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Author: N.H.D.S.S.Yapa, Dr.R.K.Jayamali De Silva

(University of Moratuwa, Sri Lanka)

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DEVELOPING A "READY–TO–WEAR" SAREE BLOUSE USING APPROPRIATE FABRICATION AND PATTERN CUTTING METHODS

[1]N.H.D.S.S.Yapa, [2]Dr.R.K.Jayamali De Silva

[1,2]Department of Textile & Clothing Technology, University of Moratuwa, Sri Lanka

[1]sachideshika@gmail.com, [2]jayamalide@gmail.com

ABSTRACT

"Sareeya" is the commonly used office attire and & occasional wear in Sri Lanka. However, inaccurately fitted saree blouse is a significant problem. Therefore, it is essential to improve the fit of the saree blouse. The existing problems of saree blouse were identified using an online questionnaire. This study explored various methods of developing the saree blouse and presented reasonably accurate product using pattern cutting techniques and the correct raw material selection. The secondary research was carried out to examine, relevant shapewear techniques in the current market and new inventions. In addition, shop visits were used to investigate the drawbacks of ready-to-wear saree blouse which are currently available in the market. Therefore both quantitative data & qualitative data were used for final analysis. In addition experimental research method carried out for fulfill final outcome. All the findings were used to design the experiments to develop the proposed saree blouse based on right selection of raw materials, pattern cutting methods and proper construction methods. Triple cut saree blouse style was selected as the core style. Final samples constructed according to experiments and made subjective wearer trail as a validation. Ease, the number of wrinkles & seam line deviation were the criteria that have scored.

It was revealed that interesting pattern cutting techniques that can apply to enhance the fit of the saree blouse. This study can develop further to find out more advanced methods to improve the fit, however the final product outcomes need to be validated with the cost of manufacturing.

Keywords – Experiments, fit of the saree blouse, pattern cutting techniques, raw materials, subjective wearer trial

INTRODUCTION

Clothing is a symbolic expression of non-verbal communication in modern society. According to Sharma, Agrawal, & Pathak (2014) costume is an important adjunct of personality. In Sri Lanka "Sareeya & Ohoriya" are the conventional attires that exhibit the social stratification. With modern influences, contemporary saree drapings expose sensual women body curves & the femininity. Both, six to nine yards of fabric piece and saree blouse give comparatively equal contribution to enhance natural contours of the female. The correct fit-on of saree blouse is a kind of body-fitted upper garment that covers the upper body & gives a slim and sleek shape to the feminine body contour. But it have been difficult to find correct fitted ready-to-wear saree blouse within Sri Lankan market.

Due to wide variety of body shapes and sizes, it is difficult to achieve correct fit as a ready-to-wear garments. Therefore fit problems continue to be an issue for apparel manufacturers without clear solutions.

A comfortable fit consequently makes confidence inside the wearer. The visual appearance of any garment is directly affected by the characteristics of the fabric in which it is made (Aldrich, 2012).A single design looks differently due to the variety of its raw materials.

Only few published literature exists with regards to the product named saree blouse. Since saree blouse is a body fitted garment, it compresses the body. Technically the purpose of wearing shapewear garment similar to the objective of wearing saree blouse. Shapewear has been used as foundation garment, it does not feel comfortable. Every single technique in shape wear stayed to be appear slim and sleek by compressing the body, sculpting it into a particular shape. Shape wear with firm and medium compression are best worn for only few hours because it provides powerful control to specific areas squeezing the wearer's body and restricting blood circulation. If shape wear is too restrictive, wearer may have trouble in breathing properly. (Kumanayake & Vithanage, 2017).

Therefore this study investigates the techniques of shapewear garments and apply those into saree blouse without any discomfort.

The primary outcome of this research was to introduce well fitted saree blouse using novel pattern cutting techniques as well as the appropriate raw materials. Firstly, this study depicts existing drawbacks which are related to saree blouses & identify the relevant areas to improve the product. Then Questionnaire was emailed to the relevant audience to examine significant issues with reference to saree blouse. Consequently, this study investigates the pattern cutting techniques of shapewear garments which can be used to enhance the body shape construction. And then select appropriate fabrication to develop proposed ready-to-wear saree blouse. After collate all the findings and experiments to check the fit of the product for the purpose. Finally, this study develop fit of saree blouse without any discomfort or any health issue to wearer. Therefore, the contribution made here has broad applicability. Moreover, this product will improve the morale of the wearer of traditional "Ohoriya & Sareeya" among Sri Lankan women in the future.

LITERATURE REVIEW

By the way modern Sri Lankan women more intended to wear ready-made saree blouses because of their busy life style. It saves their money, time and help to build self-confidence. The traditional saree blouse has short sleeves and a low neckline in front and back that is designed to support and mold the soft tissues of the upper female form (Varghese & Thilagavathi, 2012). However fit of the saree blouse founded as major concern (Ukalkar, 2008). This study intends to identify the issues of fit of saree blouse & develop this product to achieve the accurate fit. The fit of a garment is like a relationship between the body & the garment. The poor fit in a garment is due to the wrong measurement between any back and front length and width. The garment should lie smoothly on the body without any stain or gaps caused by excess fabric (Minott, 1991) as cited by (Varghese & Thilagavathi, 2012).

Shapewear and its construction methods were studied at the beginning of this research as of the product similarity. Shapewear generally refers to undergarments designed to control the wearer's body shape into a desired form. Typical materials used in shapewear include elastane, polyamide, latex, etc. These materials are used because of its elasticity to provide a compression. In other words, because these materials are elastic, shapewear garments can be made to be tight fitting and restrictively hold the wearer's body into the desired shape.

Common garments used as shapewear include bodysuits, brassieres, corsets, control underwear, etc.(Conde & Conde, 2014).

