



Examining students' knowledge of infant feeding: A non-experimental descriptive study

Research Paper

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ABSTRACT

Introduction: Breastfeeding rates in Canada are suboptimal, putting mothers and their infants' health at risk. Understanding breastfeeding knowledge and attitudes in the university student population is important as many are likely to become parents in the future. University students' knowledge and attitudes regarding infant feeding has been studied internationally; however, no studies including both female and male students have been conducted in Canada. The **purpose** of this study was to determine breastfeeding experiences, education, knowledge, infant feeding attitude and perceptions of the difference in mode of infant feeding among university students which can be used to inform future health promotion campaigns and school curriculum. **Methods:** A non-experimental, descriptive cross-sectional study was conducted in which data from university students was collected to identify knowledge and attitude toward breastfeeding identify differences in knowledge of breast and bottle feeding. **Results:** Findings suggest 65% (n=117) of university students had no previous knowledge of breastfeeding practices. **Conclusion:** Breastfeeding information within the high school curriculum is needed to support evidence-informed preconception infant feeding choices and increase future parents' understanding of how breastfeeding works to assist them in meeting their future infant feeding goals and increase breastfeeding rates.

KEYWORDS

Attitude, Breastfeeding, Infant, Knowledge, Students

INTRODUCTION

Infant feeding decisions made by parents can alter health outcomes for their children. Breastfeeding promotes child survival and wellbeing and is recognized as the superior form of infant feeding due to its nutritional and immunological properties (UNICEF, 2018). For this reason, leading health authorities worldwide endorse the initiation of breastfeeding within the first hour after birth, exclusive breastfeeding until 6 months of age, and continuation of breastfeeding once solids are introduced until 2 years of age and beyond (UNICEF, 2018; World Health Organization, 2021). Health benefits of breastfeeding for babies include protection against infections and malocclusion, increases in intelligence, and reduced probability of

being overweight and developing diabetes (Victora et al., 2016). Additional benefits for women who breastfeed are decreased risk of breast cancer, ovarian cancer, and type two diabetes as well as improved birth spacing (Victora et al., 2016).

In 2017-2018, only approximately 35% of Canadian babies were exclusively breastfed until 6 months (Statistics Canada, 2020). The reasons for discontinuing breastfeeding vary, however, lack of knowledge regarding breastfeeding and understanding the difference between feeding methods may be a contributing factor in a traditionally bottle-feeding culture. Most infants are prematurely weaned due to breastfeeding difficulties



encountered rather than maternal choice (Gianni et al., 2019). The lack of knowledge regarding the physiological process of breastfeeding may contribute to common breastfeeding problems such as sore nipples and insufficient milk supply (Morrison et al., 2019). In a traditionally bottle-feeding culture, where the visual representation and advertising of breast milk substitutes inform the public on infant feeding, additional methods of education regarding human lactation may be required to provide people with accurate information about breastfeeding, why it is important, how it works and how to overcome common issues. Additionally, most infant feeding decisions are made prior to conception (Goulet et al., 2003; Kavanagh et al., 2014; Padmanabhan et al., 2016). Thus, educating the public before decisions about pregnancy are made rather than specifically targeting expectant parents may be warranted.

Health curriculum is designed to help all students reach their full potential, develop the knowledge, skills, and perspectives they need to be informed, productive, caring, responsible, healthy, and active citizens in their communities and in the world (Ministry of Education, 2019). This should include teaching young people about the anatomy and physiology of reproduction, as well as making healthy choices around healthy eating and human development (Ministry of Education, 2019). This would require education about breastfeeding, which currently the school system does not consistently provide (OPHA, 2013; Reyes et al., 2018). School is an ideal place for this information to be disseminated. Having breastfeeding be included in reproductive health is certainly an important consideration for the students. The Ontario Public Health Association recommends:

“Breastfeeding is a life skill which requires prior knowledge and attitudinal acceptance. One primary way to increase the likelihood of later breastfeeding success and thereby increasing child health is to educate youth about breastfeeding concepts before they conceive and to expose students to experiences and conversation that presents breastfeeding as a normal, expected health behavior.” (OPHA, 2013)

Exploring university students’ breastfeeding education, experiences, knowledge, and attitude will

assist in determining the general knowledge level and effectiveness of infant feeding information currently taught through the school system as well as through infant feeding messages in society. This knowledge can inform the development of school curriculum in this area, public health social marketing advertisements, and additional efforts to combat the information distributed through advertising breast milk substitutes.

