

Work-related Allergy in Medical Doctors **– atopy, exposure to domestic animals, eczema induced by** **common chemicals and membership of the surgical profession** **as potential risk factors –**

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Introduction: the purpose of this study

Work-related allergy is one of the important occupational health problems among medical doctors. At present, about 287,000 doctors work in Japan.

Decline of work efficiency and of QOL caused by work-related allergies is not only a personal problem but can also contribute a substantially to loss of human resources for community health.

For the last few decades, latex allergy have been a major occupational health concern in the hospital environment.

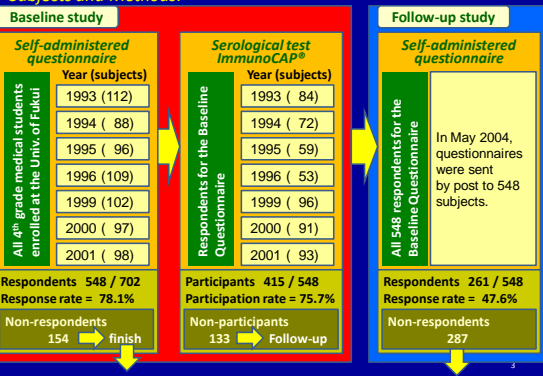
In addition, chemical substances like disinfectants, aerosolised medications, adhesive solvents, and cleaning products have been identified as risk factors associated with allergy among nurses, nursing-related professionals.

Despite the great variety of allergens in hospital and laboratory environments, as far as we know, there are few such studies on medical students¹, and work-related allergies among medical doctors are usually reported along with hospital workers.

The present study aimed to investigate predictive risk factors for work-related allergy in medical doctors.

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Subjects and Methods:



Subjects and Methods: Baseline questionnaire items 1/2

Demographic Information: ID, Name, Gender, Birth of date, Age

Health status: Personal history of allergic diseases & physician diagnosed age

Bronchial asthma (BA), Allergic rhinitis and/or Pollen allergy (AR/PA), Sinusitis, Eczema, Urticaria, Allergic conjunctivitis (AC), Atopic dermatitis (AD)

Height and Weight

Family history:

Bronchial asthma (BA), Allergic rhinitis and/or Pollen allergy (AR/PA), Sinusitis, Eczema, Urticaria, Allergic conjunctivitis (AC), Atopic dermatitis (AD)

Life-style: Smoking habit
Living environment Domestic animals, living location
Physical activity
Eating habits Frequency of prepared foods, eggs, milk, bananas, mangoes and avocados, Breast-fed, Breakfast

Hobby: Hobby, Tools and materials

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Subjects and Methods: Baseline questionnaire items 2/2

History of allergy-like symptoms:

Respiratory Age of first attack, Symptom severity change, Most frequent season

'Wheezing and Whistling' BA-like symptoms

Question was based on ISAAC questionnaire for wheezing and asthma.

* ISAAC: International Study of Asthma and Allergies in Childhood

Dermal Age of first attack, Symptoms severity change, History of eczema caused by rubber gloves, metallic accessories and cosmetics.

'Reddish skin, Itching, and Oozing' AD, Eczema, Urticaria-like symptoms

Question was based on ISAAC questionnaire for eczema.

Nasal Age of first attack, Symptom severity change, Most frequent months

'Sneezing, Nasal discharge, and Nasal obstruction' AR/PA-like symptoms

Question was based on ISAAC questionnaire for rhinitis.

Ocular Age of first attack, Symptom severity change, Most frequent months

'Eye Itching, Reddish eyes, and Watery eyes' AC, PA-like symptoms

Subjects and Methods: Follow-up questionnaire items

Demographic Information: ID, Name, Year of entrance into/graduate from school

Lifestyle: Smoking habit

History of allergy-like symptoms:

Respiratory
Dermal
Nasal
Ocular

- Questionnaire for allergy-like symptoms were same as Baseline.
- Changes in symptom severity after graduation
- Whether the symptoms seemed to be work-related?
- Symptom appearance by work-related items: chemical substances, medical tools, medical materials, laboratory animals, and others

Symptoms appeared on the workplace, and decreased or disappeared at home.

Symptoms appeared at the days on duty, decreased or disappeared during the days off duty.

Symptoms disappeared after workplace/profession change.

Work-relatedness !

