ADVERSE REACTION TO LATEX CONTAINING MATERIALS IN HEALTH CARE WORKERS

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Abstract- Latex allergy has become an occupational hazard among healthcare workers. Atopy, intensity and duration of exposure have been recognized as predisposing factors for latex sensitization. Frequency of sensitization varies among countries. So we decided to investigate the prevalence of latex sensitization and potential risk factors among healthcare workers in a general hospital. In a cross sectional study by distributing a questionnaire among 876 employees of a general hospital, we investigated the prevalence of latex allergy and the potential risk factors for latex sensitization. We collected information about occupational history, including specific tasks performed, time of first exposure to latex, number of pairs of gloves used, and duration of weekly exposure. We also investigated the interval between first exposure and onset of symptoms. We asked about pre-existing rhinoconjuctivitis, asthma, atopic and contact dermatitis, hay fever, autoimmune diseases, and food allergies. This survey documented a high prevalence of adverse reaction to all latex containing materials (52.5%). 37.7% of responder had adverse reaction to latex gloves. The highest prevalence of adverse reaction to all latex containing materials was found in the surgical operating room, followed by emergency unit and internal medicine wards. According to this study, frequency of adverse reaction to latex was high among health care workers. This may be due to relatively low response rate, low quality of latex products in Iran, and the method of measurement. Whenever, the need for implementing prevention program, using latex-free methods and training of employees to reduce adverse reaction to latex is apparent.

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INTRODUCTION

Allergic sensitization to natural rubber latex (NRL) is an important occupational health problem among healthcare workers (1-4). Proteins of NRL (*heavamine, hevein*, and rubber elongation factor) can be absorbed through the skin or inhaled. Also cornstarch glove powder can act as a carrier for these allergenic proteins (5, 6).

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Skin manifestations may include allergic contact dermatitis (type 4 or delayed hypersensitivity), urticaria, and angioedema (IgE mediated, type 1 or immediate hypersensitivity reaction). Immediate hypersensitivity reactions to latex can cause rhinitis, conjunctivitis, asthma, and in rare cases anaphylaxis (6-9). Previous studies found a frequency of allergy to latex from 10% up to 48% (1, 10-13). An apparent rise in incidence of latex-related symptoms has been associated with widespread use of NRL gloves to protect against blood-borne infections especially after rising in prevalence of HIV infection (2, 13).

In many hospitals, latex-free methods have been realized to avoid the possible occurrence of severe reactions in workers and patients (2, 3). Data from

several epidemiological studies shows that sensitization varies among countries, and also among different regions of a country (1). It is necessary to gather information about the frequency and determinants of latex sensitization so that preventive measures and heath surveillance can be implemented effectively. With this regard, we investigated the prevalence of latex sensitization and potential risk factors among healthcare personnel in a general hospital in Tehran.

MATERIALS AND METHODS

We surveyed 876 employees of a general hospital in Tehran. At first, a questionnaire was administered to 876 healthcare workers (all of healthcare workers in the hospital who use latex products). The aim and procedures of the survey were explained for all of them. Information about occupational history, including the specific tasks performed, ward, time of first exposure, and time period between first exposure and occurrence of adverse reaction to latex exposure was obtained. The questionnaire also investigated the number of pairs of gloves used per week, and hours they were worn. Adverse reaction (such as chapping or cracking of skin, rhinoconjunctivitis, prorates in hands & eyes, redness, swelling, hives, dyspenea, anaphylactic shock, vesicles and blisters, sneezing), and time interval between the first exposure and the onset of symptoms were also asked.

Predisposing factors to sensitization such as pre-existing rhinoconjunctivitis, asthma, atopic and contact dermatitis, hay fever, autoimmune diseases and food allergies (especially kiwi, tomato, banana, milk, egg…) were surveyed. We considered multiple sources of latex exposure including balloons, rubber gloves, hot water bottles, rubber balls, rubber bands, adhesive tape, ace bandages, dental devices, bandages, belt, brassieres, carpet backing, clothing, suspenders, condoms, erasers, face masks, garden hoses, golf & tennis grips, foam pillows, IV tubing, shower, ostomy bag, NG Tube.

RESULTS

The total number of participants who replayed to the questionnaire was 501(57%), including 273(55.5%)nurses, 112(22.4%) physicians, 65(13%) laboratory personnel and 36(7.2%) other occupations. Age of responders ranged from 18 to 51 yr (mean 31.6 yr SD = 6.6) and 77.5% were women.

