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Pakistani Punjabi Men's Summer "Shalwar kameez" of upper class having income of US$ 5OOO/Month. Best practices and Spinning norms

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***Abstract*— Cotton fabrics having important properties like moisture absorbent, soft handle and feel etc. And because of such properties it is the most dominant preference of the people of Pakistan as a fibre in their apparel because of long summer season .Textile sector plays a vital role in the economic growth of the country. In Pakistan, Punjab is most populated province and most of the people related to business or agriculture prefer to wear "Shalwar kammez" in summer. In this research paper the premium quality of woven cotton fabric was analyzed in terms of characteristics and properties for high income group people of having income around US $5000/ month located in various parts of the province. By studying and analyzing the norms of spinning and characteristics of fabric through various lab test, best practices were developed for the fabric. The norms were related to the demand of fabric and of customer like strength, wearing properties,handle , feel etc with respect to right fibre type, yarn type and the fabric construction.**

***Index Terms*—Cotton Fabric, Shalwar Kammez, feel, fibre.**

I. INTRODUCTION

The economy of Pakistan is directly related to the textile sector of the country, especially cotton containing products. The major portion of value added products and exports relates with the textile goods which is around 55% of total export value. On the basis of demand of cotton products Locally (inside the country) many of textile producers started their work on premium quality of cotton fiber products (such as the Extra Long Staple from the US) ,(Emeka Osakwe, May 18 2009). For premium quality of textile products , fibre length is considered the foremost characteristic (Richard, 2012), and has an one of most important character of premium quality yarn production. (Cui et al., 2009). To measure the length of the fibre which is known as staple length is to be measured by the fibro graph suggested by Hertel in 1940, consider most reliable measurement source of fibre length.(Hertel, 1940). Along this many other high tech measuring instrument such as USTER HVI, USTER AFIS PRO the staple length can be measured easily. The most lengths are characterized as the mean length (ML), the short fiber content (SFC), the upper quartile length (UQL), and so on. These parameters plays an important role in the manufacturing of staple yarn which is cotton based that directly approaches towards the quality of the yarn that ultimately leads towards the quality of the fabric.(Lin, Xing, Oxenham, & Yu, 2012). In Pakistan short length fiber is to be grown which accounts as short staple length and medium length of fibre such as 1/8 of inch. There are various types of cotton varieties planted and available in Pakistan which used in various textile goods such as CIM 496 in Punjab and NIAB-78, and CRIS-134 in Sindh. The staple is short and medium (although it mostly medium). The reason found for short and medium length of cotton fibre is due to the commonness insects and mealy bugs along climatic conditions(Emeka Osakwe, May 18 2009).The special characteristics of the woven fabric considered many important properties such as light weight, soft feel, cover factor, high drape, and well-designed look, ecofriendly for the premium quality of woven fabrics..((Swamy 2002), very restricted research has been carried out on the finest yarn and fabrics for certain culture and region but there is always need to address the important manufacturing processes of yarn and fabrics such as durability of the yarn in terms of tensile strength, bursting strength abrasion resistance.(Uttam and Gangwar 2006). The durability and strength of fabric not only rely on strength of the yarn used but also many other important factor for the manufacturing of premium quality of the woven fabrics (Morton 1949; Realff et al. 1997). It was concluded that there is correlation exists between yarn strength and the fabric structure (Essam 1929). The density of warp and weft yarns influence the flexural rigidity and modulus of the fabric (Cooper 1965; Gere2003; Guthrie et al. 1954; Lord and Mohamed 1982; Montgomery 2005; Nash 1972; Peirce 1930;Tuma 1993; uksekkaya et al. 2008). As the linear density of the yarn increases, the above two parameters also increases. Cotton fabrics of various constructions like plain, 1⁄3 twill, and 4-end irregular sateen have been made and the effect of fabric weave on different fabric properties such as mechanical properties, bending, and creasing behavior and appearance of the fabric are studied before .(Ashis Kumar Samanta, Asis Mukhopadhyay, Madhusudan M. Bhagwat &Tapas Ranjan Kar 2015) Ureyen and Kadoglu (2006) .A linear multiple regression method for the estimation of qualitative characteristics of yarn. They found that, in addition to fiber properties, yarn count, twist, and roving properties had considerable effects on the yarn properties.(Strumillo, Cyniak, Czekalski, and Jackowski(2007) determined the functional dependencies of selected fundamental parameters of cotton yarn quality such as tenacity, elongation, unevenness, hairiness, and the number of faults on the linear density of yarn. And with the increase in linear density (tex), tenacity, elongation, and hairiness increases, and the number of faults decreases.(El-Mogahzy (2006) .

