

## 【Original Article】

## Research on Second-Hand Smoke Prevention Measures at Medical/Welfare Related Universities

## First Report: Actual Conditions of Second-Hand Smoke Prevention Measures and Knowledge and Awareness of Faculty Members

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**[Background]** There exists no simultaneous research examining actual conditions of second-hand smoke prevention measures at a number of universities and knowledge and awareness of faculty members working there on them. Due to this, the actual situations of knowledge and awareness of faculty members on second-hand smoke prevention measures implemented at universities have not been clarified. Thus, we researched the current conditions of second-hand smoke prevention measures at medical/welfare related universities and knowledge and awareness of faculty members on them.

**[Methods]** We sent requests for cooperation to the research to the presidents of 21 universities with medical, nursing or welfare departments in Hyogo Prefecture and conducted a survey on anti-smoking conditions at 6 universities which agreed to cooperate. At the same time, we also targeted 861 faculty members at the 6 universities and researched their knowledge and awareness on second-hand smoke prevention measures. For the survey, we adopted the placement method utilizing anonymous automatic-recording questionnaires and conducted the survey from February to September 2011. The survey was implemented after ethical review by the university the researchers belonged to.

**[Results]** 502 of 861 faculty members (58.3%) at the 6 universities responded. For analysis, we only used valid responses from 495 people (57.5%). According to the anti-smoking classification, 3 universities (285 members belonged to) were non-smoking facilities and 3 universities (210 members belonged to) were smoking facilities. 73% of the faculty members at non-smoking facilities and 59.6% at smoking facilities properly understood their anti-smoking classifications. 21.5% of respondents from non-smoking facilities and 47.9% from smoking facilities answered that they were exposed to second-hand smoke, indicating a significant difference ( $p < 0.001$ ).

**[Conclusion]** Although medical/welfare related universities are supposed to have many faculty members with medical expertise, 30% faculty members at non-smoking facilities and 40% at smoking facilities did not properly understand their universi-

ties' anti-smoking classifications. In addition, even at non-smoking facilities, where on-campus smoking is supposedly prohibited, second-hand smoke existed too.

**Keywords:** Medical/welfare related universities, second-hand smoke prevention measures, faculty members

**Introduction**

Since the enforcement of Health Promotion Law in 2003, schools have been designated as a place with a duty to take second-hand smoke prevention measures in order to protect non-smoking individuals. Therefore, necessity of second-hand smoke prevention measures has further increased especially in educational facilities with students including minors. Amid such situation, Hyogo prefecture has developed "Prefectural guideline for second-hand smoke prevention measures" on March in 2004. With an explicit statement for non-smoking on the premises such as universities and professional schools, the guideline has shown its concept that "Smoking on the premise shall be prohibited in order to improve the circumstance for students to be able to take proper actions based on correct information since university students make their way from minors to adults during their school days and the period is exactly when many people start smoking habit <sup>1)</sup>". Further, a goal has been set up to achieve 100% non-smoking within premises of universities and professional schools by 2005 <sup>1)</sup>. It has been a pioneering effort nationally in an aspect that certain target values for achieving smoking prohibition on the premises of universities were indicated mainly led by local governments. According to a result of "Implementation status survey of second-hand smoke prevention measures" conducted by health promotion section of health division in health and welfare department of Hyogo prefecture, however, the result was far from the achievement of 100% smoking prohibition on the premises of universities showing smoking prohibition measures implementation ratios of 28.8% and 36.1% <sup>2)</sup> as of 2005 and 2008 respectively in educational institutions such

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as universities and professional schools. In terms of smoking prevention measures for minors, on the other hand, with education of health disturbance caused by smoking including second-hand smoke for early elementary grades, smoking prevention education has become to be implemented strenuously based on enforcement of various policies<sup>3)</sup> by individual local governments and the curriculum guidelines specified by the Ministry of Education<sup>4)</sup>. As the result, a lot of survey findings have been reported that smoking ratios in minors have remarkably decreased<sup>5,6)</sup>. However, disputed trend in students to start smoking after enrollment in universities<sup>7-10)</sup> has been a common phenomenon observed in universities nationwide. At present when the percentage of students who advance to universities or junior colleges has reached more than 50% level, it's not an exaggeration to say that health promotion activities at universities could make a great difference to health of graduates, i.e. citizens in the future<sup>12)</sup>. However, while various efforts for second-hand smoke prevention have been made at many universities, few reports have reviewed current situation of second-hand smoke prevention measures implemented at universities as well as knowledge and awareness on such measures of their faculty members simultaneously, resulting in insufficient clarification of recognition degree of faculty members relating to second-smoke prevention measures implemented at universities.

Therefore, "actual conditions of second-hand smoke prevention measures" and "knowledge and awareness on them" were simultaneously surveyed in the study at medical/welfare related universities which are supposed to take responsibilities of education of students to actively work for medical welfare field in the future and to have higher level of knowledge on smoking.

## Methods

### 1. Subjects and Methods of Survey

Based on data disclosed by the Ministry of Education, Culture, Sports, Science & Technology as of January 2011, survey cooperation requests were sent to presidents of 21 universities with medical, nursing, welfare faculties in Hyogo prefecture and the survey was conducted for 6 universities which agreed with the request and 861 of faculty members who belonged to the universities. Placement method based on anonymous self-administered questionnaire was used for the survey.

