that should take place in private. A study in 2014 assessed comfort with breastfeeding in public among 383 undergraduate students in China. The majority of students believed they would be embarrassed to breastfeed, or to have a partner breastfeed in public (58.2%) (Lou *et al.* 2014). Another study in 2014 assessed comfort with breastfeeding in public among 2075 residents in New York City, NY. As a result, 33.2% of the participants were uncomfortable with women breastfeeding near them in public (Mulready-ward and Hackett 2014).

The literature about breastfeeding knowledge and breastfeeding public comfort among college students is small. There has yet to be a study that compares knowledge between students from United States and international students studying in United States. The current study will analyze differences in breastfeeding knowledge and comfort between these types of students. In this study, an overall analysis of the samples comfort with seeing women breastfeed in public will be completed, as well as, an analysis of any differences in comfort by certain demographics (age, race, gender, ever breastfed).

The main limitations of the study were the use of a convenience sample of college students at one university in the southern of United States. The results of the study are not be generalizable to other groups of U.S. and international students on other campuses. Also, the survey was not distributed to all students on the campus to potentially participate; not all students had the opportunity to participate. Finally, the study has a small sample size compared to the total number of U.S. and international students on campus.

The aims of this study were:

- Estimate breastfeeding knowledge and levels of comfort in public between United States students and international students studying in United States in a sample based in Baton Rouge, Louisiana.
- Evaluate differences in agreement with the five factors related to breastfeeding knowledge between United States students and international students.
- Analyze comfort levels in breastfeeding in public by certain demographics (age, race, gender, ever breastfed).

2. METHODOLOGY

The study was conducted in Louisiana State University and Agricultural and Mechanical College (LSU) that is located in Baton Rouge, Louisiana, United States. The majority of the study was conducted in classrooms where students were received some class regardless of which department they belonged to. The department in charge of carrying out and applying the surveys was School of Nutrition and Food Sciences (SNFS).

This study was divided in three phases: the phase I was related to the pilot test, the phase II on data collection and finally phase III was about data analysis.

Phase I. Pilot test.

Bibliographic review. A wide online and physical research was performed during approximately three weeks. Consulted and selected articles were related with breastfeeding overall knowledge and individual's comfort when looking women breastfeed.

Survey. The survey was created by Dr. E. McKinley in 2019, with the purpose of measuring proficiency among college students from Louisiana State University (LSU). This survey was part of a larger validation study of the breastfeeding knowledge instrument. The instrument creator needed at least 650 participants in order to perform factor analysis (Sharma and Petosa 2012).

Testing survey. A pilot study included 51 participants who assessed readability, comprehensibility and the time it took to fully complete the instrument. A sample of 51 students enrolled in one class at the University took the 78-question survey. The survey completion time ranged from 6-13 minutes. The pilot sample did not have any feedback on any needed changes with regard to readability and comprehension.

Survey application instrument. The survey was completed entirely online through a specific link to the Qualtrics Survey Platform. The first page of the survey contained the study information and consent agreement. Only those who clicked "I Agree" to the study details were directed to the survey. This study was approved by the LSU AgCenter Institutional Review Board Director, Dr. Michael Keenan. Due to the low risk of the study, it qualified for IRB Exemption (#HE19-1).

Phase II. Data collection.

Population and sample. The main population were located in Baton Rouge, Louisiana, United States. Current students at Louisiana State University served as the convenience sample for data collection. This campus has approximately 30,000 students. Typically, students of this university are from Louisiana and surrounding areas. Within that, there are approximately 1650 international students. The criteria inclusion of this study was only people who were students at the time of data collection. Participation was totally voluntary, and participants must have the ability to understand. Exclusion criteria included students who are under 18 years of age. The total sample who received the survey were 1117 students.

Courses surveyed. Data was collected over 8 weeks from January 30 to March 18, 2019. A series of courses with large enrollment (60+ students) were chosen from the spring 2019-course listings. The professors of the chosen courses were emailed to ask permission to go to their class for the first or last 10 to 15 minutes to invite the students to participate and give them time to complete the survey on their phones or laptop computers. Approximately 55 professors were emailed and 16 classes were visited to be surveyed. The areas in which the classes visited were related are Astronomy, English, Nutrition, Textiles Apparel and Merchandising, Agroeconomics, and Food Sciences.

Instrumentation. Participants were asked to rate their agreement with each statement on a scale from 1 to 5, with 1 being strongly agree and 5 being strongly disagree. Comfort with breastfeeding in public was measured with one item. The item asked participants to indicate their comfort level with seeing a human breastfeed in public. Answer choices ranged from “very comfortable” to “very uncomfortable”. Demographic questions included age, gender, race/ethnicity, education level, work status, marital status, international student status and country of origin (if applicable – i.e. international student). There are also questions asking if the student was breastfed as a child, if they have ever breastfed a child, if they (females) were currently breastfeeding, and if they ever breastfeed on campus in the provided private spaces.

Phase III. Data Analysis.

Statistics. The statistical analysis for this study was a Randomized Model with Convenience Sample (students from Louisiana State University). Data was subjected to Mann-Whitney U tests (due to data non having anormal distribution) to assess the differences in mean breastfeeding knowledge score between the United States students and international students. Data was subjected to Mann-Whitney U test to assess differences at the significance level of $P < 0.0025$ (to account for Bonferroni’s correction) in scoring of the five factors of the knowledge scale and the two groups of students. One-way ANOVA’s were done to compare knowledge of breastfeeding in public comfort among all subjects, then again for just United States students, and a third just for international students. Correlations were calculatated with a Spearman’s rank correlation coefficient. Differences in breastfeeding in public comfort level were assessed by the demographics through a

Kruskal-Wallis H test. Statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS Version 25) ($P < 0.05$).

Procedure to data analysis. In this part, all the information was obtained from Qualtrics Survey Platform followed by ordering in an Excel spreadsheet. The main activities were: data cleaning, switch written data to numeric, calculate the frequencies, calculate the Cronbach's alpha, create new variables and calculate the final correlations.

Data cleaning. In order to clean data, all incomplete information were deleted. In this study, data cleaning was the longest process in order to obtain the final analysis. The survey was sent to 1117 students, leaving 882 students who took the survey (78.96%). Students who did not answer the entire survey were deleted (121 students). The final sample to analyze was 761 students, representing an 86.28% of students who completed the survey.

