

Prevalence of latex allergy in hemodialized children and adolescents under 18 years of age in hospitals of Shiraz University of Medical Sciences, 2006

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Abstract

Introduction:

Ig E-mediated allergy to the protein of natural rubber latex is an important global health problem. Due to the specific immunity status of children and adolescents with renal failure, possible exposure to other cross-reactive allergens specially pollen and trees, their exposure to frequent hemodialysis and use of gloves, catheters and other equipment containing latex, this study was designed aiming at determining the prevalence of latex allergy in hemodialyzed children and adolescents under 18 years old in hospitals of Shiraz University of Medical Sciences -2006.

Material and Methods:

In this descriptive cross-sectional study, reaction of 68 participants to scratch skin test (Prick) with standard latex extract, previous history about sensitivity and their demographic data were analyzed by SPSS, version 11 software using descriptive and inferential statistic such as proportion test, independent t-test and Chi-square.

Results:

The findings revealed that one of the seven subjects (14.7%) had positive reaction to latex. Proportion test indicated that this prevalence rate was higher than the normal population sensitivity rate ($P=0/001$).

Conclusion:

With respect to the results, researchers suggest that exact history taking and the necessary latex allergy tests should be performed in this high risk group to prevent damage and possible side effects. Also, to reduce the sensitivity of latex, we recommend that protein component of the gloves, the catheter and other equipment used containing latex be decreased by Chlorination, Autoclaving and use of Proteolytic enzymes or Nonionic surfactants such as Polyethylene glycol

Keywords: Latex Hypersensitivity, Child, Adolescent, Renal Dialysis

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Introduction:

made of latex have a higher chance for latex allergy than others [2, 3, 5].

It is worth mentioning that in addition to medical and paramedical staff, workers in factories producing material derived from latex, people with hand dermatitis, those with allergy to certain fruits, especially tropical fruits, individuals with a history of atopy, and patients with a history of repeated procedures and surgery are groups that have a higher chance for latex allergy [11 and 12]. Accordingly, hemodialysis patients are also considered as one of the high risk groups faced with latex allergy. Research has shown that the probability of latex allergy in this group of patients is 14.6 percent [14]. In addition, the latex allergens show cross-reaction with some fruits, trees and plants pollen which cause allergy if entering to gastrointestinal tract, inhaled or in the case of contact with mucous membranes or skin [2].

As shown in the above discussion, children and adolescents on hemodialysis in hospitals have a high chance of allergic reactions to latex due to the special status of the immune system, chronic illness, exposure to repeated procedures and use of gloves, catheters and other latex-containing products during hemodialysis. Therefore, this study aimed to determine the prevalence of latex allergy in children and adolescents younger than 18 and on hemodialysis in Shiraz Medical Sciences University's hospitals in 1385.

Material and Methods:

This is a cross-sectional study with the target population of all the children and adolescence under 18 who suffered from

Latex (Natural Rubber Latex) is a type of natural rubber used widely around the world in the last century for producing more than 4500 products [1 and 2]. One of the important medical applications of latex is in manufacturing gloves and a variety of catheters; during the past twenty years, its use in health care has been on increase [3 and 4]. Natural latex is derived from gum tree called *Hevea Brasiliensis* which grows in areas around the Amazon River and is a combination of different materials that can cause allergy due to immunological, chemical and other causes. [5-7].

Allergy to the protein in natural latex through immunoglobulin E (IGE) is known as one of the problems in global health issue that is increasingly growing and diminishes the ability to use gloves and other products derived from latex safely [2, 8 and 9]. The prevalence of latex allergy in the healthy population according to FDA statistics was less than one percent and 3-17 percent of health providers and individuals who are exposed to latex due to their occupation are affected. Research has shown that the prevalence of latex allergy in different societies varies from 1.1 percent to 7.6 percent, and morbidity odds ratio in some patients suffering from specific diseases such as Spinal bifida raises to 65 percent. Generally, each contact and exposure to latex can increase the risk of allergy and anaphylactic reactions [2, 10-13].

In studies conducted in Iran, the prevalence of latex allergy in the medical and paramedical workers has been reported from 21 percent to 34.8 percent and it has been emphasized that those exposed to products

confirmed. Also, its reliability was calculated through test-retest ($r=0.83$) [18]. The questionnaire was completed by interviews with research units. First of all, the researcher in order to consider ethical issues in his study, explained the objectives of the research and ensured that the subjects participating in this research are completely free and also they are allowed to discontinue their participation in any time they want, then he asked them to answer the questions. The questionnaires were anonymous and the individuals' information in all stages of the research was kept confidential via codes assigned to them; the data were used only for research. It is worth mentioning that according to the age range of the research participants and explaining the research steps and mentioned points, in addition to their consent, their parents' consent was obtained. At this stage, one of the parents was not willing that his son participates in the research, while ensuring that their lack of participation in the research will not cause any problem in treatment process [17] this individual was excluded.