Further, it was required to precisely comprehend actual conditions of anti-smoking as well as second-hand smoke prevention measures in order to understand how faculty members recognized the actual conditions of such measures implemented by universities they belonged to. Therefore, we asked for answers about the actual conditions of second-hand smoke prevention measures to one person for each university selected from among students and faculty members in charge of health control of health control center or the like and those who were in charge of second-hand smoke prevention measures and knew well about the activities. The surveillance period was from February to September in 2011.

### 2. Contents of Survey

Totally 20 items of questions were setup as the contents of survey for faculty members including age, sex, occupation, professional qualifications of medical or welfare field, basic

attributes including length of service, degree of recognition about second-hand smoke prevention measures of universities they belonged to, experience of second-hand smoke on the campuses, awareness on smoking by students in medical/welfare faculties as well by faculty members of medical/welfare-related universities, feeling at the time of second-hand smoke, knowledge on health effects caused by second-hand smoke, relationship between smoking trend in students and measures against smoking by students, stance for second-hand smoke prevention measures in the future, knowledge on responsibility of facility managers to take steps for second-hand smoke prevention measures required by Health Promotion Law, degree of recognition about guidelines of Hyogo prefecture for second-hand smoke prevention measures and target values indicated by them relating to smoking prohibition on the premises of universities, and interest in second-hand smoke prevention measures (Document 1). A question to ask the condition of second-hand smoke prevention measures implemented by universities was set up for the survey to understand the actual conditions of such activities of universities including anti-smoking measures (Document 2). In addition, "universities with implementation of smoking prohibition on the campus" in the study has been defined as "universities which have publicly announced any and all smoking prohibition on their premises including inside and outside of buildings".

### 3. Methods of Analysis

Descriptive analysis of each survey item was conducted for age, sex, profession, professional qualification for medical and welfare field, and length of service. Further, examination was conducted on difference in proportions between two groups, i.e. universities which have been implementing smoking prohibition on the premises (hereinafter refers to as on-the-premise smoking prohibition implementing school) and those which have not been implementing smoking prohibition on the premise (hereinafter refers to as on-the-premise smoking prohibition non-implementing school) based on responses from representatives of each university relating to the items of degree of recognition about second-hand smoke prevention measures of universities they belonged to, experience of second-hand smoke on the campuses, relationship between smoking trend in students and measures against smoking by students, stance for second-hand smoke prevention measures in the future. In addition,  $\chi^2$  tests were conducted on differences in proportions based on sex and medical-related professional qualifications for each result. Each amount of statistics has been shown by average value  $\pm$  standard deviation with level of statistical significance at 0.05 or less. Missing values have been eliminated and not included in the analysis. SPSS 20.0J for Windows was used for the statistical analyses mentioned above.

Furthermore, free descriptions relating to reasons for choosing the direction for second-hand smoke prevention measures in the future were quantified by categorizing them into each group with similar descriptions. Subsequently, the second-hand smoke prevention measures were compared by their directions.

### 4. Ethical Consideration

With explicit description about outline, purpose and methods of the study, securement of confidentiality and anonymity of

data, and no disadvantage for rejection of participation in the study or suspension thereof on the explanation and consent documents distributed to universities and subjects for the survey, we regarded the collected consent forms from universities and survey slips from faculty members as their consents to the study. With an explicit description that participants may decline the study even along the way without any disadvantage, a copy of the survey response paper (consent form) and request form for consent withdrawal were sent by mail to universities which agreed with the survey. Further, analyses were conducted by separating off any information that could identify personal name based on the anonymous survey. The survey was approved (on August 24, 2011) by Ethics Review Committee of Kansai University of Social Welfare.

### Result

As a result of request of cooperation to the survey in writing sent to presidents of 21 universities with a faculty of medicine, nursing or welfare in Hyogo prefecture, we received responses from 10 of them (47.6%) over whether they accepted the cooperation or not. However, the request of cooperation to the survey was sent again to presidents of 11 universities which hadn't responded previously. As the result, we received responses from 5 universities anew by which the final number of respondent universities reached 15 (71.4%) in total. We obtained consent from 6 universities (28.6%) among the respondent universities. Then, survey slips were distributed to 861 faculty members of the 6 universities and the questionnaire forms were collected from 502 respondents (58.3%) in total. Data of valid responses from 495 respondents (response ratio of 57.5%) were used for the analyses.

#### 1. Outline of Subjects

Outline of subjects are shown in Table 1 separately by each anti-smoking measure. As a whole, all subjects are divided into 197 (40.1%) of men and 294 (59.9%) of women by sex, and 133 (27.1%) in their 40's are classified as the most dominant group by age followed by 118 in their 30's and 105 in their 50's. 219 (44.7%), 261 (53.3%) and 10 (2.0%) were teachers, office staff and others respectively by classification based on occupation. In terms of qualification, 121 (25.1%) had medical/welfare related professional qualifications, while 361 (74.9%) didn't. Further, 338 (69.4%) with three or more service years consists more than half of all subjects, while those with less than three service years were 149 (30.6%).

