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SARS preventive and risk behaviours of Hong Kong air travellers

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SUMMARY

This study aims to investigate Severe Acute Respiratory Syndrome (SARS)-related behaviours of travellers returning to Hong Kong by air. A total of 820 travellers returning to Hong Kong by air were interviewed about their SARS-related behaviours in April 2003. Three quarters of the respondents wore a mask most/all of the time on board, 15% did so in public places at the travel destination. Perceived susceptibility to SARS at the destination predicted mask-wearing in public places and avoidance of crowded places, and perceived efficacy was a predictor for mask-wearing during flight. Approximately 16% of the respondents stated that they would delay their medical consultation for flu-like symptoms until returning to Hong Kong. Nearly 18·2% stated that they would not wear a mask in public places at the destination if they had flu-like symptoms. Education programmes, special services and effective thermal screening are required to minimize the chance of the spread of SARS by air travellers.

INTRODUCTION

Severe Acute Respiratory Syndrome (SARS) became a global epidemic in 2003, and population mobility has been implicated as an important mode of the rapid spread of this disease. Travellers have played an important role in cross-border transmission of the disease by serving as a 'bridge population' for SARS transmission across countries. A number of cases of cross-border transmissions of SARS have been reported around the world from travellers en route to a destination. A Hong Kong passenger was believed to have transmitted the virus to 22 passengers on the same flight [1]. The World Health Organization (WHO) has also reported 27 cases of SARS transmission from four flights as well as 31 airline flights with symptomatic, probable SARS cases on board [1]. Cross-border transmission has also been documented after travellers arrived at their destination. The source person of the first large-scale (138 cases) outbreak in Hong Kong at the Prince of Wales Hospital [2, 3], is believed to have contracted the virus from an infected guest from mainland China while visiting the Metropole Hotel. Moreover, seven other hotel guests who contracted SARS at the Metropole Hotel, in turn, became sources of infection in Canada, Singapore and the United States [2].

Due to the rapid spread of SARS, a number of countries have instituted SARS prevention measures such as thermal screening and health declaration at entry check-points. In addition to these measures, some countries have required inbound airline passengers to be interviewed and in some cases, even quarantined [4, 5]. Even though little evaluation of these measures has been conducted, these measures are perceived as important and necessary. Nevertheless,

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these public-health measures were not completely effective, due to the enormous numbers of travellers, and also to the fact that many clinical symptoms may not arise until after entering the country. When travellers visit SARS-affected areas, there is potential for bi-directional disease transmission; the virus may be imported from or exported to the passenger's home country. Our previous study showed that frequent mask-wearing in public venues and frequent hand washing were widely practised by the general public in Hong Kong during the SARS epidemic [6] and were demonstrated to be effective measures against SARS spreading [OR for mask-wearing 0·36 (95% CI 0·25–0·52) and OR for hand washing 0·58 (95% CI 0·38–0·87)] [7]. Studies by others have also demonstrated the effectiveness of precautions against droplets and contact in prevention of SARS transmission [8, 9]. Reducing population contact (or avoidance of public places) has been regarded as having contributed to the control of the SARS epidemic [10]. Preventive behaviours such as wearing a mask and avoidance of public places are, therefore, important. It is necessary to understand the factors that are associated with such preventive behaviours.

Travellers have often been noted to practice both preventive and risk behaviours simultaneously [6, 11]. Some studies have demonstrated that individuals are more likely to practice risk behaviours while travelling [12]. Rapid hospital attendance by symptomatic individuals (or those having flu-like symptoms) has contributed to the decrease in SARS transmission rates in Hong Kong [10]. Delayed medical consultation for flu-like symptoms during the SARS epidemic would increase the risk of SARS transmission. It is imperative that SARS cases be detected as soon as possible, in order to minimize the number of contacts from the contagious individual. Detection of SARS cases among travellers may be problematic if the individual is averse to undergoing a clinical examination due to considerations such as medical cost, perceived quality of treatment and fear of nosocomial infections. Moreover, the risk of transmission would be enhanced if those travellers showing flu-like symptoms turn out to be SARS cases and do not wear a mask in public places after the onset of symptoms. The confluence of these factors has strong public-health implications for cross-border SARS epidemic control. There is a dearth of information regarding SARS-related risk behaviours practised by international travellers.