To increase breastfeeding rates, it is important to identify factors that may influence one’s intentions regarding infant nutrition (Padmanabhan et al., 2016). Many researchers have chosen young people as a target for examining this, as women often make the decision about whether they are going to breastfeed before they become pregnant (Padmanabhan et al., 2016). Among this population, it has been found that one’s intentions are associated with their knowledge of and attitudes toward breastfeeding (Padmanabhan et al., 2016). Subsequently, researchers have been studying breastfeeding knowledge and attitudes among university students to assess factors that may influence intentions and provide suggestions for what interventions may be needed to increase breastfeeding rates in the population (Padmanabhan et al., 2016).

Studies across Canada (Fairbrother & Stanger-Ross, 2010), China (Lou et al., 2014), India, (Padmanabham et al., 2016), Israel (Natan et al., 2008), Jordan (Al-Ali et al., 2013; Hatamleh et al., 2018; Nahla et al., 2012); Korea (Kang et al., 2005), Kuwait (Ebrahim, et al., 2011), Lebanon and Syria (Hamade et al., 2014), Nigeria (Ogunba & Agwa, 2014), Saudi Arabia (Khreshah, 2020; Khriesat Ismaile, 2017), and the USA (Cheianu-Marshall Ford & Rainville, 2018; Dinour & Bai, 2019; Dodgson et al., Choi, 2014; Kavanagh et al., 2012; Marrone et al., 2008; Spear, 2006) have assessed breastfeeding knowledge and attitudes of university students. Results suggest, students’ knowledge of breastfeeding is lacking (Dinour & Bai, 2019; Nahla et al., 2012; Spear, 2006). Those who have received breastfeeding education tend to be more knowledgeable, however, misconceptions are still common (Kang et al., 2005; Khriesat & Ismaile, 2017). As well, many university students have negative



attitudes toward breastfeeding (Ebrahim et al., 2011; Khriesat & Ismaile, 2017). Nahla et al. (2012) identified that negative attitudes were related to misconceptions. In addition, as mentioned above, breastfeeding knowledge and attitudes influence future intentions (Padmanabhan et al., 2016). University students with negative attitudes and misconceptions about breastfeeding were less likely to report intent to breastfeed in the future (Nahla et al., 2012).

Although trends were identified in this body of literature suggesting increased breastfeeding knowledge and attitude leads to increased breastfeeding intentions, the breastfeeding knowledge and attitude measures used in the studies varied, with most measures not being validated tools. Research using validated tools is warranted. Additionally, no studies have been published regarding the breastfeeding knowledge, attitudes, and intention of both female and male Canadian university students, identifying a gap in this area.

STUDY PURPOSE

The purpose of this non-experimental descriptive cross-sectional study was to determine the breastfeeding knowledge and infant feeding attitude using validated scales (Comprehensive Breastfeeding Knowledge Scale, Abbass-Dick et al., 2020; Infant Feeding Attitude Scale, de la Mora et al., 1999), as well as breastfeeding intentions, exposure, and students' perceptions regarding the differences between breast and bottle feeding in a university in Ontario, Canada.

METHODS

Sample, Procedure, Ethics

A convenience sample was recruited for this study from a large, urban university in Ontario, Canada. The target population included both undergraduate and graduate students. Eligible students met the inclusion criteria which was being enrolled as a student in the university on a full or part time basis.

Emails were sent out via the Registrar's office to all students currently enrolled in the university in March

2020. A reminder email was sent 2 weeks later. This recruitment method was designed to capture diverse members of the population, in relation to gender, age, parental status, degree being completed, years in the program, and faculty. Recruitment material provided a description of the study, the study teams contact information, and the link to the online consent form and questionnaire. Upon receiving the link to the study materials, an online consent form was provided and once completed, the online questionnaire was made available for the student to complete.

