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Pooja Singh

Research Scholar, Department of Clothing and Textiles, College of Home Science, G.B. Pant University of Agriculture and Technology, Pant Nagar, Uttarakhand, India.

Dr. Manisha Gahlot

Professor, Dept. of Clothing & Textiles, College of Home Science, G.B. Pant University of Agriculture and Technology, Pant Nagar, Uttarakhand, India.

Functional clothing for lactating women: A user oriented product development approach

Pooja Singh and Dr. Manisha Gahlot

Abstract

Despite the extraordinary benefits of breastfeeding for both mother and child, the modern day woman faces various psychosocial barriers to breastfeeding, in addition to these emotional and physical challenges. There is great potential for the development and improvement of apparel for breastfeeding mothers. The aim of this study was to design and develop functional clothing for a lactating woman. A questionnaire was developed for personal interview to assess clothing requirements of lactating mothers. The identified clothing requirements were incorporated in garment designs. After designing the garment was constructed and given to the lactating women for wear trial. Designed and constructed garment (kurti 2) were found to be highly suitable with the score (20/21- 95.23%) for comfort features and for constructional features (14/15- 93.33%). The scores of kurti 1 were (19/21- 90.47%) for comfort features and for constructional features (16/21- 76.19%). The acceptability score of kurti 1 and 2 were found to be (53/80-66.25%) and (55/80-68.75%) It can be concluded from the data that subject was satisfied with the functional designs. This type of Designing and construction of functional clothing can boost up the confidence of lactating mothers to breastfeed in the public places and thus ultimately breaking psychosocial barriers to breastfeeding and also enhance psychological comfort by lifting their self esteem.

Keywords: Breastfeeding, Psychosocial, Lactating, functional clothing, psychological

1. Introduction

World Health Organization's (WHO) recommended women to breastfeed their infants exclusively for the first six months of life. Breastfeeding is a very physical process and requires the baby to be held throughout (Gjerdingen *et al.*, 1993) [6]. There are four common holds utilized during breastfeeding. The cradle hold (and variations), the cross-over hold, the clutch or football hold, and the reclining position are the most commonly breastfeeding positions (Pollard, 2011) [14]. Designers of breastfeeding apparel should consider how the baby is being held when implementing functional properties into the product such as ease-of-use (Newman, 2005). Studies have found that in the first three years of infant life breastfeeding protects babies from gastrointestinal, respiratory, ear and urinary tract infections (Riordan & Wambach, 2010; US DHHS, 2011) [15, 20].

When designing apparel, understanding the human body is a critical component of the design process (Soares *et al.* 2012) [18]. A key characteristic of User Product Development method is a "systematic analysis of the relation between user, product, task, and environment," (Kaulio, 1998) [7]. This method can be used in functional and technical apparel research (May-Plumlee and Pittman, 2002) [11]. While determining user needs, it is necessary to define and measure deficiencies in products against the users' ideal of those product/s. This process is known as a needs assessment (Unruh & Unruh, 1984; Rouda & Kusy 1995; Mullet, 1984) [19, 17, 12]. Needs assessments have been successfully used by apparel researchers when designing apparel for special user groups (Chae & Schofield- Tomschin, 2010; Bye & Hakala, 2005; Dickson & Pollak, 2000) [2, 1, 4].

Functional properties within apparel include components of fit, material comfort, visibility of design features, thermal balance, ease-of-use, mobility, and donning/doffing (Lamb & Kallal, 1992; Rosenblad-Wallin, 1985). Necklines are an important feature of breastfeeding apparel

Correspondence

Pooja Singh

Research Scholar, Department of Clothing and Textiles, College of Home Science, G.B. Pant University of Agriculture and Technology, Pant Nagar, Uttarakhand, India.

in tops, dresses, tanks and bras. Scoop, V-neck and cross-over necklines are typical because they allow easy access for breastfeeding by simply pulling the garment down or up depending on the apparel feature. (Choi, H., Choi, J., & Kim, S., 2000) [3]. Researchers have not examined symbolic properties within breastfeeding apparel; however it is well known that pregnancy and childbirth can be a stressful transition with respect to the physical body and to a women's changing social roles (Riordan & Wambach, 2010) [15].

