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Development of new supportive intimate clothing for plus size women based on somatometry

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KEYWORDS: *somatometry, supportive clothing, obesity, functionality, contour and innovation.*

ABSTRACT:The study aims at developing a set of supportive clothing for plus-size women, based on the somatometric measurements. Research has been conducted to explore as to how matured women are in buying clothes, their requirement for fashion, clothing, fit, brands and price. The concept has picked up further for specialised clothing line, where a specific set of clothes are made to perform certain functions, thereby supporting the physical and psychological needs of the wearer. These are termed as supportive clothing, which are designed with specific features. The work is inspired by the fact that there has been no much research done this area, where younger women suffer from uneasy and lack a confident self image due to obesity. Therefore, a study was designed to develop a clothing solution for working women who virtually experience obesity related issues and their specific measurements other than the usual measurements were considered for the study. An approach was developed to make supportive wear, which provided trimmed look and the contoured lines in the garment provided additional support and toned look to the body. The designing of the products were done in a scientific manner based on the somatometry study, understanding the landmarks and relative measurements necessary to develop effective patterns to counter the posture related problems, thereby supporting the look of the wearer. The technique used was primly based on pattern making, where a set of panels were introduced within the pattern to section out the pattern at required positions and to include specifically designed components to support the functionality of the wear. The newly developed wear was tested on the consumers, among the target customers of women age group 25 to 40 years. The product was assessed based on the parameters of functionality, comfort ability, design, fabric, overall performance and innovation. The customers were impressed by the new clothing line which imparted a toned look to their body dissipating the obese look. The positive response from the customers helped to explore the importance of relating the designing work with anthropometry which will provide better pedestal for successful design work. Apart from the works done in the areas of biomechanics and physiology, there is also a necessity to explore the possibilities of making use of innovative approaches in the areas of pattern construction, designing and subsequently the textile field.

INTRODUCTION

Essentially clothes have been the major area of research in the recent days. Owing to the fact that they form one of the basic needs of mankind, meant primarily for covering and protection, clothing has taken several shifts with the changing times. Especially, the women ready to wear sector has been witnessing vigorous changes due to the varying requirements and transforming role of women from time to time. A women's ward-

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robe is expected to fit and suit for any occasion, may it be a party wear, office wear, casual or a lounge wear. Research has been conducted to explore as to how matured women are in buying clothes, their requirement for fashion, clothing, fit, brands and price. The concept has picked up further for specialised clothing line, where a specific set of clothes are made to perform certain functions, thereby supporting the physical and psychological needs of the wearer. These are termed as functional clothing, which are designed with specific features. The present study is aimed at developing a set of contoured innerwear for working women, based on the somatometric measurements (Somatometryis a systematized technique to measure living body including head and face. The measurements are of different kinds like linear measurement, girth measurement, skin fold measurement, weight measurement)(1)(2). The work is inspired by the fact that there has been no much research done this area, where younger women suffer from uneasy pain at the back due to their long hours of work in the same posture. This has been a concern and many women have been advised to put on an abdominal belt which is not desirable and comfortable because of its obvious looks and the uncomfortable feeling. Therefore, the study was designed to develop a clothing solution for working women who virtually experience low back pain and stiffness due to posture related issues and their specific measurements other than the usual measurements were considered for the study. An approach was developed to make contoured corset styled upper torso inner wear, which provided sufficient back support and the contoured lines in the garment provided additional support and toned look to the body. The designing of the products were done in a scientific manner based on the somatometry study, understanding the landmarks and relative measurements necessary to develop effective patterns to counter the posture related problems, thereby supporting the body of the wearer(3). The technique used was primly based on pattern making, where a set of panels were introduced within the pattern to section out the pattern at required positions and to include specifically designed components to support the functionality of the wear(4, 5, 6, 7). It also included the art of manipulating the darts yet maintaining the fit of the wear. The newly developed torso wear was tested on the consumers, among the target customers of women age group 25 to 40 years(8,9,10). The product was assessed based on the parameters of functionality, comfort ability, design, fabric, overall performance and innovation (11, 12). Post pregnant women and mothers were more benefitted by the innovation, which remarkably supported their back from getting into poor postures while on work (13, 14). Also, they could overcome the obvious look of wearing a supportive inner wear. The positive response from the customers helped to explore the importance of relating the designing work with anthropometry which will provide better pedestal for successful design work. Apart from the works done in the areas of biomechanics and physiology, there is also a necessity to explore the possibilities of making use of innovative approaches in the areas of pattern construction, designing and subsequently the textile field(15, 16).

