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Designing And Construction Of Functional Clothing For A Child With Disability: A Step Towards The Social Responsibility.

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Abstract:
Clothing is one of the basic needs of human. The children with disability have different clothing requirement from an average and normal group. Both functional and aesthetic features are required in the clothing of differently abled children. Functional features are required to allow more independence in dressing and more self sufficiency in daily activities whereas aesthetic feature are required to distract attention from the disabled part and to provide psychological satisfaction to the wearer. This type of clothing helps the differently abled children to link with the main stream of the society. Therefore there is an urgent need to design clothing according to their special requirements. The aim of this study was to design and develop functional clothing for a differently abled child with paralysis of hands and legs. A questionnaire was developed for personal interview to assess clothing requirements of differently abled child. The identified clothing requirements were incorporated in garment designs. After designing the garment was constructed and given to the child for wear trial. Designed and constructed garment was found to be highly suitable with the suitability level of 2.66 by the differently abled child and his mother. This type of Designing and construction of functional clothing not only give physiological comfort to the children but also enhance psychological comfort by enhancing their selfsteem.

Key words- Paralysis, differently abled, adaptive clothing, suitability level, functional clothing

1. Introduction

According to Census 2011 data on disability it was found that India has 20.42 lakh children with disability aged between 0 and 6 years. Around 71% of them - 14.52 lakh children - are in rural areas. There are 5.9 lakh children with disability in the cities. Of them, 11.04 lakh are male and 9.38 lakh are female children. Among them, 1.49 lakh children have multiple disabilities (1). Children with physical disabilities are also an important component of society. Physical differences, such as limb disability, often obstruct those in this population from participating in daily activity and communication. One of the reasons for this is a shortage in the marketplace of specially designed, functional clothing, which should be attractive and stylish in a manner similar to the garments used by normal people in embellishment, but at the same time convenient to put on and take off (2).

Clothing plays an important role in not only protecting us from various external factors but also provides physiological as well as psychological comfort to humans. Our preferences and behaviour regarding the clothing we wear depends on various factors. Besides these usual

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transformations of human body sometimes birth defects or an accident injury may cause disability to the person. The Los Angeles Times reported in 1985 that in a valiant effort to find a kinder term than handicapped, the democratic National Committee has coined **differently abled.**

According to a **WHO report of 2012,** Disabilities are an umbrella term, covering impairments, activity limitations, and participation restrictions. Impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual when confronted with life situations. Thus, disability is a complex phenomenon, reflecting an interaction between features of a person's body and features of the society in which he or she lives (3). Throughout the years, several types of disability classifications have been elaborated, the most used being The International Classification of Functioning, Disability and Health**,** which establishes the following disability types: behavioural, communicational, personal care, locomotor, physical, dexterity, and situational disabilities.

Among all type of disability Clothing is mainly deals with physical disability. A physical disability is a limitation on a person's physical functioning, mobility, dexterity or stamina (4). Disabilities have a strong impact on one's ability to move around freely. The functional capacities that are hindered by motor affections are: walking, climbing the stairs, sitting or standing for a long period of time, grabbing or handling various objects, maintaining body balance and coordination, lifting, stretching, as well as other ordinary activities (5). Almost all patients who were the victims of an accident or of a vascular/cerebral trauma develop a physical condition that limits or impairs their ability to eat, get dressed, take care of themselves, transfer or move. The designing of clothing is done according to the human body's features. The evident differences are observed between people with physical disabilities and normal people. Both aesthetic and functional features are required for the person with disability. The aesthetic features are required for psychological satisfaction while functionalised designs are required for allowing more independence in dressing and undressing the clothes. The clothing for the differently abled person is generally called adaptive clothing or functional clothing. Adaptive clothing is clothing designed for people with physical disabilities, the elderly, and the infirm who may experience difficulty dressing themselves due to an inability to manipulate closures, such as buttons and zippers, or due to a lack of a full range of motion required for self-dressing (6)

The life quality of the differently abled persons can be enhanced by improving the aesthetic appeal and functionality of clothes. But the specific needs of the differently abled persons are different from the majority of population. It varies

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according to certain requirements that are triggered by a particular necessity. Thus, designing of the clothing should be as that the developed clothing must provide additional comfort at functional and sensory levels, as well as at a psychological one **(7).**