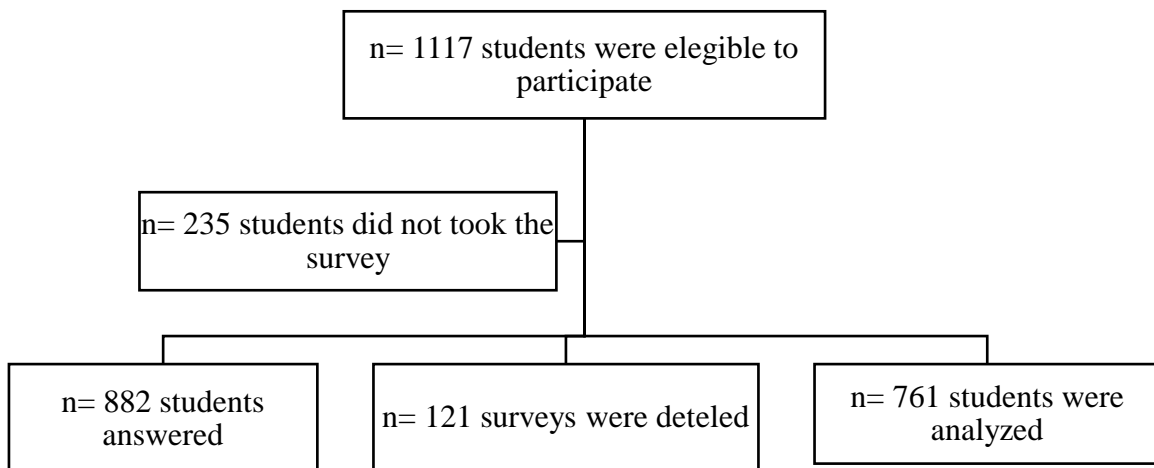


Figure 1. Consort Diagram for descriptive study.

Switch written data. Written data was assigned with a numeric value, in this part, all the written information was recoded into same numeric variable. All knowledge questions were coded in numeric from 1 to 5 depending on Likert scale, if they were regular code the value was 5 for “strongly agree” and 1 for “strongly disagree”, and if its code is reversed, then the opposite. For all demographic questions recoded, the value for “Yes” was 1 and for “No” was 0. In the case of age, a range was made to categorize data. For the others demographic questions, data was recoded with values from 1 to 5 depending on the options. Then, frequencies were analyzed for each demographic question.

Cronbach's alpha. The Cronbach alpha was calculated for all 64 questions (Table 1). The first round for all 64 questions of Cronbach alpha was $\alpha = 0.942$. In the second round, eight questions were removed (#35,#37,#38,#40,#41,#42,#43,#44), the Cronbach alpha was now $\alpha = 0.954$, questions #12,#13,#19 and #29 were deleted in the third round, alpha was now $\alpha = 0.95$. In the final round, two questions were removed (#30 and #47), now the final Cronbach's alpha for the 50 final questions was $\alpha = 0.953$.

Table 1. Preliminary procedure of final data, number of questions removed and final questions related with Cronbach's alpha.

Round	Number of questions removed	Number of final questions	*Cronbach alpha (α)
1	0	64	0.942
2	8	56	0.954
3	4	52	0.955
4	2	50	0.953

*Cronbach's alpha indicates the reliability of the survey.

Study factors. To obtain the five factors, a rotation varimax analysis was performed (used when data is not correlated). Furthermore, the correlation of the survey was calculated, which gave as a result 0.331 to 0.689 (any items less than 0.300 should be eliminated). The final survey has 50 questions, which are validated to measure breastfeeding knowledge among college students in the United States.

3. RESULTS AND DISCUSSION

Demographics. The majority of students were white (78.85%) from United States (91.24%), were 18-22 years of age (61.06%), female (77.55%) and single (77.31%). The mean age of the sample was 25.48 (SD 9.79). Seventy two percent (72.34%) of the participants had no prior breastfeeding experience and 64.12% were breastfed as children. Participants had a mean breastfeeding knowledge score of 184.08 (SD 26.70) with a range of 96-248. Shapiro-Wilk test for normality equated to 0.950 with 761 degrees of freedom ($P < 0.001$), indicating that the data from sample was not normal.

Breastfeeding knowledge scale. The final analysis included 50 breastfeeding knowledge scale questions that remained after the exploratory factor analysis of the entire questionnaire. The internal consistency of the 50-item breastfeeding knowledge scale was measured using Cronbach's alpha. Cronbach's alpha equalled 0.953 with an item-to-total correlation range of 0.331 to 0.689, indicating all items were adequately correlated with the entire scale. After a test-retest analysis, the Cronbach's alpha for the scale was 0.933, indicating the scale is reliable when used again over time. The resulting factors related with breastfeeding knowledge of the 50 questions were: I) longterm benefits of breastfeeding, II) breastfeeding basics, III) mom and breast milk misconceptions, IV) breastfeeding misconceptions, and V) maternal benefits.

Mean breastfeeding knowledge score and mean breastfeeding in public comfort score were calculated for each demographic group and Kruskal-Wallis H tests were completed to assess differences in mean breastfeeding knowledge scale scores with an $P < 0.05$. (Table 2 to Table 15).

Significantly higher scores were seen for participants who were white than those who were Asian ($P < 0.001$). There was also significant a difference between the Asian students and black students (black higher, $P < 0.001$). A previous study in the U.S. found that females who were born outside the U.S. had lower total knowledge scores than those who were born in the U.S. (Chang *et al.* 2012). Another study in Malaysia found that 77.7% of the students had a low level breastfeeding knowledge (Hamid and Yahya 2018) (Table 2).

Table 2. Mean breastfeeding knowledge score in race

Characteristic	n	%	Mean Breastfeeding Knowledge Score (SD)	P-value
Race	727			< 0.001*
White	574	78.95	187.32 (27.32) ^a	
Other	44	6.05	180.22 (26.86) ^{ab}	
Black	69	9.49	172.78 (19.43) ^{bc}	
Asian	40	5.50	167.50 (16.34) ^{bc}	

* indicates significant difference between groups. Score range: 96-248.

Other includes American Indian or Alaska Native and Native Hawaiian or other Pacific Islander.

^{a-c} mean measures with lowercase letter indicates significant differences (P < 0.05).

Significant differences were found with regard to race (Table 3) between the Asian students and students of “other” races (i.e. American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and the combo) (P = 0.001).

Table 3. Mean comfort with viewing breastfeeding in public score in race.

Characteristic	n	%	Mean Comfort Score (SD)	P-value
Race	717			0.02*
Other	42	5.86	4.48 (0.96) ^a	
Black	67	9.34	4.10 (1.03) ^a	
White	568	79.22	4.13 (1.14) ^a	
Asian	40	5.58	3.53 (1.32) ^{ab}	

* indicates significant difference between groups. Score range: 1-5.

Other includes American Indian or Alaska Native and Native Hawaiian or other Pacific Islander.

^{a-b} mean measures with lowercase letter indicates significant differences (P < 0.05).

Among the age groups (Table 4), significant differences were found in age between those who were 18-19 and those who were 23-30 (P < 0.001) and those over 31 (P < 0.001), with 18 to 19 year olds having the lowest scores. Students who were 20-22 had significantly lower knowledge than those 23-30 (P < 0.001) and those over 31 (P < 0.001). Those 31 and over had the highest mean knowledge scores and they were significantly higher than the other groups (P < 0.011).

