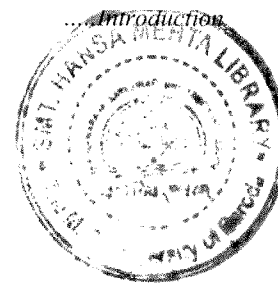


CHAPTER I

INTRODUCTION



“Dress makes the man”, this is especially for women! While a good ensemble enhances the inherent beauty of a person, it can hide the defects and drawbacks of others. People prefer several features in range for their aesthetic appeal of clothing one of which is it should be equally comfortable as well. Both comfort and fit bring satisfaction and appeal. Comfort can be achieved by reducing garment restraint imposed on the body and extra fabric can create its new dimensions for the wearer leading to comfort.

The knowledge of comfort is used by designers and manufacturers to develop functional clothing systems for different wear situations such as sportswear, casual wear or formal wear. So in these products/garments, comfort with fashion will have to be integrated with segmentation in uses and use on occasions. Comfort in varying degree depends on the ease of movement, transmission properties of clothing for heat and moisture, the drape and appeal of the dress.

Textiles for apparels are developed by innovations in technology with regard to fibers and construction. Fabrics used for garments generally constructed either by weaving or knitting. There are various methods as well as materials that bring varieties of fabrics for different end use. The fabric quality has direct association with design development, comfort and aesthetic appearance of the garments with the fiber content, type of yarn, fabric geometry and the form of finish used in each case. The end product requirements of many of these textiles when put in use are strength, extension, elasticity, hand and resistance to abrasion. Woven fabrics show very good strength but light rigidity to provide comfort and fit to the wearer if not constructed rightly. Knitted fabrics are known for their superior elastic recovery property over woven and non-woven fabrics and hence they are widely used for body-fit garments. Knitted fabrics have aesthetically pleasing elastic structure, comfort and softness which make them ideal to be used in sportswear, inner wear, sweaters, casual wear, fashion apparel, etc.

The performance and appeal of fabrics destined for apparel depend upon a number of

mechanical and physical properties and the relative importance of these depending upon the intended end-use. Customer's expectations for a particular apparel product depend on garment fit and fabric's wear conditions. In addition to these it also involves factors such as size and seam strength. 'Wear' referring to the deterioration of the physical and aesthetic properties of textiles in use where fiber content, fabric felt and change in the physical dimensions due to laundering, stress - strain, abrasion, etc. and their effect on the garment attribute is very important to study.

Many other industrial or consumer textiles have to simultaneously fulfill the requirements of function, comfort and aesthetics. The relative importance of these aspects vary with the specific end uses. Different raw materials and manufacturing technologies have all their inherent advantages in one or more end use applications as woven and knitted. Many changes are going on within the textile industry itself with development constantly expanding the range of choice, making textiles more attractive and more comfortable, and easier for homemakers to use. The rapid technological development of recent years has greatly increased the supply and modified the characteristics of textiles and they in turn have modified other aspects of the lives of people. Today's consumer is exposed to dozens of new fibres, as well as too many combinations of new and old fibres. ⁽²⁸⁾

Persons involved with textile and garment making have to perceive and to link innovations into craftsmanship in designing. The requirements for the fit of apparels may mean the balance of different properties of stretch, drape, smoothness, etc. for different end uses and then get desired comfort as well as aesthetic appeal in the garments.

Today the textile industry is concentrating on giving new characteristics to natural fibres, improving man-made fibres, and blending the results. The impact of inter fibre competition has changed the character of textile production beyond all resemblance to historical facts. As one reviews conditions in the textile industry, it is evident that cotton continues to occupy first place in the market. The rapid advance of manmade fibres has placed them second to cotton in importance for their uses.

Majority of dresses and household textiles are developed by innovations in technology with regard to fibers and construction. Fabrics used for garments

generally constructed either by weaving or knitting. Woven fabrics with their flat and firm construction have varieties of spun, filament, textured and blended yarns which brings about feel, texture, appearance and to some extent stretch also. There are various methods as well as materials that bring varieties of fabrics for different end use. The end product requirements of many of these textiles are very different. Carpet yarns need to be bulky, resilient and very resistant; underwear has to be made from soft, absorbent, smooth yarns, and seatbelt must be taken when designing yarns to ensure that the character and properties are correct for the end product often a compromise balance of properties is accepted since optimization of any one property can usually only be obtained at the expense of another. Strength, elasticity, extension, hand, resistance to abrasion, appearance and aesthetic appeal of the yarn must all be viewed in the light of the end product requirements. The constituent fibres bring character and properties to the yarns, and the way they are arranged in the yarn structure. This leads to major differences in the end-product performance. The physical and mechanical properties of woven fabrics are determined by the inherent properties of fibres, as well as upon the geometrical arrangement of the fibres in yarns, and of yarns in fabrics.

