DETERMINING THE FUNCTIONAL APPAREL DESIGN REQUIREMENTS OF PREGNANT WOMEN IN LAGOS STATE

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Abstract
This study focused on the determination of functional apparel design requirements of pregnant women in Lagos State. Three specific objectives with three corresponding research questions guided the study. Survey design was used. The population consisted of 1,074,320 respondents comprising 1,069,125 registered pregnant women, 3,686 registered nurses, 1,500 registered garment makers and 09 clothing and textile lecturers. The sample size was 996 respondents drawn from the four groups that constituted the population for the study. Questionnaire was used for data collection. Data were analysed using means, standard deviation and t-test. Results indicate among others, that the overall shape or silhouette apparel design showing gathering at the yoke (X=4.01), light and non-constricting (X=3.85), have adjustable waistline (X=3.79), be fashionable and sporty styles (X=3.86) determine the functional apparel design requirements to a high extent. The study recommended, among others, that the garment makers and apparel industries in Nigeria should encourage the production of smart, stylish and attractive designs that are functional and aesthetic for pregnant women. Nurses and other stakeholders also should educate the pregnant women on the apparel design requirements suitable for use.

Key words: Functional, Apparel, Design, Requirements, Pregnant Women.

Introduction
Apparels are complex but very vital aspect of everyone's life. Apparel encompass all forms of clothing/garments, ornaments, foot and head coverings worn on the body for various reasons; such as comfort, protection, adornment and self-esteem. Horn and Gurel (1981) defined clothing as all items of apparel and adornment. Therefore apparel could be referred to as what is worn to cover the body for various reasons. Apparels include skirts, trousers, dungarees, blouses, gowns among others. Apparels also include under wears, swimming wears, and foot wears (Anyakoha 2015). The significance of clothing among the people of the world has been theorized under such functions of clothing as modesty, immodesty, protection and adornment. During pregnancy there are psychological, emotional and physical changes in women. During this period, pregnant women could be identified by some characteristics, such as her physical shape, look and gait, and her sitting, standing and walking position, (Petral and Blazena, 2010). Other physical characteristics common with pregnant women are fuller and firmer breasts. Tiredness and dizziness sometimes occur during the 1st trimester. The 2nd and 3rd trimesters of pregnancy is also characterized by swelling of hands and feet, although not experienced by all pregnant women. This is caused by changes in the volume of blood that automatically doubles to meet the needs of the foetus. Often folds in the body especially at the axial (armpit) and neck, even the mid-cliff and the surface of the belly may appear and eventually protruding belly accompanies pregnancy. According to Medical news today (2009), the pregnancy becomes obvious during the 2nd and 3rd trimesters. During this period, pregnant women need functional apparels that will accommodate the daily protruding stomach (Mohammed, 2011). The apparel should also be able to cover the expanded belly and still make the pregnant woman comfortable. These changes that occur during pregnancy therefore call for comfort in the choice of a pregnant woman's apparel at this crucial stage. It is better to avoid tight trousers or skirts that will make the pregnant women uncomfortable. Also, tight dresses during pregnancy contribute to sweat and heat (Anwesha, 2011). American Pregnancy Association (2015) reveals that tight apparels can make a pregnant woman uncomfortable and increase her virginal secretions. Wearing tight-fitting clothing can cause pain in different areas of the body during pregnancy. This includes the abdomen, chest and arms. Putting pressure on any part of the breasts for too long can cause the milk ducts to clog even before a woman starts breastfeeding. This can result in pain, redness and even a lump on the breast. Apparels that are tight on the limbs, such as the arms and thighs, can cut off blood flow and create numbness or tingling sensation. Pregnant women need comfortable apparels that will take care of their changing body size and shape. Ashleigh (2013) and Nitma, (2015) also advocated that pregnant women should start wearing maternity apparels when they begin to feel uncomfortable in their old tight-fitting apparels. Pregnancy is a beautiful time to be comfortable and fashionable with the appropriate maternity apparel. Pregnancy should not require a radical break from personal style (Nitma, 2015). Pregnant women should not loose fashion sense but maintain the pre-pregnancy identity as signified through stylish and smart maternity apparels,
Maternity apparel is specifically designed to be worn by pregnant women. It is designed with a loose, comfortable cut which expands as the expectant mother's belly grows. Pregnant women need comfortable maternity apparels which are necessary and not a luxury (Marshall and Raynor, 2014). According to Noopur, (2012) maternity apparel is functional apparel specially designed to address the anthropometric growth in the human body during pregnancy. Maternity apparel should make the pregnant woman feel comfortable. This is a stage where the anthropometric requirements of the human form are very different, reason being that there is substantive weight gain, but the distribution of this weight is not uniform around the body. That is, certain body parts grow much more in proportion than other parts.