Participants who were 23 years of age and older had significantly higher scores across all five factors compared to those 18-22. Previous studies found no significant differences for age with regard to knowledge about breastfeeding (Afrose *et al.* 2012) (Saied *et al.* 2013).

With increased age may come a natural acquisition of knowledge obtained over time (Hamid and Yahya 2018).

Table 4. Mean breastfeeding knowledge score in age.

Characteristics	n	%	Mean Breastfeeding Knowledge Score (SD)	P-value
Age	732			< 0.001*
31+	157	21.45	213.52 (22.13) ^a	
23-30	128	17.49	194.06 (26.55) ^b	
20-22	256	34.97	173.78 (17.71) ^c	
18-19	191	26.09	168.83 (16.73) ^c	

*: Significant difference between groups. Score range: 96-248.

^{a-c} mean measures with lowercase letter indicates significant differences (P < 0.05).

Among the age groups, significant differences in comfort were found with age between those who were 18-19 and those who were 23-30 (P < 0.001) with those over 31 (P < 0.001). Students who were 20-22 had significantly lower comfort than those 23-30 (P < 0.001) and those over 31 (P < 0.001). Those 31 and over had the highest mean comfort scores and were significantly higher than the three other age groups (P = 0.011) (Table 5).

A previous study analyzed comfort in public and found that younger females (18-25 years) had negative feelings about breastfeeding in public compared to older participants who had positive evaluations (26-71 years). In the same study, younger males (18-25) had negative feelings about breastfeeding in public compared to older participants (26-71) who had positive evaluations (Acker 2009). This present study saw the lowest comfort among the youngest age group (18-19) and among males.

Table 5. Mean comfort with viewing breastfeeding in public score in age.

Characteristic	n	%	Mean Comfort Score (SD)	P-value
Age	722			< 0.001*
31+	155	21.47	4.78 (0.65) ^a	
23-30	127	17.59	4.39 (1.16) ^a	
18-19	185	25.62	3.68 (1.08) ^b	
20-22	255	35.32	3.80 (1.20) ^b	

*: Significant difference between groups. Score range: 1-5.

^{a-b} mean measures with lowercase letter indicates significant differences (P < 0.05).

Significant differences were found in gender between females and males ($P < 0.001$) as well as females and “other” students (i.e. students who identify as genders other than male or female) ($P = 0.002$). Females had the highest knowledge of all genders (Table 6).

Students who had the higher breastfeeding knowledge total scores tended to be either married, female, of older age (23+), with breastfeeding experience or were white. Similar results were seen in a previous study with females having significantly higher knowledge than the males (Hamid and Yahya 2018). Females may have higher breastfeeding knowledge due to the fact that breastfeeding is a female act. There is no current literature comparing breastfeeding knowledge by the other demographics among college students. In this sample, the participants who identified as female had significantly higher scores across all five factors compared to self-identified males. A previous study in the literature saw males having less knowledge about breastfeeding than females (Chang *et al.* 2012).

Table 6. Mean breastfeeding knowledge score in gender.

Characteristic	n	%	Mean Breastfeeding Knowledge Score (SD)	P-value
Gender	735			$< 0.001^*$
Female	570	77.55	189.52 (26.68) ^a	
Male	157	21.36	167.10 (20.89) ^b	
Other	8	1.09	159.12 (27.41) ^{ab}	

*: Significant difference between groups. Score range: 96-248.

Other includes transgender female, transgender male, gender variant or non-conforming, not listed and prefer to not answer.

^{a-b} mean measures with lowercase letter indicates significant differences ($P < 0.05$).

In addition, significant differences in comfort were found between males and females ($P < 0.001$); females having higher scores. Students who either had prior breastfeeding experience, who were married, female, or older than typical college age (over 23) but not those who were not breastfed as kids had significantly higher comfort than their counterparts. A previous study found similar results with regard to increased comfort and higher age (Mulready-ward and Hackett 2014), but there is no evidence in the literature discussing the other demographics and breastfeeding comfort (Table 7). Another study that analyzed comfort showed that men were less likely to not fully support breastfeeding in shopping malls and restaurants, but found no significant associations by gender (Russell and Ali 2017).

Table 7. Mean comfort with viewing breastfeeding in public score in gender.

Characteristics	n	%	Mean Comfort Score (SD)	P-value
Gender	725			< 0.001*
Male	154	21.24	3.75 (1.19) ^a	
Female	563	77.66	4.23 (1.09) ^b	
Other	8	1.10	3.50 (1.77) ^{ab}	

*: Significant difference between groups. Score range: 1-5.

Other includes transgender female, transgender male, gender variant or non-conforming, not listed and prefer to not answer.

^{a-b} mean measures with lowercase letter indicates significant differences ($P < 0.05$).

Married participants had significantly higher scores than single participants ($P < 0.001$). A study in Bangladesh showed no significant association between knowledge and marital status (Afrose *et al.* 2012). For students who are married there may be an increased likelihood of children in the household who may have been breastfed (Hamid and Yahya 2018) (Table 8).

Table 8. Mean breastfeeding knowledge score in marital status.

Characteristic	n	%	Mean Breastfeeding Knowledge Score (SD)	P-value
Marital Status	736			< 0.001*
Married	167	22.69	214.30 (20.89)	
Single	569	77.31	175.67 (21.69)	

*: Significant differences between groups. Score range: 96-248.

Married students felt more comfortable with breastfeeding in public than single students ($P < 0.001$). There is no literature to compare marital status and comfort level of breastfeeding (Table 9).

Table 9. Mean comfort with viewing breastfeeding in public score in marital status.

Characteristics	n	%	Mean Comfort Score (SD)	P-value
Marital Status	726			< 0.001*
Married	166	22.87	4.70 (0.85)	
Single	560	77.13	3.95 (1.16)	

*: Significant difference between groups. Score range: 1-5.

Participants who indicated they previously breastfed a child had significantly higher scores than those without experience ($P < 0.001$). The literature does not show results about breastfeeding experience in relation to differences in breastfeeding knowledge. However, a study in 2013 showed that mother's knowledge was highly correlated to attitude (Saied *et al.* 2013) ($r = 0.714$) (Table 10). Women who have breastfed children may naturally have higher knowledge than women with no prior experience (Hamid and Yahya 2018).

Table 10. Mean breastfeeding knowledge score in breastfeeding experience (breastfeeding and seeing other people doing it).

Characteristic	n	%	Mean Breastfeeding Knowledge Score (SD)	P-value
Breastfeeding experience	582			< 0.001*
Yes	161	27.66	218.86 (20.66)	
No	421	72.34	175.36 (18.74)	

*: Significant difference between groups. Score range: 96-248.

Females with breastfeeding experience (i.e. breastfed a child) felt more comfortable than females without breastfeeding experience ($P < 0.001$) (Table 11). Comfort is not the same as attitude, but when participants had higher knowledge their attitude about breastfeeding was also more positive. Often times researches gauge breastfeeding attitude with an item related comfort in some way (Saied *et al.* 2013). The participants with prior exposure may be developed comfort earlier in life that has strengthened over time. With age comes maturity, which may lead to increased comfort with viewing breastfeeding (Mulready-ward and Hackett 2014).