Shape memory materials such as shape memory polymer, shape memory alloy have qualities to deform when cold but return into pre-deformed shape when heated. Fabrics & accessories which have these qualities can use restore from deformed state back to the previous shape when induced by a specific temperature or pressure. According to Conde & Conde (2014) this techniques aid in the lifting and supporting breasts as well as other targeted areas of body. Anvaripour & Monica (2012) proposed a garment which has diamond shape area on abdomen .See fig 01, it explained this diamond shape work as a guard for providing support and flattering the stomach. It has three layers of mesh on heavy duty performance fabrics, which is use as base fabric. Top layer of mesh layers cut approximately 40% smaller than other layers of stomach guard because when it sewn to the garment it will pulls & flatten the stomach. There are three bands around the body contour and upper band support to lift the breast, middle band wrap around the hips and connect to the stomach guard to provide support to "love handles" which are besides of the waist. Third band connected stomach guard to shape and slim buttocks. Power mesh which is around back helps to reduce back fat and smooth bulges caused by bras. Performances of power mesh helps to reduce lumps and irregular shaping of the body. Zigzag stitch used to give extra strength, durability and flexibility.

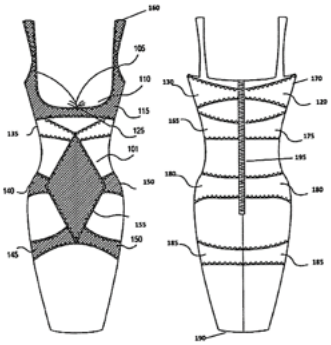
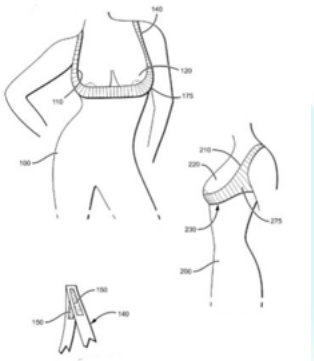


Figure 1- illustration of a garment reprinted from GARMENT FOR PROVIDING BODY SHAPNG (Anvaripour, K.2012)



Fi m BODY GARMENT AND SHAPEWEAR DESIGN AND METHOD OF USE (Noel, n.d.)

Noel (n.d.) contemplated a shapewear garment which comprise sleek nylon-spandex threads that can worn under a multitudes of clothing & styles. It has described as a second skin which has high compression to slim the body for those who desire an even tighter appearance. In figure 02, comprise straps that are knitted with a gentle yet supportive weave. Those straps are thin due to prevent bulk & wide to prevent cutting into shoulders. The shoulder straps are positioned with an inward design which can prevent being seen when worn a sleeveless garment. Trimmed upper areas of shoulder straps to perform as shelf bra that can be easily tucked under the lower seam of a separated bra. A band which is goes under shoulder straps gently woven as a support. This multi-purpose, complex design allows the shelf bar to fit comfortably into a bra, or to support the breast when not worn a bra.

It is natural to visible skin flabbiness and wrinkles around upper arms and

forearms due to muscle aging & excess weight. Thompson (n.d.) contemplated some ideas to overcome from that issues.

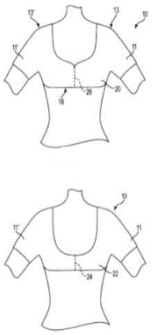


Figure 3-illustrate front and back views of a Women's sleeved under/outer garment, according to an embodiment of the present invention reprinted from (Thompson, n.d.)

This invention can wear as an either outer wear of inner wear. Sleeves of this contemplated garment can be attached or removable.in figure 03, area 20 which is made with elastic material comprise the breast instead of wearing separate bra, and also there is a foam cup to give lifting and desired shape. Sleeve area also made from similar material. But sleeve can be short or long as requirement. Sleeves fitted around arm to get sleek look. Shoulder areas made with same elastic and tight material due to comprise that area by creating sleek, fitted look. But as the requirement can be change the material. In addition shoulder section provide additional support to conventional bra to prevent slipping off the shoulders of the wearer. Lower midriff edge positioned according to desired shape. If it is placed just below the bust line it will give a snug fit over conventional bra. Lower midriff may be positioned lower to minimize undue bulkiness of torso. Thompson (n.d.) derived some other contemplated ideas from this core idea.

Figure 4- illustrate front and back views of another embodiment of the present invention including decorative sleeves (Thompson, n.d.)

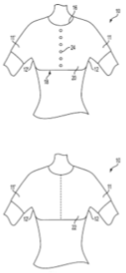


Figure 5-illustrate front and back views of yet another embodiment of the present invention including tight fit under-arm regions. (Thompson, n.d.)

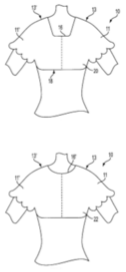


Figure 6- illustrate front and back view of yet another embodiment of the present invention including a multiple material covering (Thompson, n.d.)

Today, as result of development of technology shape wear is combined with different compression levels to achieve desired shaping results. Different techniques such as seamless technology, advanced pattern cutting techniques and advanced materials are used. Not only using body compression methods but also combine with body enlarging methods such as applying silicone form, pads help to fulfill different requirements and reach perfect body shape.

According to Conde & Conde (2014) , one drawback with traditional shapewear is that the garments are intentionally made to be tight fitting, by providing over all compression to accomplish the shaping goal. However, this makes the garments difficult to wear. It can be a struggle to even get into the garment itself. The underwire are typically rigid and tend to dig into the body of the wearer, and as a result, may be very uncomfortable for a wearer. & also (Morosini, 2016) described that wearing garments which are compress our body for long time may cause to health issues.

In addition Stretch is a most important property of textile that can contribute to wearer comfort. The stretch yarn and fabrics are widely used in last few years all over the world because of their shape retention properties.

Drapability of fabric decided the placement of the seams of the garment. The drape coefficient was greater on samples with seams than samples without a seam (Varghese & Thilagavathi, 2012).

Moore (1992) as cited by (Varghese & Thilagavathi, 2012) described fabric grain alignment is one of the most important factors to consider when analyzing a garment's fit and drape. Varghese & Thilagavathi (2012) revealed that warp grain received a higher rating from wearer trail and gave better fit with fewer wrinkles, the saree blouse material with higher thickness, weight, and cover factor draped well through the body corners and gave better fit to the wearer. Lightweight blouse materials show more wrinkles and seam line deviations in blouse and affect the fit of the blouse.

