Usage and satisfaction of bed cloth fabrics: a reality study

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Abstract

Presently, sleep disorders are rapidly increasing due to sudden social development and lifestyle diversification. Among the various factors contributing to comfortable sleep, bedclothes are a major factor that readily influence the sleeping conditions, as they directly come in contact with the human body. This study therefore researches use and purchasing status of bedclothes by consumers, as well as the subjective satisfaction. This would accordingly help us to understand the consumers' performance needs, and collect basic data to develop bedclothes that assist comfortable sleep. This study used multiple choice questions and a 5-point Likert scale in a survey-style research. The results of the study indicate that consumers prudently considered practicality and durability, as bedclothes are seldom purchased. The most preferred material was cotton, but the use of microfiber, a new material, has also increased. Further, consumers' preferred lightweight bedclothes that displayed excellent water absorption, thermal insulation, durability, detergency, and flexibility. Hence, bedclothes developed according to the results of this study are expected to aid comfortable sleep.

Keywords : bedclothes, fabrics satisfaction, reality of usage, blanket fabrics, Korean-style mattress fabrics

I. Introduction

Recently, the number of people currently experiencing sleep disorders is rapidly increasing, with 721,000 people diagnosed with sleep disorders in 2015, or 56 % more than 5 years ago (Nownews, 2016). Sleep plays a major role in the body's recovery from fatigue and restoring labor power; thus, a lack of ample sleep can critically affect people's daily lives. This means effective sleep is required both quantitatively and qualitatively. Various factors contribute to comfortable sleep, and such external factors include the bedroom's thermal environment, noise, light, bedclothes, pajamas, and bed, among others (Walker, McGown, Jantos, & Anson, 1997); bedclothes act as a most important factor that can readily change sleeping conditions, as they directly come in contact with the human body (Lee, 2002).

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Therefore, bedclothes must not only look appealing, but also be functional, with such features as thermal insulation, water absorption or permeability, or waterproof capabilities, and be lightweight, soft, and have comfort maintenance as well as hygiene capabilities. Further, as comfort in a sleeping environment varies with each individual, a thorough understanding of the conditions that satisfy consumers' subjective comfort is required.

Most prior bedclothes studies have involved the status of bedclothes usage (Cho & Kim, 2010; Jung & Sung, 1997; Park, 2001; Shin & Park, 2013), the development of bedclothes design (Ju & Kim, 2013; Park & Park, 2011; Rhee & Kim, 2011; Yoo & Kim, 2014), or sleeping environment (Choi, Kim, & Kim, 2005; Choi, Kim, & Kim, 2008; Kweon, 1991; Lee & Kweon, 1990), among others. Studies on bedclothes material have also focused on natural materials, such as cotton or wool (Park & Jeong, 2012). However, papers have not recently discussed (2010~2016) the utilizing of newly developed "new materials," or consumers' use of these bedclothes. Further, studies are also insufficient regarding the satisfaction with bedclothes currently in use. The condition and purchasing of consumers' bedclothes must be understood, and their satisfaction rate must be accordingly investigated, to develop bedclothes that contribute to comfortable sleep. Moreover, an understanding of the sources of consumers' discontent is necessary to develop bedclothes that fit consumers' tastes. Therefore, this study aims to research consumers' bedclothes use and purchasing, and accordingly research subjective satisfaction to provide basic data to develop bedclothes that contribute to comfortable sleep. This includes bedclothes composed of microfiber, a recently popular

material. This study limited its scale to the most commonly used bedsheets and "yo," or Korean-style bedclothes used as a bed on the floor, to research the status of bedclothes use, with a focus on the Daejeon area. Such problems as consumers' dissatisfaction with bedclothes use and the bedclothes themselves were researched to understand consumers' performance demands.

Ⅱ. Study method

1. Subjects and data collection

This study was performed on 350 Daejeon City residents over one month, from November 1 to November 30, 2015. Survey questions referenced preceding studies (Choi et al., 2005; Park, 2001; Soh, 1993), and were revised and supplemented after a preliminary survey to produce a final form. The survey was classified into general, bedclothes use and purchase-related, materials-related, and miscellaneous categories, with a total of 25 questions; 343 surveys out of 350 were retrieved except for the 6 that were incomplete or unsatisfactory, and 337 survey forms were used to conduct a statistical analysis.

2. Data analysis

This study involves a survey-based empirical research method, using multiple choice and 5-point Likert scale questions, and additional descriptive questions followed the satisfaction-related questions. A data analysis was performed using SPSS Statistics 21.0 software, and employed descriptive statistics to investigate general characteristics. Further, a

cross analysis (χ^2-test) and t-test were performed to understand the status of bedclothes use and satisfaction according to demographic factors. The significance level noted in this paper was $p < 0.05$.

