

Quality of life in health care workers with latex allergy

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Background	Exposure to latex gloves and glove powder makes health care workers (HCWs) particularly susceptible to developing an allergy to latex.
Aims	To assess the impact on the quality of life (QOL) of HCWs who are allergic to latex products before removal from latex exposure and after removal from exposure.
Methods	We studied 39 latex allergic HCWs from the Health & Safety Executive south area. Twenty-nine attended for an assessment with the occupational physician and were asked to fill out a questionnaire. Spirometry, immunoglobulin E levels and latex radioallergosorbent test levels were measured.
Results	In total, 29/39 (74%) of patients responded. All of the participants had a type 1 allergy to latex. All individuals reported a significant improvement of symptoms once latex was removed from their working environment. Of those that reported skin complaints, 83% reported that their skin no longer had an impact on their QOL once latex was removed. Over 90% ($n = 26$) of all participants stated that their eye/nose symptoms had no longer an impact on their QOL and 86% ($n = 25$) of all participants stated that their respiratory symptoms had no impact on their QOL following the removal of latex from their working environment. Overall, 45% of the respondents had changed jobs: 61% of this group changed to a completely nonclinical post.
Conclusions	On average, 86% of latex allergic HCWs reported that their QOL had improved significantly since their removal from latex. In employees who are latex allergic/sensitized, taking latex avoidance measures results in cessation or diminution of symptoms.
Key words	Latex allergy; latex gloves sensitization.

Introduction

The latex glove is a primary barrier for protection against infection for health care personnel and its use has increased, particularly due to concerns about blood-borne viruses.

The first reports of sensitivity to latex were in the form of cutaneous reactions. In 1979, Nutter reported urticaria to latex [1]. In 1987, the US Centre for Disease Control produced a document on recommendations for prevention of HIV transmission in health care settings from which the following universal precautions were drawn: 'gloves should be worn for touching blood and bodily fluids; mucous membranes or non intact skin of all patients; for handling items or surfaces soiled with blood or bodily fluids; and for performing vascular access procedures'.

With this came a dramatic rise in the use and wearing of latex-protective gloves [2] and concomitant exposure to latex.

An increase in the demand for examination gloves in the USA led to a corresponding increase in their importation. Some of these products were not subject to rigorous quality assurance procedures appropriate for medical devices [3].

The necessity to lubricate gloves to facilitate donning has always been a source of problem. The original use of talc in surgical gloves was abandoned in the 1950s on account of its role in the induction of postoperative granulomata and adhesions. Cornstarch is the powder presently added to latex gloves to make them easier to put on and take off. This powder absorbs the natural rubber latex (NRL) proteins [4]. Powdered gloves have higher latex allergen content than powder-free gloves [5] and there is good evidence that their use is associated with a substantially higher prevalence and rate of latex sensitization [6,7].

In April 1996, The Medical Devices Agency (MDA) issued guidance on latex sensitization in the health care setting. The MDA has described three types of reaction

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to latex gloves. (i) Irritation is a nonallergic condition, the effects of which are usually reversible. (ii) Delayed hypersensitivity (Type IV) is more common and usually represents cell-mediated reactions to the chemical additives in rubber rather than the latex proteins. The most common type IV allergens are the thiurams. (iii) Immediate hypersensitivity (Type I) is a response to the natural protein residue found in NRL. This is sometimes referred to as immunoglobulin E (IgE) response and generally produces symptoms within 5–30 min of latex exposure. The symptoms usually diminish rapidly once contact with the rubber material has ceased. The symptoms are characterized by local or generalized urticaria and edema. If mucous membranes are affected, rhinitis, conjunctivitis or asthma may result. Respiratory difficulties and anaphylaxis may occur in extreme cases. Anaphylactic shock, characterized by generalized hives, respiratory distress and low blood pressure can occur within minutes of exposure [8].

The aim of this study was to assess the impact on the quality of life (QOL) of health care workers (HCWs) who are allergic to latex products before removal from latex exposure and after removal from exposure.

Methods

This study was approved by the Clinical Research Ethics Committee of the Cork Teaching Hospitals.

We studied 39 latex-allergic HCWs from the Health & Safety Executive South area. All staff members with a diagnosis of latex allergy and who attended the occupational health department were eligible to participate, following a chart review to ensure the diagnosis of IgE-mediated NRL had been objectively confirmed on the basis of positive latex radioallergosorbent test (RAST). All subjects had a history relating to latex exposure with the development of an adverse clinical finding. When a staff member was diagnosed with an allergy to latex, a number of measures were considered: latex-free gloves, reducing exposure to latex and redeployment or change of employment. Redeployment was not always considered in those with confirmed sensitization, the decision based on severity and the likelihood of further exposure and degree of control. Staff members that had developed significant respiratory symptoms were also seen by a respiratory physician and in some cases a clinical immunologist.

