

Wearing Cotton-polyester Gloves Under Surgical Latex Gloves to Improve the Symptoms of Hand Dermatitis in Operating Room Staff

Masoud Sayadi Shahraki¹, MD; Bahareh Sadat Abtahi Naeeni², MD; Amin Asefi³, MD; Mahdi Rafie⁴, BS; Shima Sefiddashti³, MD; Milad Nazari Sabet¹, MD

¹Department of General Surgery, School of Medicine, Isfahan University of Medical Sciences, Iran
²Department of Dermatology, School of Medicine, Isfahan University of Medical Sciences, Iran
³School of Medicine, Isfahan University of Medical Sciences, Iran
⁴Department of Operation Room Technology, Ayatollah Kashani Hospital, Isfahan University of Medical Sciences, Iran

Correspondence:

Milad Nazari Sabet, MD;
 Department of General Surgery,
 School of Medicine, Isfahan University
 of Medical Sciences, Iran
 Tel: +98 9119379064
 Email: Miladnazarisabet64@gmail.com
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Abstract

Background: Hand dermatitis is a group of diseases that result in inflammation of the skin in the area of the hand. The prevalence of latex allergies has been increasing in recent years, one of the reasons being the use of latex gloves to maintain safety. This study aimed to evaluate the effect of wearing cotton-polyester gloves under surgical latex gloves to improve the symptoms.

Methods: This study is a randomized controlled clinical trial performed in Alzahra and Ayatollah Kashani hospitals in Isfahan. The statistical population consisted of the staff of the surgery room. Sampling was done by the census from October 2018 to March 2019. Cotton-polyester gloves (weight between 5–10 grams, 50% cotton and 50% polyester) are soft and flexible and easily absorb the sweat- under latex gloves. Also, it can be re-sterilized with ethylene oxide. In rupture of surgical gloves due to strong and integrated stitching, the cotton-polyester gloves prevent hand burns with electrocautery or damage by sharp objects. These gloves were distributed and used among the samples for 6 months.

Results: Data were analyzed based on symptoms of erythema, appearance, economic burden, and disruption in daily life; there was a significant relationship between lack of using cotton-polyester gloves under the surgical gloves compared to when using them ($P < 0.01$). However, there was no significant relationship between pain and disorder in social relations ($P > 0.01$).

Conclusion: Using cotton-polyester gloves under surgical latex gloves can improve the symptoms of dermatitis. On the other hand, the use of these gloves will not interfere with the function of the hands.

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Introduction

Dermatitis or Eczema is inflammation of the skin due to a group of diseases.¹ Its main symptoms are itching, redness, and crusting.² The patient's symptoms vary according to the severity and course of the disease. The short course of the disease presents with blisters, and in the chronic type, the skin has a thick appearance. Allergic contact dermatitis is a common diagnosis

among those who deal with chemicals.^{3, 4} The most common symptoms of latex gloves are dryness, flaking, roughness, and skin sensitivity. Clinical symptoms of latex allergy can be divided into two categories: IgE-dependent contact dermatitis and IgE-independent contact dermatitis.^{5, 6} There are different types of dermatitis, the most important of which include atopic dermatitis, Irritant contact dermatitis, allergic contact dermatitis, seborrheic dermatitis and dandruff,

dermatitis, and infectious dermatitis.⁷ Irritant contact dermatitis is frequent contact with water, detergents, solvents, chemicals, and any skin friction that can cause this type of dermatitis. This condition leads to itchy and erythematous skin.⁸

Allergic contact dermatitis occurs due to the skin contact with substances to which most people do not react, such as soap, alcohol, nickel, perfume, elastic, latex gloves, hair dye, or condoms. This condition also leads to itchy, irritated, and erythematous skin and it is essential to administer the patch test for diagnosis of the cause.⁸ Cao et. al. report that even when latex-safe items are used, allergic contact dermatitis from synthetic rubber gloves might develop. To prevent and treat allergic contact dermatitis, further information on the chemicals included in these gloves, to which the skin is exposed during usage, is needed.⁹ Given that this problem means allergy to latex, and dermatitis is a common problem among health system employees, especially those who work in the operating room, the most critical factor in controlling such a problem is to avoid these allergens; however, not using latex gloves is not possible for these people and requires long-term treatment, so it has a significant effect on reducing the quality of life and work. Therefore, by examining the effect of using new cotton-polyester gloves (Figure 1), which were designed and produced by the authors and are thin and serializable under latex gloves, we can find its effect on reduction of the prevalence and severity of this problem.