III. Study results and evaluation

1. Demographic characteristics

Table 1 displays the subjects' demographic characteristics. Respondent age from the collected surveys were 17.8 % for aged under 20, 35.6 % for aged 20 to under 30, 31.5 % for aged 30 to under 50 and 15.1 % for aged 50 and over. The subjects displayed an even sex ratio, with 46.6 % male and 53.4 % female, and their educational levels were also balanced, with 43.9 % high school graduates and 56.0 % university graduates or above. Regarding occupation, the majority, or 62.9 %, were employed, whereas 37.1 % were not. Concerning residence type, 39.2 % lived in houses, whereas the majority, or 60.8 %, lived in apartments. Family size varied, with 6.2 % having 2 members, 15.7 % having 3

Table 1. Demographic Characteristics of Subjects

Division		Frequency (N)	Percentage (%)
Age	From 10 years to under 19 years	60	17.8
	From 20 years to under 29 years	120	35.6
	From 30 years to under 49 years	106	31.5
	More than 50 years	51	15.1
Sex	Male	157	46.6
	Female	180	53.4
Level of education	High school graduates	148	43.9
	University graduates	189	56.1
Job	Have an occupation	212	62.9
	Be without a job	125	37.1
Marital status	Single	180	53.4
	Married	157	46.6
Residence type	Housing	132	39.2
	Apartment	205	60.8
Family size	2 people	21	6.2
	3 people	53	15.7
	4 people	194	57.6
	More than 5 people	69	20.5
Bed	Enable	236	70.0
	Disable	101	30.0
Price	Less than 1,000,000 won	28	8.3
	1,500,000~2,500,000 won	38	11.3
	2,500,000~3,500,000 won	121	35.9
	3,500,000~4,500,000 won	79	23.4
	4,500,000 won over	71	21.1
Total		337	100.0

members, 57.6 % having 4 members, and 20.5 % having 5 or more members; families with 4 members were the most common. A majority of monthly incomes were between 25 and 35 million won.

2. Bedclothes purchasing and usage status

1) Bedclothes purchase period and place

Bedclothes' purchase period and place were examined through a cross-analysis (χ^2-test), according to demographic factors, and the purchase period indicated significant differences according to bed usage and family income. Further, the purchase place demonstrated significant differences according to age, occupation, marital status, residence type, family size, and family income (Tables 2 and 3). Bedclothes were purchased most frequently due to changes in living environments (39.5 %) and mood (36.4 %), as well as discoloration and damage (25.8 %). Bedclothes are items that demand efficiency, and are purchased once or twice annually, as needed. This result approximates

Choi et al. (2005) study, in that new bedclothes are purchased due to consumers' children growing up, changes in the living environment (moving or seasonal changes), discoloration or damage, or mood changes, among others. These results indicate that consumers have long perceived bedclothes as daily necessities that must be practical and durable, unlike such items as clothes, which emphasize visibility. The purchase period according to bed usage revealed that bed users relatively prefer purchasing based on mood changes, whereas ondol (Korean floor heating system) users made purchases due to changes in their living environments, discoloration, and damage ($p <$ 0.01). Further, the lower the income, the less likely bedclothes were purchased based on mood changes or trends, and repurchases were only made for discoloration or damage. This result demonstrates that low-income families most value practicality (Table 2).

Bedclothes were mostly purchased at discount stores, which comprised 29.7 %, followed by department stores, with 27.9 %, and bedclothes agencies, with 25.8 %. All of these involve comparable

Table 2. Purchase Period based on Demographic Characteristics

Purchase period / Demographic characteristics		Change in living environment N(%)	Mood change N(%)	Out of trends N(%)	Discount period N(%)	Discoloration or damage N(%)	Total N(%)	χ^2
Bed	Enable	85(36.0)	76(32.2)	2(0.8)	22(9.3)	51(21.6)	236(70.0)	31.04***
	Disable	48(47.5)	13(12.9)	4(4.0)	0(0.0)	36(35.6)	101(30.0)	
Price (won)	Less than 1,000,000	7(25.0)	7(25.0)	0(0.0)	0(0.0)	14(50.0)	28(8.3)	33.27***
	1,500,000~2,500,000	21(55.3)	5(13.2)	2(5.3)	1(2.6)	9(23.7)	38(11.3)	
	2,500,000~3,500,000	49(40.5)	26(21.5)	2(1.7)	7(5.8)	37(30.6)	121(35.9)	
	3,500,000~4,500,000	29(36.7)	24(30.4)	2(2.5)	9(11.4)	15(19.0)	79(23.4)	
	4,500,000 over	27(38.0)	27(38.0)	0(0.0)	5(7.0)	12(16.9)	71(21.1)	
Total		133(39.5)	89(26.4)	6(1.8)	22(6.5)	87(25.8)	337(100.0)	−

***p<0.01

portions (Table 3) because functionality and practicality are valued when purchasing bedclothes. The purchase locations analyzed according to demographical characteristics revealed that those aged 30 and below most often purchase at discount stores, whereas those older than 30 prefer department stores ($p < 0.05$). Older people, in other words, prefer purchasing at department stores as these individuals are more economically stable. Purchase location according to occupation revealed that employed individuals purchased at department stores, whereas the unemployed preferred discount stores ($p < 0.01$). This result also implies that economically stable people prefer to purchase at department stores. When

marital state was analyzed, it was noted that single people purchased at discount stores, whereas married people demonstrated high purchase rates at department stores ($p < 0.05$). This means that single people value practicality more when purchasing bedclothes.

