

# ICT 의료시설 기반에서 종사자의 소방안전 지식과 대처방법 인식수준

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ICT Medical Service Provider's Knowledge and level of recognizing how to cope with fire fighting safety

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## 요약

본 연구는 광주·전남지역 ICT 의료시설 기반에서 종사자를 대상으로 소방안전 지식과 대처방법 인식수준의 정도를 파악하고 차이를 조사하여 ICT 의료시설 기반에서 소방안전 대처방법 교육 매뉴얼의 기초자료를 제공하기 위하여 수행 되었다. 자료는 SPSS Win 14.0을 사용하여 분석하였다. 연구결과 ICT 의료시설 기반에서 종사자의 소방안전 지식은 10점 만점에 7.06점, 소방 대처방법 인식수준은 11점 만점에 6.61점이었다. ICT 의료시설 기반에서 종사자의 일반적 특성과 소방안전 대처방법 인식수준을 분석한 결과 성별( $t=4.12$ ,  $p<.001$ ), 연령( $\chi^2=17.24$ ,  $p<.001$ ), 근무경력( $\chi^2=22.76$ ,  $p<.001$ ), 소방안전교육 경험 유무( $t=6.10$ ,  $p<.001$ ), 소방안전에 대한 본인의 주관적 지식정도( $\chi^2=53.83$ ,  $p<.001$ )에서 통계적으로 유의한 차이가 있었다. 따라서 ICT 의료시설 기반에서 종사자의 소방안전 대처를 증진하기 위해서는 강의 중심의 지식 전달 교육을 지양하고, 자기 주도적 학습, 개인별 맞춤형 학습, 협동 학습을 강조하는 다양한 콘텐츠 개발을 통한 실무 체험 중심의 소방안전 교육, 시뮬레이션을 이용한 환자분류체계별 배치와 광역 화재감지를 위한 적외선 레이저 연기검출, 다중포인트 통신 프로토콜에 의한 디지털 화재 방지 모니터링 시스템, 영상기반 화재검출, 화재감지를 위한 로봇 설계 및 데이터 처리등의 다학문적인 접근을 통한 ICT 의료시설 기반에서 소방안전 대처에 관한 교육 매뉴얼의 개발이 필요하다고 사료된다.

## ABSTRACT

In this study, ICT medical service provider's level of knowledge fire fighting safety and methods on coping with fires in the regions of Gwangju and Jeonam Province of Korea were investigated to determine the elements affecting such levels and provide basic information on the manuals for educating how to cope with the fire fighting safety in medical facilities. The data were analyzed using SPSS Win 14.0. The scores of level of knowledge fire fighting safety of ICT medical service provider's were 7.06(10 point scale), and the scores of level of recognizing how to cope with fire fighting safety were 6.61(11 point scale). level of recognizing how to cope with fire fighting safety were significantly different according to gender( $t=4.12$ ,  $p<.001$ ), age( $\chi^2=17.24$ ,  $p<.001$ ), length of career( $\chi^2=22.76$ ,  $p<.001$ ), experience with fire fighting safety education( $t=6.10$ ,  $p<.001$ ), level of subjective knowledge on fire fighting safety( $\chi^2=53.83$ ,  $p<.001$ ). In order to enhance the level of understanding of fire fighting safety and methods of coping by the ICT medical service providers it is found that: self-directed learning through avoiding the education just conveying knowledge by lecture tailored learning for individuals fire fighting education focused on experiencing actual work by developing various contents emphasizing cooperative learning deploying patients by classification systems using simulations and a study on the implementation of digital anti-fire monitoring system with multipoint communication protocol, a design and development of the smoke detection system using infra-red laser for fire detection in the wide space, video based fire detection algorithm using gaussian mixture mode developing an education manual for coping with fire fighting safety through multi learning approach at the medical facilities are required.

## 키워드

ICT Medical service provider, Fire safety, Education manual  
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## I . INTRODUCTION

### 1. Necessities of the Research

The main tasks of fire fighting are to rescue the people and carry out first aid, as well as prevent and extinguish the fire to protect the life and property of the people. In the event of an emergency functions for proper initial coping are to be revitalized, from the 119 call to dealing with fire, to improve the methods of coping with such urgency for the purpose of minimizing the damage to the people.

