

The Relationship of Work Characteristics to  
Dermatologic Symptoms in Hairdressers

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# The Relationship of Work Characteristics to Dermatologic Symptoms in Hairdressers

A Masters Thesis

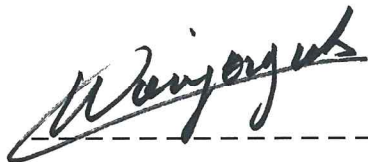
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# ABSTRACT

## **The Effect of Work Characteristics on Dermatologic Symptoms in Hairdressers**

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**Objective:** In Korea there are 126,358 professional hairdressers and they perform various tasks such as hair washing, hair cutting, blow-drying, permanent waving, dying or tinting. The objective of this study is to provide descriptive statistics on general and work characteristics of hairdressers in Korea and to identify work related risk factors of irritant contact dermatitis in hairdressers.

**Methods:** Data was obtained from the Survey on Exposure Risks, Injury Experiences and Health Problems of hairdressing Industry Workers conducted in 2012. A self-reported questionnaire survey was conducted from May 1st to September 31st and total of 1,500 questionnaires were sent to the study subjects and 1,209 questionnaire were returned thus showing response rate of 80.6%. Work

characteristics considered in this study were business type, shop size, training status, work tenure, working hour, experience of exposure to chemicals, use of personal protective equipments and type of personal protective equipments used. The total subjects included in the analysis consists of 1,054 hairdressers who have answered the relevant questions. Other than the descriptive statistics t-test and chi-square test for continuous and categorical variables were performed respectively and analysis for correlation between variables were conducted. The subjects were classified into subgroups according to their exposure to chemicals, training status and main tasks and then risk of the dermatologic symptoms was evaluated.

**Result:** The overall mean age of the study subjects was  $36.9 \pm 10.4$  years, the majority were females (894 hairdressers, 85.6%). Among the study subjects 212 hairdressers (20.1%) complained of dermatologic symptoms. According to the training status of the study subjects, 388 hairdressers (36.8%) were masters, 380 hairdressers (36.1%) were designers and 286 hairdressers (27.1%) were staffs. Dermatologic symptoms were more prevalent in younger, unmarried or highly educated hairdresser groups. Hairdressers with bad perceived state of health also showed higher prevalence of dermatologic symptoms. Hairdressers with bad perceived state of health also showed higher prevalence of dermatologic symptoms. Regarding work characteristics of hairdressers, dermatologic symptoms were more prevalent in the hairdressers who worked in a chain of hair shops of large size. Staff hairdressers and who's work tenure is less than 3 years also showed higher prevalence of dermatologic symptoms. According to the main tasks, dying/tinting and washing showed higher prevalence of dermatologic symptoms than cutting or permanent wave work. Most commonly affected body parts were forearms or



fingers regardless of the training status. To the question for specific dermatologic symptoms experienced, 37.7%(370 hairdressers) have answered as redness and itching and 28.9%(276 hairdressers) have answered as redness and swelling. Designer hairdressers showed statistically higher dermatologic symptom prevalence regardless of the specific symptoms except for blister formation but staff hairdressers showed the highest prevalence for symptoms lasting for more than 3 weeks. Proportions of the hairdressers with the experience of hospital visits due to dermatologic symptoms in the past year was significantly higher in master hairdressers, and dermatologic disease diagnosed by doctors were also higher in master hairdressers. For the last, who experienced dermatologic symptoms that were relieved in the weekends were more prevalent in master hairdressers. Logistic regression analysis for odds ratios of dermatologic symptoms according to exposure to chemicals, training status and main tasks in three different models was performed and in case of exposure to chemicals, no statistically significant result were observed. According to the training status, compared to master hairdressers, designer and staff hairdressers showed higher odds ratios of 1.62(95% CI: 1.10-2.38) and 2.69(95% CI: 1.82-3.96) in the crude model, respectively. In case of Model I, both designer(OR: 1.31, 95% CI 0.77-2.22) and staff hairdressers(OR: 2.83, 95% CI: 1.47-2.43) showed higher odds ratios than master hairdressers but the results were statistically significant only in the staff hairdressers. In Model II designer hairdressers showed higher odds ratios without statistical significance(OR: 1.22, 95% CI: 0.68-2.19) but staff hairdressers showed statistically higher odd ratios(OR: 2.70, 95% CI: 1.32-5.51) than master hairdressers. According to the main tasks, compared to cutting work group

dying/tinting and washing group showed higher odds ratios of 2.16(95% CI: 1.03-4.52) and 2.36(95% CI: 1.64-3.39) in the crude model, respectively. In case of Model I only washing group(OR: 2.14, 95% CI: 1.32-3.47) showed higher odds ratio than cutting work group and in case of Model II Dying/tinting group(OR: 1.08, 95% CI: 0.38-3.07) and washing group(OR: 2.03, 95% CI: 1.22-3.37) showed higher odds ratios than cutting work group but the results were statistically significant only in the washing group.

**Conclusion:** The present study suggested that training status and main tasks of the hairdressers were significantly correlated to each other. In addition, dermatologic symptoms were more prevalent in staff hairdressers or hairdressers who chose washing as their main tasks thus suggesting that the dermatologic symptoms of hairdressers are related to work characteristics such as training status or main tasks.

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**Keywords:** Hairdressers, wet work, training status, main task, contact dermatitis, dermatologic symptoms

## **I. INTRODUCTION**

As demand for beauty increases and women's social role grows, demand for hairdressing industry is continuously increasing(Kang et al. 1999). At the same time, hair has been one of a favorite part of the body to fashion and it keeps growing naturally thus making hairdressing inevitable(Henk et al. 1994). According to the nationwide survey for establishments conducted by Statistic Korea 2011, there are 81,671 hair shops currently under operating and 126,358 hairdressers belong to those hair shops. The figure is in continuously increasing trend since year 2006. Customers demand various changes of their hair and to fulfil this need hairdressers provide wide range of service such as hair cutting, permanent wave, dyeing, tinting, hair washing or hair drying. During work, hairdressers are exposed to various health risk factors(Stock et al. 1998) such as physical or chemical factors. Hairdressers are known to be exposed to over 3,000 kinds of chemicals and about 30% of those are classified toxic to human(Stock et al. 1998). In case of physical factors, due to work characteristics and sitting heights of the customers, hairdressers should work in unfavorable work postures such as working with their arms raised, remaining in the standing or fixed position for a prolonged time. At the same time hairdressing contains certain amount of repetitive movements of hands or arms(Bradshaw et al. 2011; Wahlstrom et al. 2010). In addition to these risk factors, hairdressers are also prolonged wet work(Kralj et al. 2011) since considerable portion of task involves water resistant glove wearing or use of water(Lysdal et al. 2012). A technical guideline in Germany for protection of the skin of people who have to work with water or wear water-resistant

protective gloves suggests that workers who spend more than 2 hours in wet work should get a possibility to participate in targeted occupational-medical health examinations and who spend more than 4 hours should mandatorily receive medical health examinations.