METHODS/EXERIMENTAL

Materials

The basic pattern making tools, pattern paper, tracing sheets, muslin fabric and the cutting equipments were used. Measuring tape was used to derive the body measurements of the wearer. Also, functional trims like Velcro tapes, wadding materials, sponge sheet, fusing, lining and fusible interlinings were used. A standardised dress form of size 34 was used for the fit assessment. 100% cotton pres shrunk fabric in white colour was

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used as the shell fabric to make the torso wear. Steam press was used to flatten the toile.

Methodology

Pre-survey

A pre-survey was conducted to understand the prevailing issues related to posture and the intensity of the pain and its occurrence pattern. As a case study, working women who were software professionals and bank employees were approached. 10 women were considered, who complained about back pain and discomfort in using abdominal belts. Their working hours, pattern of work, sitting posture, type of seat and their clothing styles were assessed.

Pre-Assessment

After an in-depth assessment of the factors related to work and clothing styles, a detailed research was done to understand the reasons for back pain, its nature, symptoms and severity, in consultation with a physiologist along with the primary data of established fact that wrong posture would lead to low back pains and discomfort in working women. Further, efforts were made to understand the usability of abdominal belts, highly elasticised lingerie, wired and mechanically supported wears. It was explored that these wears caused lots of discomfort, cramps in the muscles, irregularities in blood circulation and off-shaped look in certain areas of the body when worn. It also hampered comfortable movement of the body when worn.

Design Process

The design process was more logical than being artistic. A few quick start sketches were made, keeping in mind the need of the wearer. The challenge was to maintain the look of the wearer even after wearing the inner wear, to support their posture intended problem. The design process was based on the *somatometry*, where minute details of the body of the wearer was considered by measuring them physically, using a non-stretchable measuring tape.

Design Development

Further, the designing process was more tedious as the limitation was that the product was an inner wear and the basic concern was the comfort and practicality of the design. Three inner wear designs were finalised for production. The design featured usage of panels or sections within the garment at predominant locations, style lines eliminating the traditional darts,

Production process

Pattern generation - Based on the designs developed, a set of basic and specific body measurements were taken. These measurements were recorded in a systematic way. The relativity of the measurements were checked using the *scale system* to decide an approach for pattern construction.

Pattern adaptation - A set of standardised bodice blocks were constructed with their size ranging from medium to large. These patterns were adapted to 3 different styles of wears, as per the finalised designs. The adaptation process included elimination of basic darts, inclusion new style lines, panels and supportive components. The final pattern for production was included with seam allowance, necessary ease, style lines and cutting lines. All the important lines were marked to guide the cutting and sewing activity.

Components preparation

All the necessary components of each style were cut in shell fabric as well as the lining and interlinings. The important marks, notches and abbreviations were included for sewing reference.

Sewing process

The sewing process was a complex one with many intermediate steps of preparation of components and linings. Care was taken to assemble the components following the pattern instructions. At every stage the components were steam pressed to clear wrinkles. The seams were selected to conceal raw edges to avoid fraying and the bulkiness which would have caused in case of

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using over lock or overcast stitches. The sewing focused on keeping the assembled components and the seams line flat.

Fit test

Before the final finishing and seaming, the intermediate stitched garment was draped on the dress form to check the fit. The positioning and the accuracy of the pattern and the sectioned panel lines were checked. The expected fit and support element was evaluated before the final finishing.

Finishing process

The inner wears were trimmed, pressed and neatly packed for the final presentation to the wearer.

Product presentation

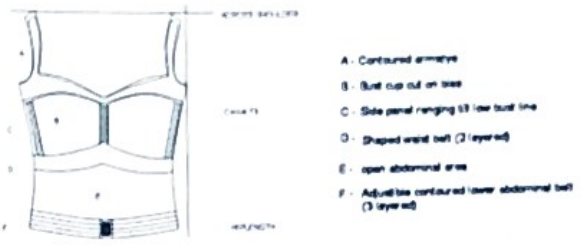
The three newly developed innovative inner wear for the upper torso for working women was ready for the trial. The target customers were given the inner wears and were asked to wear it on consistently for a week's time during the working hours.

Customers feedback

All the 10 ladies who were experiencing the back pain, shoulder pain and pain along the midriff used the new set of inner wear for a week's time and gave the feedback. The customers gave a feedback that, there was a noticeable reduction in the pain, the inner wear was very supportive and stiff yet flexible with necessary ease, the contour of the body was not distorted in spite of using the inner wear, the comfort ability of the wear was good, due to which it could be worn for longer hours and the fabric was soft and absorbent which was an advantage as an inner wear.