Table1. Outline of Subjects

Item	smoking ban status	
	total smoking ban n=285	Not total smoking ban n=210
sex		(unanswered=4)
Male	99(35%)	98(47.1%)
Female	184(65%)	110(52.9%)
Age		(unanswered=5)
20-29	32(11.3%)	18(8.7%)
30-39	62(22.0%)	56(26.9%)
40-49	80(28.3%)	53(25.5%)
50-59	62(22.0%)	43(20.7%)
0-9	41(14.5)	36(17.3%)
70-	5(1.8%)	2(1.0%)
Occupation		(unanswered=5)
Teacher	125(44.6%)	94(44.8%)
Office worker	151(53.9%)	110(52.4%)
Others	4(1.4%)	6(2.9%)
Medical welfare employment qualification		(unanswered=13)
Yes	77(28%)	44(21.3%)
No	198(72%)	163(78.7%)
Length of the job		(unanswered=8)
>3years	95(34.1%)	54(26.0%)
<3years	184(65.9%)	154(74.0%)

#### 2. Anti-smoking Measures Classification

As for classification of anti-smoking measures in 6 universities, three of them were on-the-premise smoking prohibition implementing schools, and remaining three of them were on-the-premise smoking prohibition non-implementing schools. The numbers of faculty members of the former schools were 285 and those of the latter were 210.

#### 3. Anti-smoking Classification Recognized by Faculty Members

Anti-smoking classifications recognized by faculty members are shown in Table 2 by each anti-smoking measure which has been actually introduced by each university. Of all faculty members of three on-the-premise smoking prohibition implementing schools, 205 of them (73.0%) had recognized the on-the-premise smoking prohibition correctly and 62 of them (22.1%) had mistakenly recognized it, revealing that 76 (27.1%) of faculty members including 14 (5.0%) of those who responded they didn't know had not recognized the on-the-premise smoking prohibition. On the other hand, of all faculty members of three on-the-premise smoking prohibition non-implementing schools, 124 of them (59.6%) had correctly rec-

Table2.Smoking regulation recognized by teachers

smoking regulation status	total smoking ban	Not total smoking ban	p
	3	3	
The number of the respondents	n		
	281 <sup>2)</sup> (%)	208 <sup>2)</sup> (%)	
smoking regulation recognized by teachers			
total smoking ban	205(73.0)	6(2.9)	p<0.001 <sup>1)</sup>
smoking ban in buildings	23(8.2)	124(59.6)	
smoking is allowed in smoking rooms	25(8.9)	20(9.6)	
smoking place is not directed	14(5.0)	55(26.4)	
unclear	14(5.0)	3(1.4)	

<sup>1)</sup>pearson's  $\chi^2$  analysis

<sup>2)</sup>except unanswered

ognized anti-smoking classification introduced by the universities they belonged to, while 6 of them (2.9%) had recognized as on-the-premise smoking prohibition and 3 of them (1.4%) responded they didn't know.

Then, difference in ratios of correct recognition of anti-smoking classification by faculty members for each anti-smoking measure introduced by each university was compared between those who had medical/welfare related qualifications and those who didn't (Table 3). As a result, among faculty members of on-the-premise smoking prohibition implementing schools who had recognized the anti-smoking classification correctly, 50 of them (66.7%) had medical/welfare related professional qualifications while 150 of them (76.1%) didn't, showing significant difference recognized depending on with or without such qualifications ( $p < 0.001$ ). On the other hand, among faculty members of on-the-premise smoking prohibition non-implementing schools who had recognized the anti-smoking classification correctly, 31 of them (70.5%) had medical/welfare related professional qualifications and 92 of them (56.8%) didn't, and it has been confirmed that ratio of those who had correctly recognized the indoor no-smoking intro-

duced by on-the-premise smoking prohibition non-implementing schools was significantly higher in those who had medical/welfare related professional qualifications ( $p < 0.05$ ).

Further, as a result of comparison on difference in ratios of recognition of anti-smoking classification between sexes (Table 4), among faculty members of on-the-premise smoking prohibition implementing schools who had recognized the anti-smoking classification, 68 of men (68.7%) and 136 of women (75.1%), i.e. about 70% of both men and women had correctly recognized the on-the-premise smoking prohibition, showing no significant difference between sexes. Among faculty members of on-the-premise smoking prohibition non-implementing schools who had recognized the anti-smoking classification, however, 47 of men (48.0%) and 77 of women (71.0%) had recognized the anti-smoking classification correctly, showing significantly high ratio of correct recognition of the classification in women ( $p < 0.001$ ).

#### 4. Experience of Second-hand Smoke on the Campuses

Table 5 shows the status of experience of second-hand smoke on the campuses for each anti-smoking measure prac-

**Table3. Teachers who have medical welfare system professional qualifications and those who do not were compared. Anti-smoking divisions that those teachers are aware of are as follows:**

smoking regulation status	total smoking ban 3		<i>p</i>	Not total smoking ban 3		<i>p</i>
	Yes	No		Yes	No	
	75 <sup>2)</sup> (%)	197 <sup>2)</sup> (%)		44 <sup>2)</sup> (%)	162 <sup>2)</sup> (%)	
Medical welfare employment qualification						
Anti-smoking divisions that teachers are aware of						
total smoking ban	50(66.7)	150(76.1)		3(6.8)	3(1.9)	
smoking ban in buildings	1(1.3)	21(10.7)	$p < 0.001^{1)}$	31(70.5)	92(56.8)	$p < 0.05^{1)}$
smoking is allowed in smoking rooms	10(13.3)	14(7.1)		1(2.3)	18(11.1)	
smoking place is not directed	6(8.0)	6(3.0)		7(15.9)	48(29.6)	
unclear	8(10.7)	6(3.0)		2(4.5)	1(0.6)	