Medical facilities operating 24 hours a day have difficulty in securing the safety of the occupants staying there in considering their nature in a fire critical patients, chronic and acute disease patients whose physical movement is restricted, the aged and children are hard to evacuate by themselves and accordingly they need systematical assistance by educated medical facility employees who can efficiently cope with emergency situations[1]. In the past important fires occurred to such facilities, 80 patients were evacuated in 2009 on the occasion of the fire at the Patriots and Veterans' Hospital in Seoul, 18 patients suffocated by smoke in a fire at a pediatric clinic in Gunsan in 2007, 5 people were killed by fire at the psychiatric clinic in Gongju in 2006, 8 were killed and 25 suffocated by fire at Kim Kyung Bin Neuropsychiatric Clinic in Seoul in 2000[2].

Education on the fire fighting safety is included in the evaluation of the medical institutions and evaluation systems for hospital certification to render relevant education services to the medical service providers. It seems, however, to be in effective for them to be able to understand and implement how to cope with an emergency situation properly as such education is conducted mainly by giving lectures. In this regard, self-directed learning by e-learning, tailored learning for each individual, fire fighting safety

education experiencing actual works by developing diversified contents for cooperative learning and a multi learning approach are required.

Since the Hall of Experiencing Safety for Seoul Citizens was opened in 2003, experience in fire fighting safety improved peoples' safety conscience by conducting the fire fighting experience at the Experience Hall and fields across the country. Even though the manual for teaching and educating children's safety was published based on the study on the real conditions of fire fighting safety education for the elementary schools and methods of improvement, study on the fire fighting safety conscience of elementary school teachers, methods to improve fire fighting safety education for the elementary school students by fire fighting science class, basic data on the systematical education manual coping with fire fighting safety for the medical service providers are insufficient at the moment.

This paper intends to figure out the elements affecting the conscience level of the medical service providers on how to cope with fire fighting safety and check individual characteristic elements such as gender, age, employment history, experience of attending the fire fighting safety education to provide basic data to develop an education manual for the medical service providers on coping with fire fighting safety focused on actual experience to enhance their level of recognizing the methods to cope with fire fighting safety.

### 2. Objectives of the Study

Objectives of this study are to understand the elements affecting the ICT medical service provider's level of recognizing how to cope with fire fighting and the details are as below:

First, understand common features of the ICT medical service providers.

Second, understand their knowledge on the fire fighting safety and level of recognizing how to

cope with it.

## II. METHODS

### 1. Study Design

This is a non-experimental investigation design study aiming to understand the elements applying the ICT medical service provider's knowledge and level of recognizing how to cope with fire fighting safety.

### 2. Samples and setting

Data and information were collected from 350 medical service providers, among those working in Gwangju city of Jeonam Province of Korea, who understood the object of the study and agreed to participate in the study from April 27th 2011 through June 7th of the same year. A total of 331 questionnaire sheets were used for analysis excluding 19 of them that were filled in insufficiently or improperly.

### 3. Instruments

Composing items on fire fighting safety knowledge and important concepts were referred from the literature concerned and reviewed and advised by an expert group of 10 specialists in the relevant fields including one professor of a department of fire fighting, two professional engineers of fire fighting, three fire fighting supervisors of special grade, three professors of a nursing college and one medical doctor. The author of this paper developed the method (CVI=.85) after modifying and supplementing the questionnaire sheets accordingly. Items on the recognition level of coping with fire fighting safety applied to those described on the evaluation on the medical institutions(Guide Book for Evaluating Medical Institutions, Ministry of Health and Welfare)<sup>3)</sup>. Survey items on the questionnaire sheets consisted of 33 questions including

8 on the common features, 10 on the fire fighting safety knowledge, 11 on the recognition level of coping with and 4 on the fire fighting facilities.

### 4. Data Analysis

Data investigated were processed statistically with SPSS version 14.0. For the analysis, an independent t-test, One-Way Anova, Kruskal-Wallis were applied to verify the difference between the fire fighting knowledge and the recognition level of coping with fire fighting safety in accordance with common features of the medical service providers, while the variables of significant difference at  $p < .05$  were examined afterwards by a Dunnett T3.

### 5. Limitations to the Study

As this study was carried out among a limited group, generalizing its outcome is, therefore, limited.