SUBJECTS AND METHODS

The study population

The study population comprised Hong Kong Chinese residents between the ages of 15 and 60 years, who were travelling back to Hong Kong by air. Respondents were interviewed using a structured questionnaire by trained interviewers. The interview took place in two locations: the airport express bus station ($n = 422$) and the express train platform ($n = 398$). It was observed that the majority of inbound travellers used either the express train or express bus to get to the city centre, situated approximately 25 km from Hong Kong International Airport at Chap Lap Kok [13]. The interviews were conducted from 09:00 to 19:00 hours between 22 and 29 April 2003. Each interview took about 5 min to complete.

A total of 1122 eligible respondents were invited to join the study. They were assured that the information collected would be anonymous and confidential. A total of 847 were interviewed with verbal consent and 820 completed the interview. The response rate, defined as the number completing the questionnaire (820) divided by the number of eligible respondents approached (1122), was 73·1%.

Measurements

A structured questionnaire was used. Respondents were asked to provide: demographic and background information, including gender, age, marital status, education, the city and country where they boarded the plane and returned to Hong Kong, duration of the trip (days), purpose for making this trip (business, tourism, visiting friends/relatives, or other), number of air flights made in the last 2 months, and whether they were acquainted with someone infected with SARS. Respondents were asked about the following SARS-related preventive behaviours such as whether they wore a mask on board the return flight (all the time, most of the time, a little of the time, or none of the time) or in public places at the travel destination (often, frequently, infrequently, or never), the reasons for wearing a mask on board (self protection, protection of others, both, or other), the reasons for not wearing a mask on board and the reasons for not wearing a mask in public places at the destination (low chance of infection, fear of discrimination, discomfort, no mask available, or other), and whether avoiding visits to crowded places at the destination (yes or no). Respondents were then asked about the following risk behaviours: whether the individual would see a doctor if he/she had flu-like symptoms at the destination (would see a doctor at the destination, only after returning to Hong Kong), whether he/she would wear a mask in public places at the destination if he/she had flu-like symptoms (definitely, likely, not likely, or definitely not), whether they had flu-like symptoms during the 2 weeks before boarding (yes or no), and if yes, whether they had consulted a local doctor (yes or no). Finally, SARS-related perceptions, including perceived susceptibility of infection with SARS on board and at the destination (very high, high, medium, low, or very low) perceived efficacy of mask-wearing for SARS prevention (very high, high, medium, low, or very low), and perceived chance of mortality of SARS (very high, high, medium, low, or very low).

Respondents were divided into three categories based upon the WHO classification of SARS-affected areas at the time of the survey [14]. The first group (affected areas) includes Toronto (Canada), Singapore, Beijing (China), Guangdong (China), Inner Mongolia (China), Shanxi (China), and Hanoi (Vietnam). The second group (less-affected areas) includes all other provinces/states of China, Canada and Vietnam, as well as London. Travellers returning from all other regions were classified as having returned from 'non-affected areas'.

Statistical analyses

The χ^2 test was used to test the significance of the overall associations between background characteristics and whether the respondents returned from an affected area. Univariate odds ratios (OR_u) and multivariate odds ratio (OR_m) were derived by using univariate and multivariate logistic regression models respectively [15]. Forward stepwise selection of variables was used to identify factors associated with preventive and risk behaviours. SPSS for Windows Release 11.0.1 [15] was used to analyse the data and P values less than 0·05 were considered as statistically significant.

RESULTS

Background characteristics

Of the 820 travellers who completed the survey, 54·4% were male and 45·6% were female (Table 1). The age and educational background are described in Table 1. Business was cited as the main purpose of travel (52·6%), followed by tourism (24%). Nearly half of the respondents had travelled by air at least three times in the last 2 months and 4·5% knew a SARS patient. Whether the respondents were returning from an affected, less-affected or non-affected area was associated in an overall sense with their duration of stay, reasons for making the trip, number of flights made in the last 2 months, and knowing a SARS patient, but not associated with other factors listed in Table 1 ($P<0·05$).