McKinney et al. (2012) developed a model to study the relationship of the human body to the garment. According to that model fit evaluation with objective measurements involves space between the body and the garment. The subjective measure is studied by analyzing the observer's perception of the garment fit and wearer's perception of how the garment fits (Varghese & Thilagavathi, 2012).

Research Approach

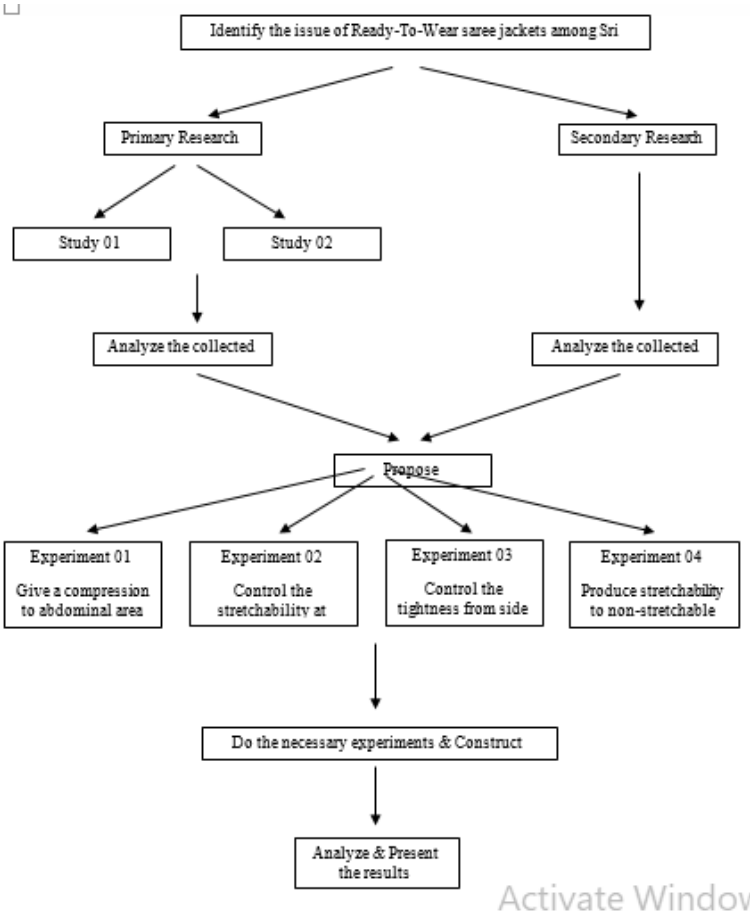


Figure 7-Research Process

Study 01 – Questionnaire survey

Initial survey was carried out to identify research gap. It revealed existing issues relevant to the saree blouse. The questionnaire was distributed via social media among working & non-working women who are in the 20-60 age range, living in the western province. Data received from 100 participants.

Table 1- age range of sample

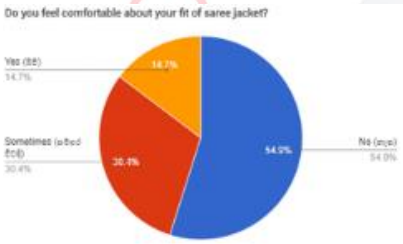
Age range	Sample size
20-30	59
31-40	25
41-50	15
51-60	3

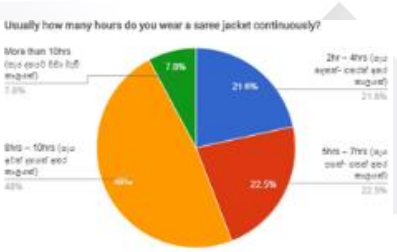
Table 2 -occupations of sample

Occupation of participants	Sample size
Undergraduate	27
Educational	46
Creative industries	6
Business & financial	8
Healthcare	3
Engineering & manufacturing	10

The highest number of responses received from teachers who are in the age limit of 20-30. Therefore, that sample was referred when designing the experiments.

According to the survey results, majority of women were not satisfied with fit comfort of saree blouse & 48% women wear saree for more than 8 hours.





Too tight, rolled-up the waist line, shoulder fallen down, not having accurate bust shape, bust point not in accurate point, underarm wrinkles, too tight, poor posture, skin irritations, back pain, neck pain, shoulder are the issues found from investigation. The majority of women (22%) suffered from the tightness of the saree blouse due to the fact of its being a tight-fitting costume.

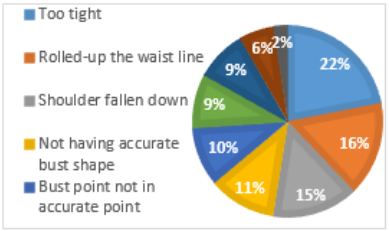


Figure 10- Problems due to incorrect fit of the saree blouse

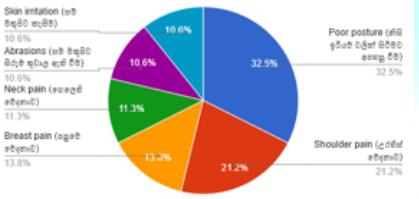


Figure 11-Prolonged issues due to fit of the saree blouse

Due to the difficulties mentioned above, customers faced prolonged health issues such as displayed on (fig.7). 32.5% of women faced the issue of poor posture. Therefore, this study intends to develop a saree blouse to overcome those issues.

Study 02 – Product survey

Product survey were carried out to explore existing shapewear products and its construction including fabrication. High street shops in Sri Lanka was selected for the Product survey and branded export quality products also reviewed at the manufacturing organizations. Products were reviewed for its construction and raw materials.

