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Protective Clothing for Paraplegic Women

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ABSTRACT The problems of paraplegic women were identified by interview as well as observation methods The problems encountered by them were: difficulty in wearing and removing of upper garments due to pain in upper limbs, slipping legs in garments and removing them, garments and bed wetting because of incontinence, bunching of garments causing discomforts and bed sores at pressure points like scapula region, hip or back bones and wounds due to traction belt. Suitabilty assessment of functional features provided in the garments of paraplegics in accordance to their clothing related problems revealed that *kameez* made with center front placket and large armholes were assessed to be highly suitable for the patients who had pain in their upper limbs. *kameez* back made to hip length were found to be very comfortable as bunching and wetting of garments could be prevented. A vest designed with back pocket for poly fiber padded cushion provided comfortability at scapula region while sleeping and sitting. *Salwar* with crotch length placket was assessed to be highly suitable due to ease in dressing/undressing as well as changing of napkins and pads. Napkin with side placket, padded with poly fiber at identified areas was found to be very appropriate as it could be changed easily and padding provided sufficient comfortability at pressure points.

INTRODUCTION

Paraplegics are the persons who are suffering from paralysis of the legs and lower part of the body. Most of such patients face problems of incontinence. Under such circumstances they need diapers or pads that absorb the urine to prevent bed-wetting and spread of diseases. The napkins or underwear and the lower garments should have special plackets which can be changed easily without undressing the entire garments. The individual with sensory loss face many more problems because clothing that put pressure on the body, thick seams, rough fabrics, inappropriate bedding and continuous sleeping in one position also lead to formation of pressure sores. To overcome the problems of the paraplegics, functional garments were designed which were subjected to suitability assessment. The present part of the paper highlights the suitability level of the functional features incorporated in the garments of the paraplegics.

METHODOLOGY

In a study conducted on 200 physically handicapped, 25 respondents were suffering from paraplegia and among them 10 were females. Interview and observation methods were used to identify their clothing related problems. Designs of upper as well as lower garments were sketched by incorporating functional features in accordance to problems encountered by the paraplegics. The sketched designs were got evaluated from 10 judges comprising of clothing and textiles experts and occupational therapists. The selected designs of garments were constructed to assess their suitability. The functional garments were given to the ten respondents for three consecutive trials. The suitability Performa was developed to assess the suitability of the functional features incorporated in the garments. Extent of suitability was assessed on three point rating scale i.e. high, medium and low with a score of 3, 2 and 1. Observations of respondents and their care takers were recorded to calculate the suitability score.

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RESULTS AND DISCUSSION

Specification of Designs for Functional Garment

Following problems were encountered by the paraplegics

Upper Garment: a) Wetting of upper garments because of incontinence, b) Bunching of upper garments causing discomfort and bedsores, c) Wearing and removing upper garments by those patients only who have pain in their upper limbs, d) Bedsores at scapula region.

Lower Garments: a) Slipping legs in gar-

ment and removing them, b) Garments/bed wetting because of incontinence, c) Bed sores at hip/back bones, d) Wounds due to traction belt.

In accordance to the above mention clothing related problems functional features were incorporated in women's most common dress i.e. *kameez-salwar*. Four designs each were developed for *kameez* , vest, and napkin but in case of lower garments, one *salwar* was designed having two plackets along the crease line. *Pyjama* was suggested for women due to the fact that it was less voluminous than *salwar* and that was one of the requirements of garments for paraplegics to prevent bunching. Other articles developed were pads and waist belt. The specifications of the constructed garments have been depicted in table 1.

Suitability Assessment of Functional Garments

All the paraplegics selected for suitability assessment of functional garments were dependent on others for dressing/undressing of lower garments. Out of them, five respondents