Table 11. Mean comfort with viewing breastfeeding in public score in breastfeeding experience (breastfeeding and seeing other people doing it).

Characteristic	n	%	Mean Comfort Score (SD)	P-value
Breastfeeding experience	579			< 0.001*
Yes	160	27.63	4.84 (0.63)	
No	419	72.37	3.95 (1.15)	

*: Significant difference between groups. Score range: 1-5.

Significant differences were found between students that did not know if they were breastfed as children and both those who were breastfed ($P < 0.001$) and those that were not ($P < 0.001$) (Table 12). Students who were not breastfed as children had significantly higher scores across five factors (II, III, IV, V) compared to the students who did not know if they were breastfed. One study showed that those who had been breastfed as infants scored significantly higher in infant feeding knowledge, compared to those who were unsure (Kavanagh *et al.* 2012). These results are conflicting; one of the possible reasons may be education. Participants who took the survey were enrolled in college and some of them may have had classes with topics related to breastfeeding or infant feeding. This may be contributing to higher knowledge despite not being breastfed as children.

Table 12. Mean breastfeeding knowledge score in breastfed as a child.

Characteristic	n	%	Mean Breastfeeding Knowledge Score (SD)	P-value
Breastfed as a child	733			< 0.001*
Yes	470	64.12	184.89 (25.86) ^a	
No	174	23.74	190.28 (28.68) ^a	
Don't Know	89	12.14	170.49 (21.55) ^b	

*: Significant difference between groups. Score range: 96-248.

^{a-b} mean measures with lowercase letter indicates significant differences ($P < 0.05$).

Significant differences were found between students that did not know if they were breastfed as children and both of those who were breastfed ($P < 0.001$) and those that were not ($P < 0.001$). There is no literature that compares comfort level and been breastfed as a child (Table 13).

Table 13. Mean comfort score in breastfed as a child.

Characteristic	n	%	Mean Comfort Score (SD)	P-value
Breastfed as a child	729			< 0.001*
No	173	23.73	4.28 (1.10) ^a	
Yes	467	64.06	4.18 (1.08) ^a	
Don't know	89	12.21	3.52 (1.30) ^b	

*: Significant difference between groups. Score range: 1-5.

^{a-b} mean measures with lowercase letter indicates significant differences (P < 0.05).

There was no statistical difference between U.S. and international students related to level of breastfeeding knowledge (P = 0.052). U.S. students had a slightly higher mean knowledge score (Table 14). There was no significant differences between U.S. and International students with regard to breastfeeding knowledge. There are no studies in the literature comparing these two groups of college students in the same sample. There is also a lack of studies comparing any group of U.S. and International people with regard to breastfeeding knowledge. Reasoning for this may be similar to that for the lack of differences in comfort. Despite coming from countries with a more natural acceptance of breastfeeding compared to U.S., International students do not seem to be any more knowledgeable about breastfeeding.

Table 14. Mean breastfeeding score in international status.

Characteristic	n	%	Mean Breastfeeding Knowledge Score (SD)	P- value
International status	731			P = 0.052
Domestic (U.S.)	667	91.24	184.96 (26.74)	
Foreign (Non- U.S.)	64	8.76	178.18 (25.39)	

Score range: 96-248.

There was no significant difference between U.S. and International students (P = 0.0542) with regard to comfort with seeing women breastfeed in public. U.S students had slightly higher mean comfort (Table 15). This is the first study of its kind to compare comfort between these groups in the same sample. The relatively small sample of International students in the study (8.53%) may not have been large enough to show any difference compared to the large U.S. sample (91.47%). The survey did not ask International students to indicate how long they have been in the U.S. Those who have been in the U.S. longer may have adapted to the culture ways of the U.S.

Table 15. Mean comfort with viewing breastfeeding in public score in international status.

Characteristic	n	%	Mean Comfort Score (SD)	P-value
International status	727			P = 0.542
Domestic (U.S.)	665	91.47	4.12 (1.12)	
Foreign (Non- U.S.)	62	8.53	4.03 (1.29)	

Score range: 1-5.

International status of the survey was predominant in the Asian continent (Table 16). In general, the study did not find differences between domestic and foreign students. The literature shown that students in Malaysia had lower level of breastfeeding knowledge and uncomfortable with seeing women breastfeeding in public (Hamid and Yahya 2018). Another study in China shown that students believed that breastfeeding in public would be embarrassed (Lou *et al.* 2014).

Table 16. Distribution of countries for international status divided into continents.

Continent	International participants	%
Asia	30	46.9
Latin America	21	32.8
Europe	6	9.4
Africa	4	6.3
Oceania	2	3.1
North America	1	1.6
Total	64	100

*North America includes Canada.

Breastfeeding knowledge factors. Results of further nonparametric univariate testing to examine how the mean scores of the individual scale factors differed by the demographics, are displayed in the follow tables $P < 0.0025$. A Kruskal-Wallis H test was performed to determine differences in total breastfeeding knowledge score and the individual factors scores by each level of comfort with breastfeeding in public. All scores (mean total and mean factor scores) were significantly higher ($P < 0.001$) for participants who selected their comfort level as “very comfortable” than all other participants who had selected comfort levels of “slightly comfortable” or less.

Significantly higher scores were observed among white vs black participants for factor I (longterm benefits), III (mom and breast milk misconceptions), and IV (breastfeeding misconceptions). For factor V (maternal benefits), white participants had significantly

higher scores than the Asian participants, but not the black. Students rating comfort as “very comfortable” had significantly higher total knowledge scores and mean factor scores (all factors) than those rating comfort as “slightly comfortable” or less. There is no literature that relates breastfeeding knowledge to comfort with viewing breastfeed in public.

Factor I. There was no significant difference between U.S. and International students ($P = 0.622$) with regard to knowledge about the long-term benefits of breastfeeding, although U.S. student’s mean score was slightly higher. On the contrary, significant differences were found between students who were 18-19 and those who were 23-30 ($P < 0.001$), and also those over 31 ($P < 0.001$). Mean factor I scores were the lowest for 18 to 19 years old. Females had higher scores than males ($P < 0.001$). Also, significant differences were found between the white (higher) and black participants ($P = 0.002$). Married students had significantly higher scores than single students ($P < 0.001$). Students who were breastfed as children had significantly higher scores than students who did not know if they were breastfed ($P = 0.001$). Those who had breastfed a child themselves had significantly higher scores than those women who had no experience ($P < 0.001$) (Table 17 and Table 18).

Table 17. Mean long term benefits score about International status, age and gender.