Methods

This is a randomized controlled clinical trial study

conducted at Al-Zahra Hospital and Ayatollah Kashani Hospital in Isfahan. The statistical population consisted of the operating room staff, and the study was conducted from April 2019 to September 2019. The method of randomization was performed, so that in each work shift the individuals were included in the study according to the inclusion criteria and divided into two groups each containing nine people: intervention and control. The inclusion criteria were the operating room staff who suffered from skin dermatitis after wearing latex gloves, lack of dermatitis from childhood, and the operating room staff with at least three months of work experience in these centers in the hospital that used latex gloves regularly and daily. Exclusion criteria were the evidence of other causes of skin symptoms as migration, job change, lack of willingness to continue participation, and death. The sample population comprised 18 operating room staff.

The way to use the gloves was fully explained for the subjects before the study, and they gave their informed consent. The present study was carried out in accordance with the Helsinki Declaration Principles. The Research Ethics Committees of School of Medicine - Isfahan University of Medical Sciences approved this study with the code of IR.MUI.MED.REC.1397.218 dated 2019-02-12.

Participant

The samples were selected using convenient nonprobability sampling and randomly assigned to two groups of nine each.

Intervention

The control group used latex gloves with

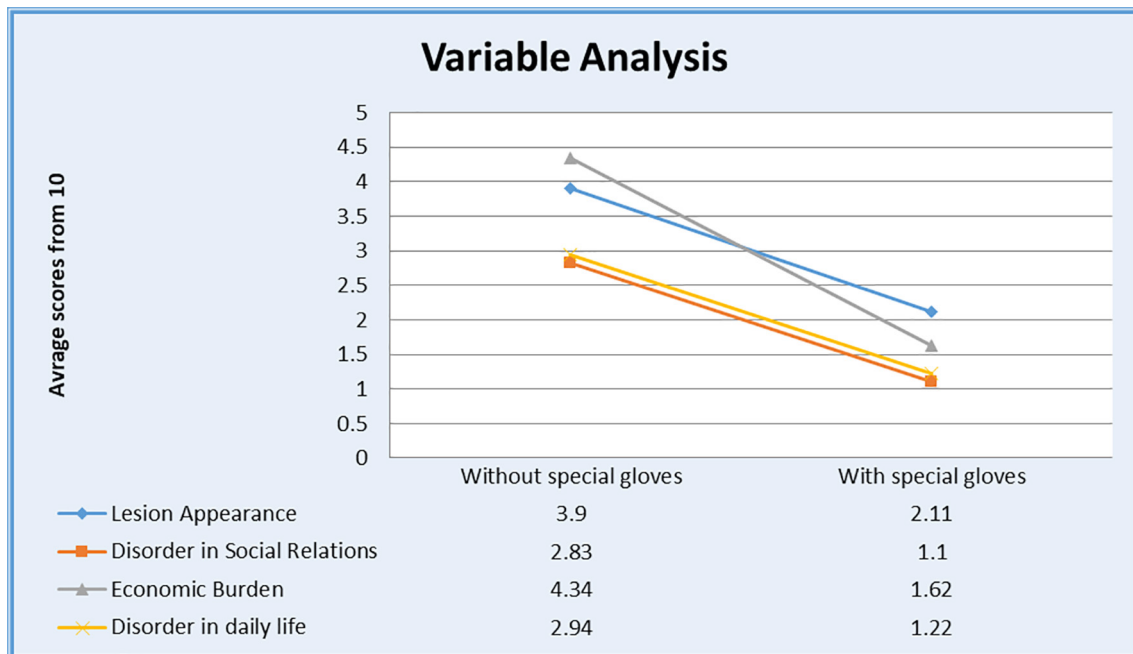


Figure 1: According to the Table, in the cases of skin lesion appearance, economic burden and disturbance in daily life, a significant relationship was observed between not using cotton gloves under surgical latex gloves and after use (P<0.001), while there was no significant relationship between pain at the lesion site and social disorders.

