A Study on the Design of Hospital Gowns for Child Patients in Korea

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Abstract

This study investigated the usage of child hospital gowns to suggest a gown design suitable for child inpatients in Korea. The satisfaction on size suitability and design of child hospital gowns was surveyed among 219 child inpatients in 20 general hospitals. The most hospitals provided 2 to 4 different size pajamas for child inpatients. However, 53% of the subjects chose not to wear the uniform pants that the hospital provided and 28% did not wear the shirts. The reasons most often given for rejecting to wear the uniforms were unsuitable size (42.1%) and difficulty in taking on and off (26.2%). The dissatisfactory parts of hospital gowns were pants length (27.9%), sleeve length (19.6%), pants waist closure (16.9%), and neckline opening (11.9%).

The preference in gown design for child inpatients varied by age ($p<.05$) and the styles that they had worn ($p<.05$). Significant differences for style preference were found in the opening of shirts or pants, pants waist closure type, and pants length. These results suggest that the hospital gowns for child inpatients need to reflect the wide diversity in their body size and preference in style.

Key words : hospital gown, child patients, design preference.

I. Introduction

The economic development and the subsequent changes in life style in recent years were extended to the expectation for better services in hospitals. In Korea, most hospitals provide their inpatients with uniform gowns for an efficient maintenance of patients' outfits during hospitalization. These gowns are clinical supplements intended to provide physical and psychological well-being for the inpatients[1]. Patients' satisfaction of hospitalization is generally influenced by a complex mixture of prognosis, quality of treatment, and the experience of health improvement[2]. In addition to the actual medical procedure, there are a number of potential sources of stress for a hospitalized child, who is undergoing diagnostic tests, medical treatment, or surgery[3].

Thus, hospital patient gown should be desi-

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gned to fulfill the patient's physical and emotional needs. Children tend to move continuously and often impatient especially when they are ill. Children have different body proportion from that of adults, and their body size is different by age or body development stage. Therefore children need their own garment sizing system which properly reflects their body sizes. However, previous studies revealed that the size range of child hospital gown in Korea was very limited, and that the gown design was not different from that of adults[4].

The purpose of this study was to develop a hospital gown design appropriate for child patients at 2 months to 15 years of age. Toward this goal, the researchers examined the design and size of hospital gowns for child patients in Korea. They also surveyed the user's satisfaction on fit or funtionality of child hospital gown and design preference for style, detailed shape, and fabric features. The results were analyzed with respect to the subjects' age and stature.

Ⅱ. Review of Literature

An essential factor for evaluating the suitability of the garment sizing system for children is to understand how a child's body grows between infancy and childhood. During this period, the shape and proportion of body are continually changing. Children's body growing rate is different by age their physiological characteristics[5]. Children's growth is classified by age as follows: neonate (birth to 1 month), infant (1 to 12 months), toddler (1 to 3 years), preschooler (3 to 5 years), and school age child (5 years to puberty)[6].

It is apparent that the same mode of outfit does not suit children at different stage of development. To solve the problem of garment fit, manufacturers have divided children's wear into several size ranges. The size categories for children's wear are infants, toddlers, children, and girls / boys[7,8]. Each size category consists of a range of sizes for children of similar body proportions and developmental stages. For example, infants have the highest growth rate, and their garment sizes are usually specified at 3 months intervals, i.e. 3 months, 6 months, 12 months, and 18 months. The toddler category refers to 1 to 3 years of age when children begin to walk. Clothing for this age group must be still designed with adequate fullness to accommodate diapers. The children category refers to the youngsters at preschool age. Finally, the boys and girls category refers to the grade schoolers, usually the children from 7 to 10 years of age. Garments for this age group should reflect the unique changes of their bodies, i.e. definite slimming and lengthening of the torso and limbs[9].

