In Situ

Issue 1 *In Situ 2010 Vol. I* Article 4

12-1-2010

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Over the past decade, research on the long-term benefits of breastfeeding has greatly increased. Women all over the world, particularly in industrialized countries, which in the past tended to have a low prevalence of breastfeeding, are becoming more aware of the advantages of breast milk over formula milk and bottle-feeding. Several researchers have turned their attention toward the myriad factors associated with women's decision to initiate and continue breastfeeding. Although the past few decades have seen a dramatic increase in breastfeeding, from 25% in 1970s to 73.9% in 2005, the optimal breastfeeding rate is still not being met (CDC). There are several medical benefits to breastfeeding, both for the child and the mother (WHO). Yet, a large number of women still continue to bottle-feed (Earle, 2002). A number of social, cultural and political factors significantly affect the initiation and duration of breastfeeding. Infant feeding decisions depend on attitudes toward breastfeeding that may be developed as early as adolescence (Martens 2001). Therefore, from a public health perspective, it is extremely important to identify the factors responsible for breastfeeding beliefs from an early age.

The goal of this study is to describe the attitudes and intentions toward breastfeeding in a group of university students in the United States, and to determine if any demographic or behavior variables can be designated as predictors of these feelings. This study also explores whether some variable, such as student or family income, cultural differences, or exposure to breastfeeding at home, is associated with attitudes toward breastfeeding. Through a review of the medical benefits of breastfeeding, contemporary barriers that women face, and worldwide cultural trends, my paper will explore the different variables responsible for certain attitudes and intentions toward breastfeeding.

Breastfeeding conveys vast health advantages to both the child and the mother (Stuart-Macadam & Dettwyler, 1995). The most obvious advantage is the nutritive function of breast milk. Breast milk is also rich in regulatory substances that stimulate the development of the infant's own immune system. Newborn babies have antibodies circulating in their bloodstream, which they acquire from the mother; however, the immune system is not yet functional and requires long-term exposure to the environment before it becomes active. In the mean time, babies have to rely on antibodies contained in the mother's milk (Stuart-Macadam & Dettwyler, 1995). Breastfeeding also prevents the growth of antibiotic-resistant bacteria in babies.

Many studies also point to the benefits of breastfeeding in the long-term development and health of the infant. As an example, bottle-feeding is correlated to Crohn's disease (which causes inflammation of the digestive tract) and hypersensitivity to allergens (Koletzko 1989). Early feeding practices have also been associated with coronary pathologies, disorders of immune regulation, and psychomotor development (Lucas 1998; Cunningham 1995). Some theories also link infant diseases to cow's milk (Stuart-Macadam & Dettwyler 1995).

Breastfeeding is also beneficial to the mother's health. The fertility-reducing effects of lactation benefit both the mother and her current and future offspring. Closely spaced births, i.e. less than 2 years apart, lead to an increased rate of infant mortality, not only of the firstborn child in a sequence, but also the second (Mozumder et. al 2000). The repeated suckling of the baby helps release oxytocin and prolactin, also known as the "hormone of love," and the "motherly hormone," respectively (Stuart-Macadam & Dettwyler 1995). Oxytocin is particularly important because it helps the mother feel calm and relaxed, and also helps the uterus contract and return to the pre-pregnancy stage (Bouchez, 2005). Furthermore, mothers who breastfeed can remain ammenorrheic for several months, which helps maintain iron levels in the mother's body and provides natural spacing for future pregnancies. Mothers who bottle-feed are denied this benefit, and resume their menstrual cycles within six to eight weeks after giving birth. Other long-term health benefits for the mother include optimal metabolic profiles, reduced risk of ovarian and uterine cancers, and better mental health (Dermer 2001).

Regardless of the various medical benefits of breastfeeding, many women still choose to bottle-feed. Therefore the ability to breastfeed is more than just having the knowledge to do so. The act of breastfeeding is influenced by a number of social, political and cultural factors. According to Arora and colleagues, the top three barriers to breastfeeding in the US include the mother's perception of father's attitude; uncertainty regarding quantity of breast milk; and return to work (Arora et. al 2000). Other major barriers include sexualization of the breast and the stigma associated with breastfeeding in public. Such anxieties are a product of the rise of women in the workforce, the rise of feministic beliefs, and the rise of pharmaceutical companies. Together, these factors form an intrinsic web of events, which have constantly reinforced each other to shape the trends of breast- and bottle-feeding in the United States.