OPPERFECT HARIR with low-powder, hypoallergenic, made by Iran Silk Gloves Company alone, and the intervention group used latex gloves made of cotton-polystyrene gloves, which were cotton-polyester gloves designed and produced by the authors; they were thin, could be sterilized, and were suitable to wear under surgical gloves. The items used for scrub and disinfection of the hands (by PANKOHL disinfectants solution containing 70% ethanol and propylene glycol) were selected before surgery in all cases and from a single company. The study lasted for six months. In this study, only the points of involvement of the hands were examined.

Research Tools

To record the participants' information, we used a checklist before using gloves; it included 31 questions and that after using gloves included 12 questions. Questions of both checklists were related to age, sex, place of residence, occupation, location of the lesion on the body, symptoms of the disease (including redness, pain, and appearance of the lesion), social relations disorder, economic burden, disruption of daily life, effective factors on symptoms, cost of treatment, duration of involvement, ways to prevent symptoms, and the way to inform and follow up the patients' treatment. The questions were answered by individuals, and a group of questions was related to the symptoms of the lesion, in the form of scoring from 1 to 10, which have been answered by the individuals themselves before and after the use of cotton-polyester gloves and considered to be the Criteria for recovery. Patients were examined before and after the intervention. Whenever dermatitis developed, the specimens were treated, and the study period ended for them.

Analysis

At the end of the study, the information obtained was entered into SPSS software (version 21) and analyzed using descriptive statistics, Qi square, and T-test. The sample had a normal distribution.

Results

Among the participants, 10 (55.6%) were female, and 8 (44.4%) were male before completing the checklist and using gloves. The Mean±SD of the age of the

operating room staff were 30±1/1 years. 17 cases (94.4%) considered the use of latex gloves as the main cause of dermatitis of their hands. The involved different parts of the body were 38.9% for all the fingers, 33.3% for the back of the hand, 27.8% for the back of the fingers, 11.1% for the leg, 5.6% of the face, 5.6% of the scalp, and 11.1% of other points of the body. Analysis of data using analysis of mean, median, standard deviation, minimum and maximum is shown in Table 1.

The main cause of the participants' suffering was the redness of hands, pain, appearance of the lesion, disorder in social relations, economic burden, and disruption in daily life. According to Table 1, after six months there was a significant difference between the case and control groups in erythema, appearance, economic burden, and disruption in daily life, ($P<0.01$) (Figures 2 and 3), while in cases of pain and disorder in social relations there was no difference between the two groups ($P>0.01$).

The results showed that there was a significant relationship between the seasons and intensification of hypersensitivity ($P<0.01$). Most of the operating room staff (72.2%) considered their hypersensitivity unrelated to the season, while allergies were more prevalent in winter (65%). From the point of view of operating room staff, among the factors affecting hypersensitivity, high activity with fingers (44.8%) and then mental stress (5.6%) were more important, while 33.3% considered environmental factors unrelated to their hypersensitivity.

The results showed that of the types of allergies among the operating room staff, 72.2% had allergic contact dermatitis, and 5.6% had irritative dermatitis. Among the types of treatments, the highest percentage without treatment was 38.9%, then those who had referred to a dermatologist (33.3%), and finally self-medication (27.8%).