Specialized clips on the straps of bras and tanks that can be undone to allow access to one or both breasts at a time are one of the most common features found in breastfeeding apparel. Specialty stretch knits made from natural and synthetic fibers are usually used in breastfeeding apparel. (Linsey A. Gordon, 2015) [10].

The social environment surrounding a breastfeeding mother, as well as her socioeconomic status, significantly affects a mother's decision to breastfeed (Flacking, *et al.*, 2007) [5]. Considering this factor, different types of apparel do exist that are designed specifically for breastfeeding mothers such as bras, tops, blouses, and dresses. But the variety in designs and colors are not easily available. The functional features are same across styles and brands. A mother has to breastfeed often throughout the day and apparel needs to be very easy to use (Lawrence & Lawrence, 2011) [9]. The aim of this case study was to find out the clothing related problems of a lactating mothers to design and develop a casual and formal wear dress for the lactating mother so that she would be able to feed the baby in the public places too. The case study highlights the suitability level of the functional features incorporated in the garments for the subject.

1.1 Objectives

1. To collect information on clothing related problems of the lactating mothers
2. To develop suitable designs of apparels for the subject
3. To evaluate the developed designs and construct the garments
4. To evaluate the constructed garments

2. Material and methods

The study was conducted during the year 2015 in the G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand. For the present study a 26 years old- Mrs. Huma lactating mother was selected. Subject was teaching personnel in the Department of Human Development and Family Studies. Her working hours were from 9 am to 5 pm. She had 5 months old baby and she used to bring him with her to the institution. She left him in the crutch during her class timings because working with baby during the working hours is not easy. She feed him 5 times a day.

Feeding the baby is a private activity which is many times embarrassing or awkward in public places. She faced this problem of feeding the baby because she had to lift the suit or dress either from the hem or from the neck to nurse. She told the investigator about her delivery. She had the caesarean delivery and faced the problems while feeding her baby. For that she made a cut in her nightwear at the breast portion to easily feed the baby because at that time she was physically not fit and most of the time she used to rest on the bed.

After informing the subject about the nursing garments, nursing bras and accessories investigator discussed with the subject and noted down her requirements and problems in detail. After analyzing the problems faced by her, adaptive clothing was designed and provided to her.

Further additional information on clothing problems and the constructional details to be incorporated in the special garments was also collected. For this self structured questions related to the clothing problems and existing wardrobe of the subject were asked. On the basis of information five designs were sketched and two of them were selected for construction on the basis of functionality and attractiveness of the garment according to the subject. The fabric material for suit was procured from local market of Kichha, Uttarakhand. The fabric material was cotton. Zipper and Lace were procured from the local market of Pantnagar (Uttarakhand). On the basis of information collected from the subject, two set of garments were constructed according to the body measurements of the subject. Finally the garments were given to the subject for wear trial where the wear period for the garments was 1 day. After wear trial the investigator personally interviewed the mother by administering the self structured interview schedule and gathered the information about acceptability, comfortability and attractiveness of the newly designed functional garments.

3. Results and Discussion

The whole work of construction was divided in the following headings:-

3.1 Designing

Five designs of kurti were made as per the requirements of the subject. Designs were comprised of both casual wear as well as formal wear. The sketches and description of these five designs are below:-

Design 1: Functional Breastfeeding kurti with horizontal zipper pattern

- ✓ Front with round neck line and horizontal pleats
- ✓ Lace at the bustline
- ✓ Use of invisible zipper at bust level for opening
- ✓ Back- plain with round shape neckline
- ✓ Circular cap sleeve
- ✓ Flared silhouette

Design 2: Functional breastfeeding kurti with velcro for opening.