Occupational history as a medical doctor: Department, Duration, Job contents

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Results: Characteristics of Baseline and Follow-up respondents

Age: range 21–40, mean \pm SD=23.2 \pm 2.9; Male 352, Female 196 **Baseline**
range 24–44, mean \pm SD=30.3 \pm 3.5; Male 162, Female 99 **Follow-up**

Smoking status:	gender	Current smoker (%)		Ex-smoker (%)	
		Baseline	Follow-up	Baseline	Follow-up
	Male	24.4%	12.9%	9.1%	17.8%
	Female	4.6%	4.1%	3.6%	4.1%

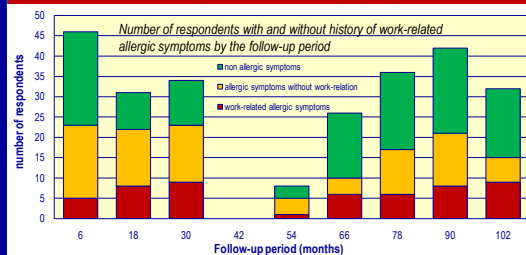
History of Allergic Diseases: Baseline study

BA		AR/PA		Sinusitis		Eczema		Urticaria		AC		AD	
M	F	M	F	M	F	M	F	M	F	M	F	M	F
13.0	3.0	32.7	35.4	4.3	3.1	3.1	7.1	20.4	15.2	5.6	9.1	8.7	14.1

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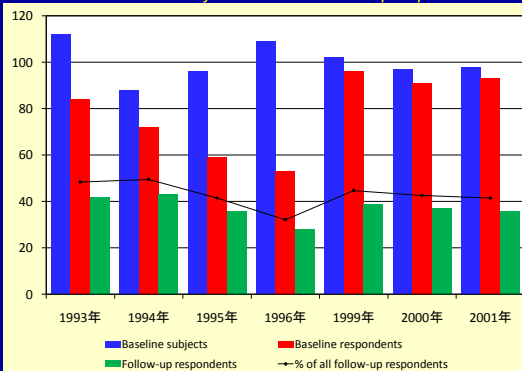
Results: Characteristics of follow-up respondents

Age 24–44 years, mean \pm standard deviation (SD) was 30.3 \pm 3.5 years
Smoking status **Current smoker** were 21 (12.9%) for male, 4 (4.1%) for female
Profession **Surgical** 73 (28.2%), **Internal medicine** 119 (45.9%),
Basic medicine 2 (0.8%), **Doctor-in-training** 65 (25.1%)



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Results: Characteristics of Baseline and Follow-up respondents



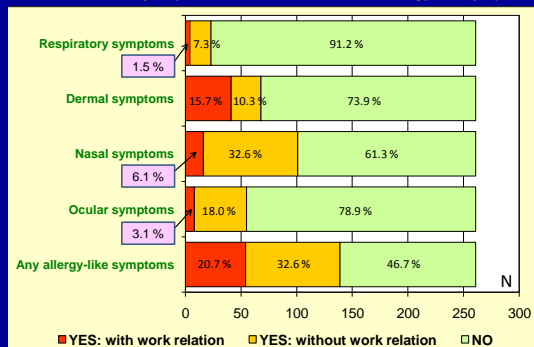
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Results: Causes of work-related allergy-like symptoms

Causes of Work-related Allergy-like Symptoms:	Respiratory	Dermal	Nasal	Ocular
Chemical substances, Medical tools and Medical materials	0	36	4	2
Ethanol	0	3	1	0
Chlorhexidine Gluconate solution	0	4	0	0
Benzalkonium Chloride	0	2	0	0
Povidone-Iodine	0	4	0	0
Formalin	0	0	1	1
Chloroform	0	1	0	0
Surgical Gloves (including Latex Gloves)	0	16	0	0
Powder of Latex Gloves	0	4	1	0
Powder of Plaster Casts	0	1	1	1
Laboratory Animals	2	4	5	5
Mice	1	2	3	2
Rats	1	1	1	1
Rabbits	0	1	1	1
Cats	0	0	0	1
Other causes	0	8	2	1
Hand Washing in the Operating Theatre	0	3	0	0
Working in the Room for Premature Babies	0	1	0	0
Mental Stress	0	1	0	0
Lack of Sleep	0	2	0	0
Others	0	1	2	1

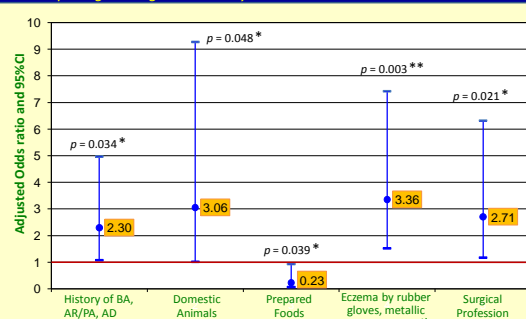
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Results: Number of respondents with work-related allergy-like symptoms