Contact dermatitis is a multifactorial origin disease, and while irritants or harsh working environment mentioned above acts as exogenous factors which perturbate skin barrier structure and composition, innate immune reactivity or history of atopic disease in the past could act as endogenous factors(Koopman et al. 2004; Smith et al. 2004). Contact dermatitis could be characterized by symptoms such as dryness, fissuring, itching and hyperkeratosis and symptoms may last for more than several years even after the removal of irritants. Factors such as water, detergents, acids, alkalis, or cold frictions could all contribute to the initiation of contact dermatitis(Chew et al. 2003; English et al. 2004) and these factors are commonly associated with a wet working environment(Dickel et al. 2002; McDonald et al. 2006). Workers who are exposed to wet work for more longer than 2 hours per day, to frequent hand washing or who use water resistant gloves are considered to be exposed to wet working environment(Diepgen et al. 1999). Thus, contact dermatitis including eczema is a well known disease in occupations which involve contact with chemicals and long duration of wet work and those are cleaners(Jungbauer et al. 2004), health care workers(Jungbauer et al. 2004; Skudlik et al. 2009) or hairdressers(Schwanitz et al. 2000; Lind et al. 2007).

Reports regarding dermatitis of hairdressers in various cultures are not uncommon. Results of the previous studies on the occurrence of hand eczema in hairdressers give a cumulative prevalence of 17-42%(Leino et al. 1998) and

amongst the occupational groups in the United Kingdom, female hairdressers and barbers showed highest incidence rate of dermatitis(Uter et al. 1998). Some studies suggested that dermatitis of hairdressers are common in certain training groups due to difference in main tasks which involve wet work in the job(Ling et al. 2002), but other studies show contradictory results concerning training status or main tasks of the hairdressers(Kralj et al. 2011). Conclusion that work environment including work climate could vary according to the social atmosphere or to the nations could be inferred from these varying study results.

There have been various studies regarding health issues of hairdressers in Korea such as musculoskeletal disease(Kang et al. 1999), psychological factors including occupational stress or job satisfaction(Lee et al. 2007), chemical exposure(Cho et al. 2007) or dermatologic disease(Kim et al. 2012). However, there are scarce results when it comes to the studies concerning work characteristics such as training status or main tasks, which could affect wet work duration that will eventually generate differences in the prevalence of dermatologic symptoms of hairdressers in Korea.

## **II. OBJECTIVES**

This study focused on the relations between work characteristics including business type, shop size, training status, main tasks or experience of exposure to chemicals and dermatologic symptoms of hairdressers in Korea.

Specifically and additionally,

- (1) To provide descriptive statistics on the general characteristics, work characteristics and point prevalence of symptoms of contact dermatitis of hairdressers.
- (2) To identify work related risk factors of symptoms of contact dermatitis in hairdressers, and whether there is a relation between training status and main tasks of hairdressers.
- (3) To make suggestions on health management guidelines for dermatologic disease of the susceptible employees according to the study results

### **III. METHODS**

#### **1. Study subjects**

The participants of this cross-sectional study were selected from the data of a Survey on Exposure Risks, Injury Experiences and Health Problems of hairdressing Industry Workers, 2012. The survey was conducted in two steps. The first step was a focus group interview and literature review to identify main health problems and the possibilities of exposure to physical, chemical, biological, and psycho-sociological risk factors. The second step was the survey through self-administered questionnaires.

According to the results of nationwide survey for establishments conducted by Statistic Korea 2011, 126,538 hairdressers are currently on the job and in order to obtain certain amount of representativeness, about 1% of the total number of hairdressers were randomly selected for this research. The survey was conducted for five months duration, from May to September, 2012. Total of 1,500 questionnaires were sent to the study subjects and 1,209 questionnaire were returned thus showing response rate of 80.6%. Relatively high response rate was achieved through uniform distribution and collection of questionnaires by relevant hairdresser associations, franchisee hair shops or associated academic organizations.

## **2. Data collection**

The questionnaire used could be mainly divided into two sections, general characteristic section and work characteristic section. Questions regarding general characteristics include demographic variables and lifestyle related risk factors. Demographic variables used are age, gender, height, weight, marital status, and educational level. Lifestyle related risk factors used are smoking, number of alcohol consumption per week, regular exercise and perceived state of health. Body Mass Index(BMI) was calculated using height and weight and was divided into two categories which are less than 25 and 25 or more.

Among the answers to the question for marital status, not married were defined as those who were not married and had been married in the past including divorced or bereaved. In case of number of alcohol consumption per week, none was defined as those who does not drink or who drink on occasion, mild was defined as those who drink less than 4 times per week and heavy was defined as those who drink 5 times or more per week. Perceived state of health was categorized into three and who answered as very good and good to the relevant question were categorized into good, who answered as normal to the relevant question were categorized into normal and rest were categorized into bad. Main task was defined as the most frequently performed task. Work tenure was defined as total sum of working duration as a hairdresser. Working hour was calculated as a working week. Oversleeve, aprons, or others miscellaneous equipments were included in the category of Others for the answer of the question for type of equipments used.



As for the questions to evaluate dermatologic symptoms of hairdressers in the past year, total of five questions to represent symptoms of contact dermatitis were adopted from the research, Health Hazards and Occupational Accident of firefighters were used. First four questions are as follows, 'Have you experienced redness and swelling?', 'Have you experienced redness and cracking?', 'Have you experienced blister formations?', and 'Have you experienced redness and itching?' Clinically, symptoms of contact dermatitis are known to last for over 3 weeks and persists after removal of irritants, thus who have answered yes to any one of the above questions were asked to answer the following question 'Have you experienced any of the symptoms lasting for more than three weeks?' Finally, who have answered yes to the last question were categorized in to the group who have experienced occupational dermatologic symptoms.

### **3. Statistical analysis**

General and work characteristics of the study subjects (numbers, proportions, mean value and standard deviations) were evaluated. Differences of values according to the presence of dermatologic symptoms were assessed by student's t-test for continuous variables such as age, by chi-square tests for dichotomous and categorical variables and Kruskal Wallis test for skewed variables. Fischer's exact test was applied if the number of observations per cell was fewer than five and relation between training status and main tasks were also evaluated. Correlation analysis using Pearson's coefficients to evaluate correlations between variables which are assumed to be closely linked to each other such as age and work tenure or business type and shop size was performed.

