June 2020

Assessing Breastfeeding Knowledge, Attitudes and Intention Among Adult Female Undergraduate and Graduate Students

Kritee Niroula
Louisiana State University and Agricultural and Mechanical College

ASSESSING BREASTFEEDING KNOWLEDGE, ATTITUDES AND INTENTION AMONG ADULT FEMALE UNDERGRADUATE AND GRADUATE STUDENTS

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Science

in

The School of Nutrition and Food Sciences

by
Kritee Niroula
B.Sc., Tribhuvan University, 2016
August 2020

ACKNOWLEDGMENT

I would like to thank my major professor, Dr. Erin McKinley, for her constructive guidance, encouragement and invaluable time, and suggestions for my research work from the very beginning to the end. I would also like to thank the professors who graciously agreed to serve on my committee: Dr. Georgianna Tuuri and Dr. Elizabeth Gollub. Working under the guidance of this committee has been an inspiring and amazing opportunity for which I will always be grateful. My deepest sense of gratitude towards Dr. Michael Keenan and LSU AgCenter Institutional Review Board for helping me out with the ethical approval to complete my research. I appreciate the time and effort of various instructors and professors who helped me recruit my study participants in their precious lecture time and sharing the survey link with their students and requesting them to participate. I am also indebted to the female students, especially to those who participated in the study and without whom this study could not have been brought into present shape.

I must also express my gratitude to my wonderful support of friends and family. Most importantly, I must thank my friends Praja Adhikari and Linda Fergus, for the motivation and invaluable support.

TABLE OF CONTENTS

List of Tables

ABSTRACT

This study measured the breastfeeding knowledge, attitude and intention of adult female students of Louisiana State University. Participants (n=1039; mean age 20.12 ± 3.122 years) were recruited to complete the questionnaire. Racial/ethnic representation was White (76.1%), African American (14.3%), Asian (5.5%), American Indian/ Alaska Native or Native Hawaiian/ Pacific Islander (0.8%) and Multi-racial (3.3%). The questionnaire was used to deliver a set of knowledge, attitude and intention items. Participants were evaluated based on their scores in each section. The questionnaire was pilot tested among five students for comprehensibility and understandability and necessary changes were made according to their suggestions. The dataset was analyzed using SPSS. The total mean knowledge score was found to be 13.16 ± 2.48 out of 19 with a mean attitude score of 64.19 ± 7.69 out of 85. The entire sample was divided into three groups based on if they already had children or their intention to have a child in the future. Analysis of the difference in knowledge score among the three groups showed that the mean score was highest among the group who already had child/children and lowest among the group that had no intention to have child/children in the future. Similarly, the mean attitude score was highest among the group who already had children and the lowest among the group who did not want children in the future. Overall participants had a good level of knowledge and a positive attitude about breastfeeding. The majority of the females without children at present had an intention to breastfeed their children in the future. The only item that most of the participants did not agree with was "breastfed babies are smarter than babies who are not breastfed." Demographics such as age, college major, college year, and mother's education had a significant difference with this item. Knowledge and attitude scores were higher among participants from the College of Agriculture (compared to the College of Business, College of Human Sciences

and Education, College of Science) and among participants who were married, senior and graduate students and participants of age 22 years and above.

CHAPTER 1. INTRODUCTION

Breastfeeding is the most appropriate way of providing young infants with the nutrients needed for healthy growth and development.[1] The World Health Organization (WHO) actively promotes breast milk as the best source of nourishment for infants and young children.[1,2] The WHO and the United Nation International Children's Emergency Fund (UNICEF) recommend:

- Initiation of breastfeeding within one hour of birth;
- Exclusive breastfeeding for the first six months of infant life;
- Complementary (solid) foods introduced after six months with continued breastfeeding up to two years of age.[2]

Infants may benefit from breastfeeding of any type or duration. Not only providing energy and nutrients, breastfeeding also protects infants against gastrointestinal infections. The rate of other infections and mortality may be reduced. In addition, breastfed children may have higher intelligence test scores and improved productivity in the future. [2] Despite these recommendations, the rate of exclusive breastfeeding has not improved in either developed or developing countries.[3] According to Global Breastfeeding Scorecard 2018, only 42% of babies are breastfed within an hour of birth. Similarly, only 41% of babies under six months old are exclusively breastfed.[4]

Looking at the statistics among different states in the US, Alaska (93.1%), Washington (92.4%) and Colorado (90.9%), had the highest breastfeeding rates. Comparatively, the Southern states of Mississippi (63.2%) and Louisiana (67.0%) had the lowest rates. Additionally, in Louisiana, 39% of the infants were breastfeeding at six months, which decreased to 20.6% at 12 months. Only 20.2% were exclusively breastfed for up to six months.[5]

Another study found that a mother's intention to breastfeed her infant was predicted by higher breastfeeding knowledge and positive attitudes toward breastfeeding.[6] Infant feeding decisions may depend on the mothers' knowledge and attitude towards breastfeeding. These supporting studies suggest that good knowledge and a positive attitude are the primary factors that give rise to the intention of a mother to breastfeed her child.[7] Young, college-age women are an important demographic in which to identify existing misconceptions or negative perceptions that may act as a hindrance for breastfeeding in the future.[8] The breastfeeding knowledge and attitudes of young adults should be identified before they become parents.[9]

There is very limited breastfeeding or infant feeding research targeting young females across the globe. Findings from a study completed among young females 20 to 30 years of age in Nigeria reported that less than half of the study population had good breastfeeding knowledge. Their attitude was found to be positive but with poor intention.[10] A study carried out at a University in the southern US used the Infant Feeding Knowledge Test A form and the Iowa Infant Feeding Attitude Scale (IIFAS) and found that the knowledge of female participants was dependent on their mother's education and the place they were born. The participants whose mothers had finished college scored higher than those whose mothers attended some college. Similarly, women who were born in the southern region of the country scored lower on knowledge than those who were born in other parts of the country.[11]

The decision to breastfeed or not is reported to be highly dependent on breastfeeding attitude, which is formed early in life as an adolescent[12] or during early adulthood.[10] The limited research available suggests that young females may need to have good knowledge and positive attitudes about breastfeeding in order to experience successful breastfeeding in the future. Results from the current study may be beneficial in the creation of future interventions among college-age

females to improve breastfeeding knowledge, attitudes and intentions. The current study will address the gap in the literature that exists by examining the breastfeeding knowledge, attitudes, and intentions of young adult females attending a university in the southern United States.

Research Aims

1. Assess breastfeeding knowledge, attitude and intention of young females in college.
2. Identify and assess the variables contributing to any negative attitudes towards breastfeeding.
3. Analyze differences in knowledge, attitudes and intentions by the demographic variables.

References

1. World Health Organization (WHO). Breastfeeding. 2019; http://www.who.int/topics/breastfeeding. Accessed 05/29/2019.
2. World Health Organization (WHO). Infant and young child feeding. 2019. https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding. Accessed 5/31/2019.
3. Al-Nuaimi K, Ali R, Hatem Ali F. The effect of a breastfeeding educational workshop on clinicians' knowledge, attitudes and practices. *Br J Midwifery.* 2019;27(4):242-250.doi: 10.12968/bjom.2019.27.4.242.
4. World Health Organization (WHO). Global breastfeeding scorecard 2018. 2018; 4. Available at: https://www.who.int/nutrition/publications/infantfeeding/global-bf-scorecard-2018.pdf?ua=1.
5. Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Division of Nutrition PA, and Obesity. . 2018 breastfeeding report card. 2018. www.cdc.gov/breastfeeding/data/reportcard.htm. Accessed May 30, 2019.
6. Fairbrother N, Stanger-Ross I. Reproductive-aged women's knowledge and attitudes regarding infant-feeding practices: an experimental evaluation. *J of Hum Lact.* 2010;26:157-167.doi: 10.1177/0890334409352853.
7. Hamze L, Mao J, Reifsnider E. Knowledge and attitudes towards breastfeeding practices: a cross-sectional survey of postnatal mothers in China. *Midwifery.* 2019;74:68-75.doi: 10.1016/j.midw.2019.03.009.
8. Goulet C, Lampron A, Marcil I, Ross L. Attitudes and subjective norms of male and female adolescents toward breastfeeding. *J Human Lact.* 2003;19(4):402-410.doi: 10.1177/0890334403258337.

9. Kavanagh KF, Lou Z, Nicklas JC, Habibi MF, Murphy LT. Breastfeeding knowledge, attitudes, prior exposure, and intent among undergraduate students. *J Hum Lact.* 2012;28:556-564.doi: 10.1177/0890334412446798.

10. Leshi O, Samuel, F.O. and Ajakaye, M.O. . Breastfeeding knowledge, attitude and intention among female young adults in Ibadan, Nigeria. *Open J Nurs.* 2016;6:11-23.doi:10.4236/ojn.2020.102005.

11. Chang Y, Valliant M, Bomba AK. Gender differences in knowledge and attitude regarding breastfeeding. *Int J Consum Stud.* 2012;36(3):342-351.doi: 10.1111/j.1470-6431.2010.00994.x.

12. Leclair E, Robert N, Sprague AE, Fleming N. Factors associated with breastfeeding initiation in adolescent pregnancies: a cohort study. *J Pediatr Adolesc Gynecol.* 2015;28(6):516-521.doi:10.1016/j.jpag.2015.03.007.

CHAPTER 2. REVIEW OF LITERATURE

Introduction

Breastfeeding is the most appropriate way of providing young infants with the nutrients needed for healthy growth and development.[1] The World Health Organization (WHO) actively promotes breast milk as the best source of nourishment for infants and young children.[1,2] WHO and the United Nation International Children's Emergency Fund (UNICEF) recommend:

- Initiation of breastfeeding within 1 hour of birth;
- Exclusive breastfeeding for the first 6 months of infant life;
- Complementary (solid) foods introduced after 6 months with continued breastfeeding up to 2 years of age. [2]

The American Academy of Pediatrics, The American College of Obstetricians and Gynecologists, American Academy of Nutrition and Dietetics and World Health Organization all have similar recommendations about breastfeeding. They all suggest, "Exclusive breastfeeding for about 6 months, followed by continued breastfeeding as complementary foods are introduced, with the continuation of breastfeeding for 1 year or longer as mutually desired by mother and infant."[1,13,14]

Infants may benefit from breastfeeding of any type or duration. Not only providing energy and nutrients, breastfeeding protects the infant against gastrointestinal infections. The rate of other infections and infant mortality may be reduced. In addition, breastfed children may have higher intelligence test scores and improved productivity in the future.[2] A recent study further added to the literature on the benefits indicating protective effects against childhood overweight and obesity.[15] The benefits of breastfeeding are not only exclusive to infants, as mothers who breastfeed also receive several benefits. According to the American Academy of Pediatrics

(AAP), the maternal benefits of breastfeeding are decreased postpartum bleeding and uterine contraction.[16] Women who have breastfed may have a lower risk of breast and ovarian cancer.[2] Breastfeeding also acts as a natural contraceptive by helping women to space their pregnancy.[2] In addition to these, the overall health costs of the family are reduced.[2]

Despite these recommendations, the rate of exclusive breastfeeding has not met the objectives in both developed and developing countries.[3] According to Global Breastfeeding Scorecard 2018, only 42% of babies are breastfed within an hour of birth. Similarly, 41% of babies under 6 months old are exclusively breastfed.[4] These rates are comparatively higher in the United States. Breastfeeding rates among infants born in 2015 in the US show that 83.2% of children were ever breastfed, 57.6% were breastfed for 6 months and 35.9% were breastfeeding at 12 months.[5] Looking at the statistics among different states, Alaska (93.1%), Washington (92.4%) and Colorado (90.9%), had the highest breastfeeding rates. Comparatively, the southern states of Mississippi (63.2%) and Louisiana (67.0%) had the lowest rates. Additionally, in Louisiana, 39% of the infants were breastfeeding at 6 months, which decreased to 20.6% at 12 months. Only 20.2% were exclusively breastfed for up to 6 months. In contrast, 15.7% infants were found to have received formula before 2 days of age and this percentage was higher among several states such as Alabama, Ohio, Colorado, Iowa.[5] This might be due to a higher number of working mothers who do not have enough time to breastfeed their child, poor breastfeeding knowledge among women, or some kind of cultural misconception regarding breastfeeding.

