SCIE DOI: 10.14744/scie.2021.21548
South. Clin. Ist. Euras. 2021;32(3):294-298

Original Article

The Latex Allergy Awareness and Attitudes to Protective Measures in Healthcare Workers

Kadriye Terzioğlu,[1] Dane Ediger,[1] Ebru Özdemir,[1] Raziye Tülümen Öztürk,[1] Fatma Oflu Doğan,[2] Gökhan Ocakoğlu[3]

[1]Section of Immunology and Allergic Diseases, Department of Chest Diseases, Uludağ University Faculty of Medicine, Bursa, Turkey
[2]Department of Familiy Medicine, Uludağ University Faculty of Medicine, Bursa, Turkey
[3]Department of Biostatistics, Uludağ University Faculty of Medicine, Bursa, Turkey

Submitted: 13.10.2020
Accepted: 27.07.2021

Correspondence: Kadriye Terzioğlu, Uludağ Üniversitesi Tıp Fakültesi, Göğüs Hastalıkları Anabilim Dalı, Allerji ve İmmünoloji Bilim Dalı, Bursa, Turkey

E-mail: dr.kadriyete@gmail.com

Keywords: Allergic reactions; gloves; health problem; healthcare workers; latex allergy.

ABSTRACT

Objective: Adequate training and protective measures are some of the effective ways to preventi latex allergy. This study aimed to assess the level of knowledge about latex allergy, behavioral patterns and the incidence of latex allergy.

Methods: Four hundred ten healthcare workers (HCWs) were invited to participate in a survey and answer a questionnaire on the level of knowledge and protective methods of latex allergy. A second supplemental questionnaire was applied to 53 HCWs who were diagnosed with latex allergy or had symptoms of latex exposure.

Results: The study population consisted of 410 HCWs; 240 (61.9%) were female and had a median working duration of 5 (IQR: 0.13–38) years. 74 (18%) HCWs described symptoms after latex exposure with a median working time of 34.5 (IQR: 21–50) years. Despite the symptoms, skin test was not performed 41 (78.8%) of 74 patients. When the knowledge levels of protection methods from the latex allergen were compared, research assistants and nurses were found to be more than the technicians (p=0.047, p=0.016, respectively). When the anxiety level was compared between occupational groups, it was significantly higher in nurses and technicians compared to research assistants (p=0.012, p=0.001, respectively).

Conclusion: The data indicated that HCWs are not adequately informed about latex allergy, and comparing the occupational groups, this fact was more remarkable among technicians. Continuing education of HCWs regarding latex allergy, appropriate diagnostic tests in the presence of symptoms, and taking effective protective measures are essential steps in the fight against latex allergy.

INTRODUCTION

Latex allergy was first revealed by skin test in 1979, and latex-induced allergic reactions began to be described increasingly in the following years.[1] Healthcare workers (HCWs) are particularly exposed to latex allergen through powdered gloves. Powdered gloves usually contain cornstarch in powder form, and these powders bind to latex proteins with a potent affinity, are suspended as aeroallergens and trigger allergic diseases in sensitive individuals.[2,3]

HCWs exposed to latex allergen are at higher risk than the normal population, and the patients requiring frequent surgery are also at high risk for latex allergy. While the prevalence of latex allergy in the general population is between 1 and 1.37 %, it is estimated to be 2.9 to 12.1 % among HCWs.[4–7]

With the spread of powdered gloves, latex allergy has become a major health problem and has even been defined as an occupational disease. The first evidence-based guidelines to reduce and prevent latex allergy in healthcare professionals and patients were published in 2008 by the Royal College of Physicians.[8] These guidelines reported that raising awareness and knowledge about latex allergy and avoiding powdered latex gloves are effective measures to prevent latex allergy in HCWs.

This study aimed to evaluate the level of knowledge (LOK) about latex allergy, latex allergen prevention methods, and latex allergy incidence and symptoms among HCWs.