Characteristic	Mean Long Term Benefits Score (SD) ^a	P-value
International Status (n=731)		$P = 0.622$
No (U.S. citizen)	3.53 (0.75)	
Yes	3.49 (0.81)	
Age (years) (n=732)		$< 0.001^*$
31 and over	4.06 (0.72) ^a	
23 - 30	3.71 (0.73) ^b	
20 - 22	3.36 (0.68) ^c	
18 - 19	3.21 (0.60) ^c	
Gender (n=735)		$< 0.001^*$
Female	3.61 (0.75) ^a	
Male	3.27 (0.64) ^b	
Other	2.78 (1.10) ^{ab}	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-b} mean measures with lowercase letter indicates significant differences ($P < 0.05$).

Table 18. Mean long term benefits score in race, marital status, breastfed as a child and breastfeeding experience.

Characteristic	Mean Long Term Benefits Score (SD) ^a	P-value
Race (n=727)		< 0.001*
White	3.59 (0.74) ^a	
Other	3.50 (0.86) ^a	
Black	3.42 (0.71) ^{ab}	
Asian	3.26 (0.66) ^b	
Marital status (n=736)		< 0.001*
Married	4.03 (0.71)	
Single	3.38 (0.70)	
Breastfed as a Child (n=733)		< 0.001*
No	3.55 (0.79) ^a	
Yes	3.47 (0.74) ^a	
Don't know	3.26 (0.70) ^{ab}	
Breastfeeding experience (n=582)		< 0.001*
Yes	4.11 (0.73)	
No	3.37 (0.66)	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-b} mean measures with lowercase letter indicates significant differences (P < 0.05).

Factor II. There was no significant difference between U.S. and international students (P = 0.347) with regard to knowledge about breastfeeding basics. Students from either group had nearly identical mean factor scores. On the other hand, significant difference was found between students who were 18-19 and those who were 23-30 (P < 0.001) and also these 31 and over (P < 0.001) with lowest mean scores in 18 to 19 groups. Those 20-22 had the lower mean score than those 23-30 (P < 0.001), and those over 31 (P < 0.001). Finally, those 23-30 had significantly lower scores than those over 31 (P < 0.001). Females had significantly higher scores than males (P < 0.001). On the contrary, there was no significant difference in race for this factor (P = 0.011). Married students had significantly higher scores than single students (P < 0.001). Significantly lower scores were observed for students that did not know if they were breastfed as children compare to those who were breastfed (P < 0.001) and also those that were not (P < 0.001). Those who had breastfed a child themselves had significantly higher scores than those women who had no prior experience (P < 0.001) (Table 19 and Table 20).

Table 19. Mean breastfeeding basics score about International status, age and gender.

Characteristic	Mean Breastfeeding Basics Score (SD) ^a	P-value
International Status (n=731)		P = 0.347
No (U.S. citizen)	4.09 (0.54)	
Yes	4.05 (0.45)	
Age (years) (n=732)		< 0.001*
31 and over	4.47 (0.39) ^a	
23 - 30	4.22 (0.50) ^b	
20 - 22	3.96 (0.48) ^{ac}	
18 - 19	3.88 (0.50) ^c	
Gender (n=735)		< 0.001*
Female	4.18 (0.48) ^a	
Male	3.77 (0.51) ^b	
Other	3.73 (1.03) ^{bc}	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-c} mean measures with lowercase letter indicates significant differences (P < 0.05).

Table 20. Mean breastfeeding basics score in race, marital status, breastfed as a child and breastfeeding experience.

Characteristic	Mean Breastfeeding Basics Score (SD) ^a	P-value
Race (n=727)		P = 0.011
White	4.10 (0.53)	
Black	4.05 (0.46)	
Asian	3.95 (0.42)	
Other	4.05 (0.66)	
Marital status (n=736)		< 0.001*
Married	4.47 (0.38)	
Single	3.98 (0.51)	
Breastfed as a Child (n=733)		< 0.001*
No	4.19 (0.53) ^a	
Yes	4.11 (0.51) ^a	
Don't know	3.80 (0.56) ^b	
Breastfeeding experience (n=582)		< 0.001*
Yes	4.53 (0.42)	
No	4.00 (0.46)	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-c} mean measures with lowercase letter indicates significant differences (P < 0.05).

Factor III. Significantly higher scores were observed in U.S. students than International students ($P < 0.001$) with regard to misconceptions about mom and her breast milk. In the same way, significant difference was found between students who were 18-19 and those who were 23-30 ($P < 0.001$), and also these 31 and over ($P < 0.001$) with the lowest mean scores in 18 to 19 year olds. Those 20-22 had the lower mean score than those 23-30 ($P < 0.001$), and those over 31 ($P < 0.001$). Finally, those 23-30 had significantly lower scores than those over 31 ($P < 0.001$). Females had significantly higher scores than males ($P < 0.001$). Also, significantly higher scores were found for white compared to black participants ($P < 0.001$), and white compared to Asian participants ($P < 0.001$). Married students had significantly higher scores than single students ($P < 0.001$). Significantly higher scores were found for students that did not know if they were breastfed as children compared to those who were breastfed ($P = 0.001$) and also those that were not ($P < 0.001$). Those who had breastfed a child themselves had significantly higher scores than those women who had no experience ($P < 0.001$) (Table 21 and Table 22).

The five individual factors were analyzed for differences between the demographic groups, the only factor that was significantly different between U.S. and International students was that related to misconceptions about mom’s lactation and her breast milk (Factor III), with U.S. students having higher mean scores. Breastfeeding education and promotion in the U.S. consider breast milk to the “clinical gold standard” for infants over infant formula. Not as much information is given to overcome common misconceptions about milk quality and mom’s quality of life while breastfeeding but is available if one looks for it (CDC 2019).

Table 21. Mean mom and breast milk misconceptions about International status, age and gender.

Characteristic	Mean Mom and breast milk Misconceptions Score (SD)^a	P-value
International Status (n=731)		< 0.001*
No (U.S. citizen)	3.74 (0.58)	
Yes	3.45 (0.60)	
Age (years) (n=732)		< 0.001*
31 and over	4.32 (0.45) ^a	
23 - 30	3.88 (0.60) ^b	
20 - 22	3.51 (0.43) ^c	
18 - 19	3.39 (0.45) ^c	
Gender (n=735)		< 0.001*
Female	3.82 (0.58) ^a	
Male	3.35 (0.46) ^b	
Other	3.16 (0.69) ^{ab}	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-c} mean measures with lowercase letter indicates significant differences ($P < 0.05$).

Table 22. Mean mom and breast milk misconceptions in race, marital status, breastfed as a child and breastfeeding experience.

Characteristic	Mean Mom and breast milk misconceptions score (SD) ^a	P-value
Race (n=727)		< 0.001*
White	3.79 (0.59) ^a	
Black	3.48 (0.50) ^b	
Other	3.52 (0.54) ^b	
Asian	3.23 (0.51) ^b	
Marital status (n=736)		< 0.001*
Married	4.33 (0.45)	
Single	3.53 (0.50)	
Breastfed as a Child (n=733)		< 0.001*
No	3.87 (0.61) ^a	
Yes	3.70 (0.58) ^a	
Don't know	3.46 (0.50) ^b	
Breastfeeding experience (n=582)		< 0.001*
Yes	4.41 (0.41)	
No	3.52 (0.48)	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-c} mean measures with lowercase letter indicates significant differences ($P < 0.05$).