Regarding residence type, people living in houses more often used discount stores (36.4 %), whereas those living in apartments used department stores (35.6 %) and bedclothes agencies (26.8 %) ($p < 0.01$). Further, families with two (52.4 %) or three members (47.2 %) primarily used bedclothes agencies or department stores, whereas those with four (31.4 %) or more than five (43.5 %) members primarily used discount stores. This is expected

Table 3. Place of Purchase based on Demographic Characteristics

Demographic characteristics	Purchase place	Department store N(%)	Bedclothes agencies N(%)	Market N(%)	Discount store N(%)	Total N(%)	χ^2
Age	10 ~ 19	11(18.3)	13(21.7)	12(20.0)	24(40.0)	60(17.8)	22.28**
	20 ~ 29	23(19.2)	31(25.8)	26(21.7)	40(33.3)	120(35.6)	
	30 ~ 49	39(36.8)	29(27.4)	12(11.3)	26(24.5)	106(31.5)	
	50 ~	21(41.2)	14(27.5)	6(11.8)	10(19.6)	51(15.1)	
Job	Have an occupation	71(33.5)	58(27.4)	31(14.6)	52(24.5)	212(62.9)	13.41***
	Be without a job	23(18.4)	29(23.2)	25(20.0)	48(38.4)	125(37.1)	
Marital state	Single	39(21.7)	44(24.4)	37(20.6)	60(33.3)	180(53.4)	11.00**
	Married	55(35.0)	43(27.4)	19(12.1)	40(25.5)	157(46.6)	
Residence type	Housing	21(15.9)	32(24.2)	31(23.5)	48(36.4)	132(39.2)	20.81***
	Apartment	73(35.6)	55(26.8)	25(12.2)	52(25.4)	205(60.8)	
Family size	2 people	4(19.0)	11(52.4)	3(14.3)	3(14.3)	21(6.2)	34.28***
	3 people	25(47.2)	14(26.4)	8(15.1)	6(11.3)	53(15.7)	
	4 people	57(29.4)	42(21.6)	34(17.5)	61(31.4)	194(57.6)	
	More than 5 people	8(11.6)	20(29.0)	11(15.9)	30(43.5)	69(20.5)	
Price (won)	Less than 1,000,000	0(0.0)	12(42.9)	5(17.9)	11(39.3)	28(8.3)	35.21***
	1,500,000~2,500,000	5(13.2)	11(28.9)	9(23.7)	13(34.2)	38(11.3)	
	2,500,000~3,500,000	29(24.0)	31(25.6)	22(18.2)	39(32.2)	121(35.9)	
	3,500,000~4,500,000	25(31.6)	22(27.8)	12(15.2)	20(25.3)	79(23.4)	
	4,500,000 over	35(49.3)	11(15.5)	8(11.3)	17(23.9)	71(21.1)	
Total		94(27.9)	87(25.8)	59(17.5)	97(28.8)	337(100.0)	–

**$p<0.05$, ***$p<0.01$

to be due to more family members increasing the number of bedclothes needed, which as a result increases their economic burden, which leads them to discount stores. Moreover, families with over 4.5 million won in income preferred department stores (49.3 %), families with less than 1.5 million won preferred discount stores (42.9 %), and families with between 1.5 and 3.5 million won in income evenly preferred bedclothes agencies and discount stores. In other words, those who are married, have few family members, live in apartments, have high income, and are older appeared to prefer department stores, as these individuals are more economically stable.

2) Information source and conditions upon purchasing

Research noted that 42.7 % of the respondents acquired information from items displayed in stores, 36.2 % from television or magazine advertisements, and 13.1 % from products around them, such as neighbors' products that were used. However, no significant statistical difference exists from a demographic perspective. Therefore, it could be inferred that consumers acquire purchase information by tangibly experiencing the product in stores, rather than visually through advertisements. In other words, as bedclothes are a large, expensive, and long-term use product regardless of the consumer's age, sex, or income, consumers

tend to acquire satisfactory information by personally touching and feeling the product rather than simply deciding based on advertising.

Research on what consumer's value when purchasing bedclothes products revealed that practicality and durability were valued the most (38.6 %), followed by the material quality (30.0 %), reasonable price (30.0 %), and exterior design (11.9 %). This result agrees with Park's (2001) preceding study, which noted that thermal insulation, practicality, and economic value are considered when purchasing bedclothes. This is because bedclothes are not frequently swapped, but are used over long periods, with one to two types for each season. Notably, as people become aware of the significance of bedclothes materials (Choi et al., 2005; Yun, Kim, & Sung, 2002), consumers value not only practicality (38.6 %), but also the material (30.0 %), which plays a vital role in reinforcing practicality and durability.