The customer in general is getting better educated about his or her clothes. Better quality and 'perks' such as shape memory, retention and easy-care are understood and appreciated more and more. Modern life is becoming more and more informal easy going and demands self-comfort. For these reasons the knitted sportswear, casual wear, T-shirts, overalls, jackets, suits etc. are catching up, as knitted garments are stretchable, ready to fit, good wicking property and gives comfort in various posture of wearer.

The quality of a fabric in the textile and clothing industry has been traditionally assessed subjectively by sense of touch, involving extensively personal preferences, and thus there are no common standards for quality. The quality of a woven fabric is judged initially by its appearance and handle and thereafter, by how it wears and performs in actual service. Fabric quality is associated with fibre content, type of yarn, fabric construction and the form of finish used in each case. Overall judgment relies upon experience with the particular end use for which the fabric is designed. ⁽⁴⁸⁾

Garments and sizes for different people across the world

Everything concerning pattern making and grading starts with sizes and measurements. Clothing has to be made so that it fits the sizes and the shape of the body as well as possible. The size chart provides vital information which enables manufacturers to select and cater for specific areas of the population. It is obvious that whole population cannot be covered by a single manufacturer. ⁽⁹⁾

In describing garment sizes the standard size labeling systems developed in Germany, Austria, Hungary and the USA have similarities. Garment sizes are indicated by arbitrary numbers, garment sizes are made for two or three height groups-petite (or short), regular and tall height and garment sizes are defined by three dimensions- bust, waist and hip measurements.

However, because of the drape and ease of the fabric, not all measurements are required to obtain a well-fitting dress in most styles. It's a familiar problem for many women, as standard sizing has never been very standard, ever since custom clothing gave way to ready-to-wear. So, baffled women carry armful of the same garment in different sizes into the dressing room. They order several sizes of the same shirt online, just to get the right fit.

Now, a handful of companies are tackling the problem of sizes that are unreliable. Some are pushing more informative labels. Some are designing multiple versions of a garment to fit different body shapes. And one is offering full-body scans at shopping malls, telling a shopper what sizes she should try among the various brands.

As the American population has grown more diverse, sizes have become even less reliable. Over the years, many brands have changed measurements so that a woman who previously wore a 12 can now wear a 10 or an 8, a practice known as "vanity sizing." Jim Lovejoy, the industry director for the Size USA survey says, "Most companies aren't using the standard ASTM [American Society for Testing and Materials] sizes any more. Sizes have been creeping up a half inch at a time so that women can fit into smaller sizes and feel good about it." The move away from standard sizing has its disadvantages—especially for small-boned women who might be a standard size 4 but who now have to go into the negative numbers to get something that fits. ⁽⁴⁵⁾

Change in Readymade Garment in developing countries

In recent years, the readymade garment segment has seen vertical growth. Accounting nearly Rs. 20,000 crores, this industry is growing at the rate of 20 percent, with massive visibility and consideration margins. The largest segment for the readymade garment segment includes the age-group of 16-35 that is very brand conscious and gives priority to high quality. Branded readymade garments account over 21 percent of the readymade garment industry. ⁽⁷⁷⁾

The Indian retail industry undergoes major revolutions. Retailing in India is gradually becoming the next boom industry and the consumer buying patterns and behavior are changing steadily. The growth of India's retail sector not only limited to urban areas but also in rural areas. India's apparel retail market is drawing huge attention both global and retailers. The high growth in India's apparel retail sector is due to impact of rising incomes, increasing urbanization, greater brand competition, changing lifestyles, favorable demographic patterns, dropping dependency ratio and rapidly rising education levels. Retail market industry is booming due to increasing disposable incomes of middle, upper middle class and the young IT professionals.