- ✓ Scoop neck line with Lace
- ✓ Vertical opening with velcro
- ✓ Contrast color yoke
- ✓ Back- plain with round shape neckline
- ✓ Bracelet sleeve with lace

Design 3: Functional breastfeeding kurti with vertical zipper pattern

- ✓ Front with round neck line and contrast color yoke of golden brocade fabric
- ✓ Use of vertical invisible zipper at bust level for opening which is hidden under the lengthwise pleats
- ✓ Back- plain with round shape neckline
- ✓ Bracelet sleeve
- ✓ Decorative buttons on the yoke

Design 4: Functional breastfeeding kurti with concealed curved zipper pattern

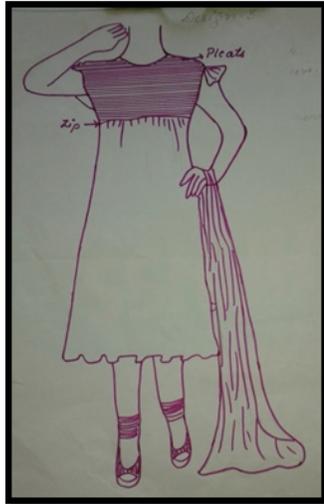
- ✓ Collar neck line, with band and functional buttons
- ✓ Embroidered yoke
- ✓ Gathers at the base of the yoke
- ✓ Use of invisible zipper on the outline of the yoke for opening

- ✓ Back- plain with round shape neckline
- ✓ Bracelet sleeve with lace

Design 5: Functional breastfeeding kurti with vertical zipper pattern

- ✓ Front with decollete neck line
- ✓ Use of invisible zipper on both the sides at bust level for opening

- ✓ Back- plain with round shape neckline
- ✓ Melon sleeve
- ✓ Gathers at the waistline with adjustable waistband for proper fit.
- ✓ Lace at the neckline
- ✓ Gathered silhouette



Design 1



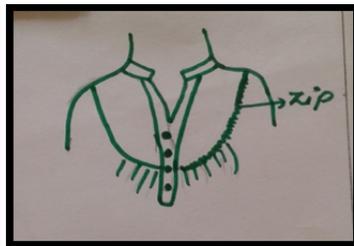
Design 2



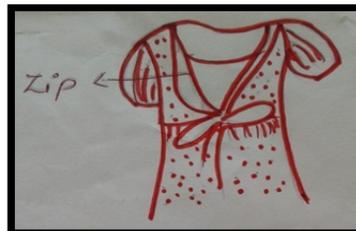
Design 3



Design 4



Design 4



Design 5



Design 5

3.2. Evaluation and selection of design

Designs prepared by the investigator were evaluated by the subject and from those five designs only two (Design 1 and Design 5) were selected for final construction.

3.3. Construction and wear trial

The garments were cut with the help of proper drafting patterns and constructed incorporating all the features. After the construction of the garment, it was worn by the subject for the period of two days for the trial.

3.4. Evaluation

In order to assess the suitability of constructional features and assessment of comfort three point rating scale was formulated. To assess the acceptability of the developed garments statements were framed and the subject was asked to give her opinion on five point rating scale. The responses derived for each kurti were coded and tabulated in the tables 1, 2, 3 and 4.

3.5. Result

It can be concluded from table 1 that the characteristics of the constructed garment (kurti 1) in terms of the constructional features such as circumference lines of the kurti, easy to tie

and open were found to be highly suitable followed with the length of the kurti, easy to fasten & easy to unfasten were suitable. The length of the zipper opening was somewhat suitable.