The prominent growth is usually on the waist, bust, and hip. There is also growth on the biceps and thighs among others (Noopur, 2012). Therefore, maternity apparels should be designed in such a way that there is enough space on the waist to accommodate maximum growth on the waist and also have enough room for the hips, bust and biceps which corresponds with the growth of the human body during pregnancy. During this period, good fit functional apparels should be available. Good fit functional apparels for pregnant women can only be achieved by considering the shape, size and measurement of the direct wearer (Noopur, 2012). Pregnancy does not mean that the days of comfort and stylish are over, and so one should offer oneself the perfect mix of comfort, fit, style and look of today’s fashion (Annette, 2001). Maternity apparels which are perfectly comfortable and functional may be completely rejected by pregnant women if they do not look smart, stylish or not perceived to be conveying the proper image (Noopur, 2012).

Psychological expectations and preferences of pregnant women must therefore be given due consideration so as to create functional apparels which are in tune with their social and cultural background, geographical location, age, activity and work profile. There is therefore need for functional apparels that will accommodate the increase in body size occasioned by pregnancy, and will also meet the social and psychological needs of the users. A pregnant woman's apparel is regarded as functional when it meets the required standard such as comfort, protection, safety, ease of donning and doffing, and aesthetics. Functional apparels refer to apparels designed to be practical and useful rather than attractive (Prabir, 2011). Functional apparel process begins with a thorough analysis of the anticipated user who are in different sizes of small, medium or large, and the identification of the physical, emotional and situational needs of that user, climate and other hazards in the environment. The overall process of development of functional apparel designing starts and ends with meeting the specific needs of the users. However, at the information gathering stage, focusing on the needs and preferences of the target consumer lays much more emphasis on functional design (Carrol and Kincade, 2007).

Designing is the first step in garment production. Designing is making a plan artistically and skillfully. Designing involves a set of skills that range from market research and creativity to sketching and fabric selection. Designing is more than creativity, it entails conceptualization of the needs of the wearer and the accommodation of the solution to the needs in the design (Gupta, 2011). For instance, the process of designing functional apparel for pregnant women begins and ends with meeting the specific requirements of the pregnant women. Most designs also include elastic, tabs, and other methods of expansion allowing blouses and trousers to be let out. According to Musial (2014), often, maternity apparels have childish patterns on them such as bows, polka dots or flowers, also, an A-line. This design de-emphasize protruding belly while re-emphasizing childishness. Good fitting apparel designs are achieved through the inclusion of pattern styling features like godet, gores, and the incorporation of appropriate trims, plackets, and fit elements, like pleats darts, gathers, and smocking (Noopur 2012).

The aesthetic aspect of the design, termed the elements of design, is viewed as the interplay of lines, form (shape and space), texture and colour of the garment and other materials used on the garment. These elements of design must be applied artistically. The artistic guidelines that dictate the use of the elements of design are: balance, proportion, emphasis, rhythm and harmony. The elements and principles of design when properly applied, work together to bring about the functionality required on apparel to be developed for pregnant women. The fashion trend is now making many pregnant women in Lagos state dress without consideration for their comfort and that of the unborn children. For example by wearing tight fitting foundation apparels, tight fitting skirts, blouses / tops, trousers and brazier to look smart and this has negative implications on their health. There is need to determine functional maternity apparels for the pregnant women to specifically accommodate the growth on the abdomen and there is also a need to determine stylish and smart functional apparels to meet their yearning aesthetic needs. Hence, the study, is a measure towards
Purpose of the Study
The major purpose of the study was to determine the functional apparel design requirements of pregnant women in Lagos State, specifically, the study determined the
1. functional apparel design requirements (overall shape/silhouette) of pregnant women.
2. functional apparel design requirements (Necklines) of pregnant women.
3. functional apparel design requirements (Fabric type) of pregnant women.

Research Questions
1. What are the functional apparel design requirements (Overall shape/silhouette) of pregnant women?
2. What are the functional apparel design requirements (Necklines) of pregnant women?
3. What are the functional apparel design requirements (Fabric type) of pregnant women?

Research Methodology
Design of the Study: The design adopted for this study was descriptive survey. This was used to obtain information about the apparel design requirements of pregnant women.

Areas of Study: The study was carried out in Lagos state, Nigeria. The study took place in Lagos metropolis. There are tertiary health care delivery centres, government and private maternity centres and clinics in Lagos metropolis.

Population for the Study: The population for the study was 1,074,320 respondents comprising five groups from the three local government areas of Lagos metropolis. The population was made up of 1,069,125 pregnant women registered in both private and Lagos state owned hospitals, 3,686 registered nurses, 500 garment designers and 9 clothing and textiles lecturers.