Prevalence of wearing a mask during the return flight and associated factors

Approximately 75·7% (95% CI 72·8–78·6) of the respondents wore a mask all the time or most of the time during the flight. The univariate OR is presented in Table 2. The multivariate analysis shows that those returning from an affected area or from a less-affected area, those with a shorter duration of stay in mainland China (<8 days), those who perceived a high/very high risk of in-flight SARS transmission, those who perceived high/very high efficacy of wearing a mask and those who perceived SARS to be likely/very likely to be fatal, were more likely than others to have worn a mask all or most of the time during the flight (Tables 2 and 3). The other variables including age, frequency of travelling by air, gender, marital status, educational level, knowing a SARS case or not, and perceived high/very high susceptibility of SARS infection at the destination, were statistically non-significant in the multivariate analysis ($P>0·05$).

There were 43·4% of respondents who reported wearing a mask during the flight for self-protection and 3·1% who did so for the protection of others, while 53·5% reported that they did so to protect both themselves and others. Perceived low chance of infection and discomfort (49·4 and 20·9% respectively) were the two most frequently mentioned reasons for not wearing a mask during the flight. Uselessness (8·9%), and psychological factors such as fear of discrimination and the fact that nobody was wearing a mask (4·4%) were also mentioned by some respondents as reasons for not wearing a mask during the flight (results not tabulated).

Prevalence of wearing a mask in public places at the visited destination

Approximately only 15% (95% CI 12·6–17·5) of the respondents reported wearing a mask in public areas

Table 1. *Background characteristics of respondents*

	n	Affected areas % (n)*	Less-affected areas % (n)*	Non-affected areas % (n)*	Total % (n)*	P values†
Gender	783					0·130
Male		62·1 (59)	55·5 (167)	50·8 (154)	54·4 (426)	
Female		37·9 (36)	21·3 (167)	19·7 (154)	45·6 (357)	
Age (yr)	784					0·498
15–29		38·9 (37)	31·4 (118)	30·4 (95)	31·9 (250)	
30–39		32·6 (31)	29·5 (111)	33·5 (105)	31·5 (247)	
40–49		18·9 (18)	23·7 (89)	22·0 (69)	24·4 (176)	
⩾50		9·5 (9)	15·4 (58)	14·1 (44)	14·2 (111)	
Education level	779					0·763
<F4		4·3 (4)	6·4 (24)	7·4 (23)	6·5 (51)	
F4–F7		24·5 (23)	27·7 (104)	27·4 (85)	27·2 (212)	
>F7		71·3 (64)	65·9 (247)	62·5 (202)	62·2 (516)	
Marital status						0·335
Married		52·2 (47)	57·4 (210)	52·0 (158)	54·6 (415)	
Other		47·8 (43)	42·6 (156)	48·0 (146)	45·4 (345)	
Duration of stay in this destination (days)	783					<0·001
1–7		47·4 (45)	63·7 (240)	47·3 (147)	55·2 (432)	
⩾8		52·6 (50)	36·3 (137)	52·7 (164)	44·8 (351)	
Reasons for making the trip	783					<0·001
On business		60·0 (57)	63·9 (241)	36·6 (115)	52·6 (413)	
Tourism		10·6 (10)	17·2 (65)	36·6 (115)	24·2 (190)	
Visiting friends/relatives		17·0 (16)	15·4 (58)	22·9 (72)	18·6 (146)	
Other		11·7 (11)	3·4 (13)	3·8 (12)	4·6 (36)	
Number of air flights in the past 2 months	786					0·011
1–4		72·3 (68)	67·6 (255)	77·8 (245)	72·3 (568)	
⩾5		27·7 (26)	32·4 (122)	22·2 (70)	27·7 (218)	
Knowing a SARS patient	780					0·012
Yes		5·3 (5)	4·5 (17)	4·2 (13)	4·5 (35)	

* Percentages are presented as valid responses (missing values were excluded from the analysis) and the number of missing values of these variables in this table range from 1 to 33.
† P values derived from Pearson χ^2 test for $k*c$ contingency tables.

at the visited destination most or all of the time. The univariate results are summarized in Tables 2 and 3. Multivariately, those who returned from an affected area or from a less-affected area, those who stayed in the destination place for 7 days or less, those who were frequent air travellers, those who perceived the chance of SARS transmission to be very high/high at the destination and those who perceived SARS to be fatal were more likely than others to have worn a mask in public places at the destination (Tables 2 and 3). The other studied variables were statistically non-significant in the multivariate analysis, including age, gender, marital status, educational level, and whether knowing a SARS case or not (Tables 2 and 3).

