

DESIGNING OF SUN PROTECTIVE ACCESSORIES FOR YOUNG FEMALES

Fashion Technology

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ABSTRACT

India is a tropical country, where the population faces extreme temperatures in summer in some places. Being concerned towards personal appearance young females take different protective measures like sun protective accessories and cosmetics which provides protection for a limited time period and also found harmful for skin therefore more functional sun protective accessories were suggested as a better and a safe way of protection. The concept of more functional sun protective accessories which was not new but less popular among consumer group due to lack of availability, ineffective cost and rigid styles therefore in order to suggest a few styles this study was formulated to develop sun protective accessories according to the consumer interests and preferences in sun protective accessories which could be carried with consumer's daily clothing style. Suitable fabric for sun protective accessories was explored and selected on the basis of GSM, density, thickness, linear density, rubbing fastness, colour fastness towards light, wash fastness and cover factor. The selected fabric was tested and rated. Flat sketches of designs for shrug; scarf and jacket styles were prepared and assessed by a selected group of respondents. Sun Protective accessories of the highly preferred flat sketches were developed. Developed accessories were assessed for its consumer acceptance.

KEYWORDS

Sun protection, UPF, Designing, Development, Accessories.

INTRODUCTION

The human race universally wears articles of clothing, known as dress, garment, or attire-on the body to protect them from different climatic conditions. Definition given by **Hardcastle (2006)** explains clothing as the coverings of the torso and limbs, as well as the coverings for the hands, feet and head in the past era. However in present time the end use functions are such as thermal protection, flame protection, chemical protection and so on. Apart from these noticeable hazards there are environmental hazards like direct exposure to sun rays. The statement given by **Alam and Islam (2017)** sun rays that reaches the earth are comprised of 66% of infrared light, 32% visible light, and 2% ultraviolet light, UV rays are of specific concern.

Direct exposure to sun rays needs to be avoided and people need to be aware of it. According to the study of **Dey (2019)** the level of knowledge regarding sun exposure hazards was very low, and sun prevention behaviors were also very poor. A very small group of population takes preventive measures. Sunscreens (products that are placed in contact with human skin with the intention of absorbing, scattering, or reflecting solar UV radiation) are the most common among them and it provides protection for a certain period of time which also has many adverse effects due to the chemicals present in the cream.

Czajkowski and Paluszkievicz (2008) stated that the clothing offers the safest protection from UV radiation (UVR). The protection properties of textiles depend upon constitutional and unconstititional characteristics of fabric. The constitutional properties are fabric content or fiber type, the transmission rate of UV rays is affected by the fiber type. And its protective properties depend on constitutional and unconstititional properties fabric. **Davis (1997)** has stated that a fabric SPF usually increases with mass or weight increment but the relationship was not linear. The concept of sun protective cosmetics is very popular among adults but in counterpart of it sun protective accessories (scarves, stoles and hats) has always been an important means of protecting oneself. Although there's a range of sun protective accessories available for providing sun protection, the size of its market is narrow due to lack of unawareness and high end prices. Market price of sun protective accessories by different brands ranges from purchasing a pair of sun protective gloves to cost 3,683 ₹ according to a brand known as solbari (www.amazon.com). There are brands such as Coolibar, UV fashion, REI, UV skinz and Athleta those are providing sun protective accessories. Reasons behind not using these accessories are somewhat their inflexible and rigid designs that don't support the daily clothing style of the consumer group. Adults have influence from fashion portrayals and celebrities and they do not want to spend on something which had a boring appearance.

Hence present study was formulated by exploring and testing suitable fabrics concerning the efficiency of the cost. In this study the idea of trend based designs in sun protective accessories with maximum skin

coverage has been implemented. The core concept of this study was to develop styles in sun protective accessories in reference to current fashion choices.

