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Physiological Comfort of Clothing during Lactation

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Abstract

As reported by the World Health Organization, breastfeeding meets the nutritional needs of infants necessary for immune protection and optimal growth and development. Some of the benefits to breastfed infants include a decrease in respiratory infections, sudden infant death syndrome and diseases in later adult life that might include obesity, diabetes and gastroenteritis. Similarly, benefits to the mother constitute return to pre-pregnancy weight and a lower risk of ovarian and breast cancer. Newborn infants who have experienced short and long term skin-to-skin contact with mothers (Kangaroo care) have demonstrated improvements in successful and longer duration of breastfeeding.

Keywords: Breastfeeding; Nutritional needs; Syndrome; Growth and development

Introduction

Physiological comfort or sensorial comfort, thermal comfort, fit and fabric weight is affected by the physiological changes of the body while breastfeeding. Breastfeeding changes the physiology of a women's body causing pain, changes in milk flow and alterations in body temperature. Clothing can influence the physiological comfort level of a breastfeeding woman by keeping her warm and providing a light covering and soft surface to hold a child. Understanding the design of clothing that enhances physiological comfort would be extremely paramount to breastfeeding mothers in selecting the most ideal clothing to promote and increase the duration of breastfeeding [1].

Clothing comfort is a component of quality or the degree of excellence to which a garment meets expectations. Specifically, it is a performance property defined as a condition of ease or well-being affected by many factors, including physical properties (e.g. design materials, construction and finishes). These physical features contribute to the garment's aesthetics (e.g. design, color, etc.) and functional performance (e.g. use-ability). Within this framework, Cho dentified physiological comfort or the sensory aspects of clothing; for example fit, touch, weight, etc [2].

Physiologically, lactating women may experience breast engorgement and breast infections causing fever and flu-like symptoms. Pain experienced in breasts and nipples are primary reasons for mothers to cease breastfeeding. Some factors associated with painful breasts include weight of the breast and ill-fitting bras which restrict blood flow prompting pulsating discomfort. Restriction of milk flow may cause redness of the breasts and conceivably a discernable irregularity of available milk. Problems with milk flow could be avoided with proper fit of the clothing while respecting and concealing the mother's privacy during lactation [3].

Additionally, candidiasis, a parasitic contaminant, causes sore and inflamed nipples resulting in excruciating pain under the arms. A contributor for this occurrence is milk seepage that produces a wet breast pad; a conducive environment for the development of contagious painful diseases. According to Gordon apparel designers and researchers should consider prevention of infections related to lactation when choosing materials for breastfeeding products [4]. Furthermore, variation in hormonal changes during lactation could affect thermal balance contributing to hot flashes and discomfort. Physiological clothing features that might remedy the abovementioned breastfeeding issues include thermal properties of the fabric, style of the garment, fabric's sensation on the body and garment-fit. These characteristics are specifically affected by fiber and types of fabric that influence factors including air permeability, tensile, thermal insulation, water-vapor permeability and pore size. Popular literature has noted that clothing during lactation must be light weight and comfortable against the skin for proper air circulation [5].

To date, limited research has focused on the physiological comfort of outerwear clothing on lactating mothers. Therefore, the purpose of this research was to compare physiological comfort of two types of clothing worn during breastfeeding: Designed clothing-DC (e.g. side flaps to access the breasts) with conventional clothing-CC (e.g. t-shirt) [6].

Materials and Methods

Design

Data came from lactating women who participated on reddit and babycenter blogs along with members of the home4birth club on Facebook. The survey asked a series of questions including demographics, general lactating behaviors, breastfeeding clothing/devices and physiological comfort. The items on seven physiological comfort were altered from Cho's study on the comfort of hospital gowns. Prior to the start of the research, the survey was tested for validity by five experts (fashion merchandising, apparel designers, lactation consultant and survey designer) and four women who had previously breastfed [7]. To ensure reliability, a test-retest was performed within one week apart with a different sample of 40 women who had experienced breastfeeding. The physiological features were reliable (seven physiological features, $\alpha \leq 920$). This cohort was not part of the final analysis [8].

Setting

Women who had lactated within the last two years and who resided in the United States were invited to participate.

Sample

The survey was completed by 217 mothers either currently lactating or who had lactated in the last two years. If mothers were less than 18 years they were excluded.