This study was conducted following ethics approval from the university (#15790).

Data Collection

Baseline Demographic Variables

All participants completed an online baseline questionnaire that included demographic and breastfeeding variables such as age, gender, born in Canada, degree completing, faculty and year of program.

Breastfeeding Variables

All participants completed questions regarding their parental and breastfeeding history, infant feeding intentions and cultural norm, comfort with breastfeeding in public, and breastfeeding education, breastfeeding curriculum, and preferences for receiving health education.

Breastfeeding Knowledge

This outcome was assessed using the Comprehensive Breastfeeding Knowledge Scale (CBKS). The CBKS is a 28 items self-report instrument designed to assess breastfeeding knowledge. Items were rated on a 3-point scale, Disagree (1) Unsure (2) Agree (3). Negatively worded items were reversed scored to produce a summative score ranging from 28 to 84, with higher scores reflecting greater knowledge. This scale has established reliability and validity in the parent population (Abbass-Dick et al, 2020). The Cronbach's alpha in for this scale in the data collected for this study was 0.82.



Infant Feeding Attitude

This outcome was assessed using the Iowa Infant Feeding Attitude Scale (IIFAS), a 17 items self-report instrument (de la Mora et al., 1999). This scale was developed to assess attitudes towards various dimensions of infant feeding. Items were rated on a 5-point scale to produce a summative score ranging from 17 to 85, with lower scores reflecting a preference for formula feeding and higher scores reflecting a preference for breastfeeding. The scale has been used with student populations (Al-Ali et al., 2013; Marrone et al., 2008; Nahla et al., 2012). Cronbach's alpha for this scale in the data collected for this study was 0.77.

Perception of Infant Feeding Mechanisms

One open ended question was asked to determine participants' understanding of the difference between infant feeding methods, "In your own words, how do you think the way the baby sucks at the breast and receives milk differs or is the same as bottle feeding?"

Analysis

Data were analyzed with SPSS version 27. A 2-sided significant level of 0.05 was utilized for all study outcomes. For dichotomous data, the frequencies and percentages were calculated and differences between groups examined using Pearson Chi Square tests. For continuous data, means (M) and standard deviations (SD) were calculated and differences between groups were examined using independent 2-sample t-tests. Open ended questions were analyzed using content analysis to generate emerging patterns and trends. For any responses that were left blank on the CBKS and IIFAS scales, the mean score was substituted (score = unsure). This allowed for the utilization of collected data in an incomplete dataset which is consistent with reported techniques for handling missing data (Kang, 2013). Frequencies were used to determine scale items answered most correctly, incorrectly, or that the participants were unsure of. Demographic and breastfeeding experience variables were analysed to determine

differences in knowledge and attitude scored between groups.

RESULTS

Participant Characteristics

A sample (N=179) of eligible students reviewed the detailed explanation and agreed to participate (Table 1). Most participants were female (79.9%), enrolled in an undergraduate degree (79.2%), born in Canada (79.9%), not yet parents (76.5%). Most participants indicated the cultural norm was to feed a combination of breastmilk and formula (58.1%). Eighty-four percent were planning to breastfeed and 33% had previously received breastfeeding education. Most participants had seen someone breastfeeding in public (n=162, 90.5 %) and were comfortable with breastfeeding in public (n=155, 87.1 %).

Breastfeeding Knowledge

Comprehensive Breastfeeding Knowledge Scale scores (M=68.04, S.D. 7.4: range 52-84) were assessed with subscales calculated (correcting misconceptions M=26.5, S.D. 3.63; range 19-33; persisting through challenges M=23.8, S.D. 3.06; range 17-30; and, maintaining milk supply M=17.7, S.D. 2.33; range 11-21). When the correct answers were calculated for each participant, the mean score was 16/28 or 57%. The items with the most correct answers, least correct answers and most unsure answers are displayed in Table 2.