Factor IV. There was no significant difference between U.S. and international students ($P = 0.592$) with regard to knowledge about breastfeeding misconceptions. On the contrary, significant differences were found between students who were 18-19 and those who were 23-30 ($P < 0.001$), and also these 31 and over ($P < 0.001$) with the lowest mean scores in 18-19. Those 20-22 had the lower mean scores than those 23-30 ($P < 0.001$), and those over 31 ($P < 0.001$). Finally, those 23-30 had significantly lower scores than those over 31 ($P < 0.001$). Females had higher scores than males ($P < 0.001$). Also, significantly higher scores were observed in compared to white and black participants ($P < 0.001$), and white compared to Asian participants ($P < 0.001$). Married students had significantly higher scores than single students ($P < 0.001$). Significantly lower scores differences were seen for students that did not know if they were breastfed as children compared to those who were breastfed ($P = 0.002$) and also those that were not ($P < 0.001$). Those who had breastfed a child themselves had significantly higher scores than those women who had no experience ($P < 0.001$) (Table 23 and Table 24).

Table 23. Mean breastfeeding misconceptions score about International status, age and gender.

Characteristic	Mean Breastfeeding Misconceptions Score (SD)^a	P-value
International Status (n=731)		P = 0.592
No (U.S. citizen)	3.33 (0.77)	
Yes	3.23 (0.61)	
Age (years) (n=732)		< 0.001*
31 and over	4.20 (0.59) ^a	
23 - 30	3.66 (0.74) ^b	
20 - 22	2.97 (0.47) ^c	
18 - 19	2.87 (0.44) ^c	
Gender (n=735)		< 0.001*
Female	3.45 (0.79) ^a	
Other	3.03 (0.38) ^b	
Male	2.82 (0.45) ^{ab}	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-b} mean measures with lowercase letter indicates significant differences (P < 0.05).

Table 24. Mean breastfeeding misconceptions score in race, marital status, breastfed as a child and breastfeeding experience.

Characteristic	Mean Breastfeeding misconceptions score (SD)^a	P-value
Race (n=727)		< 0.001*
White	3.41 (0.78) ^a	
Other	3.24 (0.64) ^b	
Asian	2.92 (0.44) ^b	
Black	2.91 (0.56) ^b	
Marital status (n=736)		< 0.001*
Married	4.28 (0.55)	
Single	3.05 (0.56)	
Breastfed as a Child (n=733)		< 0.001*
No	3.49 (0.84) ^a	
Yes	3.32 (0.74) ^a	
Don't know	3.02 (0.56) ^b	
Breastfeeding experience (n=582)		< 0.001*
Yes	4.42 (0.43)	
No	3.02 (0.51)	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-b} mean measures with lowercase letter indicates significant differences (P < 0.05).

Factor V. There was no significant difference between U.S. and international students ($P = 0.006$) with regard to knowledge about maternal benefits of breastfeeding. On the contrary, significant differences were found between students who were 18-19 and those who were 23-30 ($P < 0.001$), and also these 31 and over ($P < 0.001$). Those 20-22 had the lower mean scores than those 23-30 ($P < 0.001$), and those over 31 ($P < 0.001$). Finally, those 23-30 had significantly scores than those over 31 ($P < 0.001$). Females had significantly higher scores than males ($P < 0.001$). In addition, significantly higher lower scores were seen in white compared to Asian participants ($P < 0.001$). Married students had significantly higher scores than single students ($P < 0.001$). Significantly lower scores were seen in students who did not know if they were breastfed as children compared to those who were breastfed ($P = 0.002$) and also those that were not ($P < 0.001$). Those who had breastfed a child themselves had significantly higher scores than those women who had no experience ($P < 0.001$) (Table 25 and Table 26).

Table 25. Mean maternal benefits score about International status, age and gender.

Characteristic	Mean Maternal Benefits Score (SD) ^a	P-value
International Status (n=731)		P = 0.006
No (U.S. citizen)	3.51 (0.77)	
Yes	3.26 (0.87)	
Age (years) (n=732)		< 0.001*
31 and over	4.06 (0.78) ^a	
23 - 30	3.66 (0.82) ^b	
18 - 19	3.27 (0.60) ^c	
20 - 22	3.22 (0.68) ^c	
Gender (n=735)		< 0.001*
Female	3.61 (0.80) ^a	
Male	3.12 (0.55) ^b	
Other	2.70 (0.91) ^{ab}	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-c} mean measures with lowercase letter indicates significant differences ($P < 0.05$).

Table 26. Mean maternal benefits in race, marital status, breastfed as a child and breastfeeding experience.

Characteristic	Mean Maternal Benefits Score (SD) ^a	P-value
Race (n=727)		< 0.001*
White	3.55 (0.77) ^a	
Other	3.54 (0.82) ^b	
Black	3.23 (0.77) ^{ab}	
Asian	3.01 (0.64) ^b	
Marital status (n=736)		< 0.001*
Married	4.10 (0.75)	
Single	3.32 (0.70)	
Breastfed as a Child (n=733)		< 0.001*
No	3.64 (0.84) ^a	
Yes	3.50 (0.77) ^a	
Don't know	3.19 (0.65) ^b	
Breastfeeding experience (n=582)		< 0.001*
Yes	4.20 (0.77)	
No	3.30 (0.67)	

^a Mann-Whitney U and Kruskal Wallace H tests were used to determine differences in mean factor scores. * indicates a significant difference between groups. Score range: 1-5.

^{a-c} mean measures with lowercase letter indicates significant differences (P < 0.05).

4. CONCLUSIONS

- The validated survey demonstrated efficiency collecting information about international and national students in Baton Rouge, Louisiana about their knowledge level and comfort regarding breastfeeding.
- Factor III, mom and breast milk misconceptions score, was the only one that showed significant differences between national and international students.
- Regarding demographic variables; gender, age, marital status, and previous breastfeeding experience, have a wide impact on different levels of comfort.

5. RECOMMENDATIONS

- Increase the number of international students in future surveys.
- Collect data at the beginning of the classes, so participants have enough time to complete the survey.
- The researcher could give incentive gifts or extra credit to improve the number of participants who complete the entire survey.
- For future studies, religion should be taken into consideration as one of the demographic variables.
- Take into account in future studies from which part of the state the evaluated people are because cultural vision and practices could change between different areas in the state.