MATERIALS AND METHODS

Participants

Uludag University Medical Faculty Clinical Research Ethics Committee approval was obtained (Decision date: February 18, 2014; Decision Number: 2014-4/8). Uludag University Faculty of Medicine health workers were included in the study. Occupational groups were defined as nurses, research assistants, specialist physicians, faculty members, and technicians. 410 participants who filled out the questionnaire sent to 485 health workers were included in the study.

Questionnaires

Two questionnaires were conducted. The first questionnaire was carried out with all HCWs, and the second with HCWs reported to have a latex allergy (please see Suppl. 1 and 2). In the detailed analysis of questionnaires made by allergy specialists; individuals with significant clinical symptoms with clinical examination findings after each exposure to latex allergen, and individuals previously diagnosed by a physician were considered to have a latex allergy. No other diagnostic method was applied to confirm latex allergy.

The first questionnaire included questions about demographic data such as age, gender, occupational groups, departmant they work, and whether they use latex gloves in the workplace, whether they have a known allergy to latex, and LOK measurement about latex allergy.

The second questionnaire asking HCWs about the frequency of latex glove use, clinical signs of latex allergy, treatment, comorbidities, food reactions, preventive measures against latex, and anxiety levels.

Multiple true and false option was given in the answer part of the questions. They were asked to choose the appropriate answer for them.

Statistical analysis

Continuous variables of the study were expressed as median, minimum and maximum values. Kruskal Wallis and Mann Whitney tests were used for the intergroup comparisons of the continuous variables. Categorical variables were expressed as frequency and related percentage values, and the chi-square test was used for the intergroup comparisons. The results were analyzed using SPSS v20 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) software, and p-value of <0.05 was considered statistically significant.

RESULTS

Four hundred ten HCWs who completed the questionnaires were included in the study.

In the overall study population, 240 (61.9%) participants were female. The occupational groups consisted of 134 (32.8%) nurses, 164 (39.9%) research assistants, 30 (7.3%) specialist physicians, 56 (13.7%) faculty members and 26 (6.3%) technicians. Of these, 257 (64.5%) were working in non-surgical departments, and 141 (35.4%) were in surgical departments. The median working duration was 5 (IQR: 0.13–38) years.

Latex gloves were used by 353 (86.1%) participants. Of these, 74 (18%) reported symptoms following latex exposure. Table 1 shows the answers to the questions assessing the LOK of HCWs about latex allergy.

Questions (1 and 4) assessing the LOK revealed a significant difference between occupational groups. The percentage of correct answers to question 1 (What are the risk groups for latex allergy?) was found to be higher in the research assistant group than in the nurses ($p=0.001$) and technicians ($p=0.017$); and the percentage of correct answers to question 4 (What are the environmental protection methods a patient with latex allergy shoul take?) was higher in the nurses and in research assistants group than the technicians ($p=0.047$, $p=0.016$, respectively). The overall correct answer rate was found to be higher in the nurses and research assistant groups than in the technician group ($p=0.047$, $p=0.010$, respectively).

No significant difference was found among groups in terms of the question 2 (What are the diagnostic methods for latex allergy?) and question 3 (What are the therapeutic methods for latex allergy?). There was no significant difference between subjects with latex allergy and subjects without latex allergy in terms of questions evaluating LOC.

When the HCWs were asked to assess subjectively their LOK about latex allergy as "adequate", "partially adequate" or "inadequate", only 40 (9.8%) HCWs rated their LOK as "adequate", 220 (53.7%) HCWs rated it "partially adequate" and 150 (36.5%) HCWs were rated it "inadquate". When these three groups were compared; the HCWs who considered themselves to have "adequate" LOK had a higher overall correct answer rate to all questions ($p=0.001$).

To the question regarding continuing education ("should there be training on latex allergy?") 285 (69.5%) participants answered "yes" 125 (30.5%) participants (30.5%) answered "no".

Subgroup evaluation of known or suspected latex allergy:

Of the 74 patients with known or suspected latex allergy, 53 participated in a second questionnaire. 36 (78.3%) patients were female, and the median working duration was 34.5 years (IQR: 21–50). The occupational groups consisted of 26 (52%) nurses, 12 (24%) research assistants, 6 (12%) faculty members, and 6 (12%) technicians; 73.3% of them working in internal departments and 26.7% in surgical departments. 45 (84.9%) HCWS with known or suspected latex allergy had used latex gloves.