Garments for children should fulfill the particular clothing needs at their ages. Since neonates simply alternates between sleep and wakeful modes, ready-to-wear clothes design for neonate are very limited[10]. For infants, clothing should be comfortable in terms of

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freedom of body movement and hygiene. Likewise, toddlers need garments that provide maximum freedom for the usual activities of their ages. A toddler moves from dependency to relative independence for their activities. With increased refinement of grasp ability, the toddler of 18 to 21 months is able to handle large buttons[11]. Toddler's interest in clothes is particularly influenced by the ease of taking them off since the ability to remove their clothes affect an enormous accomplishment[12]. On the other hand, children of preschool age need make-believe clothing to accommodate their dream-world fantasies[13]. Children at this stage are generally eager to dress themselves. By four to five years of age, they manage to dress alone quite efficiently in general. Clothes with large armholes and simple designs would make them learn that to dress by themselves is easy. Children at 3 to 6 years of age show great interesting on color[14]. They often refuse to wear a garment with no apparent reason. The cause of the refusal of wearing the clothing could be a scratch of skin that caused from edge finish of the seam alowance or texture of fabric, uncomfortable fit, or unfavorable color[15].

Hospital gown is the special gown for the patients being in hospital. The hospital gown has the function of controlling body temperature, protecting body from bacillus, and assisting the nursing care and hospital treatment[16].

The previous studies of hospital gown design suggested that the hospital gown with shoulder or upperarm opening was convenient to take on and off the gown. It is evaluated by the inpatients that the pants with side seam opening and elastic band waist closure was convenient[17].

Ⅲ. Research Methods

1. Questionnaire

The self-administered questionnaire was composed of four sections : (1) usage of the hospital gown, (2) the satisfaction on fit or functionality, (3) options for design preference, and (4) demographic information. In addition, it was also surveyed whether they actually wore the hospital gowns provided for them. In case of not wearing it, the reasons for rejecting the hospital gown were investigated. The satisfaction in fit for length and fullness of shirts and pants was measured in 5-point Likert scale, where 1 indicates too tight or short, and 5 indicates too loose or long.

To inquire the child inpatients about their design preferences, sketches of the uniform design features were presented using flat line drawings. The design features of the shirt were surveyed on five categories : sleeve length, sleeve /shoulder shape, neckline, closure type, and opening. For design preference survey, multiple options were given for (1) full, three-quarters, or short sleeve length, (2) set-in or raglan sleeves, (3) round or V-neckline neckline, (4) drawstring, button,

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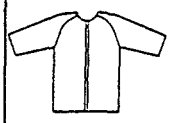
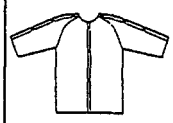
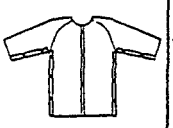
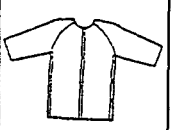
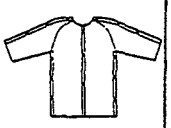
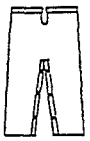
Style	A	B	C	D	E
Shirts Opening	 center front (CF)	 CF/overarm	 CF/underarm/ side seam	 CF/side seam	 CF/overarm/ side seam
Pants Opening	 no-opening	 side seam	 front of a leg	 inseam leg	

<Fig. 1> The illustrations of shirts and pants opening.

snap, or hook-and-loop tape closure, and (5) 4 different pants opening and 5 different shirts openings(Fig. 1). Demographic variables included were age, height, weight, and gender.

2. Subjects

In this study, 219 hospitalized children were surveyed in 20 different general hospitals in Seoul, Korea. The average age of subjects was 4.2 years, and 32.9% of the subjects were under 2 years of age. Children at 2 to 4 years of age were 33.8%. The mean height was 102.9cm, and 40.7% were shorter than 80cm. The mean body weight was 18.2kg, and 26.5% were under 10.0kg (Table 1). All subjects did not have serious surgical treatment at the time of the survey.

3. Procedures

A pilot study was conducted with 30 child inpatients in three different general hospitals. The results from the pilot study led us to refine the instructions for answering the questions and to define appropriate options for design preference survey. Pilot study results were not included in the analysis. In the main survey, data were collected from 20 different general hospitals on February and March in 1996.