6. REFERENCES

- Acker M. 2009. Breast is Best...But Not Everywhere: Ambivalent Sexism and Attitudes Toward Private and Public Breastfeeding. *Sex Roles*. 61(7-8):476–490. doi:10.1007/s11199-009-9655-z.
- Afrose L, Banu B, Ahmed KR, Khanom K. 2012. Factors associated with knowledge about breastfeeding among female garment workers in Dhaka city. *WHO South East Asia J Public Health*. 1(3):249–255. eng. doi:10.4103/2224-3151.207021.
- AWHONN. 2015. Breastfeeding. *J Obstet Gynecol Neonatal Nurs*. 44(1):145–150. eng. doi:10.1111/1552-6909.12530.
- Brahmbhatt KR, Chandana G, Vishwanath J, Raman R, Jayaram S, Mallya S, Shetty H, D'Silva R, Shetty S. 2016. Knowledge of breastfeeding among female college students: institution based cross-sectional study. *Int J Community Med Public Health*. 3(6):1579–1583. eng. doi:10.18203/2394-6040.ijcmph20161632.
- CDC, Centers for Disease Control and Prevention. 2019. Breastfeeding, why it matters.[internet]. United States: CDC; [consulted in July 16th, 2019]. <https://www.cdc.gov/breastfeeding/about-breastfeeding/why-it-matters.html>.
- Chang Y, Valliant M, Bomba AK. 2012. Gender differences in knowledge and attitude regarding breastfeeding. *International Journal of Consumer Studies*. 36(3):342–351. doi:10.1111/j.1470-6431.2010.00994.x.
- Hamid SBA, Yahya N. 2018. Knowledge attitude prior exposure and intention to breastfeed among undergraduate university students. *J Clin Health Sci*. 3(2):26-35. eng. eISSN 0127-984X.
- IDRE (Institute for Digital Research and Education). 2006. What does Cronbach's alpha mean? SPPS FAQ. [internet]. United States. UCLA. [Review on February, 15th].
- Jolly L, Pagels P, Woodfin G, Silver M, Kindratt T, Gimpel N. 2013. Knowledge and attitudes toward breastfeeding in an African American male population. *J Obstet Gynecol Neonatal Nurs*. 42(6):664–671. eng. doi:10.1111/1552-6909.12258.
- Karanci G, Yenel K. 2014. Breastfeeding knowledge among working pregnant women in Turkey. *Workplace Health Saf*. 62(4):143–148. eng. doi:10.1177/216507991406200403.
- Kavanagh KF, Lou Z, Nicklas JC, Habibi MF, Murphy LT. 2012. Breastfeeding knowledge, attitudes, prior exposure, and intent among undergraduate students. *J Hum Lact*. 28(4):556–564. eng. doi:10.1177/0890334412446798.

- Kent M. 2016. Food and fitness: A dictionary of diet and exercise: Over 2,000 entries. Second edition. Oxford: Oxford University Press. 1 p. (Oxford reference). ISBN: 9780191803239. eng. <http://www.oxfordreference.com/view/10.1093/acref/9780191803239.001.0001/acref-9780191803239>.
- Laanterä S, Pölkki T, Ekström A, Pietilä AM. 2010. Breastfeeding attitudes of Finnish parents during pregnancy. *BMC Pregnancy Childbirth*. 10:79. eng. doi:10.1186/1471-2393-10-79.
- Lessen R, Kavanagh K. 2015. Position of the academy of nutrition and dietetics: promoting and supporting breastfeeding. *J Acad Nutr Diet*. 115(3):444–449. eng. doi:10.1016/j.jand.2014.12.014.
- Lou Z, Zeng G, Orme JG, Huang L, Liu F, Pang X, Kavanagh KF. 2014. Breastfeeding knowledge, attitudes, and intention in a sample of undergraduate students in Mainland China. *J Hum Lact*. 30(3):331–339. eng. doi:10.1177/0890334414526058.
- Mohamadi F, Rostami K, Gholamzadeh S, Noghabi FA, Sadaghi T. 2017. Analysis of the concept of successful breastfeeding. *International Journal of Medical Research and Health Sciences* 6(10):65-75. eng. ISSN No: 2319-5886
- Mulready-Ward C, Hackett M. 2014. Perception and attitudes: breastfeeding in public in New York City. *J Hum Lact*. 30(2):195–200. eng. doi:10.1177/0890334414524988.
- Natan MB, Haikin T, Wiesel R. 2018. Breastfeeding knowledge, attitudes, intentions, and perception of support from educational institutions among nursing students and students from other faculties: A descriptive cross-sectional study. *Nurse Education today*. 66–70. eng. doi:10.1016/j.ndt.2018.05.026.
- Russell K, Ali A. 2017. Public Attitudes Toward Breastfeeding in Public Places in Ottawa, Canada. *J Hum Lact*. 33(2):401–408. eng. doi:10.1177/0890334417695203.
- Saied H, Mohamed A, Suliman A, Al Anazi W. 2013. Breastfeeding knowledge, Attitude and Barriers among Saudi Women in Riyadh. *J. Nat. Sci. Res*. 3(12), 6-13. eng. ISSN 2224-3186.
- Sharma M, Petosa RL. 2012. Measurement and evaluation for health educators. 1st edition. Burlington, MA (USA). Jones & Barlett Publisher.
- Shaw SC, Devgan A. 2018. Knowledge of breastfeeding practices in doctors and nurses: A questionnaire-based survey. *Med J Armed Forces India*. 74(3):217–219. eng. doi:10.1016/j.mjafi.2016.11.015.
- Spear HJ. 2007. College students' experiences and attitudes regarding middle and high school-based breastfeeding education. *J. Sch. Nurs*. 23(5): 276-82. eng. doi:10.1177/10598405070230050601.
- Tamim H, Ghandour LA, Shamsedine L, Charafeddine L, Nasser F, Khalil Y, Nabulsi M. 2016. Adaptation and validation of the Arabic version of the infant breastfeeding knowledge questionnaire among Lebanese women. *J Hum Lact*. 32(4):682–688. eng. doi:10.1177/0890334416663474.

7. APPENDIX

Appendix 1. Study survey instrument

Instructions: For each question, read each statement and indicate your level of agreement by circling the appropriate response. Please do not leave any questions blank.

1. It is recommended that babies be fed just breastmilk for the first 6 months of life.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
2. It is recommended that babies be fed breastmilk with other appropriate foods from 6 months to as long as the mother and baby desire.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
3. The first choice for feeding a premature baby should be the mother's milk.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
4. When a mother cannot produce breastmilk, safe donor milk is an acceptable substitute.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
5. Breastfeeding is the process of feeding a mother's breastmilk to her baby either directly from the breast or by pumping it out and feeding with a bottle.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
6. Infants who are hungry will nuzzle against their mother's breast and make sucking motions or will put their hands in their mouths.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
7. A mother should try to breastfeed infant for the first time as soon as possible after the infant is born.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Continuation of appendix 1.