Analysis of existing shapewear garment techniques

Table 3-Analysis of data gathered from shop visit

PRODUCT CODE		01 – shapewear for upper body (covers the breast & it look like a bra which have extended up to waist line		
MATERIALS		• Elastics (different widths) • Stretchable fabrics • Non-stretchable fabrics • Lace • Stabilizers	• Rings and slides • Plastic bones • Hook & eye • Strap elastic	
FASTENING METHOD		Hook and eye		
STITCHES	STITCH TYPE	zigzag (this stitch type used at stretched areas of garment)	Flat lock (this stitch type use at stretched areas but it has more secure than which has used zigzag	Double needle (type of lock stitch)
	USAGE	• Neckline • Underarm • Attached strap elastic ,hook and eye	• Attached bottom band to waist line (give extra length to garment)	• Used for attach all pieces (because at side seams do not need to stretch just need to fixed the shape from that places)
TECHNIQUES		• Used 2" wide elastic as a bottom band – it gives more support to lift and shape the abdominal areas. • Used plastic bones at side seams – it gives extra lifting and shaping. • Front panel divided into 14 pieces symmetrically, according to body shaping control zones (each side has seven panels). • Used different type of lining fabrics according to the areas which need to shapeup. • Used wide strap elastics to give extra strength to lifting the breast. • The elastic which are used to neckline and underarm also wider than normal bra usage. • Used hook and eye with two stripes of adjustable. • Combine two layers in the areas which need high shaping like belly area (as here fuse the lace fabric to control stretchability of base fabric). • Attached tape using cover seam method to cover all the seams.		

PRODUCT CODE		02 – shapewear for upper body but doesn't cover the breast (coverage start under the bust line)			
MATERIALS		• Power mesh • Lace • Elastics • Plastic bones • Hook and eye			
FASTENING METHOD		Hook and eye			
STITCHES	STITCH TYPE	Zigzag	Overlock	Flatlock	Double needle
	USAGE	• Attach bottom band, elastic hook and eye,front lining layers,back lining layers to base fabric • Neckline & underarm	• Shoulder attachment • Attached front and back panels together	• Attached front panels together	• Fortitude attachment
TECHNIQUES		• Used 1.5cm width elastic at the waistline. • Used bones at the back, it helps to shape the back extra fat & help to lift them. • Attached fortitude to side seams give extra tension. • For requirement of high body shaping parts used double layers of fabric. • Hook and eye-six rows, six adjustable (this technique helps to increase the durability of garment). • According to body shape control areas attach liner fabric in same as base fabric at the back and use zigzag stitch to attach them. • Neckline & armhole covered using piping. • Bottom band fold and turn over. Then attach elastic using zigzag. • Front panels assemble using both flatlock and zigzag. • Front and back panels attached using overlock at side seams. Then cover it using fortitudes.			

PRODUCT CODE		03 – Shapewear for upper body (Attached a hook and eye at gussets.)		
MATERIALS		• Knit fabric • Lace • Power mesh • Elastics • Covering zipper • Hook and eye • Zipper – at center front • Hook and eye – at center front and gussets		
FASTENING METHOD		• Zipper – at center front • Hook and eye – at center front and gussets		
STITCHES	STITCH TYPE	Flatlock	Lockstitch	Double needle
	USAGE	• Attached front, lower panels	• Attached back panels,front panels at side seams,back panes at center,hook & eye and zipper,lining at the back	• Attached upper parts of front panel
TECHNIQUES		• This garment has enhanced different shaping areas than previous garments. • Used different type of fabric as base fabrics. It looks like a knitted fabric & also used lace and power mesh as lining. • Used covering zipper as a fastening method of front base layer. For underneath layer used hook and eye as fastening method (different fastening methods used at same place). • Neckline, underarm and leg whole edges covered using piping. • There is an elastic at the center back. It has attached using zigzag. It seems base of back panel separately attached at the center back and attached elastic on the seam of it. • Used flatlock stitch at the lower parts of front panels, upper parts attached using double needle stitch. • Overlock & attached gussets to upper body parts of garment. Hook and eye attached to gussets. • Lining done using mesh fabric and it has attached using zigzag.		

PRODUCT CODE		04 – Shapewear for both upper & lower body (all in one garment)			
MATERIALS		• Power mesh • Knit fabric(looks like a t-shirt fabric)used for piping) • Lace			
FASTENING METHOD		Hook & eye			
STITCHES	STITCH TYPE	Zigzag	Flatlock	Lockstitch	Double needle
	USAGE	• Attached bottom band,hook and eye,lining,elastics,piping	• Attached front lining	• Side seams	• Attached fortitude,bones
TECHNIQUES		• In front of the garment there were two layers. The top layer covers only upper body and use hook & eye as fastening method. It seems it'll give good support to shape up the body. • There are bones align to rib cage. It helps to shape the belly area. This top layer fully lining with the same fabric. At the waist line there was an elastic which has attached as a bottom band. • Second layer was start at the under bust line & it extended as a short to shape the lowest body. • It has used lockstitch at the side seam & attached elastic to cover that seam. • At the center back there is an elastic. • There was a zigzag stitch along the shape of buttock area to enhance that shape & attached elastic using zigzag to panty lines of back. • Neckline, armhole finished using piping.		

PRODUCT CODE		05 – Shapewear which covers only belly area		 
MATERIALS		• Knitted elastics which have plastic fibers • Plastic bones • Woven elastics • Velcro tapes • Knitted fabric		
FASTENING METHOD		Velcro tape		
STITCHES	STITCH TYPE	Lockstitch	Zigzag	
	USAGE	• Attached woven elastics velcro tapes,additional stripes • Stitched the divided front pieces together	• Covered the edges using piping	
TECHNIQUES		• It has used knitted elastic which has mixes plastic fibers. This elastic doesn't narrow when it stretched. Therefore, the durability of this garment comparatively higher. • There are woven elastic straps and additional strap attached at center back. Woven elastics attached in same distance in vertically. It gives more support to lift excess of fat. The additional straps can stretch as consumer's favor and fastening using Velcro tapes. • There are removable semi-rigid plastic bones at the back of garment, it gives or strength to lift the back muscles. • Edges covered using knit fabric as a piping.		