The child inpatients filled out the questionnaire, but if the child inpatients who could not read and write, the parents asked the children their thought and filled the form.

For data analysis, subjects were compiled into 5 groups by their age or height. The age groups were under 2 years of age, 2 to 4 years, 5 to 7 years, 8 to 11 years, and 12 years and over. The height groups were under 80cm, 81 to 100cm, 101 to 120cm, 121 to 140cm, and over 140cm. The effects of age and height on fit satisfaction and design preference were evaluated by analysis of variance(ANOVA), Duncan test, Chi-square test, and t-test.

<Table 1> Characteristics of subjects

Characteristics		n	%
Gender	Male	128	58.8
	Female	91	41.2
Age (years)	under 2	72	32.9
	2~4	74	33.8
	5~7	31	14.2
	8~11	28	12.8
	12 and over	14	6.4
Height (cm)	under 80	89	40.7
	81~100	48	21.9
	101~120	36	16.4
	21~140	18	8.2
	over 140	28	12.8
Weight (kg)	under 10	58	26.5
	11~20	101	46.1
	21~30	30	13.7
	31~40	13	5.9
	over 41	17	7.8

Ⅳ. Results and Discussion

1. The Usage of the Child Inpatients' Uniform

Among the hospitals that participated in this study, half of them provided 2 to 4 different size pajamas-styled uniforms for their child inpatients. The others provided both pajamas-styled and one-piece dress-styled uniforms. Chi-square tests were done to determine the effect of age and height on the usage of hospital gown. The results show that the tendency of wearing uniforms was significantly different by height or age. The percentage of inpatients wearing uniform gradually increased with increasing age or height. Children shorter in height more preferred one-piece dress style in comparison with the taller counterparts (Table 2). A sizeable number of child inpatients under 2 years of age (34.7%) or under 80cm of height (31.5%) did not wear the uniforms that the hospital provided for them (Tables 2 & 3). The preference of one-piece dress-styled uniforms was decreased with increment of height or age ($p<.001$) (Tables 3). Especially, only 16.7% of the youngest age group (under 2 year) wear uniform pants. The reluctance of wearing pants in this age group may be attributed to wearing diapers. These result implies that one-piece style uniform is apt to the child patients under 2 years of age. In all age groups, child inpatients wore uniform shirts more frequently than the pants. It implies that uniform shirts may be more important for hospitalization and receiving medical care.

A sizable proportion of the children (19.6%) in the survey were reluctant to wear the inpatient uniforms. The major reasons for the refusal were unsuitable size (42.1%) and inconvenience of changing uniforms (26.2%). In addition, 14.3% of the respondents also pointed out lack of attractiveness of uniform design (Fig. 2). These results imply that design and sizing system for child patient uniforms need to be improved.

<Table 2> Usage of hospital gown by height

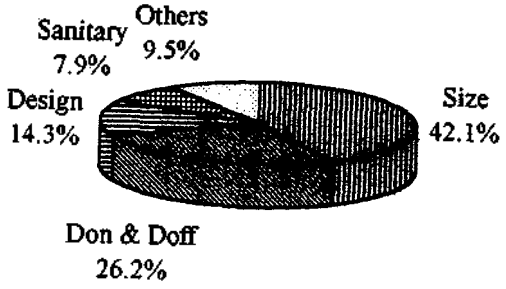
Variables	Height(cm)					χ^2-value
	under 80 (n=89)	81~100 (n=48)	101~120 (n=36)	121~140 (n=18)	over 140 (n=28)	
One-piece gown	17	7	2	0	0	
Pajamas	44	34	29	16	27	17.35***
No gown	28	7	5	2	1	

*** $p<.001$

<Table 3> Usage and Preferred Style of Hospital Gown by Age

Variables	Age(years)					χ^2-value
	under 2 (n=72)	2~4 (n=74)	5~7 (n=31)	8~11 (n=28)	12 & over (n=14)	
Preferred style						
One-piece gown	23	11	3	1	0	
Pajamas	40	54	26	19	14	19.69***
No response	9	9	2	8	0	
Usage of gown						
One-piece gown	16	9	3	0	0	
Pajamas	31	54	24	25	14	20.89***
No gown	25	11	4	3	0	
Usage of pajamas						
Shirts	30	45	24	25	13	22.58***
Pants	12	34	19	23	12	56.21***

*** $p<.001$



<Fig. 2> Causes for rejecting wearing hospital gown.