Measurement

There were three components to the survey. Part A consisted of questions on demographics, lactating behaviors and preferred apparel (DC or CC) during breastfeeding. Part B had graphical images of DC (side flaps to access the breasts and a strap that unhooks) and CC (center front button closure, center front zipper, knitted v-neck shirt and a t-shirt) commonly worn during lactation [9]. Based on their preferred choice of apparel, during breastfeeding, participants completed the survey items about DC and/or CC. In part C participants rated seven physiological comfort features of DC and/or CC on a 5-point Likert scale (1=strongly agree, most comfortable; 2=somewhat agree, moderately comfortable; 3=neutral, no preference; 4=somewhat disagree, moderately uncomfortable; and 5=strongly disagree, least comfortable). These features were:

- The garment did not seem bulky when I was standing.
- The garment covered my body well to keep me warm while breastfeeding.
- The seams of the garment did not irritate my skin.
- The length of garment was appropriate for breastfeeding.
- The garment was a size that fit me well.
- The garment kept me warm enough.
- I was comfortable because the garment seems to be light.

Data collection

After exempt approval was obtained from the university's institutional review board, a recruitment letter with the survey link was posted for one month on reddit, babycenter, and home4birth club. A reminder was posted fortnightly requesting participation [10].

Data analysis

Data were downloaded into SPSS v.23 for Windows (SPSS, 2016) for analysis. Descriptive statistics and frequency counts were run on all variables. Frequencies (number and percent) were used to determine the overall prevalence of specific survey questions and to identify the type of outerwear clothing attributes desired by breastfeeding women. Interval and ratio data were analyzed using appropriate parametric statistics (e.g., One sample t-test). Statistical significance was set at $p \leq 0.05$ [11].

Results

Normal reference intervals

There were 217 women ranging between 20-40+ years who met the criteria and successfully completed the study. The majority identified themselves as caucasian (n=101; 83.5), reported being employed full time (n=55; 45.5%) or were homemakers (n=38; 31.4%). Fifty-one (33.8%) resided in the Midwest. From the original pool of 217 participants, commonly reported apparel worn during lactation were as follows: CC (n=124), DC (n=93), both CC and DC (n=82). Since more than one-third (n=82) of the participants reported wearing both types of apparel during lactation and to avoid biasness, comparisons were made with this sample [12].

Physiological comfort scores for CC was a total mean of 13.17. Average mean for all seven comfort features was 1.88 (n=124). The women who wore CC during lactation had the highest mean score indicating they experienced less physiological comfort. This was typically noted with regard to-the garment covered my body well to keep me warm while breastfeeding (m=2.39; SD=1.280). The most comfortable feature for CC was in reference to touch: The seams of the garment did not irritate my skin (m=1.61; SD=.917) (Table 1) [13].

Physiological comfort	Minimum	Maximum	Mean	Std. deviation
Bulky when standing	1	5	1.69	0.991
Warmth while breastfeeding	1	5	2.39	1.28
Seams irritating skin	1	5	1.61	0.917
Appropriate length	1	5	2	1.02
Appropriate fit	1	5	1.68	0.942
General warmth while wearing	1	5	1.94	1.015
Lightness/weight of the garment	1	4	1.86	0.81
Note: 1=Strongly agree; 2=Mildly agree; 3=Neutral; 4=Mildly disagree; 5=Strongly disagree				

Table 1: Physiological comfort: Minimum, maximum, scale mean and standard deviations for conventional clothing (N=124).

Physiological comfort features of CD had a total mean of 11.59. Average mean for all seven comfort features was 1.65 (n=93). This on the Likert scale reflected the physiological comfort items ranged from moderately comfortable to neutral. A feature-the garment kept me warm enough had the highest mean of 2.09 (SD=1.139) indicating this was a reason CD was not physiologically comfortable. Similarly, the item the garment covered my body well to keep me warm while breastfeeding had a mean score of 2.10 (SD=1.145). The item the length of garment was appropriate for breastfeeding had the lowest score (m=1.47; SD=0.842) (Table 2) [14].

Physiological comfort	Minimum	Maximum	Mean	Std. deviation
The garment did not seem bulky when I was standing	1	5	1.84	1.145
The garment covered my body well to keep me warm while breastfeeding	1	5	2.1	1.225
The seams of the garment did not irritate my skin	1	5	1.59	0.863
The length of garment was appropriate for breastfeeding	1	5	1.47	0.842
The garment was a size that fit me well	1	5	2.01	1.247
The garment kept me warm enough	1	5	2.09	1.139
I was comfortable because the garment seemed light	1	5	2.04	1.01
Note: 1=Strongly agree; 2=Mildly agree; 3=Neutral; 4=Mildly disagree; 5=Strongly disagree				

Table 2: Physiological comfort: Minimum, maximum, scale mean and standard deviations for designed clothing (N=93).