Infant Feeding Attitude

The mean score on the Iowa Infant Feeding Attitude Scale (IIFAS), was 62.1 (S.D 8.6; range 47-83). The most positive responses toward breastfeeding were found for items related to mother infant bonding (item #3), women breastfeeding in public places (item #8), breastmilk being cheaper than formula (item #16) (Table 3). The most positive responses toward formula were for questions related to convenience (item #2), feeding methods not being related to joys of motherhood (item #9) and formula is as healthy as breastmilk (item #14). The items with the most unsure responses related to iron content in



breastmilk (item #4), formula fed babies being overfed (item #5) versus breastfed babies being overfed (item #10).

Breastfeeding Experiences and Perceptions

Most students had been breastfed as a child (72.1%), had seen someone breastfeed (90.5%), were comfortable with seeing someone breastfeeding in public (87.1%), and 63.1% indicated breastfeeding in public was socially accepted in their culture.

Although breastfeeding was reported by the majority as a cultural norm for feeding infants (n=164, 91.6%) 63.4% of them indicated this was combined with formula feeding (n=104, 63.4%). Fifty-nine participants (33%) indicated they had received prior breastfeeding education. Most of this education was received in the hospital (n=21, 25%), in school (n=19, 22.6%) or in a prenatal class (n=12, 14.3%). When asked if breastfeeding education should be taught in high school (n= 156, 87.2%) or university, 60.3% (n=108) replied 'yes'. Health (n=76, 50%), Family Studies (n=19, 12.7%), Science (n=16, 10.7%) and Social Sciences and Humanities (n=15, 10%) were the more frequently selected courses in which breastfeeding content should be included. When asked about their preference for receiving health education such as breastfeeding education, the mode most frequently selected was a class facilitated by a health care provider (n=95, 53.1%) followed by online resources (websites) (n=50, 27.9%).

Differences in knowledge and attitude scored between groups based on demographics and breastfeeding experiences are presented in Table 4.

Perception of Breastfeeding versus Bottle Feeding Mechanism

The open-ended question "how do you think the way the baby sucks at the breast and receives milk differs or is the same as bottle feeding?" was answered by 149 (83.2%) participants. Responses were found in three categories (1) breastfeeding and bottle feeding are the same (n=14, 9.4%) (2) not sure if breastfeeding and bottle feeding are different (n=12, 8.05%), and (3) breastfeeding and bottle feeding are different (n=123, 82.6%). Participants

who felt that breastfeeding worked in the same way as bottle-feeding stated, "it doesn't matter for babies" and "the baby doesn't know the difference I imagine". Some participants believed the shape of a nipple on a bottle was the same as the shape of a breast nipple, with one participant stating, "the sucker on the bottle is shaped similarly to a nipple" and another participant saying, "I feel as if the bottle was made to imitate the nipple and how it is received is the same". Participants who were not sure about the similarities of bottle feeding and breastfeeding stated, "I have no idea or experience with this", "I have literally no idea" and "it is different but not sure how".

For participants who felt breastfeeding and bottle feeding were different in the way milk is delivered, several themes emerged in the responses, which included: 1) differences in how milk is delivered to a baby (including differences in flow speed and consistency, the way a baby regulates breastfeeding, ease of feeding for babies who are bottle fed versus breastfed), 2) differences in latch and feel, and 3) differences in maternal child bonding and closeness. Participants believed there were differences in flow speed saying that "[breastfeeding] is slower and more inconsistent in the milk flow" Participants also felt that there were differences in the way the baby regulates breastfeeding by saying "the baby can control the flow easier at the breast" and "in breastfeeding, the amount and pace is determined by the baby".

There were differences in perceptions in the ease of feeding for babies who are bottle fed versus breastfed with most comments indicating bottle feeding is easier such as "bottles demand less effort from baby" and "the baby needs to work harder for the breast milk and have more of a suction whereas milk that is received from a bottle is easier for the infant to get". Participants also noted differences in the latch between breastfeeding and bottle-feeding stating, "the latch during breastfeeding would be wider" as well as differences in the feel of breast and bottle feeding such as "sucking [from] bottle feeding will be different because the material is made out of plastic versus the breast is a natural part of our evolutionary history when feeding a baby in nature". Participants also noted differences in maternal child



bonding and closeness through the following statement breastfeeding “is better at promoting mother-infant attachment”.