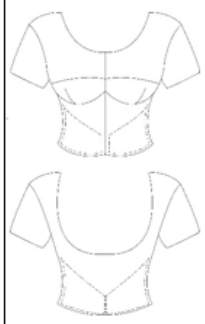
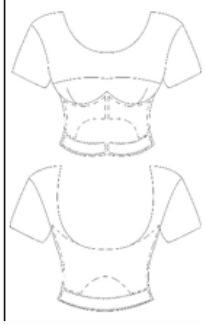
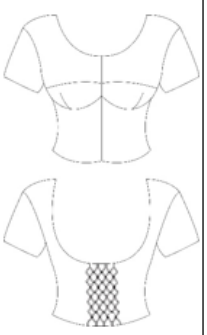
Advantages & disadvantages of existing ready-made saree blouse & tailor-made saree blouse

Table 4-anaysis of existing ready-made saree blouses and tailor-made saree blouses

	Advantages	Disadvantages
Ready-to-wear saree blouse   	• It has comparatively low price. • Can use it right away after buying. • Available on online stores. • Save time spent on construction as in case of tailor-made saree blouse.	• Sizes are standardized and with a limited fit. • The garment cannot be customized. • Fabrics are not always of the best quality. • Fit is not satisfied level. It showcase belly fat, back fat clearly.
Tailor-made saree blouse   	• It has perfect fit. • It can be completely customized. • Can be use quality materials. • Can be highlight personal style.	• Must go to a tailor. • Waiting time is often very long. • Numerous refinement meeting are needed. • The price is rather high.

Proposed Experiments

Table 5-Explanations of experiments

	Product design sketch	Expected outcome	Inspiration
Experiment No. 01		• Reduce appearance of belly area & back fat using different accessories such as power mesh	• "Garment for providing body shaping"- research paper by (Anvaripour & Monica, n.d.). • Shapewear product review
Experiment No. 02		• Control extra stretchability of fabric in certain areas blouse while shaping the body • Give extra stretch at waist line to prevent rolled up issued.	• Shapewear product review
Experiment no 03		• Shape up the body using both stretch fabric & non-stretch fabric & it control the tightness issue of saree blouse	• "Handle and Comfort Characteristics of Cotton Core Spun Lycra and Polyester/Lycra fabrics for application as Blouse"- research paper by (Varghese & Thilagavathi, 2012) • Shapewear product review
Experiment no 04		• Give stretchability to saree blouse using non-stretchable fabric	• "Designing of functional sari blouse for arithmetic women"- research paper by (Ukalkar, 2008)

Development of the saree blouse

Material aspects

Through the questionnaire able to find out what is the most preferable fabrication use for a saree blouse.

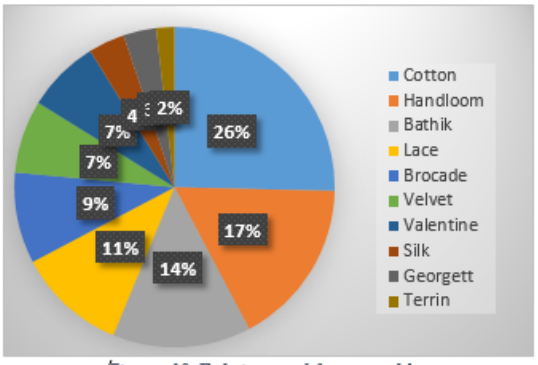


Figure 12-Fabrics used for saree blouse

(Varghese & Thilagavathi, 2014) described, Stretch is often the most impotent property of a textile that contributes to weather comfort. But it is difficult to get stretchability from 100% cotton fabric. It gave the influence to go for the stretch cotton.

From advance pattern cutting techniques supposed to achieve slim & sleek appearance & to go to apply shapewear techniques to saree blouse. Stretchability is the main requirement for shapewear.

As a final result, 100% pure cotton, stretch cotton (cotton 97%, spandex 3%), knitted polyester fabric (polyester 80% spandex 20%) have chosen as experimental fabrics.

Pattern design & Garment construction

The response of the questionnaire showcases what is the most preferable saree blouse style (fig.9) Therefore, chosen the triple cut style as the core style & use the basic pattern of this style to cut panels. Hook & eye used as a closer method.

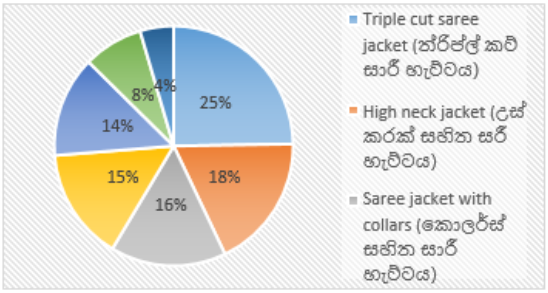


Figure 13-Most wearable saree blouse styles of saree blouse by consumer

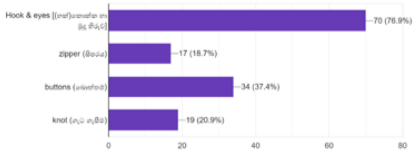


Figure 14-Most preferable closure methods

UK size 12 was chosen as the desired size criteria. Standardized UK size 12 dummy measurements are shown in the following table.

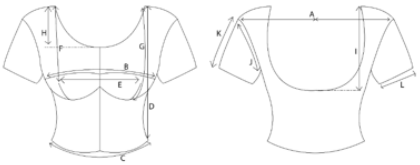


Figure 15-Body dimensions

Table 6-Measurement table

	Description	Measurements (inches)
A	Shoulder length	15
B	Circumference of bust	34 ¼
C	Circumference of waist	26 1/8
D	Blouse length	15 ¼
E	Distance between bust point	7 ¼
F	Shoulder to bust point	9 ¼
G	Shoulder to under bust	12 ¼
H	Front neck depth	6 ½
I	Back neck depth	9
J	Armhole circumference	17 3/8
K	Sleeve length	5
L	Sleeve open	11 ¼

Pre-Product Planning (mock ups)

Before the experiments it has done some mock ups to select best methods which are going to apply from each experiment.

Table 7-Pre-product experiments

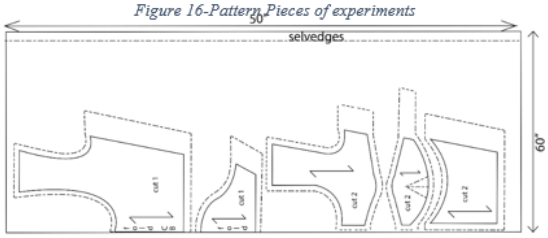
Knitted polyester fabric used as base fabric. Power mesh used as lining fabric.		
		