Logistic regression analysis was performed to assess the risk for contact dermatitis according to exposure status, training status or main tasks of hairdressers and odds ratios of unadjusted model was calculated. Possible confounders to be controlled were selected after literature review, and correlation analysis between the variables. All logistic regression analysis was performed additionally with adjustment for general characteristics such as age, gender, marriage, educational level, smoking, number of alcohol consumption per week, exercise or perceived state of health (Model I) and with adjustment for work characteristics such as business type, exposure to chemicals or kinds of personal protective equipments worn in addition to general characteristics (Model II). Work tenure and shop size were not included in the adjustment variables for these two variables showed high Pearson's correlation coefficients in relation to training status (0.74, p-value < 0.001) and business type (0.75, p-value < 0.001). The risks were

expressed as odds ratios with the reference group of masters and cutting work respectively. All statistical tests were performed with the SAS version 9.2(SAS Institute, Cary, NC). All analysis were two-sided and p values  $<0.05$  were regarded as statistically significant.

#### **IV. RESULTS**

In the period of May to September, 2012 total of 1,500 questionnaires were sent out to the study subjects and 1,209 questionnaires were returned, thus showing response rate of 80.2%. 1,054 questionnaires were actually used in the analysis due to missing values in the relevant sections(dermatologic symptoms, training status or main task) of the questionnaire.

The overall mean age of the study subjects was  $36.9 \pm 10.4$  years and the majority were females(894 hairdressers, 85.6%). Only 4.4%(42 hairdressers) of the study subjects were obese(BMI>25). 41.0%(410 hairdressers) were married, and 45.4%(471 hairdressers) were more than high school graduates. In case of lifestyle related risk factors, 21.0%(214 hairdressers) of the study subjects were current smokers, 7.8%(77 hairdressers) were heavy drinkers, 39.3%(401 hairdressers) performed certain amount of regular exercise and 13.1%(136 hairdressers) answered their state of health is in bad condition.

In case of dermatologic symptoms, 20.1%(212 hairdressers) of the study subjects were categorized into dermatologic symptom positive group thus showing consistency with the results of various previous studies which shows roughly 10% to 20% of symptom prevalence(Holm et al. 1994; Leino et al. 1998).

In case of work characteristics, 25.6%(234 hairdressers) of hairdressers worked more than 52 hours per week and 19.8%(201 hairdressers) of the hairdressers were exposed to chemical substances during working hours. According to the training status of the study subjects, 388 hairdressers(36.8%) were masters, 380 hairdressers(36.1%) were designers, and 286 hairdressers(27.1%) were staffs.

### **1. General characteristics of the study subjects by dermatologic symptoms**

Table 1 shows general characteristics of the study subjects according to dermatologic symptoms. Dermatologic symptoms were more prevalent in younger, unmarried or highly educated hairdresser groups. Hairdressers with bad perceived state of health also showed higher prevalence of dermatologic symptoms. There were no significant differences in the prevalence of dermatologic symptoms for gender, or BMI.

Table 1. General characteristics of study subjects by dermatologic symptoms

Unit: Person(%)

Characteristics*		Dermatologic	Dermatologic	p value†
		Symptom (+)	Symptom (-)	
		N(%)	N(%)	
Age	Mean±SD§	33.06±10.47	36.56±10.24	<0.001
	<30	96( 28.1)	246( 71.9)	
	<40	67( 20.1)	267( 79.9)	
	≥40	45( 12.9)	304( 87.1)	
Gender				
	Male	32( 21.2)	119( 78.8)	0.741
	Female	179( 20.0)	715( 80.0)	
BMI				
	<25	181 (19.8)	735( 80.2)	0.622
	≥25	7( 16.7)	35( 83.3)	
Marital status				
	Not married‡	132( 22.3)	459( 77.7)	0.015
	Married	66( 16.1)	344( 83.9)	
Educational level				
	≤High school	101( 17.8)	465( 82.2)	0.023
	>High school	111( 23.6)	360( 76.4)	
Total		212( 20.1)	842( 79.9)	

\* The total of each variable is not always 1,054 due to missing values.

† P-value by chi-square test, p<0.05

§ Mean value ± standard deviation by t-test, p<0.05

‡ Included divorced, separated and bereaved

## **2. Distribution of lifestyle related risk factors of the study subjects according to the dermatologic symptoms**

Table 2 shows the distribution of lifestyle related risk factors of the study subjects according to the dermatologic symptoms. Hairdressers with bad perceived state of health showed higher prevalence of dermatologic symptoms but there were no significant differences in the prevalence of dermatologic symptoms for smoking, alcohol consumption per week or regular exercise.

Table 2. Distribution of lifestyle related risk factors of the study subjects according to the dermatologic symptoms

		Unit: Person(%)		
Characteristics*		Dermatologic Symptom (+)	Dermatologic Symptom (-)	p value <sup>†</sup>
		N(%)	N(%)	
<b>Smoking</b>				
	Non/Past smoker	157( 19.5)	648( 80.5)	0.163
	Current smoker	51( 23.8)	163( 76.2)	
<b>Alcohol consumption per week</b>				
	None	88( 19.4)	365( 80.6)	0.408
	Mild	97( 21.1)	363( 78.9)	
	Heavy	20( 26.0)	57( 74.0)	
<b>Regular exercise</b>				
	None	140( 22.6)	479( 77.4)	0.072
	≤4times/wk	58( 16.8)	287( 83.2)	
	>4times/wk	9( 16.1)	47( 83.9)	
<b>Perceived state of health</b>				
	Good	62( 15.1)	348( 84.9)	0.001
	Normal	106( 21.7)	383( 78.3)	
	Bad	40( 29.4)	96( 70.6)	
<b>Total</b>		212( 20.1)	842( 79.9)	

\* The total of each variable is not always 1,054 due to missing values.

† P-value by chi-square test, p<0.05



### **3. Work characteristics of the study subjects by dermatologic symptoms**

Table 3 shows the work characteristics of the study subjects by dermatologic symptoms. Dermatologic symptoms were more prevalent in the hairdressers who worked in a chain of hair shops of large size. Staff hairdressers and who's work tenure is less than 3 years also showed higher prevalence of dermatologic symptoms. According to the main tasks dying/tinting and washing showed higher prevalence of dermatologic symptoms than cutting or permanent wave work. Other than these variables, there were no significant differences in the prevalence of dermatologic symptoms for working hour, exposure to chemicals, whether personal protective equipments were used, or type of equipments used.

Table 3. Work characteristics of the study subjects by dermatologic symptom

Unit: Person(%)

Characteristics*	Dermatologic Symptom (+)	Dermatologic Symptom (-)	p value <sup>†</sup>
	N(%)	N(%)	
<b>Business type</b>			
Chain shops <sup>‡</sup>	98( 22.6)	335( 77.4)	0.035
Single hair shop	103( 17.3)	491( 82.7)	
<b>Shop size</b>			
1 employee	29( 12.7)	199( 87.3)	0.001
2~4 employees	42( 16.9)	206( 83.1)	
5~9 employees	33( 22.6)	113( 77.4)	
≥10 employees	88( 25.4)	259( 74.6)	
<b>Training status</b>			
Master	52 (13.4)	336( 86.6)	<0.001
Designer	76( 20.0)	304( 80.0)	
Staff	84( 29.4)	202( 70.6)	
<b>Main task</b>			
Cutting work	105( 16.9)	515( 83.1)	<0.001
Permanent wave	29( 16.5)	147( 83.5)	
Dyeing/Tinting	11( 30.6)	25( 69.4)	
Washing	65( 32.5)	135( 67.5)	
Drying	2( 9.1)	20( 90.9)	
<b>Total</b>	<b>212( 20.1)</b>	<b>842( 79.9)</b>	

\* The total of each variable is not always 1,054 due to missing values.