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Risk factors for work-related allergy-like symptoms: multiple logistic regression analysis results



Adjusted for gender, history of allergic diseases, lifestyle at baseline, age and profession at follow-up.
BA: bronchial asthma, AR: allergic rhinitis, PA: pollen allergy, AD: atopic dermatitis

Discussion:

1. Work-related respiratory allergy-like symptom was very few in the number. Work-related dermal allergy-like symptoms represented the vast majority of all types of work-related symptoms.

Some cases of work-related dermal symptoms, e.g. caused by hand washing in the operating room, from ethanol, povidone-iodine, surgical gloves and powder of latex gloves, may be not allergy but irritation.

Even if the prevalence of work-related dermal allergy-like symptoms may be overestimated for this reason, dermal symptoms would still be the most frequent.

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Discussion:

2. From the multiple logistic regression analysis results, any types of work-related allergy-like symptoms were significantly related to

- (1) personal history of personal history of atopic diseases (BA, AR/PA, or AD) at the baseline study. Adjusted OR = 2.30

This strongly suggests that atopy is a concrete predictor of work-related allergy-like symptoms.

- (2) history of eczema caused by rubber gloves, metallic accessories, and cosmetics at the baseline study. Adjusted OR = 3.36

Our subjects of baseline study were 4th grade medical students, and they had already been exposed to surgical gloves allergen and a variety of chemical substances during the experiments of medical school classes, and the practice of human anatomy, besides allergens in daily use goods.

Based on pre-existing sensitisation, the work-related allergy-like symptoms may frequently appear among doctors exposed to allergens in the work place.

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Discussion:

3. Employment in the surgical profession was significantly associated with work-related allergy-like symptoms. Adjusted OR = 2.71.

This finding coincides with the result of our previous cross-sectional study (Sato et al. 2004) conducted in another population of doctors.

4. Work-related allergic symptoms were significantly associated with a history of keeping domestic animals at baseline study. Adjusted OR = 3.06.

High molecular weight allergens of animal origin are known to be inducers of IgE mediated allergies.

Rat and mouse allergy, defined as symptoms of allergy accompanied by specific atopic sensitisation, were highly associated with elevated total IgE and positive skin prick test responses to common allergens. This relationship could be explained by a response to cat or dog allergens. (Hollander et al. 1996)

Sensitisation to cats ranges 2-30% among general population. (Bousquet et al. 2001)

80.4% of our respondents had lived at some time with domestic animals, and many of them potentially be sensitised to animal allergen.

Discussion: Limitations

- (1) This was a questionnaire-based study, all the data concerning the medical history were founded on self-reported contents.

Since the findings can be perceived to be advantageously to the study population, the quality of answers in terms of accuracy was expected to be uniformly higher than general population.

- (2) Response rate to the follow-up questionnaire was low (47.6%).

Possible reasons: doctors are busy and tend to change address frequently

Compared with the respondents, a percentage of current or ex-smoker of non-respondents was significantly higher.

For this reason, smoking status might not be related to work-related allergy-like symptoms in our results.

With respect to other variables, there were no significant differences between respondent group and non-respondent group.

Thus, 'loss to follow-up bias' and 'non-respondent bias' are likely minimal.

Discussion: Limitations

- (3) Many respondents were excluded from the current multiple logistic regression analysis due to inconsistent / incomplete answers to follow-up questionnaire. Therefore, our results might be affected by the bias.

Gender, age, smoking status, profession, personal history of allergic diseases, and so on were no significant differences between the included group and the excluded group.

Therefore, selection bias is minimal.

- (4) Respondents with long work duration were few in number.

Among eligible respondents, 65 of 259 (25.1%) were doctor-in-training and 111 of 255 (43.5%) were with less than 3 years of experience.

We assume that this partly leads to a comparatively low prevalence of work-related allergy-like symptoms as a whole.

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Conclusion:

The present study provides new information on the risk factors associated with work-related allergy-like symptoms in medical doctors.

We shed light on the significant associations between work-related allergy-like symptoms and atopy, personal history of eczema caused by common goods, history of keeping domestic animals, and employment in the surgical profession.

Thorough risk management is warranted for doctors in the medical work place, in living environment, and their lifestyle from school days.

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