## III. RESULTS AND DISCUSSION

### 1. General characteristics of the ICT Medical Service Providers

Common features of the subjects of this study were: more female than the male by 74.0%, their age on average was  $33.83 \pm 8.7$ , with those ranging from 20 to 29 occupying 39% of the subjects the academic background showed 52.8% subjects graduating from vocational college, 36.3% graduated from university or higher and those with less than 5 years career experience made up 46.5% of the subjects. Medical care providers (medical doctor, nurse, oriental medical doctor, dentist and midwife) specified by the Medical Act were 48.9% of subjects and non medical care providers were 51.1%. 60.01% of them had fire fighting education, which was higher than those without any education at 39.9%. 59.8% showed a medium subjective knowledge level on the fire fighting safety, which

was more than half, and 89.1% expressed willingness in participating with fire fighting safety education (Table 1).

The majority of nursing crews working at the medical facilities were female, which indicates a leaning to the female. As the turnover ratio is rather high due to the nature of the work, those of less than 5 years service occupied 46.5%, and 60.1% of them seemed to have attended the education concerned because education on fire fighting safety is included in the evaluation of medical institutions and evaluation items of hospital certification. Female nursing crews occupying the majority of the medical service providers go through a general job orientation for about one month and one to two months in depth education at each ward, even though such period varies depending on the hospital, when they are employed by university hospital grade. While such education is rendered to such new nursing employees, education focused on experiencing the actual works for the fire fighting safety of medical facilities has been deemed necessary to undertake.

Table 1. General characteristics of medical service providers (N=331)

| Features             | Classification                   | n (%)      |
|----------------------|----------------------------------|------------|
| Gender               | Male                             | 86 (26.0)  |
|                      | Female                           | 245 (74.0) |
| Age                  | 20-29                            | 129 (39.0) |
|                      | 30-39                            | 117 (35.3) |
|                      | Older than 40                    | 85 (25.7)  |
| Academic background  | High school                      | 36 (10.9)  |
|                      | Vocational college               | 175 (52.8) |
|                      | University or above              | 120 (36.3) |
| Length of career     | Less than 5 years                | 154 (46.5) |
|                      | More than 5- less than 10 years  | 77 (23.3)  |
|                      | less than 10 years               | 60 (18.1)  |
|                      | More than 10- less than 15 years | 40 (12.1)  |
| Medical staff        | Medical staff                    | 162 (48.9) |
|                      | non medical staff                | 169 (51.1) |
| Experience with fire | Yes                              | 199 (60.1) |

|   |        |            |
|---|--------|------------|
| fighting education                                    | no     | 132 (39.9) |
| Level of subjective knowledge on fire fighting safety | High   | 38 (11.5)  |
|   | Medium | 198 (59.8) |
|   | Low    | 95 (28.7)  |
| Intension of attending fire fighting safety education | Yes    | 295 (89.1) |
|   | no     | 36 (10.9)  |

## 2. ICT Medical Service Provider's Knowledge on Fire Fighting Safety by Question

Medical service provider's knowledge on the fire fighting safety disclosed that 34.4% of them had proper and correct knowledge on the fire fighting facilities such as fire extinguishing facility and alarm system and only 26% on the priority of evacuation by patient's type (Table 2).

Table 2. ICT medical service providers' knowledge on the fire fighting safety by question (N=331)

| Question   | Result                          |                               |
|--|---------------------------------|-------------------------------|
|  | Number of correct answers n (%) | Number of wrong answers n (%) |
| 1. What is the phone number in Korea to report a fire or emergency situation?  | 329(99.4)                       | 2(0.6)                        |
| 2. How many times do you think the fire extinguishing facility, alarm system or other fire fighting facilities should be inspected at minimum? | 114(34.4)                       | 217(65.6)                     |
| 3. What do you think are the most critical causes of fire if it is classified into number of fire occurrence and its cause?                    | 257(77.6)                       | 74(22.4)                      |
| 4. What do you think is the most important cause of death out of the human damage by fire?   | 310(93.7)                       | 21(6.3)                       |
| 5. What should you do if you feel the door knob is hot when you try to go out because of fire?   | 296(89.4)                       | 35(10.6)                      |
| 6. What is the correct combination priority for evacuation   | 86(26.0)                        | 245(74.0)                     |