Prevalence of avoidance of public places at the destination and associated factors

Approximately half (46%, 95% CI 42·6–48·9) of the respondents avoided going to crowded places at the place they visited. The multivariate analysis shows that married respondents, visiting an affected/less-affected area, having made less than five air trips in the past 2 months, perceived high/very high risk of transmission at the destination, and perceived fatality of SARS were multivariately associated with avoidance of going to crowded places. Perceived efficacy of using a mask to prevent SARS was only marginally significant in the multivariate analysis. The other

Table 2. *Univariate associations between background factors and the three preventive behaviours*

	Prevalence of wearing a mask during flight ('All/most of time')			Prevalence of wearing a mask in public places at the destination ('Often/frequently')			Prevalence of avoidance of crowded places ('Yes')		
	% (*n*)*	OR$_u$†	OR$_m$‡	% (*n*)*	OR$_u$†	OR$_m$‡	% (*n*)*	OR$_u$†	OR$_m$‡
All	75·7 (620)			15·0 (123)			46·0 (375)		
Gender									
Male	74·0 (330)	0·81 (0·59–1·12)	n.s.	14·8 (66)	0·95 (0·64–1·39)	n.s.	48·2 (214)	1·22 (0·92–1·61)	n.s.
Female	77·8 (287)	1·0		15·5 (57)	1·0		43·3 (159)	1·0	
P value	0·210¶	0·210§		0·774¶	0·774§		0·166¶	0·166§	
Age group (yr)									
15–29	82·4 (211)	2·38 (1·44–3·92)	n.s.	17·6 (45)	2·04 (1·01–4·10)	n.s.	42·3 (107)	0·84 (0·54–1·31)	n.s.
30–39	74·0 (191)	1·44 (0·90–2·32)		16·7 (43)	1·91 (0·95–3·85)		45·5 (117)	0·96 (0·62–1·49)	
40–49	74·7 (139)	1·50 (0·90–2·49)		12·9 (24)	1·41 (0·67–3·01)		52·2 (97)	1·25 (0·79–1·99)	
⩾50	66·4 (77)	1·0		9·5 (11)	1·0		46·6 (54)	1·0	
P value	0·007¶	0·007§		0·152¶	0·152§		0·235¶	0·235§	
Marital status									
Married	74·1 (320)	0·88 (0·63–1·21)	n.s.	15·2 (66)	1·56 (0·78–1·73)	n.s.	50·6 (219)	1·57 (1·18–2·09)	1·64 (1·18–2·26)
Other	76·5 (274)	1·0		13·4 (48)	1·0		39·4 (140)	1·0	1·0
P value	0·425¶	0·425§		0·474¶	0·474§		0·002¶	0·002§	0·003
Education level									
<F3	72·2 (39)	0·89 (0·48–1·67)	n.s.	13·0 (7)	0·88 (0·38–2·01)	n.s.	50·0 (27)	1·13 (0·65–1·98)	n.s.
F3–F7	79·1 (174)	1·30 (0·89–1·89)		16·0 (35)	1·12 (0·73–1·73)		42·7 (94)	0·84 (0·62–1·16)	
>F7	74·5 (400)	1·0		14·5 (78)	1·0		46·9 (251)	1·0	
P value	0·342¶	0·342§		0·808	0·808§		0·478	0·478§	
Whether knowing a SARS case									
Yes	76·3 (29)	1·03 (0·48–2·22)	n.s.	13·2 (5)	0·86 (0·33–2·25)	n.s.	55·3 (21)	1·48 (0·77–2·85)	
No	75·7 (586)	1·0		15·0 (116)	1·0		45·5 (351)	1·0	
P value	0·932¶	0·932§		0·757¶	0·757§		0·237¶	0·237§	
SARS status of destination									
Affected	83·2 (79)	3·34 (1·86–5·97)	3·91 (2·05–7·45)	40·0 (38)	18·36 (8·87–30·04)	20·53 (8·98–46·94)	67·4 (64)	5·29 (3·23–8·68)	5·41 (3·13–9·35)
Less affected	87·8 (330)	4·85 (3·31–7·10)	4·81 (3·15–7·34)	19·6 (74)	6·73 (3·50–12·93)	5·66 (2·73–11·77)	54·6 (206)	3·09 (2·24–4·25)	2·71 (1·91–3·84)
Non-affected	59·7 (188)	1·0	1·0	3·5 (11)	1·0	1·0	28·1 (87)	1·0	1·0
P value	<0·001¶	<0·001§	<0·001	<0·001¶	<0·001§	<0·001	<0·001¶	<0·001§	<0·001
Duration of the trip (days)									
1–7	82·4 (366)	2·25 (1·62–3·12)	2·05 (1·39–3·02)	19·6 (87)	2·26 (1·49–3·43)	1·93 (1·14–3·24)	53·3 (209)	1·13 (0·85–1·49)	n.s.
⩾8	67·6 (250)	1·0	1·0	9·7 (36)	1·0	1·0	39·8 (104)	1·0	
P value	<0·001¶	<0·001§	<0·001	<0·001¶	<0·001§	0·014	0·402¶	0·402§	
Number of air flights in past 2 months									
1–4	72·6 (432)	0·51 (0·34–0·76)	n.s.	12·0 (71)	0·46 (0·31–0·69)	0·59 (0·36–0·96)	42·6 (252)	0·61 (0·45–0·83)	0·58 (0·41–8·34)
⩾5	83.9 (187)	1·0		22·8 (51)	1·0	1·0	55·0 (122)	1·0	1·0
P value	0·001¶	0·001§		<0·001¶	<0·001§	0·033	0·002¶	0·002§	0·003