† P-value by chi-square test, p<0.05

‡ Franchisee hair shops

Table 3. Work characteristics of the study subjects by dermatologic symptom

(Continued)		Unit: Person(%)		
Characteristics*	Dermatologic Symptom (+)	Dermatologic Symptom (-)	p value <sup>†</sup>	
	N(%)	N(%)		
Work tenure**				
<3 years	31( 25.6)	90( 74.4)	0.011	
<10 years	69( 20.5)	267( 79.5)		
≥ 10 years	59( 14.6)	345( 85.4)		
Working hour <sup>§</sup>				
<52hours	44( 18.8)	190( 81.2)	0.508	
≥ 52hours	142( 20.8)	540( 79.2)		
Exposure to chemicals				
Not exposed	172( 21.1)	643( 78.9)	0.315	
Exposed	36( 17.9)	165( 82.1)		
Personal protective equipments				
No	104( 19.6)	427( 80.4)	0.588	
Yes	101( 21.0)	381( 79.1)		
Type of equipment				
Mask	108( 21.6)	393( 78.4)	0.460	
Gloves	89( 19.2)	374( 80.8)		
Etc	7( 15.2)	39( 84.8)		
Total	212( 20.1)	842( 79.9)		

\* The total of each variable is not always 1,054 due to missing values.

\*\* Work tenure in the same profession

† P-value by chi-square test, p<0.05

§ Working hour per week

‡ Franchisee hair shops

#### **4. Distribution of characteristics of dermatologic symptoms of the study subjects according to the training status**

Table 4 shows distribution of characteristics of dermatologic symptoms of the study subjects according to the training status. Dermatologic symptoms were more prevalent in the staff hairdressers, and the most commonly affected body parts were forearms or fingers regardless of the training status. To the question for specific dermatologic symptoms experienced, 37.7%(370 hairdressers) have answered as redness and itching and 28.9%(276 hairdressers) have answered as redness and swelling. Designer hairdressers showed statistically higher dermatologic symptom prevalence regardless of the specific symptoms except for blister formation but staff hairdressers showed the highest prevalence for symptoms lasting for more than 3 weeks. Proportions of the hairdressers with the experience of hospital visits due to dermatologic symptoms in the past year was significantly higher in the master hairdressers, and dermatologic disease diagnosed by doctors were higher in master hairdressers. For the last, who experienced dermatologic symptoms that were relieved in the weekends were more prevalent in master hairdressers.

Table 4. Distribution of characteristics of dermatologic symptoms of the study subjects according to the training status

Characteristics *	Unit: Person(%)			p value <sup>†</sup>
	Masters N(%)	Designers N(%)	Staffs N(%)	
<b>Dermatologic symptoms</b>				
No	336( 39.9)	304( 36.1)	202( 24.0)	<0.001
Yes	52( 24.5)	76( 35.9)	84( 39.6)	
<b>Affected body part<sup>‡</sup></b>				
Whole body	11( 40.7)	12( 44.4)	4( 14.8)	0.016
Face, neck	23( 35.9)	21( 32.8)	20( 31.3)	
Forearms, fingers	99( 28.5)	127( 36.5)	122( 35.1)	
Trunk, shoulders	1( 10.0)	5( 50.0)	4( 40.0)	
Thighs, legs	9( 47.4)	5( 26.3)	5( 26.3)	
Feet, toes	14( 63.6)	6( 27.3)	2( 9.1)	
<b>Specific symptoms</b>				
<b>Redness&amp;Swelling</b>				
No	242( 35.6)	262( 38.6)	175( 25.8)	0.002
Yes	69( 25.0)	111( 40.2)	96( 34.8)	
<b>Redness&amp;Cracking</b>				
No	251( 32.9)	302( 39.6)	210( 27.5)	0.039
Yes	47( 26.1)	67( 37.2)	66( 36.7)	
<b>Blister formation</b>				
No	245( 31.7)	310( 40.2)	217( 28.1)	0.556
Yes	56( 32.2)	63( 36.2)	55( 31.6)	
<b>Redness&amp;Itching</b>				
No	225( 36.8)	236( 38.6)	151( 24.7)	0.001
Yes	101( 27.3)	140( 37.8)	129( 34.9)	
<b>Lasting&gt;3weeks</b>				
No	179( 43.3)	140( 33.9)	94( 22.8)	<0.001
Yes	56( 25.8)	76( 35.0)	85( 39.2)	
<b>Total</b>	<b>388( 36.8)</b>	<b>380( 36.1)</b>	<b>286( 27.1)</b>	

\* The total of each variable is not always 1,054 due to missing values.

† P-value by chi-square test, p<0.05

‡ Majors body parts where dermatitis occurred

Table 4. Distribution of characteristics of dermatologic symptoms of the study subjects according to the training status (Continued)

Characteristics *	Unit: Person(%)			p value †
	Masters N(%)	Designers N(%)	Staffs N(%)	
Hospital visits ‡				
No	57( 23.7)	103( 42.7)	81( 33.6)	<0.001
Yes	160( 47.8)	88( 26.3)	87( 26.0)	
Diagnosed by doctors **				
No	49( 19.7)	117( 47.0)	83( 33.3)	<0.001
Yes	128( 47.1)	80( 29.4)	64( 43.5)	
Symptoms relieved §				
No	87( 27.7)	118( 37.6)	109( 34.7)	<0.001
Yes	109( 46.6)	68( 29.1)	57( 24.4)	
Total	388( 36.8)	380( 36.1)	286( 27.1)	

\* The total of each variable is not always 1,054 due to missing values.

\*\* Dermatitis or eczema diagnosed by a doctor(s)

† P-value by chi-square test, p<0.05

§ Whether symptoms are relieved in the weekends when off-duty

‡ Experience of hospital visits in the past year due to dermatologic symptoms

## **5. Odds ratios of training status and main tasks for dermatologic symptoms**

Table 5 shows the odds ratios of dermatologic symptoms according to exposure to chemicals, training status and main tasks in three different models. In case of exposure to chemicals, no statistically significant result were observed. In case of training status, master hairdressers were set as a reference group, and in case of main tasks hairdressers who performed cutting work was set as a reference group. Other than the crude analysis, Model I was adjusted for general characteristics such as age, gender, marriage, educational level, smoking, number of alcohol consumption per week, exercise and perceived state of health and Model II was additionally adjusted for work characteristics such as business type, exposure to chemicals and whether personal protective equipments were used.

