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## Measures for Strengthening Performance of DISASTER and Safety Management System at Local Government

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### Abstract

*This study aims to analyze the present local government status systematically and establish practical disaster and safety management system of the local government. Rural area is composed of small business farm community with people engaged in primary industry. The disaster occurring in rural area includes both social disaster and natural disaster. Urban area is differentiated from rural area in aspect of industrial composition, administration, and facility. The disaster occurring in urban area includes both social disaster and natural disaster. In administrative district aspect, urbanrural complex area refers to city which connects urban and rural area spatially. Metropolitan area is a concept contrast to basic local government. Also, current workers for disaster prevention department are insufficient compared to quota. In addition, excessive number of residents is assigned per worker at disaster department. The work hours of workers at disaster department exceeds average work hours at the local government.*

**[Keywords]** *Local Government, Disaster Management System, Disaster Management, Crisis Management System, Disaster Cooperation*

## 1. Introduction

### 1.1. Research background and purpose

As new dangers, virus, infectious disease, fire, collapse, earthquake, and heavy rain increased diversified, the role of local government in management of disaster and safety became more crucial. The administrative demand on disaster and safety management increased as local residents have higher awareness on disaster compared to the past.

Due to change from agricultural economic structure to industrial economic structure, large number of population moved to cities with developed industry. In order to solve traffic problems, usage of public transportation increased and high rise complex building connected to basement and multiuse facilities increased in order to expand housing and

facilities. Such urbanization is worsening the disaster environment.

The disaster may start from minor accident, and such minor accident can develop into large scale disaster, leading to fatal accident. It is mandatory for the local government to have improved performance on disaster and safety management system.

Thus, the local government should meet expectations of local residents and should have independent and leading functional role for effective disaster management. The local government also should fulfill the duty at the frontline of disaster scenes to protect lives and property of local residents.

Therefore, for strengthening performance of disaster and safety management system at local government, this study aims to analyze

the present local government status systematically and establish practical disaster and safety management system of the local government.

## **1.2. Research range and method**

This study is for diagnosis and consulting of disaster and safety management system at the local government. The study analyzes and diagnoses status of disaster and safety management system at the local government and researches on measures to improve performance for disaster and safety management at the local government.

For detailed direction for analysis on status of disaster and safety management system at the local government, due to limits on research schedule, this study conducted research by sampling research subjects(2 large unit local self-governments at cities and provinces, 3 cities, 2 provinces, and 3 districts for primary local governments).

Thus, the study aims to aims to examine and select related contents based on urban, rural, urbanrural complex, and metropolitan regions and analyze current state and status to suggest practical performance strengthening measures.

## **2. Theoretical Consideration on Disaster and Safety Management System at the Local Government**

### **2.1. Significance of disaster and safety management system at the local government**

Since it is difficult to make prediction on the present social economic change, the predictability for future is very low. Such increasing uncertainty raises the frequency of disaster occurrence. The recent various disaster and accidents such as hydrofluoric acid gas outflow at Gumi, sinking of Sewol ferry, earthquake at Gyeongju, earthquake at Pohang, and collapse of tower crane demonstrates that disaster and safety management

system still has weaknesses and needs improvements[1].

In this regard, the role of institute managing the disaster and safety management system is more crucial than ever. The discussion on efficiency of institute for disaster and safety management system will be a very important issue to protect people exposed to various dangers[2].

The safety system for disaster management system in South Korea designates range of safety tasks for Ministry of Public Administration and Security such legislation of making and executing policy, separated management of disaster and accidents, manual management for each disaster type, total management on emergency, and mobilization based on safety system for disaster management. The safety task for Ministry of Public Administration and Security is composed of group for indirect performances such as matters related to safety disaster and safety, matters related to emergency preparation, policy making, support and cultivation. The group functions for establishment and resource investigation for emergency expense plan, governmental practice and emergency training, legislation of related law, support on non-profit and non-governmental organization, and promotion of policy related to activation of volunteer work[3].

The local government is the government agency adjacent to the regional community and is specified as the institute with primary responsibility for disaster and safety management and related disaster response. Although it may vary on disaster scale and competence of performer, the action for accident and disaster management will become more efficient with sufficient competency of the local government.