Relationship Between Attitude, Knowledge, and Demographic Variables

The CBKS and IIFAS scores were significantly correlated $r=.67$ ($p<0.01$). Table 4 shows that there was a significant difference in scores among male versus female students; being in the Faculty of Health Sciences compared to the other faculties, intending to breastfeed, having received breastfeeding education, and being a parent. There were no differences related to being born in Canada, having been breastfed as a child, completing an undergraduate degree.

There was no difference in scores between students who indicated breastfeeding should be taught in high school and those that did not, however, those who thought it should be in university curriculum had statistically significant higher CBKS and IIFA scores (CBKS-M 69.41, SD 8.12 compared to M 66.0, SD 5.85; $p=0.001$; IIFAS- M 64.43, SD 8.83 compared to M 58.64, SD 6.78; $p<0.001$). Students who indicated exclusive breastfeeding to be the norm in their culture had statistically significant higher attitude scores compared to those for which combined feeding or formula were the norm (M 65.12, S.D 7.98 compared to M 60.87, S. D. 8.52; $p=0.02$).

DISCUSSION

One hundred and seventy-nine students, including undergraduate and graduate students, completed the survey with students representing all faculties. Most students had witnessed previous breastfeeding and considered it a cultural norm. Most students indicated they had intended to have their child breastfed.

The breastfeeding knowledge (CBKS) scores were lower in this sample of university students compared to expectant parents scores (Abbass Dick et al., 2020) (full 28 item scale M=68.04, S.D, 7.4: range 52-84 compared to M=72.25, S.D, 6.5) including correcting misconceptions (M=26.5. S.D. 3.63; compared to M=28.24. S.D. 3.3) persisting through challenges

(M=23.8, S.D, 3.06; M=25.23, S.D, 2.9) and maintaining milk supply (M=17.7, 2.33 S.D. compared to M=18.78, S.D.1.9). Low knowledge scores are consistent with a systematic review by Yang et al. (2018), which included fourteen studies and found that students lacked knowledge about breastfeeding even after completing maternal and child health unit of study.

Among students, knowledge of the benefits of breastfeeding was found to be high with knowledge of physiology and management of breastfeeding to be lower. This was similar in our study as student items with higher scores related to breastfeeding benefits, as it promotes bonding, strengthens the baby’s immune system and is cheaper than formula. However, participants in our study scored lower for questions related to physiology leading to common concerns such as mastitis, sore nipples, as well as the impact of father’s formula feeding, the number of times to feed or how to hand express. The attitude scores suggest further knowledge of the nutritional value of breast milk compared to formula is needed.

Our study found that students in the Faculty of Health Sciences had the highest breastfeeding knowledge scores when compared to students in all other faculties. This is consistent with previous research that found students from science, health-related majors, and medicine were more knowledgeable on breastfeeding/lactation in comparison to students in other faculties and programs (Hamade et al., 2014; Hatamleh et al., 2018; Kang et al., 2005; Natan et al., 2008; Ogunba & Agwa, 2014; Padmanabhan et al., 2016). Interestingly, in our sample, when each faculty was individually assessed, the students in the Faculty of Education had the highest scores.

Participants in our study had mean infant feeding attitude scores (M=62.1, S.D 8.6) that were slightly higher compared to other published studies with university students. Hamid and Yahya, (2018) found the mean infant feeding attitude scores among undergraduate university students ($n=377$) in Selangor, Malaysia to be 60.64 (S.D 5.02). Similarly, Jefferson (2017) found that mean infant feeding attitude scores to be 59 (S.D. 7.47) among college students ($n=696$) at the University of Missouri, United States.



Our study also found there were significant differences in knowledge and attitude scores between male versus female students. This finding is consistent with other studies which showed that female students ($n=182$) had higher scores for breastfeeding knowledge (9.08 vs 8.56, $p=.02$), compared to male students ($n=64$) at the University of Tennessee at Knoxville, United States (Kavanagh et al., 2012). Similarly, Marrone et al. (2008) found that female students ($n=111$) had significantly higher knowledge scores ($F(1, 21.53) = 6.46$, $p=.02$) compared to male students ($n=50$) at the University of North Dakota, United States.