|  |           |           |
|--|-----------|-----------|
| by patients' type?   |           |           |
| 7. What is the best method to go out if the top of a room is full of smoke due to fire?                | 200(60.4) | 131(39.6) |
| 8. What is the correct method of using a fire extinguisher?  | 273(82.5) | 58(17.5)  |
| 9. What is the correct method of evacuating patients when fire breaks out at a hospital?               | 241(72.8) | 90(27.2)  |
| 10. What is the fire fighting facility that a hospital employee operates first when a fire breaks out? | 230(69.5) | 101(30.5) |

According to the study on the development of self-inspection of fire fighting facilities, what are required are securing professionalism of the employees responsible for fire prevention, revitalizing publicity of the self-inspection system, revising the objects of self-inspection, standardization of estimating the fee for self-inspection and establishment of legislative criteria on securing inspection equipment[4]. Hardware, such as fire extinguishing facilities or alarm systems, can be solved by the management team of medical facilities by way of an in house broadcasting guide to self inspection for the employees, necessity of inspection and transferring knowledge on the matters requiring attention to fire extinguishing facilities or alarm systems.

However, as loss of life could take place while evacuating the patients by type under an emergency situation, automatic fire fighting doors should be installed after letting them and their guardians out and a transmitter should be pushed immediately and notify the employees nearby and the disaster prevention center for medical facilities.

First priority for evacuating patients is given to those in the rooms where the fire has occurred and those in the next room, and second priority is to those in the nearby rooms. Evacuation methods by patient type are in the order of from non critical to

critical patients, from the people who can walk to those that cannot walk. Those who can walk should lower their stance as much as possible and cover their mouth and nose with a wet towel to minimize smoke inhalation and move to the evacuation place through evacuating stairs. Those who move by wheelchair or bed should move to the evacuation place using a lift on the opposite side of the place of fire[5].

In consideration that a real situation cannot be demonstrated due to the unique characteristics of each medical facility and education manuals on how to cope with fire fighting safety at medical facilities have not be prepared yet, it is required to develop such manuals focused on experiencing actual works by a multi learning approach.

### 3. ICT Medical Service Provider's Level of Recognizing How to Cope With Fire Fighting Safety by Question

Reviewing the medical service provider's level of recognizing how to cope with fire fighting safety, 47.4% of respondents responded positively to the question of whether they were aware of the organizing of voluntary fire fighting squads and the responsibility of employees, 39.3% positively for how to discharge emergency smoke when a fire breaks out, 34.7% positively for how to cope with when medical gas is isolated, 42.6% positively for how to cope with when electric power is cut off, which indicates that majority of them did not know about it (Table 3).

Fire fighting administrative staff are nominated to conduct fire preventing tasks as the object of fire fighting, establish fire fighting plans for such objects, fire fighting drills and education. Responsibility for the tasks of fire fighting safety should be displayed at an easily noticeable place for employees so they can remember and understand them well[6]. Smoke discharging methods, suspension of medical gas and electricity should be

solved by the experts in the fields residing permanently at the medical facilities at the time when the problem occurs and it is deemed necessary to attract attention to the posted guides for preventing electric fires in the patient's rooms, doctor's offices, nursing and treating rooms.

Table 3. ICT medical service provider's level of recognizing how to cope with fire fighting safety by question

*(N=331)*

| Question  | Result       |            |
|---|--------------|------------|
|   | Yes<br>n (%) | no<br>n(%) |
| 1. Are you aware of the fire fighting plan?   | 240(72.5)    | 91(27.5)   |
| 2. Are you aware of the reporting channel, emergency alarm and the network of emergency contact?      | 220(66.5)    | 111(33.5)  |
| 3. Are you aware of the organization responsibility for voluntary fire fighting squads and employees? | 157(47.4)    | 174(52.6)  |
| 4. Are you aware of the location of evacuation facilities and their path?                             | 238(71.9)    | 93(28.1)   |
| 5. Are you aware of how to discharge emergency smoke when fire occurs?                                | 130(39.3)    | 201(60.7)  |
| 6. Do you understand what should be prepared for emergency evacuation?                                | 206(62.2)    | 125(37.8)  |
| 7. Are you aware of how to evacuate the patients by their type?                                       | 192(58.0)    | 139(42.0)  |
| 8. Do you understand how to cope when medical gas is cut off?   | 115(34.7)    | 216(65.3)  |
| 9. Do you understand how to cope when electricity is cut off?   | 141(42.6)    | 190(57.4)  |
| 10. Are you aware of the location of manual fire extinguishers?                                       | 284(85.8)    | 47(14.2)   |
| 11. Do you understand how to use manual fire extinguishers?   | 267(80.7)    | 64(19.3)   |