Bathing Melissa Gradilla ('11)

Interestingly, hardly any scientific evidence exists to explain why breasts are considered erotic and are therefore sexualized. According to a 1999 conducted by Dettwyler, this is most likely a culturally learned phenomenon. When Dettwyler questioned Mali women about sexual foreplay involving the breasts, the women were either "bemused or horrified" by the idea that a woman's breasts could sexually arouse a man (Stuart-Macadam and Dettwyler). Sexualization of breasts appears to be a culturally and socially constructed western phenomenon. Furthermore, the stigma attached to public breastfeeding is societal, and not a product of individual self-consciousness. In 1997, California passed a legislation that "allows a mother to breastfeed her child in any location, public or private, except the private home or residence of another, where the mother and the child are otherwise authorized to be present" (National Conference of State Legislatures). This exception was made to clarify that breastfeeding is legal behavior, not public nudity.

Artificial feeding first appealed to women because it released them from purely reproductive roles and allowed them to delve into more productive labor areas. During World War II, societal needs pressured women to work outside the home, which further encouraged reliance on bottle-feeding (Worcester & Whatley 2004). By the late 1970s, the percentage of working mothers with infants had jumped from 32% to 52%, with two-thirds of these women working full-time (Blum 1999). Therefore, to women working and breaking away from their traditional reproductive roles, bottle-feeding was alluring because of its convenience and efficiency (Worcester & Whatley 2004).

When women first arrived in the workforce, they entered on unequal footing and were forced to conform to an already established male-environment. This raised an important question for lactating mothers in the workplace: Should they be allowed a private space for breastfeeding or should they challenge the dominantly male environment by refusing privacy? Modern notions of breastfeeding are intricately tied to feminism. However, the position of feminism regarding infant feeding is contradictory. Modern feminism is caught between trying to minimize gender differences, and embracing and enhancing these differences (Sen & Grown 1987). Because the act of breastfeeding is sex-specific, it challenges the feminist perspective of gender-neutral child bearing. Some believe breastfeeding limits the mother to an object of nourishment, unable to expand herself as a person (Latteier 1998), while bottle-feeding thus relieves the mother from her role as a reproductive machine. Others feel that bottle-feeding denies a woman of a uniquely feminine experience.

Many critics hold pharmaceutical formula companies responsible for the sharp decline in breastfeeding rates, and for exploiting new mothers' confidence as professionals and growing belief in science and technology. The burgeoning niche that pharmaceutical companies have created in the baby market has produced a cyclical chain of events causing new mothers to constantly rely on artificial feeding. Production of breast milk is dependent on how much a baby breastfeeds, so not breastfeeding exclusively can cause insufficient milk syndrome, a dangerous

condition. Pharmaceutical companies use this as an incentive to not risk breastfeeding at all (Worcester & Whatley 2004). The mere accessibility and availability of formula food also constantly encourages women to turn to bottle-feeding. These women do not breastfeed, therefore produce less breast milk, and as a result rely even more on artificial feeding (Latteier 1998).

Cultural differences also play an important role in influencing a mother's decision to breastfeed. Breastfeeding is a biological act, but these instinctive behaviors, techniques, and commitments are strongly determined by culture (Latteier 1998). Women in collectivist countries like India, China, and Papua New Guinea experience less difficulty breastfeeding, whereas women in individualistic countries like the USA and UK experience more dissonance. A study conducted in 2006 revealed that Indian, Pakistani, Bangladeshi, black Caribbean and black African mothers were more likely to initiate and continue breastfeeding up to 6 months, as compared to white mothers (Kelly et. al 2006).

A number of reasons exist why women in collectivist countries breastfeed. For example, the majority of the population in these countries is below the poverty line and therefore cannot afford expensive formula food or bottle milk. In countries like India and Pakistan, women are expected to maintain households, not work. Therefore they are not necessitated to find convenient methods of feeding their infant. Large support groups for women in such countries also motivate continued breastfeeding. Perhaps individualism and collectivism influence decisions of women in the US at a sub-conscious level.

The target population for this study consists of women between the ages of 18 and 24, i.e. undergraduate students, in an urban college campus such as that of the University of Pennsylvania. Infant feeding decisions depend on attitudes toward breastfeeding that may be developed as early as adolescence (Martens 2001). Adolescents generally have positive attitudes toward breastfeeding but are subject to misconceptions embedded in culture, which are difficult to correct in adulthood (Goulet et. al 2003) Therefore it is extremely important to target the factors responsible for breastfeeding attitudes and beliefs from an early age. Lack of information may induce negative assumptions about breastfeeding in students (Kang et. al 2005). Very little is data available on university students' attitudes and intentions toward breastfeeding; deriving such information will be helpful in building an early intervention program for young women.