According to the training status, compared to master hairdressers, designer and staff hairdressers showed higher odds ratios of 1.62(95% CI: 1.10-2.38) and 2.69(95% CI: 1.82-3.96) in the crude model, respectively. In case of Model I, both designer(OR: 1.31, 95% CI 0.77-2.22) and staff hairdressers(OR: 2.83, 95% CI: 1.47-2.43) showed higher odds ratios than master hairdressers but the results were statistically significant only in the staff hairdressers. In Model II designer hairdressers showed higher odds ratios without statistical significance(OR: 1.22, 95% CI: 0.68-2.19) but staff hairdressers showed statistically higher odd ratios(OR: 2.70, 95% CI: 1.32-5.51) than master hairdressers.

According to the main tasks, compared to cutting work group dying/tinting and washing group showed higher odds ratios of 2.16(95% CI: 1.03-4.52) and 2.36(95% CI: 1.64-3.39) in the crude model, respectively. In case of Model I only washing group(OR: 2.14, 95% CI: 1.32-3.47) showed higher odds ratio than

cutting work group and in case of Model II Dying/tinting group(OR: 1.08, 95% CI: 0.38-3.07) and washing group(OR: 2.03, 95% CI: 1.22-3.37) showed higher odds ratios than cutting work group but the results were statistically significant only in the washing group.



Table 5 Odds ratios of dermatologic symptoms according to exposure to chemicals, training status and main tasks

Characteristics	Crude OR	95% CI	Model I <sup>†</sup>	95% CI	Model II <sup>‡</sup>	95% CI
Exposure to chemicals						
No	1.00		1.00		1.00	
Yes	0.82	0.55-1.21	0.91	0.56-1.47	0.89 <sup>§</sup>	0.53-1.49
Training status						
Master	1.00		1.00		1.00	
Designer	1.62	1.10-2.38	1.31	0.77-2.22	1.22	0.68-2.19
Staff	2.69	1.82-3.96	2.83	1.47-5.43	2.70	1.32-5.51
Main task						
Cutting work	1.00		1.00		1.00	
Permanent wave	0.97	0.62-1.52	0.93	0.57-1.51	0.89	0.53-1.49
Dyeing/Tinting	2.16	1.03-4.52	1.00	0.36-2.81	1.08	0.38-3.07
Washing	2.36	1.64-3.39	2.14	1.32-3.47	2.03	1.22-3.37
Drying	0.49	0.11-2.13	0.45	0.10-2.02	0.45	0.10-2.03

§ Odds ratio and 95% confidence intervals estimated using logistic regression model adjusted for age, gender, marital status, educational level, smoking, number of alcohol consumption per week, exercise, perceived state of health, business type, personal protective equipments

† Odds ratio and 95% confidence intervals estimated using logistic regression model adjusted for age, gender, marriage, educational level, smoking, number of alcohol consumption per week, exercise, perceived state of health

‡ Odds ratio and 95% confidence intervals estimated using logistic regression model adjusted for age, gender, marital status, educational level, smoking, number of alcohol consumption per week, exercise, perceived state of health, business type, exposure to chemicals, personal protective equipments

## V. DISCUSSION

Relationship between work characteristics such as training status and main task and dermatologic symptoms in hairdressers of Korea were evaluated in this study through analyzing results of self-reported questionnaire based survey conducted in 2012. Although several previous studies have suggested a positive association between wet work and dermatologic symptoms in hairdressers(Uter et al. 2000; Perkins et al. 2005) work characteristics which could have effect on dermatologic symptoms could vary according to the social atmosphere inferring from the differences between previous study results thus making current study valuable. Relevant data used in this study was collected from the Survey on Exposure Risks, Injury Experiences and Health Problems of hairdressing Industry Workers, 2012 and compared to other studies dealing with health issues of hairdressers which usually involve several hundreds of participants, relatively large number of study subjects were used for analysis therefore possessing certain amount of representativeness of the total hairdressers. At the same time, this is the first study which actually confirmed the relationship between the training status and main tasks of hairdressers, and concurrently assessing relationship between these work characteristics and dermatologic symptoms of hairdressers in Korea thus putting additional values to the current study.

Main tasks performed in hair shops in Korea could be mainly categorized into 4 and those are cutting work, permanent wave, dying/tinting, and hair washing/drying. Cutting work involves repetitive manual movement with arms raised position and use of various equipments such as scissors or razors which

increases vulnerability to musculoskeletal disease or occupational injuries(Kang et al. 1999). Permanent wave or dying/tinting involves use of various kinds of chemicals. Exposure to chemicals, such as dying or tinting agents are more likely to induce acute forms of contact dermatitis than chronic forms where dermatologic symptoms dealt in the current study belong(Basketter et al. 1999; Welss et al. 2004). On the other hand, relatively weak chemicals such as detergents used in washing work are more likely to act as a chronic form of irritant and induce chronic contact dermatitis. Additionally, wet work acts as a weak but chronic irritant(Chew et al. 2003) which can perturb skin barrier, it plays a great role in inducing contact dermatitis. It is believed to be more closely related to the occupational dermatologic symptoms mentioned in the current study(McDonald et al. 2006; Dickel et al. 2002).

In the aspects of whether hairdressers are actually exposed to longer duration of wet work, there was a report that suggested hairdressers are known to be exposed to more than 2 hours of wet work per day and exposure time was longer in the masters than the apprentices(Kralj et al. 2010) and the other report suggested that wet work duration is related not only to washing but also to water-resistant glove wearing tasks such as dying or permanent waves(Uter et al. 1999). Likewise, as a result of prolonged exposure to chemicals and water, occupational group with the highest annual incidence rate (120 cases per 100,000 employed) of occupational contact dermatitis was reported as female hairdressers and barbers(Cherry et al. 2000). To summarize, hairdressers are prone to contact dermatitis and exposure to chemical substances or wet work is related to its prevalence. Despite of the consistent results concerning contact dermatitis or dermatologic symptoms of the

hairdressers, results on the work characteristics which could affect occurrence of contact dermatitis such as wet work duration vary according to the studies.