Sample for the Study: The sample size for this study was 996 respondents drawn from the four groups that constituted the population for the study. Simple random sampling was utilized to select the respondents.

Instrument for Data Collection: A well structured questionnaire based on the four point scale instrument sought for information on the functional apparel design requirements of pregnant women.

Method of Data Collection: Research assistants were recruited by the researcher. The entire sample comprising 996 respondents provided responses for obtaining data for the study.

Method of Data Analysis: The research questions were analysed using mean standard deviation and t-test. Any item with mean value equal to or greater than 3.00 \( (x \geq 3.00) \) is said to be accepted/satisfactory otherwise not accepted/not satisfactory \( (x \leq 3.00) \).

Findings of the Study
Functional Apparel requirements of pregnant women were determined. It was determined that apparels for pregnant women should enhance both the baby and the mother's comfort and growth, fashionable, protective among others.

Research Question 1: What are the functional apparel design requirements \((\text{Overall Shape/Silhouette})\) of pregnant women in Lagos State?
The results presented in Table 1 shows the mean and standard deviation of pregnant women, nurses, garment makers and clothing and textile lecturers on the functional apparel design requirements (overall shape/silhouette) of pregnant women. The result shows that 22-items were accepted to be the overall shape/silhouette of functional apparel design requirements of pregnant women, while 3-items were not accepted. Those items accepted have mean values greater than the criterion mean of 3.00 (\( \bar{x} > 3.00 \)) and those not accepted have their mean values less than criterion mean of 3.00 (\( \bar{x} < 3.00 \)). Hence, majority of the items were accepted as the functional apparel, apparel design requirements of pregnant women. The values of the standard deviation show less variation in the responses of the respondents due to the nearness of the values.

**Research Question 2:** What are the functional apparel design requirements (Necklines) of pregnant women?
The results presented in Table 2 shows the mean and standard deviation of pregnant women, nurses, garment makers and clothing and textile lecturers on the functional apparel design requirements of pregnant women on necklines, high necklines and neckline with collar. The result shows that, all the 6-items on low necklines were accepted, all the 5-items on high necklines were not accepted, all the 3-items on necklines with collar were accepted. The items accepted have mean values greater than the criterion mean of 3.00 (\( \bar{x} > 3.00 \)) and those not accepted have their mean values lesser than criterion mean of 3.00 (\( \bar{x} < 3.00 \)). Hence, majority of the items were accepted as the functional apparel design requirements of pregnant women. The values of the standard deviation show less variation in the responses of the respondents due to the nearness of the values.

**Research Question 3:** What are the functional apparel design requirements (Fabric Types) of pregnant women.

### Table 2: Mean and standard deviation of respondents on the functional apparel design requirements (Necklines) of pregnant women.

<table>
<thead>
<tr>
<th>Items on: Low Necklines</th>
<th>( \bar{x} )</th>
<th>SD</th>
<th>REMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparel should:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 be low neckline</td>
<td>3.79</td>
<td>1.112</td>
<td>A</td>
</tr>
<tr>
<td>32 be low neckline (Scooped)</td>
<td>3.81</td>
<td>1.054</td>
<td>A</td>
</tr>
<tr>
<td>33 be low neckline (Round)</td>
<td>3.88</td>
<td>.998</td>
<td>A</td>
</tr>
<tr>
<td>34 be low neckline (Square)</td>
<td>3.92</td>
<td>.985</td>
<td>A</td>
</tr>
<tr>
<td>35 be low neckline (V-neck)</td>
<td>3.92</td>
<td>.971</td>
<td>A</td>
</tr>
<tr>
<td>36 be low neckline (Scalloped)</td>
<td>3.91</td>
<td>.969</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items on: High Necklines</th>
<th>( \bar{x} )</th>
<th>SD</th>
<th>REMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparel should:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37 be high neckline (Scooped)</td>
<td>2.14</td>
<td>.013</td>
<td>NA</td>
</tr>
<tr>
<td>38 be high neckline (Round)</td>
<td>2.81</td>
<td>1.027</td>
<td>NA</td>
</tr>
<tr>
<td>39 be high neckline (Square)</td>
<td>2.08</td>
<td>.977</td>
<td>NA</td>
</tr>
<tr>
<td>40 be high neckline (V-neck)</td>
<td>2.94</td>
<td>1.058</td>
<td>NA</td>
</tr>
<tr>
<td>41 be high neckline (Scalloped)</td>
<td>1.77</td>
<td>1.076</td>
<td>NA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items on: Necklines with Collar</th>
<th>( \bar{x} )</th>
<th>SD</th>
<th>REMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparel should:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 be neckline with shirt collar</td>
<td>3.83</td>
<td>1.055</td>
<td>A</td>
</tr>
<tr>
<td>43 be neckline with other collars (Convertible, Peter pan)</td>
<td>3.80</td>
<td>1.134</td>
<td>A</td>
</tr>
<tr>
<td>44 be jacket collar</td>
<td>3.86</td>
<td>1.079</td>
<td>A</td>
</tr>
</tbody>
</table>