Many of the breastfeeding objectives set in Healthy People 2020 (5 out of 8) have been met as of the 2015 data as given by the 2018 CDC Breastfeeding Report Card. The target for the proportion of infants ever breastfed was 81.9% and the actual proportion was 83.2%. Similarly, the proportion of infants who are breastfed at 1 year (target = 34.1%) was 35.9% and the

proportion of infants who are exclusively breastfed through 3 months (target = 42.9%) has reached 46.9%.[5] According to the 2018 CDC Breastfeeding Report Card, breastfeeding is regarded as a key health behavior to help improve public health in the United States.[5]

Socio-cultural variables such as lack of support from family or community, or workplace support for breastfeeding, as well as religious perceptions, are known to be possible contributors to the low breastfeeding initiation rate and its continuity in the western countries.[17] Bertino and colleagues found mothers' attitudes to be the single factor associated with the duration of breastfeeding in the first year of life.[18] Another study found that a mother's intention to breastfeed her infant is predicted by higher breastfeeding knowledge and positive attitudes toward breastfeeding.[6] Infant feeding decisions may depend on the mothers' knowledge and attitude towards breastfeeding. Attitudes towards breastfeeding are formed in early life.[19,20] These supporting studies suggest that good knowledge and a positive attitude are the primary factors that give rise to the intention of a mother to breastfeed her child. "Maternal positive attitude and knowledge play key roles in the process of breastfeeding".[7] Young, college-age women are an important demographic in which to identify existing misconceptions or negative perceptions that may act as a hindrance for breastfeeding in the future.[8] The breastfeeding knowledge and attitudes of young adults should be identified before they become parents.[9]

Breastfeeding Knowledge

Kang and colleagues point out that breastfeeding knowledge is developed through experience and exposure to a range of information about breastfeeding.[21] A similar study defines breastfeeding knowledge as "an individual's basic understanding of the importance, physiology and mechanism of breastfeeding as a natural biological human process".[22]

A study by Kavanagh and colleagues carried out in 2010, measured breastfeeding knowledge, attitude, and intention among undergraduate students in the US and found the participants had overall good knowledge of breastfeeding. The results indicated that students who were breastfed when they were infants scored higher on the knowledge scale compared to those who were not breastfed. Breastfeeding knowledge differences by gender are conflicting. The females in Kavanagh's study were found to have higher breastfeeding knowledge than males[9] whereas, in a different study conducted among general practice (GP) registrars in Australia, there were no significant differences in knowledge by gender.[23] A third study showed male participants having higher knowledge compared to the female participants.[24]

A cross-sectional study assessing Korean university students' knowledge found overall low scores among the students, with those enrolled in a health-related major having more knowledge compared to the others.[21] Similar results were found in a study conducted at the University of Central Israel where nursing students had a comparatively higher level of knowledge than other students.[25] Students, young people, and working women were found to have low knowledge of breastfeeding in a study conducted in Kathmandu, Nepal.[26] This was not the same among mothers attending Wajir District Hospital in Kenya where the knowledge on breastfeeding was reported to be high.[27] The difference is possibly due to the literacy rate among study participants or the beliefs and traditions prevalent within particular societies. Surprisingly results from a study conducted at the University of Karachi found that the overall breastfeeding knowledge of medical students was found to be low.[28] Poor results were also found in a study among baccalaureate students in Egypt, showing 50% of the students had no idea about exclusive breastfeeding and 85% did not know it was recommended for 6 months.[29]

Scales to measure breastfeeding knowledge

The Australian Breastfeeding Knowledge and Attitude Questionnaire (ABKAQ) was developed by Brodribb and group in 2008 to test the breastfeeding knowledge among health workers in Australia. It consists of a 40-item knowledge scale with a Cronbach's alpha of 0.83, indicating good validity of the survey items to measure the concept. The questionnaire was reviewed by an expert panel of doctors and researchers with knowledge and experience in the field, prior to distribution.[23] Twenty-two of the 40 items from this questionnaire focused on knowledge and were used on a survey in a study carried out among baccalaureate students in Egypt. The Cronbach's alpha for those 22 items among that study population was reported to be 0.72, indicating that those questions are not measuring the concept as well when separated from the full ABKAQ.[29]

Marrie Tarrant and Joan Dodgson in 2007 developed a scale consisting of 14 items asking participants to agree and disagree with each statement in order to assess knowledge of infant feeding. Two specialists were appointed to review the items and confirm the content validity; the Content Validity Index (CVI) was reported to be 0.93, indicating excellent content validity to measure the concept.[30] This scale was used by Hatamleh and colleagues, who developed an Arabic version with a resulting Cronbach's alpha value of 0.87, indicating good validity of the items to measure breastfeeding knowledge.[31]

In 1995, researchers Elizabeth Williams and Lawrence Hammer, to test the breastfeeding knowledge of pediatricians, developed a questionnaire. The questionnaire consisted of 46 items and 9 multiple-choice questions. A group of three experts in lactation and pediatrics reviewed the questionnaire, but the statistical analysis for reliability and validity was not carried out.[32] Researchers who completed a cross-sectional study assessing Korean university students' knowledge and attitude developed a Korean version of this scale using 20 of the original items.

The resulting Cronbach's alpha was 0.86, indicating the 20 items were measuring the concept well.[21] Katherine Kavanagh and colleagues in 2012 developed a knowledge scale to assess the breastfeeding knowledge and attitudes of undergraduate students in the US. It was derived from two studies by Tarrant and Giles. Eight items were taken from the Tarrant et al. and four from Giles et al. and were modified to fit the study population. Psychometric tests were not done for reliability and validity.[20,30]

Breastfeeding Attitude

Kang et al. indicated that breastfeeding attitude is the readiness for breastfeeding behavior which may include a like or dislike, the belief about the importance of breastfeeding, and beliefs about the positive health benefits.[21] Mothers with higher attitude scores may be more likely to initiate breastfeeding and to breastfeed longer.[33] One study found that women with low education levels had a more positive attitude towards formula feeding and were found to introduce formula earlier compared to more educated mothers.[7]

Kavanagh et al. found a neutral breastfeeding attitude among their study population. Age was related to breastfeeding attitudes as students greater than 20 years of age had a higher overall positive attitude score than those less than 19 years of age.[9] The difference in attitudes by age may be due to exposure to breastfeeding education by older students, or they may be more concerned about these things as they are entering adulthood in the near future. Brodribb and colleagues found no difference in attitude score by gender[23], but Kang and colleagues had a female study population with a more positive attitude about breastfeeding than the males in the same study.[21] Similarly, the knowledge and attitude scores were significantly positively correlated in both Kavanagh et al. and Brodribb et al. studies, where a higher score on knowledge scales indicated a more positive attitude. Brodribb also found that having some

personal breastfeeding experience had a positive impact on both attitude and knowledge for both genders.[23]

A study conducted among Chinese mothers living in China and Australia found that, in both countries, higher education and higher economic status were significantly associated with the women's positive attitude towards breastfeeding.[33] These two factors may form the basis on which a woman makes her breastfeeding decision. Positive breastfeeding attitude was found to be associated with exclusive breastfeeding among women attending a district hospital in Wajir, Kenya.[27] Outcomes of a study in Turin, Italy reported breastfeeding attitude to be a strong single determinant of breastfeeding duration over other demographic factors.[18]

Scales to measure breastfeeding attitude

The Iowa Infant Feeding Attitude Scale (IIFAS) was developed as an instrument to measure mothers' attitude towards infant feeding and consists of 17 items. The questionnaire was created and tested among three independent samples of females. The first and second samples consisted of postpartum women (within 48 hours of childbirth) who had not yet started breastfeeding, the third included women who had already initiated breastfeeding. Tests among all three samples showed the IIFAS to be a valid and reliable instrument for measuring mothers' attitudes towards infant feeding. Cronbach's alpha values of 0.86, 0.85 and 0.68 were computed from the first sample to the third.[34] Based on these scores, the scale appears to measure infant feeding attitudes among mothers not currently breastfeeding better than among mothers that are breastfeeding at the time of survey completion. This scale was used in a study among postnatal mothers in China with a Cronbach's alpha score of 0.63 [7], by Kavanagh and colleagues (α=0.86) and also among Chinese mothers living in China and Australia (α=0.58).[33] A longitudinal study in Turin, Italy also used this scale but statistics for validity and reliability were not computed.[18]

The Australian Breastfeeding Knowledge and Attitude Questionnaire (ABKAQ) also contained items to measure breastfeeding attitude. It consisted of 20 items with a 5-point Likert-type scale for an agreement that had a Cronbach's alpha of 0.84, indicating good validity for measuring breastfeeding attitude.[23]

Scott and researchers developed a breastfeeding attitude scale in 2003 that included 49 items with a 5-point scale Likert scale for agreement. It embedded the items from the IIFAS into the scale. For the content validity, comments from an expert panel were taken and modifications were made.[35] Twenty-two of these items from this attitude scale was used by Brodribb and group in their study among general practice registrars (Cronbach's $\alpha = 0.84$).

Breastfeeding Intention

Breastfeeding intention is defined as "a participant's desire or consideration to 'exclusively breastfeed' or 'breastfeed in any amount' in the future".[22] A study in Croatia examined the intentions of third-year secondary students and found no difference in students' breastfeeding intention with respect to whether they were breastfed as infants or by sex.[36] Women in a study in Kuwait reported shyness to be the major barrier to breastfeeding regardless of their educational level.[37] Similarly, another group of adult women said they were against breastfeeding in public.[38] Students also indicated that embarrassment is one of the major reasons that prevent women from breastfeeding.[39] This attitude is highly related to the cultural beliefs existing in one's society or country surrounding women, motherhood and infant feeding. A study in Ireland pointed out that adolescents who had seen a mother breastfeed were more likely to intend to breastfeed their child or encourage their partner.[20] In a study among Hong Kong University students, respondents reported formula feeding to be convenient, providing more freedom to the mother.[30]

Scales to measure breastfeeding intention

The Infant Feeding Intentions (IFI) Scale was developed by Nommsen-Rivers and Dewey in 2009 with the aim to measure a woman's intended duration of breastfeeding and her strength of intention to initiate breastfeeding. The Cronbach's alpha value for the IFI is 0.90 and it consists of five items in total. It was pilot tested among pregnant women.[40] Two studies used the IFI scale to assess breastfeeding intentions among undergraduate university students and women in Lebanon.[41,42]

A study carried out among undergraduate students of the University at Jordan formulated an intention scale to measure breastfeeding intention. It included two questions and had a Cronbach's alpha value of 0.67, indicating the items were not measuring breastfeeding intention well as written.[31] Leshi and researchers carried out a study to measure the future breastfeeding intention of young females in Nigeria and created an intention scale that included 10 items. It was pilot tested among 40 females living outside the study area. The Cronbach's alpha value for the scale was 0.84, indicating good validity for measuring breastfeeding intention.[10]

Breastfeeding among Young Females

There is very limited breastfeeding or infant feeding research targeted at young females across the globe. Findings from the study completed among young females 20 to 30 years of age in Nigeria reported that less than half of the study population had good breastfeeding knowledge but had poor knowledge about colostrum. Their attitude was found to be positive, but with poor intention.[10] Hamade and colleagues, in a study among female undergraduate university students in Lebanon and Syria, used the Infant Feeding Knowledge Test A Form to assess knowledge, the IIFAS to assess attitude and the IFI scale for determining intentions, and found that intention to breastfeed had positive associations with attitude and knowledge scores. The study also highlighted a positive breastfeeding attitude among the students of both countries.[41]

In a second study that studied female college students, researchers found that there was a gap in knowledge and attitude among study participants. The women claimed that breastfeeding spoiled a woman's beauty and caused interference in employment as the reasons for the negative attitude.[43] Findings of a third study, which included female college students, reported breastfeeding knowledge to be higher among those who lived in nuclear families (single-family household) compared to extended-family households.[44] Conversely, a study in Jordan found attitude scores were lower among study participants who had less than 8 members in the family household, compared to those households with more than 8 members. The overall knowledge level was low, with extremely negative attitudes among this study population.[17]

A study carried out at a University in the southern US used the Infant Feeding Knowledge Test A form and the IIFAS and found that the knowledge of female participants was dependent on their mother's education and the place they were born. The participants whose mothers had finished college scored higher than those whose mothers attended some college. Similarly, women who were born in the southern region of the country scored lower on knowledge than those who were born on the other parts of the country.[11]

Summary

The decision of whether to breastfeed or not is reported to be highly dependent on breastfeeding attitude, which is formed early in life, as an adolescent [12] or during early adulthood.[10] Studies have highlighted the dearth of research targeting the young population and have suggested that future research should highlight the importance of breastfeeding attitudes of university students who have not yet experienced childbirth and infant feeding.[45] Similarly, Padmanabhan and colleagues stated the importance of seeking out these gaps in the research and acting upon them, as young women will be entering motherhood in the future.[43] Finding young adults' knowledge, attitudes, prior exposures, and future intent about breastfeeding may highlight

the existing gaps that could give birth to interventions addressing the gaps.[46] "Exploring the breastfeeding knowledge, attitude and intention of young adults will help in planning and understanding the strategies that may be used in intervention program to this sub-population before they step into parenthood".[10]

The limited research available has made it clear that adult females may need to have good knowledge and positive attitudes about breastfeeding in order to experience successful breastfeeding in the future. Results from the current study may be beneficial in the creation of future interventions among college-age females to improve breastfeeding knowledge, attitudes, and intentions. The current study will address the gap in the literature that exists by examining the breastfeeding knowledge, attitudes, and intentions of young, adult females in the United States.