When responses to the physiological comfort items were compared between CC and DC, two comfort features were statistically significant. The first-the garment covers my body well to keep me warm while breastfeeding t(82)=2.304, p=0.024. The average mean on this item for CC and DC were: 2.53 (SD=1.328) and 2.07 (SD=1.187) respectively. Second-the length of garment is appropriate for breastfeeding t(82)=5.903, p=0.000. CC for this comfort feature had an average mean of 2.07 (SD=1.045), while DC had an average mean of 1.48 (SD=0.861) (Figure 1) [15].

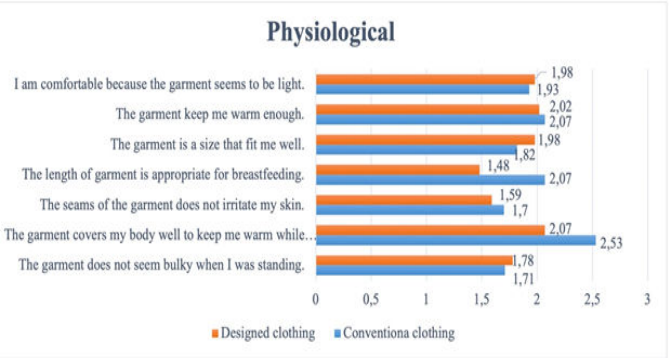

Figure 1: Average mean of physiological comfort items for conventional clothing and clothing designed for breastfeeding (n=164).

Discussion

When comparing overall mean scores of DC and CC, DC was perceived as having greater physiological comfort. The results indicated health care professionals could be more proactive in educating lactating women about the physiological features of DC. More specifically, when comparing DC to CC, two physiological comfort features had a statistically significant difference. The first feature related to body temperature. The respondents were neutral about CC regarding the statement, the garment covers my body well to keep me warm while breastfeeding. While the group wearing DC mildly agreed with the statement. Nursing mothers may have hot flashes, infections and hormonal changes. The evidence suggests lactating mothers that experience hormonal changes could consider DC to help alleviate discomfort.

The second statistically significant difference was found in the feature, the length of garment is appropriate for breastfeeding. Although women in the DC category agreed with this statement, there was discrepancy with the CC group indicating their disagreement to the statement. Previous studies supported the idea that designers should choose garments to fit lactating mothers at a time when their bodies are fluctuating in size. Therefore, DC might be better designed to accommodate this need.

The results of this study may help a wide variety of professionals, form apparel designers, merchandisers, health care professionals, to lactating support providers. Apparel designers can utilize these findings to maintain some of the garment features of DC that enhance physiological comfort. Hospitals and other medical professionals could also find the results useful. Development of apparel that would meet psychological comfort could lead to increase duration of bonding between infant and mother, thereby contributing to ease and duration of breastfeeding. The outcome of this would affect the overall health status of infants. Recommendations to wear DC could be made to patients that have particular issues with hormonal variations. In merchandising, marketers can highlight the physiological and functional comfort advantages of buying and wearing DC during lactation.

The strengths of the research outweigh the limitations in that:

- This was the first study that examined physiological comfort of outerwear clothing during lactation.
- Comparisons related to physiological comfort were compared between DC and CC.
- The survey instrument to assess physiological comfort of clothing worn during lactation is original and was tested for validity and reliability.

- The participants who were actively engaged in certain types of technology (reddit, babycenter and facebook) had the opportunity to complete the survey resulting in a broad cohort.

Future research should focus on populations beyond the United States. Also, an intergenerational population (e.g. greater than 40+, lactating greater than 24 months) to understand how perceptions of clothing worn during lactation have changed over time.

Conclusion

Examining the comfort of clothing worn while breastfeeding has the potential to affect the duration and participation rates resulting in health benefits for both the mother and infant. Physiological clothing features are important to consider given the physical changes a mother experiences post pregnancy. The results found physiological comfort of CC and DC during lactation differed with mothers preferring the latter. Warmth and fit of the clothing are important features to consider for physiological comfort of the lactating mother. Further research is need to understand how perceptions of physiological comfort might vary among different ethnicities, culture and age groups.

Limitations

There were a couple of limitations in the current research that must be taken into consideration: The sample included only women residing in the United States and only participants who breastfed within the past 24 months were invited.

Declaration of Conflict of Interest

All authors declare no potential conflict of interest with respect to the research, authorship or publication of this article.

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