MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218/makrjms.2024.5.28.39

OPEN ACCESS

Key Words
Cytokeratin 7, cytokeratin 20, colonic adenocarcinoma, esophageal carcinoma, gastric cancer, Immunohistochemistry

Corresponding Author
Yogesh Kumar Kasediya,
Department of Dermatology G R Medical College Gwalior MP

Author Designation
[1,4]Tutor/Registrar/Sr
[3]Doctor
[2]Assistant professor

Received: 28 November 2023
Accepted: 31 December 2023
Published: 8 January 2024

Citation: Kamal Singh Bhadoria, Amit Kumar Niranjan, Ranjeet Kumar, Yogesh Kumar Kasediya, 2024. A Study on Correlation of Clinical Features and Patch Testing in Contact Dermatitis of Hands. Res. J. Med. Sci., 18: 28-39, doi: 10.59218/makrjms.2024.5.28.39

A Study on Correlation of Clinical Features and Patch Testing in Contact Dermatitis of Hands

[1]Kamal Singh Bhadoria, [2]Amit Kumar Niranjan, [3]Ranjeet Kumar, [4]Yogesh Kumar Kasediya
[1,4]partment of Dermatology G R Medical College Gwalior MP, India
[2]Department of Pathology, G R Medical College Gwalior MP, India
[3]Medical Officer S.H. Gopalganj Bihar, India

ABSTRACT
Contact dermatitis of hand is common dermatoses with different aetiological conditions and different morphologies. The aim of our study is to identify the clinical patterns, causative allergens and the relevance of patch testing for contact dermatitis of hand. A total of 100 patients with hand eczema were included in our study after getting informed and written consent to do patch tests during December 2016 to July 2018in our dermatology OPD. Patch test was done by using Indian standard series battery and the readings were taken at 48 hrs and 72 hrs. The results were interpreted according to International Contact Dermatitis Research Group (ICDRG) criteria. The incidence of hand eczema was 4.07 percent with male female ratio of 2.1:1. The most common age group affected was 30-39 years. The most common morphological pattern observed in our study was 31% of patients exhibited hyperkeratotic eczema, whereas 17% had patchy eczema. The kind is vesiculo squamous. These two morphological variants comprised 48% of the total number of cases. Patch testing is a very useful scientific diagnostic tool that unravels the cause of contact dermatitis of hand. Avoidance of the substances responsible for allergy can be advised to the patient.

INTRODUCTION

A pattern of skin inflammation that is both clinically and histologically observed in a variety of dermatoses with different aetiologies is contact dermatitis. Endogenous, exogenous, environmental, and cultural elements are frequently intertwined in the various entities that make up this dermatitic group of skin illnesses. This is especially true for multifactorial contact dermatitis of the hands, which is typically incapacitating or upsetting for the affected person and frequently challenging to treat[1]. Hand contact dermatitis is a prevalent skin condition that arises from a range of external and internal sources.

Exogenous factors encompass contact irritants (chemical and physical), contact allergens (including delayed and acute hypersensitivity kinds), ingested allergens, infections and secondary dissemination[2]. Endogenous variables encompass idiopathic reasons, immunological or metabolic deficiencies, psychological causes and dyshidrosis[2]. Patch testing serves as the diagnostic method for identifying allergic contact dermatitis. This procedure is both straightforward and effective for identifying the specific allergy in question. The use of patch testing to diagnose contact allergies provides clinicians with a clear benefit in managing patients and often leads to improved prognosis. Regular patch testing is crucial in order to provide reliable guidance on the identification and prevention of allergens, which is essential for determining the most effective treatment. Performing patch testing Hand eczema necessitates the use of remains a crucial tool in the diagnostic work up and holistic management of patients with hand eczema. for effective diagnosis and comprehensive treatment. This study examines the clinical characteristics of hand contact dermatitis and its association with patch testing.

Materials and METHODS

The study was carried out for a duration of 18 months, specifically from December 2016 to July 2018, in the Department of Dermatology at PESIMSR in Kuppam. During this timeframe, a cohort of one hundred patients with allergic contact dermatitis of the hands who visited the outpatient clinic were enrolled in this study. All patients provided informed consent.

Inclusion criteria:

- All instances of allergic contact dermatitis affecting the hands
- Age range of individuals between 10-60 years
- Both genders

Exclusion criteria:

- Age groups below 10 years and above 60 years
- Expectant mothers
- Primary irritant dermatitis refers to a condition characterised by skin inflammation caused by direct contact with an irritating substance
- Additional types of eczemas that originate from within the body
- Patients who have dermatitis that is now active and worsening.
- Patients who have been receiving systemic corticosteroids, immunosuppressant, or PUVA medication for a minimum of 2 weeks before the patch test
- If topical corticosteroids are being used to the back the process of patch testing should be postponed for a period of 3 days
- Photoallergic contact dermatitis

Collection of data: Patients will undergo testing using all 24 antigens from the Indian standard series procured from Systopic Pharmaceuticals in New Delhi. The user's text consists of a bullet point symbol.A comprehensive medical history will be obtained, including thorough information on symptoms and skin lesions. Additionally, data regarding the length of time the allergen has been used the frequency of exposure, and any factors that may trigger or worsen the dermatitis will be recorded.

- All patients will get a thorough examination of the skin, which will include an assessment of the location and appearance of lesions, as well as the existence of any secondary infections

Performing patch testing: The kit consists of a microporous tape measuring 15 x 15cm and an aluminium patch test chamber. The experiment will utilise aluminium patch test chambers that have an internal diameter of 9mm and a depth of 0.7mm. The test chambers will be oriented in an upward direction, with a separation of 2cm between the centres of each chamber. The item is stored at an ambient temperature.

Reading time:

- All patients will be instructed to come back after 48 hrs (2 days). The patches will be extracted and the reading will be conducted 1 hrs subsequent to their removal

Analysis of reactions:

- The observations were evaluated based on the guidelines provided by the International Contact Dermatitis Group (ICDRG)

Which symbol should be used: ± or? Mild redness Sceptical responseThe individual is experiencing redness and raised areas on the skin. Mildly good

response ++ The individual is experiencing inflammation of the skin, characterised by the presence of little raised areas and fluid-filled blisters.Intense favourable responseThe symptoms include erythema (redness of the skin), edoema (swelling) and vesicles/ulceration (blistering or open sores). Excessive favourable response-UnalteredAdverse response InfraredAbsence of indurationAdverse skin response The confirmation of allergic contact dermatitis will rely on a positive patch test result to an allergen.

RESULTS

The current study found that the prevalence of hand dermatitis was 4.07%. Hand dermatitis is a prevalent dermatological issue.