References

1. World Health Organization (WHO). Breastfeeding. 2019; http://www.who.int/topics/breastfeeding. Accessed 05/29/2019.

2. World Health Organization (WHO). Infant and young child feeding. 2019. https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding. Accessed 5/31/2019.

3. Al-Nuaimi K, Ali R, Hatem Ali F. The effect of a breastfeeding educational workshop on clinicans' knowledge, attitudes and practices. *Br J Midwifery.* 2019;27(4):242-250.doi: 10.12968/bjom.2019.27.4.242.

4. World Health Organization (WHO). Global breastfeeding scorecard 2018. 2018; 4. Available at: https://www.who.int/nutrition/publications/infantfeeding/global-bf-scorecard-2018.pdf?ua=1.

5. Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Division of Nutrition PA, and Obesity. . 2018 breastfeeding report card. 2018. www.cdc.gov/breastfeeding/data/reportcard.htm. Accessed May 30, 2019.

6. Fairbrother N, Stanger-Ross I. Reproductive-aged women's knowledge and attitudes regarding infant-feeding practices: an experimental evaluation. *J of Hum Lact.* 2010;26:157-167.doi: 10.1177/0890334409352853.

7. Hamze L, Mao J, Reifsnider E. Knowledge and attitudes towards breastfeeding practices: a cross-sectional survey of postnatal mothers in China. *Midwifery.* 2019;74:68-75.doi: 10.1016/j.midw.2019.03.009.

8. Goulet C, Lampron A, Marcil I, Ross L. Attitudes and subjective norms of male and female adolescents toward breastfeeding. *J Human Lact.* 2003;19(4):402-410.doi: 10.1177/0890334403258337.

9. Kavanagh KF, Lou Z, Nicklas JC, Habibi MF, Murphy LT. Breastfeeding knowledge, attitudes, prior exposure, and intent among undergraduate students. *J Hum Lact.* 2012;28:556-564.doi: 10.1177/0890334412446798.

10. Leshi O, Samuel, F.O. and Ajakaye, M.O. . Breastfeeding knowledge, attitude and intention among female young adults in Ibadan, Nigeria. *Open J Nurs.* 2016;6:11-23.doi:10.4236/ojn.2020.102005.

11. Chang Y, Valliant M, Bomba AK. Gender differences in knowledge and attitude regarding breastfeeding. *Int J Consum Stud.* 2012;36(3):342-351.doi: 10.1111/j.1470-6431.2010.00994.x.

12. Leclair E, Robert N, Sprague AE, Fleming N. Factors associated with breastfeeding initiation in adolescent pregnancies: a cohort study. *J Pediatr Adolesc Gynecol.* 2015;28(6):516-521.doi:10.1016/j.jpag.2015.03.007.

13. The American College of Obstetricians and Gynecologists. Optimizing support for breastfeeding as a part of obstetric practice. *ISRN Obstet Gynecol.* 2018;132.

14. American Academy of Pediatrics. Breastfeeding and the use of human milk. *Pediatrics.* 2012;129(3); https://www.acog.org/-/media/Committee-Opinions/Committee-on-Obstetric-Practice/co756.pdf?dmc=1&ts=20190622T1714383826. Accessed 06/05/2019.

15. Pattison KL, Kraschnewski JL, Lehman E, et al. Breastfeeding initiation and duration and child health outcomes in the first baby study. *Preventative Medicine.* 2019;118:1-6.doi: 10.1016/j.ypmed.2018.09.020.

16. American Academy of Pediatrics. Breastfeeding. 2019; https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Breastfeeding/Pages/Benefits-of-Breastfeeding.aspx. Accessed 06/25/2019.

17. Al-Domi HA. Knowledge and attitudes towards breastfeeding among unmarried female graduates at the University of Jordan. *Mal J Nutr.* 2015;21(3):309-319; http://libezp.lib.lsu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=114779645&site=eds-live&scope=site&profile=eds-main. Accessed 05/21/2019.

18. Bertino E, Varalda A, Magnetti F, et al. Is breastfeeding duration influenced by maternal attitude and knowledge? A longitudinal study during the first year of life. *J Matern Fetal Neonatal Med.* 2012;25:32-36.doi: 10.3109/14767058.2012.712341.

19. Bella H. Are Saudi female college students prepared for successful breastfeeding? *J Roy Soc Health.* 1997(6):387; http://libezp.lib.lsu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsagr&AN=edsagr.GB1997029282&site=eds-live&scope=site&profile=eds-main. Accessed 5/22/2019.

20. Giles M, Connor S, McClenahan C, Mallet J. Attitudes to breastfeeding among adolescents. *J Hum Nutr Diet.* 2010;23:285-293.doi: 10.1111/j.1365-277X.2010.01048.x.

21. Kang N-M, Song Y, Im E-O. Korean university students' knowledge and attitudes toward breastfeeding: A questionnaire survey. *Int J Nurs Stud.* 2005;42(8):863-870.doi: 10.1016/j.ijnurstu.2005.01.003.

22. Reyes C, Barakat-Haddad C, Barber W, Abbass-Dick J. Investigating the effectiveness of school-based breastfeeding education on breastfeeding knowledge, attitudes and intentions of adolescent females. *Midwifery.* 2018;70:64-70.doi: 10.1016/j.midw.2018.12.010.

23. Brodribb W, Fallon A, Jackson C, Hegney D. Breastfeeding and Australian GP registrars—Their knowledge and attitudes. *J Hum Lact.* 2008;24(4):422-430.doi: 10.1177/0890334408323547.

24. Hatamleh R, Maghaydah SS, Abuhammad S, Rababah H. Knowledge, attitudes and future intentions towards breastfeeding among undergraduate students at a Jordanian public university. *Evidence Based Midwifery.* 2018;16(4):136-142; https://eds-b-ebscohost-com.libezp.lib.lsu.edu/eds/pdfviewer/pdfviewer?vid=1&sid=17da6df0-ce0f-4dc4-8f94-df8b339cea24%40pdc-v-sessmgr06. Accessed 06/28/2019.

25. Ben Natan M, Haikin T, Wiesel R. 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.* 2018;68:66-70.doi: 10.1016/j.nedt.2018.05.026.

26. Sharma I, Khadka A. Assessing the level of knowledge and practice of breastfeeding among factory working mothers in Kathmandu, Nepal. *Journal of Health Research.* 2019;33(1):24-34.doi: 10.1108/JHR-12-2018-0166.

27. Mahat Jimale M, Sophie O, Victor OO. Comparison of knowledge, attitudes and practices on exclusive breastfeeding between primiparous and multiparous mothers attending Wajir District hospital, Wajir County, Kenya: a cross-sectional analytical study. *Int Breastfeed J.* 2018(1):1.doi: 10.1186/s13006-018-0151-3.

28. Anjum Q, Ashfaq T, Siddiqui H. Knowledge regarding breastfeeding practices among medical students of Ziauddin University Karachi. *JPMA.* 2007;57:480-483; https://www.researchgate.net/publication/5857105_Knowledge_regarding_breastfeeding_practices_among_medical_students_of_Ziauddin_University_Karachi. Accessed 06/01/2019.

29. Ahmed A, El Guindy SR. Breastfeeding knowledge and attitudes among Egyptian baccalaureate students. *Int Nurs Rev.* 2011;58(3):372-378.doi: 10.1111/j.1466-7657.2011.00885.x.

30. Tarrant M, Dodgson JE. Knowledge, attitudes, exposure, and future intentions of Hong Kong University students toward infant feeding. *JOGN Nurs.* 2007;36(3):243-254.doi: 10.1111/j.1552-6909.2007.00144.x.

31. Hatamleh R, Abuhammad S, Rababah H. Breastfeeding knowledge and attitude scale: Arabic version. *Evidence Based Midwifery.* 2018;16(2):40-43; https://eds-a-ebscohost-com.libezp.lib.lsu.edu/eds/detail/detail?vid=0&sid=c0b93e39-01e3-4ff4-b1f8-d0d3b0099344%40sdc-v-sessmgr02&bdata=JnNpdGU9ZWRzLWxpdmUmc2NvcGU9c2l0ZQ%3d%3d#AN=130540367&db=ccm. Accessed 06/05/2019.

32. Williams EL, Hammer LD. Breastfeeding attitudes and knowledge of pediatricians-in-training. *Am J Prev Med.* 1995;11(1):26-33; http://libezp.lib.lsu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=psyh&AN=1995-34832-001&site=eds-live&scope=site&profile=eds-main. Accessed 07/03/2019.

33. Shu C, Binns CW, Yi L, Maycock B, Yun Z, Li T. Attitudes towards breastfeeding -- the Iowa infant feeding attitude scale in Chinese mothers living in China and Australia. *Asia Pac J Clin Nutr.* 2013;22(2):266-269.doi: 10.6133/apjcn.2013.22.2.09.

34. De La Mora A, Russell DW, Dungy CI, Losch M, Dusdieker L. The Iowa infant feeding attitude scale: analysis of reliability and validity. *J App Soc Psych.* 1999;29(11):2362-2380.doi: 10.1111/j.1559-1816.1999.tb00115.x.

35. Scott J, McInnes R, Tappin D, Guthrie E. Breastfeeding opinions, knowledge, management practices and training of Scottish midwives. 2003.doi: 10.13140/RG.2.1.3754.6480.

36. Marija Č, Tamara Voskresensky B, Sunčana R, Josip G. Adolescents' knowledge of breastfeeding and their intention to breastfeed in the future. *Acta Clin Croat.* 2017(6):51.doi: 10.20471/acc.2018.57.04.08.

37. Al-Darweesh F R-HR, Al-Shatti K, Abdullah A, Taqi M. Knowledge, intention, practice, and perceived barriers of breastfeeding among married working women in Kuwait. *Int J Community Fam Med.* 2016;1.doi:10.15344/2456-3498/2016/108.

38. Mulready-Ward C, Hackett M. Perception and attitudes: breastfeeding in public in New York City. *J Hum Lact.*2014;30.doi: 10.1177/0890334414524988.

39. Forrester IT, Wheelock G, Warren AP. Assessment of students' attitudes toward breastfeeding. *J Hum Lact.* 1997;13(1):33-37; http://libezp.lib.lsu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&d

b=ccm&AN=107321753&site=eds-live&scope=site&profile=eds-main. Accessed 06/28/2019.

40. Nommsen-Rivers LA, Dewey KG. Development and validation of the Infant Feeding Intentions scale. *Matern Child Health J.* 2009;13(3):334-342.doi: 10.1007/s10995-008-0356-y.