When asked about the protective measures ("how do you use gloves?"); 9 (17%) individuals stated that they never used gloves, 12 (22.6%) individuals used latex-free gloves, 33 (62.3%) individuals used powder-free gloves, and 28 (52.8%) individuals used latex gloves over clear gloves.

Table 1. Latex allergy knowledge level

Questions	Choices	Answering "Yes" n (%)	Answering "No" n (%)	Answering "I don't know" n (%)
1. What are the risk groups for latex allergy?	Operating room staff	359 (87.6)	18 (4.4)	33 (8)
	Intensive care unit staff	309 (75.4)	68 (16.6)	33 (8)
	Clinic staff	275 (67.1)	102 (24.9)	33 (8)
	Outpatient clinic staff	172 (42.1)	205 (49.9)	33 (8)
	Children with congenital anomalies requiring frequent surgeries	161 (39.3)	216 (52.7)	33 (8)
2. What are the diagnostic methods for latex allergy?	Skin prick test	198 (48.3)	89 (21.7)	123 (30)
	Serum specific IgE measurement	146 (35.6)	141 (34.4)	123 (30)
	Glove fingertip test	57 (13.9)	230 (56)	123 (30)
	Patch test	92 (22.4)	195 (47.6)	123 (30)
3. What are the therapeutic methods for latex allergy?	Not using latex gloves	301 (73.4)	45 (11)	64 (15.6)
	Medical therapy	84 (20.5)	262 (63.9)	64 (15.6)
	Latex immunotherapy	62 (15.2)	282 (69.1)	64 (15.7)
	Changing work/department	116 (28.3)	230 (56,1)	64 (15.6)
4. What are the environmental protection methods that a patient with latex allergy should take?	Using powder-free gloves	119 (29)	245 (59.5)	46 (11.2)
	Using vinyl or synthetic gloves	122 (29.8)	242 (59.0)	46 (11.2)
	Using latex-free gloves	266 (65.0)	97 (23.7)	46(11.2)
	Using cotton glove liners	63 (15.4)	301 (73.4)	46 (11.2)
	Using latex gloves on clear gloves	114 (27.8)	250 (61)	46 (11.2)
	Avoiding using medical materials containing latex	214 (52.2)	150 (36.6)	46 (11.2)

Table 2. Latex allergy-induced clinical symptoms and comorbidities

	Yes n (%)	No n (%)
Latex allergy-related complaints		
Redness and pruritus on hands (suggesting contact dermatitis)	38 (71.7)	15 (28.3)
Nasal complaints (nasal congestion/discharge/sneezing)	22 (41.5)	31 (58.5)
Blistering, redness, pruritus on the body (urticaria)	21 (39.6)	32 (60.4)
Pruritus, redness on and watering of eyes	16 (30.2)	37 (69.8)
Shortness of breath	6 (11.3)	47 (88.7)
Angioedema	4 (7.5)	49 (92.5)
Anaphylaxis	4 (7.5)	49 (92.5)
Larynx edema	0	53 (100)
Comorbidities		
Allergic rhinitis	21 (39.6)	32 (60.4)
Eczema	17 (32.1)	36 (67.9)
Drug allergy	12 (22.6)	41 (77.4)
Food allergy	10 (18.9)	43 (81.1)
Asthma	7 (13.2)	46 (86.8)
Venom allergy	2 (3.8)	51 (96.2)

Table 3. Medications and dosing used for latex allergy

Medication group	Regularly n (%)	Intermittent n (%)
Antihistaminic	11 (20.8)	21 (39.6)
Nasal spray	6 (11.3)	5 (9.4)
Asthma medication	4 (7.5)	1 (1.9)
Corticosteroids	2 (3.8)	3 (5.7)
Eye drops	1 (1.9)	1 (1.9)

Table 2 shows the latex allergy-induced symptoms and comorbidities, and Table 3 shows the medical treatments. No one in the latex-allergic subgroup was aware of latex immunotherapy.