In local government, disaster and safety management system is the actualization of the safe governing. Such actualization starts from awareness that strengthening of disaster response ability of local government is the basic task for effective disaster management. Through support from special subsidy tax on disaster and safety and subsidy for fire fight safety, the finance for safety expands on local

government. The establishment of exclusive organization for disaster is also supported. In addition, through obligation of disaster and safety education for senior managers, the safety performance is strengthened. The quick response is also available through granting the head of the local government the authority to declare disaster.

## **2.2. Competency of disaster management organization at the local government**

Following are the competency elements of disaster management organization at the local government based on theoretical consideration on disaster and safety management system at local government.

### **1) Legal System**

As the need for safety from disaster and danger is emphasized, the government has enacted safety-related laws such as 「Basic Act on Disaster and Safety Management」 and has established policies to protect lives and property of people from various disasters. Although the government is endeavoring on arranging level system, safety accidents are still increasing[4].

The sinking of Sewol ferry occurred at Yellow Sea near Jodo-myeon, Jindo-gun, Jeollanam-do on last April 16 exposed the overall weakness of safety management system in South Korea. The body of the ship is not salvaged until now. Although salvage of dead body has been suspended, the cause of sinking has not been identified yet.

As limits of existing disaster management organization appears, arrangement of legal and institutional base for effective disaster and safety management is needed. In addition, establishment of domestic and overseas legislation analysis and alternatives should be made to improve laws related to disaster and safety fields[4].

### **2) Concern and Leadership for Head of the Local Government and Leader of Disaster Management Organization**

Korean national disaster and safety management system is composed of 'Central Committee for Safety Management' having

prime minister as chairperson, 'Central Disaster and Safety Management Headquarters' having Ministry of Public Administration and Security as director, and 'Central Emergency Headquarter' having competent Minister. Ultimately, fire chief of cities and head of maritime police station are in practical charge of response stage for 3 stages of disaster prevention, disaster preparation, and disaster recovery and are involved in initial response.

In urgent disaster scene, the rescue of human lives in disaster response stage depends on leadership of disaster management institute and head of the local government. The establishment of disaster and safety management system which avoids report system focusing on overall control and adjustment feature and allows vertical leadership focusing on disaster scene without wasting initial golden time is significant. Also, there is increased need for system which allows members to save and respond urgently through vertical leadership[5].

The concern and leadership for head of the local government and leader of disaster management organization adjusts and regulates disaster management organization efficiently. Such adjustment and regulation satisfy various disaster management demands through synergy effect and suggest effectiveness by making the members of the organization to participate in disaster response during disaster[6].

### **3) Organization and Personnel**

The objective of disaster management organization is to protect lives and property of residents from visible or invisible dangers. The disaster management organization is a system which is responsible for the most basic government function[7].

The local government is the institute responsible for disaster management which protects practical lives and property of residents at frontline during disaster. The citizens expect the best administrative service on disaster management from local government they belong than the other local governments. Also, when the local government manages the disaster management organization well,

disaster damage can be reduced through immediate response when disaster occurs. The economic loss and finance of the local government can also be reduced within damaged area[8].

The disaster management affair in South Korea is very complicated and many fields are linked together to each department. In aspect of administrative organization, disaster management affair is dispersed while having insufficient overall control system. The manpower in charge of disaster management is also insufficient and lacks professionalism. In general, departments related to disaster management are accepted as the avoided departments due to overload.

In regard to personnel in South Korean disaster management organization, current government officials at disaster management organization lack qualification as expert due to personnel transfer by rotation based on personnel management system for general government official. In addition, government officials at disaster management organization have overload during disaster and have excessive responsibility. Although they are suffering from manpower shortage, the officials work in a poor working environment without special incentive. In order to solve such inadequate work system naturally, the head of the local government and leader of the disaster management organization should have awareness and should be concerned on disaster management.

#### 4)Cooperation System

The cooperation system in the disaster management organization refers to close connection of various related organizations for effective response in natural disaster and social disaster. Such cooperation system includes governmental-local governmental relationship, disaster management organization-other organizations, the government and private sector, and cooperation between people. The participants of the cooperation system process in disaster management are diversified and success and failure of the disaster management can be made by the cooperation level.

In aspect of cooperative disaster management at the local government, the mayor, governor, and head of borough can request needed supports such as dispatch of government official to head of military unit and related administrative agency located at other cities or jurisdiction if necessary. The requested head of military unit and related administrative agency should comply to the request when there is no special reason.

Also, for command on disaster scene, the head of emergency relief and control system at cities directs emergency relief activities. The matters related to police action, however, are determined after consultation with the head of district police station.

