

Survey investigation and methodology results of environmental exposure to heated tobacco products exhaled aerosol in Japan

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BACKGROUND AND PURPOSE

- Heated tobacco products (HTP) have become increasingly popular in Japan, and reports on environmental exposure to HTP exhaled aerosol have been increasing accordingly.
- However, there is a limited number of studies that investigated the status of those exposure in detail.
- And environmental exposure studies regarding tobacco products include a limitation that respondents may have vague memory because respondents themselves do not use tobacco products.
- In addition, widely used Internet-based surveys include a limitation that inaccurate responses may occur because questions are not understood or read correctly as compared to traditional methods such as telephone.
- The purpose of this study was to investigate the status of environmental exposure to HTP exhaled aerosol in detail and to examine the methodology to improve response accuracy.

METHODS

1. Survey design

Survey participants	<ul style="list-style-type: none"> ■ Adults aged 20 to 69 living in Japan ■ Non-smokers (Adults who do not currently use tobacco products daily and who have used less than 100 cigarettes during their lifetime.)
Number of participants	■ 30000
Survey methods	<ul style="list-style-type: none"> ■ Internet-based survey ■ Sampling was performed to be same composition as the age-sex population ratio by prefecture across Japan.
Main survey items	<ul style="list-style-type: none"> ■ Characteristics of participants (age, sex, education, occupation, smoking status etc.) ■ The status of environmental exposure by place* (The proportion of participants who responded, "having the opportunity to inhale exhaled smoke or aerosol" to the question "Do you currently have the opportunity to inhale smoke or aerosol exhaled from tobacco users?" by place) <p>*Place: home, workplace, restaurant, game hall, public place, public transportation, street and car</p>
Survey company	■ Cross marketing inc.

2. Examination of the methodology to improve response accuracy

The following items were examined to improve response accuracy by using the data obtained in this survey. (See Table 3,4,5)

■ The identification of tobacco types

The proportion of participants who selected "HTP" or "Conventional Cigarette (CC)" to the question "What tobacco types do you currently inhale smoke or aerosol exhaled from tobacco users?" was calculated to examine the proportion of participants who could identify tobacco types to which they were exposed.

■ The accuracy of memories

The proportion of participants who could respond the exposure initiation time was calculated to examine differences in memory of exposure between participants who could identify tobacco types and participants who could not.

■ The consistency between responses

The proportion of participants who had inconsistent responses between similar questions was calculated to examine response accuracy.

RESULTS AND DISCUSSION

1. The status of environmental exposure from tobacco users

Table1. Characteristics of participants

	n	%
Total	30000	100.0
Sex		
Men	11720	39.1
Women	18280	60.9
Age groups (years)		
20-29	4093	13.6
30-39	5028	16.8
40-49	6772	22.6
50-59	6442	21.5
60-69	7665	25.6

Table2. The proportion of participants who have the opportunity to inhale exhaled smoke or aerosol by place (%) (Total, n=30000)

Type/Place	Home	Work place	Restaurant	Game hall	Public place (Indoor)	Public place (Outdoor)	Public transportation	Street	Car
HTP	1.96	0.65	0.38	0.17	0.09	0.24	0.08	0.33	0.61
CC	3.87	2.03	2.16	0.51	0.64	2.33	0.37	4.18	0.89
HTP&CC	0.64	2.14	2.75	0.62	0.77	2.16	0.36	3.20	0.39
Unknown	0.90	1.93	4.27	0.95	1.60	4.05	0.91	6.36	0.33

- The proportion of environmental exposure to CC, HTP & CC and Unknown tended to be high at place where many and unspecified persons gather, such as street and restaurant.
- The proportion of environmental exposure to HTP was high at places where specific persons gather, such as home, workplace, and car.

2. Examination of the methodology to improve response accuracy

Table3. The proportion of participants who could identified tobacco types

	Home	Work place	Restaurant	Game hall	Public place (Indoor)	Public place (Outdoor)	Public transportation	Street	Car	
Participants who responded having the opportunity to inhale exhaled smoke or aerosol (n)	2211	2026	2866	677	927	2633	514	4221	667	
Participants who could identify tobacco types ^{*1}	n	1940	1447	1585	392	448	1417	242	2312	567
	%	87.7	71.4	55.3	57.9	48.3	53.8	47.1	54.8	85.0

*1 Number of participants including those who had duplicate responses for HTP and CC

- The proportion of participants who could identify tobacco types was the highest at home, followed in order by car and workplace.