<sup>1)</sup>pearson's  $\chi^2$  analysis

<sup>2)</sup>except unanswered

**Table4. Smoking regulation recognized by teachers when sex compares.**

smoking regulation status	total smoking ban 3		<i>p</i>	Not total smoking ban 3		<i>p</i>
	Male	Female		Male	Female	
	n			n		
The number of the respondents <sup>2)</sup>	99 (%)	181 (%)		98 (%)	109 (%)	
Smoking regulation recognized by teachers						
total smoking ban	68(68.7)	136(75.1)		1(1.0)	5(4.6)	
smoking ban in buildings	8(8.1)	15(8.3)	n.s <sup>1)</sup>	47(48.0)	77(71.0)	$p < 0.001^{1)}$
smoking is allowed in smoking rooms	15(15.2)	10(5.5)		16(16.3)	3(2.8)	
smoking place is not directed	5(5.1)	9(5.0)		34(34.7)	21(19.3)	
unclear	3(3.0)	11(6.1)		0	3(2.8)	

<sup>1)</sup>pearson's  $\chi^2$  analysis n.s=not significant

<sup>2)</sup>except unanswered

**Table5. Passive smoking in the university**

smoking regulation status	total smoking ban	Not total smoking ban	<i>p</i>
	3	3	
The number of the respondents	n		
	284 <sup>2)</sup> (%)	209 <sup>2)</sup> (%)	
passive smoking			
daily	8(2.8)	14(6.7)	$p < 0.001^{1)}$
sometimes	53(18.7)	88(41.2)	
never	223(78.5)	107(51.2)	

<sup>1)</sup>pearson's  $\chi^2$  analysis

<sup>2)</sup>except unanswered

**Table6.**Feelings when received passive smoking when compared between respondents who have medical welfare system professional qualifications and those who do not.

Medical welfare employment qualification	Yes	No	p
	n		
	46 <sup>2)</sup> (%)	118 <sup>2)</sup> (%)	
Feelings when received passive smoking			
Do not feel anything in particular	4 (8.7)	25 (21.2)	n.s <sup>1)</sup>
It is disturbing, but it does not affect or damage my health	32 (69.6)	75 (63.6)	
It affects or damages my health, so I feel bad	10 (21.7)	18 (15.3)	

<sup>1)</sup>pearson`s  $\chi^2$  analysis n.s=not significant

<sup>2)</sup>except unanswered

**Table7.**Feelings when received passive smoking when sex compares.

The number of the respondents	Male	Female	p
	n		
	78 <sup>2)</sup> (%)	89 <sup>2)</sup> (%)	
Feelings when received passive smoking			
Do not feel anything in particular	20 (25.6)	8 (9.0)	p<0.01 <sup>1)</sup>
It is disturbing, but it does not affect or damage my health	48 (61.5)	61 (68.5)	
It affects or damages my health, so I feel bad	10 (12.8)	20 (22.5)	

<sup>1)</sup>pearson`s  $\chi^2$  analysis

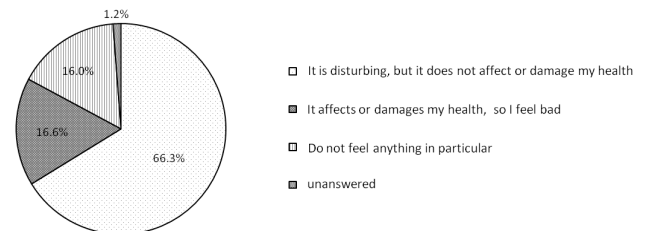
<sup>2)</sup>except unanswered

ticed during the past 6 months. Those who responded they had experienced second-hand smoke routinely and occasionally were 8 persons (2.8%) and 53 persons (18.7%) in on-the-premise smoking prohibition implementing schools and 14 persons (6.7%) and 88 persons (41.2%) in the non-implementing schools respectively, showing significantly lower ratio of experience of second-hand smoke in on-the-premise smoking prohibition implementing schools ( $p < 0.001$ ). However, those who had experienced second-hand smoke on the universities they belonged to during the past 6 months were 163 persons in the 6 universities, making up 33.1% of the whole respondents. Moreover, those who had experienced second-hand smoke while smoking prohibition on the premise was practiced were 61 persons, making up 21.5% of faculty members who belonged to on-the-premise smoking prohibition implementing schools. In other words, it has been proved the reality that second-hand smoke was observed even at higher education institutions such as medical/welfare related universities which educate specialists to work at medical/welfare related site in the future in spite of implementing smoking prohibition on the premise.