<Table 4> The dissatisfied features with hospital gown fit

	Features	Percent
Shirts	Sleeve length	19.6
	Neckline opening	11.9
	Shirts length	5.9
	fit at chest	5.9
	Fit at arm	4.1
	Fit at armscye	2.7
Pants	Pant length	27.9
	Waist closure	16.9
	Fit at crotch	5.1

2. Satisfaction on Fit, Functionality, and Design

Child patient's dissatisfaction with hospital gown fit was surveyed, and the results were summarized in 〈Table 4〉. The uniform parts that child patients were least satisfied with were pants length (27.9%), sleeve length (19.6%), pants waist closure (16.9%), and neckline opening (11.9%).

The satisfaction with hospital gowns' fit among different height groups was compared. The satisfaction with the hospital gown fit was significantly different among the five height groups(Table 5). The shirts and pants were too long and loose for the patients shorter than 80cm in height. In contrast, subjects belonged to the 81~100cm and 121~140cm height ranges felt that the shirts size is appropriate. Sleeve was too loose for subjects shorter than 80cm or over 140cm. Sleeves were too long for children shorter than 121cm. The 81~100cm height group was

relatively satisfied with the shirts fit except sleeve length. Child patients taller than 140cm answered that shirts sleeve length was appropriate but pants and shirts were too long or loose. Overall, the pants fit was not satisfactory for all height groups. The pants were too long, and had too much ease on leg in most cases. In order to improve the user's fit satisfaction, the results of this study show that the sizing system for child inpatients go-

<Table 5> ANOVA on dissatisfaction with hospital gown fit by height groups

Features	Height(cm)					F-Value
	under 80 (n=89)	81~100 (n=48)	101~120 (n=36)	121~140 (n=18)	over 140 (n=28)	
Shirts fullness	3.69^{a}	3.08^{b}	3.31^{ab}	3.00^{b}	3.44^{ab}	2.80**
Shirts length	3.64^{a}	3.09^{b}	3.32^{ab}	2.78^{b}	3.23^{b}	3.76***
Sleeve fullness	3.34^{a}	2.93^{b}	3.00^{b}	2.87^{b}	3.27^{a}	3.25**
Sleeve length	3.65^{a}	3.36^{a}	3.59^{a}	2.93^{b}	3.04^{b}	4.41***
Pants fullness	3.71^{a}	3.34^{ab}	3.50^{a}	3.23^{b}	3.28^{b}	2.06**
Pants length	3.94^{a}	3.83^{a}	3.80^{a}	3.38^{b}	3.36^{b}	2.53**

** $p < .01$, *** $p < .001$

scale 1 = too tight or short ; 5 = too loose or long

Means with the same letter (a, ab, b) are not significantly different at $p < .05$.

<Table 6> Satisfaction on functional utility and design of child hospital gown

Features	Style		T-Value
	A mean (SD)	B mean (SD)	
Functional Utility			
Don & doff in general	3.10 (0.87)	2.83 (0.95)	1.95*
Don & doff at I. V. treatment	2.03 (1.03)	2.19 (0.93)	0.87
Don & doff at defecation	3.31 (0.93)	2.91 (0.91)	2.35**
Don & doff at usual treatment	3.53 (0.83)	3.19 (0.83)	2.21**
Design			
General appearance	3.10 (0.95)	2.84 (0.93)	1.78*
Fabric texture	3.44 (0.84)	3.01 (0.88)	3.29***
Fabric color	3.33 (0.90)	3.05 (0.85)	2.00**
Fabric prints	3.41 (0.85)	3.00 (0.81)	3.20***

* $p < .05$, ** $p < .01$, *** $p < .001$

Scale : 1 = very dissatisfied ; 5 = very satisfied

Styles for functional utility features

A = Subjects wore one-piece style hospital gowns.