There are various measures to assess wet work duration. Direct measurement methods using observation or sensors or indirect measurement methods using job matrix were used in the other previous studies concerning wet work durations of hairdressers. In the present study, relationship between main tasks and training status of hairdressers were evaluated and the result showed that the main tasks which known to involve significant amount of wet work were determined according to the training status. Thus, training status could act as a potential representative for wet work duration in Korea. In detail, study result showed that 51.9% and 43.4% of master and designer hairdressers chose cutting work as their main task while only 4.7% of staff hairdressers chose cutting work as their main task. In case of tasks such as permanent wave or dying/tinting which likely involve exposure to chemicals, while 46.7% of designer hairdressers chose this as their main tasks 28.8% of master and 24.5% of staff hairdressers chose this as their main tasks respectively. However, in case of washing which is believed to be the main source of wet work(Uter et al. 1999) while only 1.5% and 2.0% of master and designer hairdressers chose this as their main tasks 96.5% of staff hairdressers chose this as their main task thus showing obvious difference in main tasks according to the training status. These findings could be arising from the result that majority of the staff hairdressers belong to franchisee hair shops where more than 10 hairdressers are employed and division of duty is clear. Since there was a significant difference in the result between the training status groups, training status were used to represent the potential wet work duration. Additionally, since results of the previous studies suggests that not only wet work

but also glove requiring tasks such as dying or permanent waves is also a significant source of wet work(Uter et al. 1999) burden of wet work of staff hairdressers would be even greater than expected.

There are potential limitations in this study to be considered. First, the study was conducted based on the self-reported questionnaire and targeted past year's experience of dermatologic symptoms, thus bound to the possibilities of recall bias. Second, questions for past medical or family history such as past history of dermatitis or atopic disease which could be related to current condition of dermatologic symptoms were not included in the questionnaire items, thus could act as a potential confounder. Third, information of individuals who have not responded to the questionnaire was absent. The survey was conducted in five month period and with the aid of relevant hairdresser associations and academic organizations relatively high response rate of 80.2% could be achieved, but certain portion of selection bias could be still remaining not controlled. Furthermore, as do other cross-sectional studies bear the same problem, this study is also not free from the healthy worker effect(Bregnhøj et al. 2011). There are reports suggesting that hand eczema is one of the recognizable reasons in change of job in hairdressers(Perkins et al. 2005). On the contrary, many other studies suggests that main reasons of change of job in hairdressers is work conditions such as low income, long work hour or job stress(Chae et al. 2008) In case of health problems, more serious health problems such as asthma or Chronic Obstructive Pulmonary Disease(COPD) acts as important factors in changing of a job. Inferring from the previous study results, though dermatitis attributed to about 30% of the career change in student hairdressers(Uter et al. 1999) other work characteristics seemed to be playing a greater role in changing of a job in

hairdressers. At the same time, due to the hierarchical structure of work characteristics of hairdressers, selective migration of the diseased workers out of the exposed(Washing group) to non-exposed(Cutting work group) task is not likely to happen. Finally, causal relationship or dose-response relationship between training status or main task and dermatologic symptoms could not be clearly established as an issue derived from the cross-sectional study design itself.

In case of United Kingdom, 'Bad Hand Day' campaign was launched by Health and Safety Executive in November, 2006 to raise awareness of work related dermatitis in the hairdressing industry and to protect skin of hairdressers. In this campaign, suggestions for suitable protective equipment use for wet work such as shampooing or rinsing are provided. Additionally, management plans for dermatologic health of hairdressers are given. In case of Germany, guidelines to protect skin of people who have to work with water or wear water-resistant protective gloves are stated in the TRGS 401(Technical rules for Hazardous Substances) and German Social Accident Insurance recommends occupational medical examinations for those at risks. The need for hairdressing industry is continuously increasing in Korea according to the statistics report, as main customers of hairdressing industry, women's social role is growing(Kang 1999), but there are currently no guidelines or specific health management plans for hairdressers skin conditions except a guideline for occupational accidents of hairdressers. This study could provide basis for dermatologic health management plans for hairdressers in Korea and arouse academic interests in the hairdressing industry which is believed to be a relatively neglected area of occupational health.

## **VI. CONCLUSION**

The present study suggested that training status of Korean hairdressers are closely linked to actual main tasks and those two work characteristics are closely related to the self-reported dermatologic symptoms in the past year which lasted for more than three weeks, even after adjustment for potential confounders such as age, gender, marital status, educational level, smoking, number of alcohol consumption per week, exercise, perceived state of health, business type, exposure to chemicals or whether personal protective equipments were used. Thus suggesting that work characteristics such as training status or mains tasks could be related to the occurrence of occupational irritant contact dermatitis.

The workers of hairdressing industries are experiencing various health problems and are exposed to wide variety of chemical, physical, and psycho-sociological hazards and among the health problems which hairdressers encounter, dermatitis accounts for the significant proportions, thus potential impact of this study result should not be considered lightly. Regretfully, there are no suitable guidelines or manuals available to prevent occupational dermatologic disease of hairdressers in Korea except Industrial Accident Prevention Guidelines for hairdressers, although wet work is a relatively well known risk factor for dermatitis in hairdressers. According to the results of our study, wet work seems to be strictly reserved for hairdressers who belong to certain training status, thus acting as a greater risk factor to the dermatologic health of hairdressers in Korea. In the future, based on the results of this study, researches which involve quantitative measures to evaluate actual wet work duration according to work characteristics such as

training status will be required and health management guidelines for hairdressers should be established.



## APPENDICES

### Appendix 1. General characteristics and lifestyle risk factors survey questionnaire

O. 인적사항, 생활습관 및 사회경제적 조건			
다음은 귀하의 기초 인적사항에 관한 내용입니다. 이 자료는 작업환경과 건강문제의 연관성을 분석할 때 개인적 변수들의 차이를 보정하는 통계적 용도 이외에는 쓰이지 않으며 외부로 유출되지 않으니 반드시 기록해 주시기 바랍니다.			
O1. 성별	① 남 ② 여	O2. 출생연도	년도
O3. 키	cm	O4. 몸무게	kg
O5. 결혼상태	① 미혼 ② 기혼 ③ 기타(사별, 이혼 등)		
O6. 최종학력	① 중졸 ② 고졸 ③ 전문대졸 ④ 대졸 ⑤ 대학원졸 이상		
O7. 흡연	① 핀 적 없다 ② 피우다 끊었다 ③ 현재 피운다		
	▶ '③ 현재 피운다'에 응답하신 경우 흡연량 : 하루( )갑 ▶ '② 피우다 끊었다'와 '③ 현재 피운다'에 응답하신 경우 흡연 경력 : 년		
O8. 음주	① (거의)마시지 않는다 ② 월 2~3회 ③ 주 1~2회 ④ 주 3~4회 ⑤ 주 5회 이상		
	▶ '② 월 2~3회', '③ 주 1~2회', '④ 주 3~4회', '⑤ 주 5회 이상'에 응답하신 경우 (맥주는 1캔 355cc가 14잔 정도임) ① 소주 반병 이하 ② 소주 1병 ③ 소주 1병 반 ④ 소주 2병 이상		
O9. 운동	▶ 땀이 몸에 배일 정도의 운동의 30분 이상 1주 기준		
	① 안한다 ② 1~2회 ③ 3~4회 ④ 5~6회 ⑤ 거의 매일		

E16. 귀하의 건강상태는 전반적으로 어떠합니까?