The disaster management at the local government is largely influenced by the relationship with the central government. When disaster occurs, the central government supports the local government with personnel and budget and adjusts authority and responsibility. Such adjustment is one of emphasized principles in American disaster management organization after hurricane Katrina in the United States in 2005. Thus, the authority, responsibility, and personnel distribution should be implemented vertically between the central government and local government. The central government also should play a complementary role for the local government. The communication and information sharing is the basic item during the process[9].

### 3. Analysis on Status of Disaster and Safety Management System at the Local Government

#### 3.1. Research on feature and condition of disaster and safety management system at the local government

(Rural Area) The rural area is composed of small farm community with people engaged in primary industry. In South Korea, small counties with population less than 50,000 are classified as rural community. Generally, rural community has less population than city and

has low population density. For most people living in rural community, primary industry is the means of living and the style of living. In addition, compared to city, the rural community has low anonymity and division of labor. The rural community, however, has high homogeneity among residents.

(Urban Area) In general, city plays pivotal role in supplying goods and services to surrounding areas. The city also promotes material shape and cultural satisfaction and constantly changes and develops. The city is different from rural area in aspect of industrial composition, administration and facility. The urban area does not include primary industry in principle. Instead, the urban area is composed of people engaged in secondary and tertiary industries.

(Urbanrural Complex Area) In administrative district aspect, urbanrural complex area refers to city combined with rural and urban area by connecting two areas spatially. Urbanrural complex area appeared on South Korea in 1995 when many small and large areas were integrated with the enforcement of local autonomy system.

The purpose of urbanrural complex area is to develop local small and medium-sized cities and nearby area through mutual exchange between urban and rural area. The urbanrural complex area also promotes standardization of the area by creating unified living zone for urban and rural area.

For selection of urbanrural complex area, the study selected cities that combine urban and rural area spatially in administrative district and cities with fused primary, secondary, and tertiary industries based on industry feature.

(Metropolitan Area) The regional local government is a contrast concept to basic local government. In South Korea, there are Seoul Metropolitan City, 6 metropolitan cities, and 9 provinces. Province is a regional local government which has the largest area among local governments in South Korea.

### 3.2. Analysis on department, manpower and function, and workload at disaster

#### and safety management organization at the local government

From analysis on department, manpower and function, and workload at disaster and safety management organization at the local government, Busan demonstrated the most number of organizations and manpower of 83. Chungcheongnam-do followed up Busan with 80 workers.

Seogu, Daegu had the least number of organizations and manpower of 8 and had 8 workers.

From analysis on average annual work hours per person working at disaster and safety management organization at the local government, overall local governments exceeded average work hours. Among the local governments, Jeollanam-do had the longest work hours and Gyeongju followed up.

**Table 1.** Department, manpower, function, and workload on disaster and safety management organization at the local government.

Category			Department	Manpower	Function and workload per person (Average) (Average annual work hours)
Rural type	District (Gun)	Jindo-gun	1 division, 2 systems	9	2,280
		Eumseong-gun	1 division, 2 teams	22	2,153
Urban type	City(Si)	Busan	3 divisions, 16 teams, one control	83	2,444
	Borough(Gu)	Seogu, Daegu	1 division, 2 teams	8	2,513
	Borough(Gu)	Namgu, Gwangju	1 division, 2 teams	18	2,542
Urbanrural complex	City(Si)	Sejong City	3 divisions, 14 people in charge	24	2,475

type	Borough(Gu)	Seogu, Incheon	1 room, 4 teams	16	2,324
	City(Si)	Gyeongju	1 division, 4 teams	15	2,764
	City(Si)	Gangneung	1 division, 4 teams	16	2,162
	City(Si)	Cheongju	1 division, 7 teams	28	2,467
Metropolitan	Province(Do)	Jeollanamdo	3 divisions, 10 teams	73	2,813
	Province(Do)	Chungcheongnamdo	3 divisions, 15 teams	80	-

Note: Average work hour has been filled in on the basis of annual 2,090 hours per individual (=52 weeks× five-day work per week×8 hours per day). When overtime work was necessary, overtime was added on work hours(When a person works over than 2,080 hours per year, it is regarded as overtime work).

On analysis on department and manpower of disaster and safety management organizations at the local government based on feature of the local government, rural type had the least departments and manpower. On contrary, urban type had more departments and manpower compared to urbanrural complex type.