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The objective of the design of any form in terms of fabric or a garment is to be defined by many properties and behavior of the product. The solution of the problem solved by meeting the requirements of aesthetics and physical demand.(Güngör Başer (2008). In this research paper the aesthetic demand concern color and feel but the physical demand account the fiber staple length, strength coefficient of variation , similarly for yarns the tensile strength, thick/thin places, evenness, and for the fabric the design parameter weave type, strength, density, warp and weft finesses. The design of the product woven fabric is to be set by assigning values to a set of parameters each denoting a property of the product. The values can be color, shape, behavior of the product.

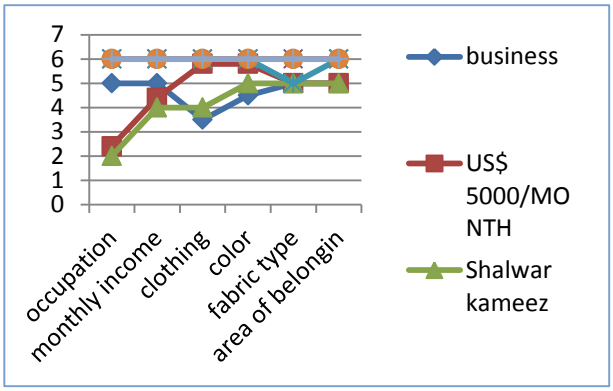
II. Methodology

Pakistan contains diversify cultures on the basis of region. In Pakistan Punjab is most populated province. The Punjab is Pakistan's second largest province at 79,284 sq miles and is the most developed, most populous, and most prosperous province of Pakistan., in general shalwar kammez, Paghri, lacha and dhoti are the common costumes of Punjabi people(Sarah Veach Katy Williamson Texas State University). The Punjab province contains two major regions one is central Punjab and second is southern Punjab. The major income source related to agriculture and its allied industries. In order to know the preference of Men's Apparel in Punjab, a small structured questionnaire that containing closed ended question is to be conducted by keeping in view the uniqueness of the research objective and research concern. The questions covers important observation directly related to the research questions. In given questionnaire the following question were asked about

1) occupation
2) Your monthly income
3) Please indicate which items of clothing you prefer to wear in the summer during your business hours?
4) Which part of the province do you belong to?
5) What qualities do you look for in your clothing?
6) Which colors do you prefer to wear during the summer
7) Which fabric type do you prefer to wear in the summer?

In conducting the survey the questionnaire is to be developed by considering mixed approach method. Typically simplifying occurs in mix method of qualitative and qualitative research. (Curtis, Gesler, Smith, and Washburn (2000) and Onwuegbuzie and Leech (2005c, 2007) Quantitative researchers tend to make "statistical" generalizations, which involve generalizing findings and inferences from a representative statistical sample to the population from which the sample was drawn. In contrast, many qualitative researchers, although not all, tend to make "analytic" generalizations (Miles & Huberman, 1994), which are "applied to wider theory on the basis of how selected cases 'fit' with general constructs" (Curtis et al., 2000, p. 1002); or they make generalizations that involve case-to-case transfer (Firestone, 1993; Kennedy, 1979). In other words, statistical generalizability refers to representativeness (i.e., some form of universal generalizability), whereas analytic generalizability and case-to-case transfer relate to conceptual power (Miles & Huberman, 1994). Therefore, the process of sampling is important to both quantitative and qualitative research. Unfortunately, a false dichotomy appears to prevail with respect to sampling schemes available to quantitative and qualitative researchers. As noted by Onwuegbuzie and Leech (2005b), random sampling tends to be associated with quantitative research, whereas non-random sampling typically is linked to qualitative research. However, choice of sampling class (i.e., random vs. non-random) should be based on the type of generalization of interest (i.e., statistical vs. analytic).. The sampling scheme was selected Simple in which Every individual in the sampling frame (i.e., desired population) has an equal and independent chance of being chosen for the study and Homogeneous in which Choosing settings, groups, and/or individuals based on similar or specific characteristics. The sampling case is to be selected Random Purposeful because of Selecting random cases from the sampling frame and randomly choosing a desired number of individuals to participate in the study. The choice of sample size is as important as is the choice of sampling scheme because it also determines the extent to which the researcher can make statistical and/or analytic generalizations. The sample size for analyzing the preferences of the respondents were 30 in number (e.g., Charles & Mertler, 2002; Creswell, 2002; Gall, Borg, & Gall, 1996; Gay & Airasian, 2003; McMillan & Schumacher, 2001).