Forty-one (78.8%) participants with latex allergy did not undergo skin prick test, despite having obvious clinical findings and comorbid atopic diseases related to latex allergy Interaction with tropical fruits was detected in 5 (9.6%) individuals.

The median anxiety score was 4 (0–9) in HCWs. The anxiety level was significantly different among occupational groups (p=0.002) and was higher in nurses and technicians compared to research assistants (5 vs. 2.5, p=0.012; 5.5 vs. 2.5 p=0.001, respectively).

DISCUSSION

In response to the increasing latex allergy, various protective measures were developed and trainings were organized to protect the HCWs and patients from latex allergy. Despite these preventive measures, there is no substantial decrease reduction in the incidence of latex allergy. In this study, we assessed the latex allergy rate, and HCWs' awareness and LOK on the latex allergy.

18% of the health workers had latex-related symptoms after latex exposure. Previous studies have found lower prevalence in Sri Lanka (11.4%),[6] in China (8.8%),[7] in Spain (5.9%)[9] and in France (4.32%).[10] This might be because other studies confirmed the diagnosis of latex allergy with a skin prick test and serum specific IgE positivity. The actual diagnosis rates may not be reflected due to the lack of standardization in the skin test solutions used in the diagnosis of latex allergy and the fact that latex has 15 different allergen subtypes. In a study in which 32 employees working in a factory producing latex were evaluated; 1 occupational respiratory symptoms related to latex were present in 28.12% of workers, skin lesions in 18.75%, eye irritation in 43.75% and abnormal pulmonary function test in 12.5%, however, skin test positivity could not be demonstrated in any of the latex allergens.[11] Similarly, Buss et al.[12] detected clinical symptoms related to the use of latex gloves in 57% of 260 HCWs, nevertheless, they found prick test positivity only in 4% of them. It is crucial to note that skin test positivity may not be observed although the patients have latex-induced clinical symptoms, and this may lead to misleading results in latex allergy prevalence.

When HCWs were asked to identify risk groups for latex allergy; 87.6% of them defined working in surgical departments as a risk factor, and 75.4% of them defined working in ICU as a risk factor for latex allergy.

On the other hand, the majority of participants (60.7%) were unaware that children with congenital anomalies requiring frequent surgeries are also at risk. In their study, Al-Niaimi et al.[13] have found that only 25% of the HCWs questioned their patients for latex allergy during examination. As a result, it may be overlooked by physicians and other healthcare professionals that patients may be at high risk for latex allergy. We found that research assistants can define the risk groups for latex allergy significantly better than the other occupational groups (p=0.0001).

In our study, the most common clinical presentations of latex allergy were glove dermatitis (71.7%), allergic rhinitis (41.5%) and urticaria (39.6%). In a Chinese study including 743 nurses with latex allergy, the most common clinical presentation was glove dermatitis with 77.1%.[7] This shows that HCWs are most commonly exposed to the latex allergen through the contact with latex gloves.

Our study found that 83.1% of all HCWs used latex gloves, and similarly, 84.9% of the latex allergy group continued to use latex gloves. Despite latex-induced clinical symptoms, it was remarkable that the use of latex gloves was high in the group.

When the group with latex allergy was asked about how they use the gloves; 28 (52.8%) HCWs were found to follow a wrong approach to using latex gloves with clear gloves. 72.2% of HCWs assumed that using latex gloves with clear gloves is an effective way of protection against allergen. Healthcare professionals could not take the proper protective measures since they were not adequately informed. In the study by Çelik et al.,[14] it was revaled that the courses given to doctors and dentists to raise awareness about latex allergy during their training are not adequate. Therefore, vocational trainings for latex allergy should be continued at intervals. In Germany, a significant decrease was achieved in the number of cases with latex-induced allergy after the training and regulatory interventions.[15]

The basic rule in the treatment of allergic illnesses is to avoid the allergen. Avoiding using latex gloves or changing departments to minimize contact is one of the methods to allergen protection. A large proportion (71.7%) of the participants were found to be unaware that switching departments might be effective in the treatment of latex allergy. The LOC of the latex allergen protection methods of nurses and research assistants was found to be higher than that of technicians (p=0.047, p=0.016, respectively).