#### 4. Conclusion: Implication

(Features of Rural Area) Rural area is composed of small business farm community with people engaged in primary industry. The disaster occurring in rural area includes both social disaster and natural disaster. Generally, rural areas have larger damage on agricultural facility due to natural disaster. Rural areas have the least budget for disaster and safety at the local government.

(Features of Urban Area) Urban area is differentiated from rural area in aspect of industrial composition, administration, and facility. The disaster occurring in urban area includes both social disaster and natural disaster. As urban area has scatted tunnel, bridge, factory, infrastructure, and high buildings, new risks still exist during disaster. Therefore, expertise of disaster and safety organization is needed.

(Features of Urbanrural Complex Area) In administrative district aspect, urbanrural complex area refers to city which connects urban and rural area spatially. The study selected integrated city connecting urban and rural area spatially and city fused with primary, secondary, and tertiary industries as the urbanrural complex area. Urbanrural complex area is vulnerable to both natural disaster and social disaster. The damage also includes features of disaster occurring in rural area and urban area. Therefore, leader of disaster management organization and head of the local government should have comprehensive understanding and attention on disaster.

(Features of Metropolitan Area) Metropolitan area is a concept contrast to basic local government. Province(do) has the local government with the largest area among the local governments in South Korea. Metropolitan area is vulnerable to both natural disaster and social disaster. The damage, however, includes both features of disaster occurring in rural and urban area.

(Common Features of the Local Government) On conditions of disaster and safety management system, current workers are insufficient compared to quota for disaster department. Also, current workers for disaster prevention department are insufficient compared to quota. In addition, excessive number of residents is assigned per worker at disaster department. The work hours of workers at disaster department exceeds average work hours at the local government.

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## Content Analysis of RISK Report on Household Chemical Products

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### Abstract

*Consumers rely on media in seeking risk information about their products. Many of the products that consumers encounter commonly in everyday life are the results of highly sophisticated processes from the beginning of production to the completion stage, forcing consumers to rely on the opinions of the experts through the media in obtaining information about products. The purpose of this study was, accordingly, to analyze the actual processes in which risk information messages are provided to consumers. It is suggested that the consumers are likely to fall in risky situation due to their lack of knowledge of coping measures. It is considered, therefore, that risk communication or risk reporting in the future should provide personal measures as a prognostic framing together with diagnostic framing.*

**[Keywords]** Content Analysis, Consumers, Media, Household Chemical Products, Information

## 1. Introduction

The 'communication' has emerged recently as an important social issue. Human beings as a member of a society and some community have a common interest. Media plays an important role as a tool in such communications as expression of opinion and response to each other. The media provide consumers with a various information from political issues to social, economic, and cultural information. The information released by press on safety issues closely related to life such as food safety issues, safety accident due to household chemical products, and cosmetics accident plays an important role as a clue when customers evaluate risks. The consumers' responses to the risk information provided through the media, however, can vary greatly depending on the type and content of the information and how they are structured. The risk information provided through the media plays an important role in recognizing and controlling the risk situation, while some

of them causes the consumer to overestimate the risk and becomes a wrong-directed social movement.

Consumers rely on media in seeking risk information about their products. Many of the products that consumers encounter commonly in everyday life are the results of highly sophisticated processes from the beginning of production to the completion stage, forcing consumers to rely on the opinions of the experts through the media in obtaining information about products. The purpose of this study was, accordingly, to analyze the actual processes in which risk information messages are provided to consumers.

## 2. Frame of Risk Communication

Consumers perceive same information differently depending on how the information is framed and this message framing also affects

their behavior. The phenomenon that consumer's judgment or selection changes according to the information frame is called 'framing effects'. The anchoring effect and framing effect proposed in the Prospect Theory by Kahneman and Tversky(1979) have been applied to subsequent studies on persuasive messages[1]. when the people is exposed to a message that persuades them to adopt behavior containing risk, for example, they evaluate, from a subjective perspective, the benefits and losses resulting from adopting the behavior and then choose or avoid the proposed behavior. At this time, their subjective perception may vary depending on the framing structure of the message. Kasperson, et al.(1988) suggested the importance of frames of risk reporting, arguing that when media frequently report risks focusing on risk assessment content, consumer anxiety is stimulated and social amplification may occur. That means that the effect of message framing depends on the situational context.