**4. ICT Medical Service Provider's Knowledge on Fire Fighting Safety and Level of Recognizing the Methods of Coping**

Medical service provider's knowledge on the fire fighting safety has a perfect score of 10 with a minimum value of 2.0 and maximum of 10.0 while the average was 7.06. On the other hand, the level

of recognizing the methods of coping has a perfect score of 11 with a minimum value of 0 and maximum of 11.0 while the average was 6.61. When each area is combined, the minimum value was 3.0, the maximum was 21.0, and the average was 13.67 (Table 4).

Knowledge on fire fighting safety is 7.06 while the level of recognizing the methods for coping with is 6.61, which means the knowledge they have does not go together with their action. According to Merleau Ponty, exercises in accordance with the diagram of a body are not done mechanically nor voluntarily by intelligence but by habitual exercise of the body and such bodily diagrams play a role in providing transcendental grounds to practical knowledge based upon all the recognition and bodily exercise[7]. When emergency situations of fire fighting take place, as bodily knowledge acts first than the knowledge we are aware of, education manual on coping with fire fighting safety focused on the experience of actual work is required.

Table 4. ICT medical service provider's knowledge on fire fighting safety and level of recognizing the method of coping

*(N=331)*

| Area   | Minimum value | Maximum value | Average | Standard deviation |
|--|---------------|---------------|---------|--------------------|
| Knowledge on fire fighting safety                          | 2.0           | 10.0          | 7.06    | 1.42               |
| Level of recognizing how to cope with fire fighting safety | 0.0           | 11            | 6.61    | 3.47               |
| Sum of fire fighting safety                                | 3.0           | 21.0          | 13.67   | 3.86               |

**5. Verification of Differences on the Knowledge of Fire Fighting Safety and the Level of Recognizing the Methods of Coping According to the Common Features of ICT Medical Service Providers**

no statistically significant difference was found through analysis of the common features of the respondents and their knowledge on the fire fighting safety (Table 5). According to such analysis, however, significant differences were found according to gender ( $t=4.12$ ,  $p<.001$ ), age ( $\chi^2=17.24$ ,  $p<.001$ ), length of career ( $\chi^2=22.76$ ,  $p<.001$ ), fire fighting safety education ( $t=6.10$ ,  $p<.001$ ) and level of subjective knowledge on fire fighting safety ( $\chi^2=53.83$ ,  $p<.001$ ) (Table 6).

The level of recognizing how to cope with fire fighting safety in accordance with common features was significantly higher in the male group than female ( $t=4.12$ ,  $p<.001$ ), the group of 40 years of age or above was significantly higher than the one 20~29 and 30~39 years of age in the level ( $\chi^2=17.24$ ,  $p<.001$ ). For the length of career of the respondents, higher levels were found in the group of 15 years of career or above than the one of less than 5 years, more than 5 years but less than 10 years and more than 10 years but less than 15 years ( $\chi^2=22.76$ ,  $p<.001$ ). For the experience of fire fighting safety education, on the other hand, those with such experience were higher than those without ( $t=6.10$ ,  $p<.001$ ). Those whose subjective knowledge on the fire fighting safety is high showed a higher recognition level of coping with fire fighting safety than those whose knowledge concerned is either medium or low ( $\chi^2=53.83$ ,  $p<.001$ ). For age, Dunnett's T3 post examination inspection revealed that the higher level of 7.94 was rested on the group of 40 years of age or above instead of 6.26 of the one of 20~29 years of age or 30~39 years. In the area of length of career, according to Dunnett's T3 post examination investigation, the group with more than 15 years of service showed 8.88, which is higher than 6.27 for the group with more than 5 years but less than 10 years and 6.97 for the group with more than 10 years but less than 15 years. In the area of subjective knowledge on fire fighting safety,

Dunnett's T3 post examination revealed that high was 8.92, medium was 7.16 and low was 4.56 in their level of recognizing how to cope with fire fighting safety (Table 6).