Table 1: Specification of functional garments

Problems encountered	*Design No.*		*Functional features incorporated as per the problems*
Upper Garments	**Kameez**		
a) Wetting of upper garment because of incontinence	**1**	a)	• Magyar sleeves • Centre front ¾ placket fastened with zipper
b) Bunching of upper garment causing discomfort and bedsores		back)	• Back side folded till hip length and front side till knee length
c) Wearing and removing upper garments by those patients only who have pain in their upper limbs.	**2**	a&b)	• Back side hip length and front side till knee length
		c)	• Raglan loose sleeves • Centre front full placket fastened with big press buttons
d) Bedsores at scapula region			
	Vest		
	1	c)	Centre front full placket fastened with press buttons
		d)	Pocket* at the back for inserting poly fiber padded cushion
	2	c)	Placket at shoulder line and side seam fastened with Velcro tape
		d)	Pocket* at the back for inserting foam padded cushion of one inch thickness
Lower Garments	**Salwar**		
a) Slipping legs in garment and removing them	**1**	a&b)	• Placket along crease line from nepha till mid thigh fastened with zipper
b) Garments/bed wetting because of incontinence			• Elastic on front side and belt at the back fastened with Velcro tape
c) Bed sores at hip/back bones			
d) Wounds due to traction belt	**2**		• Salwar with soft elastic in nepha
	Pajama	a)	• Placket along outer leg seam from nepha till knee length fastened with zipper • Belt in front and elastic at the back fastened with Velcro tape
	Napkin	b &c)	• Placket on one side and at the bottom fastened with Velcro tape
	1		• Padded with foam, Interfaced with layer of plastic at identified areas
		b & c)	• Placket on both sides • Fastened with Velcro tape and string padding with poly fiber at identified area
	Pads-1	b)	Disposable pads
	Pads-2	b)	Home made multilayered pad covered with washable protective covering
	Waist belt	d)	Cotton belt quilted with sponge

Table 2: Suitability assessment of functional garments

Functional features of the garments	*Functional characteristics*		*Suitability score*
Upper Garments			
Kemeez			
A. Length :	a)	Prevents wetting and bunching of *kameez*	2.8***
I. Back side hip length		Comfortable*	3.0***
i) Cut to hip length		Comfortable*	2.0**
ii) Folded and tacked till hip length			
B. Sleeves and Placket :*	a)	Easy to wear	2.2**
I. Magyar sleeves with center front ¾ placket	b)	Easy to remove	2.2**
	c)	Prevents pain in arms while dressing*	2.0**
	a)	Easy to slip the arm	2.6***
II. Raglan sleeves with center front full placket	b)	Easy to remove	2.6***
	c)	Prevents pain in arms while dressing*	2.5***
C. Fasteners:	a)	Easy to fasten	2.8**
I. Soft sliding zipper	b)	Easy to unfasten	3.0***
	c)	Conceals placket	3.0***
	a)	Easy to fasten	2.4***
II. Press buttons	b)	Easy to unfasten	2.6***
	c)	Conceal placket	2.0***
Vest			
A. Placket	a)	Easy to wear	2.7***
I) Centre front placket	b)	Easy to remove	2.7***
	c)	Easy to operate	2.5***
	a)	Easy to wear	1.3*
II. Placket along side and shoulder seam	b)	Easy to remove	2.5***
	c)	Easy to operate	1.3*
B. Pocket at the Back to Insert Cushion	a)	Provides comfort ability while sleeping and sitting*	3.0***
I. Cushion padded with poly fiber	a)	Provides comfort ability while sleeping and sitting*	2.7***
II. Cushion padded with sponge			
Lower Garments			2.0**
Pajama/Salwar			
A. Waist Placket:	a)	Easy to slip the leg	2.5***
I. Along outer leg seam till knee length	b)	Easy to set at waist	1.5*
	c)	Easy to remove	3.0***
	d)	Easy to change the napkin/pad	2.8***
	e)	Comfortable*	1.2*
	a)	Easy to slip the leg	2.5***
II. Along crease line from *nepha* till thigh level	b)	Easy to set at waist	2.5***
	c)	Easy to remove	2.7***
	d)	Easy to change the napkin/pad	2.4***
	e)	Comfortable*	2.6***
	a)	Easy to slip the leg through	2.2**
III. All round elastic in *nepha*	b)	Easy to set at waist	2.5***
	c)	Easy to remove	2.7***

Suitablity level: *Low (1.002, 1.66); **Medium (1.67, 2.33); ***High (2.342, 3.00), 4=observations of the respondents only

were not able to wear/remove their upper garments either because of pain in their upper limbs or weakness caused due to prolong illness. Such patients were dependent on others for their upper garments too. So, they also required easy to wear functional features in their upper garments, which were evaluated by them alone. Since paraplegics required help for most of the garments while dressing/undressing, so caretakers assessed the garments with the view as to how easy it was for them while changing the clothes of their wards, and respondents expressed that how convenient it was for them when they were being dressed by their caretakers. The observations of respondents and their caretakers were used to assess the suitability level of the functional features.