### **3. Materials and Method**

#### **3.1. Research material**

This study sought to recommend a strategy for consumer-oriented risk communication based on the media coverage, thus chosen the media coverage on safety problem of household chemical products, which are emerging as an issue in the field of consumer research, as a research material.

With the fatal accident due to humidifier disinfectant in May 2013, public interest in the safety of household chemical products including humidifier disinfectants increased. As of July 9, 2013, eight items of household chemical products have been designated and managed in accordance with the "Quality Control and Safety Management of Industrial Products Act". The other items not covered by the act, however, are distributed without separate safety confirmation procedures or instructions for use, threatening the consumer safety using those household chemical products. Most consumers, due to lack of

knowledge about harmful substances, experience consumer problems such as difficulty in judging the safety of the product by using the indication of ingredients and contents described in the product instruction manual

This study, accordingly, set the household chemical products as research material and analyzed the media coverage releases for the past three years from Jan 2016, when consumer interest in household chemical products increased, to Dec, 2018.

#### **3.2. Research problems**

The research problems of this study are as follows

[Research Problem 1] To draw risk information message framing useful for consumer, through review on previous studies

[Research Problem 2] To investigate the actual situation of message framing in media coverage for consumers.

#### **3.3. Method**

The content analysis, a research method of describing communication objectively, systematically, and quantitatively[2], is used to understand the past and to predict the future by analyzing past materials such as available books, speeches, newspaper articles, soap operas, magazines, and internet bulletin board. The method of classifying the contents in contents analysis varies according to research field and researcher. This study borrowed the method of contents analysis application of Hong and Lee[3], thus classified the message types according to the contents contained in the message.

### **4. Results**

#### **4.1. Frame of risk communication**

This study, based on the previous study by Song[4] who investigated the effects of exposure on consumer behavior in risk communication, classified message frames into the diagnostic framing and the prognosis framing[5][6]. The diagnostic framing defines the

problem or identifies the cause of the problem, while the prognosis framing suggests measures to overcome the risk. The diagnostic framing is also divided into gain message and loss message according to the result of the action. The criteria for distinguishing the gain message and the loss message are whether the contents of the diagnostic framing are a significant threat to the individual's goal or not; the positive frame is a gain message that it is safe, and the negative frame is a loss frame that it is dangerous[4]. Song[4], in particular, argued that when delivering the risk information to consumers, the 'coping measure' as prognostic framing should be accompanied.

**Table 1.** Risk communication message frame.

Type	Diagnostic Framing	Prognosis Framing
Message Frame 1	Gain Framing	Coping Method to Risk
Message Frame 2	Loss Framing	Coping Method to Risk

#### 4.2. Report state of risk communication

In order to confirm the actual state of media coverage on household chemical products, a search was conducted at naver, a leading portal, with household chemical products or household chemical goods as key words, to perform content analysis of report articles listed in three major daily newspapers: Chosun Ilbo, Joong-ang Ilbo, and Dong-a Ilbo. A total of 45 articles were analyzed, among which, 34 articles provided a diagnostic message indicating danger, and 11 ones provided those indicating safety.

In the case of risk information, it was shown that 10 cases provided only diagnostic framing without prognosis framing, 18 cases provided only social coping measures, four cases provided only personal coping measure, and two cases provided both social and personal coping measures. In the case of safety message, 10 cases provided only diagnostic framing without prognosis framing, six cases provided only social coping measures, three cases provided only personal coping measure, and no cases provided both social and per-

sonal coping measures. The prognosis framing was shown to be used most commonly in providing the social coping measure regardless of the type of diagnostic framing.

**Table 2.** Analysis of media coverage content frequency(percentage).

Diagnostic message	Diagnostic framing	Prognosis framing			
		No	Social	Personal	Both
Risk message	34(100.0)	10(29.41)	18(52.94)	4(11.76)	2(5.88)
Safety message	11(100.0)	2(18.18)	6(54.55)	3(27.27)	0(0.0)
Total	45(100.0)	12(26.67)	24(53.33)	7(15.56)	2(4.44)

## 5. Conclusion and Recommendation

Song(2019) measured the information literacy of consumers who are provided with risk communication and reported that, regardless of type of risk communication, the literacy level was highest in diagnostic message, and followed by social coping measure from prognostic message and lastly, personal coping measure from prognostic message. This indicates that consumers have high level of understanding of risk situation but a relatively low level of understanding of coping method in risk situation. The results of this study, however, showed that the personal coping measures as a prognosis framing was rarely provided. Combining these results with analysis results by Song[7], it is suggested that the consumers are likely to fall in risky situation due to their lack of knowledge of coping measures. It is considered, therefore, that risk communication or risk reporting in the future should provide personal measures as a prognostic framing together with diagnostic framing.