When they reach more than 40 years of age, medical service providers move from being merely proficient to become experts. Experts have a strong trend in dividing the situational patterns delicately based upon their experiences of actual work instead of depending on the principles, standards, guidelines or knowledge to take proper action for the situation they face and the experts respond according to each pattern[8]. Therefore, levels of medical service providers of more than 40 years old in their knowledge on fire fighting safety are the lowest, but as far as the level of recognizing how to cope with fire fighting safety is concerned, the level of 40 years of age or above was significantly higher statistically than the ones of 20~29 and 30~39 years of age. Regarding the length of career, those with more than 15 years were recorded to be 8.88, those of 5 years were 6.27 and those of more than 5 years but less than 10 years were 5.86.

Reviewing fire fighting safety education, levels of those who were educated for fire fighting safety was higher than those without such education in recognizing how to cope with it, which was verified also by following experiment thesis. According to the study on the experience of fire fighting safety affecting safety consciousness of children, the young students who attended such events showed higher levels than those not attending in the areas of fire fighting safety consciousness, how to react when fire breaks out, consciousness of fire prevention, knowledge on fire fighting facilities, first aid and interests in the fire fighting safety education[9].

Those who believe themselves to have higher levels of subject knowledge on the fire fighting safety show higher averages than those without such knowledge, which indicates that subjective

knowledge affects the levels of recognizing how to cope with fire fighting safety rather than the objective knowledge in an emergency.

Table 5. Knowledge on fire fighting safety according to common features of the ICT medical service provider's (N=331)

| Features  | Classification                   | n   | MD±SD     | F/t  | p    | Dunnett T3 |
|---|----------------------------------|-----|-----------|------|------|------------|
| Gender  | Male                             | 86  | 7.19±1.32 | .98  | .328 |            |
|   | Female                           | 245 | 7.01±1.45 |      |      |            |
| Age   | 20-29                            | 129 | 7.09±1.47 | .69  | .500 |            |
|   | 30-39                            | 117 | 7.14±1.38 |      |      |            |
|   | more than 40                     | 85  | 6.90±1.39 |      |      |            |
| Academic background                                   | High school                      | 36  | 6.83±1.56 | 2.52 | .082 |            |
|   | Vocational college               | 175 | 6.95±1.48 |      |      |            |
|   | University                       | 120 | 7.28±1.25 |      |      |            |
| Length of career                                      | Less than 5 years                | 154 | 7.03±1.46 | .25  | .863 |            |
|   | More than 5- less than 10 years  | 77  | 6.99±1.41 |      |      |            |
|   | More than 10- less than 15 years | 60  | 7.18±1.32 |      |      |            |
|   | More than 15 years               | 40  | 7.10±1.45 |      |      |            |
| Medical staff   | Medical staff                    | 162 | 7.16±1.50 | 1.30 | .195 |            |
|   | non medical staff                | 169 | 6.96±1.32 |      |      |            |
| Experience with fire fighting safety education        | Yes                              | 199 | 7.09±1.36 | .52  | .603 |            |
|   | no                               | 132 | 7.01±1.50 |      |      |            |
| Level of subjective knowledge on fire fighting safety | High                             | 38  | 6.76±1.46 | 2.68 | .070 |            |
|   | Medium                           | 198 | 7.20±1.41 |      |      |            |
|   | Low                              | 95  | 6.87±1.38 |      |      |            |
| Intension to attend fire fighting safety education    | Yes                              | 295 | 7.09±1.39 | 1.13 | .259 |            |
|   | no                               | 36  | 6.81±1.62 |      |      |            |

p<.05

Table 6. ICT medical service provider's level of recognizing the methods to cope with fire fighting safety (N=331)