The trial was completed by a total of 100 patients. A staggering 62% of the patients Belonging to the 3rd and 4th decades refers to those in the age group of 20-39 years. The youngest patient was approximately 16 years old, while the oldest was approximately 60 years old. The average age of the entire sample in the current study was 34.06 years. The average age for males is 34.35 years, while for females it is 33.43 years. The study was completed by a total of 100 patients, with 68 (68%) being males and 32 (32%) being females. The ratio of males to females was 2.12-1. Patients belonging to various occupations such as drivers and musicians, as well as lab technicians. Medical professionals, entrepreneurs and individuals employed in administrative roles that mostly include working at a desk. Of the female patients, 78.12% were engaged in the occupation of housewife. Among the 100 patients, the majority, accounting for 53%, identified as Hindus, while 44% identified as Muslims, and the remaining 3% identified as Christians. In the present study of 100 patients, 74 (74%) were from urban and 26 (26%) from rural area. In our study, 61 (61%) of patients belong to lower class (socio-economic status) 48% of patients suffering from ACD of hands from last 1 year and 47% had suffered from last 1-5 years duration.

Mitigating circumstances The aggravating factors considered encompassed detergents, cement, plants, vegetables, chemicals, as well as several other substances such as metals, ornaments, and paintings. Among the 100 patients included in this study, 45 (45%) reported experiencing worsened symptoms after coming into contact with detergents and soaps, while 25 (25%) reported aggravation from contact with cement. Additionally, 19 (19%) patients reported aggravation from contact with plants, 11 (11%) from contact with vegetables and 9 (9%) from contact with chemicals.

Pruritus, observed in 97% of patients, was the most prevalent symptom, followed by scaling and thickness of the skin, reported in 90-83% of patients, respectively. Fissuring was observed in 69% of cases, discomfort in 15%, redness in 13% and seeping in 6%. Among the 100 individuals included in this study, 70 (70%) had bilateral involvement and 30 (30%) displayed unilateral involvement. Regarding the bilateral group, fingers were implicated in 92.85% of cases, the dorsum of hands in 44.28% of cases, and palms in 41.42% of cases.

In the unilateral group, finger involvement was observed in 96.66% of cases, the dorsum of the hand in 16.66% of cases, and the palms in 13.33% of cases. Among the 100 patients, 38 (38%) exhibited nail abnormalities. Specifically, 33 patients saw changes in both nails, whereas 5 patients had changes in only one nail. The observed nail abnormalities included chronic paronychia, discoloration, horizontal ridges, uneven pitting and dystrophic changes.

Out of 100 patients, 17% (17 patients) displayed significant hand involvement. Among these, 14 patients had involvement in both hands, while 3 patients had involvement in only one hand.

31% of patients exhibited hyperkeratotic eczema, whereas 17% had patchy eczema. The kind is vesiculosquamous. These two morphological variants comprised 48% of the total number of cases. Table 7 displays the frequency of patch test outcomes. Among the 100 patients who underwent patch testing, 62 (62%) tested positive, while 38 (38%) tested negative. Of the positive cases, 49 patients (49%) were sensitive to a single antigen, 12 patients (12%) were sensitive to two antigens and 1 patient (1%) exhibited sensitivity to several antigens.

Table 1: Incidence of hand dermatitis

Total no of patients	Total no of hand dermatitis	Percentage
45100	1836	4.07

Table 2: Socio-demographic profile of study participants

Particular	Sub- particular	No. of patients	Percentage
Age group (years)	10-19	8	8
	20-29	30	30
	30-39	32	32
	40-49	22	22
	50-60	8	8
Gender	Male	68	68
	Female	32	32
Occupation	Housewife	25	25
	Mason	26	26
	Farmers	21	21
	Student	5	5
	Painter	9	9
	Leather worker	7	7
	Miscellaneous	7	7
Religion	3	3	3
	53	53	53
	44	44	44
Residence	Rural	74	74
	Urban	26	26
Socio-economic status	Lower class	61	61
	Middle class	34	34
	Upper class	5	5

Table 3: Duration of the disease

Duration	Male	Percentage
<6 months	30	30
6 months to 1 year	18	18
1-2 year	22	22
2-5 year	25	25
>5 year	5	5

Table 4: Aggravating factors

Aggravating factors	No. of patients	Percentage
Detergent	45	45
Cement	25	25
Plants	19	19
Vegetables	11	11
Chemical	9	9
Others	11	11

Table 5: Symptoms

Symptoms	No. of patients	Percentage
Pruritus	97	97
Scaling	90	90
Thickening of skin	83	83
Fissuring	69	69
Pain	15	15
Redness	13	13
Oozing	6	6

Table 6: Incidence of extent of dermatitis

Extent of dermatitis	Unilateral	Bilateral	Percentage
Finger	29	65	94
Palms	4	29	33
Dorsum of hands	5	31	36
Nail Changes	5	33	38
Extensive	3	14	17

Table 7: Morphology

Morphology	Total	Percentage
Pompholyx	1	1
Recurrent focal palmar peeling	14	14
Hyperkeratotic palmar eczema	32	32
Ring eczema	7	7
Finger tip eczema	4	4
Wear and tear dermatitis	14	14
Apron eczema	0	0
Discoid eczema	5	5
Chronic acral eczema	7	7
Gut eczema	0	0
Patchy vesiculosquamous	16	16

Table 8 : Patch test results

Patch test results	Total	Percentage
Single antigen positive	49	49
Two antigen positive	19	19
Multiple antigen positive	2	2
Negative	30	30