**5. Sensation When Exposed to Second-hand Smoke**

We asked 163 of those who responded they had experienced second-hand smoke routinely and occasionally in the universities they belonged to during the past 6 months about the sensation when they were exposed to second-hand smoke. As shown in Fig.1, the result shows that 66.3% of them responded they had felt it annoying but it had no harmful effect (damage) on health and 16.6% of them had complained its harmful effect (damage) on health with arduous feeling, revealing that more than 80% of them in total had felt adverse effect on health and arduous feeling as well. Further, as nearly 20% of them responded they had already been affected (damaged) by second-hand smoke with arduous feeling, it has been confirmed that there were faculty members whose health conditions were affected by second-hand smoke on the campuses.

Then, difference in ratios with regard to sensation when they were exposed to second-hand smoke was compared between



**Figure1.** Feelings when received passive smoking

respondents with and without medical/welfare related professional qualifications (Table 6). As the result, those who responded it had not affected (damaged) their health but annoyed them with and without medical/welfare related professional qualifications were 32 persons (69.6%) and 75 persons (63.6%) respectively, and similarly those who responded it had affected (damaged) their health and distressed as well, and those with and without the qualifications who did it had made them feel nothing special were 10 persons (21.7%) and 18 persons (15.3%) in the former case, and 4 persons (8.7%) and 25 persons (21.2%) in the latter case respectively, with no significant difference confirmed depending on medical/welfare related professional qualifications.

Further, differences of ratios in each item by sex were compared (Table 7). As the result, of all those who responded it had not affected (damaged) their health but annoyed them, 48 were men (61.5%) and 61 were women (68.5%), and similarly of all those who responded it had affected (damaged) their health and distressed them as well and those who did it had made them feel nothing special, 10 were men (12.8%) and 20 were women (22.5%) in the former case, and 20 were men (25.6%) and 8 were women (9.0%) in the latter case respectively, with significant difference confirmed between men and women ( $p < 0.01$ ).

**6. Awareness of Faculty Members on Second-hand Smoke of Students on the Campus**

The faculty members were asked how they considered sec-

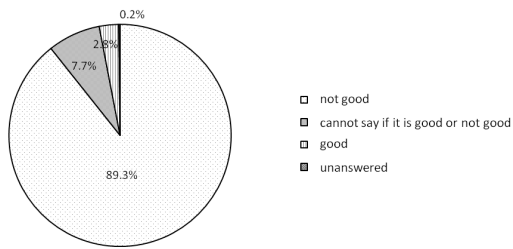


Figure2. Teachers' awareness concerning the fact that students receive passive smoking in the university

ond-hand smoke of students on the campuses of universities they belonged to. As shown in Fig. 2, the result indicates 89.3% of faculty members took it undesirable for students to be exposed to second-hand smoke on the campuses. In other words, it has been revealed that nearly 90% of faculty members think it unfavorable for students to be exposed to second-hand smoke on the campuses. On the other hand, it has

been also revealed that there still exist some faculty members who don't mind if students are exposed to second-hand smoke on the campuses of universities they belonged to, even if the ratio was as low as 2.8%.

As a result of comparison of awareness on second-hand smoke of students on the campuses between faculty members with and without medical/welfare related professional qualifications (Table 8), of all those who considered it undesirable, 113 persons (93.4%) had professional qualifications and 316 persons (87.8%) didn't, and similarly of all those who responded yes or no and those who tolerated it, 6 persons (5.0%) had the qualifications and 32 persons (8.9%) didn't in the former case and 2 persons (1.7%) had the qualifications and 12 persons (3.3%) didn't respectively, with no significant difference recognized depending on the medical/welfare related professional qualifications.

Further, as a result of comparison by sex of awareness on second-hand smoke of students on the campuses between faculty members (Table 9), of all those who considered it undesirable, 173 were men (88.3%) and 266 were women (90.5%), and similarly of those who responded yes or no and those who

Table8. Teachers' awareness concerning the fact that students receive passive smoking in the university when compared between respondents who have medical welfare system professional qualifications and those who do not.

Medical welfare employment qualification	Yes		No		p
	n		n		
	121 <sup>2)</sup> (%)		360 <sup>2)</sup> (%)		
<b>Awareness of Faculty Members on Second-hand Smoke of Students on the Campus</b>					
good	2(1.7)		12(3.3)		n.s <sup>1)</sup>
not good	113(93.4)		316(87.8)		
Cannot say if it is good or not good	6(5.0)		32(8.9)		

<sup>1)</sup>pearson's  $\chi^2$  analysis n.s=not significant

<sup>2)</sup>except unanswered

Table9. Awareness of Faculty Members on Second-hand Smoke of Students on the Campus when sex compares.

The number of the respondents <sup>2)</sup>	Male	Female	p
	n		
	196(%)	294(%)	
<b>Awareness of Faculty Members on Second-hand Smoke of Students on the Campus</b>			
good	3(1.5)	11(3.7)	n.s <sup>1)</sup>
not good	173(88.3)	266(90.5)	
Cannot say if it is good or not good	20(10.2)	17(5.8)	

<sup>1)</sup>pearson's  $\chi^2$  analysis n.s=not significant

<sup>2)</sup>except unanswered

Table10. Students' smoking conditions that teachers feel and the influences of passive smoking prevention measures at each university.