Both base and lining fabric in same size.	Lining smaller than ¼ inches than base fabric.	Lining smaller than ½ inches than base fabric.
• No wrinkles • Control the stretchabily from power mesh • Smooth fit	• Slight wrinkle on base fabric • Perfect fit • Give extra tightness due to the smaller lining	• Wrinkles clearly visible • Comparatively too tight
Stretch cotton fabric used as base fabric. Power mesh used as lining fabric.		
		
Both base and lining fabric in same size.	Lining smaller than ¼ inches than base fabric.	Lining smaller than ½ inches than base fabric.
• comparatively fit it smooth than polyester base	• Tight but not too much • Slight wrinkle	• Too tight than others • Wrinkles clearly visible than other samples
Elastic which have 1 ½" wide (made using plastic fibers)		
		
Attached elastic using lockstitch.	Attached elastic using zigzag.	
• Break the stitches easily	• Give excess ease to stretch without any breaks	
Control extra stretchability at certain areas using fusing		

		
One layer of fusing paste on stretch cotton.	Paste Two layers of fusing.	Attached two layers of stretch cotton fabrics which have separately paste one layer of fusing in each stretch cotton layer.
• Control the stretchability but pasted fusing has torn easily.	• Too tight and the area which has not fusing didn't perform well as stretch fabric.	• Two layers gave extra strength and it was not torn.
Try smoking methods to get stretcgability from non-stretchable fabric		
		
Smoked using elastic thread.	Smoked using honey comb smoking method.	
• It was difficult to finish the edges.	• Comparatively have more fabric excess to be stretch	

Lay plan of the core pattern pieces.

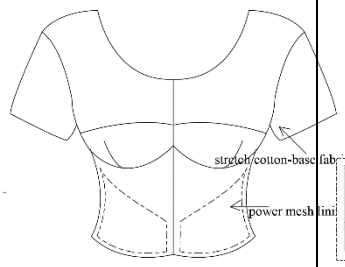
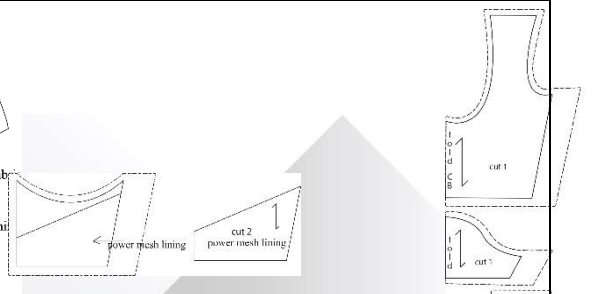
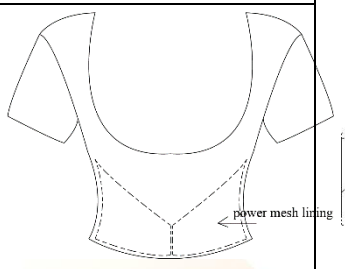
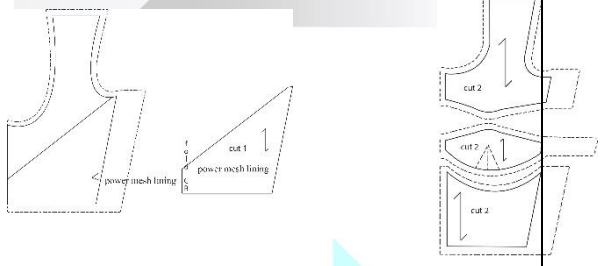
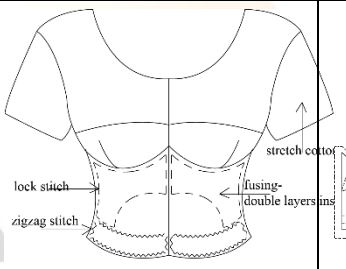
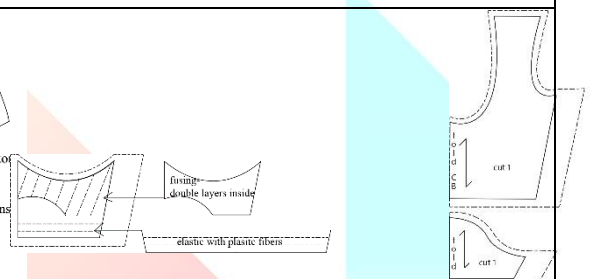
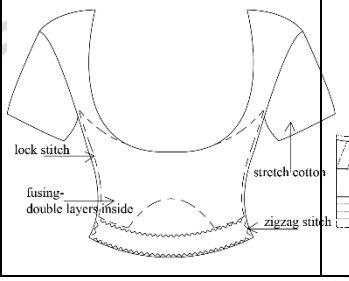
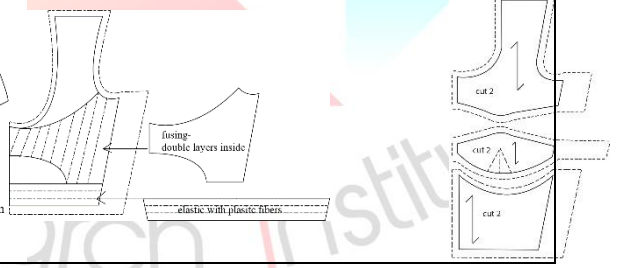
This is the lay plan of triple cut saree blouse pattern pieces which was use for the experiments