Further, in observing pivotal factors according to demographic characteristics (χ^2-test), high-income consumers tended to consider designs and trends when purchasing bedclothes products ($p < 0.05$).

3) Preferred bedclothes colors

Preferred colors in bedclothes purchases included pink(25.8%) and ivory(20.8%), followed by blue and green, whereas trendy colors, black,

Table 4. Purchase Information Sources based on Demographic Characteristics

Information source / Demographic characteristics	Advertisement	Display product	Neighbor's product	Impulse buying	Misc.	Total	χ^2
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	
Total	122(36.2)	144(42.7)	44(13.1)	2(0.6)	25(7.4)	337(100.0)	−

Table 5. Product Factors Consumers Value When Purchasing

Product factors / Demographic characteristics		Trendiness N(%)	Practicality N(%)	Price N(%)	Material N(%)	Brand N(%)	Design N(%)	Total N(%)	χ^2
Price (won)	Less than 1,000,000	0(0.0)	13(46.4)	5(17.9)	10(35.7)	0(0.0)	0(0.0)	28(8.3)	31.99**
	1,500,000~2,500,000	0(0.0)	12(31.6)	6(15.8)	16(42.1)	0(0.0)	4(10.5)	38(11.3)	
	2,500,000~3,500,000	3(2.5)	48(39.7)	15(12.4)	30(24.8)	6(5.0)	19(15.7)	121(35.9)	
	3,500,000~4,500,000	1(1.3)	36(45.6)	8(10.1)	20(25.3)	4(5.1)	10(12.7)	79(23.4)	
	4,500,000 over	7(9.9)	21(29.6)	10(14.1)	25(35.2)	1(1.4)	7(9.9)	71(21.1)	
Total		11(3.3)	130(38.6)	44(13.1)	101(30.0)	11(3.3)	40(11.9)	337(100.0)	-

**p<0.05

and white were rarely preferred. This conveys that consumers prefer light colors and pastel tones to dark or primary colors when purchasing bedclothes, which mirrors preceding study results (Yun & Sung, 2002), in that pastel tones are most preferred when purchasing bedclothes.

When compared according to demographical characteristics using an χ^2-test, significant changes occurred due to sex, family income (p < 0.01), and number of family members (p < 0.01). Females preferred pink the most (39.5 %), whereas males preferred blue (24.8 %) and ivory (24.8 %). Further, the preference for pink increased as family members increased and income decreased. This is believed to be because the pink color is less vulnerable than ivory to discoloration caused by contamination or frequent washing, which delays the repurchasing period.

3. Bedclothes (bedsheets and "yo") material and satisfaction

1) Bedsheet material and satisfaction

An investigation of the external and filling materials in currently used bedsheets indicated that cotton had the highest usage rate for external materials with 46.0 %, followed by microfiber (21.2 %) and cotton-blend fabrics (12.5 %). Regarding filling material, cotton was the most common, with 57.0 %, followed by wool (12.2 %).

Cotton is a material commonly used in daily life for such products as underwear, infant clothing, and bedclothes due to its laundering convenience, thermal insulation, hygiene, and water absorption. Cotton has been most commonly used for bedclothes since ancient times due to these merits. Further, this study illustrates a high usage rate for microfiber, which is unprecedented in prior studies. This indicates that an increase in those interested in new materials has also led to an increase in new materials for bedclothes.

Material use according to sex demonstrated that females prefer to use cotton and microfiber over males (p < 0.01).