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### Abstract

*There is a great concern for infectious diseases across the world, and the U.S. Center of Disease Control(CDC) puts emphasis on the prevention of respiratory infection. However, the importance of cough etiquette is still overlooked than that of hand washing. Specifically, this phenomenon is quite serious among college students who are indifferent a lot to health and live a community life. The rate of the incorrect answers was high as to covering mouth with a hand, handkerchief, sleeve or tissue, and the compliance rate was below 30 percent as well. The compliance rates with some items were approximately three times larger than those in 2014, but the rates are still low. As a consequence, they are at high risk of various respiratory diseases and infectious illnesses that incur droplet infection. Like the case of hand washing, prolonged nationwide education should be provided about cough etiquette, and how to increase the compliance rate should carefully be considered. That is expected to lessen the burden of Middle East respiratory syndrome and influenza.*

**[Keywords]** *Human & Disaster College Student, Cough Etiquette, Droplet Infection, Infectious Disease, Practice*

## 1. Introduction

Cough etiquette is an important part of prior control in the area of infectious diseases control. The U.S. Center of Diseases Control(CDC) reported that it is one of crucial ways to prevent diseases such as MERS or influenza that causes droplet infection[1]. Droplet infection via cough is apt to spread easily, and many studies found that aerosols like saliva and nasal discharge which come out through coughing fly away approximately up to 1000 meters[2].

Lately, infectious diseases have mostly flowed in from abroad rather than taken place in our country. MERS that occurred in 2015 also flowed in from overseas, and it just took about 40 days for that to spread all over the country. 36 people died from it, and there were 186 confirmed cases[3].

Droplet infection via the respiratory organs is expected to take place at a quite fast speed among students who lead a community life[4]. In secondary schools, students are under control, and after they enter college, college years should be the healthiest period of their lifetime, but it's not easy for them to lead a healthy life on account of drinking, smoking, irregular eating habits, the need for college adjustment and employment stress. Although their risk factors for diseases are on the increase because of waning immunity, they are neither well aware of the phenomenon nor are interested in it, which could emerge as one of social issues[5][6][7].

In recent years, the incidence of tuberculosis is rising[8], especially in places for collective life. According to a 2013 report, there was the mass outbreak of tuberculosis in about 300 places, and it's reported that additional confirmed cases

were found in some colleges even a year later[9].

Since college students who are in their 20s are at high risk of infectious diseases but don't pay attention to that, something has to be done for their sake, but no appropriate measures have not yet been taken. A study investigated health care students in 2016, but not many studies have not yet been conducted[10].

The purpose of this study was, therefore, to examine the educational experience of college students on cough etiquette, their intention of receiving that education, their concern and compliance levels in an effort to provide some information on how to offer the most basic cough etiquette education to prevent respiratory infectious diseases.

## 2. Method

### 2.1. The subjects & method

In this study, for the four months from June 2018 to the end of September, students in Busan's Gyeongnam area are directly contacted with students who have given prior consent to conduct a questionnaire survey on cough etiquette awareness and interest. Questionnaire distribution the questionnaire survey was carried out using the postal questionnaire district court, and the final 519 copies were analyzed.

The contents of the questionnaire are: general characteristics 4 questions (sex, grade, major, part-time job experience), cough etiquette interest 1 question, education 1 question, intention to receive education 1 question, practice level 12 cough etiquette (2 parts covered with cough, 5 parts of method, 3 parts of behavior after coughing, 2 parts of foreign body treatment method) 4 points to always do so, 3 points to usually do so Two points are almost one point of the unhandled one, and the higher the score, the higher the fulfillment level.

### 2.2. Data analysis

Statistical analysis was performed using spss 25.0. Conduct frequency analysis to examine the practice level of cough etiquette, and cross-tabulate to see if it has interest and educational experience according to general characteristics. went.