n.s., Non-significant.
* Percentages are based on valid responses (missing values excluded) and the number of missing values of these variables in this table range from 1 to 33.
† Univariate odds ratios.
‡ Multivariate odds ratios derived from multiple logistic regression with forward stepwise selection of independent variables.
§ Derived from the univariate logistic regression (χ^2).
¶ Derived from Pearson χ^2 test for $k*c$ contingency tables.

Table 3. *Perceived susceptibility, fatality and efficacy associated with preventive behaviours as factors associated with preventive behaviours*

	Wearing a mask during the flight ('All/most of the time')			Wearing a mask in public places at the destination ('Often/frequently')			Avoidance of crowded places ('Yes')		
Demographic	% (*n*)*	OR_u†	OR_m‡	% (*n*)*	OR_u†	OR_m‡	% (*n*)*	OR_u†	OR_m‡
Perceived susceptibility during flight									
Very high/high	87·0 (180)	2·55 (1·64–3·97)	2·55 (1·52–4·26)		n.a.	n.a.		n.a.	n.a.
Medium/small/ very small	72·3 (428)	1·0	1·0						
P value	<0·001¶	<0·001§	<0·001						
Perceived susceptibility at destination									
Very high/high	95·0 (38)	6·40 (1·53–22·76)	n.s.	50·0 (20)	6·54 (3·40–12·57)	4·01 (1·83–8·78)	80·0 (32)	5·06 (2·30–11·13)	2·99 (1·27–7·04)
Medium/small/ very small	74·8 (569)	1·0		13·3 (101)	1·0	1·0	44·1 (335)	1·0	1·0
P value	0·004¶	0·004§	n.s.	<0·001¶	<0·001§	0·001	<0·001¶	<0·001§	0·012
Perceived efficacy of mask-wearing									
Very high/high	86·1 (255)	2·72 (1·86–3·99)	1·98 (1·29–3·02)	17·2 (51)	1·32 (0·88–1·96)	n.s.	52·2 (155)	1·49 (1·11–1·99)	1·39 (1·00–1·94)
Medium/low/ very low	69·5 (347)	1·0	1·0	13·6 (68)	1·0		42·3 (210)	1·0	1·0
P value	<0·001¶	<0·001§	0·002	0·169¶	0·169§		0·007¶	0·007§	0·050
Perceived fatality of SARS									
Very high/high	84·8 (223)	2·23 (1·52–3·28)	2·05 (1·30–3·23)	21·3 (56)	2·09 (1·40–3·11)	2·27 (1·43–3·62)	56·5 (148)	1·89 (1·40–2·55)	1·96 (1·39–2·77)
Medium/low/ very low	71·4 (380)	1·0	1·0	11·5 (61)	1·0	1·0	40·7 (216)	1·0	1·0
P value	<0·001¶	<0·001§	0·002	<0·001¶	<0·001§	0·001	<0·001¶	<0·001§	<0·001