Table 6. Preference Color based on Demographic Characteristics

Preference color Demographic characteristics		Ivory N(%)	Pink N(%)	Grey N(%)	Yellow N(%)	Blue N(%)	Green N(%)	Black& White N(%)	Other N(%)	Fashion color N(%)	Total N(%)	χ^2
Sex distinction	Male	39 (24.8)	16 (10.2)	6 (3.8)	8 (5.1)	38 (24.2)	28 (17.8)	9 (5.7)	0 (0.0)	13 (8.3)	157 (46.6)	32.24***
	Female	31 (17.2)	71 (39.4)	1 (0.6)	9 (5.0)	20 (11.1)	23 (12.8)	8 (4.4)	10 (5.6)	7 (3.9)	180 (53.4)	
Family size	2 people	7 (33.3)	7 (33.3)	0 (0.0)	0 (0.0)	3 (14.3)	4 (19.0)	0 (0.0)	0 (0.0)	0 (0.0)	21 (6.2)	102.79***
	3 people	22 (41.5)	15 (28.3)	0 (0.0)	0 (0.0)	7 (13.2)	6 (11.3)	0 (0.0)	0 (0.0)	3 (5.7)	53 (15.7)	
	4 people	33 (17.0)	44 (22.7)	6 (3.1)	10 (5.2)	41 (21.1)	28 (14.4)	16 (8.2)	5 (2.6)	11 (5.7)	194 (57.6)	
	More than 5 people	8 (11.6)	21 (30.4)	1 (1.4)	7 (10.1)	7 (10.1)	13 (18.8)	1 (1.4)	5 (7.2)	6 (8.7)	69 (20.5)	
Price (won)	Less than 1,000,000	10 (35.7)	9 (32.1)	0 (0.0)	5 (17.9)	2 (7.1)	1 (3.6)	0 (0.0)	1 (3.6)	0 (0.0)	28 (8.3)	52.42***
	1,500,000 ~2,500,000	6 (15.8)	12 (31.6)	0 (0.0)	1 (2.6)	5 (13.2)	10 (26.3)	1 (2.6)	0 (0.0)	3 (7.9)	38 (11.3)	
	2,500,000 ~3,500,000	17 (14.0)	42 (34.7)	6 (5.0)	7 (5.8)	16 (13.2)	20 (16.5)	2 (1.7)	5 (4.1)	6 (5.0)	121 (35.9)	
	3,500,000 ~4,500,000	22 (27.8)	16 (20.3)	0 (0.0)	4 (5.1)	23 (29.1)	10 (12.7)	1 (1.3)	2 (2.5)	1 (1.3)	79 (23.4)	
	4,500,000 over	15 (21.1)	8 (11.3)	1 (1.4)	0 (0.0)	12 (16.9)	10 (14.1)	13 (18.3)	2 (2.8)	10 (14.1)	71 (21.1)	
Total		70 (20.8)	87 (25.8)	7 (2.1)	17 (5.0)	58 (17.2)	51 (15.1)	17 (5.0)	10 (3.0)	20 (5.9)	337 (100.0)	–

***$p<0.01$

Table 7. Bedsheet Material

Bedsheet material Demographic characteristics		Cotton N(%)	Silk N(%)	Microfiber N(%)	Synthetic fiber N(%)	Cotton blend fabric N(%)	Misc. N(%)	Total N(%)	χ^2
Sex distinction	Male	68 (43.3)	23 (14.6)	31 (19.7)	22 (14.0)	10 (6.4)	3 (1.9)	157 (46.6)	30.88***
	Female	87 (48.3)	3 (1.7)	40 (22.2)	14 (7.8)	32 (17.8)	4 (2.2)	180 (53.4)	
Total		155 (46.0)	26 (7.7)	71 (21.1)	36 (10.7)	42 (12.5)	7 (2.1)	337 (100)	–

***$p<0.01$

Cotton wool was used most often for bedsheet filling material, with 57.0 %, followed by wool (12.2 %). However, miscellaneous materials comprised a substantial portion (9.5 %) compared to synthetic fibers or cotton blend fabrics, among others, which is assumed to be

because many respondents do not know the exact name of their bedsheet filling material. This implies that respondents are more interested in external material than in the filling material.

Demographically, males with fewer family members tended to use cotton wool material ($p < 0.01$), whereas females with fewer family members and high incomes tended to use microfiber ($p < 0.01$).

Regarding satisfaction rates for bedsheet materials, most respondents were satisfied, whereas 30.0 % of the respondents found it either moderately acceptable or dissatisfactory.

An analysis of bedsheet material satisfaction relative to demographic factors (t-test) displayed significant differences in sex ($p < 0.01$) and marital state ($p < 0.05$). Satisfaction was measured using a 5-point Likert scale; males achieved an average of 4.13 points with approximately 80.0 % satisfied, whereas females achieved only 3.78 points with approximately 65.0 % satisfied. This result was likely because more females purchase and take care of bedclothes, meaning that they are not only more interested in bedclothes than men, but also likely to be aware of dissatisfactory factors.