2. METHODOLOGY

2.1 Identification of consumer awareness needs and interests for development of sun protective accessories

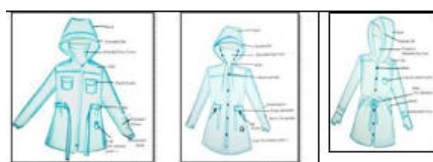
An e-survey was conducted for identifying consumer awareness level towards sun protection, common problems caused by sun exposure, usual time periods spent under sun exposure, identifying consumer interests and preferences for sun protective accessories and their material was conducted via e-platforms. Random sampling technique was used for selection of sample. Consumer preferences were remarked and followed for fabric content, color, and pattern and for styles of sun protective accessories.

2.2 Sketching of designs for sun protective accessories

Flat sketches of designs were developed after identifying consumer preferences in styles of sun protective accessories to find out the most preferred designs in developed sketches. Total 17 designs for all the categories were developed, for jacket, for shrug and for scarf style were developed.

Table:1 Jacket style designs J1, J2, J3.

Jacket Style Designs



DESIGN: J1

DESIGN: J2

DESIGN: J3

Table :2: Scarf style designs SC1, SC2, SC3 SC4, SC5 and SC6

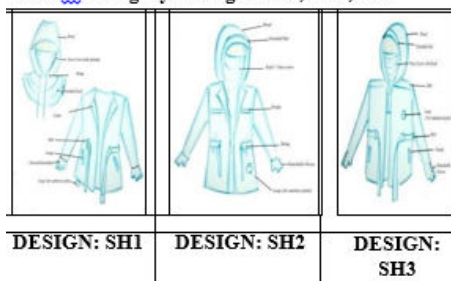
Scarf Style Designs



DESIGN: SC1

DESIGN: SC2

DESIGN: SC3

Table:3 Shrug style designs SH1, SH2, SH3**Table 4. Selected fabric samples**

Fabric sample code	Fabric sample	Weave	Material
S1		Plain	Cotton blended
S1			
S1			

2.3 Testing of selected fabric samples for sun protective accessories and Ultraviolet Protection Factor (UPF) test of selected fabric Australian/New Zealand standard AS/NZS 4399:1996

Table.1 shows the fabric samples selected through market survey on the basis of density, GSM, thickness and appearance. The selected fabric samples were tested for GSM, thickness, linear density, colours fastness towards light, washing, rubbing cover factor and UPF. **Akgun (2010)** stated Ultraviolet Protection Factor (UPF) as the scientific term used to indicate the amount of ultraviolet (UV) protection provided to skin by fabric. UPF measures both UVA and UVB radiation blocked. UPF signposts only the protective property of textile material it is not about the garment. UPF rating does not refer to the design of the garment, just its material. The testing of fabric UPF sample was done by **NORTHERN INDIA TEXTILE RESEARCH ASSOCIATION (Linked to Ministry of Textiles, Government of India), Raj Nagar, Ghaziabad**. Vitro method (Australian/New Zealand standard AS/NZS 4399:1996) was used for testing fabric UPF.

2.4 Consumer acceptance assessment of developed accessories

Most preferred designs for each style shrug, scarf and jacket were developed. The developed accessories were assessed by a selected group of 40 respondents, which was comprised of apparel designing students, female candidates working in apparel industry and PhD scholars of the Department of Home Science.

3. RESULTS AND DISCUSSIONS

3.1 Demographic profile of the respondents

Table 5: Demographic profile of the respondents (n=84)

S.No.	Variable	Category	Frequency
1.	Age	18-32	92 %
		32-46	8%
2.	Profession	Student	76%
		working	21%
		Non- working	3%

Data in Table: 2 Show the demographic Status of the respondents. The age of respondents was 18-46. Great segments, 92% of respondents were fall under age group of 18-32 whereas only 8% respondents were found under age group of 32-46. Most of the respondents were students (76%) followed by 21% working and 3% non-working respondents.