Discussion

The aim of this study was to evaluate the effect of using new cotton-polyester gloves, which were designed and produced by the authors, which are thin and serializable under latex gloves, to examine its effect on reduction of the prevalence and severity of this problem. In this study, allergies were more prevalent in winter. Among the factors affecting hypersensitivity in terms of the severity of impact, we can mention cases of work and high

Table 1: Comparison of mean and standard deviation of the studied variables before the intervention and 6 months after the intervention

	Mean±SD	Mean±SD	P
Redness	3.88 (2.31)	3.77(97)	<0.01
Dermatitis pain site	2.11(1.36)	0.88(1.45)	>0.01
Lesion appearance	2.44(1.94)	3.33(1.93)	<0.01
Disorder in Social Relations	0.666(0.86)	0.88(1.45)	>0.01
Economic burden	2.33(1.87)	3.33(1.93)	<0.01
Disorder in Daily life	2.22(1.39)	1.44(2.45)	<0.01



Figure 2: Cotton-polyester gloves (OP-PERFECT HARIR) weighing about twenty grams, made by Iran Silk Gloves Company



Figure 3: It is shown that the use of cotton-polyester gloves under surgical latex gloves for 6 months or less and the lack of direct contact of the sensitive hand with sterile surgical gloves relieves the symptoms of contact dermatitis and skin lesions and its complications such as itching, burning, and uncomfortable dryness.

activity and then mental stress; by examining the effect of the disease with factors such as work and activity, economic burden, patient discomfort, and problems of depression, anxiety and sleep disorders before and after using polyester cotton gloves under latex surgical gloves, impact intensity was reduced from low and moderate to slight and small. According to the results of this study, a

significant percentage of hand skin of hospital staff was involved because of using latex gloves. Among these cases, women were more involved than men, with slight differences similar to other articles. Symptoms including pain, redness, and the appearance of hand lesions were examined; redness with 4 cases had the most symptoms, and pain and disorders in social relations had the lowest

number. All symptoms were higher in women than men, but no significant difference was observed. Also, factors such as the type of disinfectant and number of uses were effective on the severity of symptoms.^{10, 11} The level of sensitivity using latex gloves was significantly higher among women than men. In our study, due to the small number of samples and in terms of being significant, we cannot comment.^{12, 13} Among the skin problems reported from hospital operating room staff in Odisha, 41.6% of diseases were reported to be related to skin allergies due to the use of latex gloves. Due to the high prevalence of this disease similar to our study, it is highly important.¹⁴

Skin problems of the hospital staff were related to latex gloves which, according to our study, indicates that this problem is important. Among the types of skin problems, only 10% of skin allergies have been reported, which is a small percentage compared to our study.¹⁵ 54.7% of the nurses in the study showed skin allergies due to latex gloves; 4.9% of them were related to the use of latex gloves alone. According to our study, the use of latex gloves alone accounted for a large percentage of skin sensitivities.¹⁶ A 46-year-old woman with a history of allergy to latex, cobalt octoate sensitivity was introduced as an accelerator in polyester resin. She has also been successful in treating his hand dermatitis by constantly wearing cotton gloves_PVC while working. However, in the cotton-polyester gloves of our study, no other excipient was used, and dermatitis caused by wearing cotton-polyester gloves did not occur.¹⁷ Wearing cotton-polyester clothing reduced the level of skin irritation about 70% in the PO_SCORAD assessment in boys with atopic dermatitis; it also increased air permeability about 32%; in line with the results of our study, there was a significant relationship ($P < 0.001$) between the use of cotton-polyester combination and reduction of dermatitis symptoms.¹⁸ Our findings also showed that the use of polyester-cotton gloves under surgical gloves significantly improved the symptoms of skin dermatitis in patients ($P < 0.001$). It was effective in improving the quality of life as well.

Limitations of the study included the short research period, small sample size, lack of quantitative criteria for assessing dermatitis, problems in access to operating room staff in hospitals, lack of cooperation and awareness of a group of staff about their illness, and control of the problem of separate treatments along with using gloves by individuals.

Conclusion

As to redness, lesion appearance, economic burden, and disturbance in daily life, a significant relationship was seen between not using polyester cotton gloves under surgical latex gloves with after using it, while between cases of pain and disorder in social relations there was no significant relationship. All signs after using the

polyester-cotton gloves under the Latex gloves improved dramatically up to 50% after six months of use.

Funding

This study received no funding.

Ethical Approval

All procedures performed in studies involving human participants were following the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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