41. Hamade H, Naja F, Keyrouz S, et al. Breastfeeding knowledge, attitude, perceived behavior, and intention among female undergraduate university students in the Middle East: The case of Lebanon and Syria. *Food Nutr Bull.* 2014;35:179-190; http://libezp.lib.lsu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=edswsc&AN=000349134500004&site=eds-live&scope=site&profile=eds-main. Accessed 06/20/2019.

42. Yehya N, Abdel Khalek L, Tamim H, et al. Validation of the Arabic version of the Infant Feeding Intentions Scale among Lebanese women. *J Hum Lact.* 2017;33(2):383-389.doi: 10.1177/0890334416680790.

43. Padmanabhan R, Thulasingam M, Chinnakalai P. Female college students knowledge, attitude and future intention towards breastfeeding: implications for advocacy. *J Clin Diagn Res.* 2016;10(11):11.doi: 10.7860/JCDR/2016/20675.8904.

44. Brahmbhatt KR CG, Vishwanath J, Raman R, Jayaram S, Mallya S, Shetty H, D'Silva R, Shetty S. Knowledge of breastfeeding among female college students: institution based cross-sectional study. *IJCMPH.* 2016;3(6):1579-1583.doi:10.18203/2394-6040.ijcmph20160001.

45. Marrone S, Vogeltanz-Holm N, Holm J. Attitudes, knowledge, and intentions related to breastfeeding among university undergraduate women and men. *J Hum Lact.* 2008;24(2):186-192.doi: 10.1177/0890334408316072.

46. Lou Z, Zeng G, Orme JG, et al. Breastfeeding knowledge, attitudes, and intention in a sample of undergraduate students in Mainland China. *J Hum Lact.* 2014;30:331-339.doi: 10.1177/0890334414526058.

CHAPTER 3. ASSESSMENT OF BREASTFEEDING KNOWLEDGE, ATTITUDE, AND INTENTION AMONG ADULT FEMALE UNDERGRADUATE AND GRADUATE STUDENTS

Abstract

Introduction: Breastfeeding is the most appropriate way of providing young infants with the nutrients needed for healthy growth and development. The statistics among different states in the United States show Alaska (93.1%) and Washington (92.4%) as having the highest breastfeeding rates while southern states like Mississippi (63.2%) and Louisiana (67.0%) have the lowest. Adult, college-age women are an important demographic in which to identify existing breastfeeding misconceptions or negative perceptions that may act as a hindrance in the future. The breastfeeding knowledge and attitudes of young adult females should be identified before they become a mother, to manage successful breastfeeding in the future. This study measured the level of breastfeeding knowledge, attitude, and intention of female students enrolled at a public, higher education institution in the southern US.

Methods: A convenience sample of 1,039 students were recruited to complete the 58-item questionnaire. The questionnaire contained individual scales to measure knowledge and attitude, with three items to assess breastfeeding intention.

Results: The mean knowledge and attitude scores were found to be 13.16 ± 2.48 out of 19 and 64.19 ± 7.69 out of 85, respectively. Similarly, a majority (91.45%) of participants had intentions to breastfeed their future children. Knowledge and attitude scores were highest among participants who were married, a senior or graduate student, and aged 22 or older.

Conclusions: Overall, good breastfeeding knowledge and a positive attitude were present among the sample. Future research should include male students to consider gender differences in

knowledge and attitude about breastfeeding. Studies should also compare those attributes among adult people from across the US.

Introduction

Breastfeeding is the most appropriate way of providing young infants with the nutrients needed for healthy growth and development.[1] The World Health Organization (WHO) actively promotes breast milk as the best source of nourishment for infants and young children.[1,2] Exclusive breastfeeding for up to 6 months has multiple benefits for both mother and child. Not only providing energy and nutrients, breastfeeding protects the infant against gastrointestinal infections. The rate of other infections and mortality may be reduced. Despite these recommendations, the rate of exclusive breastfeeding has not met the requirements in both developed and developing countries.[3] Breastfeeding rates among infants born in 2015 in the US show that, 83.2% children were ever breastfed, 57.6% were breastfed for 6 months and 35.9% were breastfeeding at 12 months.[4] Looking at the statistics among different states, Alaska (93.1%), Washington (92.4%) and Colorado (90.9%), had the highest breastfeeding rates. Comparatively, the southern states of Mississippi (63.2%) and Louisiana (67.0%) had the lowest rates. Additionally, in Louisiana, 39% of the infants were breastfeeding at 6 months, which decreased to 20.6% at 12 months. Only 20.2% were exclusively breastfed for up to 6 months.[4]

According to the 2018 CDC Breastfeeding Report Card, breastfeeding is regarded as a key health behavior to help improve public health in the United States.[4] Supporting studies suggest that good knowledge and positive attitude are the primary factors that give rise to the intention of a mother to breastfeed her child. “Maternal positive attitude and knowledge play key roles in the process of breastfeeding”.[5] Young, college-age women are an important demographic in which to identify existing misconceptions or negative perceptions that may act as a hindrance

for breastfeeding in the future.[6] The breastfeeding knowledge and attitudes of young adults should be identified before they become parents.[7]

The limited research available has made it clear that adult females may need to have good knowledge and positive attitudes about breastfeeding in order to experience successful breastfeeding in the future. Results from the current study may be beneficial in the creation of future interventions among college-age females to improve breastfeeding knowledge, attitudes and intentions. The current study will address the gap in the literature that exists, by examining the breastfeeding knowledge, attitudes, and intentions of young, adult females in the United States.

Methods

Study Design

This is a cross-sectional survey study using a convenience sample of young adult university students attending Louisiana State University, Baton Rouge, Louisiana (LSU).

Ethical Consideration

Ethical approval was obtained from the LSU Agricultural Center Institutional Review Board. Participants were not requested to provide their names or other identifying information to the Principal Investigator (PI). Study data were stored in Qualtrics and exported to Excel and SPSS files at the conclusion of data collection. Files were stored on a password-protected computer in the locked office of the PI. Files were also automatically backed-up to the AgCenter secure OneDrive cloud system and managed only by the PI or AgCenter IT support, when necessary.

Study Population and Inclusion Criteria

The study population included young female undergraduate and graduate students attending LSU. To be included in the study, a participant had to:

- be 18 years of age or older
- be a student attending LSU
- identify herself as a female.

Male students were excluded because the study focused on females and a health behavior exclusive to them.

Sample Size Determination

Using the Open Source Epidemiologic Statistics for Public Health (OpenEpi) version 3.01, the sample size was calculated to be 1025. It is open-source software for epidemiological statistics.[14] The two-sided confidence level was 95% and the odds ratio was 2.

Instrument

The questionnaire consisted of a 19-item knowledge section, a 17-item attitude section with a total of 55-58 questions. It was intended to gather information about the participant's knowledge and attitude toward breastfeeding, experiences feeding infants, and sociodemographic information. The questionnaire starts with the question "Do you intend to have children in the future?". This question divides the whole study participants into three groups: G1 indicates participants who want to have children in the future, G2 are those who do not want children and G3 indicates participants who already have children.

Knowledge Scale

The knowledge scale consisted of 19 items with Yes or No options. First, a list of content areas that were intended to be included in the scale were prepared by the PI. Validated surveys from

previous studies on breastfeeding knowledge were reviewed to check if any major content area was missing from the PI's list.[7,10] Additional concepts were taken from the literature available on breastfeeding knowledge. From there the PI drafted survey items covering each of the concepts. The PI and a breastfeeding measurement scale expert reviewed the items for content validity to breastfeeding knowledge. The remaining 19 items were intended to produce a breastfeeding score with a possibility of 0-19. Correct answers were scored as 1 and incorrect as 0. The scores would serve as a variable in which to compare to breastfeeding intention, breastfeeding attitude, and the demographic items.

Attitude Scale

The attitude scale included 17 items. Like the knowledge scale, the PI prepared a list of concepts related to breastfeeding attitude to be included in the scale and gleamed additional concepts from previous studies that measured breastfeeding attitude.[11,16] . The PI drafted 17 items and a measurement scale expert reviewed and confirmed the content validity. This scale used a 5-point Likert scale with 1 meaning "Strongly disagree" and 5 meaning "Strongly agree." This scale provided scores ranging from 17-85 and served as a variable in which to compare to breastfeeding knowledge, breastfeeding intention, and the demographic items.

Other Survey Items

The remaining survey items assessed participants' intention to breastfeed their children in future and the demographic items. Breastfeeding intention was only measured among those who indicated they did not have children when answering the question, "Do you intend to have children in the future?" There were additional questions related to the intended duration, intended infant feeding method(s), breastfeeding and returning to work, feeling comfort while breastfeeding in public. For those who indicated they had child(ren), the survey included

questions related to the number of children they had and the number breastfed, duration of breastfeeding, method(s) of infant feeding, breastfeeding and returning to work, feeling comfort while breastfeeding in public. Sociodemographic items included marital status, age, international student status, race, employment, household size, school funding, LSU college, LSU classification and mother's education. Additional questions inquired if the students were breastfed when they were infants.

Data Collection

An initial pilot study with five students, utilizing purposive sampling of the study population, was conducted. The pilot study tested the questionnaire for readability, comprehensibility of the survey items, and time. The survey took 5-10 minutes to be completed. Purposive sampling was used to ensure at least one person fit each of the three possible sample paths. The pilot also served as an opportunity to assess and confirm the face validity of the knowledge and attitude scales. There were no issues relating to the survey comprehension therefore no changes were made to the survey at the conclusion of the pilot study.

For the full study, participants completed the survey by accessing the link to Qualtrics and completing the questions. To recruit participants, a list of courses being taught during the fall 2019 semester was compiled and every third-course section was highlighted. Course instructors for the highlighted courses were contacted via email to request 10 minutes of class time for the PI to come to the class to provide the survey link to the students interested in participating. Instructors were also given the option to forward the survey link in an email to their students if they could not spare the class time. The PI was granted permission to access 72 undergraduate and graduate classes in either the first or last 10 minutes of the class time. During that time, the PI explained the purpose of the survey, asked those interested to participate and

displayed the survey link on the screen in the classroom. The PI stayed in the room while students complete the survey to answer any questions students may have had.

Approved flyers with the survey information and link were posted on announcement boards across campus in an effort to recruit more participants. The survey was formatted in Qualtrics to be accessible on a desktop or laptop computer, as well as a mobile phone or tablet. Paper copies were available in case someone requested one. The study information and consent script were presented on the first page of the survey with a question asking if the potential participant agreed to continue with the survey or not. Only those who checked "I Agree" were granted access to the survey questions. All who checked "I Do Not Agree" were directed to a "thank you" page with instructions to close out their web browser. The data collection started in mid-September and lasted 8 weeks. Participants who completed the survey were directed to another Qualtrics link to answer a simple question and provide their email address. Those who answered the question correctly were entered a drawing to win one of three $20 Amazon gift cards. To choose the winters, the email addresses were entered into an excel spreadsheet, assigned a number from 1 to __and a random number generator produced three random winners. Winning participants were contacted to confirm their email address and the Amazon gift card code was forwarded from there.

Statistical Analysis

Research Aim 1

Assess breastfeeding knowledge, attitude, and intention of young females in college

Breastfeeding knowledge and attitude scores were calculated as ranges and means with standard deviations for the total sample and for each intention groups. The sample was split by how participants answered the initial survey question, "Do you intend to have children in the future?"

This created three groups: “No children, want children,” “No children, do not want children,” and “Already have children.” Since the dataset was found to be non-normal using a normality test, the Kruskal-Wallis test was performed to assess differences in knowledge and attitude between the three groups.

Research Aim 2

Identify and assess the variables contributing to any negative attitudes towards breastfeeding

The 17 items on the attitude scale were individually analyzed to identify which items the sample scored in a negative way. For each item, the sample was split into three groups. Those who answered the item as “Strongly agree” or “Agree” were combined into the group “Positive”. The “Neither agree nor disagree” answers stayed in a “Neutral” group and the “Disagree” and “Strongly disagree” were combined into a “Negative” group. From there it was clear which items most of the sample scored as the “Negative.” The topic areas that corresponded to “Negative” items were analyzed and discussed.