8. Infants who are hungry will nuzzle against their mother's breast and make sucking motions or will put their hands in their mouths.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
9. A mother should try to breastfeed infant for the first time as soon as possible after the infant is born.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
10. Breastfeeding a baby during the night is not needed.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
11. Infants can breathe normally while feeding at the breast.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
12. A good latch is important for both effective breastfeeding and mothers' comfort.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
13. To break the suction and end a breastfeeding session, the mother must wait for the baby to unlatch and fall asleep.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
14. Mothers should allow their infant to set his or her own nursing pattern.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
15. Most mothers will not be able to produce enough breastmilk to maintain breastfeeding very long after birth.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
16. A baby less than 3 months old only needs about 575 calories a day.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
17. Breastfeeding may be natural, but it is also a skill that takes practice.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Continuation of appendix 1.

18. The “let-down reflex” is another term for when the milk is being sent to the milk ducts in the breast.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
19. Stress and anxiety are two factors that may affect the mother’s ability to eject breastmilk when the baby is ready feed.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
20. Babies who are breastfed have decreased risk for childhood obesity.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
21. Babies who are breastfed have decreased risk for developing Type II diabetes later in life.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
22. Breastfed babies need to be fed on a schedule, just like formula fed babies.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
23. If breastfeeding starts out difficult, it will only get worse.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
24. Breasts take a long time to fill back up after each feed.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
25. Babies who are breastfed have decreased risk for developing asthma.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
26. Babies who are breastfed experience less ear infections.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
27. Babies who are breastfed experience less respiratory infections.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
28. Babies who are breastfed experience less gastrointestinal infections.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Continuation of appendix 1.

29. Babies who are breastfed experience less eczema.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
30. Individuals who were breastfed experience higher scores on intelligence tests later in life.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
31. Breastfeeding mothers do not get as much sleep as non-breastfeeding mothers.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
32. Breastfeeding should be stopped altogether if a baby develops diarrhea or is vomiting frequently.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
33. Mothers who breastfeed their newborns have decreased risk for postpartum depression.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
34. Mothers who breastfeed their newborns have increased risk for hypertension.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
35. Mothers who breastfeed their newborns have decreased risk for breast cancer before the age of 50.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
36. Mothers who breastfeed their newborns have increased risk for Type II diabetes.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
37. Mothers whom breastfeed their newborns will possibly experience greater infant bonding.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
38. Mothers whom breastfeed their newborns can experience greater postpartum weight loss compared to mothers who do not breastfeed.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Continuation of appendix 1.

39. Mothers who breastfeed their newborns may experience a delay in ovulation.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
40. Mothers who breastfeed their newborns may experience a delay in the return of their monthly period.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
41. When a breastfed is sick, the mother's milk adapts and changes to provide the proper nutrients to fight off the illness.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
42. Breastfeeding mothers should stop breastfeeding if they currently use or start using illicit drugs.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
43. Mothers diagnosed with Human Immunodeficiency Virus (HIV) should not breastfeed their baby.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
44. Breastfed babies need other types of milk, other than breastmilk, after 6 months of age.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
45. Mothers who were diagnosed with chicken pox the week of giving birth should avoid breastfeeding altogether and feed with just formula.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
46. A mother who is undergoing intravenous (IV) chemotherapy treatment should not breastfeed her baby until treatment is complete.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Continuation of appendix 1.

47. Mothers who use marijuana with tetrahydrocannabinol (THC) should stop using or significantly reduce usage if they plan to breastfeed their baby.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
48. Mothers who are diagnosed with any type of Hepatitis can safely breastfeed their babies.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
49. Mothers should wait 3 to 4 hours after consuming alcohol to resume breastfeeding their child.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
50. Mothers should wait 3 to 4 hours after smoking a cigarette to resume breastfeeding their child.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
51. Mothers can safely use legal cannabidiol (CBD) products and breastfeed their child.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
52. Babies who have jaundice, or yellow discoloration of the skin after birth, can still breastfeed as normal.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
53. Once a baby starts to eat solid food, they no longer need breastmilk.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
54. Mothers who have a cold or the flu can safely breastfeed their babies while sick.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
55. Many over-the-counter medications are safe for breastfeeding mothers to take while breastfeeding.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
56. Mothers who experience blood sugar control issues during pregnancy can safely breastfeed their babies after birth.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Continuation of appendix 1.

57. It is normal for breastfeeding to hurt the mother.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
58. There is no way for a mother to tell if her baby is getting enough breastmilk to eat.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
59. Infant formulas available today have identical ingredients as human breastmilk.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
60. Breast size directly determines how much milk a mother will be able to produce.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
61. A mother cannot produce enough milk to satisfy her baby for the first few days after birth.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
62. Frequent breastfeeding and pumping will lessen the quality of the breastmilk being produced.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
63. Frequent breastfeeding and pumping will lessen overall production of breastmilk.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
64. Breastfeeding mothers must feed from each breast each time they breastfeed their baby.	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

Instructions: For this last section, please select or provide your response to each question.

All responses will be kept confidential and private.

65. How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor or pharmacy? (check one)

- Never
- Rarely
- Sometimes
- Often
- Always

Continuation of appendix 1.

66. Are you aware that the LSU campus has its own lactation space program with designated private rooms solely used for breastfeeding and pumping breastmilk?

- Yes
- No

67. What is your level of knowledge about the LSU Tiny Tigers Pregnancy and Parenting Program?

- Heard of, and know a lot about
- Heard of, but do not know much about
- Just heard about it somewhere
- Have not heard of nor know nothing about

68. What is the highest degree or level of school you have completed? (check one)

- Less than high school degree
- High School Graduate (high school diploma or equivalent, including GED)
- Some college, but no degree
- Associate's degree in college (2-year)
- Bachelor's degree in college (4-year)
- Master's degree
- Doctoral degree
- Professional degree (JD, MD)

69. What is your marital status? (check one)

- Never married
- Married
- Widowed
- Divorced
- Separated

70. What is your current age? _____

71. To which gender identity to you most identify. (check one)

- Female
- Male
- Transgender Female
- Transgender Male
- Gender variant/Non-Conforming
- Not Listed (open text box)
- Prefer not to answer

72. Are you Hispanic or Latina? (A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.):

- No, not Hispanic or Latina(o),
- Yes, Hispanic or Latina(o)

Continuation of appendix 1.

73. How would you describe yourself? (Choose one or more from the following):

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White

74. Do you currently work for pay? (check one)

- Yes, full time (>32 hours/week)
- Yes, part time (< 32 hours/week)
- Full time student, not currently employed
- Not currently employed nor in school

75. When you were a baby, were you ever breastfed? (check one)

- Yes
- No
- Don't Know

75.2. Have you ever breastfed a child?

- Yes
- No
- N/A

75.3. Are you currently breastfeeding a child?

- Yes
- No
- N/A

75.4. Have you ever utilized a private lactation space on the LSU campus?

- Yes
- No

76. Are you an international student or a citizen of a country other than the United States?

- Yes
- No

76.1. If, yes to question #76, what country are you from?

77. What college is your academic major housed in?

Continuation of appendix 1.

78. How comfortable are you seeing a mother breastfeed her child openly in public in front of other people? (check one)

- Very comfortable
- Slightly comfortable
- Neither comfortable nor uncomfortable
- Slightly uncomfortable
- Very uncomfortable