India has gained strong position as the third most attractive retail market after Brazil and China. Apparel retail market contribute second largest to the overall retail revenues in India. Apparel retail contributes 10% of India's total retail market. The women apparel retailing in India has shown a rapid development despite the ongoing financial crisis. The Indian woman apparel market has undergone major changes over the past few years. The women wear market was estimated at more than Rs 37,000 core in 2007. The market posted a growth rate of good 14% in the past five years. ⁽³³⁾

Over the past several years, as the ready-to-wear garment industry in India progressed from fledgling into a robust sector, one common lament has been about "sizing being a major problem". While most countries have gone on to modernize and revise their sizing systems based on inputs from sizing surveys during the last decade, India does not even have a rudimentary system till date.

Individual sizes and variations in garment styles in India

India is a country of diversity where one can find a lot of variations in climate, culture and clothing. Indian clothing industry has come a long way with custom made tailoring which seems to dominate the Indian dressing scenario today. The garment Industry has increased manifold with millions of garments being produced annually to fit vast population but still we find that in India, 30 million potential customers with good clothing sense are ignored, due to non-availability of proper sizing there by accelerating the need for size classifications of populations.⁽¹⁾

At present there are many readymade garment industries, but mainly for men and children. This is so because they do not require fitting, as it is necessary in making a women's garments. As the Indian consumer moves away from the tailored clothes to ready-to-wear, and the manufacturing Industry gears up for mass production, the issue of sizing and fit is found to assume great importance. It is surprising that in India no nationwide survey has ever been undertaken to capture the anthropometric measurements of the diverse population. Thus there is no size charts standardized for the Indian population. It will be actually difficult to sustain the process of production in the absence of a reliable sizing system. Retailers will also find difficult to address the issue of fit and sizing.⁽¹³⁾

The most important point in judging a garment is its fit. A fit can either flatter or change the contour of human figure. Erwin states, "A well fitted garment feels comfortable, is becoming consistent with present fashion and adjust to the activities of the wearer – in general it hangs or sets without wrinkle, sagging or popping out". The general standard of a well fitted garment remains the same from year to year as they are based on structural lines of the human figure.⁽⁴⁷⁾

Fit may be part of the problem, especially for women. Men's clothes often come in specific waist sizes and other dimensions. But women's clothes vary dramatically from one manufacturer to another. And even though ASTM International has created standard tables for clothing sizes, most companies ignore them. 'Fit' is a very personal issue, but it is the biggest reason people don't buy clothing. It's the reason things get left on the rack with a variety of sizes in her closet.

Anthropometric surveys have been conducted frequently in India for the last 30 – 40 years. Some have been conducted by Home Science colleges and the results have been used for pattern development exercises for various age groups. A comprehensive all India survey was undertaken by Singh K.S. for the Anthropological survey of India, from 1985 onwards, to study the effect of several parameters on growth patterns of the various ethnic groups in India. However, the measurements taken for anthropological studies are quite different from those required for the purpose of developing size charts for garment manufacture and cannot be used for the purpose. More recently, some major garment manufacturers retailing in India, commissioned anthropometric studies before launching their respective brands in the domestic market. But there exists no record of systematic, all India anthropometric survey ever conducted. There exist as many sizes and sizing systems in the Indian clothing market as there are brands! The sizes are different; the nomenclature is different in each case. There is no way a customer can buy her clothing without having to try on innumerable clothes in each brand. There is no consistency of sizes even within the same brand. All this creates a lot of confusion in the mind of customer mainly because exact body measurements for which the garment is intended are not known to the customer and often there is no relation between the garment size and the body measurements.

In India, even a primitive garment sizing system is not in place as the traditional Indian garments comprised primarily of draped wear and if little stitching required, was catered by the local tailor. There were no organized retailing setups. Moreover our population was not fashion or fit conscious. Thus the need was never felt for a readymade garment sizing system. As the clothing preferences now shift from Indian to western wear, the need for sizing system is being felt actually. The problem garment sizing is extremely complex and has been faced by so called developed nations also. Being interdisciplinary in nature, it makes the entire exercise of developing a sizing system a highly capital and time intensive one. It requires inputs from all people related to sizing system, Anthropologists, statistical and mathematicians, Pattern makers, Garment technologists and designers. The weakest link has been the process of data analysis which a simple statistician is incapable of processing data due to the inherently nonlinear nature of the problem. Analysis of the Indian population data shows that about 20% of the population matches the

dimensions of an “average figure”! So the rest of 80% will have to be catered to as special categories.