smoking regulation status	total smoking ban	Not total smoking ban	p
	3		
	285 <sup>2)</sup> (%)	209 <sup>2)</sup> (%)	
<b>student's smoking</b>			
Increased comparing with the past	18(6.3)	22(10.5)	n.s <sup>1)</sup>
Decreased comparing with the past	120(42.1)	87(41.6)	
unclear	147(51.6)	100(47.8)	
<b>The influences of passive smoking prevention measures</b>			
	281 <sup>2)</sup> (%)	206 <sup>2)</sup> (%)	
Greatly affected	36(12.8)	9(4.4)	p<0.001 <sup>1)</sup>
Affected to some extent	88(31.3)	66(32.0)	
Not significantly affected	51(18.1)	69(33.5)	
unclear	106(37.7)	62(30.1)	

<sup>1)</sup>pearson's  $\chi^2$  analysis n.s=not significant

<sup>2)</sup>except unanswered

tolerated it, 20 were men (10.2%) and 17 were women (5.8%) in the former case and 3 were men (1.5%) and 11 were women (3.7%) in the latter case respectively, with no significant difference confirmed between men and women.

**7. Trend of Smoking among Students Perceived by Faculty Members and Effects of Second-hand Smoke Prevention Measures Implemented by Each University**

Trend of smoking among students perceived by faculty members is shown in Table 10 by each anti-smoking measure. In terms of trend of smoking among students of universities they belonged to, ratios of the faculty members in on-the-premise smoking prohibition implementing schools and non-implementing schools who perceived the trend had shrunk than before were 42.1% and 41.6% respectively, and ratios of those who perceived the trend had strengthened than before were 6.3 % and 10.5% respectively, showing almost the same ratios with no significant difference observed depending on the anti-smoking measures. By a question whether they thought the second-hand smoking prohibition measures implemented by the universities they belonged to had influence on the trend of smoking among students, such a tendency has been recognized that faculty members of on-the-premise smoking prohibition implementing schools more likely perceived significant impact and those who belonged to the non-implementing schools more likely perceived less impact ( $p < 0.001$ ).

**8. Second-hand Smoke Prevention Measures to be Implemented or Continued Ultimately**

The results shown in Table 11 are responses to a question about second-hand smoke prevention measures which should be implemented or continued ultimately in the future in the universities they belonged to. In case of faculty members of

on-the-premise smoking prohibition implementing schools, the highest ratio of 75.7% of them responded on-the-premise smoking prohibition should be continued, followed by 13.7% of them preferring completely separate smoking and 9.9% of them preferring indoor no-smoking. In case of those who belonged to on-the-premise smoking prohibition non-implementing schools, the highest ratio of 45.9% of them responded on-the-premise smoking prohibition should be continued, followed by 28.2% of them preferring indoor no-smoking and 21.5% of them preferring completely separate smoking, revealing that faculty members of on-the-premise smoking prohibition implementing schools more likely recognized a need to continue the on-the-premise smoking prohibition as a trend for second-hand smoke prevention measures in the future ( $p < 0.001$ ).

Then, as a result of comparison (Table 12) between faculty members with and without medical/welfare related professional qualifications about how they considered the second-hand smoke prevention measures to be implemented or continued ultimately in the universities they belonged to, it has been revealed that those who had medical/welfare related professional qualifications more likely recognized a need to continue the on-the-premise smoking prohibition ( $p < 0.001$ ).

**9. Reason for Selection Relating to Direction for Second-hand Smoke Prevention Measures in the Future**

As 182 out of 493 respondents relating to direction for second-hand smoke prevention measures in the future described also about reasons of selection, a result of analysis of their descriptions is shown. Of 182 respondents, 104 selected to implement or continue on-the-premise smoking prohibition as a direction for second-hand smoke prevention measures in the future, followed by 39, 36 and 3 respondents who selected indoor no-smoking, completely separate smoking, and sepa-

**Table11. Passive smoking prevention measures that should be implemented finally or continued to implement.**

smoking regulation status	total smoking ban	Not total smoking ban	<i>p</i>
	3	3	
The number of the respondents	n		
	284 <sup>2)</sup> (%)	209 <sup>2)</sup> (%)	
The direction of the anti-smoking that should be implemented finally or continued to implement			
total smoking ban	215(75.7)	96(45.9)	$p < 0.001^{1)}$
smoking ban in buildings	28(9.9)	59(28.2)	
smoking is allowed in smoking rooms	39(13.7)	45(21.5)	
smoking place is not directed	2(0.7)	8(3.8)	
free smoking	0	1(0.5)	

<sup>1)</sup>pearson`s  $\chi^2$  analysis  
<sup>2)</sup>except unanswered

**Table12. Passive smoking prevention measures that should be implemented finally or continued to implement when compared between respondents who have medical welfare system professional qualifications and those who do not.**

Medical welfare employment qualification	Yes	No	<i>p</i>
	n		
The number of the respondents	121 <sup>2)</sup> (%)	359 <sup>2)</sup> (%)	
Passive smoking prevention measures that should be implemented finally or continued to implement			
total smoking ban	96(79.3)	204(56.8)	$p < 0.001^{1)}$
smoking ban in buildings	13(10.7)	74(20.6)	
smoking is allowed in smoking rooms	11(9.1)	71(19.8)	
smoking place is not directed	1(0.8)	9(2.5)	
free smoking	0	1(0.3)	

<sup>1)</sup>pearson`s  $\chi^2$  analysis  
<sup>2)</sup>except unanswered

Table13. The reasons of the selection regarding the orientation of passive smoking prevention measures in the future.