- ① 매우 좋다 ② 좋은 편이다 ③ 보통이다 ④ 나쁜 편이다 ⑤ 매우 나쁘다

Appendix 2. Work characteristics survey questionnaire

**A. 근무 특성**

<b>A1. 업종</b>	① 헤어                      ② 네일                      ③ 피부관리
<b>A2. 미용업 형태</b>	▶ <input type="checkbox"/> 프랜차이즈 : 원장 포함 근무 인원 (       )명
	▶ <input type="checkbox"/> 개인운영 : 원장 포함 근무 인원 (       )명
<b>A3. 직위</b>	① 원장    ② 디자이너 및 실장    ③ 매니저(상담관리전문)    ④ 스탭    ⑤ 기타
	▶ 디자이너인 경우 고용형태 : ① 별도의 사업자 등록증 있음    ② 임금근로자
<b>A4. 종사기간</b>	- 같은 업종 총 (       )년 (       )개월 간 근무
	- 현 직장 (       )년 (       )개월 간 근무 중

A5. 다음 업무 내용 중에서 본인이 가장 많이 하는 업무 세 가지의 번호를 순서대로 적어 주세요.  
 ..... 첫째 (       ), 둘째 (       ), 셋째 (       )

헤어 : ① 컷트                      ② 퍼머                      ③ 염색                      ④ 샴푸                      ⑤ 드라이                      ⑥ 기타 (       )
네일 : ① 기본케어                      ② 컬러링                      ③ 왁싱                      ④ 발관리                      ⑤ 기타 (       )
피부 : ① 안면마사지                      ② 등마사지                      ③ 팔마사지                      ④ 목부마사지                      ⑤ 기타 (       )

**B. 근무 조건**

다음은 귀하의 근무조건에 관한 내용입니다. 근무시간은 최근 3개월의 평균으로 작성해 주시기 바라며 점심시간과 출퇴근시간을 제외하고 계산하십시오. 근무시간이 30분이 넘어 1시간으로 반올림하여 기입해주시기 바랍니다. (해당사항이 없으면 '0'으로 기입)

<b>B1. 연장근무 포함 하루 평균 근무시간 (식사, 출퇴근 제외)</b>	하루 (       ) 시간							
<b>B2. 연장근무 포함 1주일 평균 근무시간 (식사, 출퇴근 제외)</b>	주 (       ) 시간							
<b>B3. 밤 10시~새벽 5시 사이 2시간 이상 밤 근무의 월 평균 횟수</b>	월 (       )일							
<b>4. 화학제품/물질을 취급하거나 피부와 접촉함</b>	<table border="1"> <tr> <td>①</td> <td>②</td> <td>③</td> <td>④</td> <td>⑤</td> <td>⑥</td> <td>⑦</td> </tr> </table>	①	②	③	④	⑤	⑥	⑦
①	②	③	④	⑤	⑥	⑦		

**M. 산업안전보건관련 인식 및 필요성**

M1. 일을 하시면서 보호구를 착용하십니까? (       ) ① 예                      ② 아니오

M2. 다음 중에서 최근 한 달간 착용한 적이 있는 보호구에 모두 표시해 주시기 바랍니다. (       )  
 ① 마스크                      ② 장갑                      ③ 토시                      ④ 앞치마                      ⑤ 기타 (       )

Appendix 3. Dermatologic symptom survey questionnaire

**G. 피부 질환 증상**

※ 지난 1년 동안 다음과 같은 증상을 경험한 적이 있습니까? V 표시 해주세요. (단, 무증에 의한 경우 제외)

G1. 피부가 붉어지고 붓는다	① 예	② 아니오	③ 모름
G2. 피부가 붉고 갈라진다	① 예	② 아니오	③ 모름
G3. 피부에 작은 물집이 생긴다	① 예	② 아니오	③ 모름
G4. 피부가 붉고 가렵다	① 예	② 아니오	③ 모름

→ 모두 '아니오'로 대답하신 분은 다음 'H. 호르몬 증상'으로 가세요

G5. 위 증상 중 하나 이상이 3주 이상 지속되었습니까? ① 예 ② 아니오

G6. 위 증상 중 하나 이상이 지난 1년 동안 두 번 이상 나타났습니까? ① 예 ② 아니오

G7. 위 증상은 주로 어느 부위에 나타났습니까?

- ① 온몸                                      ② 얼굴·목                                      ③ 전완(손목부터 팔꿈치까지의 팔부분)·손·손가락  
 ④ 몸통·어깨·겨드랑이·사타구니                                      ⑤ 허벅지·다리                                      ⑥ 발·발가락

G8. 위 증상이 지금 현재 있습니까? ① 예 ② 아니오

G9. 위 증상은 근무 중에는 심해지고 휴일에는 호전되는 경향을 보였습니까? ① 예 ② 아니오

※ 미용업 종사 시작 후에 발생한 증상은 무엇입니까? (이전부터 있었던 경우 '아니오'에 표시바랍니다)

G10. 여드름이 생겼다	① 예 ② 아니오	G12. 색이 변했다 (과색, 탈색)	① 예 ② 아니오
G11. 습진 비슷한 염증이 생겼다	① 예 ② 아니오		

G13. 최근 1년간 이러한 피부 질환 증상으로 병원을 방문한 적이 있습니까? ① 예 ② 아니오

**E. 미용업 종사 이후의 건강 및 질병 상태**

각각의 질환명에 대하여 4가지 질문에 응답하여 주십시오. 해당 질병이 없거나 모르는 경우에는 1번 문항에만 응답하시면 됩니다.

	1. 미용업 종사 이후 지금까지 한번이라도 앓은 적이 있습니까? ① 그렇다 ② 아니다 ③ 모른다	2. 미용업 종사 이후 지난 1년간 석달 이상 앓았거나, 현재 앓고 계십니까? ① 그렇다 ② 아니다 ③ 모른다	3. 미용업 종사 후 의사로부터 진단을 받으신 것입니까? ① 그렇다 ② 아니다 ③ 모른다	4. 치료를 어떻게 받고 계십니까? ① 완치되어 치료받지 않음 ② 완치되지 않았지만 치료받지 않고 있음 ③ 현재 치료 받고 있음
1. 하지정맥류	1 2 3	1 2 3	1 2 3	1 2 3
2. 빈혈	1 2 3	1 2 3	1 2 3	1 2 3
3. 위염	1 2 3	1 2 3	1 2 3	1 2 3
4. 위십이지장궤양	1 2 3	1 2 3	1 2 3	1 2 3
5. 방광염	1 2 3	1 2 3	1 2 3	1 2 3
6. 불면증	1 2 3	1 2 3	1 2 3	1 2 3
7. 우울증	1 2 3	1 2 3	1 2 3	1 2 3
8. 피부염, 습진	1 2 3	1 2 3	1 2 3	1 2 3
9. 천식	1 2 3	1 2 3	1 2 3	1 2 3
10. 안구건조증	1 2 3	1 2 3	1 2 3	1 2 3