B = Subjects wore pajamas-styled hospital gowns.

Styles for design features

A = Subjects wore hospital gowns with animated cartoon prints.

B = Subjects wore hospital gowns with hospital logo prints.

wn needs to be revised to reflect children's body dimensions properly.

The function of child hospital gowns was evaluated by surveying the convenience of changing garments during the time of intravenous injection, daily activities, defecation, and medical treatment. The results showed that patients wearing one-piece gown were more satisfied with the convenience of changing gowns in comparison with those wearing pajamas-styled hospital gown. Changing garments during the intravenous injection was inconvenient with the current patient gown designs (Table 6).

The users' satisfaction with overall outlook and fabric features of the child hospital gowns was measured. The preference of fabric features was significantly different between the group wearing uniforms with animated cartoon prints and those wearing gown with hospital logo prints. The child patients wearing uniforms with animated cartoon prints had significantly higher satisfaction not only with the fabric prints and texture ($p<.001$) but also with color($p<.01$) and general appearance($p<.05$) in comparison with those wearing gown with hospital logo prints (Table 6).

3. Preference of Design

The favored designs for the child hospital gowns were investigated. 〈Table 7〉 shows the child patients participating in this survey preferred round neckline(69.3%) rather than V-neckline.

They preferred three-quarter length sleeves(59.3%) or the full length sleeves(39.5%) over short sleeves. Full-length(57.7%) and three-quarter length pants (41.3%) were favored over short pants. They preferred button closure for shirts, and elastic waist band for pants. For shirts opening, subjects most preferred center front and overarm opening (39.0%). For pants leg opening, subjects preferred no-opening(39.1%) or crotch opening (37.0%) rather than the opening at front of a leg.

<Table 7> Preferences for Child Hospital Gown Design

Design Features		Percent
Shirts		
Neckline	Round-neckline	69.3
	V-Neckline	30.7
Sleeve length	Three-quarter	59.3
	Full	39.2
	Short	1.5
sleeve type	Raglan	50.5
	Set-in	49.5
Closure type	Button	51.0
	Hook-and-loop tape	21.6
	Snap	20.0
	Straps	7.4
Opening	CF/overarm (B)	39.0
	CF/underarm/side seam (C)	24.3
	CF (A)	22.0
	CF/overarm/side seam (E)	12.5
	CF/side seam (D)	2.0
Pants		
Pant length	Full	57.7
	Three-quarter	41.3
	Short	1.0
Waist closure	Elastic band	62.0
	Drawstring	19.5
	Hook-and-loop tape	14.0
	Button	4.4
Leg opening	No-opening (A)	39.1
	Leg inseam opening (D)	37.0
	Side seam opening (B)	17.7
	Front of a leg opening (C)	6.2

The shirts and pants leg openings are illustrated in Figure 1.

The preferences for design details were different by age($p<.05$)(Table 8). For example, children under four years of age preferred the shirt with openings at center front and along the shoulder to overarm(type B, Fig. 1). The

<Table 8> Preference of child hospital gown design by age groups

Design		Age (years)					χ^2-Value
		under 2 (n=72)	2~4 (n=74)	5~7 (n=31)	8~11 (n=28)	12 & over (n=14)	
Shirts							
Opening	CF (A)	11	13	4	7	6	28.58*
	CF/overarm (B)	22	31	13	6	6	
	CF/underarm/side seam (C)	13	16	11	8	1	
	CF/side seam (D)	3	0	0	1	0	
	CF/overarm/side seam (E)	15	6	1	3	0	
	Others	8	8	2	3	1	
Pants							
Waist closure	Drawstring	10	16	4	7	2	20.84*
	Elastic band	39	42	20	15	8	
	Button	5	1	0	0	3	
	Hook & loop tape	11	8	5	4	0	
	Others	7	7	2	3	1	
Length	Full	33	28	18	21	10	17.68*
	Three-quarter	28	35	8	4	4	
	Short	1	0	1	0	0	
	Others	10	11	4	3	0	
Leg opening	No-opening (A)	13	27	14	13	7	20.79*
	Side seam opening(B)	11	15	3	3	2	
	Front of a leg opening (C)	4	4	2	2	0	
	Leg inseam opening (D)	34	18	11	6	2	
	Others	10	10	1	4	3	