Garment sizing is also about catering to different body proportions, such as waist to hip ratio (WHR), bust to hip ratio and so on. Some key measurements have to be identified for each garment type and the population has to be classified on the basis of these multiple dimensions. Also, the number of size categories should be kept to a minimum to keep the inventories manageable. It is not easy to carry out this complex analysis given the huge size of the data matrix obtained from anthropometric studies.⁽⁷³⁾

Fabrics to fit various sizes

A comfort characteristic is an important functionality of clothing. So, to know about the comfort characteristics of any particular fabrics or clothing, it is required to determine the different properties of the fabric which have direct effects on the comfort. The clothing characteristics include the characteristics of the fibres and materials from which the clothing is made, its tactile characteristics, design features of the clothing, brand labels, information on fabric / garment care, price etc. The wearer's attitudes towards either fabrics or items of clothing can affect the actual physiological comfort and can become the primary determinant of consumer behavior.

Consumers expect very good appearance and also the fit of the garments that give comfort during wear that could only be achieved by innovations to create new products and process. Easy care and aesthetically satisfying fabrics are very much in production and accepted by majority of the consumers. Stretch has fairly obvious impact on comfort, adding flexibility and freedom of movement. Woven fabrics just cannot attain this level of extension. Hence, initially textured weft knitted fabric was used in sportswear. The next development was lying in or plaiting on elastomeric component in the garment. This improved considerably stretch and recovery from stretch characteristics of the sportswear. In 1942, polyurethane was invented which the basis of a novel type of elastomeric fiber is known generically as spandex. It is a synthetic (segmented polyurethane) fiber known for its exceptional elasticity that can be stretched by between 500 and 800%. In chemical terms, Elastane is a long-chain

polymer containing at least 85% polyurethane. Spandex was created in the late 1950s, developed by E.I. Du Pont de Nemours & company, Inc. and first commercially produced in the United States in 1959. A well-known trademark for spandex or Elastane is Invista's brand name Lycra®.

It has been introduced into both woven and knitted fabrics in varied percentages for optimum performance and aesthetics. Woven Lycra blends have additional advantage of allowing sewers to more closely fit a pattern than would be comfortable in a fabric without Lycra. Its slight stretch would add to the garment's comfort and resistance to wrinkling. Very small amount of Lycra fiber can transform the performance of fabric with the amount of Lycra fiber in a material as little as 2%. The fabrics can have Lycra introduced in lengthwise, crosswise or both directions in both knits and woven. Lycra is laid in with every other yarn in a weft jersey knit to give crosswise elasticity. This is used for knit tops of cotton, manmade fibers, wool or silk. The warp knits like tricot, Lycra can be added along with the lengthwise yarn to give more of a power knit construction.

Performance and appeal of fabrics destined for apparel depend upon a number of mechanical and physical properties and the relative importance of these depending upon the intended end-use and customer's expectations as well as on the customer's wear conditions and garment fit. In addition to these, garment wear also involves factors such as size/fit and seam strength, 'wear' referring to the deterioration of the physical and aesthetic properties of textiles in use. Fiber content, fabric felt and change in the physical dimensions due to laundering, stress - strain, abrasion, etc. and their effect on the garment attribute is important to study.

The role of Lycra in imparting stretch ability and shape retentions properties is well accepted when other aspects related to comfort are judged. A form-fitting garment can be uncomfortable if it is not properly designed with proper fiber selection, fabric design and finish contributing to comfort. Lycra would give these stretchable and form fitting properties in the garments. The properties of cotton are limited due to its natural origins, and therefore Lycra is increasingly used to impart a great level of stretch and more dimensional recovery.

The sensation of pressure during wearing of tight – fit garment is a major component of comfort and the pressure applied by a garment mainly depends on the extensibility of fabrics, the fitness of garments and the style of garments. The pressure comfort is one of the most important factors influencing a wearer's sensation of comfort in tight-fitting garments. The fitness of garment and extensibility of fabric has great predictive power for the subjective measurement of pressure when the style of garments remains the same. The extensibility of fabrics has the main contribution to the garment pressure.⁽⁵¹⁾

Designing clothing for a specific individual body size also poses tremendous challenges when one wants to consider all the aspects, like fit, design, aesthetic or other comfort related aspects together. Extensive use of computer software helps in the development of patterns by measuring the body, analyzing anthropometric data, drafting clothing patterns, and designing and manufacturing clothing. Such technology facilitates large scale anthropometric studies and the development of improved fit models and sizing standards for mass production. It also encourages expansion of custom clothing production by providing a more accurate and cost effective means for fitting the individual. Essentially the problem of fitting a garment to the human body involves the spatial relationship of the two dimensional garment planes to the body surface.⁽¹⁴⁾

