

AN INVESTIGATION OF THE USE OF HAY FEVER MASKS FOR THE YOUTH

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Specific examinations of university students in Japan revealed numerous people affected by hay fever among the younger population, various measures for hay fever prevention and dissatisfaction with commercially available hay fever masks. Questionnaire replies from 1519 students demonstrated the following results: (1) those with hay fever accounted for 36.5% of males and 44.0% of females; (2) masks and chemicals were mainly used hay fever treatments; (3) 38.4% males and 41.0% females wore masks to prevent problems from hay fever; (4) almost all of the users reported problems with commercially available hay fever masks; (5) male mask users reported 'humidity' and 'occurrence of mist over glasses', whereas female users reported 'ruining make-up', 'humidity', and 'breathing difficulties' as problems. These results confirmed that many young people suffered from hay fever. Further, we investigated the use of hay fever masks among young patients and the factors that could improve the effectiveness of the masks and eliminate the discomfort caused by masks used to prevent hay fever.

Key words: questionnaire; hay fever sufferers; individual treatments; non-chemical treatments

INTRODUCTION

Young people are more frequently affected by hay fever than others (Richards, 1992). Usually avoiding prescribed medicines, they instead choose over-the-counter drugs for treatment. This may lead to adverse effects such as drowsiness induced by medications. Many reports in the literature have described that hay fever patients have asthma and sinusitis. The treatments for these symptoms might be more complex than those for corresponding disease or all (Bhattacharyya et al., 2009; Riedinger et al., 2002). Moreover, major difficulties can arise in choosing medicines in view of the various effects and side effects of taking allergy medicines (Obtulowicz et al., 2000; Ostergaard et al., 2005).

Therefore, we infer that hay fever sufferers regard physical treatments as more effective than chemical treatments. Physical treatments include wearing masks, glasses, scarves, hats and protective clothing, using air cleaners, and performing nasal and eye irrigations (Matsuzaki et al., 2002; Gotoh et al., 2005). Of all these methods, using masks is expected to be the most effective as a means for self-care. Researchers have surveyed the effects of wearing masks for protection from pollens. We have also described the availability of masks with respect to how well the mask fitted the face, the materials used to make them and their designs (Morishima, 2008; Morishima, 2009). These previous studies have used various techniques of investigation such as questionnaires and have also developed

new equipment for their purposes. In the present study, we made observations on the use of masks among university students in Japan and focused on the current use of hay fever masks by the younger population in Japan.

METHODS

During the period between October 2009 and February 2010, we collected information about the opinions of students in Japanese universities in the Tohoku, Kanto, Chubu, Kinki and Kyushu regions of Japan and about their use of hay fever masks. Hay fever is caused by various types of pollen such as cedar pollens, grass pollens, and ragweed pollens. Different types of pollens are dispersed during different times in a year. Therefore, the kind of pollens that causes hay fever was unspecified in this questionnaire. They filled out a self-completed questionnaire, as shown in Table 1. Valid responses were obtained from 1519 students (715 males, 804 females). The mean age of the respondents was 20.1 (SD=2.6), with 20.4 (SD=2.7) for males and 19.9 (SD=2.6) for females.

Table 1. Questionnaire entries in this study.

Q1. Do you have hay fever?			
Yes (---> Q2)	or	No	
Q2. What treatments have you received for hay fever? Please tick all the items which are applicable.			
Using masks (---> Q3), Taking non-prescribed medicines,	Using glasses, Receiving injections,	Gargling, Other,	Taking prescribed medicines, None
Q3. Do you use a mask that was marketed as a measure for preventing hay fever?			
Yes (---> Q4),	or	No	
Q4. Do you face any problems in wearing and using the masks?			
Yes (---> Q5)	or	No	
Q5. What are the problems that you face in wearing and using hay fever masks? Please tick all that apply.			
Humidity, Spoiling of make-up, Inconvenience due to ill-fitting masks, Other problems	Occurrence of mist over glasses, Pain in the ear,	Breathing difficulties, Discomfort due to heat,	Embarrassment, Causes distraction,