Categories that have been extracted from the contents of free description	Number of Descriptions	%
1)total smoking ban	104	(100.0)
Necessary for passive smoking prevention measures	47	45.2
Necessary for health	20	19.2
Smoking itself is annoying or unpleasant	14	13.5
Reasonable as a university of Medical Welfare system	12	11.5
Necessary for education	11	10.6
2)smoking ban in buildings	39	(100.0)
Possible occurrence of harmful effects caused by banning smoking in the site	13	33.3
Smoking is a personal freedom and rights	11	28.2
Difficult to ban smoking completely	8	20.5
No problem with the present situation	4	10.3
Banning smoking in the site is too compulsory	2	5.1
Health hazards are reduced by banning smoking in the building	1	2.6
3)smoking is allowed in smoking rooms	36	(100.0)
Possible occurrence of harmful effects caused by banning smoking in the site	13	36.1
Smoking is a personal freedom and rights	11	30.6
Difficult to ban smoking completely	7	19.4
Acceptable to separate smoking and non-smoking areas completely	5	13.9
4)smoking place is not directed	3	(100.0)
Other measures are unrealistic	2	66.7
Smoking is a personal freedom and rights	1	33.3

rate smoking respectively. In relation to the reason for selecting implementation or continuation of on-the-premise smoking prohibition as a direction for second-hand smoke prevention measures in the future, the highest ratio of 45.2% of respondents selected reasons belonged to a category of "necessity of second-hand smoke prevention measures", followed by 19.2%, 13.5%, 11.5% and 10.6% of those who selected categories of "necessity for health", "unpleasant and disturbing properties of smoking", "as a matter of course for medial/welfare related universities" and "necessity for education" respectively. Further, among reasons of those who selected implementation or continuation of indoor no-smoking, or completely separate smoking, and separate smoking, those reasons categorized into "possibility of adverse effect caused by on-the-premise smoking prohibition", "smoking as an individual liberty and right" and "difficulty in complete smoking prohibition" ranked high, and such reasons categorized into "necessity for second-hand smoke prevention measures", "necessity for health" and "necessity for education" weren't observed at all compared with descriptive contents of those who selected implementation or continuation of on-the-premise smoking prohibition.

\*Words quoted by " " indicate category names.

#### 10. Obstructive Factors for On-the-premise Smoking Prohibition

As for 96 of faculty members who desired on-the-premise smoking prohibition ultimately in the universities they belonged to where the on-the-premise smoking prohibition hasn't been introduced yet, factors shown in Fig. 3 are those responded by them as the hindrance to implementation of on-the-premise smoking prohibition by the universities they currently belong to. As the result, the most dominant reason accounting for 29.6% was that cooperation of faculty members with smoking habit wasn't obtained, followed by those accounting for 26.9% and 13.0% that increased smoking outside the premise could cause troubles for neighbors and that it was difficult to obtain assistance from top management with smoking habit, respectively. In Health Promotion Law, schools are designated as an institution with an obligation to take any measure as required to prevent second-hand smoke and so facility managers are imposed with a duty to make efforts to take second-hand smoke prevention measures. However, as a factor to prevent on-the-premise smoking prohibition from being introduced, such responses that it was difficult to obtain assistance from top management with smoking habit made up for more than 10% of the whole responses.