▶ **This result suggested that conducting a survey focusing on a place such as home where non-smokers can easily identify tobacco product users would be suitable when investigating the accurate status of environmental exposure to HTP exhaled aerosol.**

Table4. The proportion of participants who could respond the exposure initiation time^{*2} by place

	Home	Work place	Restaurant	Game hall	Public place (Indoor)	Public place (Outdoor)	Public transportation	Street	Car	
Participants who could identify tobacco types ^{*3} (n)	1940	1447	1585	392	448	1417	242	2312	567	
Participants who could respond the exposure initiation time	n	995	752	614	178	142	410	92	658	273
	%	51.3	52.0	38.7	45.4	31.7	28.9	38.0	28.5	48.1
Participants who could not identify tobacco types (n)	271	579	1281	285	479	1216	272	1909	100	
Participants who could respond the exposure initiation time	n	87	215	221	66	65	153	33	225	22
	%	32.1	37.1	17.3	23.2	13.6	12.6	12.1	11.8	22.0

*2 This was specified by asking their own age at the exposure initiation time

*3 Number of participants including those who had duplicate responses for HTP and CC

- In all investigated places, the proportion of participants who could respond the exposure initiation time to participants who could identify tobacco types were higher than participants who could not.
- Among participants who could identify tobacco types, more than 50 % people could respond the exposure initiation time at home and workplace.
- It should be noted that regardless of whether the respondents could identify tobacco types, the proportion of participants who could respond the exposure initiation time tended to be low (11.8 ~ 52.0 %).

▶ **This result suggested that participants who could identify tobacco types have more accurate memories about their exposure.**

Table5. The proportion of participants who had inconsistent responses between similar questions (Place: Home)

Similar questions	Participants who responded having the opportunity to inhale exhaled smoke or aerosol	n	%
Similar questions 1	Participants who responded that none of their roommates use tobacco products	422	
	Inconsistent responses		19.1
Similar questions 2	Participants who could identify tobacco types among participants who have the opportunity to inhale exhaled smoke or aerosol ^{*4}	1940	
	Participants who responded different tobacco types between tobacco used by roommates and tobacco to which they are exposed	73	
	Inconsistent responses		3.8
Similar questions 3	Participants who could respond the exposure initiation time and initiation time of tobacco products use by roommates ^{*5} among participants who have the opportunity to inhale exhaled smoke or aerosol and could identify tobacco types ^{*6}	690	
	Participants who responded earlier own exposure initiation than the initiation of tobacco products use by their roommates	154	
	Inconsistent responses		22.3

*4 Number of participants including those who had duplicate responses for HTP and CC

*5 This was specified by asking their own age at the exposure initiation time and initiation time of tobacco products use by roommates

*6 Number of participants excluding those who responded that "do not know/do not remember" to the question asking about their own age at the exposure initiation time and initiation time of using tobacco products by roommates

- The proportion of participants who responded that none of their roommates use tobacco products despite responding having the opportunity to inhale smoke or aerosol was 19.1 %, while the proportion of participants who had inconsistent responses between tobacco types used by their roommates and the tobacco types to which participants themselves were exposed was as small as 3.8 %.

Note: The actual inconsistency proportion may be less than these results because questions regarding environmental exposure from tobacco users other than roommates at home were not included in this survey.

▶ **In the survey about environmental exposure from tobacco users, identifying inconsistent responses between similar questions and, displaying a warning to participants during the response process or identifying data during data analysis would contribute to improving response accuracy.**

Note:

- The proportion of participants who had the inconsistent responses between their own exposure initiation time and initiation time of tobacco products use by roommates was the highest (22.3 %) among all investigated inconsistencies.
- However, it should be noted that only about half of participants responded the exposure initiation time. (Table4. Among participants who could respond tobacco types at home, the proportion of participants who could respond the exposure initiation time was 51.3 %.)
- Therefore, it is considered to be difficult that utilizing questions regarding the exposure initiation time to improve response accuracy.

CONCLUSION

- These results suggested that conducting a survey focusing on a place such as home where non-smokers can easily identify tobacco product users would be suitable when investigating the accurate status of environmental exposure to HTP exhaled aerosol.
- In the survey about environmental exposure from tobacco users, identifying inconsistent responses between similar questions would contribute to improving response accuracy.