Conversely, Hatamleh et al.'s (2018) study conducted with university students in Jordan found that male students ($n=146$) had somewhat higher breastfeeding knowledge than female students ($n=272$) although there was no significant difference between genders ($t=1.467$, $p<.143$). As well, a Chinese study by Tarrant & Dodgson (2007) found no significant differences in breastfeeding knowledge scores (71.0% vs. 71.1%; $p = .99$) nor attitudinal differences (2.64 [SD = .26] vs. 2.60 [SD = .24]; $p = .07$) between male ($n=186$) and female ($n= 211$) university students.

STRENGTHS AND LIMITATIONS

Strengths of our study include the use of a validated breastfeeding knowledge scale and the inclusion of both undergraduate and graduate students. There are notable limitations of this study which can decrease the generalizability of the findings to the broader population. First, since this was a cross-sectional design, we are unable to predict future behavior. Second, since a convenience sample of undergraduate and graduate students was used, it is likely, the students who completed the study had more interest and favorable attitudes regarding breastfeeding and these findings may appear higher than the actual breastfeeding attitudes, knowledge, and intentions of the student population.

Additionally, there was no sample size calculation, and the sample was recruited from one urban university. Therefore, it is unclear if the breastfeeding knowledge and attitudes are representative of

students in different universities or non-university students and those in rural areas. Little information was collected related to the students' culture and ethnicity; these factors may impact breastfeeding knowledge, attitudes, and intentions and this should be further explored in future studies.

IMPLICATIONS AND RECOMMENDATION

Overall, results of this study suggest that breastfeeding education should be included in high school curriculum given that infant feeding decisions are formed prior to conception and even as early as adolescence (Goulet et al., 2003). These decisions may influence future breastfeeding intentions, therefore commencing breastfeeding education during adolescence could increase knowledge and attitudes later in life (Goulet et al., 2003). Only 22.6% of our students had received breastfeeding education in school and 87% indicated it should be taught in high school. Future research should focus on education interventions that target both adolescent males and females to increase their breastfeeding knowledge and attitudes. Studies have shown breastfeeding knowledge and attitudes of male partners significantly influences breastfeeding initiation and duration rates (Arora et al., 2000; Rempel & Rempel, 2004).

Additionally, a Canadian study of female secondary students ($n=77$) showed that a single school-based breastfeeding educational intervention for high school students significantly increased breastfeeding knowledge ($p < 0.001$), attitudes ($p < 0.001$), and future intentions to exclusively breastfeed ($p < 0.05$; Reyes et al., 2019). Having time within the school health curriculum to teach new content can be challenging since the curriculum is already full of equally important topics. Therefore, being able to provide a short, yet effective, intervention will be more feasible and has been recommended in other studies (Reyes et al, 2019; Zeller, 2016). School curriculum should also consider cultural variations in breastfeeding norms as they may impact student attitudes, knowledge, and intentions (Reyes et al, 2019).

In addition to the inclusion of breastfeeding information in school curriculum, health promotion



campaigns should target adolescent males and females to address misconceptions. Social media may be a feasible and convenient way of disseminating breastfeeding information to younger populations. Other recommendations include ensuring breastfeeding support resources are available at all university campuses, such as a breastfeeding resource center and having a designated room within each faculty building to breastfeed and/or pump breastmilk. Faculty members and staff should be aware of such resources and promote them to students.

CONCLUSION

This study demonstrates that university students in Canada received little breastfeeding education in school and have low knowledge and attitude scores with some misconceptions regarding its importance how breastfeeding works. Since exclusive breastfeeding rates to 6 months in Canada are low, it is important to increase knowledge and improve attitudes towards breastfeeding. Including credible breastfeeding education within the high school curriculum is important to promote evidence informed infant feeding choices during the preconception period. Increasing parents' understanding of how breastfeeding works can assist them in meeting their future infant feeding goals and increase breastfeeding rates.