Research Aim 3

Analyze differences in knowledge, attitudes, and intentions by the demographic variables

The Kruskal-Wallis test was used to assess differences in breastfeeding knowledge and attitude among the various demographics. Chi-Square tests assessed differences in breastfeeding intention by the demographics.

Results

Demographics

The total number of surveys collected was 1042. Three participants were eliminated due to being under 18, leaving 1039 participants in the final sample. The mean age was 20.12 ± 3.12 years. The minimum age of participants was 18 years, and the maximum was 54 years. The final

sample included 1002 undergraduates and 33 graduate students (4 participants did not answer this question). Table 3.1. shows the demographics of the study population. Most of the student participants were White (76.1%) followed by African American (14.3%), Asian (5.5%), other (0.8%) which included American Indian or Alaska Native and Native Hawaiian or other Pacific Islanders and multiracial (3.3%). Six hundred and seventy-seven (65.2%) of the females indicated that they were breastfed when they were a child, 204 (19.6%) were not breastfed, and 158 (15.2%) did not know whether they were breastfed during childhood.

Table 3.1. Study sample characteristics (N=1039)

Demographics	**n (%)**
Age (years):	
18	255 (24.6)
19	308 (29.7)
20	192 (18.5)
21	128 (12.3)
22 and above	154 (14.9)
Marital Status:	
Never Married	1010 (97.2)
Married	25 (2.4)
Not Married	4 (0.4)
International Student	
No	933 (89.9)
Yes	105 (10.1)
Continent:	
North America	988 (95.1)
South America	9 (0.9)
Asia	27 (2.6)
Africa	3 (0.3)
Europe	6 (0.6)
Australia	1 (0.1)
Race:	
White	791 (76.1)
African American	149 (14.3)
Asian	57 (5.5)
Others	8 (0.8)
Multi-racial	34 (3.3)
Breastfed as an infant:	
Yes	677 (65.2)
No	204 (19.6)
Don’t Know	158 (15.2)
Household Size:	
1-3	165 (16.0)
4	395 (38.3)
5	302 (29.3)
6-15	169 (16.4)

(table cont’d)

Demographics	n (%)
College Major:	
College of Engineering	30 (2.9)
College of Agriculture	156 (15.0)
College of Science	195 (18.8)
College of Business	70 (6.7)
College of Humanities and Social Sciences	286 (27.6)
College of Art and Design	19 (1.8)
School of Mass Communication	34 (3.2)
College of Human Sciences and Education	240 (23.1)
School of Veterinary Medicine	2 (0.2)
College of Music and Dramatic Arts	4 (0.38)
College Year	
Freshman	273 (26.38)
Sophomore	336 (32.39)
Junior	223 (21.63)
Senior	170 (16.39)
Graduate	33 (3.20)
Mother's Education:	
Less than High School	42 (4.1)
High School Graduate	112 (10.8)
Some College	264 (25.5)
College Degree	376 (36.4)
Graduate Degree	240 (23.2)

Results by Research Aims

Assess breastfeeding knowledge, attitude, and intention of adult females in college

The total mean knowledge score was found to be 13.16 ± 2.48 with a range of 4.00 to 19.00. Similarly, the mean attitude score of the entire sample was 64.19 ± 7.69. The range was from 30.00 to 85.00. The normality test was carried out, and since the sample size was less than 2000, the Shapiro-Wilk test was used. The dataset was not normally distributed ($p<0.001$). The entire sample was divided into 3 groups based on if they already have children or intend to have or not have a child in the future. Analysis of differences in knowledge scores among the three groups showed that the highest mean score was in the group who already had children and the lowest was among the group that had no intention of having children in the future (Table 3.2.). A

Kruskal-Wallis test showed a significant difference in knowledge among all three groups ($p<0.001$).

The mean attitude score was the highest among the group who already had children and the lowest among the group who did not want children in the future (Table 3.2.). There was also a significant difference in the attitude score among all three groups ($p = 0.001$).

Table 3.2. Mean knowledge and attitude scores by the three subgroups of the sample

Groups	**Knowledge Score**			**Attitude Score**		
	n (%)	**Mean (S.D.)**	**Range**	**n (%)**	**Mean (S.D.)**	**Range**
G1	905(89.96)	13.19(2.44)	4-19	913(89.95)	64.28(7.62)	30-85
G2	80(7.95)	12.38(2.67)	6-18	81(7.98)	62.16(7.94)	45-77
G3	21(2.08)	15.00(2.34)	10-19	21(2.06)	68.52(7.32)	45-82
Total	1006	13.16(2.48)	4-19	1015	64.20(7.68)	30-85

G1: group of participants who had intentions of having children in future
G2: group of participants who had no intentions of having children in future
G3: group of participants who already had children

Regarding intention, only the data from the participants who did not have any children was considered since the main aim of this research was to focus on female adults without any personal experience with breastfeeding. The participants who had no children at the present but were intending to breastfeed future children had higher mean knowledge and attitude scores compared to participants who had no children at present and no intention to breastfeed their children in the future. There was also a significant difference in knowledge score by intention ($p = 0.03$), but no difference in Attitude score ($p = 0.71$) among all participants who had no children (G1+G2). Based on their plans to have children in the future, there was a significant difference in knowledge score by intention ($p = 0.007$) with those wanting to have children in the future having stronger intention to breastfeed.

Table 3.3. Comparison of knowledge and attitude score among two groups by their intention to breastfeed in future

Intention of		**Knowledge Score**		**Attitude Score**	
	n(%)	**Mean (S.D.)**	**p-value**	**Mean (S.D.)**	**p-value**
(G1 + G2):			0.003*		0.071
No	82 (8.54)	11.51 (2.53)		56.22 (7.48)	
Yes	878 (91.45)	13.28 (2.42)		64.86 (7.22)	
G1:			0.007*		0.056
No	63 (7.15)	11.68 (2.62)		56.68 (7.51)	
Yes	818 (92.84)	13.32 (2.40)		64.88 (7.26)	
G2:			0.018*		0.22
No	19 (24.05)	10.94 (2.19)		54.68 (7.37)	
Yes	60 (75.94)	12.81 (2.68)		64.5 0 (6.71)	

Note: * Statistically significant ($p<0.05$)
G1: group of participants who had intentions of having children in future
G2: group of participants who had no intentions of having children in future
G1+G2: Group 1 and 2 combined which as a whole denotes the childless females

Identify and assess the variables contributing to any negative attitudes towards breastfeeding

When evaluating the Attitude score for items that were contributing to a negative attitude, only one item was truly answered negatively. The item was, "breastfed babies are smarter than babies who are not breastfed." As Table 3.4. shows, there was a significant difference between how the three groups answered that item ($p = 0.001$). There were differences between groups 1 and 2 and groups 2 and 3. There was also a significant difference in the mean scores of this item based on age, college major, college year, international student status and mother's education, as seen in Table 3.5. Scores for participants of 18 ($p = 0.001$), 19 ($p = 0.003$) and 20 years ($p = 0.011$) were significantly lower for participants age 22 and older. Using Bonferroni correction (adjusted p-value = 0.005), there was a significant difference in the scores of participants from the College of Agriculture and College of Humanities and Social Sciences ($p <0.001$). Similarly, scores of freshmen were significantly lower than senior ($p = 0.036$) and graduate students ($p = 0.017$). Students from the U.S. scored significantly lower than international students on this particular item ($p = 0.010$).

Table 3.4. Comparison of negatively answered attitude item with response of the three groups

	n (%)	Mean (S.D.)	p-value
G1	930 (89.94)	1.74 (0.70)	0.001*
G2	82 (7.93)	1.46 (0.54)	
G3	22 (2.12)	1.91 (0.81)	

Note: Possible answer ranges from Strongly disagree with score 1 to Strongly agree with score 5.
* Statistically significant ($p<0.05$)
G1: group of participants who had intentions of having children in future
G2: group of participants who had no intentions of having children in future
G3: group of participants who already had children

Table 3.5. Comparison of negatively answered attitude item by the demographics

Demographics	n (%)	Mean (S.D.)	p-value
Age Category (years)			0.001*
18	254 (24.58)	2.50 (0.96)	
19	307 (29.72)	2.55 (0.99)	
20	191 (18.48)	2.57 (1.02)	
21	128 (12.39)	2.69 (1.05)	
22 and above	153 (14.81)	2.92 (1.13)	
College Major:			<0.001**
College of Agriculture	156 (15.11)	2.86 (1.09)	
College of Art and Design	19 (1.84)	2.47 (0.90)	
College of Business	70 (6.78)	2.59 (1.09)	
College of Engineering	30 (2.90)	2.80 (1.21)	
College of Human Sciences and Education	237 (22.96)	2.59 (1.21)	
College of Music and Dramatic Arts	4 (0.38)	2.25 (0.96)	
College of Science	195 (18.89)	2.74 (0.94)	
School of Mass Communication	33 (3.19)	2.55 (1.15)	
School of Veterinary Medicine	2 (0.19)	4.00 (1.41)	
College of Humanities and Social Sciences	286 (27.71)	2.40 (0.95)	
College Year			0.003*
Freshman	272 (26.38)	2.51 (0.98)	
Sophomore	334 (32.39)	2.56 (0.98)	
Junior	223 (21.63)	2.60 (1.02)	
Senior	169 (16.39)	2.79 (1.12)	
Graduate	33 (3.20)	3.09 (1.21)	
International Student			0.010*
No	929 (89.84)	2.59 (0.99)	
Yes	105 (10.15)	2.86 (1.23)	
Mother's Education			0.026*
Less than High School	42 (4.07)	2.90 (1.10)	
High School Graduate	112 (10.87)	2.69 (0.94)	
Some College	262 (25.43)	2.47 (0.94)	
College Degree	375 (36.41)	2.59 (1.04)	
Graduate Degree	239 (23.20)	2.71 (1.09)	

Note: Note: Possible answer ranges from Strongly disagree with score 1 to Strongly agree with score 5.
**Bonferroni correction (Statistically significant $p<0.005$). * Statistically significant ($p<0.05$)

Analyze differences in knowledge, attitudes and intentions by the demographic variables

Looking at the chi-squares, it was found that being breastfed as an infant was the only factor associated with the breastfeeding intentions of group 1 ($p < 0.001$), group 2 ($p < 0.031$) and both groups as a whole (G1 + G2) ($p < 0.001$).

Table 3.6. Differences in breastfeeding intention by grouping and demographics

Demographics	**Intention of**								
	G1			**G2**			**G1 + G2**		
	X^2	**df**	**p-value**	**X^2**	**df**	**p-value**	**X^2**	**df**	**p-value**
Age	7.812	4	0.099	4.206	4	0.379	5.995	4	0.199
Marital Status	0.225	2	0.894	--	--	--	0.190	2	0.909
Breastfed as a child	76.385	2	<0.001*	6.91	2	0.031*	80.338	2	< 0.001*
Class Year	3.449	4	0.486	3.611	4	0.461	4.491	4	0.344
College Major	11.577	9	0.238	11.491	8	0.175	13.273	9	0.151
Race	4.889	4	0.299	0.506	4	0.973	3.462	4	0.484
International Student	1.054	1	0.305	1.505	1	0.220	0.036	1	0.850
Mother's Education	1.661	4	0.798	3.291	4	0.510	0.510	4	0.972
Household size	0.998	2	0.607	2.12	2	0.346	0.847	2	0.655

Note: * Statistically significant ($p<0.05$)
G1: group of participants who had intentions of having children in future
G2: group of participants who had no intentions of having children in future
G1+G2: Group 1 and 2 combined which as a whole denotes the childless females

Kruskal-Wallis tests were carried out to analyze the differences in knowledge and attitude by the demographics. The knowledge and attitude scores were highest among participants who were 22 years and older. Results of post-hoc tests showed a difference in knowledge among the age groups 18 only and 22 and above, 19 only and 22 and above, 20 only and 22 and above ($p < 0.001$). Regarding attitude, there was a difference between age groups 18 only and 22 and above, 19 only and 22 and above, 21 only and 22 and above ($p < 0.001$). Similarly, married participants had significantly higher knowledge ($p = .005$) and a significantly more positive attitude ($p = 0.026$) towards the concept of breastfeeding than unmarried participants. International students had slightly higher knowledge and attitude scores compared to U.S. citizens but there was no significant difference. White and African American participants had almost equal knowledge and

attitude scores but the slightly higher mean attitude scores among African American participants were significant ($p = 0.002$). The knowledge and attitude scores were comparatively higher among participants who indicated their household size to be 6 to15 people. In addition, there was a significant difference in attitude among participants with household size 4 and those with 6-15 ($p = 0.007$).