Table 8. Bedsheet Filling Material

Bedsheet filling material / Demographic characteristics		Cotton N(%)	Wool N(%)	Goose down N(%)	Microfiber N(%)	Synthetic cotton N(%)	Misc. N(%)	Total N(%)	χ^2
Sex distinction	Male	101 (64.3)	12 (7.6)	17 (10.8)	6 (3.8)	7 (4.5)	14 (8.9)	157 (46.6)	30.88***
	Female	91 (50.6)	29 (16.1)	8 (4.4)	23 (12.8)	11 (6.1)	18 (10.0)	180 (53.4)	
Family size	2 people	15 (71.4)	0 (0.0)	3 (14.3)	3 (14.3)	0 (0.0)	0 (0.0)	21 (6.2)	35.51***
	3 people	33 (62.3)	10 (18.9)	1 (1.9)	3 (5.7)	1 (1.9)	5 (9.4)	53 (15.7)	
	4 people	102 (52.6)	25 (12.9)	17 (8.8)	15 (7.7)	14 (7.2)	21 (10.8)	194 (57.6)	
	More than 5 people	42 (60.9)	6 (8.7)	4 (5.8)	8 (11.6)	3 (4.3)	6 (8.7)	69 (20.5)	
Price (won)	Less than 1,000,000	21 (72.4)	0 (0.0)	0 (0.0)	1 (3.4)	7 (24.1)	0 (0.0)	29 (8.6)	54.15***
	1,500,000 ~2,500,000	26 (60.5)	5 (11.6)	1 (2.3)	2 (4.7)	5 (11.6)	4 (9.3)	43 (12.8)	
	2,500,000 ~3,500,000	58 (51.8)	23 (20.5)	4 (3.6)	6 (5.4)	5 (4.5)	16 (14.3)	112 (33.2)	
	3,500,000 ~4,500,000	55 (70.5)	4 (5.1)	11 (14.1)	5 (6.4)	0 (0.0)	3 (3.8)	78 (23.1)	
	4,500,000 over	32 (42.7)	9 (12.0)	9 (12.0)	15 (20.0)	1 (1.3)	9 (12.0)	75 (22.3)	
Total		192 (57.0)	41 (12.2)	25 (7.4)	29 (8.6)	18 (5.3)	32 (9.5)	337 (100)	–

***$p<0.01$

Table 9. Satisfaction Regarding Bedsheet Material

Satisfaction of bedsheet material / Demographic Characteristics		Highly dissatisfactory N(%)	Dissatisfactory N(%)	Neither good or bad N(%)	Satisfactory N(%)	Highly satisfactory N(%)	Average satisfaction rate	Total average satisfaction rate	t-value
Sex distinction	Male	0 (0.0)	8 (5.1)	22 (14.0)	68 (43.3)	59 (37.6)	4.13	3.96	3.14***
	Female	8 (4.4)	17 (9.4)	39 (21.7)	64 (35.6)	52 (28.9)	3.78		
Job	Have an occupation	1 (0.6)	7 (4.5)	27 (17.2)	70 (44.6)	52 (33.1)	3.92	3.88	0.21
	Be without a job	7 (3.9)	18 (10.0)	34 (18.9)	62 (34.4)	59 (32.8)	3.84		
Marital state	Single	(0.6)	7 (4.5)	25 (15.9)	72 (45.9)	52 (33.1)	4.01	3.94	2.29**
	Married	7 (3.9)	18 (10.0)	36 (20.0)	60 (33.3)	59 (32.8)	3.81		
Residence type	Housing	2 (1.5)	6 (4.5)	37 (28.0)	55 (41.7)	32 (24.2)	3.92	3.94	−0.43
	Apartment	6 (2.9)	19 (9.3)	30 (14.6)	77 (37.6)	73 (35.6)	3.97		
Total		8 (2.4)	25 (7.4)	61 (18.1)	132 (39.2)	111 (32.9)	–	–	–

5-point Likert scale: 1 (highly dissatisfactory), 3 (neither good or bad), 5 (highly satisfactory)
**$p<0.05$, ***$p<0.01$

The results of multiple-choice questions in seven categories (water absorption, thermal insulation, flexibility, light weight, laundering convenience, durability, other description) regarding factors for satisfaction or dissatisfaction indicated that bedsheet flexibility, thermal insulation, and an appropriate light weight were priority satisfaction factors, whereas low laundering convenience, weight (too heavy or too light), and low durability were priority dissatisfaction factors. Thus, consumers prefer bedsheet materials with the appropriate flexibility, thermal insulation, weight, and durability.

2) "Yo" material and satisfaction

Research on the external and filling materials for "yo" revealed that cotton was most often used as an external material, with 51.0 %, followed by cotton blend fabrics (20.2 %), microfiber (14.8 %), and synthetic fiber (11.9 %). Regarding filling material, cotton wool was the most common with 43.3 %, and wool was also frequently used, with a usage rate of 22.3 %.

Similar to bedsheets, demand for microfiber for "yo" is increasing, and cotton was most often used for both external and filling materials, regardless of demographic characteristics. Further, miscellaneous materials comprised a substantial portion of the survey results for "yo" filling materials, with 17.2 %. This appears to be because, as with bedsheets, many respondents do not know the exact material that comprises

their fillings; this demonstrates that people are more interested in external materials than in filling materials.

Studies on satisfaction rates for "yo" materials revealed that a majority were satisfied, but approximately 41.0 % of the respondents found it acceptable or dissatisfactory. Dissatisfaction with "yo" materials was higher compared to bedsheet materials (approximately 30.0 %), and the *t*-test related to demographic factors displayed significant differences depending on sex. The satisfaction rate was measured on a 5-point Likert scale; males achieved 3.93 points with approximately 64.3 % satisfied, whereas females achieved 3.53 points with approximately 54.5 % satisfied. This result displays the same trends as the bedsheet material satisfaction study.