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Table 1. Demographic and Breastfeeding Variables

Demographics		Participants (n=179) n (%)
Gender	Female	143 (79.9)
	Male	35(19.6)
Age categories	20 and Under	40 (22.3)
	21-26	75 (41.9)
	Over 26	64(35.8)
Born in Canada	Yes	143 (79.9)
	No	36 (20.1)
Degree	Undergraduate	142 (79.2)
	Masters	30 (16.8)
	PhD	7 (3.9)
Year in degree	1 st	51 (28.5)
	2 nd	36 (20.1)
	3 rd	35(19.6)
	4 th	46(25.7)
	5 th +	11 (6.1)
Faculty	Business	16 (8.9)
	Education	20 (11.2)
	Engineering	5 (2.8)
	Energy systems	16 (8.9)
	Health Sciences	52 (29.1)
	Social Sciences	36 (20.1)
Parent status	Yes	40 (22.4)
	I am expecting my first child	4 (2.2)
	No	135 (75.4)



Table 2. Comprehensive Breastfeeding Knowledge Scale scores

Item	Disagree	Unsure	Agree
Items with the most correct responses			
28. Breastfeeding promotes mother-infant bonding and emotional attachment.	0 (0%)	6 (3.4%)	173 (96.6%)
2. Breastfeeding early after birth, spending time skin to skin and having the mother and baby room-in together, day and night, are supportive hospital practices that help with establishing breastfeeding.	2 (1.1%)	10 (5.6%)	167 (93.3%)
25. Breast milk contains germ fighting properties which protect a baby from infections and strengthen his/her immune system.	2 (1.1%)	25 (14%)	152 (84.9%)
13. Watching the output (pees and poos) and energy level of the baby are good ways of monitoring if the baby is getting enough breast milk.	4 (2.2%)	26 (14.5%)	149 (83.2%)
17. Small breasts will not make as much milk as larger breasts (reverse-scored)	147 (82.1%)	23 (12.8%)	9 (5%)
Items with least correct responses			
24. If a mother has mastitis (breast infection) she should continue to breastfeed her baby.	115 (64.2%)	35 (19.6%)	29 (16.2%)
3. It is normal for breastfeeding to hurt. (reverse-scored)	44 (26.4%)	76 (42.5%)	59 (33%)
8. Formula feeding is a good way of letting fathers/partners care for their breastfed babies. (reverse-scored)	58 (32.4%)	48 (26.8%)	73 (40.8%)
22. A sore or cracked nipple is an indication of incorrect latch.	44 (24.6%)	70 (39.1%)	65 (36.3%)
1. When a mother is sick with a flu or cold, she should continue to breastfeed her baby as this may prevent her baby from getting sick.	37 (20.7%)	70 (39.1%)	72 (40.2%)
Items with most unsure responses			
6. Babies should be breastfed at least 8 times in a 24-hour period to support an adequate milk supply. 1	11 (6.1%)	86 (48%)	82 (45.8%)
3. It is normal for breastfeeding to hurt. (reverse-scored) 3	44 (26.4%)	76 (42.5%)	59 (33%)
10. Learning the skill of hand expression will enable mothers to remove breast milk if needed. 2	10 (5.6%)	76 (42.5%)	93 (51.9%)
7. Jaundice is best prevented with frequent breastfeeding and the baby having a good output (pees and poos). 2	22 (12.3%)	74 (41.3%)	83 (46.4%)
26. Breastfeeding can decrease a mother's risk of developing breast, uterine and ovarian cancers. 3	28 (15.6%)	72 (40.2%)	79 (44.1%)