Individually looking at the majors of participants, students from the College of Agriculture had higher knowledge and a more positive attitude. College of Agriculture students had significantly higher mean knowledge scores than the College of Science, College of Business, College of Humanities and Social Sciences, College of Human Sciences and Education and College of Art and Design ($p < 0.001$). Within the attitude, there was a difference between the College of Agriculture and the College of Business ($p < 0.001$) with the College of Agriculture having higher scores. Among the participants' years in college, both knowledge and attitude were higher in senior and graduate students. Similarly, differences were also found in knowledge between graduate students and sophomores and graduate students and juniors ($p < 0.001$). Similarly, there was a significant difference in attitude scores between freshman and seniors and sophomores and seniors ($p = 0.004$). Regarding the mother's education, there was a significant difference in knowledge between participants whose mother had completed "some college" and those who completed a college degree ($p = 0.042$). Participants were divided based on whether they were breastfed during childhood. Knowledge and attitude scores were higher among participants who were not breastfed during childhood. Here, a significant difference was found between knowledge and attitude between participants who were ($p < 0.001$) and were not breastfed ($p < 0.001$).

Table 3.7. Differences in knowledge and attitude scores by the demographic variables

Demographics	**n (%)**	**Knowledge Score**		**Attitude Score**	
		Mean (S.D.)	**p-value**	**Mean (S.D.)**	**p-value**
Age (years):			<0.001*		<0.001*
18	255 (24.6)	12.87(2.32)		63.37(7.71)	
19	308 (29.7)	13.01(2.33)		63.53(7.35)	
20	192 (18.5)	12.94(2.57)		64.59(6.77)	
21	128 (12.3)	13.40(2.51)		63.88(8.18)	
22 and above	154 (14.9)	14.09(2.69)		66.58(8.54)	
Marital Status:			0.005*		0.026*
Never Married	1010 (97.2)	13.12(2.48)		64.09(7.68)	
Married	25 (2.4%)	14.54(1.86)		68.20(7.65)	
Not Married	4 (0.4%)	15.00(2.45)		64.00(5.59)	
International Student			0.207		0.807
No	933 (89.9)	13.12(2.46)		64.16(7.59)	
Yes	105 (10.1)	13.54(2.62)		64.42(8.54)	
Race:			0.546		0.002*
White	791 (76.1)	13.14(2.48)		63.72(7.67)	
African American	149 (14.3)	13.14(2.25)		65.86(7.46)	
Asian	57 (5.5)	13.30(2.83)		64.21(8.94)	
Others	8 (0.8)	14.87(2.47)		66.25(4.95)	
Multi-racial	34 (3.3)	13.09(2.83)		67.40(5.59)	
Household Size:			0.129		0.007*
1-3	165 (16.0)	13.21(2.72)		64.54(8.99)	
4	395 (38.3)	12.99(2.49)		63.63(7.36)	
5	302 (29.3)	13.20(2.47)		63.93(7.24)	
6-15	169 (16.4)	13.48(2.24)		65.53(7.76)	
College/School			<0.001**		<0.001**
Engineering	30 (2.9)	13.96(2.41)		65.00(8.87)	
Agriculture	156 (15.0)	14.44(2.31)		66.48(8.64)	
Science	195 (18.8)	13.35(2.51)		64.67(7.56)	
Business	70 (6.7)	12.89(3.01)		61.55(8.25)	
Humanities and Social Sci	286 (27.6)	12.53(2.29)		63.92(6.76)	
Art and Design	19 (1.8)	11.88(2.02)		61.57(7.47)	
Mass Communication	34 (3.2)	13.16(2.62)		62.36(8.64)	
Human Sciences and Educ	240 (23.1)	13.02(2.32)		63.79(7.40)	
Veterinary Medicine	2 (0.2)	15.00(1.41)		65.50(4.95)	
Music and Dramatic Arts	4 (0.38)	12.25(3.30)		67.25(6.84)	
College Year:			<0.001*		0.004*
Freshman	273 (26.3)	12.85(2.34)		63.39(7.50)	
Sophomore	336 (32.4)	13.09(2.38)		63.53(7.59)	
Junior	223 (21.5)	13.12(2.58)		64.71(6.81)	
Senior	170 (16.4)	13.58(2.62)		65.72(8.24)	
Graduate	33 (3.2)	14.62(2.68)		66.03(10.4)	

(table cont'd)

Table 3.7. Differences in knowledge and attitude scores by the demographic variables

Demographics	**n (%)**	**Knowledge Score**		**Attitude Score**	
		Mean (S.D.)	**p-value**	**Mean (S.D.)**	**p-value**
Mother's Education:			0.042*		0.064
Less than High School	42 (4.1)	13.60(2.40)		65.67(6.65)	
High School Graduate	112 (10.8)	13.15(2.74)		65.75(8.28)	
Some College	264 (25.5)	12.77(2.48)		63.52(7.16)	
College Degree	376 (36.4)	13.38(2.35)		63.91(7.67)	
Graduate Degree	240 (23.2)	13.21(2.56)		64.47(8.05)	
Breastfed as a Child:			<0.001*		<0.001*
Yes	677 (65.2)	12.64(2.40)		62.38(8.00)	
No	204 (19.6)	13.47(2.48)		65.18(7.39)	
Don't Know	158 (15.2)	12.51(2.36)		62.30(7.80)	

Note: **Bonferroni correction (Statistically significant p<0.005). * Statistically significant (p<0.05)

Discussion and Conclusion

The distribution of the study participants in terms of the race was similar to the distribution of university students as per the record of fall 2019 given by the LSU Fall Facts publication.[17] Such as most of the students at LSU were white (68.56%) followed by African American (13.41%)[17] compared to the current study where the percentage of white female students was 76.10% and African American was 14.30%. The percentage of undergraduate enrollment at LSU in 2019 was 81.61%.[17] Since the study utilized convenience sampling, 96.8% of study participants were undergraduates. Similarly, a larger number of students were from the largest colleges including the College of Agriculture, College of Science, College of Humanities and Social Sciences, and College of Human Sciences and Education.

Overall, good knowledge and a positive attitude were found among the female students regarding breastfeeding. Knowledge and attitude scores were higher among females as compared to a similar study conducted at the University of Mississippi.[8] A study among female students at the University of Jordan found a low level of knowledge and extreme negative attitudes.[9] Participants in the third group, who already had children, scored highest on knowledge and

attitude. This might be because of some education or curiosity to understand the concept of breastfeeding, personal research, or some experience in breastfeeding. Comparison between the main two groups, participants who want to have children in the future and those who do not, shows those with plans to have children had higher knowledge and a more positive attitude. Most of the students (91.45%) reported they would breastfeed their children in the future. This was like the breastfeeding intentions of a sample of students at the University of Missouri, where the majority indicated a high probability of breastfeeding their children in the future.[18]

Although the results indicated a positive attitude towards breastfeeding, most students denied the fact that breastfed babies were comparatively smarter than non-breastfed babies. There are no current studies available in the literature in which to compare this study outcome.

Studies at universities and colleges in the southern United States reported that students had problems with breastfeeding in public. A study among students in Alabama in 1997 claimed breastfeeding in public to be embarrassing.[12] Results were the same at the University of Tennessee in 2019 as there was low support for breastfeeding in public,[7] but this study did not report any concern overviewing public breastfeeding.

Participants ages 22 years and older had more knowledge and a more positive attitude about breastfeeding. This might be because of more information during their particular major of study, some kind of personal experience, or interest in knowing about breastfeeding for future planning to have children. Similar results were found by previous studies at the University of Tennessee and the University of North Dakota where students 20 and older scored higher on breastfeeding attitude scales than students younger than 20.[7,13] Similarly, participants who were married scored higher in knowledge and attitude scales compared to unmarried. Participants

from the LSU College of Agriculture had higher knowledge and there was a significant difference between the College of Agriculture and other colleges. Students from this college might be aware of the physiology and benefits of breastfeeding/lactation for infants and mothers due to majors related to human nutrition and animal sciences. Students who reported their family size to be 6-15 people scored high on knowledge and attitude scales. This was similar to a study carried out among unmarried female graduate students at the University of Jordan, where participants with more than 8 family members had higher attitude scores.[9] The difference in attitude by age category was consistent with the results of a previous study targeting undergraduate men and women at the University of North Dakota.[13]

Final Conclusion

The participants had a good level of knowledge with a positive attitude. Similarly, a majority of participants reported they had the intention to breastfeed their children in the future. Most of the participants denied the fact that breastfed babies may become comparatively smarter than formula-fed babies.

Limitations

1. The results of this study do not represent the views of all students at LSU and all college students at US institutions.
2. Since the questionnaire was self-reported, participants might have chosen options that are more desirable or misinterpret items.
3. This study uses convenience sampling including undergraduate and graduate female students of Louisiana State University; not all students at the university had an equal chance to participate.
4. This study did not use validated survey instruments to measure the major concepts of breastfeeding knowledge, attitude, and intention.

Future Directions

Future research should include male students and there should be studies that include gender differences in knowledge and attitude regarding breastfeeding. Studies should also compare those attributes among adults from different states. It would be better to validate knowledge and attitude scales or use already validated scales.

References

1. World Health Organization (WHO). Breastfeeding. 2019; http://www.who.int/topics/breastfeeding. Accessed 05/29/2019.

2. World Health Organization (WHO). Infant and young child feeding. 2019. https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding. Accessed 5/31/2019.

3. Al-Nuaimi K, Ali R, Hatem Ali F. The effect of a breastfeeding educational workshop on clinicans' knowledge, attitudes and practices. *Br J Midwifery.* 2019;27(4):242-250.doi: 10.12968/bjom.2019.27.4.242.

4. Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Division of Nutrition PA, and Obesity. . 2018 breastfeeding report card. 2018. www.cdc.gov/breastfeeding/data/reportcard.htm. Accessed May 30, 2019.

5. Hamze L, Mao J, Reifsnider E. Knowledge and attitudes towards breastfeeding practices: a cross-sectional survey of postnatal mothers in China. *Midwifery.* 2019;74:68-75.doi: 10.1016/j.midw.2019.03.009.

6. Goulet C, Lampron A, Marcil I, Ross L. Attitudes and subjective norms of male and female adolescents toward breastfeeding. *J Human Lact.* 2003;19(4):402-410.doi: 10.1177/0890334403258337.

7. Kavanagh KF, Lou Z, Nicklas JC, Habibi MF, Murphy LT. Breastfeeding knowledge, attitudes, prior exposure, and intent among undergraduate students. *J Hum Lact.* 2012;28:556-564.doi: 10.1177/0890334412446798.

8. Chang Y, Valliant M, Bomba AK. Gender differences in knowledge and attitude regarding breastfeeding. *Int J Consum Stud.* 2012;36(3):342-351.doi: 10.1111/j.1470-6431.2010.00994.x.

9. Al-Domi HA. Knowledge and attitudes towards breastfeeding among unmarried female graduates at the University of Jordan. *Mal J Nutr.* 2015;21(3):309-319; http://libezp.lib.lsu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&d

b=ccm&AN=114779645&site=eds-live&scope=site&profile=eds-main. Accessed 05/21/2019.

10. Mahat Jimale M, Sophie O, Victor OO. Comparison of knowledge, attitudes and practices on exclusive breastfeeding between primiparous and multiparous mothers attending Wajir District hospital, Wajir County, Kenya: a cross-sectional analytical study. *Int Breastfeed J.* 2018(1):1.doi: 10.1186/s13006-018-0151-3.

11. De La Mora A, Russell DW, Dungy CI, Losch M, Dusdieker L. The Iowa infant feeding attitude scale: analysis of reliability and validity. *J App Soc Psych.* 1999;29(11):2362-2380.doi: 10.1111/j.1559-1816.1999.tb00115.x.