The following questions were asked to all the respondents: “Do you have hay fever?” We then presented the second question to those who answered ‘yes’ to the first: “What treatments have you received for hay fever?” Their response choices were using masks, using glasses, gargling, taking prescription medicines, taking non-prescription medicines, receiving injections, other treatments, or none. These options were provided based on the results of previous studies (Gotoh et al., 2005; Ciprandi et al., 2002; Ostergaard et al., 2005; Young 2007). Those who chose ‘using masks’ were asked the next question: “Do you use a mask that was marketed as a measure for preventing hay fever?” Those who responded ‘yes’ were asked the fourth question: “Do you face any problem in wearing and using hay fever masks?” Those who answered ‘yes’ were asked the final question: “What are the problems that you face in wearing and using a hay fever mask?” Possible responses were humidity, occurrence of mist over glasses, breathing difficulties, embarrassment, ruining make-up, ear pain, discomfort because of heat, distraction, inconvenience caused by ill-fitting masks or other responses). These options were provided to respondents based on the results of our past studies conducted by using a text-mining approach.

RESULTS AND DISCUSSION

The answers obtained for question 1 are presented in Fig. 1. The self-reported data obtained for the question revealed that about 40% of young people (males 36.5%, females 44.0%) had hay fever. The results were of this study are based on self-reporting of the condition. Numerous previous studies have been based on medical diagnoses obtained by using blood tests, skin tests, nasal provocation tests and diagnostic processes using interviews (Sibbald et al., 1991). Greisner et al. (1998) described that 30.9% of 1243 college freshmen who underwent skin testing in 1962–1963 had at least one positive skin test reaction. Richards et al. (1992) reported that the prevalence of hay fever among young people aged 15–24 by self-reporting in 1990 was 31.3% among males and 39.2% among females. The frequency of hay fever sufferers in our study was slightly higher than that in those earlier studies. Reportedly in recent years, the age of hay fever onset is decreasing.

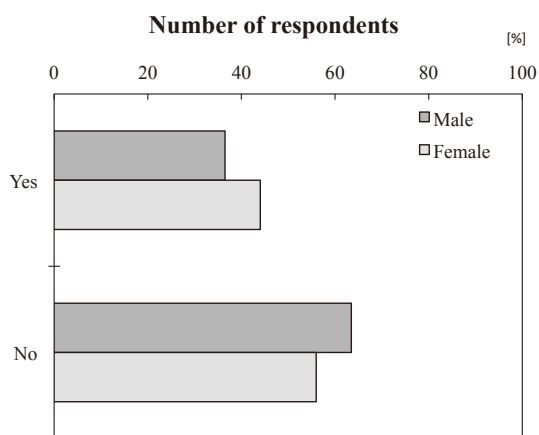


Fig. 1. Number of people with hay fever found from question 1: Are you suffering from hay fever? (males $n=715$, females $n=804$).

Figure 2 shows the gender-segregated percentage of each treatment selected by individual subjects in response to question 2. Pearson's product-moment correlation coefficient between the answers of males and those of females was calculated as 0.97. The results of the de-correlation test indicated a significant difference between their answers. Approximately half of the 615 respondents, 43.7% of 261 males and 54.0% of 354 females, had used a mask. Treatments with the second-highest and third-highest percentages for the responses related to individual treatments of hay fever involving chemical treatment: 'taking prescription medicines' (36.4% of respondents, 31.8% of males and 39.8% of females) and 'taking non-prescription medicines' (29.4% of respondents, 28.7% of males and 29.9% of females).

When the most common answer "using masks" was focused on, the effectiveness of using a mask to alleviate allergy symptoms has been proved in past studies. Xiao, et al. (1991) revealed that the Japanese cedar pollen inhibition rate for a dry cotton mask was 58.8% in natural breathing, and that the corresponding rate for a half-wet cotton mask was 98.3%. Further, Kanda et al. (1988) reported using the results of a questionnaire that 85.5% of the hay fever patients (27 persons in their study) showed improvements regarding symptoms such as a running nose and sneezing by using a mask.