DISCUSSIONS

The current investigation revealed that the occurrence of hand dermatitis among patients attending the Dermatology OPD was 4.07%, which is slightly lower than the incidence reported by Warshaw *et al*.[14] (4.35%), Agrup *et al*.[9] (2.3%) and Peltonen *et al*. (4%).The number is 146. The current study had a lower incidence of dermatitis compared to the study conducted by Warshaw *et al*.[14]. The percentage of (4.35%) is higher than that of Agrup *et al*.[9] (2.3%). The incidence of 3.16% is nearly Aligning with the research conducted by Peltonen *et al*.[144] Peltonen (146, 4%). This variance likely relies on the various types of allergens that sensitise individuals. The prevalence of hand dermatitis in the global population currently ranges from 2-8.9%, with an estimated 20-35% of all cases of dermatitis affecting the hands. Forty The current investigation revealed that the age group most frequently observed in the presentation was those aged between 20 and 39 years. A staggering 62% of our patients fell into this category. Our results are lower than those reported by Kishore *et al*.[23] (64%) and higher than those reported by Bajaj *et al*.[3] (45.9%).The elevated incidence in this age range may be attributed to their heightened level of activity and increased likelihood of encountering allergens. The present study revealed that the average age was 34.06 years, with males having an average age of 34.35 years and females having an average age of 33.43 years. The average age of our patients is higher than Kishore *et al*.[23] had a mean age of 30.95 years, Goh *et al*.[26] had a mean age of 32.5 years and Skoet *et al*.[10] had a somewhat lower mean age of 36.1 years. The average age of our male patients is slightly higher than that of Goh *et al*.[26] (34 years), Kishore *et al*.[23] (33.7 years), and slightly lower than that of Skoet *et al*.[10] (37.1 years). The average age of our female patients aligns with the findings of Goh *et al*.[26], which reported an average age of 31 years. Greater than the age reported by Kishore *et al*.[23] (28.2 years) and less than the age reported by Skoet *et al*.[10] (35.1 years). The average age of both males and females in their fourth decade is associated with higher economic productivity, which in turn increases the likelihood of interaction with allergens. The current investigation revealed a male to female ratio of 2.12:1, which is consistent with the findings of Kishore *et al*.[23] (1.21:1), Kumar *et al*.[21] (1.2:1) and Goh *et al*.[26]. (1.27:1) Due to the prevalence of gender roles, agriculture and masonry work, including cement work, are predominantly performed by males. Increased likelihood of exposure to allergens. Diepgen *et al*.[126] (1:1.54) and Bajaj In a study conducted by *et al*.[3], it was found that the incidence rate was higher in females, with a ratio of 1:1.5. Presumably the reason for this occurrence is that women were exposed to allergens related to cleaning and cooking, which sensitised their hands in the two experiments. The present study revealed that 78.12% of the participants are engaged in the occupation of being housewives. The results of our research align with Kishore *et al*.[23] reported a success rate of 68.2%, while Sharma *et al*.[22] reported a success rate of 66.6%. Female housewives are particularly at risk of occupational hazards due to their greater exposure to numerous substances. She consistently encounters a wide range of chemicals, detergents, cosmetics, bleaches and other compounds that can potentially cause irritation or allergic reactions. Furthermore, she is always susceptible to the potential harm caused by the physical actions of rubbing and scrubbing her hands, in addition to the potential harm caused by exposure to chemicals. Among males, 69.11% of individuals were classified as unskilled labourers. The results of our study exceed those reported by Kishore *et al*.[23] The study conducted by. reported a prevalence rate of 53.6%, while the study conducted by Sharma *et al*.[22] reported a prevalence rate of 40.42%. This could be attributed to increased exposure of unskilled labourers to chemicals without adequate hand protection. As previously said, wet work can be found in various professions due to the presence of water. The hypotonic solution acts as a cytotoxic

agent on damaged skin. If the surface lipid has been previously eliminated by solvents, such as detergents, water has the potential to dissolve the hygroscopic chemicals that are necessary to maintain the skin's flexibility. This enhances the effects of existing allergens, leading to an increased occurrence of contact allergy in individuals engaged in wet jobs. The number is[29]. In our study, the majority of patients (61%) were from lower socio-economic backgrounds. The prevalence of class (34%) was significantly higher compared to the research conducted by Hald *et al*.[144]. The percentages reported by the authors are as follows 47.2%, 40.4-42.8% for the first study and 30.6% for the second study conducted by Skoet *et al*.[10]. This correlation can likely be ascribed to the fact that our patients from lower and middle socioeconomic classes had higher exposure to allergens. It is evident that having a poor socio-economic position is a risk factor for the development of hand dermatitis. One hundred and thirty-four Due to our study's reliance on cases treated at the Trust hospital, our sample size of patients from the upper class is less. Our study found that 48% of patients exhibited ACD hands, which had a duration of shorter than one year. Our results are slightly lower than those reported by Hald *et al*.[144] (52.2%) and Lerback *et al*.[134] (67.6%). This variance arises from the fact that the majority of our patients were engaged in physical labour or were homemakers. Due to their rural upbringing and limited educational attainment, only 48% of our patients sought medical attention within one year after experiencing the beginning of hand eczema. The remaining 52% was delivered one year later. The current study revealed that pruritus, or itching, was the most prevalent symptom, reported by 97% of participants. This was followed by scaling, reported by 90% of participants, and dryness, reported by 83% of participants. The results of our study exceed those reported by Kishore *et al*.[23], Skudli *et al*.[125] and Lerback *et al*.[134]. However, the occurrence of fissuring was lower (69%) compared to the study conducted by Skudli *et al*. (75%) and greater than the studies conducted by Kishore *et al*.[23] and Lerback *et al*.[135]. Discomfort The percentage of (15%) was lower than that of Kishore *et al*.[23] (40%). These variances likely arise from differences in work patterns and exposure to specific allergens. While fissuring and pain were not as prevalent, they had the most unsettling impact on patients, leading to substantial morbidity and the cessation of regular activities. The phenomenon of recurrence was observed in the majority of patients within our study cohort. 45% of our patients reported experiencing aggravation upon interaction with detergents. The results of our study are superior to those of Minoch *et al*.[33] The study conducted by Huda *et al*.[137] found a prevalence rate of 36.92%. The percentage of Bajaj *et al*.[3] is 18%, which is lower than the percentage of Kishore *et al*.[23], which is 56%. Various studies have suggested soaps and detergents as predisposing factors. Additionally, certain compounds included in these products, such as potassium dichromate, lanolin, perfumes, colophony and enzymes, have been identified as potential allergens, as previously noted.[3] Eleven percent of our patients reported experiencing irritation upon contact with vegetables. However, when compared to other studies, our findings revealed a higher rate of worsening symptoms upon contact with vegetables. The study conducted by Minocha *et al*.[33] found that 38.46% of participants had the desired outcome. Similarly, Huda *et al*.[139] also reported similar results. The study conducted by *et al*.[139] reported a prevalence rate of 26.19%, while Bajaj AK *et al*.[3] found a higher prevalence rate of 47.36%. Vegetables were responsible for the increased amount. Incidence of hand dermatitis in housewives. The number is 28 This might likely be attributed to the inherent characteristics of work in many studies, including the current study. Twenty-five percent of our patients reported experiencing a worsening of symptoms after coming into touch with cement and metals. The results of our study align with the findings of Minoch *et al*.[33] (26.15%) and are greater than those reported by Bajaj *et al*.[3] (14.03%) but lower than the results reported by Sharma *et al*.[22] (42.5%). These variances are likely attributed to the fact that the majority of our staff lack the necessary skills and are primarily masons. Within the category of metals, nickel has been identified as the most prevalent sensitizer. The number is[28]. Chromium finds applications in steel alloys, electroplating, tanning, dyeing and pigments. Chromates are present in several substances such as bleaching agents, matches, hide glues, detergents, brushless shaving creams, paints, polishes, ashes, textiles and cements. The number is[22]. Twenty percent of our patients reported experiencing aggravation upon interaction with chemicals, plastics, rubber materials and leather items. Our results are somewhat higher than the findings reported by Sharma *et al*.[22] (18.75%) and Bajaj *et al*.[3] (18%) but lower than. The study conducted by Minocha and colleagues reported a prevalence rate of 22.3% (33 individuals). The variances arise from diverse work habits and the varying sensitivities of individuals to different allergies. Our study showed 70 (70%) patients had involvement of both the hands. This is lesser than Kumar *et al*.[21] (77.71%) and Kishore *et al*.[23] (78%) studies. Unilateral hand involvement was 30% in our study. This is higher than Kishore *et al*.[23] (22%) and Kumar *et al*.[21] (22.29%) studies. These variations are probably due to the geographical area and type of work done by our patients comparing the other studies. Our investigation revealed that 94% of patients exhibited finger involvement and dorsum of hands. Thirty-six percent. The results of this study show greater values compared to the findings reported by Lerback *et al*.[134]) and