## 3. Results

### 3.1. Cough etiquette practice level

The cough etiquette practice levels are as shown in Table 1. Always keep "Cover my nose when I cough" 15.5%, "Cover my mouth when I cough" 36.7%, "When I cough, I don't cover at all as long as saliva is not spat out" 1.9%, "Cover with my hand while coughing" 27.2%, "Cover with a paper tissue or a handkerchief while coughing" 10.6%, "Cover with a sleeve while coughing if a paper tissue or a handkerchief is not available" 30.8%, "I usually wear a mask while I'm coughing" 19.8%, "I do not wash my hands as long as my hands look clean" 6.6%, "I usually hands with running water for at least 20 seconds after coughing." 22.5%, "I wash my hands with soap and running water after coughing if contaminated with saliva" 39.7%, "If sputum is formed in my mouth, I spit it out directly into a garbage can" 11.3%, "If I need to spit sputum, spit it out into paper tissues, and then throw these into a garbage can" 34.8% appeared..

### 3.2. Cough etiquette attention by general characteristics

The level of interest in cough etiquette is shown in Table 2. Gender was the highest in girls in grade 4 and above, followed by grade 2 and 3. In the major, health was the highest, and it appeared in the order of humanities and society, engineering, and was more interested if he had a part-time job experience.

### 3.3. Cough etiquette according to general characteristics existence of education and intention to receive education

Cough etiquette Table 3 shows whether there is an educational experience or not.

There were many people with educational experience, and the first grader was the most common in the grade. It was in order of the fourth grader and the second grader. In the majors, the largest number was in the order of engineering and natural sciences in Tokyo, and it was high if there was a part-time job experience.

Women were more likely to receive education, most in the second grade, and one in the fourth

grade or higher. In the major, health was the most, followed by natural science, then engineering, and when I had a part-time job, the slope was higher.

**Table 1.** Practice level of cough etiquette.

Categories	Items	Never	Barely	Usually	Always
Site to cover	Cover my nose when I cough.	128(26.1)	106(20.0)	203(38.4)	82(15.5)
	Cover my mouth when I cough.	33(6.2)	81(15.3)	221(41.8)	194(36.7)
How to cover	When I cough, I don't cover at all as long as saliva is not spat out.	328(62.0)	145(27.4)	46(8.7)	10(1.9)
	Cover with my hand while coughing.	49(9.3)	58(11.0)	278(52.6)	144(27.2)
	Cover with a paper tissue or a handkerchief while coughing.	138(26.1)	210(39.7)	125(23.6)	56(10.6)
	Cover with a sleeve while coughing if a paper tissue or a handkerchief is not available.	55(10.4)	108(20.4)	203(38.4)	163(30.8)
	I usually wear a mask while I'm coughing.	81(15.3)	159(30.1)	184(34.8)	105(19.8)
Behavior after coughing	I do not wash my hands as long as my hands look clean.	196(37.1)	154(29.1)	144(27.2)	35(6.6)
	I usually hands with running water for at least 20 seconds after coughing.	42(7.9)	159(30.1)	209(39.5)	119(22.5)
	I wash my hands with soap and running water after coughing if contaminated with saliva.	15(2.8)	63(11.9)	241(45.6)	210(39.7)
Sputum disposal	If sputum is formed in my mouth, I spit it out directly into a garbage can.	192(36.3)	133(25.1)	144(27.2)	60(11.3)
	If I need to spit sputum, spit it out into paper tissues, and then throw these into a garbage can.	39(7.4)	80(15.1)	226(42.7)	184(34.8)

**Table 2.** Cough etiquette attention by general characteristics.

Characteristics	Categories	Level of interest	t/F	p
Gender	Male	2.75±0.87	-0.935	0.350
	Female	2.82±0.92		
Grade	1	2.75±0.96	0.547	0.650
	2	2.83±0.93		
	3	2.76±0.86		
	4	2.89±0.76		
College	Humanities, social sciences	2.86±0.09	0.971	0.435
	Management	2.77±0.88		
	Natural sciences	2.75±0.88		
	Engineering science	2.78±0.86		
	Health	2.93±0.89		
	Art, athletic	2.61±0.88		
Part time job	Yes	2.83±0.90	1.862	0.063
	No	2.66±0.90		

**Table 3.** Cough etiquette according to general characteristics existence of education and intention to receive education.