Table 1: Suitability assessment of developed clothing (kurti 1)

S. No	Functional features of Kurti	Characteristics of functional features of kurti	Frequency			Suitability score Kurti 1
			H.S. (3)	S. (2)	S.W.S (1)	WMS
1.	Constructional features					
a)	Size and shape of kurti	Length of the kurti		✓		2 (S)
		Circumference lines of the kurti	✓			3(H.S)
b)	String at waist	Easy to tie	✓			3(H.S)
		Easy to open	✓			3(H.S)
c)	Zipper opening at neck	Easy to fasten		✓		2 (S)
		Easy to unfasten		✓		2 (S)
		Length of Zipper opening			✓	1(S.W.S)
2.	Assessment of comfort					
a)	Comfortable during wear	Easy to wear	✓			3(H.S)
		Easy to remove	✓			3(H.S)
		Ease in wear	✓			3(H.S)
		Ease of feeding while wearing the dress	✓			3(H.S)
b)	Fabric of kurti	Hand or feel of fabric		✓		2 (S)
		Drape of fabric according to the design	✓			3(H.S)
c)	Overall appearance	Aesthetic value of dress		✓		2 (S)

H.S.= Highly Suitable, S.= Suitable, S.W.S.= Some What Suitable

Table 2: Suitability assessment of developed clothing (kurti 2)

S.NO	Functional features of Kurti	Characteristics of functional features of kurti	Frequency			Suitability score Kurti 2
			H.S. (3)	S. (2)	S.W.S (1)	WMS
1.	Constructional features					
a)	Size and shape of kurti	Length of the kurti	✓			3 (H.S)
		Circumference lines of the kurti	✓			3(H.S)
c)	Zipper opening at breast level	Easy to fasten	✓			3 (H.S)
		Easy to unfasten		✓		2 (S)
		Length of Zipper opening	✓			3(H.S)
2.	Assessment of comfort					
a)	Comfortable during wear	Easy to wear	✓			3(H.S)
		Easy to remove	✓			3(H.S)
		Ease in wear	✓			3(H.S)
		Ease of feeding while wearing the dress	✓			3(H.S)
b)	Fabric of kurti	Hand or feel of fabric		✓		2 (S)
		Drape of fabric according to the design	✓			3(H.S)
c)	Overall appearance	Aesthetic value of dress	✓			3(H.S)

H.S.= Highly Suitable, S.= Suitable, S.W.S.= Some What Suitable

Table 3: Acceptability assessment of functional clothing (Kurti 1)

S.NO	statements	strongly agree (5)	Agree (4)	cannot say (3)	Disagree (2)	Strongly disagree (1)	Score
1.	The functional clothing is easy to wear.		✓				4
2.	The functional clothing look attractive.		✓				4
3.	Designs of the garment is so simple that person good at stitching can follow the designs.	✓					5
4.	Functional clothing can be washed and maintained easily.	✓					5
5.	It is worth spending extra money on functional clothing.		✓				4
6.	One must wear functional clothing.	✓					5
7.	I will suggest other fellows to adopt functional clothing.	✓					5
8.	It takes more time while wearing and removing functional clothes.					✓	1
9.	Functional clothes seems unattractive.					✓	1
10.	The garment is not comfortable due to Zipper at the neck.				✓		2
11.	The functional clothes cause hindrance while working.				✓		2
12.	The washing and maintainance of functional clothing is difficult.					✓	1
13.	It will be difficult to get it stitched due to their complicated designs.			✓			3
14.	The garment should not be recommended because this is not useful.					✓	1
15.	The functional garment is more useful if worn along with maternity bra.	✓					5
16.	The functional garment is appropriate for intended purpose.	✓					5

Table 4: Acceptability assessment of functional clothing (Kurti 2)