n.a., Not applicable; n.s., non-significant.

* Percentages are based on valid responses (missing values excluded) and the number of missing values of these variables in this table range from 1 to 29.

† Univariate odds ratios.

‡ Multivariate odds ratios derived from multiple logistic regression with forward stepwise selection of independent variables.

§ Derived from the univariate logistic regression (χ^2).

¶ Derived from Pearson χ^2 test for $k * c$ contingency tables.

variables listed in Tables 2 and 3 were not of statistical significance in the multivariate analysis.

Prevalence of delayed medical consultation when having flu-like symptoms during the trip and associated factors

Approximately 16·4% (95% CI 13·9–18·9) of the respondents indicated that they would only visit a doctor after returning to Hong Kong (but not at the destination), if they had flu-like symptoms in the place they visited. In the multivariate analysis, visiting an affected area and a less-affected area were multivariately significant (Table 4). Other variables listed in Tables 4 and 5 were not significant in the multivariate logistic regression analysis.

Perception of not wearing a mask in public places when having flu-like symptoms at the destination and associated factors

Almost one fifth (18·2%, 95% CI 15·6–20·9) of the respondents did not intend to wear a mask if they had flu-like symptoms at the destination (defined as 'definitely not/not likely'). In the multivariate analysis, those who were married, those whose trips were of 7 days or less and who returned from an affected area or from a less-affected area were more likely to wear a mask when having flu-like symptoms in the guest country. Those who perceived very high/high efficacy of mask-wearing were also more likely to wear a mask, as indicated by the results of the multivariate analysis (Tables 4 and 5).

Prevalence of having flu-like symptoms during the last 2 weeks before boarding

A total of 3·8% (95% CI 2·59–5·41) of respondents reported having flu-like symptoms within the last 2 weeks before boarding. Among these 31 respondents who developed some flu-like symptoms, 14·3% (4/28) returned from an affected area, 50% (14/28) from a less-affected area and 35·7% (10/28) from a non-affected area. Almost one third (10/31) of them had not consulted a doctor for this episode of illness. Further, 22·6% of them (7/31) stated that they would not wear a mask when going to public areas, if they had any flu-like symptoms.

DISCUSSION

Travellers, particularly airline passengers, form an important bridge population in the transmission of SARS. Our results show that these travellers might simultaneously practice both preventive and risk behaviours. Most of the respondents had been wearing a mask during the flight in order to protect themselves rather than to protect others. During an epidemic, dispensing free face masks when boarding an aircraft may encourage their use and may also reduce possible stigmatization. The perception of risk and susceptibility to SARS were significant predictors of the protective behaviours studied, as were variables related to the perceived efficacy of mask use and perceived fatality of SARS. These factors are related to the health belief model, which may, therefore, be applied to studies of SARS-related behaviours and also to devise appropriate health interventions.

Only 40, 19·7 and 3·5% of respondents wore a mask in public areas of the affected, less-affected and non-affected regions they visited, which was significantly lower than the prevalence of mask use in Hong Kong during the same time-period (94%) [6]. The risk of contracting the virus might have been perceived to be higher in Hong Kong than in the other countries visited at the time of the study. However, even among those perceiving a high/very high risk of contracting the virus at the travel destination, only 50% were wearing a mask in public areas of the destination country. It is likely that fewer people were wearing a mask in the destination country than in Hong Kong. Fears of stigmatization or wrongly being perceived to be a SARS case in the destination country may also partially explain the observed differences.