Upper Garments: Hip length of back side of *kameez* was found highly suitable as it prevented wetting and bunching (2.6). The *kameez* cut to hip length was assessed to be very comfortable (3.0) as compared to the *kameez* folded to hip

length (2.2). So, to retain the comfort ability of the *kameez* it should be cut to hip length, and front length can be made as per the choice of the wearer.

To solve the problems of respondents whose upper limbs were affected the *kameez* with center front full placket was evaluated to be highly suitable because of ease in dressing/undressing (2.6). It also prevented pain to a greater extent (2.5). The *kameez* with ¾ placket was found moderately suitable as it was not found very easy to wear/remove (2.2), so it could not prevent pain properly (2.0).Vest with center front placket was found to be very convenient while dressing/ undressing (2.7).Its plackets could also be operated very easily(2.5). as compared to vest with shoulder and side placket. One of the major reasons for bed sores was hard bedding so, to provide cushioning at scapula region, one pocket was made at the back of the vest to insert cushion. Due to insulation nature of cushions, vest as well as other garments was tried in winter. Poly fiber cushion assessed to be much more comfortable (2.7) than sponge cushion (2.0). This idea of poly fiber cushion for winter and air filled cushion for summer was very much appreciate by the nursing staff and occupational therapists.

Lower Garments: For ease of dressing/ undressing and to change the napkin/pads conveniently *salwar* was made with crotch length placket along the crease line. The *salwar* had belt at the beck and elastic in the front but it was reverse in *pajama* which had knee length placket. The paraplegics who had recovered from incontinence, and numbness but not from immobility for them *salwar* having soft elastic in nepha was constructed. Suitability score at both type of plackets made dressing/undressing very easy as their score ranged from 2.5 to 3.0 Salwar with crotch length plackets could be set very easily (2.7) but *pajama* with long placket was difficult to set (1.0). Irrespective of the length, both the plackets were assessed to be very suitable(2.8) as napkins and pads could be changed without any problem. *Salwar* with all round soft elastic were assessed to be highly suitable for those respondents who did not require napkins because of the ease of removal (2.7), ease of setting at waist (2.5) and ease of slipping the legs (2.2).

Zipper used for fastening/unfastening of side/ front plackets was assessed to be highly suitable because of ease of fastening/unfastening (2.6). Side placket/zipper were not at all found comfortable (1.2). because these pinched while lying in side position but there was no such problem with the front plackets/zipper, so they were assessed to be highly comfortable(3.0). Regarding, all round elastic was assessed to be most comfortable (2.4) followed by belt at the back (2.2) and elastic at the back (1.5).

The suitability score about napkins revealed that placement of plackets in both the napkins was assessed to be highly suitable because napkin could be worn and removed very easily scoring in the range of 2.5 to 2.8. But the napkin with side plackets was found appropriate as it was moderately comfortable (2.6) whereas the napkin with placket at the bottom was not found comfortable (1.4). The napkin padded with poly fiber at identified areas was found to be more comfortable (2.6). than napkin quilted with foam(1.2).but none of the pads served the purpose. To provide soft layer under the traction belt, a fabric belt quilted with foam was developed. It was assessed to be very comfortable (2.8) by the respondents when used below the traction belt.

CONCLUSION

It can be concluded that for the paraplegic women who have pain in their limbs, the upper garments must have large armholes and center front full placket. Back side of *kameez* should be hip length. Klinger and Streble (1984) suggested hip length garments for sitting position. Vest should have pocket at the back for inserting cushion to prevent bed sores at scapula region.

Salwar must be made with crotch length plackets, belt at the back but elastic in the front Two side seam zippers for ease in toiletring were recommended by hall and Vigon (1964). Use napkins with side plackets and pads to prevent bed wetting. Boettke (1963), Bavendam (1990) and Fowler (1990) recommended protective pants/diapers and pads as bed saver. Beber (1980) designed brief but Dallas and Wilson (1981) developed panties for incontinent.

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