The result of the surveyed questionnaire from a sample size of 30 in number which provides the evidence of Apparel selection that was Shalwar Kameez for the Punjabi people along their desired characteristics. The result is given in table 1:



Scale 0 -0.9 =05 Respondents
1-1.9= 05 Respondents
2-2.9 = 05 Respondents
3-3.9 = 05 Respondents
4-4.9 = 05 Respondents
5-5.9 = 05 Respondents
6-6.9 = 05 Respondents

The statistical data collected from the survey which is shown in above graphical representation. According to the result most of the respondents of equal distributed in central or southern Punjab province. The sample size of 30 respondents were in the favour of Men Apparel shalwar Kammez as apparel in summer season ,those belongs from upper class of having US$ 4000 TO 5000/ month. The selection of cotton fabrics due to moisture absorbency and light weight ,natural fibre , smooth feel and having comfortable wearing properties(A.J turner,2009 Natural and Man made fiber).Cotton has been used to produce yarns and fabrics from time immemorial. With the advent of

technologies and increased knowledge on cotton fibres, man has become able to control the properties of yarns and fabrics through proper selection of cottons and machinery parameters (Arindam Basu South India Textile Research Association, P.B. No. 3205, Coimbatore, Tamil Nadu 641014, India (Received 22 November 2007; final version received 3 May 2000).A large number of scientists have worked on the predictability of yarn properties based on fibre characteristics such as length, strength, fineness, inter-fibre friction, etc. Hunter (2004) has made a review of 200 articles related to this subject. Cheng and Adams (1995), Guha, Chattopadhyay, and Jayadeva (2001) and Jayadeva, Gupta, and Chattopadhyay (2003) made attempts to utilise the latest tools such as artificial neural network to predict the yarn quality on the basis of cotton-fibre quality. All the works reported good correlations between fibre properties and yarn properties. Kumar, Nishkam, and Ishtiaque (2005) studied the effect of inter-fibre friction on yarn quality. All of these studies were based on one cotton at a time, i.e. yarn was produced from single cotton, and relationships were derived.

III. Sampling and Test.

For the determining the characteristics of cotton woven fabric which is (shalwar Kameez) and the spinning norms, starting from the raw material, cotton fibre was selected of three types with respect to the origin and staple length.

a) Medium staple length (Pakistani cotton variety of staple length 1/8 inch with blend of long staple length fibre of Egyptian cotton)
b) Long staple length (American cotton of staple length 0.9 to 1.25 inch)
c) Extra long staple (Egyptian cotton of staple length 1 to 2.2 inch)
d) compact combed and carded Yarn.
e) Cotton fabric swatches

The tests were performed under controlled laboratory condition following the standards given by American Standard for Textile Material(ASTM)
The list of ASTM standards are:

- Pre conditioning of specimen for moisture equilibrium :ASTMD1776

Cotton fiber classification and testing time 4 hr relative humidity and temperature 21 ± 1 [70 ± 2] 65 ± 5(Standard Practice for Conditioning and Testing Textiles1 Designation: D1776/D1776M – 16)

- Tear Strength

ASTM D-1424
A slit is centrally precut in a test specimen held between two clamps and the specimen is torn through a fixed distance. The resistance to tearing is in part factored into the scale reading of the instrument and is computed from this reading and the pendulum capacity. Precondition the specimens by bringing them to approximate moisture equilibrium in the standard atmosphere for preconditioning textiles as directed in Practice D1776, sampling unit, take five specimens from the machine direction and five specimens from the cross-machine direction, Consider the long direction of the specimen as the direction of test. (ASTM Standard Test Method for Tearing Strength of Fabrics by Falling-Pendulum (Elmendorf-Type) Designation: D1424 – 09)