The dimensions of pattern of a garment are not identical to the corresponding dimensions across the body surface. Therefore the process of determining pattern dimensions from body dimensions must ultimately be evaluated as three – dimensional correspondence of the resulting garment of the body form. Pattern dimensions have often been determined by a process of (1) taking linear (length and circumference) measurement over the body surface with measuring tape and then (2) applying those measurements in some predetermined manner to the pattern draft. This process of garment sizing may result in improper fit and needs repeated trials and fittings of the garments by a skilled technician after the pattern is cut from cloth. Experience, therefore, demonstrates that these linear body surface measurements are not directly applicable to pattern dimensions and are useful primarily as approximations. Another type of data traditionally used in pattern development is the visual assessment of body configuration by the expert of the tailor.

Appropriate size of the garment, fit and body movements during wear of a garment are associated with each other. Clothing as the second skin of the human body must fit the human body and be adaptable to its movement. Well – fitted garments are those that are comfortable to wear, consistent with current fashion and free to undesirable wrinkles, sags or bulges, and which allow sufficient ease for freedom of movement.

Garment fit and ease of body movement depend on fabric properties, garment weight and bulkiness and, garment design. Garment fit and ease of body movement are very much related to the extensibility and recovery of fabrics. In general fabrics with > 15% elongation are referred to as stretch fabrics, and fabrics with < 15% elongation are rigid fabrics. Most woven fabrics are rigid because interlacement of yarns allows little extension to occur under a tensile force, unless the yarns (or fibers) themselves stretch. Stretch woven fabrics can therefore be structured from elastic fibers and yarns. Knit fabrics, due to the interloping yarns, usually possess a minimum of 15% elongation, but they can also be made into rigid fabrics. Knitted fabric is more extensible than woven fabric; hence for tight – fitting garments knitted fabric is preferred. Heavy and bulky garments may provide thermal protection to the wearer in extremely cold or hot conditions. However, weight and bulkiness of such garments can hinder body movement. For cold protective clothing, such as mountaineers' down jackets and firemen's uniforms, weight and bulkiness are important consideration.

During body movement, the body expands and contracts in the area surrounding it joints, so the garments expansion and contraction should follow the pattern of body movement. Garment should be designed to facilitate body movement both excessive local tightness and looseness are causes of poor garment fit and associated discomfort.⁽⁴²⁾

With respect to body movement end uses of clothing have different requirements in garment design. Therefore, the pattern of the garment should be adjusted to accommodate the body change.

Freedom of movement of the human body is inextricably linked with garment pattern design and construction. The seams that connect major sub-assemblies of a garment are important in the promotion of style and comfort. For the upper body, the seams concentrate particularly around the shoulder of the armhole. With different degrees of

movement of the upper limbs, the position of bones, muscles and joints changes significantly during periods of activity, and this makes the skin, the body surface, in different parts of the body extend or contract appreciably, which directly affects the fit and comfort of the clothing and can even change the shape of the whole upper garment. With the movement of the body, stress and recovery of the garment with body extension and contraction occurs appreciably, which directly affects the fit and comfort of the clothing and can even change the shape of the whole upper garment.

1.1 STATEMENT OF THE PROBLEM

Fabrics for apparels are constructed either by weaving or knitting using innovative methods and technology in fiber and fabric manufacture. The fabrics could have varieties produced for different end use. The end products of textiles have expected performance of comfort and aesthetic appearance with design development and when put in use, strength, extension, elasticity, hand and resistance to abrasion that could be achieved through types of fibers, yarns and fabric geometry and the form of finish used. Woven fabrics have very good strength but their rigid structure have problems of giving comfort and fit to the wearer even if designed with specialized skills. Knitted fabrics hence shown boom in the retail market with their aesthetically pleasing elastic structure that gives comfort, fit and softness.

Good appearance, durability to laundering and comfort during wear could only be achieved by innovations to create new products and process. Today majority of the population is looking forward towards fashionable clothes but those which give them comfort, stretch and flexibility. Easy care and aesthetically satisfying fabrics are very much in production and well accepted by the consumers.