In this cross-sectional and descriptive study of attitudes and intentions toward breastfeeding, a sample of undergraduate women attending the University of Pennsylvania was recruited. Any woman was eligible to participate in the study as long as she was between the ages of 18 and 24 years old and attended the University of Pennsylvania as a student. Participation was not contingent on ethnicity, race, or socioeconomic status. Data collection of surveys and questionnaires was completed within a month. All surveys and questionnaires were administered in English, and collected via email. The e-mail clarified that participation was voluntary and all information provided would remain confidential and anonymous.

A survey and questionnaire were administered to 27 students. In addition, a total of 6 in-depth, semi-structured interviews were conducted once the surveys and questionnaires were complete. The survey and questionnaire provided basic information from which more precise questions could be developed for the interviews. I conducted the interviews, either over the phone or in person depending on which method the participant was comfortable.

The surveys were used to gain demographic and quantitative information about the participants (age, ethnicity, major, annual income, marital status); intentions and attitudes toward breastfeeding; and exposure toward breastfeeding, both in public and at home. Questions asked whether the participants were breastfed as a child and whether they would feed their child in the future via bottle or breast milk. In addition, the questionnaire obtained information about students' knowledge of breastfeeding. The questionnaire consisted of 17 questions in which the participants were asked to indicate how strongly they agreed or disagreed with the statements, presented on a scale of 1 to 5.

The objective of the interviews was to collect in-depth information about attitudes, beliefs and exposure regarding breastfeeding. Because of the descriptive nature of the study, interviews were not randomized, as there was only one group of participants. Base questions were already developed, but the interview took its own course based on the data from the surveys and questionnaires.

The survey variables were calculated for descriptive statics. Each questionnaire was scored with a total possible score ranging from 17 to 85 with the higher score representing more knowledge regarding breastfeeding. The median for the score range was 63 and was used as a division between overall negative and positive attitudes. Individual questions range from a score of 1 to 5 and therefore the median was 3. Data analysis was done using JUMP.

Statistical procedures were completed at a significance level of 5%. Pearson bivariate correlations for the overall sample was performed to investigate possible relationships between factors such as intention to breastfeed, whether the participant was breastfed as a child, and whether the mother will support breastfeeding. Finally, in order to predict breastfeeding intentions, regression analysis was conducted. Predictors were picked after an examination of the bivariate correlations. The predictors that were most highly correlated with intention to breastfeed were chosen for regression analysis.

The average age of the participants was 20.29 ± 1.65 (n=27). None of the participants were married or had any children. Less than half (40.7%) reported to be in a stable union. Average annual income of family was reported as $53,214, and 66.66% of students were currently employed. 59.25% of the sample was born outside the U.S. with a majority (48.14%) of those people being born in India. The most popular languages spoken at home besides English were Hindi and Spanish.

About 85% of the women planned to have children. Of those that planned to have children, 73.9% intended to breastfeed their child, and 11.1% said they did not know whether they would breastfeed. Of the 15% who did not intend to breastfeed, some of the most common reasons provided were "disgust at the thought of breastfeeding," "don't know how to," and "sagging breasts." Of those who intended to breastfeed, about 39% intended to also feed their child foods other than breast milk. 77.7% reported being breastfed as children, and 13% did not know whether they had been breastfed or bottle-fed. Almost all women (92.5%) felt that their mother would support them if they decided to breastfeed. Only 25.9% had seen someone breastfeed in public, while only 1 in 3 had seen someone breastfeed at home.

An interesting result showed that annual income significantly impacted the probability of intending to breasting ($p<.003$). The relationship between the intention to breastfeed and whether the student's mother would support breastfeeding was marginally significant ($p=.058$). Language spoken at home did not have any correlation with exposure to breastfeeding publicly or at home. Participants from India and Puerto Rico were more willing to breastfeed their children as compared to those from the US and UK. There was a strong correlation between a participant's country of origin and intention to breastfeed ($r=.076$). Overall, participants had significant knowledge regarding breastfeeding practices. Only 11.11% of participants felt that formula milk was better than breast milk.