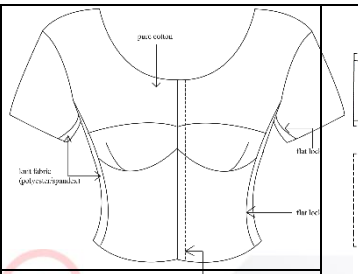
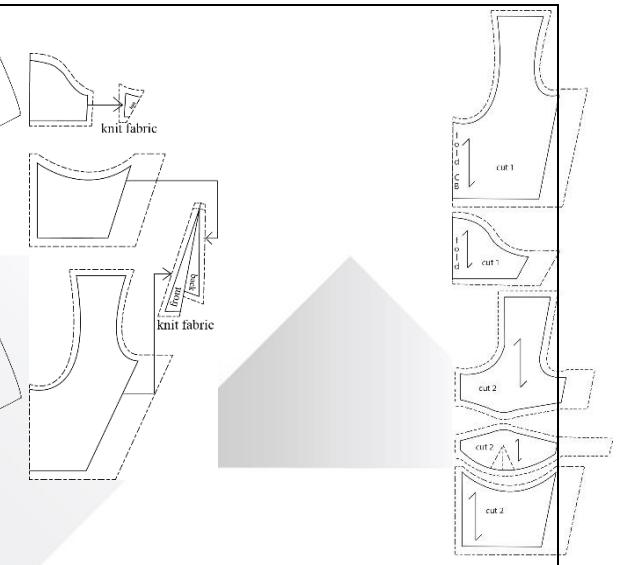
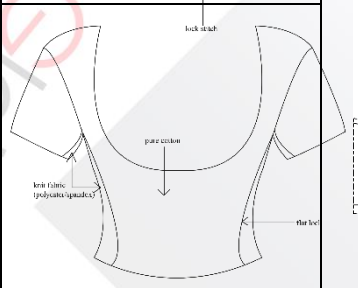
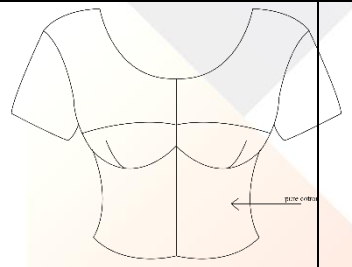
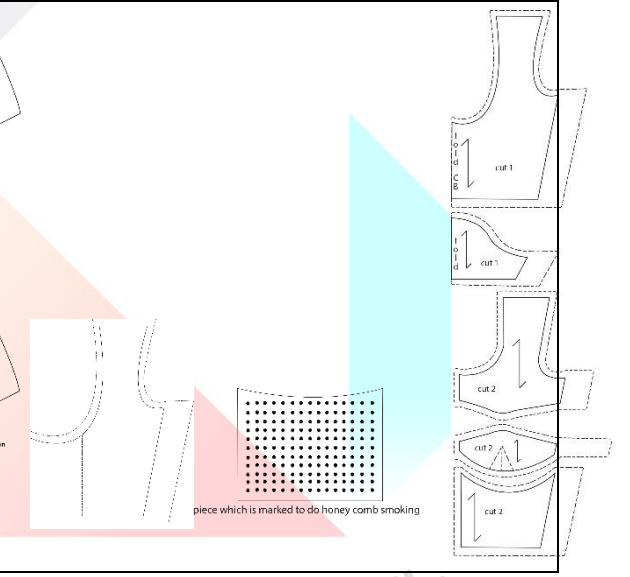
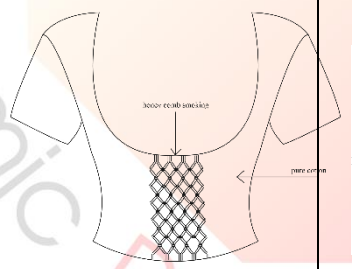
Figure 16-Pattern Pieces of experiments



The table below describes the alternations which have done for core pattern pieces in each experiment & visual analysis of predicted experiments.

Table 8- Lay plan for each experiment

	Illustrated embodiment	Pattern pieces
01 Front		
Back		
02 Front		
Back		

03 Front		
Back		
04 Front		
Back		

DATA ANALYSIS & RESULTS

Table 10-Technical analysis of experiments

	Fabrics	Accessories	Stitch type	Techniques
Experiment no 01	• Stretch cotton (97 % cotton / 3 % spandex) • Power mesh	• Stabilizer • Hook & eye	• Single needle – attached front panels • Double needle – attached power mesh	• Double layers of power mesh used to shape up the abdominal area. • Top layer of power mesh smaller than bottom layer. • Edges of mesh layer covered using stabilizer • Mesh layer attached using double needle to give extra tension
Experiment no 02	• Stretch cotton (97 % cotton / 3 % spandex)	• Fusible web • Stabilizer	• Single needle – attached front panels. Attached fusing to panels. • Zigzag – attached elastic band	• Stretch cotton used as a main fabric. • Used double layers of fusible web to compress to abdominal area and back fat. • Elastic which have 1 ½" width attached to waist line (that elastic made with plastic fibers which can control excess extensions). • Used single needle stitch type along edges of fusing layers to give extra strength.
Experiment 03	• Pure cotton (100% cotton) • Knit fabric (80% polyester / 20% spandex)	• Hook & eye – 1 row,2 adjust (1 ½ inches)	• Single needle – attached front panels, shoulders • Flatlock attached knit fabric and cotton fabric layers at the side seam	• Attached knitted polyester fabric at the both sides. But removed side seams. • Attached adjustable hook and eye as the fastening method
Experiment 04	• Pure cotton (100% cotton)	• Hook and eye	• Single needle – attached each and every panels • Hand stitch – done honey comb smoking	• Used honey comb smoking at the back of the blouse. • Used elastic thread for smoking because it needs to be flexible to stretch.

Fit evaluation

For the fit evaluation, have completed a Subjective Wearer Trail by the participation of three undergraduate students of Fashion Design & Product Development degree in University of Moratuwa. Before the fit, it has given a brief introduction of this research to them. Then asked them to mark their satisfaction on each criterion. Ease, number of wrinkles & seam line deviation were the criteria that have scaled-down into five stages.

After basic movements, wearer rated on the scale of ease criteria from very flexible to very stiff. After the fit on, the subject was counted the number of wrinkles and rate the number of wrinkles scale. Seam line deviation measured if the seam line precisely at the bodyline. Deviation measured at shoulders, sleeves and side seams.

For the final evaluation above, different scales summarized into one scale rating.