The developments in synthetic fibre production have brought marked growth in the range of 'easy-care' products. The level of comfort in casual wear was initially obtained by textured weft knitted fabrics and now improved by incorporating Elastomeric component that gives excellent recovery results with high degree of stress. This character of the elastomeric component is found to be useful in every clothing item where comfort is required.

A woven cloth is an isotropic material. The ratio between expansion in one direction and simultaneous contraction in a perpendicular directional is not constant. Hence the

complete response of the cloth to an applied stress system cannot be deducted from simple stress-strain characteristics recorded in each of the two directions respectively so the popularity of knitted fabrics have grown tremendously within recent years because the growth in consumer demand for stretchable, snug-fitting fabrics, particularly in greatly expanding areas of sportswear and other casual apparels. The structural characteristics of knitted fabrics enhance the comfort, which is felt when garments made from such fabrics are worn. Knitted fabrics made from conventional fibers are owing to their knitted structure, more elastic than woven ones made from the same materials.

The properties of cotton are limited due to its natural origins, and therefore Elastane is increasingly used to impart a great level of stretch and more dimensional recovery. Its slight stretch would add to the garment's comfort and resistance to wrinkling. It can be added lengthwise, crosswise or both directions in both woven and knits. Since stretch and elastic recovery are of such importance in fabrics, study of these properties is greatly needed. The results of such evaluations would be useful to create varieties of garments.

The new developments in the textile manufacture with various types of blends offer varieties in the market. Consumers seek not only fashionable but also have become conscious of comfort enhancing and fatigue reducing garments. Lycra has been introduced into both woven and knitted fabrics for the optimum performance and aesthetics. The influence of Lycra on fabric properties having different geometry, fabric count, mass, thickness, air permeability, shrinkage and stretch and recovery behavior would be useful to create variations in clothing pattern. This would further be useful for construction of garments to fit the range of sizes with satisfactory fit, style and comfort properties. This property and other related physical properties would lead to develop standards for sizing of bodice blocks for woven and knitted fabrics blended with Lycra to fit a range body sizes.

Woven Lycra blends have additional advantage of allowing sewers to more closely fit a pattern and be very comfortable. It imparts a great level of stretch and dimensional recovery, adding comfort and wrinkle resistance to the garments. For knits, they would be as comfortable and more of dimensionally stable fabrics. The fibre blend

and fabric structure is very important to study for the fit the garments that impart comfort, aesthetic appeal and flexibility to the wearer of various size groups.

Hence the purpose of this research was to study physical properties of woven and knitted Lycra blends with different geometry and use them for garment construction to see the garment fit with stretch and recovery property of Lycra and location of seams with larger body sizes.

Importance of seam in garment construction for body contour as aesthetic parameter and stretch and recovery property as performance parameter would be useful for garment designing with Lycra. On the basis of the study, predictions for standardization of sizes to accommodate range of body sizes which could be done for construction of garments even with different styles.

For this research Elastane containing fabrics have been selected.

- 1 Based on the fiber content, fabric feel and change in the physical dimensions due to laundering, stress - strain, abrasion, etc. and their effect on the garment attribute is important to study.
- 2 This research would throw light on growth and recovery and comfort properties that establish relations between the fiber content, method of construction and other related physical properties useful for garment sizes.
- 3 This would further be useful for construction of garments to fit the range of sizes with satisfactory fit, style and comfort properties. The standardization on the basis of elastic property would help the garment manufacturers to simplify and produce the standard size to fit many body sizes.

1.2. Objectives of the study:

- 1.2.1. To study the physical properties for Damage tolerance: Pilling and abrasion resistance, Stress-strain properties: Uniaxial extension and Fabric and yarn structure deformation.
- 1.2.2. To study the comfort parameters of fabrics such as fabric sett and thickness, tightness and air permeability and wear properties: shrinkage.

1.2.3. To develop basic bodice block and adaptation of it on the basis of physical properties of fabrics for range of body sizes.

1.2.4. To test the performance and serviceability of the garments for fit, comfort and appearance and recovery behaviour with wear trials.

1.3. Delimitations of the study:

1.3.1. The study is limited to 3 percent Lycra containing woven and knitted fabrics.

1.3.2. The fabrics selected were used for construction of upper garments for females only.

1.4. Scope of the study:

- Woven Lycra blends would have additional advantage of allowing sewers to more closely fit a pattern.
- The Lycra blend and fabric structure is very important to study for the fit^{of} the garments in terms of fit, aesthetic appeal and recovery behavior for the wearer of various size groups.