Knowledge and education, especially when combined with positive attitudes and intentions, is a useful intervention strategy to teach new mothers how to best provide for their babies. Many women seem to not know the specific health benefits of breastfeeding. The majority of interviewees knew breast milk was generally healthier than formula milk, but were unsure of specific medical benefits. One student said: "breast milk provides more natural nutrients and vitamins that are missing in formula milk." However, another student disagreed, saying: "formula milk will probably provide a balance of nutrients that may be absent in breast milk." Of the 6 interviewees, 4 intended to breastfeed their future child.

Some women seemed to have gained knowledge from friends and family, whereas a few cited television shows and high school education as their source of knowledge. Others attributed knowledge to general culture and having babies at home. The students exposed to breastfeeding in public, mostly in parks, malls and doctors' offices, and those exposed to breastfeeding at home said they were not bothered by public breastfeeding. However, a few mentioned that at first glance it seemed a little shocking and inappropriate, but they would respect the mother's choice. A few women mentioned that they had earlier been disgusted at the thought of breastfeeding; however, as they grew older and saw television programs or read about breastfeeding, they felt more "at ease and comfortable with the idea." This suggests the malleable attitude of women toward breastfeeding, and that perhaps maturation changes perspective on motherhood.

Many participants demonstrated a positive attitude toward breastfeeding. The ideas that breastfeeding is natural and "must be done," and women who do it are "brave and strong" were generally suggested. According to the Center of Disease Control and Prevention, approximately three out of every four infants born in the U.S. are breastfed (2004). However many of the interview participants were under the impression that American women

generally do not breastfeed their kids. The most common reasons given by women who intended to breastfeed were health benefits, feeling close to their child, a natural process, and benefits to the mother. The most common reasons for bottle-feeding were convenience, concern with work, physical issues such as gaining weight and sagging breasts, and uncertainty about the process in general.

This study has several limitations. One major drawback was the relatively small sample size. Since only 27 women were interviewed, the data is likely highly skewed and not an accurate representation of the general attitudes, intentions and beliefs of students at the University of Pennsylvania. The recruiting of samples may have also skewed data. Since this was a small-scale research project, most of the participants recruited were friends and other acquaintances. There was also no racial variability, which is important in a university setting. Anonymity could not be maintained as the surveys and questionnaires were administered by e-mail and no codes were assigned to any of the participants.

The kind of statistical analysis conducted also imposed limits. Since mostly correlation coefficients were represented, no causal relationships were imposed. The questionnaire was not reliable because no test-retest was conducted to determine whether the data gathered was an accurate representation of the knowledge of university students. There was also no questionnaire to assess behavior in regards to breastfeeding attitudes. No regression analysis was conducted to measure predictors of breastfeeding.

Additional research regarding attitudes and intentions toward breastfeeding in college students should be conducted, as few empirical research studies in this field exist. Gender differences should also be further researched, targeting young men who have not yet had children. Previous studies have shown that male partners significantly influence whether a woman will initiate breastfeeding (Arora et. al 2000). Cross-cultural studies should also be conducted to observe cultural and social differences in the way we understand breastfeeding. Furthermore, courses and workshops to increase knowledge about breastfeeding should be introduced. Universities should encourage students to develop campus organizations facilitating child health care, and health care providers and nursing schools should target students to increase awareness about breastfeeding (Kang et. al 2005). Breastfeeding as a topic need not be presented exclusively, but can instead be included in workshops or courses dealing with women's body image, myths surrounding women's bodies, child health, etc.

The attitudes and intentions toward breastfeeding are the result of a complex interaction of factors such as exposure in public or at home, perceived knowledge about breastfeeding, and accessibility of information regarding breastfeeding. This study shows that at the college level, the majority of women have good knowledge regarding breastfeeding practices. Attitudes and intentions toward breastfeeding are formed independently and are not correlated to whether one was breastfed as a child. Cultural differences impact the decision to breastfeed as well. Therefore, people from collectivist countries are more likely to initiate breastfeeding as compared to those from individualist countries.

Mongolian Twilight
Jenna Stahl ('11)

Jenna Stahl spent the past summer studying grazing and climate change pressures on local ecology in Mongolia. This photo features traditional Mongolian housing, gers, under a stormy evening sky. The study included interviewing Mongolian nomads about their opinions on the changing climate and was sponsored by PIRE Mongolia- University of Pennsylvania Departments of Environmental Studies and Biology and the National University of Mongolia.