Multiple-choice questions were asked to investigate the satisfactory and dissatisfactory factors regarding "yo" materials, not only regarding the category of hardness on the back, but also the seven former categories (water absorption, thermal insulation, flexibility, light weight, laundering convenience, durability, other description), with a total of eight categories. The

results indicated that satisfactory factors were prioritized as: easy on the back, great durability, convenient laundering, and water absorption; dissatisfactory factors were prioritized as: hard on the back, inconvenient laundering, low durability, and low water absorption.

These results reveal that consumers noted hardness on the back as the most important satisfaction factor for "yo," unlike bedsheet materials. Further, as "yo" has high pressure and large direct physical contact with the body, water absorption was also considered as a major factor. Therefore, materials are required for "yo" that are easy on the back, convenient for laundering, and have high durability and water absorption.

IV. Conclusion

This study aimed to investigate the use and purchasing of bedclothes for 337 Daejeon City residents using a survey method, and analyzed demanded performance to provide basic data for the development of bedclothes that assist comfortable sleep. The results are as follows:

Table 10. 'Yo' External Material

'Yo' external material / Demographic characteristics	Cotton	Cotton blend fabric	Synthetic fiber	Microfiber	Misc.	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
otal	172 (51.0)	68 (20.2)	40 (11.9)	50 (14.8)	7 (2.1)	337 (100)

Table 11. 'Yo' Filling Material

'Yo' filling material / Demographic characteristics	Cotton wool	Goose down	Wool	Synthetic cotton	Microfiber	Misc.	Total
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
Total	146 (43.3)	20 (5.9)	75 (22.3)	22 (6.5)	16 (4.7)	58 (17.2)	337 (100)

Table 12. Satisfaction Regarding 'Yo' Material

Demographic characteristics	Satisfaction of 'Yo' materials	Highly dissatisfactory N(%)	Dissatisfactory N(%)	Neither good or bad N(%)	Satisfactory N(%)	Highly satisfactory N(%)	Average satisfaction rate	Total average satisfaction rate	t-value
Sex distinction	Male	1 (0.6)	5 (3.2)	50 (31.8)	49 (31.2)	52 (33.1)	3.93	3.73	3.36***
	Female	18 (10.0)	5 (2.8)	59 (32.8)	59 (32.8)	39 (21.7)	3.53		
Job	Have an occupation	1 (0.6)	5 (3.2)	52 (33.1)	48 (30.6)	51 (32.5)	3.91	3.83	0.14
	Be without a job	18 (10.0)	5 (2.8)	57 (31.7)	60 (33.3)	40 (22.2)	3.57		
Marital state	Single	1 (0.6)	7 (4.5)	54 (34.4)	45 (28.7)	50 (31.8)	3.77	3.71	0.97
	Married	18 (10.0)	3 (1.7)	55 (30.6)	63 (35.0)	41 (22.8)	3.66		
Residence type	Housing	2 (1.5)	6 (4.5)	37 (28.0)	55 (41.7)	32 (24.2)	3.61	3.70	−1.51
	Apartment	6 (2.9)	19 (9.3)	30 (14.6)	77 (37.6)	73 (35.6)	3.79		
Total		19 (5.6)	10 (3.0)	109 (32.3)	108 (32.0)	91 (27.0)	−	−	−

***$p<0.01$

First, an investigation of the purchase period and place revealed that new bedclothes are purchased when living conditions change, such as when moving or when the season changes. Further, department stores were used more often by those who were married, older, had fewer family members, and high income, but most people preferred discount stores. This implies that even after long periods, bedclothes are considered a product that requires practicality and durability, and consumers are expected to prudently consider many factors prior to their purchase.

Second, an investigation of the information-obtaining methods upon purchasing bedclothes, and the conditions they considered important, noted that 42.7% of the respondents obtained information from products displayed in stores, and the next most common source was advertising. Moreover, the most important conditions consumers considered when purchasing bedclothes were practicality and material, with males prioritizing practicality and females prioritizing material. It is assumed that as bedclothes are used for a long time after purchase, people obtain satisfactory information by personally touching them. Consumers also emphasize, and are interested in, both material and practicality. This seems to be because material heavily impacts comfort, as it makes direct contact with the skin upon use. Therefore, material affects not only practicality, such as laundering convenience and hygiene, but also comfortable sleep.

Third, cotton was most commonly used for bedclothes' external and filling materials, and the usage rate for microfiber appeared to be increasing. Further, a study of consumers' satisfaction with their bedsheets indicated that most were satisfied, but 30.0 % were unsatisfied. Notably, 80.0 % of males were satisfied, whereas only 65.0 % of females were satisfied. Moreover, respondents' satisfaction factors revealed that consumers preferred bedsheet materials with appropriate flexibility, thermal insulation, weight, and durability.