The subjects were asked to fill in the questionnaire in the waiting room. Following this, the subject had an appointment with an occupational physician. Blood was collected for an IgE and latex RAST. Pulmonary function testing in the form of spirometry was also carried out during this assessment.

Published questionnaires by Juniper *et al.* [9,10] that addressed the QOL associated with the diagnosis of eye and nose complaints and occupational asthma were

used. A QOL questionnaire designed by Finlay and Kelly for skin conditions was used. The three questionnaires were amalgamated into one questionnaire [11]. Each individual completed the questionnaire in full.

This was a retrospective study. Participants were asked to fill out a before and after latex removal questionnaire. This allowed a comparison to be made on their QOL before the diagnosis of latex allergy and their QOL at the present time. During the assessment with the occupational physician, the subjects were given the opportunity to relate any life changing events and ask any questions regarding their diagnosis and likely prognosis.

The Dermatology Life Quality Index (DLQI) scores for each question are as follows: very much = 3, a lot = 2, a little = 1 and not at all/not relevant = 0. The DLQI is calculated by summing the score of each question resulting in a maximum of 30 and a minimum of 0. The higher the score, the more QOL is impaired. The DLQI can also be expressed as a percentage of the maximum possible score of 30. The Asthma QOL Score was used to determine the effect of latex allergy on various activities. The overall score is the mean of the responses to each of the 32 questions. The resultant overall score will be between 1 and 7. Rhinoconjunctivitis QOL Score employs the same scale as the Asthma QOL questionnaire. The overall score is the mean of the responses to each of the 24 questions. The resultant overall score will be between 1 and 7. Laboratory tests included the RAST. This method uses a blood sample from an individual suspected of sensitization of NRL. This gives measurements of specific IgE antibodies against NRL allergens measurements of serum IgE specific for latex. The obtained values ranged from classes 1 to 6. IgE levels >0.70 IU/ml (Class 2) were considered positive.

Results

Twenty-nine individuals agreed to take part in the study which represented a 74% response rate. Several attempts were made to contact nonresponders by telephone and letter. Five were contacted but unwilling to participate as they were on career breaks due to family commitments. Four had relocated elsewhere and were not contactable and one individual did not wish to participate in the study.

The year of diagnosis ranged from 1 year to 15 years ago with a mean value of 6.5 years since diagnosis.

Forty-five percent ($n = 13$) had changed job profile directly as a result of the diagnosis of latex allergy. Sixty-one percent ($n = 8$) of this group changed to a completely nonclinical post. The reasons for changing an individual's position to a nonclinical post were usually due to the presence of significant respiratory symptoms.

Of the 55% ($n = 16$) that did not change jobs, 69% ($n = 11$) of this group remained in the same job but were transferred to a latex-controlled work environment. The

remaining 31% ($n = 5$) were advised to change to latex-free gloves only and they continued to work in the same job in the same area. The individuals that only required changing to latex-free gloves typically had less severe symptoms or localized skin dermatitis.

A total of 48% ($n = 14$) suspected that they were allergic to latex prior to their diagnosis. The average time from when they suspected that they had latex allergy to diagnosis with latex allergy was 1 year.

One hundred percent had changed to latex-free gloves. Seventeen percent ($n = 5$) stated that they were still in regular contact with latex. One hundred percent said their symptoms had improved since they changed to latex-free gloves. Eighty-three percent ($n = 24$) said their employer was helpful. Only 41% ($n = 12$) wore an alert bracelet. Fifty-nine percent ($n = 17$) attended for an annual medical review at the occupational health department.

Fifty-two percent ($n = 15$) reported that latex allergy had some impact on their contraceptive choices. Many reported that it was extremely difficult to get latex-free condoms. Thirty-eight percent ($n = 11$) stated that they found their general practitioner (GP) was well informed on latex allergy. While 63% ($n = 18$) believed their dentist was well informed on latex allergy.

Eighty-three percent ($n = 24$) reported that their skin symptoms had improved significantly following the removal of latex from their work environment. Ninety percent ($n = 26$) stated that their eye/nose symptoms had no impact on their QOL following the removal of latex. Eighty-six percent ($n = 25$) reported a significant improvement in their respiratory symptoms following the removal of latex from their working environment ($P < 0.05$; Table 1).

A significant difference was noted between the result of the latex RAST pre-removal from latex and post removal of latex from the individuals working environment ($P < 0.05$). All the individuals had positive latex RAST i.e. ≥ 1 pre-removal from latex. Only 65% ($n = 19$) had positive latex RAST results post removal from latex at the time of this study (Table 1).

A significant drop in IgE levels was noted between the groups, before and after removal from exposure.