3.2 Consumer awareness level towards direct impact of sun exposure (n=84)

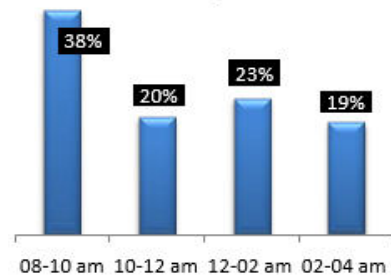
Level of awareness regarding direct impact of sun exposure

**Fig: 1: Percentage distribution of consumer awareness level**

As shown in the Fig:1 major segment of respondents 58.33% respondents were found aware about the direct impact of sun exposure on skin whereas 41.75 % was found unaware about it. Study conducted by Kumar (2019) had studied the consumer awareness level towards direct impact of sun exposure on sample size of 350 and found that a major segment of respondents were unaware of it.

3.3 Usual Time periods of respondents spent under sun exposure by the respondents (n=84)

Time period usually spent under sun exposure

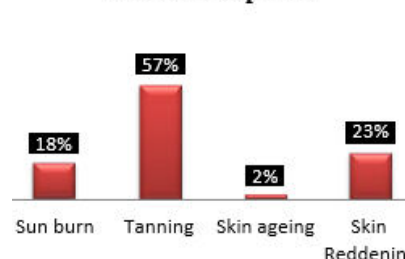
**Fig: 2: Percentage distribution of Time period usually spent under sun exposure**

As the Fig:2 portrays the spent time periods of respondents spent under sun exposure were found between 08-10 am 38% followed by 20%, 10-12 am, 23 % 12-02 am and 02-04 am 19%. From the collected responses it was found that a major segment of the respondents spent the time between 08-10 am under the sun exposure.

3.4 Common harmful impacts of direct sun exposure faced by the respondents (n=84)

Data shown in the Fig: 3 illustrate the common problems faced by the respondents. From the collected statistics tanning was found as the most dominant harmful impact among the given four impacts.

Common harmful impacts of direct sun exposure

**Fig: 3 Percentage distributions of Common harmful impacts of direct sun exposure faced**

Tanning was being faced by 57% respondents pursued by sun burn, 23% skin reddening, 18% sun burn and Skin aging only 2%.

3.5 Consumer preferences in sun protective measures (n=84)

Preferences in protective measures for sun protection

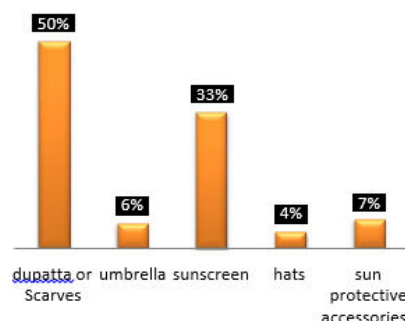


Fig: 4 Percentage distributions of preferences in protective measures for sun protection

The preference in sun protective measures shown in the Fig: 4. as the figure shows that a majority (50%) of respondents were using dupatta or scarves to protect themselves from sun. The rest of 33% respondents were using Sunscreen, 7% sun protective accessories, 6% umbrella and 4% respondents were using hats.

3.6 Consumer preferences for sun protective accessories (n=84)

Table: consumer preferences for sun protective accessories (style, fabric content, fabric content and fabric color)

S.no			Percent- age
1.	Style	Scarf	36%
		Shrug	23%
		Jacket	23%
		Shirt	18%
2.	Fabric content	Natural material	65%
		Cotton blended	35 %
3.	Colors	Pastel colors	56%
		Bright colors	35%
		Dark colors	9%
4.	Fabric pattern	Solid fill patterned	36%
		Printed fabric	64 %

Consumer preferences for style, fabric content, colors and fabric is illustrated in the above given table.