- Tensile Strength

ASTMD-5034
This test method describes procedures for carrying out fabric grab tensile tests using two types of specimens and three alternative types of testing machines. For reporting, use the following identification system of specific specimen and machine Tensile Testing Machine, of the CRE, CRL, or CRT type conforming to Specification with respect to force indication, working range, capacity, and elongation indicator, and designed for operation at a speed of 300 +/- 10 mm/min (12 +/- 0.5 in./min); or, a variable speed drive, change gears, or interchangeable weights as required to obtain the 20 +/- 3-s time-to-break. (ASTM Standard Test Method Breaking Strength and Elongation of Textile Fabrics (Grab Test Designation: D5034 − 09 (Reapproved 2013).

- Seam Strength

ASTMD-1683
This test method measures the sewn seam strength in woven fabrics by applying a force perpendicular to the sewn seam. test specimens, cut five specimens 350 6 3 mm [14 6 0.1 in.] by 100 6 3 mm [4 6 0.1 in.] with their long dimensions parallel either to the warp (machine) direction or to the filling (cross) direction, or cut specimens for testing from both directions if required. Fold the specimen 100 +/- 3 mm [4 +/- 0.1 in.] from one end with the fold parallel to the short direction of the fabric. After seaming, cut the fold open. The test specimen should contain a seam approximately 100 +/- 3 mm [4 +/- 0.1 in.] from one end. Each test specimen will contain sufficient material for one seamed and one fabric test. (Standard Test Method for Failure in Sewn Seams of Woven Apparel Fabrics, Designation: D1683/D1683M − 11a)

- Color fastness to washing

AATCC-61 2A

- Breaking strength and elongation

ASTMD-D5034
Cut each specimen 100 +/- 1 mm (4 +/- 0.05 in.) wide by at least 150 mm (6 in.) long with the long dimension parallel to the direction of testing and force application. (Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (ASTM Standard Grab Test Designation: D5034 – 09)

IV. Results

A. *Norms of Fiber and yarn*

Yarn fineness	Cotton variety	Staple length mm	Uniformity ratio % Standard at 5%	Fineness as Micronaire	Tenancity (gm/tex)	CV %
60/s Ne	Egyptian Cotton 100%	25.6	10.44	2.9	26.3	12.3
56/s Ne	Pakistani cotton With Egyptian cotton 50:50 ratio	18.4	12.22	4	20	15.9

B. Spinning Norms with respect count Lea Strength Product

Yarn fineness	Lea Dimensions (120 yard)		CV%	U% (unevenness)
	Normal (Nm * kg) Nm=metric system	Premium cotton having staple length(Nm*kg)		
60/s Ne	1522		12	22
56/s Ne	1300		14	19

C. Norms of yarn with respect to twist

Yarn finesses	Minimum Twist per inch	Maximum twist per inch
60/s Ne	26	38
56/s Ne	22	32

D. Spinning Norms of the Cotton yarn (thick thin places and Grade of yarn)

arn fineness	Thick places/+50% / km length	Thin places/ -50%/ km length	Neps /+200%/ km length	Grade of yarn
60/s Ne	22	4	44	A
56/s Ne	100	53	70	A-

A. Fabric quality parameters and their norms.

Fabric construction	Breaking strength (lbf) ASTMD-1424		Elongation %		Tensile Strength (lbf) ASTMD-5034		Seam Strength ASTM-1683		Color Fastness to washing ATCC-61 2A	
	Warp	Weft	Warp	Weft	Warp lbf	weft lbf	Warp lbf	Weft lbf	shade change	Staining on cotton
60*60/124*104	2.5	1.89	12	14	86	58	51	45	4	4
56*56/110*100	2	0.98	8	8	82	51	45	42	4	5

CONCLUSION

The quality of the fabrics were analysed on the basis of all important spinning norms . By analyzing the results which is obtained from two different fiber and fabric construction, the fiber and yarn quality of the fabric construction 60*60/124*104 with all technical parameters is considered as best practices for shalwar kammez for the people of Pakistan. In Punjab province.The result shows that by using Egyptian cotton having long staple length and finesses range from 60 to 64 in single ply considered as suitable for fabric quality .

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