Table 3. Iowa Infant Feeding Attitude Scale scores

Item	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1. The benefits of breast milk last only as long as the baby is breastfed.	69 (38.8%)	53 (29.8%)	30 (16.9%)	15 (8.4%)	11 (6.2%)
2. Formula feeding is more convenient than breastfeeding.	38 (21.3%)	31 (17.4%)	48 (27%)	49 (27.5%)	12 (6.7%)
3. Breastfeeding increases mother infant bonding.	0 (0%)	1 (0.6%)	10 (5.6%)	34 (19.1%)	133 (74.7%)
4. Breast milk is lacking in iron.	42 (23.6%)	41 (23%)	75 (42.1%)	14 (7.9%)	6 (3.4%)
5. Formula fed babies are more likely to be overfed than breastfed babies.	12 (6.7%)	24 (13.5%)	68 (38.2%)	47 (26.4%)	27 (15.2%)
6. Formula feeding is the better choice if the mother plans to go out to work.	38 (21.3%)	48 (27%)	44 (24.7%)	46 (25.8%)	2 (1.1%)
7. Mothers who formula feed, miss one of the great joys of motherhood.	53 (29.8%)	37 (20.8%)	37 (20.8%)	23 (12.9%)	28 (15.7%)
8. Women should not breastfeed in public places such as restaurants.	118 (66.3%)	33 (18.5%)	15 (8.4%)	9 (5.1%)	3 (1.7%)
9. Breastfed babies are healthier than formula fed babies.	19 (10.7%)	26 (14.6%)	44 (24.7%)	53 (29.8%)	36 (20.2%)
10. Breastfed babies are more likely to be overfed than formula fed babies.	46 (25.8%)	56 (31.5%)	68 (38.2%)	5 (2.8%)	3 (1.7%)
11. Fathers feel left out if a mother breastfeeds.	55 (30.9%)	64 (36%)	40 (22.5%)	16 (9%)	3 (1.7%)
12. Breast milk is the ideal food for babies.	2 (1.1%)	5 (2.8%)	32 (18%)	49 (27.5%)	90 (50.6%)
13. Breast milk is more easily digested than formula.	3 (1.7%)	6 (3.4%)	60 (33.7%)	35 (19.7%)	74 (41.6%)
14. Formula is as healthy for an infant as breast milk.	35 (19.7%)	36 (20.2%)	50 (28.1%)	43 (24.2%)	14 (7.9%)
15. Breastfeeding is more convenient than formula.	8 (4.5%)	44 (24.7%)	48 (27%)	38 (21.3%)	40 (22.5%)
16. Breast milk is cheaper than formula.	1 (0.6%)	4 (2.2%)	12 (6.7%)	38 (21.3%)	123 (69.1%)
17. A mother who occasionally drinks alcohol should not breastfeed her baby.	21 (11.8%)	40 (22.5%)	40 (22.5%)	34 (19.1%)	43 (24.2%)

(de la Mora et al. 1999 pg 2380)



Table 4. Relationship Between Attitude, Knowledge, and Demographic Variables

	CBKS ¹		IIFAS ²	
	M(S.D.)	t (df)	M(S.D.)	t (df)
Male (n=35)	64.11 (5.60)	4.35 (67.84) p<0.01	58.71 (7.37)	2.66 (175) p=0.008
Female (n=143*)	69.06 (7.55)		62.96 (8.69)	
Faculty of Health Science(n=52)	72.42 (7.35)	-5.403 (177) P<0.01	66.5 (8.22)	-4.643 (176) P<0.01
Other faculties (n=127*)	66.25 (6.76)		60.29 (8.06)	
Intending to breastfeed (n=153)*	68.62 (7.54)	2.54 (177) P=0.006	63.11 (8.41)	3.90 (176) P<0.01
Not intending to breastfeed (n=26)	64.65 (6.11)		56.27 (7.13)	
Breastfeeding education (n=59)	74.42 (6.73)	9.997 (177) P<0.001	67.81(8.5)	T=7.07 (176) p<0.001
No breastfeeding education=120*)	64.91 (5.59)		59.28 (7.12)	
A parent (n=40)	76.65 (4.78)	10.513 (177) P <0.01	70.55 (7.50)	8.34 (176) P<0.01
Not a parent (n=139*)	65.57 (6.15)		59.66 (7.21)	
1 st year of study (n=51)	66.0 (6.34)	-2.30 (176) P=0.023	59.18 (6.96)	-2.90 (175) P=0.004
Years 2-5+ of study (n=127)*	68.81 (7.75)		63.20 (8.87)	
Over 26 (n=64)*	73.33 (7.14)	8.35 (176) P<0.001	67.51 (8.59)	6.73 (106.6) P<0.001
Under 26 (n=114)	65.04 (5.86)		59.03 (6.90)	

1 Comprehensive Breastfeeding Knowledge Scale (CBKS)

2 Iowa Infant Feeding Attitude Scale (IIFAS)

*=IIFAS (=n-1)