Characteristics	Categories	Educational experience		Educational intention	
		Yes	No	Yes	No
Gender	Male	148(62.2)	90(37.8)	130(54.6)	108(45.4)
	Female	163(56.0)	128(44.0)	181(62.2)	110(37.8)
	$\chi^2(p)$	2.058(0.157)		3.103(0.092)	
Grade	1	92(61.3)	58(38.7)	88(58.7)	62(41.3)
	2	80(57.6)	59(42.4)	90(64.7)	49(35.3)
	3	101(57.4)	75(42.6)	92(52.3)	84(47.7)
	4	38(59.4)	26(40.6)	41(64.1)	23(35.9)
	$\chi^2(p)$	0.640(0.887)		5.858(0.119)	
College	Humanities, social sciences	59(50.4)	58(49.6)	67(57.3)	50(42.7)
	Management	39(75.0)	13(25.0)	26(50.0)	26(50.0)
	Natural sciences	44(57.9)	32(42.1)	47(61.8)	29(38.2)
	Engineering science	105(62.9)	62(37.1)	100(59.9)	67(40.1)
	Health	32(57.1)	24(42.9)	40(71.4)	16(28.6)
	Art, athletic	32(52.5)	29(47.5)	31(50.8)	30(49.2)
	$\chi^2(p)$	11.264(0.046)		7.436(0.190)	
Part time job	Yes	240(59.0)	167(41.0)	241(59.2)	166(40.8)
	No	71(58.8)	51(41.2)	70(57.4)	52(42.6)
	$\chi^2(p)$	0.023(0.917)		0.131(0.753)	

#### 4. Discussion

In this study, a survey was conducted on the selected college students to seek ways of preventing the spread of various infectious diseases via the respiratory organs, because college students are likely to be indifferent to health care. As for the levels of knowledge on cough etiquette, Jin and Kim's study found that the average rates of the correct answers to 12 items stood at 60 to 80 percent, that there were discrepancies among the rates for the items, and that the subjects weren't well cognizant of cough etiquette though they were college students who were exposed to diverse media[11]. In particular, the incorrect answer rate was high as to the item "I cover my nose when I cough." The U.S. Center of Disease Control recommended blocking both mouth and nose and doing that with one's sleeve or tissue if it's done,

on which the organization places the most importance, but they weren't well aware of it[12][13]. In this study, 36.7 percent covered their mouths when they coughed, and 10.6 percent covered their mouths with a tissue or handkerchief while coughing. 30.8 percent covered their mouths with their sleeves while coughing if a tissue or handkerchief is not available. Thus, their compliance rates were still very low. These rates are higher than the rates that the subjects in Jin & Kim's study[11] always complied with the items "I cover my mouth when I cough"(20.1%), "I cover with a tissue or handkerchief while coughing"(3.2%), and "I cover with my sleeve while coughing if a tissue or handkerchief is not available(8.2%). But the rates are still low, and the compliance rates are even below half their knowledge levels. Nonetheless, the findings of this study that were implemented in 2018 show that the compliance rates with some items are more than three times those in the

study that was conducted in 2014, though the rates with the items varied. Therefore it's needed to ponder how to boost the compliance rates. It seems that people's awareness of cough etiquette is rising to some extent, because there has been a growing concern for diseases via droplet infection over the past four years such as MERS and novel swine-origin influenza, and because it's perceived that the diseases could lead to death.

In this study, the rate of the students who had received cough etiquette education was around 50 percent, and the rates of the students who had an intention to receive that education ranged from a high of 70 percent to a low of 50 percent. Their awareness was still poor. At present, hand-washing education is conducted a lot, and the hand-washing compliance rate stands at 70 percent, but the rate of those who wash their hands all the time after coughing is below 7 percent[14].

Some recent studies have investigated cough etiquette in connection with droplet infection, but they fail to produce segmented or concrete results yet[15][16].

The ripple effects of respiratory infectious diseases via droplet infection such as MERS and novel swine-origin influenza are quite great, which could become a serious issue not only in our country but also across the world. To prevent it in advance, various efforts are required including preventive ones, and it will be very important to gather data necessary for that.

It's mostly found that in health education, higher knowledge levels are followed by higher compliance levels. Given this fact, how to improve knowledge levels should be devised[17]. Because college students are still indifferent a lot to health though they lead a community life, they are highly exposed to respiratory infectious diseases, and education should be provided in consideration of this fact.

There will be an increase in the compliance rates as well as knowledge levels if a nationwide campaign is conducted like the case of hand washing, if sustained education is offered by public institutions including public health centers and if colleges take a measure to make it mentioned in general education courses.

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