Kishore *et al*.[23]. However, the prevalence of palms (33%) is lower than that reported by Lerback *et al*.[134] (35.1%) and Kishore *et al*.[23] (46%). The prevalence of nail alterations is greater (38%) compared to the findings of Larback *et al*.[134] (30.6%) and Kishore *et al*.[23] (22%). These variances likely arise from the nature of the work and the sensitization of various anatomical locations to allergens. Forty percent of our patients exhibited significant bilateral hand involvement. The results of our investigation indicate almost equivalent to the study conducted by Kishore *et al*.[23], which reported a percentage of 16%. This is likely attributable to the utilisation of both hands for tasks. In our investigation, unilateral involvement was detected in 3% of patients, but in the study conducted by Kishore *et al*.[23], no individuals were afflicted and the condition was exclusively unilateral. This phenomenon can likely be elucidated by the utilisation of a single hand during work activities and subsequent exposure to allergenic substances. The results of our investigation indicated that hyperkeratotic eczema was the predominant morphological type. The percentage of 32% is greater than the percentage of 10% reported by Kishore *et al*.[23]. The second most prevalent kind was the patchy vesiculosquamous type, accounting for 16% of cases, which is lower than the findings of Kishore *et al*.[23] (28%). The prevalence of other common variants, such as recurrent palmar peeling, is lower (14%) compared to the study by Kishore *et al*.[23] (22%). On the other hand, wear and tear dermatitis has a greater prevalence (14%) compared to the study by Kishore *et al*.[23] (8%).The prevalence of ring eczema and chronic acral eczema is greater at 7% each, compared to the study conducted by Kishore *et al*.[23], which reported a prevalence of 2% for each condition. The prevalence rates of discoid eczema, finger tip eczema, and pompholyx are lower than those reported by Kishore *et al*.[23], which are 6-14-8% respectively. The diversity primarily arises from the individual's reaction pattern to various antigens, as well as their career type. Our investigation revealed that 49% of patients tested positive for a single antigen, which is lower compared to the findings of Kishore *et al*.[23], who reported a rate of 64%. 19% of the subjects tested positive for both antigens, which is marginally higher than the 16% reported by Kishore *et al*.[23]. The presence of several positive antigens at a rate of 2% aligns with the findings of Kishore *et al*.[23] (2%). This variance likely arises from people being exposed to and sensitised by various antigens. It is widely recognised that simultaneous sensitization to many antigens is prevalent.

The findings of our investigation indicated a 70% prevalence of good outcomes. The results of our study are more than those reported by Hald *et al*.[144] (45.6%) and lower than those reported by Huda *et al*.[139] (92.5%), Sharma *et al*.[22] (80%), Bajaj *et al*.[3] (80.28%), and Kishore *et al*.[23]. Thirty percent of our research group exhibited poor outcomes, which is greater than the percentages reported by Huda *et al*.[144] (7.5%), Sharma *et al*.[22] (20%), Bajaj *et al*.[3] (19.72%) and Kishore *et al*.[23] (18%) but lower than the percentage reported by Hald *et al*.[144] (54.4%). The likely cause of this variance is allergies. The study group did not include the exposure component of the patch test, nor did it assess the quality of the allergens used in the test. Our investigation found that potassium dichromate was the predominant sensitizer, accounting for 27% of cases. We possess The results exceed the percentages reported by Anger *et al*.[135] (12.1%), Meding *et al*.[142] (9%), Li *et al*. [12] (6.5%), Hald *et al*.[144] (4.9%), Shenoi *et al*. (11.3%) and are lower than those reported by Kishore *et al*.[23] (32%). The next often seen compound was nickel sulphate with a concentration of 14%. Our results demonstrate a larger percentage compared to Shenoi *et al*.[142] (10.8%) and a lower percentage compared to Anger *et al*.[135] (33.6%), Meding *et al*. (24%), Li *et al*.[12] (30.4%) and Hald *et al*.[144] (19.4%). The study conducted by Kishore *et al*.[23] found that 23 individuals, which accounted for 18% of the total sample, exhibited the observed outcome. The concentration of fragrance mix used in this study (6%) is consistent with the findings of Shenoi *et al*.[142] (6.1%) and lower than those reported by Kishore *et al*.[23] (8%), Hald *et al*.[144] (11.4%), Li *et al*.[12] (23.9%), Meding *et al*.[104] (9%) and Anger *et al*.[135] (18.2%). The concentration of 4-phenylenediamine is more than that of Anger *et al*.[135] (4.8%), Hald *et al*.[144] (2.9%), and Shenoi *et al*.[142] (0.9%) but lower than that of Li *et al*.[12] (8.7%). The concentration of neomycin sulphate (6%) is more than that of Meding *et al*.[104] (2%) and lower than that of Kishore *et al*.[23] (12%) and Shenoi SD142 (8.5%).The observed differences are likely attributed to the inclusion of potassium dichromate in detergents. Cement, recognised for its strong sensitising properties, particularly affects housewives and cement workers, who constitute the largest demographic in our study. It commonly leads to occupational contact dermatitis and long-term disability as a result of hand exposure[7]. There appears to be an increasing prevalence of hypersensitivity to cosmetic goods in India. This may be attributed to the expanded assortment of cosmetic goods available now, in comparison to previous times. Two hundred investigation revealed that potassium dichromate had a higher prevalence as a sensitizer in males compared to females, with a ratio of 2.2:1. The results of our study show greater values when compared to the findings of Brasch *et al*.[134] with a ratio of 1.09:1 and Hald *et al*.[144] with a ratio of 0.69:1. These variances are likely attributed to the majority of our male patients being unskilled workers, with cement being the most prevalent sensitizer among them. In females,