*Note:* \( \bar{x} = \text{Mean}, \ SD = \text{Standard Deviation}, \ N=\text{number of Respondents}, \ A = \text{Agree and NA = Not Agree} \*
The results presented in Table 3 shows the mean and standard deviation of pregnant women, nurses, garment makers and clothing and textile lecturers on the functional apparel design requirements of pregnant women on fabric type, colour of fabric and fabric surface design. The result shows that 9-items were accepted in fabric types while 2-items were not accepted; 2-items were accepted on colour of fabric while 2-items were not accepted and 5-items were accepted on fabric surface design while 1-item was not accepted. Those items accepted have mean values greater than the criterion mean of 3.00 (\( \bar{X} > 3.00 \)) and those not accepted have their mean values lesser than criterion mean of 3.00 (\( \bar{X} < 3.00 \)). Hence, majority of the items were accepted as the functional apparel, apparel design requirements of pregnant women. The values of the standard deviation show less variation in the responses of the respondents due to the nearness of the values.

### Discussion

This study with respect to research question one identified 25 functional apparel design requirements of pregnant women which are: “the apparel should: enhance baby’s comfort and growth”, prevent risk of all, be simple style and good looking, be fashionable or sporty styles, others included apparel should fit different postures, be easy when donning and doffing (wearing and taking off), enhance baby’s comfort and growth, prevent risk of fall, be simple style and good looking. Also included in the findings were that apparels should be fashionable or sporty styles, fit different postures, emphasize or disguise the waist region, suspend fullness from the waist level, suspend fullness from the hip line, show styles that avert attention away from the mid-section of the figure among others. The findings of this study are in line with Warson (2015) that pregnant women needs apparels that would make them comfortable as well as the unborn babies. This can be in the terms of the functional apparel requirements, Sleeve length, necklines, high necklines, necklines with collar, fabric type, colour of fabric and fabric surface design. American Pregnancy Association (2015) also reveals that tight apparels can make a pregnant woman uncomfortable and cause pain in different areas of the body.
body during pregnancy. This comfort exists when the above identified functional apparel requirements for pregnant women silhouette in terms of apparel being able to enhance baby's comfort. The study agrees with Marshall and Raynor (2014) that pregnant women need comfortable maternity apparels which are necessary and not a luxury. Garment should satisfy the functions of survival, safety and security (protection), the present research considered all these needs in the production of functional maternity apparel for pregnant women. High neckline designs and thick fabrics were rejected by pregnant women; this could be as a result of the weather condition of Lagos state and the fact that pregnant women sweat a lot. Cotton fabric was most preferred because of the absorbency property. This also agrees with Anwesha (2011) who opined that tight dresses during pregnancy contribute to sweat and heat. The use of cotton fabric in the present study is also in line with Prabir (2011) who supported that functional apparels should specifically be constructed using fabrics that are effective in meeting the specific needs of the wearer in attending to different activities.

Conclusion
Based on the findings of this study, the following conclusion was drawn:
The study has shown that the most predominant requirements for the functional maternity apparels were physical protection, socio psychological demands doming and doffing, modesty and fabrics and materials for designing the apparels. Since people have differences in what they like it is essential to determine what is needed before production. The two characteristics that governed the apparel design requirements of pregnant women were reflected in the choice of types of apparels, functional aesthetics and expressive design preferred by the pregnant women and the judges.

Recommendations
Based on the findings, the following recommendations are made:
1. The findings of this study should be made available to garment makers and apparel industries in Nigeria to encourage the production of smart, stylish and attractive designs that are functional, aesthetic and expressive for pregnant women's use based on the established design ideas obtained from needs assessment.
2. The summary of the functional apparel design requirements adopted in this study should be extracted and published to provide knowledge for students offering courses on garment design, clothing and textile, and their teachers in all the levels of institutions. This will aid in equipping them for creativity in garment designs with functionality in focus especially for pregnant women.
3. The functional apparel design requirements adopted in this study should form the criteria for ready to wear functional maternity apparels in different sizes and should form part of the anti-natal registration, kits for pregnant women in the maternity centres.
4. The apparel industries and manufacturers in Nigeria should use the apparel design requirements adopted in this study to prepare commercial patterns that can be used to mass produce functional maternity apparels for sale in markets and shops in Nigeria.

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