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## ABSTRACT (IN KOREAN)

### 미용업 근로자의 피부질환증상에 영향을 미치는 직업적 요인에 대한 연구

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**서론:** 사회에서 미용업의 주요 고객인 여성의 역할이 확대되어 가면서 미용업에 대한 요구가 증가되고 있다. 이를 뒷받침하는 근거로 2011년 통계청에서 발표한 자료에 따르면 한국에는 81,671개의 미용실에 126,358명의 미용업 근로자가 종사하고 있으며 이러한 수치는 2006년부터 꾸준히 증가하는 추세에 있다. 미용업 근로자들은 업무 중 독성물질로 분류될 수 있는 다양한 종류의 화학물질에 노출되는 한편, 작업 자세와 작업특성에 따라 반복된 손이나 팔의 사용, 부적절한 작업 자세 등의 근골격계 위험에도 노출 되어있다. 이러한 직업적 건강위험 인자에 더하여, 미용업은 업무 특성상 물을 사용하는 작업을 포함하게 되며 이러한 물리적 자극은 접촉 피부염의 중요한 위험 인자로 알려져 있다. 이와 같은 미용업 근로자의 건강 위험 요인에 대한 연구는 드물지 않게 행해져 왔으나 미용업 근로자의 피부질환 증상에 영향을 미치는 직업적 용인에 대한 연구는 그 결과가 연구에 따라 다소 상이하고, 국내 미용업 근로

자를 대상으로 하는 연구의 경우에는 찾아보기 힘들다. 따라서 본 연구는 국내 미용업 근로자들의 피부질환증상의 유병률을 제시하고, 피부질환증상에 영향을 미칠 수 있는 직업적 요인인, 미용실의 형태나 규모, 미용실내 담당 역할, 주요 수행 업무, 화학물질 노출의 과거력 등과 피부질환증상 유병률 사이의 연관성을 알아보고자 하였다.

**방법:** 본 연구는 2012년 수행된 한국안전보건공단 연구용역과제 중 미용업 근로자의 작업환경 유해요인과 건강영향 연구에서 수집된 설문 자료를 바탕으로 진행되었으며, 해당 연구가 수행된 기간 중 2012년 5월부터 9월까지 총 1,500부의 설문지가 배부 되었고 그 중 1,209부가 회수되어 80.6%의 응답률을 보였다. 이 중 피부질환 증상과 직업적 요인 중 미용실내 담당 역할, 주요 담당 업무에 대한 설문을 완성한 1,054명을 대상으로 본 연구에서 최종 분석을 진행하였다. 피부질환증상 유병률에 대한 기술통계량 및 일반적 직업적 특성에 대한 기술통계량을 제시하고, 각각의 변수에 대한 단변량분석을 실시하였다. 또한, 단변량분석의 결과에 따라 연구대상자들을 최종적으로 화학물질에의 노출 여부, 미용실내 담당 역할, 주요 담당 업무 등에 따라 세분한 뒤 피부질환증상 경험에 대한 로지스틱 회귀분석을 시행하였다.

**결과:** 연구대상자들의 평균 나이는  $36.9\pm 10.4$ 세였고, 대부분은 여성(894명, 85.6%)이었다. 또한 피부질환증상 유병률은 20.1%(212명)였다. 미용실내 담당 역할에 따라서는 연구대상의 36.8%(286명)가 원장, 36.1%(380명)가 디자이너, 27.1%(286명)가 스텝이었다. 피부질환증상은 연구대상자의 일반적 특성에 따라 상대적으로 젊고, 미혼이며, 고학력이고 자가건강인식이 나쁜 근로자에서 흔했고, 직업적 특성에 따라서는 규모가 큰 체인형태 미용실에서 근무하거나 근무경력이 3년 이하인 스텝 미용사, 주요 담당 업무가 염색작업이거나 세척작업

인 경우 흔했다. 피부질환증상이 주로 발생한 신체부위는 상완이나 손가락이었으며 가장 흔하게 호소한 증상으로는 발적과 간지러움증(370명, 37.7%), 발적과 부종(276명, 28.9%)등을 꼽았다. 디자이너 미용사에서 피부질환 증상과 관계없이 모든 증상이 가장 흔했으나 해당증상이 3주 이상 지속된 경우는 스텝 미용사에서 더 흔했다. 직업적 특성과 피부질환증상에 대하여 수행된 로지스틱 회귀분석의 결과, 화학물질 노출에 따라서는 피부질환증상에 유의한 차이를 보이지 않았다. 그러나 미용실내 담당 역할에 따른 피부질환증상에 대한 로지스틱 회귀분석의 경우, 보정되지 않은 분석 결과에서 원장에 비해 디자이너와 스텝 미용사에서 각각 1.62(95% CI: 1.10-2.38), 2.69(95% CI: 1.82-3.96)의 높은 Odds Ratio(OR)값을 보였고, 일반적 특성을 보정한 Model I에서는 디자이너와 스텝에서 각각 1.31(95% CI: 0.77-2.22), 2.83(95% CI: 1.47-2.43), 일반적 특성에 더하여 직업적 특성까지 보정한 Model II에서는 1.22(95% CI: 0.68-2.19), 2.70(95% CI: 1.32-5.51)의 높은 OR값을 보였다. 또한 주요 담당 업무에 따른 피부질환증상에 대한 로지스틱 회귀 분석의 경우, 보정되지 않은 분석 결과에서 커팅 담당 근로자에 비해 염색 담당 근로자와 세척 담당 근로자에서 각각 2.16(95% CI: 1.03-4.52), 2.36(95% CI: 1.64-3.39)의 높은 OR값을 보였고, 일반적 특성을 보정한 Model I에서는 세척 담당 근로자에서만 2.14(95% CI: 1.32-3.47)로 높은 OR값을 보였다. 일반적 특성에 더하여 직업적 특성까지 보정한 Model II에서는 염색 담당 근로자와 세척 담당 근로자에서 각각 1.08(95% CI: 0.38-3.07), 2.03(95% CI: 1.22-3.37)으로 높은 OR값을 보였다.

**결론:** 본 연구의 결과로 미용업 근로자들의 미용실내 담당 역할과 주요 담당 업무가 상호간 밀접하게 연관되어 있음을 알 수 있었다. 또한 미용업 근로자 중 담당 역할이 스텝인 경우, 주요 담당 업무가 머리 세척 작업인 경우 피

부질환증상을 경험하는 비율이 통계적으로 유의하게 높게 나타나 두 직업적 요인 모두 미용업 근로자의 피부질환증상과 관련이 있는 것으로 나타났다.

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**핵심 되는 말:** 미용업 근로자, 물을 사용하는 작업, 담당역할, 주요담당작업, 접촉성 피부염, 피부질환증상