The special textile products must have special functions and be manufactured by using fabrics with special properties, such as: Thermal comfort, which becomes paramount for people in wheelchairs or for those who spend a lot of time in bed **(8)** and optimal humidity absorption as well as air circulation are also very important **(9).**

The clothing specially designed for disabled people must allow more freedom and independence when being worn, but it also has to be fashionable. This is why it is essential that these products be comfortable, appealing to the eye, trendy, easy to put on/take off, accessible to all those who are disabled, safe and able to adapt to the wearer's physical needs. This particular type of clothing must satisfy the following requirements that have been given by Curteza Antonela et al. **(7).**

• To provide freedom of movement;

• Be able to keep the handicap under control;

• To provide the required level of safety and comfort;

• To provide the necessary moral and psychological comfort ;

• Be easy to maintain and cleaned in the washing machine like regular laundry, high resistance to rumpling and easy recovery from folding;

• To assure adequate thermal isolation through the use of appropriate fabrics, without increasing the volume and weight of the product;

• To assure the minimum required level of body odour retention by using natural fibres and/or applying anti-bacterial treatments or antibacterial finishing.

There is no section of special garments existing in ready-made industry that caters to the special clothing needs of children with disability. On the other hand the local tailors were unable to design special styles for these children with disabilities. Hence by analysing the severity of the problem faced by the differently abled person there is a need to design clothing that not only added the better experience of dressing or undressing the clothes but also provides the psychological satisfaction. Such clothing problems may be minimized by designing suitable garments for the needy to supplement their personality. Special clothing designed with self-help features encourages the child to dress and undress himself or herself, thus making him or her independent that in turn builds up self confidence within oneself. Such clothes can also be made attractive and fashionable. The aim of this case study was to find out the clothing related problems of a differently abled child to design and develop a winter dress for the child with paralysis of lower

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leg and hands. The case study highlights the suitability level of the functional features incorporated in the garments for the child with paralysis of lower leg and lower hand.

2. Material and methods-

The study was conducted during the year 2014 in the chakferi community of G.B.Pant University of Agriculture and Technology, Pantnagar, Uttrakhand. For the present study an 8 year old boy child was selected. The child was affected by paralysis of lower part of both hands and legs. Further additional information on clothing problems and the constructional details to be incorporated in the special garments was also collected. For this a self structured questions related to the clothing problems and information about existing wardrobe of the child were asked to the mother of the child. On the basis of information two designs were sketched and one of them was selected for construction on the basis of more suitable functionality and attractiveness of the garment according to the mother and his child. The fabric material for pant and hooded sweatshirt were procured from loacal market of Rudrapur, Uttarakhand. The fabric material was cottwool for both hooded sweatshirt and pant. Foam, zipper and Velcro were procured from the local market of Pantnagar Uttrakhand. On the basis of personal interview results, 1 set of garment was constructed according to the body measurement of the subject. Finally the garment was given to the child for wear trial where the wear period for the garment was 1 day. After wear trial the investigator personally interviewed the mother of the child by administering the self structured schedule and gathered the information about acceptability, comfortability and attractiveness of the newly designed functional garment.

3. Results and discussion-

3.1 Personal interview information-

After analysing the interview data it was found that 8 year old boy child has been suffering from the paralysis of lower part of hands and legs since 2 year of age due to an accident. Due to paralysis the child had loss of voluntary movement of lower parts of hands and legs. It was also found that the child was totally dependent on their mothers as far as clothing is concerned. Readymade t-shirts, shorts in summer and sweatshirts, pant in winter were the main clothing of the child's wardrobe. Mothers faced the problems related to donning and doffing of the garments. During donning and doffing of the garments, the child has been suffering from pain in raising the hand due to paralysis of lower parts of hands. The child has been crawling due to paralysis of lower parts of legs but there were no protective clothing for their knees hence there were also the problem of knee's abrasion and sores.

3.2 **Designing of clothing-** while designing of sketches both functional features as well as aesthetic features were considered. The sketches of designs are shown in Design 1 and Design 2 with functional details.