| Features            | Classification                                | n   | MD±SD     | F/χ²/t     | p     | Dunnett T3 |
|---------------------|---|-----|-----------|------------|-------|------------|
| Gender              | Male  | 86  | 7.81±2.98 | 4.12       | <.001 |            |
|                     | Female  | 245 | 6.20±3.53 |            |       |            |
| Age                 | 20-29 <sup>①</sup>                            | 129 | 6.07±3.52 | 17.24 (χ²) | <.001 | ①<③        |
|                     | 30-39 <sup>②</sup>                            | 117 | 6.26±3.45 |            |       |            |
|                     | more than 40 <sup>③</sup>                     | 85  | 7.94±3.09 |            |       |            |
| Academic background | High school                                   | 36  | 6.47±3.80 | 4.88       | .614  |            |
|                     | Vocational college                            | 175 | 6.47±3.48 |            |       |            |
|                     | University                                    | 120 | 6.87±3.38 |            |       |            |
| Length of career    | Less than 5 years <sup>①</sup>                | 154 | 6.27±3.57 | 22.76 (χ²) | <.001 | ①<④        |
|                     | More than 5- less than 10 years <sup>②</sup>  | 77  | 5.86±3.49 |            |       |            |
|                     | More than 10- less than 15 years <sup>③</sup> | 60  | 6.97±3.24 |            |       |            |
|                     | More than 15 years <sup>④</sup>               | 40  | 8.88±2.36 |            |       |            |
| Medical             | Medical staff                                 | 162 | 6.46±3.39 | -.82       | .414  |            |

|   |                     |     |           |            |       |
|---|---------------------|-----|-----------|------------|-------|
| staff   | non medical staff   | 169 | 6.77±3.55 |            |       |
| Experience with fire fighting safety education        | Yes                 | 199 | 7.54±3.05 | 6.10       | <.001 |
|   | no                  | 132 | 5.21±3.60 |            |       |
| Level of subjective knowledge on fire fighting safety | High <sup>①</sup>   | 38  | 8.92±2.42 | 53.83 (χ²) | <.001 |
|   | Medium <sup>②</sup> | 198 | 7.16±3.24 |            |       |
|   | Low <sup>③</sup>    | 95  | 4.56±3.30 |            |       |
| Intension to attend fire fighting safety education    | Yes                 | 295 | 6.63±3.43 | .26        | .792  |
|   | no                  | 36  | 6.47±3.80 |            |       |

p<.05

#### IV. CONCLUSION

This study was conducted to understand the elements affecting the medical service provider's level of recognizing methods for coping with fire fighting safety. The scores of level of knowledge fire fighting safety of medical service provider's were 7.06(10 point scale), and the scores of level of recognizing how to cope with fire fighting safety were 6.61(11 point scale). level of recognizing how to cope with fire fighting safety were significantly different according to gender, age, length of career, level of subjective knowledge on fire fighting safety.

In order to overcome the problems of nursing resource's being concentrated on female, the lack of human resources who are on circulating duty after the medical staff leave their daily job and prevent casualties against fire and respond with emergency immediately, it is important that fire fighting safety education should be rendered not only to the medical service providers but also to the out patients, visitors, in patients and their guardians. Other researches were recommend a study on the implementation of digital anti-fire monitoring



system with multipoint communication protocol[10], a design and development of the smoke detection system using infra-red laser for fire detection in the wide space[11], video based fire detection algorithm using gaussian mixture mode[12].

Learning activities of future education puts emphasis to self directed learning, tailored learning for individuals and cooperative learning. Effects of fire fighting safety education need to be maximized by developing various contents for educational resources such as experience with fire extinguishers, evacuating from smoke, earth quakes, first aid (cardiopulmonary resuscitation), gas explosions, natural disasters, evacuation by slow lift of visiting facilities, simulation games or cartoon for fire fighting safety. Also re-locating the space of medical facilities is required according to the type of patients using the fire evacuation simulation through an analysis of patient's type. In addition, avoiding the education just conveying knowledge by lecture and the fire fighting education focused on experiencing actual work are required.

As a conclusion, finding the elements affecting their levels is meaningful and the authors wish this study could provide the necessity in rendering education focused on the actual field experience to enhance their recognition levels and also provide basic data to develop educational manuals through a multi learning approach. The authors, accordingly, wish to suggest developing various contents to improve the medical service provider's methods for coping with fire fighting safety in consideration of the elements affecting their recognition levels as is reported by this paper and developing and making use of educational manuals on the methods for coping with fire fighting facilities of medical institutions.

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