RESULTS AND DISCUSSION

Supportive wear 1



Front - The front part shows a deep cut neck with deep arm scye. The narrow shoulder strap is supported with lining. The bust part is cut on bias for a better stretch and reinforced with rows of parallel seams. A lower bust belt was used to provide additional support and the side panels were designed with a set of tucks which was also a means of support at the bust. The lower part of the garment is attached with a waist belt with velcro designed to provide support at the abdomen.

Back - Back is designed with a yoke at the shoulder, worked with a set of parallel tucks. The tucks were used to provide stiffness and required contouring. The yoke carries a pair of horizontal fabric straps for support. The lower portion was divided into 3 sections, the centre panel, which was wadded, was reinforced with parallel seams and the side panels were designed with tucks. A row of loops for interlacement of chord was designed along the centre and side panel line t provide stiffness along the centre back and sides.

Supportive wear 2

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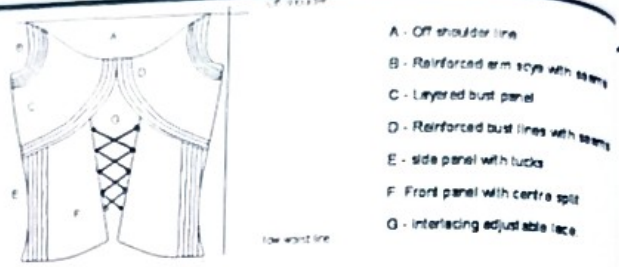
Front - The design had a deep cut neckline with flat and narrow shoulder straps. The bustier had a diagonal cut forming a 45 degree angle to support body relaxation at the bust area when worn. A set of parallel seams were constructed as reinforcement. The low bust line was also reinforced with additional seams. The side panels were worked with a set of parallel tucks to provide stiffness along the sides. The abdominal component was kept flat and rigid by controlling with parallel seams. At the hemline a fabric belt was designed, provided with elastic for stretch and firmness.

A - Deep cut arm scye
B - cross over fabric straps
C - adjustable fabric belt 1
D - adjustable fabric belt 2
E - side panel with tucks

Back – The back part had a crossing fabric straps at the shoulder area starting from across back towards the shoulder, to provide stiffness at the back. A pair of fabric bands was introduced along the side seam line to act as a supportive element for the centre back.

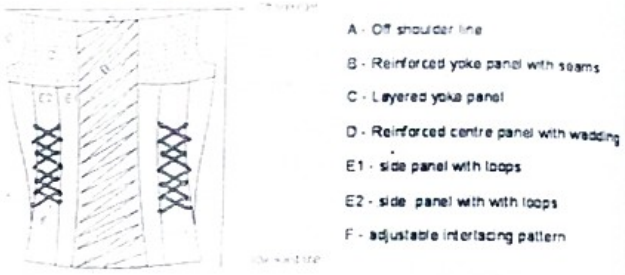
Supportive wear 3



A - Off shoulder line
B - Reinforced arm scye with seams
C - Layered bust panel
D - Reinforced bust lines with seams
E - side panel with tucks
F Front panel with centre split
G - interlacing adjustable lace

Fig : 5 FRONT

Front – It was a off – shoulder pattern, designed with two shaped bust components, reinforced at the armhole and along the bustier line with a set of parallel seams. The side panels were designed with parallel tucks for additional support along the sides and an uneven opening along the centre front with an interlacing closure.



A - Off shoulder line
B - Reinforced yoke panel with seams
C - Layered yoke panel
D - Reinforced centre panel with wadding
E1 - side panel with loops
E2 - side panel with with loops
F - adjustable interlacing pattern

Fig : 6 BACK

Back – The back part was designed with a yoke at the shoulder, across with a panelled lower section. The centre panel was wadded and seamed with zig-zag seams, to provide better support along the CB. The side panels were interlaced along the sides to contour and firm the back with support.

The innovative use of panels, style lines, tucks and seams created a remarkable difference in the strength of the garment components, thereby supporting the anticipated function of the garment.

The supportive garments were evaluated for their performance in the areas of concept, design, innovation, fit & performance and comfort ability, which was plotted in the following graphs.

Design

Graph - 1

Concept

Graph - 2

Innovation

Graph - 3

Fit & Performance

Graph - 4

Comfort ability

Graph - 5

Conclusions

Somatometry based designing of supportive inner wear for working women gave remarkable results sufficing the functional properties of the wear. These studies are recommendable to design such speciality clothing which can be a parallel therapeutic option versus the biomechanics and physiology based solutions. Also, innovation in pattern design can be a significant tool in countering such challenges in apparel designing.

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