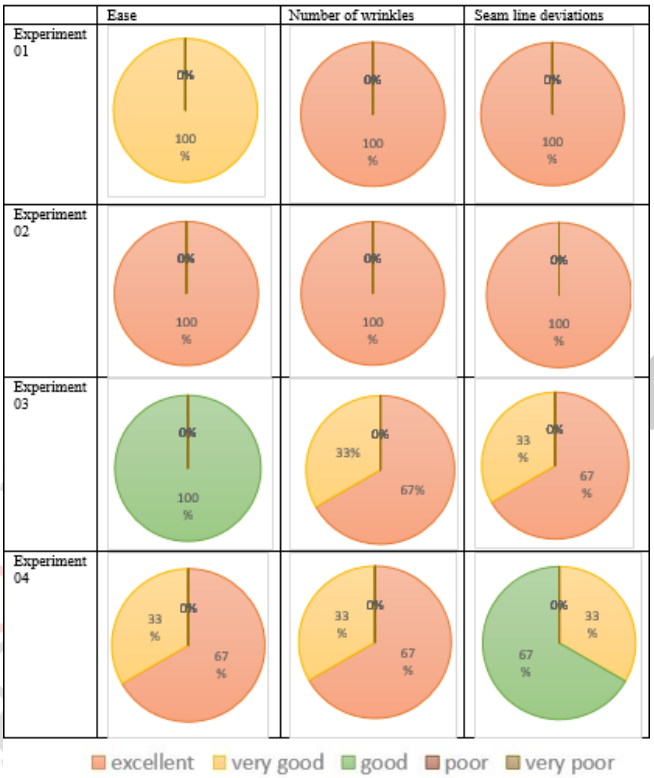
Table 11- Rating scale for ease, number of wrinkles and seamline deviation

	Ease	Number of wrinkles	Seam line deviation (mm)
Excellent	Very flexible	0 – 10	5 – 10
Very good	Flexible	11 – 20	11 – 15
Good	Medium	21 – 30	16 – 20
Poor	Stiff	31 – 40	21 – 25
Very poor	Very stiff	41 – 50	26 – 30

Table 12-Visual evidences of wearer trial

	Experiment 01		Experiment 02		Experiment 03		Experiment 04	
	Front	Back	Front	Back	Front	Back	Front	Back
Wearer 01								
Wearer 02								
Wearer 03								

Table 13-Wearers' score of fit rating



Cost Analysis

	Materials	Unit cost (LKR)	Consumption	Cost (LKR)
Experiment No.01	• Stretch cotton – (both base and lining fabric)	300 (1 yard)	2 yards	600
	• Power mesh	200 (1 yard)	½ yard	100
	• Hook & eye	3 (1 pair)	4 pairs	12
	• Thread	100 (1 cone)	1/10 cone	10
	Final cost			**722**
Experiment No.02	• Stretch cotton – (both base and lining fabric)	300 (1 yard)	2 yards	600
	• Fusible web	100 (1 yard)	¼ yard	25
	• Hook & eye	3 (1 pair)	4 pairs	12
	• Thread	100 (1 cone)	1/12 cone	8.33
	Final cost			**645.33**
Experiment No.03	• Cotton (base fabric)	275 (1 yard)	1 yard	275
	• Poplin (lining fabric)	130 (1 yard)	1	130
	• Polyester spandex mixed fabric	300 (1 yard)	¼ yard	75
	• Hook & eye stripe	100 (1 yard)	¼ yard	25
	• Thread	100 (1 cone)	1/10 cone	10
	Final cost			**515**
Experiment No.04	• Cotton (base fabric)	275 (1 yard)	1 yard	275
	• Poplin (lining fabric)	130 (1 yard)	1 yard	130
	• Hook & eye	3 (1 pair)	4	12
	• Thread	100 (1 cone)	1/10 cone	10
	Final cost			**427**

Table 14-Cost Analysis

DISCUSSION

Apparently, wearer complaints about the fit of the saree blouse due to incorrect fit & the appearance. This study carried out some experiments, after analyzing all the data which collected from primary & secondary resources. Power mesh gives strength to the garment due to its stretchability. Experiment No.01 used the power mesh as two layers, and the bottom layer is smaller than the top layer (which is 1/4 inches) because it gives extra support. This support used to reduce the appearance of back fat & belly fat. Using double needle stitch along the edges of power mesh layers create a tension to reduce the excess extensions.

Experiment No.01 & 02 have used stretch cotton as the main fabrication because its stretchability has given the solution for tightness & looseness. Moreover, it does not destroy the aesthetic aspects of the saree blouse due to fabric composition, which has 97% of cotton. The second experiment has been used fusible web layers to avoid extra stretchability on abdominal area & back area. Wide elastic band with plastic fibers gave a solution to the not only rolled-up waistline but also gave extra strength to the waistline.

If there is any consumer who does not interested in stretch cotton, then the experiment No.03 & 04 suggests appropriate solutions. In experiment No.03, it has attached knitted polyester fabric layers at both sides in blouse and sleeves. The tightness of the sleeves can avoid using this solution. This blouse suitable for consumers who have the same cup size but different band sizes on their bra. Instead of using stitch type for attached knit fabric panel at side seams, which can be used as the bonding technique. It gives more finishing effect on the garment. Experiment No.04 reveals a simple solution for the consumers who are concerned about the tight-fitting of the saree blouse. Honeycomb smoking is popular method to get stretchability from non-stretch fabric.

Experiments that have done in this study can directly apply to the saree blouse because the validation was done with subjective wearer trial. Basically, tailor-made saree blouse & ready-made saree blouse (in the current market) cost around USD 8.04 .However, the proposed product from this study, cost below USD 5.36 without the cost of tailoring, but if add tailoring cost it might increase.

CONCLUSION

It has been clearly revealed that most of the consumers are dissatisfied with the fit of the saree blouse. This study experimented different pattern cutting techniques, with different raw materials to enhance the fit of the ready-to-wear saree blouse. Incorrect fit of saree blouse occurs construction issues, incorrect measurements, unfitted fabrics or belly fat, back fat, armpit fat, different shapes of shoulders. After analyzing the collected data from a structured questionnaire survey, product survey and published literature found out issues that affected to fit of saree blouse & pattern cutting techniques, which can give solutions for those issues.

Experiments were done using different fabrics, accessories, construction methods. Finally, done a subjective wearer trail for validations. According to their responses, those techniques gave sufficient support to enhance the fit of the ready-to-wear saree blouse.

Further studies are recommended to improve the value addition. However, designers and developers can try out various products based on these experiments and propose products according to the product costs.

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