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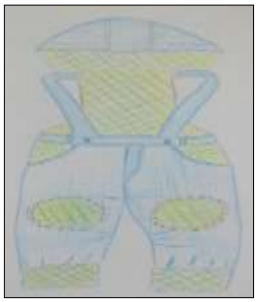
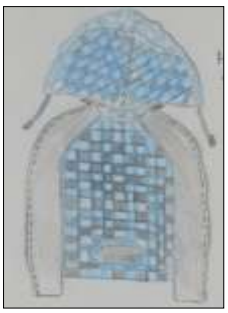
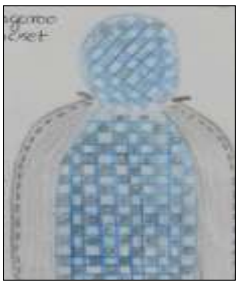


Functional features

- Detachable cushion pad at knee level portion of the garment
- strap belts for easy opening without raising arms

Design 1





Functional features

- Raglan sleeves
- Zipper on sleeves for easy opening without raising the arms
- Padded cushion for knees protection

Design 2

Design 2 was selected for the construction of the garment as per the consent of mother and child according to design suitability.

3.3 Details of the Functional features of the constructed garment-

1. Full sleeve opening through invisible zipper. This feature help in dressing without raising the hands (**Picture 1**)
2. Raglan sleeves were incorporated to provide ease in hand movement **(Picture 1**)
3. Replaceable cushion pads were attached in clothing design so that while crawling the knee region fabric would not abraded and when after some time these pads would abraded then it could be replaced with another padded cushion and attach to the knee portion so that because of tearing of only knee portion's fabric the whole fabric would not have to be discarded (**Picture 1 and Picture 2**).
4. Velcro at waste fly instead of zipper for ease in opening of pant.

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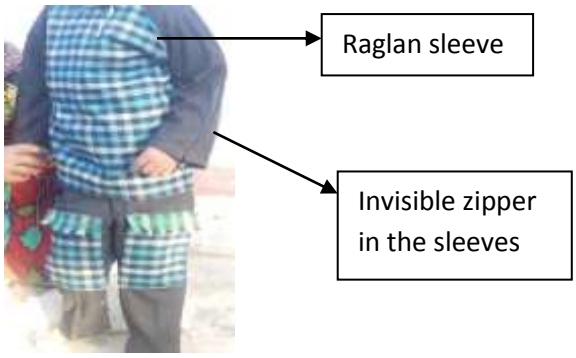
3.4 Details of the Aesthetic features of the constructed garment-

1. Combination of check and plain pattern
2. Designer pocket which was extended to the knees



Picture 1

Picture 2

3.5 Suitability Assessment of Functional Garment- It is clear from the **table1** that the suitability level was found to be 2.66 for both upper and lower garment; it means both upper and lower garments are highly suitable for the child.

Conclusion- Suitability level was found to be high for both pants and hooded shirt. In conclusion, the designed and constructed garment could be beneficial for the child in various aspects. Putting on and off of clothing has become convenient for mother. A physical and psychological sense of comfort and stability could be provided as the functional features are added in this way that there is no difference in the appearance of garment form the usual ones. Aesthetically pleasing clothing enabled the child to enjoy a healthy psychological context. Although this study is only for one child but further work could be done by taking more no. of child for a specific disability so that the particular design could be standardised for a particular disability.

Further recommendation – More number of researches could be conducted in similar way by taking more no. of children with a specific kind of disability like cerebral palsy and other physical disabilities. A proper proposal could be made to incorporate this type of **"functional clothing for the children with disability"** schemes with some governmental schemes to provide proper funding for this work. Moreover various Non Governmental Organisation could also take a step to incorporate this type of functional clothing

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schemes in to the programmes related with the children with disability.

Table 1 Post evaluation Performa

Functional Features of garment	**Characteristics of functional features**	**Frequency**			**Suitability score**
		H.S (3)	**S. (2)**	**S.S (1)**	**Mean Score**
Sweatshirt					
Full invisible zipper on sleeves	Arms have not to raise while dressing or un dressing the clothes	**3**	-	-	**1**
Reglan sleeves	For easy movements of arms	**3**	-	-	**1**
Hood	To provide protection from cold	-	**2**	-	**0.66**
				Suitability level for sweatshirt	**2.66**
2. Pants					
Patch of padded cushion (in shape of flap pocket)	To provide protection to knees against abrasion	**3**	-	-	**1**
Velcro	For easy opening	**3**	-	-	**1**
Frontier Pocket	To keep hand and other accessories	-	**2**	-	**0.66**
				Suitability level for pant	**2.66**

H.S= Highly suitable, S= Suitable, S.S=Somewhat suitable

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Suitablity level: *Low (1.002, 1.66); **Medium (1.67, 2.33); ***High (2.342, 3.00),

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