In conclusion, overall LOK among the occupational groups was found to be significantly lower in technicians compared to research assistants and nurses (p=0.047, p=0.010, respectively).

There was no significant difference among the occupational groups regarding the LOK about the diagnosis and treatment of latex allergy; similarly, no difference in LOK was observed between the latex-allergic group and the overall study population.

Only 9.8% of HCWs rated themselves as adequately informed about latex allergy. Moreover, this group answered the questions correctly at significantly higher rate (p=0.001). The rest of the participants (90.2%) subjectively rated themselves as partially or poorly informed about the latex allergy. Our results show that HCWs, especially technicians, are not adequately informed about latex allergy, and this was reflected in their behavioral patterns and increased their anxiety levels.

CONCLUSIONS

It is very important to diagnose occupational allergic diseases in the early stages and to take appropriate preventive measures. We believe that the rate of latex allergy can be reduced with regular trainings provided to HCWs and taking appropriate protective measures, thereby, the anxiety levels of the HCWs can be significantly reduced.

Ethics Committee Approval

This study approved by the Uludag University Faculty of Medicine Clinical Research Ethics Committee (Date: 26.02.2014, Decision No: 2014-4/8).

Informed Consent

Prospective study.

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: E.Ö., K.T.; Design: E.Ö., K.T.; Supervision: D.E., R.T.Ö.; Materials: R.T.Ö., G.O.; Data: E.Ö., K.T., F.O.D., G.O.; Analysis: E.Ö., K.T., F.O.D., G.O.; Literature search: D.E., E.Ö., K.T., R.T.Ö.; Writing: K.T., D.E.; Critical revision: K.T., R.T.Ö.; G.O.

Conflict of Interest

None declared.

REFERENCES

1. Nutter AF. Contact urticaria to rubber. Br J Dermatol 1979;101:597–8. [CrossRef]
2. Cabañes N, Igea JM, de la Hoz B, Agustín P, Blanco C, Domínguez J, et al; Committee of Latex Allergy; SEAIC. Latex allergy: Position Paper. J Investig Allergol Clin Immunol 2012;22:313–30.
3. Vandenplas O, Beezhold D, Tarlo SM. Latex allergy. In: Chan-Yeung M, Malo JL, Bernstein DI, Bernstein IL, editors. Asthma in the workplace. 3rd ed. New York: Marcel Dekker; 2006. p. 437–61. [CrossRef]
4. Liss GM, Sussman GL. Latex sensitization: occupational versus general population prevalence rates. Am J Ind Med 1999;35:196–200.
5. Meade BJ, Weissman DN, Beezhold DH. Latex allergy: past and present. Int Immunopharmacol 2002;2:225–38. [CrossRef]
6. Amarasekera M, Rathnamalala N, Samaraweera S, Jinadasa M. Prevalence of latex allergy among healthcare workers. Int J Occup Med Environ Health 2010;23:391–6. [CrossRef]
7. Liu QL, He XZ, Liang K, Xie R, Fang HP, Zhu KJ, et al. Prevalence and risk factors for latex glove allergy among female clinical nurses: a multicenter questionnaire study in China. Int J Occup Environ Health 2013;19:29–34. [CrossRef]
8. Royal College of Physicians. Latex allergy: occupational aspects of management 2008. Available at: https://www.rcplondon.ac.uk/guidelines-policy/latex-allergy-occupational-aspects-management-2008. Accessed Aug 25, 2021.
9. Galindo MJ, Quirce S, Garcia OL. Latex allergy in primary care providers. J Investig Allergol Clin Immunol 2011;21:459–65.
10. Bousquet J, Flahault A, Vandenplas O, Ameille J, Duron JJ, Pecquet C, et al. Natural rubber latex allergy among health care workers: a systematic review of the evidence. J Allergy Clin Immunol 2006;118:447–54. [CrossRef]
11. Moghtaderi M, Farjadian S, Momeni Z, Najib K. Natural latex sensitization and respiratory function among workers in latex glove factories: a pilot study. J Occup Environ Hyg 2012;9:D183–5. [CrossRef]
12. Buss ZS, Fröde TS. Latex allergen sensitization and risk factors due to glove use by health care workers at public health units in Florianopolis, Brazil. J Investig Allergol Clin Immunol 2007;17:27–33.
13. Al-Niaimi F, Chiang YZ, Chiang YN, Williams J. Latex allergy: assessment of knowledge, appropriate use of gloves and prevention practice among hospital healthcare workers. Clin Exp Dermatol 2013;38:77–80. [CrossRef]
14. Çelik GE, Demirören M, Aydın Ö, Cambazoglu M, Demirel YS. Awareness and attitudes of medical and dentistry students about latex allergy: do they need more?. Asthma Allergy Immunol 2013;11:76–85.
15. Allmers H, Schmengler J, Skudlik C. Primary prevention of natural rubber latex allergy in the German health care system through education and intervention. J Allergy Clin Immunol 2002;110:318–23.