Next, we specifically examined mask users. Of the mask users who replied, 13.4% (17.5% of males and 11.0% of females) had used masks alone for protection from pollens. Of the mask users, 43.6% (38.6% of males, 46.6% of females) took chemical treatments such as prescription medications, nonprescription medications, and / or injections. These results indicate that it is

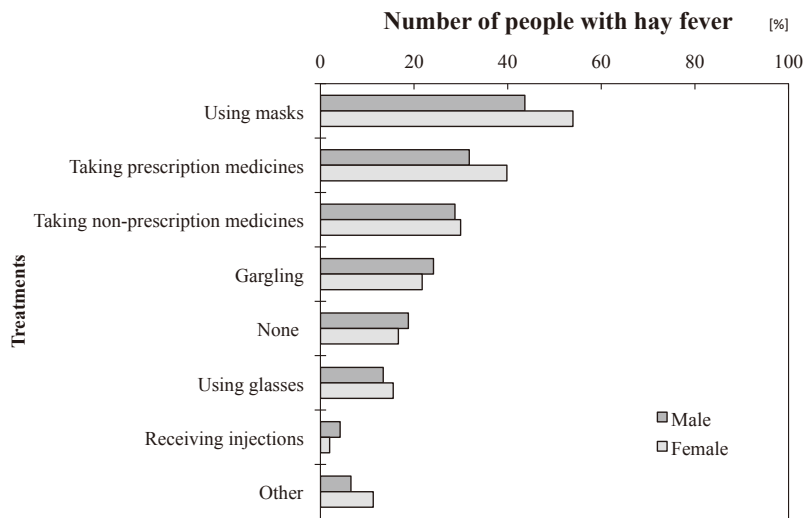


Fig. 2. Individual methods for treatment of hay fever from question 2: What treatments have you received for hay fever? (males $n=261$, females $n=354$).

insufficient for people with hay fever to wear a mask alone. Figure 3 shows people using hay fever masks according to their response to question 3 accounted for 40.0% of mask users (38.4% of 112 males, 41.0% of 188 females). In Japan, various hygiene masks are available: dust masks, hay fever masks, cold masks, influenza masks, etc. Generally, according to their filtering efficiency, the recommended use is specified on the mask package. We sought to analyze the problems faced by those affected by hay fever in using hay fever masks available in the marketplace by considering their opinions. The hay fever mask users were asked about their dissatisfaction with the masks through question 4. Figure 4 portrays the number of hay fever mask users who encountered problems using them. This study shows that almost all hay fever mask users encountered problems in using commercially available hay fever masks.

The users pointed out these problems in response to question 5, as presented in Fig. 5. Pearson's product-moment correlation coefficient between the answers of males and those of females was calculated as 0.37. Results of the de-correlation test revealed a significant difference between the answers of males and those of females. The awareness of the availability of hay fever masks among males was not the same as that in females. In fact, 58.8% of the male of hay fever mask users ($n = 36$) encountered problems of 'humidity' and 'occurrence of mist over glasses', and 'breathing difficulties' (42.7%). In contrast, female users ($n = 68$) reported problems of 'spoiling of make-up' (62.2%), 'humidity' (58.0%), and 'breathing difficulties' (50.9%). The problems of 'humidity' and 'breathing difficulties' were clearly identified as crucial because they were common to both males and females. Males also reported that 'masks have a foul odor', whereas females reported that masks were 'expensive' and 'not reusable'.

These results highlight problems associated with using hay fever masks and the degree of importance that young people attach to the use of masks. For future research for compiling a wider range of opinions, it is necessary to examine not only people with hay fever but also asymptomatic young people who have never been diagnosed as suffering from hay fever. In addition, physical properties, thermal properties, air flow properties and the mask fit to the face can be taken into account for widely various masks. Considering the awareness about masks, their physical properties and comfort, we should aim to develop masks that solve problems of humidity, breathing difficulties, occurrence of mist over glasses, discomfort caused by heat and poor fitting (Morishima, 2008, 2009; Morishima and Kamijo, 2007).