Fourth, and as with bedsheets, the external and filling materials for "yo" were most commonly cotton, and the usage rate for microfiber was also increasing. Further, the rate of satisfaction for the "yo" material was 59%, which was considerably less than with bedsheets. Dissatisfactory factors included laundering inconvenience, low water absorption, and hardness on the back, meaning that materials that are easy on the back and have high durability, water absorption, and laundry convenience are preferred for "yo."

In observing the overall results, it can be noted that consumers still consider cotton as a fit material for bedclothes, but demand bedclothes functions that surpass cotton's characteristics. Moreover, interest in new materials is increasing. Therefore, bedclothes must be developed with materials that have not only the characteristics that consumers desire, such as water absorption, thermal insulation, appropriate flexibility, tension and abrasion resistance, the ability to dry, and minimal contraction upon laundering, but also the capability to maintain comfort during sleep. It is also important regarding marketing to impress upon consumers the merits that new materials have over the traditionally used cotton.

However, as this study was performed within the Daejeon City limits, further study is required with extended residence areas. Moreover, further studies are also required regarding the functions of bedclothes necessary for comfortable sleep. Moreover, further studies are also required regarding the functions of bedclothes necessary for comfortable sleep, and objective evaluation such as polysomnography for developed bedclothes are required to conduct verification research on bedclothes for comfortable sleep.

References

Cho, C. H., & Kim, C. S. (2010). A study on Korean women's bedding consumption status, purchase behavior and degree of satisfaction. *The Research Journal of the Costume Culture, 18*(3), 423-435.

Choi, J. H., Kim, D. H., & Kim, J. Y. (2008). Sleeping environment of Korean: focused on indoor condition and sleeping habits. *Journal of the Korean Society of Living Environmental System, 15*(1), 85-91.

Choi, J. W., Kim, J. Y., & Kim, D. H. (2005). Sleeping environment of Korean focused on bedding and nightclothes. *Journal of the Korean Society of Living Environmental System, 12*(1), 48-55.

Ju, J., & Kim, H. (2013). Images of Hanji-Bedclothes According to Bedclothes Shopping Orientation. *Journal of the Korean Society of Clothing and Textiles, 37*(2), 174-185.

Jung, Y., & Sung, S. K. (1997). A study on survey of the actual use of bedding - Comparisons between Taegu and other areas-. *Fashion business, 1*(4), 10-18.

Kweon, S. A. (1991). *Effects of bedquilts of bedclimate and physiological responses during*

sleeping in Ondol environment (Unpublished doctoral dissertation). Seoul National University, Seoul, Korea.

Lee, H. J. (2002). *Comfort evaluation of mattress in human-bed system* (Unpublished doctoral dissertation). Chungnam National University, Daejeon, Korea.

Lee, S. W., & Kweon, S. (1990). A Study on the Comfort, Physiological Responses and Microclimate in Beding Pad. *Journal of the Korean Society of Clothing and Textiles, 14*(1), 44-54.

Nownews. (2016. October. 12). *Is your night comfortable? All of sleep disorder].* Retrieved November. 05, 2016, from http://nownews. seoul.co.kr/news/newsView.php?id=2016101 2601010#csidxb56295eb4b50063a37721fa5c3c 1353

Park, H. S., & Jeong, M. J. (2012). A Study on the Internal Bedding Brand Using Eco-friendly Textile Material -Focused on "Evezary", "Parkhonggeun Homefasion", "Sesaliving", and "Womanroad"-. *Journal of the Korean Society Design Culture, 18*(4), 211-222.

Park, K. H. (2001). A study on the use of bedclothes. *Journal of the Korean Home Economics Association, 39*(10), 29-37.

Park, S. O., & Park, H. L. (2011). A Study on the Naturalism in Design of Domestic Bedding Brand Products. *Journal of the Korean Society Design Culture, 17*(2), 172-180.

Rhee, S. C., & Kim, J. H. (2011). A Study on the Eco - Friendly Functional Bedding Products Containing Quantum Energy Powder. *Journal of the Korean Society of Design Culture, 17*(3), 587-599.

Shin, J. J., & Park, M. J. (2013). Allergy Recognition and Purchase Behavior for Anti-allergy Bedding Products. *Journal of the Korea Fashion & Costume Design Association, 15*(4), 175-194.

Soh, H. O. (1993). A Study of the Present Status on the Use of Bed Clothes (2). *Journal of Chung-ang University, 7*(0), 33-58.

Walker, K., McGown, A., Jantos, M., & Anson, J. (1997). Fatigue, depression, and quality of life in HIV-positive men. *Journal of psychosocial nursing and mental health services, 35*(9), 32-40.

Yoo, H., & Kim, M. (2014). A basic study for bedding pattern design guide. *Korea Design Knowledge Journal, 31*, 269-281.

Yun, C. H., Kim, J. S., & Sung, S. K. (2002). A Study on Bedding in Korea -The Cases in 1990 ~ 2000-. *Fashion & Textile Research Journal, 4*(3), 248-253.