nickel sulphate was the predominant sensitizer, with a ratio of 0.07:1. which is nearly identical to the study conducted by Brasch *et al*.[134] (with a ratio of 0.25:1) and the study conducted by Hald *et al*.[144] (with a ratio of 0.12:1). This is likely attributed to the fact that females have a higher likelihood of being exposed to detergents and metals compared to males during domestic activities. Another often encountered sensitizer in females is fragrance combination 0.5:1. The results are consistent with those reported by Hald *et al*.[144] (0.24:1) and Brasch *et al*.[134] (0.82:1). The prevalence of 4-phenylenediamine was higher in females, with a ratio of 0.2:1. This ratio is slightly lower than the ratio reported by Hald *et al*.[144] (0.91:1) and Brasch *et al*.[134] (0.8:1). This variance is likely attributed to females having a greater likelihood of being exposed to cosmetic allergens compared to males. Among guys, another frequently encountered sensitizer was wool alcohol in a ratio of 4:1. By comparison, it is highly Exceeding the value of Brasch *et al*.[134] by a ratio of 0.8:1. The concentration of thiuram mix is particularly elevated in males. When comparing with the study conducted by Hald *et al*.[144] the ratio is 0.04:1 and when comparing with the study conducted by Brasch *et al*.[134] the ratio is 0.96:1. Although the ratio of antigen sensitivity is higher for wool alcohol and Thiuram mix the number of cases reported in our study is relatively low [wool alcohol (5), Thiuram mix (4)]. This variation is likely attributed to the fact that the majority of our male patients are employed in outdoor occupations, resulting in a higher likelihood of exposure to these allergens compared to females.

CONCLUSION

Patch testing is a valuable diagnostic method for allergic contact dermatitis (ACD) affecting the hands. The correlation between clinical patterns and allergies is unpredictable. The Indian Standard Series is beneficial, however inadequate.

REFFERENCES

1. Wilkinson, D.S., 2000. Ntroduction, Definition and Classification. In: ntroduction, definition and classification, Eczema, H., T. Menne, H.I. and Maibach, (Eds.)., CRC Press, New York, pp: 1-13.
2. Berth-Jones, J., 2010. Eczema, Lichenification, Prurigo and Erythroderma. In: Rook's Textbook Dermatol, Urns, T., S. Breathnaeh, N. Cox and C. Griffiths, (Eds.)., Wiley,London, ISBN-27: 9781405161695,9781444317633, pp: 1-51.
3. Bajaj, A.K., 1983. Contact dermatitis hands. Ind. J. Dermatol. Venereol. Leprol., 49: 195-199.
4. Epstein, E., 1984. Hand dermatitis: Practical management and current concepts. J. Am. Acad. Dermatol., 10: 395-423.
5. Cohen, D.E., S.E. and Jacob, 2008. Allergic Contact Dermatitis. In: Fitzpatrick"s Dermatology in general medicine, Wolff, K., L.A. Goldsmith, S.I. Katz, B.A. Gilchrest, A.S. Paller and D.J. Leffell, (Eds.)., McGraw-Hill, New York, pp: 135-145.
6. Edman, B., 2000. Statistical Relations Between Hand Eczema and Contact Allergens. In: Hand eczema, Menne, T. and H.I. Maibach, (Eds.)., CRC Press, New York, pp: 75-86.
7. Elston, D.M., D.D.F. Ahmed, K.L. Watsky and K. Schwarzenberger, 2002. Hand dermatitis. J. Am. Acad. Dermatol., 47: 291-299.
8. Calnan, C.D., H.J. Bandmann, E. Cronin, S. Fregert and N. Hjorth, *et al*., 1970. Hand dermatitis in housewives. Br. J. Dermatol., 82: 543-548.
9. Agrup, G., 1969. Hand eczema. Acta. Derma. Venereol., 49: 41-47.
10. Skoet, R., J. Olsen, B. Mathiesen, L. Iversen, J.D. Johansen and T. Agner, 2004. A survey of occupational hand eczema in denmark. Contact Dermatitis, 51: 159-166.
11. Leggat, P.A. and D.R. Smith, 2007. Hand dermatitis among medical students from north queensland, Australia. Contact Dermatitis, 56: 137-139.
12. Li, L., J. Guo and J. Wang, 2004. Environmental contact factors in eczema and the results of patch testing Chinese patients with a modified European standard series of allergens. Contact Dermatitis, 51: 22-25.
13. Diepgen, T.L., K.E. Andersen, F.M. Brandao, M. Bruze and D.P. Bruynzeel, *et al* ., 2009. Hand eczema classification: A cross-sectional, multicentre study of the aetiology and morphology of hand eczema. Br. J. Dermatol., 160: 353-358.
14. Warshaw, E.M., R.L. Ahmed, D.V. Belsito, V.A. DeLeo and J.F. Fowler *et al*., 2007. Contact dermatitis of the hands: Cross-sectional analyses of north American contact dermatitis group data, 1994-2004. J. Am. Acad. Dermatol., 57: 301-314.
15. Athavale, P., K.W. Shum, Y. Chen, R. Agius, N. Cherry and D.J. Gawkrodger, 2007. Occupational dermatitis related to chromium and cobalt: experience of dermatologists (EPIDERM) and occupational physicians (OPRA) in the U.K. over an 11-year period (1993-2004). Br. J. Dermatol., 157: 518-522.
16. Sinha, S.M., J.S. Pasricha, R. Sharma and K.C. Kandhari, 1977. Vegetables responsible for contact dermatitis of the hands. Arch. Dermatol., 113: 776-779.
17. Pasricha, J.S. and A.J. Kanwar, 1978. Substances causing contact dermatitis. Ind. J. Dermatol. Venereol. Leprol., 44: 264-268.
18. Pasricha, J.S., 1981. Contact dermatitis caused by vegetables and fruits. In: Contact dermatitis in India, Pasricha, J.S. and N.S. Sefhi, (Eds.)., Bombay: Lyka Labs, pp: 34-36.