3.7 Assessment of developed flat sketches designs for sun protective accessories (n=84)

Table.3 Percentage distribution of consumer preference for jacket, shrug and scarf style designs

Design	Jacket Style (J)	Shrug Style(SH)	Scarf Style(S)
1	23%	14%	35%
2	28%	22%	39%
3	46%	64%	26%

Total 9 designs three designs for each category for jacket, for shrug and, for scarf style were developed. Most preferred styles among respondents were selected. The designs were assessed by selected group of respondents this was composed of apparel designing students, female candidates working in apparel industry and PhD scholars of the Department of Home Science. The designs were assessed by using 5 point rating scale.

3.8 Testing of selected fabric samples for sun protective accessories

Fabric Sample	S1	S2	S3
Fabric cover factor	19	26	13
Light fastness		8	8
Wash fastness	CC	5	5
	CS	5	5
Rubbing fastness	W. R	CS	5
		CC	5
	D. R	CS	5
		CC	5
Linear density (tex)		10	20
Density (in square cm)	wefts	30	28
	warps	30	32
Thickness(mm)		0.16	0.18
GSM (g/m2)	102	122	115

3.9 Development of sun protective accessories

Three most preferred designs for each style were prepared (J3, SH3& SC2 as fig: 12, 13 and 14 shows. Designs J3 which was found as the most preferred design in jacket style, were develop. For shrug style as design SH 3 was found most favorable out of all 5 styles and for scarf style design SC 2 was rated with the highest score.

3.10 Consumer acceptance assessment of developed accessories

The most preferred designs of each style shrug, scarf and jacket were developed. The developed accessories were assessed by a selected group of 40 respondents, which was Present study had screened that there was a major segment of respondents (42 %) who were found unaware about the impact of composed of apparel designing students, female candidates working in apparel industry and PhD scholars of the

department of home science. The designs were rated with five point rating scale in the table. The accessories were assessed based on donning and doffing, coverage providence, appearance and handling.

**Fig: 12: Developed jacket style sun protective accessory****Fig: 13: Developed shrug style sun protective accessory**



Fig. 14: Developed scarf styles sun protective accessory

CONCLUSIONS

According to the collected literature it was discovered that usually natural fabrics transmits more UVR than synthetic fabrics.

Table.4 Percentage distributions of respondents according to the given rating score for developed accessories appearance, Skin Coverage providence, Donning & Doffing (based on attached fasteners) and Handling. (A= Very Good, B= Good, C=Average, D=Poor, E=Very Poor)

Style	Rating Level	Appearance	Skin Coverage providence	Donning & Doffing	Hand - ling
Jacket style	A	47%	52%	45%	38%
	B	26%	40%	39%	34%
	C	23%	8%	13%	28%
	D	4%	0%	3%	0%
	E	0%	0%	0%	0%
Shrug style	A	47%	52%	54%	38%
	B	26%	40%	43%	34%
	C	23%	8%	3%	28%
	D	4%	0%	0%	0%
	E	0%	0%	0%	0%
Scarf Style	A	51%	76%	45%	35%
	B	32%	16%	39%	34%
	C	17%	8%	13%	30%
	D	17%	0%	3%	0%
	E	0%	0%	0%	0%

Present study had screened that there was a major segment of respondents (42 %) who were found unaware about the impact of direct sun exposure and tanning, skin reddening and sun burn were the most common problem faced by the respondents.

The main reasons for not using sun protective accessories were lack of awareness; unavailability, high prices, and rigid and unpleasant style

as observed by respondent. Synthetic fibers such as polyester were found more effective in blocking UVR and cotton blend was suggested as a better option for material of sun protective accessories. It was found that that protection provided by textiles and clothing is confounded by interactions among variables from the collected literature. Such as; fiber content yarn count, density, gsm, thickness, weave type and fabric cover factor. Shrug style, scarf style and jacket style sun protective accessories were found more pleasing among respondents. Printed pastel colored fabrics were found pleasing for sun protective accessories. This studied literature exemplifies that the wise correlation while selection of material for any specific is an important factor to be considered among constitutional and unconstititional properties. The developed sun protective accessories were found functionally acceptable.

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