After filling the questionnaire, skin test was done via Skin Prick Test method using standard extract of natural latex made by "Steallergen" factory. Before skin test using latex standard extract, the subjects were asked about sensitivity after contact with materials containing latex and during the test; then, the emergency equipment was available and ready. Skin tests also included positive control (0.1 percent Histamine) and negative control (saline Carbol) tests. If positive control (wheal $> 5\text{mm}$) was positive and negative control was negative, skin test was performed with latex standard extract,

renal failure and received hemodialysis twice a week in hospitals of Shiraz University of Medical Sciences. The study was conducted from Ordibehesht to Bahman 1385. The sample size for this study, according to the statistics of hemodialysis children and adolescents under 18 years and using Krejcie and Morgan sampling table was estimated 63 cases [15] selected through systematic random sampling. Inclusion criteria included chronic renal failure, at least five sessions of hemodialysis in Shiraz University of Medical Sciences' Hospital, age less than 18 years old, lack of use of antihistamine drugs during a week prior to research, and willingness to participate voluntarily in the study; the exclusion criteria included discontentment to participate in the study or having any defect in completing data collection.

Data gathering instruments in this study were a researcher-made questionnaire and skin test. The reason of the simultaneous use of two gathering tools was that the people views about allergy to latex containing materials through the questionnaire was generally more exaggerated than the actual rate and also skin tests are not always matched to clinical symptoms [16].

The researcher-made questionnaire contained demographic information such as age, sex, history of allergic diseases like asthma, hay fever, urticaria, food allergy, and personal or family history of atopy, latex allergy and latex cross-reactive fruits such as bananas, kiwi, potato and tomato. Based on previous research, the mentioned questionnaire was made and after applying the experts' and editors' opinions, the content validity and face validity were

independent t test and chi-square test). 0.05 was considered as significant.

Results:

In this study, data on 68 children under 18 and on hemodialysis in hospitals of Shiraz University of Medical Sciences, were studied and analyzed. Of these, 45 (66.2 percent) were males and 23 (33.8 percent) females. Their mean age was 14.7 years with a standard deviation of 3.1 years. The results suggest that 57.37 percent of the subjects have a history of allergic diseases including asthma, hay fever, urticaria, food allergy and personal or family history of atopy. The absolute and relative frequency of the types is shown in Table 1. However, none of the subjects had a history of sensitivity to cross-reactive fruits to latex. In addition, skin test was positive in 10 cases, the frequency of which is shown in Figure 1. Ratio test confirmed that the prevalence of latex sensitivity in the subjects (14.7 percent) is significantly higher than sensitivity to latex in the healthy population (less than 1 percent) ($P=0.001$).

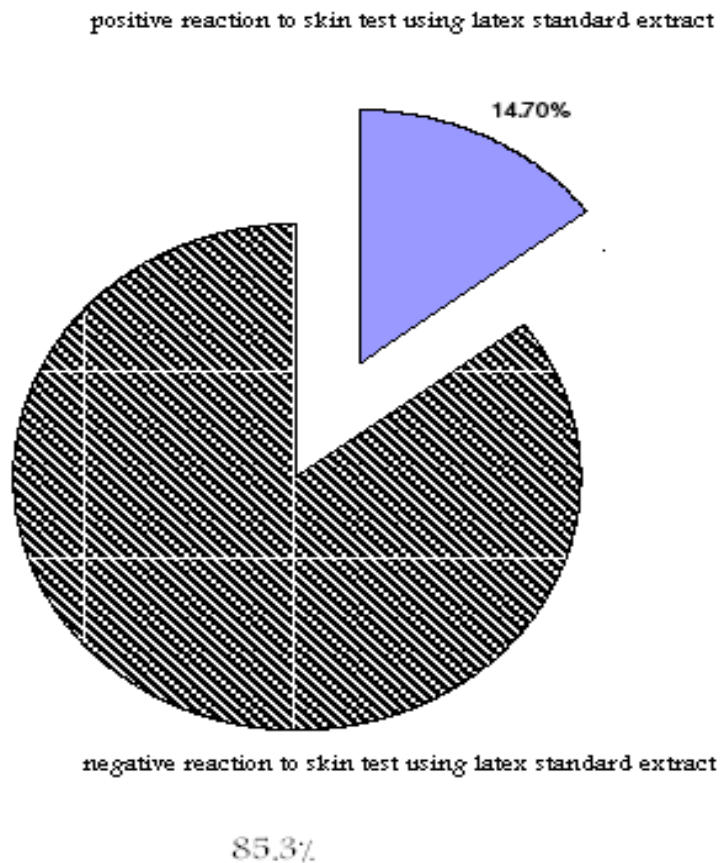
and if its diameter was three millimeters more than the bulge diameter of control material, the result was considered positive [5, 7 and 16].