Frequency of adverse reaction to all latex containing materials was 52.5% (263), (CI 95%: 48%-57%) and frequency of adverse reaction to latex gloves was 37.7% (189), (CI 95%: 33%-42%). Table 1 shows the frequency of adverse reactions to latex containing materials in details.

In this study there was a significant association between adverse reaction to latex and contact dermatitis (P=0.0005), rhinoconjunctivitis (P=0.005), asthma (P=0.021) and food allergy (P=0.001).

Table 1. Frequency of adverse reactions to latex products and latex gloves in positive cases

symptoms	adverse reaction to latex products†		adverse reaction to latex gloves	
	number	percent‡	number	percent‡
redness	158	60.7	111	58.7
Itching(hands & eyes)	151	57.4	125	66.1
Cracking of skin	124	47.1	107	56.6
swelling	69	26.2	46	24.3
hives	50	10	35	18.5
Sneezing	47	17.9	35	18.5
Rhinoconjuctivits	35	13.3	25	13.2
Blister	17	6.5	9	4.7
Dyspenea	17	6.5	12	6.3
Anaphylactic shock	1	0.2	1	0.5

† All latex containing materials including latex gloves

‡ Percent of reaction among symptomatic cases

Table 2. Comparison of mean of age, pairs of gloves used in a week, and duration of wearing gloves/week between symptomatic and asymptomatic group.

adverse reaction	symptomatic		asymptomatic		*P* value
	mean	SD	mean	SD	
Age (year)	30.7	6.7	32.6	6.4	0.001
Pairs of glove used in week	18.88	17	12.82	17.5	0.057
Duration of wearing glove/week (hour)	13.66	12.5	10.38	9.5	0.001

The time interval between the first exposure and the onset of symptoms was more than 5 yr in 21.3%, 2-5 yr in 6.5%, 1-2 yr in 6.5%, and less than 1 yr in 64.6%.

The duration of occupational exposure to latex gloves was higher in symptomatic workers (Table 2).

Table 2 shows that percentage of symptomatic workers who had used more pairs of latex gloves was higher than those who had used less pairs, and shows that younger workers were more sensitive to latex than older ones.

The prevalence of types 1 and 4 hypersensitivity was 31.5% and 68.5%, respectively.

The highest prevalence of symptomatic workers due to all latex containing products was found in the surgical operating room, followed by emergency unit, and internal medicine wards. The highest prevalence of adverse reaction to latex gloves was found in the surgical operating room, followed by ICU, and emergency unit (Table 3).

DISCUSSION

This survey in hospital personnel documented a high prevalence of adverse reaction to all latex containing products (52.9%) and latex gloves (37.7%). The response rate was relatively low (57%), but nearly similar to other studies (15,19).

This high prevalence of adverse reaction may be due to relatively low response rate, using questionnaire which is a very sensitive measure to survey such reactions, to survey other 23 latex containing products in addition to gloves, and probable low quality of latex gloves in Iran.

Our findings show association of latex sensitization with some allergic diseases (especially contact dermatitis, rhinoconjuctivits, and asthma) and food allergy, these finding are consistent with other studies (1,6,10). The symptoms most frequently associated with the use of latex gloves were skin redness and itching of the hands & eyes these finding are consistent with previous findings (6).

Table 3. Frequency of adverse reaction to latex products† & gloves in different wards

adverse reaction	adverse reaction to latex products		adverse reaction to latex gloves	
	number	percent‡	number	percent‡
Internal medicine	95	56.2	62	36.6
Surgery	46	49.5	38	40.8
Emergency	14	60.9	10	43.4
Operation room	24	85.7	22	78.5
ICU	31	54.4	25	43.8
laboratory	31	48.4	16	25
Endoscopy	6	46.2	5	38.5
Gynecology	7	31.8	4	18.2
Others	9	28.1	7	21.9

† All latex containing products including latex gloves

‡ Percent among participants in a specific ward

Definitive occupational risk factors for latex sensitization among healthcare workers include the duration of wearing and frequency of changing gloves (1,6,10). We also found statistically significant differences between two groups in terms of exposure duration and frequency of changing gloves but differences between two groups were less than our expectation, may be due to healthy workers effect.

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