19. Pasricha, J.S., 1981. Allergic disease of skin. Oxford, New Delhi, Pages: 95.
20. Khanna, N., 1997. Hand dermatitis in beauticians in India. Indian. J. Dermatol. Venereol. Leprol., 63: 157-161.
21. Kumar, P., G.S. Rao and M. Kuruvilla, 1999. Dermatoses of the hand: An observation. Indian. J. Dermatol. Venereol. Leprol., 65: 124-145.
22. Sharma, V.K. and S. Kaur, 1987. Contact Dermatitis of Hands in Chandigarh Indian. J. Dermatol. Venereol. Leprol., 53: 103-107.
23. Kishore, N.B., A.D. Belliappa, N.J. Shetty, Sukumar D, Rauis, 2005. Hand eczema clinical patterns and role of patch testing. Ind. J. Dermatol. Venereol. Leprol., 71: 207-208.
24. Singhi, M., P. Menghani, L. Gupta, D. Kachhawa and M. Bansal, 2005. Occupational contact dermatitis among the traditional 'tie and dye' cottage industry in western rajasthan. Indian J. Dermatol., Venereol. Leprol., 71: 329-332.
25. Bajaj, A., A. Saraswat, G. Mukhija, S. Rastogi and S. Yadav, 2007. Patch testing experience with 1000 patients. Indian J. Dermatol., Venereol. Leprol., 73: 313-318.
26. GOH, C.L., 1988. An epidemiological comparison between hand eczema and non-hand eczema. Br. J. Dermatol., 118: 797-801.
27. MEDING, B. and G. SWANBECK, 1987. Prevalence of hand eczema in an industrial city. Br. J. Dermatol., 116: 627-634.
28. Jungbauer, F.H.W., G.J. Lensen, J.W. Groothoff and P.J. Coenraads, 2004. Exposure of the hands to wet work in nurses. Contact Dermatitis, 50: 225-229.
29. Beck, M.W. and S.M. Wilkinson 2010. Contact dermatitis: Allergic. In: Rook"s Textbook of Dermatology, Burns, T., S. Breathnaeh, N. Cox and C. Griffiths, (Eds.)., Blackwell, London, pp: 1-106.
30. Bajaj, A.K. and A. Saraswat, 2008. Contact Dermatitis. In: IADVL Textbook of Dermatology, Valia, R.G. and A.R. Valia, (Eds.)., House, Mumbai: Bhalani, pp: 545-590.
31. Morrow, D.M., M.J. Rapaport and R.A. Strick, 1980. Hypersensitivity to aloe. Arch. Dermatol., 116: 1064-1065.
32. Hersle, K. and H. Mobacken, 1982. Hyperkeratotic dermatitis of the palms. Br. J. Dermatol., 107: 195-202.
33. Minocha, Y.C., A. Dogra and V.K. Sood, 1993. Contact sensitivity in palmar hyperkeratotic dermatitis. Ind. J. Dermatol. Venereol. Leprol., 59: 60-63.
34. Seetharam, K.A. and J.S. Pasricha, 1987. Condiments and contact dermatitis of the finger: Tips. Indian. J. Dermatol. Venereol. Leprol., 53: 325-328.
35. Cronin, E., 1985. Clinical patterns of hand eczema in women. Contact Dermatitis, 13: 153-161.
36. Menné, T. and N.V. Holm, 1983. Nickel allergy in a female twin population. Int. J. Dermatol., 22: 22-28.
37. Larsen, W.G., 1977. Perfume dermatitis. a study of 20 patients. Arch. Dermatol., 113: 623-626.
38. Heydorn, S., T. Menné and J.D. Johansen, 2003. Fragrance allergy and hand eczema-a review. Contact Dermatitis, 48: 59-66.
39. Avalos-Peralta, P., B. García-Bravo and F.M. Camacho, 2005. Sensitivity to Myroxylon pereirae resin (balsam of peru). A study of 50 cases. Contact Dermatitis, 52: 304-306.
40. Tagami, H., S. Watanabe and S. Ofuji and K. Minami, 1977. Trichophytin contact sensitivity in patients with dermatophytosis. Arch. Dermatol., 113: 1409-1414.
41. Hjorth, N., 1978. Gut eczema in slaughterhouse workers. Contact Dermatitis, 4: 49-52.
42. Walle, H.B., 2000. Irritant Contact Dermatitis. In: Hand eczema, Menne, T. and H.I. Maibach, (Eds.)., CRC Press, New York, pp: 133-139.
43. Malten, K.E., 1981. Thoughts on irritant contact dermatitis. Contact Dermatitis, 7: 238-247.
44. Jungersted, J.M., L.I. Hellgren, G.B.E. Jemec and T. Agner, 2008. Lipids and skin barrier function-a clinical perspective. Contact Dermatitis, 58: 255-262.
45. Cavallo, D., C.L. Ursini, A. Setini, C. Chianese, A. Cristaudo and S. Iavicoli, 2005. Dna damage and tnfa cytokine production in hairdressers with contact dermatitis. Contact Dermatitis, 53: 125-129.
46. Holst, R. and H. Möller, 2006. One hundred twin pairs patch tested with primary irritants. Br. J. Dermatol., 93: 145-149.
47. Wilkinson, S.M. and M.H. Beck 2010. Contact dermatitis: Irritant In: Textbook of Dermatology, Burns, T., S. Breathnaeh, N. Cox and C. Griffiths, (Eds.)., Blackwell, London, pp: 1-26.
48. Cohen D.E., 2008. Irritant Contact Dermatitis. In: Dermatology, Bolognia, J.L., (Ed.)., Contact, London,
49. Jorizzo, J.L. and R.P. Rapini, 2008. Edinburgh. Mosby, Pages: 230.
50. Rystedt, I., 1985. Work-related hand eczema in atopics. Contact Dermatitis, 12: 164-171.
51. Rystedt, I., 1985. Factors influencing the occurrence of hand eczema in adults with a history of atopic dermatitis in childhood. Contact Dermatitis, 12: 185-191.
52. Rystedt, I., 1985. Atopic background in patients with occupational hand eczema. Contact Dermatitis, 12: 247-254.
53. Lammintausta, K., K. Kalimo and V.K. Havu, 1982.