S. No	statements	strongly agree (5)	Agree (4)	cannot say (3)	Disagree (2)	strongly disagree (1)	Score
1.	The functional clothing is easy to wear.	✓					5
2.	The functional clothing look attractive.	✓					5
3.	Designs of the garment is so simple that person good at stitching can follow the designs.	✓					5
4.	Functional clothing can be washed and maintained easily.	✓					5
5.	It is worth spending extra money on functional clothing.		✓				4
6.	One must wear functional clothing.	✓					5
7.	I will suggest other fellows to adopt functional clothing.	✓					5
8.	It takes more time while wearing and removing functional clothes.					✓	1
9.	Functional clothes seems unattractive.					✓	1
10.	The garment is not comfortable due to Zipper at the breast level.				✓		2
11.	The functional clothes cause hindrance while working.				✓		2
12.	The washing and maintainance of functional clothing is difficult.					✓	1
13.	It will be difficult to get it stitched due to their complicated designs.			✓			3
14.	The garment should not be recommended because this is not useful.					✓	1
15.	The functional garment is more useful if worn along with maternity bra.	✓					5
16.	The functional garment is appropriate for intended purpose.	✓					5



Plate 1: Full view of kurti 1



Plate 2: One side opening



Plate 3: Both side opening



Plate 4: Full view of kurti 2



Plate 5: Invisible horizontal zipper

In order to assess the comfort level of kurti 1 the characteristics such as easy to wear and remove, ease in wear & feeding while wearing the dress and drape of the fabric according to the design were found to be highly suitable. The hand & aesthetic values of the dress were suitable.

In terms of kurti 2 it is clear from table two that to assess the suitability of constructional features such as length, circumference, easy to fasten, length of zipper opening were found to be highly suitable. Only one feature that is easy to unfasten was found to be suitable. To assess the comfort level the features such as easy to wear & remove, ease in wear and feeding while wearing the dress, drape of fabric, aesthetic value were found to be highly suitable. The hand of the fabric was suitable.

It is clear from table 3 that while assessing the acceptability of kurti 1 the subject was strongly agreed with the designs of the

garment was so simple that person good at stitching can follow the designs, washable, wearable, further suggestion to other fellows to adopt functional clothing, usefulness if worn with maternity bra & appropriateness for intended purpose. She was agreed with the easy to wear, attractiveness and worth spending extra money on functional clothing. She cannot say anything about that the garment was difficult to stitch due to their complicated designs. She was disagreed about the garment was not comfortable due to zipper at the neck & it cause hindrance while working. The subject was strongly disagreed with the statements saying that it takes more time while wearing and removing functional clothes, they seems to be unattractive and also the washing and maintenance of these are difficult, the garment should not be recommended because of unusefulness.

In order to assess the acceptability of kurti two from table 4 the subject was strongly agreed with easy to wear, attractiveness, design of the garment was so simple that person good at stitching could follow the designs, washable, wearable, further suggestion to other fellows to adopt the functional clothing, usefulness if worn with maternity bra & appropriateness for intended purpose. She agreed with the worth spending extra money on functional clothing. Subject cannot say anything about that it will be difficult to get it stitched due to complicated designs. She was disagree with the garment was not comfortable due to zipper at the breast level and it cause hindrance while working. Subject was strongly disagreed with the unattractiveness, difficult to wash, the garment should not be recommended because of unusefulness, takes more time while wearing and removing.

3.6 Conclusion

Designed and constructed garment (kurti 2) was found to be highly suitable with the score (20/21- 95.23%) for comfort features and for constructional features (14/15- 93.33%). The scores of kurti 1 were (19/21- 90.47%) for comfort features and for constructional features (16/21- 76.19%). The acceptability score of kurti 1 and 2 were found to be (53/80-66.25%) and (55/80-68.75%). Thus conclusion can be made that subject was satisfied with the functional designs.

4. Further Recommendation

More number of researches could be conducted in similar way by incorporating variety of designs in various dresses. It can be recommended from the present study that maternity garments with functional feature are very much required and there should be "Special Maternity Stores" in each town/ city. The developed designs can be used by garment manufacturing units to serve this special group of consumers who have specific needs of comfortable garments. These dresses can be worn with ease and fulfill their functional need.

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