As discussed above, the use of hay fever masks by the younger population in Japan related to

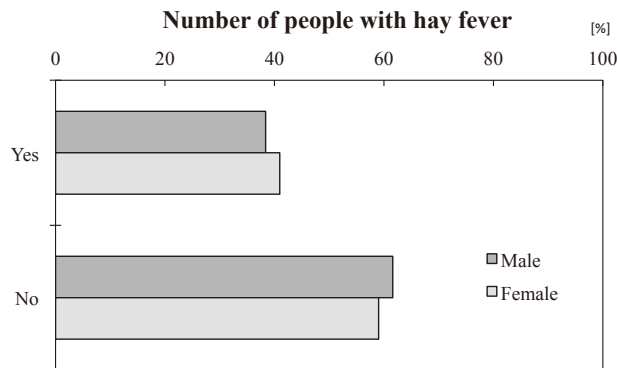


Fig. 3. Number of hay fever mask users according to question 3: Do you use a mask that was marketed for hay fever prevention? (males $n=112$, females $n=188$).

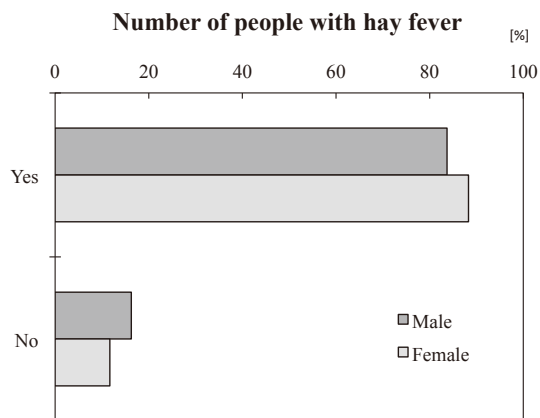


Fig. 4. Number of users who faced problems with the mask according to question 4: Do you face any problems in wearing and using hay fever masks? (males $n=43$, females $n=77$).

their essential features. In particular, we quantitatively assessed the use of hay fever masks and the degree of user satisfaction with hay fever masks available in the marketplace. The awareness of students about masks that could prevent hay fever was also investigated quantitatively. These results point to some factors that can help improve the effectiveness of masks used to prevent hay fever and the means of eliminating the discomfort caused by their use. In the near future, it is planned to propose non-chemical treatments for the prevention of hay fever.

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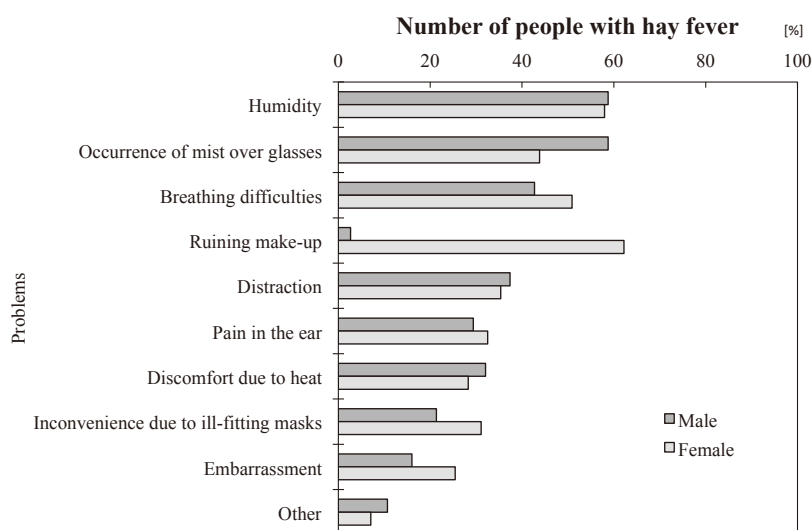


Fig. 5. Individual problems in using hay fever masks according to question 5: What are the problems you face in wearing and using hay fever masks? (males $n=36$, females $n=68$).

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