* $p < .05$

The shirts and pants leg openings are illustrated in Figure 1.

preference of pants design was also significantly different by age for waist closure type, pants length, and leg opening option. The preference for full length pants was apparent for the child patients after age five. The three-quarter length pants received wide approval from children under five. For the pants leg opening, leg inseam opening(type D, Fig. 1) was more favored for children younger than two years of age. The subjects older than four years of age preferred the pants without opening at leg to the pants with opening at leg(type A, Fig. 1).

Children generally preferred blue color, and animated cartoon prints among other options (Table 9). The preference of uniform color or print was significantly influenced by the type of hospital gown provided for them. For example, children wearing uniforms printed with animated cartoon tend to highly preferred cartoon prints rather than hospital logo prints($p<.05$). The animated cartoon prints includes flower and animal characters which are usually printed on children's underwear and nightwear.

<Table 9> Preference of fabrics features by groups wearing different styles gown

Features		n	Styles A n	Styles B n	χ^2-Value
Color	Blue tone	110	27	83	7.46*
	Yellow tone	36	16	20	
	White	23	9	14	
	Red tone	17	5	12	
	Others	15	7	8	
Prints	Hospital logo	17	1	16	7.63*
	Stripe /plaids	39	11	27	
	Cartoon prints	138	51	87	
	No-prints	7	1	6	

*$p < .05$

Styles A = Subjects wore gowns with animated cartoon prints.

B = Subjects wore gowns with hospital logo prints.

V. Conclusions

The researchers examined the usage of child hospital gowns in Korea and users' dissatisfaction with the fit and functionality or the style and design detail. The preference for the design of child hospital gowns were also surveyed in order to suggest a suitable child hospital gown design. The analysis of the data revealed that young children under two years of age had serious fit problems with the hospital gowns provided for them. The percentage of child inpatients wearing hospital uniforms was different depending on age and height. The children younger than two years of age or shorter than 80cm in height showed the lowest uniform wearing rate. The wearing rate of the pants was lower than that of the shirts. The main reasons for rejecting the uniform were unsuitable gown size, inconvenience of donning and doffing, and less attractive design.

The patients shorter than 80cm in height were much dissatisfied with fit of the child inpatient gowns. The sleeve length was too long for children shorter than 120cm. Most children did not satisfied with pants fit. The other design details that needs to be changed were neckline opening and pants waist closure. Children in the hospitals which provided childlike printed uniforms for the inpatients were more satisfied with their uniform design than the other group. The children wearing one-piece style hospital gown were more satisfied with the ease of donning and doffing of the gown than the children wearing adult-like pajamas style.

The most preferred shirts design was the one with round neckline and three-quarter sleeve length. The most preferred pants design was the full-length pants with elastic waist band. The design details preferred by different age groups were different at shirts opening, pants waist closure, pants length, and pants leg opening. The shirts with openings at the center front and along the overarm were most preferred by children under two years of age. Children in this age group also preferred hook-and-loop tape closure for pants waist. A relatively large number of children under four years of age preferred three quarter-length pants besides the full length pants. On the other hand, pants without any leg opening were preferred by the school age children. Pants with leg inseam opening were preferred by the infants and toddlers. The fact that a new sizing system for child hospital gown should be developed in order to provide proper size gown for each age or height group was evident. A new sizing system for child hospital gown will assist in raising the usage of hospital gowns by child patients. It was expected that the future study need to be done to investigate the practical usefulness of the uniform design with respect to the convenience of medical treatment and the

durability after repeated washing.

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