12. Forrester IT, Wheelock G, Warren AP. Assessment of students' attitudes toward breastfeeding. *J Hum Lact.* 1997;13(1):33-37; http://libezp.lib.lsu.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=107321753&site=eds-live&scope=site&profile=eds-main. Accessed 06/28/2019.

13. Marrone S, Vogeltanz-Holm N, Holm J. Attitudes, knowledge, and intentions related to breastfeeding among university undergraduate women and men. *J Hum Lact.* 2008;24(2):186-192.doi: 10.1177/0890334408316072.

14. Dean AG SK, Soe MM. Open source epidemiologic statistics for public health. 2013; www.OpenEpi.com. Accessed 06/06/2019.

15. Spear HJ. College students' experiences and attitudes regarding middle and high school–based breastfeeding education. *JOSN.* 2007;23(5):276-282.doi: 10.1177/10598405070230050601.

16. Morris NS, MacLean CD, Chew LD, Littenberg B. The single item literacy screener: evaluation of a brief instrument to identify limited reading ability. *BMC Fam Pract.* 2006;7(1):21.doi: 10.1186/1471-2296-7-21.

17. The LSU Division of Strategic Communications. 2019 LSU Fall facts. 2019; https://www.lsu.edu/bgtplan/facts/pdfs/2019fallfacts_final.pdf. Accessed 01/20/2020.

18. Jefferson U. Breastfeeding exposure, attitudes, and intentions of African American and Caucasian college students. *J Hum Lact.* 2016;33:089033441667938.doi: 10.1177/0890334416679384.

CHAPTER 4. SUMMARY

The purpose of this research was to measure the level of knowledge, attitude, and intention of adult female students of the University regarding breastfeeding. Finding young adults' knowledge, attitudes, prior exposures, and future intent about breastfeeding might highlight the existing gaps that could give helpful insight to professionals creating interventions to addressing the gaps in these areas among this population. A questionnaire was prepared that consisted of a 19-item knowledge section, a 17-item attitude section with a total of 55-58 questions. A convenience sample of female adults (n=1039) enrolled at Louisiana State University were recruited to complete the study questionnaire. During the statistical analysis, the whole dataset was found to be not normal. Descriptive statistics were calculated. Kruskal-Wallis and Chi-Square tests were performed. A p-value of less than .05 was considered significant. The means knowledge and attitude scores were calculated to be 13.16 ± 2.48 out of 19 and 64.19 ± 7.69 out of 85 respectively. Similarly, the majority (91.45%) of the participants had intentions to breastfeed their children in the future. This suggests a good level of knowledge, a positive attitude regarding breastfeeding among the study participants.

Overall, good knowledge and a positive attitude were found among the female students regarding breastfeeding. Although the results indicated a positive attitude, most students denied the fact that breastfed babies were comparatively smarter than non-breastfed babies. Future research should include male students and consider gender differences in knowledge and attitude regarding breastfeeding. Studies should also compare these attributes among adults from different states.

APPENDIX A. THESIS STUDY TIMELINE

Project Activities	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Initial IRB Approval	■										
Thesis Proposal	■										
Instrument Modifications and Updated IRB Approval	■										
Pilot Study (n=5)	■										
Instrument Modifications (if needed)	■										
Recruit and Collect Data (N=1025)		■	■	■							
Clean and Analyze Data					■						
Write-up Final Thesis					■	■	■	■	■	■	
Thesis Defense											■
Submit Thesis to Graduate School											■

APPENDIX B. INSTITUTIONAL REVIEW BOARD APPROVAL

LSU AgCenter Institutional Review Board (IRB)
Dr. Michael J. Keenan, Chair
School of Human Ecology
209 Knapp Hall
225-578-1708
mkeenan@agctr.lsu.edu

Application for Exemption from Institutional Oversight

All research projects using living humans as subjects, or samples or data obtained from humans must be approved or exempted in advance by the LSU AgCenter IRB. This form helps the principal investigator determine if a project may be exempted, and is used to request an exemption.

- Applicant, please fill out the application in its entirety and include the completed application as well as parts A-E, listed below, when submitting to the LSU AgCenter IRB. Once the application is completed, please submit a hard copy or attached to e-mail to the chair, Dr. Michael J. Keenan, in 209 Knapp Hall; mkeenan@agcenter.lsu.edu.

- A Complete Application Includes All of the Following:
  - **(A)** A copy of this completed form and a copy of parts B through E.
  - **(B)** A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1 & 2)
  - **(C)** Copies of all instruments and all recruitment material to be used.
    - If this proposal is part of a grant proposal, include a copy of the proposal.
  - **(D)** The consent form you will use in the study (see part 3 for more information)
  - **(E)** Beginning January 1, 2019: Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing and handling data, unless already on file with the LSU AgCenter IRB.

Training link is: (https://about.citiprogram.org/en/homepage/). You can take either biomedical or social and behavioral. Once LSU or LSU AgCenter is selected as the institution, all fees will be waived.

1) Principal Investigator: Kritee Niroula **Rank:**_____ **Student?** Y/N: Yes
Dept: SCHOOL OF NUTRITION & FOOD SCIENCES **Ph:** 8-1631
E-mail:knirou1@lsu.edu
2) Co-Investigator(s): please include department, rank, phone and e-mail for each
If student as principal or co-investigator(s), please identify and name supervising professor in this space:
Erin Mckinley, SNFS, Assistant Professor, 8-1631, emckinley@agcenter.lsu.edu
3) Project Title: : Assessing Breastfeeding Knowledge, Attitudes and Intention among Young Female Undergraduate and Graduate Students.
4) Grant Proposal?(yes or no): No **If Yes, Proposal Number and funding Agency**_____
Also, if Yes, either: **this application completely matches the scope of work in the grant Y/N**___
OR
more IRB applications will be filed later Y/N___
5) Subject pool (e.g. Nutrition Students)_____

- Circle any **"vulnerable populations" to be used:** (prisoner, fetus, children<18, or mentally impaired). Projects with incarcerated persons cannot be exempted.

6) PI signature_____ ****Date** 07/10/2019 (no per signatures)
****I certify that my responses are accurate and complete.** If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU AgCenter institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at the LSU AgCenter for three years after completion of the study. If I leave the LSU AgCenter before that time the consent forms should be preserved in the Departmental Office.

Committee Action: Exempted ✓ Not Exempted____ **IRB#** HE19-12
Reviewer Michael Keenan **Signature**_____ **Date** 7-22-2019

Part 1: Determination of "Research" and Potential for Risk

- This section determines whether the project meets the Department of Health and Human Services (HSS) definition of research involving human subjects, and if not, whether it nevertheless presents more than "minimal risk" to human subjects that makes IRB review prudent and necessary.

1. Is the project involving human subjects a systematic investigation, including research, development, testing, or evaluation, designed to develop and contribute to generalizable knowledge?
(Note some instructional development and service programs will include a "research" component that may fall within HHS' definition of human subject research)

__X__ **Yes**

____ **No**

2. Does the project present physical, psychological, social or legal risks to the participants reasonably expected to exceed those risks normally experienced in daily life or in routine physical or psychological examination or testing?
You must consider the consequences if individual data inadvertently become public.

____ **Yes Stop.** This research cannot be exempted—**submit application for full IRB review.**

__X__ **No Continue** to see if research can be exempted from IRB oversight.

3. Are any of your subjects incarcerated?

___X_ **Yes Stop.** This research cannot be exempted—**submit application for full IRB review.**

____ **No Continue** to see if research can be exempted from IRB oversight.

4. Are you obtaining any health information <u>from a health care provider and/or participant (when resides in an EU country)</u> that contains any of the identifiers listed below?

A. Names
B. Address: street address, city, county, precinct, ZIP code, and their equivalent geocodes. <u>Exception for ZIP codes:</u> the initial three digits of the ZIP code may be used, if according to current publicly available data from the Bureau of the Census: (1) The geographic unit formed by combining all ZIP codes with the same three initial digits contains more than 20,000 people; and (2) the initial three digits of a ZIP code for all such geographic units containing 20,000 or fewer people is changed to '000.' (Note: The 17 currently restricted 3-digit ZIP codes to be replaced with '000' include: 036, 059, 063, 102, 203, 556, 692, 790, 821, 823, 830, 831, 878, 879, 884, 890, and 893.)
C. Dates related to individuals

Part 2: Exemption Criteria for Research Projects

Please select any and all categories that relate to your research. Research is exemptible when all research methods are one or more of the following categories. Check statements that apply to your study:

___ 1. In education setting, research to evaluate normal educational practices.

_X__ 2. For research not involving vulnerable people [prisoner, fetus, pregnancy, children, or mentally impaired]: that observes public behavior (including participatory observation), or do interviews or surveys or educational tests:

The research must also comply with ONE of the following:

_X__ a) The participants cannot be identified, directly or statistically;

_X__ b) The responses/observations could not harm participants if made public;

___ c) Recorded information is identifiable and IRB conducts limited review – Adults only.

____ 3. For benign behavioral interventions with collection of information (verbal, written, audiovisual recording) from adult subjects who prospectively agree and one of the following is met:

____ a) Recorded information cannot readily identify the subject

____ b) Any disclosure of responses outside of the research would not reasonably place subject at risk

____ c) Recorded information is identifiable and IRB conducts limited review

---

____ 4. Secondary research for which consent is not required: use of identifiable private information or identifiable biospecimens:

The research must also comply with ONE of the following:

___ a) Information or biospecimens are publicly available

___ b) Recorded information cannot readily be identified (directly or indirectly/linked); investigator does not contact subjects and will not re-identify subjects

___ c) Information collection and analysis involving identifiable health information when use is regulated by HIPAA "health care operations" or "research" or "public health activities and purposes"

___ d) Research by or on behalf of Federal department/agency using government-generated or collected information. Compliant with relevant privacy protections.

_____ 5. Research and demonstration projects conducted/supported by a Federal department or agency or subject to approval by department/agency head and that are designed to study, evaluate, improve, or otherwise examine public benefit or service programs

___ a) Prior to commencing, research must be posted on a Federal website or in other way determined by the Agency

---

_____ 6. Research to evaluate food quality, taste, or consumer acceptance.

The research must also comply with ONE of the following:

___ a) The food has no additives;

___ b) The food is certified safe by the USDA, FDA or EPA.

_____ 7. Secondary research for which broad consent is required

___ a) Storage or maintenance of identifiable private information or identifiable biospecimens for potential secondary research use if an IRB conducts a limited review

---

_____ **8. Secondary research for which broad consent is required. Research involving the use of identifiable private information or identifiable biospecimens. All of the following are required:**

___ a) Broad consent for the storage, maintenance, and secondary uses

___ b) Documentation of informed consent or waiver of documentation was obtained

___ c) Limited IRB review that broad consent is consistent with proposed research

___ d) Return of research results not included in the study plan

Part 3: Consent Form Information

- The consent form must be written in non-technical language which can be understood by the subjects. It should be free of any exculpatory language through which the subject is made to waive, or appears to be made to waive any legal rights, including any release of the investigator(s), sponsor, institution or its agents from liability for negligence. (Note: the consent form is not a contract)

- For example consent forms, please refer to the LSU campus IRB website, https://www.lsu.edu/research/resources_for_faculty/research_compliance/institutional_review/irb_consent_forms.php

- The LSU AgCenter IRB prefers using signed informed consent. However, if that is impractical, an application to waive signed consent can be requested below. When this waiver is requested, **the LSU AgCenter IRB must be provided with the consent script** that will present the information about consent to human subjects regarding the study/research. All consent forms or scripts must include a statement that the study was approved by the LSU AgCenter IRB and provide LSU AgCenter IRB contact information to participants: Dr. Phil Elzer at 225-578-4763 or pelzer@agcenter.lsu.edu. **Note: Parental consent usually cannot be waived for studies with children as subjects. However, the parent card is acceptable parental consent for studies of 4-H programs.**

I am requesting waiver of <u>SIGNED</u> Informed Consent because:

___ **(a)** Having a participant sign the consent form would create the **principal risk** of participating in the study

<u>or that</u>

_X__ (b) The research presents **no more than minimal risk of harm** to subjects and involves no procedures for which having signed consent is normally required outside of the research environment.