It is noted that due to the probability of lack of cooperation or unwillingness of some individuals to participate in the research and to ensure the completion of sample size, the researcher at first asked 76 patients (20 percent in excess of the estimated sample size) eligible to participate in the study; 75 cases agreed to participate in the study. During the study, three subjects were excluded due to their parents' unwillingness to continue and their fear of allergic reactions refused. After completing the skin test and evaluating the completed questionnaires and the forms used for registration of test results, data related to four subjects were omitted because of their incomplete information. Finally, completed data of 68 subjects, which is more than the required number calculated, were analyzed by SPSS (version 11), using descriptive statistics (relative and absolute frequency, mean, standard deviation, tables and graphs) and inferential statistics (ratio test,

Table 1: Distribution of absolute and relative frequency of allergic disease in children and adolescents under 18 on hemodialysis in hospitals of Shiraz University of Medical Sciences, 1385

History of allergic disease	number	percentage
asthma	3	4.42
Hay fever	6	8.84
urticaria	2	2.94
Food allergy	1	1.47
atopy	10	14.7
Family history of atopy	17	25
total	39	57.37

Graph 1: Relative frequency of response of children and adolescents under 18 years on hemodialysis in hospitals of Shiraz University of Medical Sciences in 1385 to the skin test using the standard latex extract



18 on hemodialysis in hospitals of Shiraz University of Medical Sciences shows positive response to skin test using the latex standard extract. The findings of Pearson et al and Gantr et al on the prevalence of sensitivity to latex in patients on hemodialysis with the rate of 14.6 percent, children with recurrent surgery with the rate of 11.5 percent, and patients with meningomyelocele with the rate of 44 percent [19 and 20] are in the same line with the results of this study.

In this study, the prevalence of latex sensitivity in the studied subjects was higher

In this study, a statistically significant difference was not observed between the age of the subjects and their type of reaction to skin test using latex standard extract ($P=0.348$). In addition, a significant relationship was not found between positive reaction to skin test using standard extract of latex and sex ($P=0.637$), allergy history such as asthma, hay fever, urticaria, food allergy and atopy ($P=0.453$).

Conclusion:

This study showed that approximately one out of seven children or adolescents under

findings of PourPak et al are in agreement with the present study findings [5], while other literature and researches have confirmed the relationship between history of allergy and atopy with the increasing risk of latex allergy and have known atopy as the most important risk factor in susceptibility to latex allergy [7, 25-29].

Generally, the findings of this study revealed that latex allergy in children and adolescents on hemodialysis is more prevalent than in the healthy population. Considering that Ig E mediated latex allergy can lead to severe allergic reactions such as anaphylaxis shock and even death, in addition to hand itching, dry and red skin, urticaria, blisters, eyes itching, tearing, conjunctivitis, rhinorrhea and congestion, sneezing, wheezing, and asthma [1, 2], and regarding the low age of this high risk group, researchers suggest:

1. Latex allergy in children and adolescents younger than 18 years old on hemodialysis should be taken into account by members of therapy team. Taking appropriate history, performing necessary tests and precise assessment of latex allergy will prevent risks and possible harms in these individuals.

- 2 - In the hemodialysis treatment process for children and adolescents under 18 years, use gloves, catheters and devices the latex protein contents of which are reduced by chlorination, autoclaving, using proteolytic enzymes or non-ionic surfactants such as polyethylenglycol. The reduced protein content decreases latex allergy [9].

In conclusion, it is necessary to mention the fact that the length of hemodialysis (number of hemodialysis sessions) and duration of each hemodialysis session are important

than the healthy population. The rate of contact to the latex that causes sensitivity is unknown and varies depending on the people's tolerance, but generally each contact and exposure to this substance can increase the risk of sensitivity [7 and 13]. Accordingly, due to the fact that people on hemodialysis are exposed to latex more than the normal population, the study findings seem reasonable.

In this study, the relationship between positive skin test reaction using latex standard extract and age and sex variables was not approved. Although these results correspond with the cases declared by De Queiroz et al, [21], the findings of the present research do not match to the results of Abdoli and Allmers et al, denoting that the prevalence of latex sensitivity in women aged 39-30 years is higher [1 and 22]. The difference of the results of this study with the mentioned studies can be due to different data collection instrument, the difference in sample size and subjects' age range. Additionally, researchers consider sampling errors and its effect on the results possible.

The findings show that subjects do not have a history of sensitivity to latex cross-reactive fruits and there was no statistically significant relationship between food allergy and positive skin test reaction using a latex standard extract which was similar to the results of some research [5] and do not match to other studies and documents [7 and 23 and 24].

Also in this study, the significant relationship between positive reaction to skin tests using latex standard extract and allergic diseases history, personal or family history of atopy was not approved. The

study. It is recommended that other researchers consider this point in similar future studies.

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