Occurrence of contact allergy and hand eczemas in hospital wet work. Contact Dermatitis, 8: 84-90.
54. Wahlberg, J.E., K. Wrangsjö and A. Hietasalo, 1985. Skin irritancy from nonanoic acid. Contact Dermatitis, 13: 266-269.
55. Menne, T. and V. Holm, 1986. Genetic susceptibility in human allergic sensitization. Semin. Dermatol., 5: 301-306.
56. Moss, C., P.S. Friedmann, S. Shuster and J.M. Simpson, 1985. Susceptibility and amplification of sensitivity in contact dermatitis. Clin. Exp. Immunol., 61: 232-241.
57. Menné, T., O. Borgan and A. Green, 1982. Nickel allergy and hand dermatitis in a stratified sample of the Danish female population: an epidemiological study including a statistic appendix. Acta. Derm. Venereol., 62: 35-41.
58. Valsecchi, R., M. Bontempelli, O. Vicari, G. Scudeller and T. Cainelli, 1982. HLA antigens and contact sensitivity. Arch. Dermatol., 118: 533-534.
59. Molin, S., S. Vollmer, E.H. Weiss, T. Ruzicka and J.C. Prinz, 2009. Filaggrin mutations may confer susceptibility to chronic hand eczema characterized by combined allergic and irritant contact dermatitis. Br. J. Dermatol., 161: 801-807.
60. Jordan, W.P. and S.E. King, 1977. The development of allergic contact dermatitis in females during the comparison of two predictive patch tests. Contact Dermatitis, 3: 19-26.
61. Thyssen, J.P., A. Linneberg, T. Menné, N.H. Nielsen and J.D. Johansen, 2003. The association between hand eczema and nickel allergy has weakened among young women in the general population following the danish nickel regulation: Results from two cross-sectional studies. Contact Dermatitis, 61: 342-348.
62. Bonamonte, D., C. Foti, A.R. Antelmi, A.M. Biscozzi and E.D. Naro *et al*., 2005. Nickel contact allergy and menstrual cycle. Contact Dermatitis, 52: 309-313.
63. Rea, T.H., 1979. Quantitative enhancement of dinitrochlorobenzene responsivity in women receiving oral contraceptives. Arch. Dermatol., 115: 361-362.
64. Uehara, M., and T. Sawai, 1989. A longitudinal study of contact sensitivity in patients with atopic dermatitis. Arch. Dermatol., 125: 366-368.
65. Mowad, C.M. and J.G. Marks, 2008. Allergic Contact Dermatitis. In: Dermatology, Bolognia, J.L. Jorizzo and R.P. Rapini, (Eds.)., Edinburgh: Mosby, pp: 209-222.
66. Rothenborg, H.W., N. Hjorth, 1968. Allergy to perfumes from toilet soaps and detergents in patients with dermatitis. Arch. Dermatol., 97: 417-421.
67. Wutt, H.A.B. Bennett and T.J. Harrist, 2009. Non-Infection Vesiculobullous and Vesiculo-Thpustular Disease. In: Lever"s Histopathology of the skin, Elder, D.E., (Ed.)., Wolter"s Kluwer, New Delhi, pp: 235-378.
68. Chew, A.l. and H.I. Maibach, 2000. Contact Urticaria and Hand Eczema. In: Hand Eczema, Manne, T. and H.I. Maibach, (Eds.)., CRC Press, New York, ISBN-13: 9780429214530, pp: 169-180.
69. Janssens, V., M. Morren, A. Dooms-Goossens and H. Degreef, 1995. Protein contact dermatitis: Myth or reality? Br. J. Dermatol., 132: 1-6.
70. Leggat, P.A., D.R. Smith and R. Speare, 2009. Hand dermatitis among veterinarians from queensland, Australia. Contact Dermatitis, 60: 336-338.
71. Meding, B., K. Wrangsjö, J. Brisman and B. Järvholm, 2003. Hand eczema in 45 bakers: A clinical study. Contact Dermatitis, 48: 7-11.
72. Sugiura, K., M. Sugiura, R. Shiraki, R. Hayakawa, M. Shamoto, K. Sasaki and A. Itoh, 2002. Contact urticaria due to polyethylene gloves. Contact. Dermatitis., 46: 262-266.
73. Josefson, A., G. Färm, B. Stymne and B. Meding, 2006. Nickel allergy and hand eczema-a 20-year follow up. Contact Dermatitis, 55: 286-290.
74. Jøhnke, H., L.A. Norberg, W. Vach, C. Bindslev-Jensen, A. Høst and K.E. Andersen, 2004. Reactivity to patch tests with nickel sulfate and fragrance mix in infants. Contact Dermatitis, 51: 141-147.
75. Romaguera, C., F. Grimalt and J. Vilaplana, 1988. Contact dermatitis from nickel: An investigation of its sources. Contact Dermatitis, 19: 52-57.
76. Srinivas, C.R., C. Balachandran, K.K. Singh, S.D. Shenoy and D.S. Krupashankar, 1988. Flare up of nickel contact dermatits following oral challenge. Indian. J. Dermatol. Venereol. Leprol., 54: 93-94.
77. Jensen, C.S., T. Menné and J.D. Johansen, 2006. Systemic contact dermatitis after oral exposure to nickel: A review with a modified meta-analysis. Contact Dermatitis, 54: 79-86.
78. Goh, C.L., 2000. Hand eczema in the construction industry. In: Hand eczema, Menne, T. and H.I. Maibach (Eds.)., CRC Press, New York, pp: 287-294.
79. Rudzki, E. and A. Kozlowska, 1980. Causes of chromate dermatitis in poland. Contact Dermatitis, 6: 191-196.
80. Khader, Y., M. Abu-Zaghlan, I.A. Rish, S. Burgan and Z. Amarin, 2005. Self-reported allergy to latex gloves among health care workers in Jordan. Contact Dermatitis, 53: 339-343.
81. Matthieu, L., A.F.L. Godoi, J. Lambert and R.V. Grieken, 2003. Occupational allergic contact dermatitis from bisphenol a in vinyl gloves. Contact Dermatitis, 49: 281-283.