Sağlık Çalışanlarında Lateks Allerjisi Farkındalığı ve Koruyucu Önlemlere Yaklaşımları

Amaç: Sağlık çalışanlarına yeterli eğitim verilmesi ve doğru koruyucu önlemlerin alınması lateks alerjisi ile mücadelede etkin yollardan biridir. Biz de bu çalışmamızda sağlık çalışanlarının bu konudaki yeterliliklerini saptamak amacı ile lateks alerjisi hakkındaki bilgi düzeyleri, davranış modelleri ve lateks alerji görülme sıklığını incelemeyi hedefledik.

Gereç ve Yöntem: Dört yüz on sağlık çalışanına late ks alerjisi hakkında bilgi düzeyi ve kaçınma yöntemlerini ölçen anket uygulaması yapıldı. Doktor tanılı late ks alerjisi olan ve lateks maruziyet ile semptom tarifleyen 53 kişiye ikinci bir anket uygulaması daha yapıldı.

Bulgular: Çalışmaya dahi ledilen 410 sağlık çalışanın 240 (%61.9) kadın ve median çalışma süresi 5 (IQR: 0.13–38) yıldı. Lateks maruziyet sonrası semptom tarifleyen sağlık çalışan oranı 74 (%18) ve bunların median çalışma süresi 34.50 (IQR: 21–50) yıldı. Bu grupta kişilerin ise 41'inin (%78.8) lateks alerjisini saptamak amacı ile deri testlerini yaptırmadıkları saptandı. Lateks alerjeninden korunma yöntemleri hakkında bilgi düzeylerine bakıldığında araştırma görevlileri ve hemşirelerin teknisyenlerden daha bilgili oldukları saptandı (p=0.47, p=0.16, sırasıyla). Endişe düzeyleri meslek grupları arasında karşılatırıldığında hemşirelerde ve teknisyenlerde araştırma görevlilerine gore anlamlı derecede yüksek bulundu (p=0.012, p=0.001, sırasıyla).

Sonuç: Elde edilen veriler genel olarak sağlık çalışanlarının lateks alerjisi hakkında yeteri kadar bilgiye sahip olmadıkları ve meslek gruplarına baktığımızda ise bunun teknisyenlerde daha da belirgin olduğu görüldü. Buna paralel olarak da endişe düzeylerinin yüksek olduğu saptandı. Sağlık çalışanlarındaki bu bilgi açığının eğitimlerle kapatılması, lateks maruziyeti ile semptom varlığında tanı amaçlı değerlendirilmesi ve etkin koruyucu önlemlerin alınması lateks alerjisi ile mücadelede etkili olacağı düşünülmektedir.

Anahtar Sözcükler: Alerjik reaksiyonlar; eldiven; halk sağlığı problemi; lateks alerjisi; sağlık çalışanları.