Eighty-six percent ($n = 25$) agreed to have pulmonary function testing at the time of the questionnaire. All measurements were within the normal range i.e. the measured forced expiratory volume in 1 s percentage (FEV₁%) was $>80\%$. This was compared to their previous FEV₁% at the time of diagnosis of latex allergy. There was no statistically significant change between the groups.

Discussion

This study showed that HCWs who developed symptoms of latex allergy reported a negative impact on their QOL

Table 1. QOL scores and latex RAST scores pre-removal and post removal from latex

	Pre	Post
QOL skin symptoms		
No effect	4	24
Small effect	7	2
Moderate effect	10	1
Very large effect	6	2
Extremely large effect	2	0
QOL eye symptoms		
Not troubled	14	27
Hardly troubled	7	2
Somewhat troubled	8	0
QOL respiratory symptoms		
Sever impairment	0	0
Extremely limited	0	0
Very limited	3	0
Moderate limitation	6	0
Some limitation	4	2
A little limitation	2	2
Not at all limited	14	25
Latex RAST		
0	0	10
1	3	3
2	13	8
3	12	3
4	1	0

as a result. Contrary to this, 86% of latex allergic HCWs reported that their QOL had improved significantly since their removal from latex.

We found that 45% changed jobs and of these 61% changed to a completely nonclinical post. The main reasons for changing an individual's position to a nonclinical post was usually due to the fact that they had developed significant respiratory symptoms. The first redeployment of a HCW took place 15 years ago. Latex allergy was only becoming a significant problem at this time. Occupational physicians and indeed respiratory physicians involved in the treatment of HCWs with latex allergy exercised a precautionary approach. Thirty-nine percent were transferred to a latex-controlled environment.

Over 60% reported that their dentist was well informed in comparison to 32% who believed their GP was well informed. This suggests that doctors need to receive information on latex allergy. One may postulate that dentists are more familiar with latex allergy given the frequency which they change gloves and their need to wear gloves at all times.

Lewis *et al.* carried out a similar study in 2002. A postal survey was conducted of patients with NRL allergy to assess their QOL and any lifestyle change following diagnosis. Seventy-two percent of patients responded. A total of 25% had changed their job as a result of latex allergy [12].

In our study, 45% changed their jobs as a result of latex allergy.

A limitation of this study is that the sample size is relatively small; only 39 HCWs were eligible to participate. A total of 29/39 agreed to participate, which represents a 74% response rate. The participants were asked to complete a lengthy questionnaire and were required to answer questions retrospectively. The first diagnosis was 15 years ago so this length of time could affect their recall of the events.

Successful examples of primary prevention have been published in health care settings in a number of countries. Allmers *et al.* in 2004 demonstrated that a joint programme of education and regulation in German hospitals was followed by a remarkable change in glove purchase patterns. Allmers *et al.* were able to show that by switching to powder-free NRL gloves, detectable NRL aeroallergens were completely removed in a health care facility. Sensitized HCWs were able to remain at work by supplying them with NRL-free gloves, thus showing that these simple and practicable measures led to a secondary prevention of NRL allergy in HCWs. These results suggest that primary prevention of occupational NRL allergies may be achieved by switching to powder-free NRL gloves in health care facilities [13].

Latex allergy in the workplace can result in potentially serious health care problems for workers, who are often unaware of the risk of latex exposure. Such health problems can be minimized or prevented by adopting strategies similar to those adopted in German hospitals as described by Allmers *et al.*

The current evidence suggests that the use of powder-free low-protein latex gloves as an alternative to powdered latex gloves significantly reduce the incidence of latex allergy and latex-induced asthma, as well as the prevalence of latex-related symptoms. At a national and local level, a policy that encourages switching from powdered latex gloves to powder-free low-protein latex gloves is an effective method of reducing the incidence of latex allergy. Employees with latex allergy should use non-latex gloves.

In employees who are latex allergic/sensitized, taking latex avoidance measures results in cessation or diminution of symptoms [14]. Markers of sensitization appear to decrease with time. The evidence currently does not support a complete ban on the use of latex gloves. The current practice of annual health surveillance of HCWs with latex allergy should be addressed. As this study has highlighted, some individuals have been attending for health surveillance for 15 years. Health surveillance should be continued for a short defined period after diagnosis and the individual could contact the occupational health department if they have any queries with regards to their symptoms of latex allergy.

Key points

- Exposure to latex gloves and glove powder makes health care workers particularly susceptible to developing an allergy to latex.
- Latex allergic health care workers reported that their quality of life had improved significantly since their removal from latex.
- In employees who are latex allergic/sensitized, taking latex avoidance measures results in cessation or diminution of symptoms.

Conflicts of interest

None declared.

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