Now that your application is complete, please send a copy of it or attach it to an e-mail to the LSU AgCenter IRB for review at the address listed below.

LSU AgCenter Institutional Review Board
Dr. Michael J. Keenan, Chair
209 Knapp Hall
Baton Rouge, LA 70803
Ph: 225-578 1708
Fax: 225-578-4443
E-mail: mkeenan@agcenter.lsu.edu

APPENDIX C. QUESTIONNAIRE

"ASSESSING BREASTFEEDING KNOWLEDGE, ATTITUDES AND INTENTION AMONG ADULT FEMALE UNDERGRADUATE AND GRADUATE STUDENTS"

Performance Site: Louisiana State University and Agricultural and Mechanical College.
Investigators: The following investigators are available for questions about this study, Kritee Niroula, knirou1@lsu.edu or Dr. Erin McKinley, 225-578-1631, emckinley@agcenter.lsu.edu
Purpose of the Study: The purpose of this research project is to assess breastfeeding knowledge, attitudes and intention among adult females.
Subject Inclusion: Individuals 18 years of age or older who are biologically female and are enrolled at LSU. To participate in this study, you must have access to a web browser via desktop or laptop computer or on a mobile device connected to the Internet.
Number of subjects: 1025
Study Procedures: The study consists of a 55 to 58 questions survey taken entirely through the Qualtrics system or on paper. The survey can take 5 to 10 minutes to complete. You will complete the survey in one session. No further participation is required of you after submitting the online survey.
Benefits: There are no direct benefits to participants in this study.
Risks: This study poses no more than minimal risk you would encounter in everyday life. Every effort will be made to maintain the confidentiality of your study records. Files will be kept in secure files to which only the investigator has access.
Right to Refuse: Subjects may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which they might otherwise be entitled.
Privacy: Results of the study will be published in aggregate and no names or identifying information will be asked or included in the publication. Data from this study will be used for additional study analyses publications for up to the next three years.
Consent: The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. For injury or illness, call your physician or the Student Health Center if you are an LSU student. If I have questions about subjects' rights or other concerns, I can contact Dr. Michael Keenan, Institutional Review Board, (225) 578-1708, mkeenan@agcenter.lsu.edu.
By checking *"I Agree,"* I agree to participate in the study described above.
☐ I AGREE
☐ I DO NOT AGREE

Directions: Please answer this question honestly and to the best of your ability.

1. Do you intend to have children in the future?

☐Yes, I intend to have a child/children in the future.

☐No, I have no intention to have children.

☐I already have child/children.

Knowledge Scale

Instructions: For each question, read the statement and indicate whether or not you agree with the statement as written. If you agree choose yes and if you disagree choose no. Please do not leave any questions blank.

2. A baby should be put to the breast within 1 hour of birth	Yes	No
3. Breastmilk should be the baby's first feed	Yes	No
4. Breastmilk and formula are the same	Yes	No
5. Breastmilk alone can sustain a baby for the first 6 months	Yes	No
6. Breastfeeding has multiple benefits for both mother and infant	Yes	No
7. If a mother has the flu, it is necessary for her to stop breastfeeding until she is well	Yes	No
8. A mother's initial milk output should be fed to the baby	Yes	No
9. Breastfeeding prevents a woman from returning to her pre-pregnancy weight	Yes	No
10. When the baby is sick, a mother should not continue to breastfeed the baby	Yes	No
11. A baby should be breastfed on demand	Yes	No
12. If a mother has a c-section, she should wait to breastfeed until she is healed	Yes	No
13. A breastfed baby may experience less illness as an infant (1 to 12 months)	Yes	No
14. A mother who intends to occasionally drink alcohol should not plan on breastfeeding her baby at all	Yes	No
15. Semi-solid food can be introduced at 6 months of age, along with breastmilk	Yes	No
16. Experiencing pain while breastfeeding should not be expected	Yes	No
17. Babies should be fed with just breastmilk for the first 6 months of life	Yes	No
18. Most women make enough breastmilk to adequately feed the baby	Yes	No
19. A formula fed baby may experience more illnesses in the first 12 months, than a breastfed baby.	Yes	No
20. Women who have breastfed can have lower risk for breast and ovarian cancer.	Yes	No

Attitude Scale

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.

21. I think that it is acceptable for women to breastfeed in public	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
22. Breastfeeding is an intimate activity that should be kept private	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
23. Information that endorses breastfeeding should be included in middle/high school education curriculum	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

24. Healthcare providers should inform all mothers about the distinctive benefits of breastfeeding	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
25. Formula feeding is a better choice if the mother plans to go back to work during the child's first year of life	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
26. It is important to promote a breastfeeding-friendly culture in the United States	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
27. Breastmilk is cheaper than formula	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
28. Breastfeeding will help a mother feel closer to her baby	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
29. Seeing a woman breastfeed makes me uncomfortable	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
30. Breastfeeding is more convenient than formula feeding	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
31. Breastfed babies are smarter than babies who are not breastfed	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
32. A mother cannot return to work while feeding her baby with breastmilk	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
33. I respect women who breastfeed	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
34. Breastfed babies are more likely to be overfed than formula fed babies	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
35. After a mother has stopped breastfeeding, her breasts will not look as nice as they did before	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
36. Babies who are fed breastmilk are healthier than babies who are fed formula	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
37. A father may feel "left out" if a mother breastfeeds the baby	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

Instructions: For this section, please select or provide your response to each question.
All responses will be kept confidential and private.

38. What is your marital status? (Check one)
☐Never married
☐Married
☐Widowed
☐Divorced
☐Separated

39. What is your current age? _____ (Drop down list)

40. Are you an international student or a citizen of a country other than the United States? (Check one)
☐Yes
☐No

40.b. What Continent are you from?
☐North America
☐South America
☐Africa
☐Australia
☐Europe
☐Asia

41. 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

42. Do you currently work for pay? (Check one)
☐Yes, full time (More than 32 hours/week)
☐Yes, part time (Less than 32 hours/week)
☐Full time student, not currently employed

43. Thinking about the household you grew up in, how many people live(d) in your household including yourself? _____

44. How is your tuition paid? (Check all that apply)
☐Scholarships
☐Student loan in my name
☐Student loan in my parent's name
☐Assistantship
☐My parents make any needed payments
☐I make any needed payments

45. Your academic major is in which college?
☐College of Engineering
☐College of Agriculture
☐College of Science
☐College of Business
☐College of Humanities and Social Sciences
☐College of Human Sciences and Education
☐School of Veterinary Medicine
☐College of Music and Dramatic Arts
☐College of Art and Design
☐School of Mass Communication

46. Choose your academic level:
☐Freshman
☐Sophomore
☐Junior
☐Senior
☐Graduate

47. Thinking about your mother, what is the highest degree or level of school she has completed?
☐No schooling completed
☐8th grade
☐Some high school, no diploma
☐High school graduate, diploma or the equivalent (for example: GED)
☐Some college credit, no degree
☐Trade/technical/vocational training
☐Associate degree
☐Bachelor's degree
☐Master's degree
☐Professional degree
☐Doctoral degree
☐Not applicable

48. When you were a baby, were you ever breastfed? (Check one)

☐Yes
☐No
☐Don't Know

49. 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

*If you indicated that you intend to have children, proceed to **section I** of the survey (Page:16)*
*If you indicated that you do not intend to have children, skip to **section II** of the survey (Page:17)*
*If you indicated that you already have children, proceed to **section III** of the survey (Page:18)*

Intentions Scale

Section I: If you do not have children but want children:
Instructions: For this section, please select or provide your response to each question. Please do not leave any questions blank.

50.1In the future, do you intend to breastfeed?

☐Yes ☐No

51.1Thinking about your first (or only) child, if you do decide to breastfeed, how long do you think you would do so?

☐Upto 1 month ☐2-3 months ☐4-6 months
☐7-12 months ☐1 year but no longer than 2 ☐2 years or longer.

52.1Thinking about your first (or only) child, for the first 6 months of the child's life what feeding method(s) would you use?

☐Breast milk only ☐Breast milk & formula feeds ☐formula feed only

53.1Thinking about the answers you chose for the previous two questions, who or what influenced your choice? (Check all that apply)

☐Family and/or friends
☐Social Media (Influencer)
☐I know or have seen someone who breastfeeds

54.1Returning to work would make you stop feeding with breastmilk.

☐Yes ☐No

55.1I would not breastfeed in public, i.e. in a restaurant or in a park, even if covered.

☐Yes ☐No

56.1I would not breastfeed in public, i.e. in a restaurant or in a park, uncovered.

☐Yes ☐No

Note: You are now finished. Please return the survey to the researcher.

Section II: If you do not have children and do not want children:

Instructions: For this section, please select or provide your response to each question. Please do not leave any questions blank.

Thinking about a future in which you choose to have children:

50.2Would you intend to breastfeed?

☐Yes ☐No

51.2If you did decide to breastfeed, what would be the duration?

☐Upto 1 month ☐2-3 months ☐4-6 months

☐7-12 months ☐1 year but no longer than 2 ☐2 years or longer

52.2For the first 6 months of that child's life what feeding method(s) would you use

☐Breast milk only ☐Breast milk & formula feeds ☐Formula feed only

53.2Returning to work would make you stop feeding with breast milk.

☐Yes ☐No

54.2I would not breastfeed in public, i.e. in a restaurant or in a park, even if covered.

☐Yes ☐No

55.2I would not breastfeed in public, i.e. in a restaurant or in a park, uncovered.

☐Yes ☐No

Note: You are now finished. Please return the survey to the researcher.

Section III: If you have children:

Instructions: For this section, please select or provide your response to each question. Please do not leave any questions blank.

50.3 How many children do you have? (drop list) _____

51.3 How many were breastfed? (drop list) _____

Thinking about your most recent baby:

52.3Did you breastfeed or are you currently breastfeeding this child?

☐Yes ☐No

53.3What was/will be the duration of breastfeeding?

☐Upto 1 month ☐2-3 months ☐4-6 months

☐7-12 months ☐1 year but no longer than 2 ☐2 years or longer

54.3What method you are using to feed this child upto 6 months?

☐Breast milk only ☐Breast milk & formula feeds ☐Formula feed only

55.3Returning to school, made you stop feeding with breast milk.

☐Yes ☐No

56.3In the future, if you have more children, returning to work would make you stop feeding with breast milk.

☐Yes ☐No

57.3I have breastfed in public while being covered up.

☐Yes ☐No

58.3I have breastfed in public, uncovered.

☐Yes ☐No

Note: You are now finished. Please return the survey to the researcher.

Separate Incentive Survey

Note: This separate survey will only appear to students if they complete the entire study survey. The information indicated below will never be combined nor connected to the students' survey data. Students who want to enter the drawing, must follow the link, answer the trivia question correctly and enter a valid email address. The link is set to automatically redirect survey completes to this page.

Instructions: To be entered into the drawing for one of three $10 Amazon gift cards, please answer the question below and enter your email address.

1. What is the name of LSU's tiger mascot?

    a. Tony

    b. Mike

    c. Matt

    d. Louie

2. Please enter your LSU email. _____

APPENDIX D. STUDY FLYER

RESEARCH PARTICIPANTS WANTED!

Study: Assessment of Breastfeeding Knowledge, Attitude and Intention Among Adult Female Undergraduate and Graduate Students

What is the study about?

- This study will assess breastfeeding knowledge, attitude and intentions of **female undergraduate and graduate** students enrolled at LSU

What will you be asked to do?

- You will be asked to take a survey that takes about 5 to 10 minutes to complete

Who can participate?

- **Females,** 18 years of age or older, who are currently **enrolled** at LSU

Participants will have a chance to win Amazon gift cards!!!

If you are interested in participating, go to this link http://bit.ly/bfknowledge or you can also scan the QR code to access the online survey.

SCAN ME

If you have any questions, please contact: Kritee Niroula (knirou1@lsu.edu)

VITA

Kritee Niroula was born in Nepal. She received her Bachelor of Science degree in Nutrition and Dietetics from Tribhuvan University, Nepal. In January 2019, Kritee began the Master of Science program at Louisiana State University in the School of Nutrition and Food Sciences with a concentration in Human Nutrition. She is a member of the American Society for Nutrition and plans to complete her masters by summer 2020.