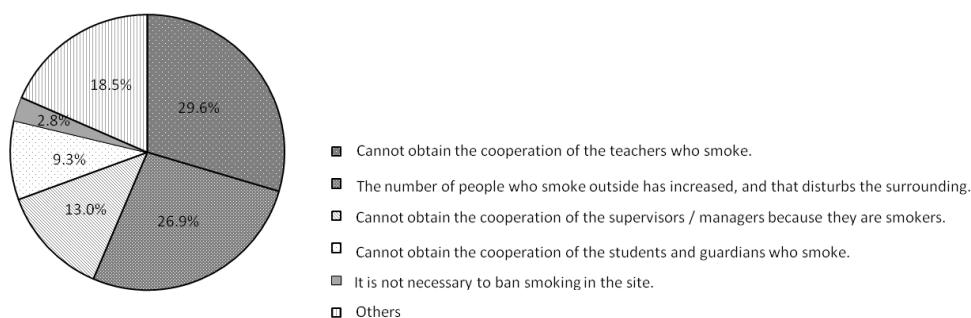


Figure3. Factors that prevent people from banning smoking in the site



## Discussion

With faculty members who didn't correctly understand second-hand smoke prevention measures of each university accounting for approximately 30% and 40% of those who belonged to on-the-premise smoking prohibition implementing schools and non-implementing schools respectively, it has been revealed that there exist certain faculty members who didn't understand actual state of second-hand smoke prevention measures. In addition, as for experience of second-hand smoke during the past 6 months, from 20% to more than 40% of people were exposed to second-hand smoke on the campuses in both on-the-premise smoking prohibition implementing schools and non-implementing schools, revealing existence of second-hand smoke regardless the state of implementation of second-hand smoke prevention measures by universities. In other words, the result has suggested a reality that second-hand smoke still exists even under implementation of on-the-premise smoking prohibition. According to a survey conducted at public elementary, junior and senior high schools by Kiyohara et al. (2008), the number of those who were exposed to second-hand smoke in schools of on-the-premise smoking prohibition implementing group was less than one-tenth of that in schools of on-the-premise smoking prohibition non-implementing group, suggesting that the regulation of on-the-premise smoking prohibition had a great impact on reducing second-hand smoke<sup>13)</sup>. With second-hand smoke observed in on-the-premise smoking prohibition implementing schools by around half of that in non-implementing schools, however, such great impact on second-hand smoke reduction by implementation of on-the-premise smoking prohibition wasn't recognized as did in public elementary, junior and senior high schools. It is believed that it was affected by differences between universities and public elementary, junior and senior high schools. Therefore, a lot of factors were thought to be associated with. For example, unlike public elementary, junior and senior high schools, universities don't have such institutions like the board of education to integrally decide and perform regulations, and unlike such institutions in which majority of educational object students are minors, they have not only students who haven't reached the age eligible to smoke but also those who have arrived in adulthood including more than half of them at eligible age for smoking, and so there are generous opinions on smoking by faculty members and students on the campuses<sup>9, 12, 14)</sup>. As may be apparent from the result this survey, the fact that 30% of faculty members hadn't recognized the anti-smoking classification in on-the-premise smoking prohibition implementing schools was believed to be a factor to hamper publicizing on-the-premise smoking inhibition implementation. As there has been a report<sup>11)</sup> that around 10% of students and faculty members hadn't acknowledged the on-the-premise smoking prohibition at the time two years after introducing on-the-premise smoking prohibition, this aspect was taken as a problem also in a survey conducted in universities implementing on-the-premise smoking prohibition, and therefore the result of the survey isn't an exception. It is believed such environmental characteristics of universities might have become factors to make faculty members difficult to acknowledge the anti-smoking classification correctly that faculty members work on in their individual rooms such as laboratories because universities don't have faculty rooms unlike elementary, junior and senior

high schools and that school buildings are scattered in the broad premises, resulting in generating a circumstance prone to smoke even on the premises where smoking is prohibited. Further, judging from the fact that faculty members hadn't acknowledged the anti-smoking classification in spite of implementation of on-the-premise smoking prohibition, it was concerned that similar phenomenon had occurred in recognition among students. Therefore, it may be an urgent need to consider how to widely supply and notify information of second-hand smoke prevention measures in order to make students and faculty members correctly recognize anti-smoking classifications.

In terms of direction for second-hand smoke prevention measures in the future in the universities faculty members belonged to, it has been revealed that many of them had recognized it undesirable to expose students to second-hand smoke regardless the on-going anti-smoking classifications and considered it necessary to introduce on-the-premise smoking prohibition for second-hand smoke prevention measures to be aimed at in the future. The tendency was observed more significantly in those who have medical/welfare related professional qualifications. As many researchers of anti-smoking measures in school have mentioned, universities are positioned as a final stage for anti-smoking education and the faculty members are required to play a role to prevent students from starting to smoke<sup>13, 15, 16)</sup>. Based on these aspects, this survey is believed to have provided a result to support a correct way for promotion of second-hand smoke prevention measures. On the other hand, however, some faculty members have selected an anti-smoking classification other than on-the-premise smoking prohibition as a direction for second-hand smoke prevention measures in the future. Moreover, responses which were belonged to such categories as to "assert liberty and rights to smoke" or "fear adverse effects by introduction of on-the-premise smoking prohibition" made up more than half of the reasons they selected anti-smoking classifications other than on-the-premise smoking prohibition. It was believed from these results that such a persistent socially-accepted idea that smoking was a personal liberty still remained actually even in medical/welfare related universities, making it difficult to introduce on-the-premise smoking prohibition. Nakai et al. (2008) has described difficulty for students after enrollment in universities to prohibit smoking on their own and importance of smoking prohibition support by universities, taking into consideration that smoking habit in students becomes addictive during a period before or after enrollment in universities<sup>17)</sup>. It may be important for universities to make efforts to eliminate circumstances in which smoking is tolerated as many as possible as well as to prevent smokers from increasing by providing correct information to students and faculty members as well. Since students to graduate medical/welfare related universities will be involved in professions relating to people's health, it is a mission for universities to produce specialist personnel capable of not only keeping their own health but also taking actions in consideration of effects to surroundings and faculty members are expected to be the closest to students and to show a better role model as well. It is required for universities in the future to improve environments to take advantage of anti-smoking education which has been addressed through elementary and junior high schools to senior high schools and to make every

single faculty member practice educational involvement for anti-smoking activities with correct knowledge.

In addition, although the survey is a crossover one and the analyses were conducted on actual situation of second-hand smoke prevention measures and awareness and knowledge of faculty members, it can't be denied that various factors which weren't involved in this survey items may have some impacts on such awareness and knowledge. Therefore, the analyses were conducted only within a range of simple comparison based on respective perspectives of anti-smoking classification, sex and possession of medical/welfare related professional qualifications.

## Conclusion

Even in medical/welfare related universities for which many faculty members with a lot of medical knowledge are supposed to work, events of second-smoke have been confirmed under on-the-premise smoking prohibition. In addition, 30% of faculty members of on-the-premise smoking prohibition implementing schools haven't correctly recognized the anti-smoking classification of the universities they belonged to.

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