As the study was conducted 3 weeks after the peak of the SARS outbreak (1 April 2003) in Hong Kong [16], those who had left Hong Kong for less than a week were more likely to have been in Hong Kong during the most intense phase of the outbreak. These respondents were likely to carry these health concerns and mask-wearing practice with them when travelling. This may partially explain why shorter duration of stay in the guest country was a significant predictor of mask-wearing in public places while travelling in the guest country.

About one in six of the respondents would defer seeking medical advice for flu-like symptoms until returning to Hong Kong. Moreover, about twice as many respondents who visited an affected or less-affected area stated that they would defer treatment compared to those who visited a non-affected area. The difference may be attributable to greater concern of nosocomial SARS infections in the affected area.

Table 4. *Demographic characteristics associated with risk behaviours and attitudes*

	Prevalence of delayed examination for flu-like symptoms (after returning to Hong Kong)			Prevalence of not wearing a mask in public places at the destination when having flu-like symptoms		
Demographic	% (*n*)*	OR_u†	OR_m‡	% (*n*)*	OR_u†	OR_m‡
All	16·4 (133)			18·2 (148)		
Age groups (yr)						
15–29	19·8 (50)	1·93 (1·00–3·72)	n.s.	19·3 (49)	0·83 (0·48–1·42)	n.s.
30–39	16·5 (42)	1·55 (0·80–3·01)		15·2 (39)	0·62 (0·36–1·08)	
40–49	15·1 (28)	1·39 (0·69–2·81)		17·9 (33)	0·76 (0·43–1·35)	
⩾50	11·3 (13)	1·0		22·4 (26)	1·0	
P value	0·212¶	0·212§		0·375¶	0·375§	
Gender						
Male	18·0 (79)	1·27 (0·87–1·85)	n.s.	18·8 (83)	1·12 (0·78–1·60)	n.s.
Female	14·7 (54)	1·0		17·2 (63)	1·0	
P value	0·217¶	0·217§		0·553¶	0·553§	
Marital status						
Married	16·2 (70)	1·01 (0·69–1·48)	n.s.	16·5 (71)	0·75 (0·53–1·08)	0·64 (0·42–0·96)
Other	16·1 (57)	1·0		20·7 (74)	1·0	1·0
P value	0·958¶	0·958§		0·125¶	0·125§	0·032
Education level						
<F3	13·0 (7)	0·73 (0·32–1·68)	n.s.	18·5 (10)	1·03 (0·50–2·11)	n.s.
F3–F7	16·0 (35)	0·94 (0·61–1·44)		18·2 (40)	1·00 (0·67–1·51)	
>F7	16·9 (90)	1·0		18·1 (97)	1·0	
P value	0·746¶	0·746§		0·988¶	0·988§	
Whether knowing a SARS case						
Yes	18·9 (7)	1·19 (0·51–2·78)	n.s.	21·1 (8)	1·20 (0·54–2·68)	n.s.
No	16·4 (126)	1·0		18·1 (140)	1·0	
P value	0·682¶	0·682§		0·650¶	0·650§	
Duration of the trip (days)						
1–7	19·4 (85)	1·65 (1·12–2·42)	n.s.	12·1 (53)	0·40 (0·28–0·58)	0·36 (0·24–0·56)
⩾8	12·8 (47)	1·0		25·5 (94)	1·0	1·0
P value	0·011¶	0·011§		<0·001¶	<0·001§	<0·001
Frequency of air flights in last 2 months						
1–4	14·1 (83)	0·56 (0·38–0·83)	n.s.	19·9 (118)	1·56 (1·01–2·42)	n.s.
⩾5	22·6 (50)	1·0		13·7 (30)	1·0	
P value	0·004¶	0·004§		0·042¶	0·042§	
SARS status						
Affected	20·7 (19)	2·26 (1·21–4·22)	2·36 (1·20–4·65)	5·4 (5)	0·14 (0·05–0·35)	0·13 (0·05–0·38)
Less affected	21·0 (79)	2·31 (1·49–3·60)	2·72 (1·68–4·39)	12·5 (47)	0·35 (0·23–0·51)	0·44 (0·29–0·68)
Non-affected	10·3 (32)	1·0	1·0	29·3 (91)	1·0	1·0
P value	0·001¶	0·001§	0·13	<0·001¶	<0·001§	<0·001

n.s., Non-significant.
* Percentages are based on valid responses (missing values excluded) and the number of missing values of these variables in this table range from 1 to 33.
† Univariate odds ratios.
‡ Multivariate odds ratios derived from multiple logistic regression with forward stepwise selection of independent variables.
§ Derived from the univariate logistic regression (χ^2).
¶ Derived from Pearson χ^2 test for $k * c$ contingency tables.

Public-health promotion for air travellers, especially those who travel frequently, is important, as they were more likely to delay medical consultations. In the event of another outbreak of SARS, health officials should also consider establishing special services to advise and assist Hong Kong travellers having

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Table 5. *Perceived susceptibility, fatality and efficacy associated with risk behaviours and attitudes*

	Prevalence of delayed examination for flu-like symptoms (after returning to Hong Kong)			Prevalence of not wearing a mask in public places at the destination if having flu-like symptoms		
Demographic	% (*n*)*	OR_u†	OR_m‡	% (*n*)*	OR_u†	OR_m‡
Perceived susceptibility during flight						
Very high/high	17·1 (35)	1·05 (0·69–1·61)	n.s.	n.a.	n.a.	n.a.
Medium/small/very small	16·4 (96)	1·0				
P value	0·812¶	0·812§				
Perceived susceptibility at destination						
Very high/high	23·1 (9)	1·58 (0·73–3·40)	n.s.	0·0 (0)	n.s.	n.s.
Medium/small/very small	16·0 (121)			19·1 (145)	1·0	
P value	0·243¶	0·243§		0·002¶	0·002§	
Perceived efficacy of mask-wearing						
Very high/high	18·2 (54)	1·18 (0·82–1·72)	n.s.	11·8 (35)	0·50 (0·33–0·76)	0·54 (0·34–0·85)
Medium/small/very small	16·0 (79)	1·0		21·0 (104)	1·0	1·0
P value	0·406¶	0·406§		0·001¶	0·001§	0·004
Perceived fatality of SARS						
Very high/high	16·0 (42)	0·97 (0·65–1·45)	n.s.	14·8 (39)	0·72 (0·48–1·07)	n.s.
Medium/small/very small	16·5 (87)	1·0		19·5 (103)	1·0	
P value	0·873¶	0·837§		0·104¶	0·104§	

n.a., Not applicable; n.s., non-significant.

* Percentages are based on valid responses (missing values excluded) and the number of missing values of these variables in this table range from 7 to 29.

† Univariate odds ratios.

‡ Multivariate odds ratios derived from multiple logistic regression with forward stepwise selection of independent variables.

§ Derived from the univariate logistic regression (χ^2).

¶ Derived from Pearson χ^2 test for $k*c$ contingency tables.

SARS-related symptoms during their travels in China, one of the most frequented destinations.

The study has a number of limitations. First, the results are based on self-reported data, which may be biased. Secondly, risk behaviours (such as not wearing a mask in public places even when exhibiting flu-like symptoms) may be under-reported. Thirdly, random sampling was not used and airline passengers who departed the airport in private vehicles were not included in the study. Finally, we observed that most of the travellers used public transport but have no data to support this claim.

Travellers who delayed treatment for flu-like symptoms pose the greatest challenge to relevant infection control measures. Reliance on public-health messages and self-reported health declaration forms may be inadequate since the data suggests that altruistic motivation for preventive behaviour is fairly low among travellers. Given that mask-wearing and avoidance of crowded venues were expected to decline sharply, body temperature screening may be the only effective option for containing this disease from spreading across borders. Compliance and performance of these thermal procedures should therefore be evaluated. Further studies on health-seeking behaviours of travellers in different countries are also warranted.

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