82. RøMyhr, O., A. Nyfors, H.L. Leira and H.T. Smedbold, 2006. Allergic contact dermatitis caused by epoxy resin systems in industrial painters. Contact Dermatitis, 55: 167-172.
83. Goulden, V. and S.M. Wilkinson, 1996. Occupational allergic contact dermatitis from epoxy resin on chipboard. Contact Dermatitis, 35: 262-263.
84. Pasricha, J.S., 1988. Contact dermatitis in India. 2Ed Edn., Offsetters, New Delhi, Pages: 154.
85. Nethercott, J.R. and D.L. Holness, 1989. Occupational dermatitis in food handlers and bakers. J. Am. Acad. Dermatol., 21: 485-490.
86. Karlberg, A.T. and C. Liden, 1992. Colophony (rosin) in newspapers may contribute to hand eczema. Br. J. Dermatol., 126: 161-165.
87. Heydorn, S., T. Menné, K.E. Andersen, M. Bruze, C. Svedman, D. Basketter and J.D. Johansen, 2003. The fragrance hand immersion study-an experimental model simulating real-life exposure for allergic contact dermatitis on the hands. Contact Dermatitis, 48: 324-330.
88. Heydorn, S., J.D. Johansen, K.E. Andersen, M. Bruze and C. Svedman *et al*., 2003. Fragrance allergy in patients with hand eczema-a clinical study. Contact Dermatitis, 48: 317-323.
89. Nixon, R., H. Roberts, K. Frowen and M. Sim, 2006. Knowledge of skin hazards and the use of gloves by Australian hairdressing students and practising hairdressers. Contact Dermatitis, 54: 112-116.
90. Patel, S., D.A. Basketter, D. Jefferies, I.R. White, R.J.G. Rycroft, J.P. Mcfadden and S.Y. Ho, 2006. Patch test frequency to P-phenylenediamine: Follow up over the last 6 years. Contact Dermatitis, 56: 35-37.
91. Ling, T.C. and I.H. Coulson, 2002. What do trainee hairdressers know about hand dermatitis? Contact Dermatitis, 47: 227-231.
92. Constandt, L., E.V. Hecke, J.M. Naeyaert and A. Goossens, 2005. Screening for contact allergy to artificial nails. Contact Dermatitis, 52: 73-77.
93. Goon, A.T., M. Bruze, E. Zimerson, C. Goh and M. Isaksson, 2007. Contact allergy to acrylates/methacrylates in the acrylate and nail acrylics series in southern sweden: Simultaneous positive patch test reaction patterns and possible screening allergens. Contact Dermatitis, 57: 21-27.
94. Sylvest, B., N. Hjorth and B. Magnusson, 1975. Lauryl ether sulphate dermatitis in denmark. Contact Dermatitis, 1: 359-362.
95. Bruynzeel, D.P., W.G. van Ketel and P. de Haan, 1984. Formaldehyde contact sensitivity and the use of shampoos. Contact Dermatitis, 10: 179-180.
96. Pasricha, J.S. and B. Guru, 1981. Contact hypersensitivity to local antibacterial agents. Indian. J. Dermatol. Venereol. Leprol., 47: 27-30.
97. Sidi, E., M. Hincky and R. Longueville, 1985. Cross-sensitization between neomycin and streptomycin. J. Invest. Dermatol., 30: 225-232.
98. Jelen, G. and D. Tennstedt, 1989. Contact dermatitis from topical imidazole antifungals: 15 new cases. Contact Dermatitis, 21: 6-11.
99. Wilkinson, S.M., 1994. Hypersensitivity to topical corticosteroids. Clin. Exp. Dermatol., 19: 1-11.
100. George, N.D., C.R. Srinivas, C. Balachandran and S.D. Shenoi, 1990. Sensitivity to various ingredients topical preparation following prolonged use. Contact Dermatitis, 23: 367-368.
101. Burry, J.N., J. Kirk, J.G. Reid and T. Turner, 1975. Chlorocresol sensitivity. Contact Dermatitis, 1: 41-42.
102. Kligman, A.M., 1983. Lanolin allergy: Crisis or comedy. Contact Dermatitis, 9: 99-107.
103. Bajaj, A.K., S.C. Gupta, A.K. Chatterjee and K.G. Singh, 1990. Contact sensitivity to polyethylene glycols. Contact Dermatitis, 22: 291-292.
104. Wilkinson, J.D., K.E. Andersen, A. Lahti, R.J.G. Rycroft, S. Shaw and I.R. White, 1990. Preliminary patch testing with 25% and 15%' caine'-mixes. Contact Dermatitis, 22: 244-245.
105. Meding, B., L. Barregård and K. Marcus, 1994. Hand eczema in car mechanics. Contact Dermatitis, 30: 129-134.
106. Spiewak, R., 2012. Contact dermatitis in atopic individuals. Curr. Opin. Allerg. Clin. Immunol., 12: 491-497.
107. Wilkinson, D.S., S.Fregert and B. Magnusson, 1970. Terminology of contact dermatitis. Acta. Derm. Venereol., 50: 287-292.
108. Fischer, T. and H.T. Maibach, 1987. Patch testing in allergic contact dermatitis: An update. Year Book Medical, Pages: 210.
109. Shehade, S.A., M.H. Beck and V.F. Hillier, 1991. Epidemiological survey of standard series patch test results and observations on day 2 and day 4 readings. Contact Dermatitis, 24: 119-122.
110. Cronin, E., 1980. Contact Dermatitis. Edinburgh: Churchill Livingstone,
111. Dooms-Goossens, A. and H. Degreef, 1983. Contact allergy to petrolatums. Contact Dermatitis, 9: 175-185.
112. Väänänen, A. and M. Hannuksela, 1986. Softisan-a new vehicle for patch testing. Contact Dermatitis, 14: 215-216.
113. Bajaj, A.K., S.C. Gupta and A. Chatterjee, 1986. Suitable bases for patch testing in tropical countries. Int. J. Dermatol., 25: 379-380.
114. Fischer, T. and H.I. Maibach, 1989. Easier patch testing with true test. J. Am. Acad. Dermatol., 20: 447-453.
115. Lerbaek, A., K.O. Kyvik, T. Menné and T. Agner, 2007. Retesting with the true test in a population-based twin cohort with hand eczema-allergies and persistence in an 8-year

follow-up study. Contact Dermatitis, 57: 248-252.
116. Magnusson, B. and K. Hersle, 1965. Patch test methods. II. Regional variations of patch test responses. Acta. Derm. Venereol., 45: 257-261.
117. Mendelow, A.Y., A. Forsyth, A.T. Florence and A.J. Baillie, 1985. Patch testing for nickel allergy the influence of the vehicle on the response rate to topical nickel sulphate. Contact Dermatitis, 13: 29-33.
118. MacFarlane, A.W., R.K. Curley, R.M. Graham, M.S. Lewis-Jones and C.M. King, 1989. Delayed patch test reactions at days 7 and 9. Contact Dermatitis, 20: 127-132.
119. Batchelor, R.J. and S.M. Wilkinson, 2006. Photopatch testing-a retrospective review using the 1 day and 2 day irradiation protocols. Contact Dermatitis, 54: 75-78.
120. Ibbotson, S.H., P.M. Farr, M.H. Beck, B.L. Diffey and J. Ferguson *et al*., 1997. Photopatch testing: Methods and indications. Workshop report, british photodermatology group. Br. J. Dermatol., 136: 371-376.
121. Zachariac, C., B. Hall, S. Cupferman, K.E. Andersen and T. Menne, 2006. ROAT: morphology of ROAT on arm, neck and face in formaldehyde and diazolidinyl urea sensitive individuals. Contact. Dermatitis., 54: 21-24.
122. Gönül, M. and Ü. Gül, 2005. Detection of contact hypersensitivity to corticosteroids in allergic contact dermatitis patients who do not respond to topical corticosteroids. Contact Dermatitis, 53: 67-70.
123. Skudlik, C., M. Dulon, U. Pohrt, K.C. Appl, S.M. John and A. Nienhaus, 2006. Osnabrueck hand eczema severity index-a study of the interobserver reliability of a scoring system assessing skin diseases of the hands. Contact Dermatitis, 55: 42-47.
124. Diepgen, T.L., T. Agner, W. Aberer, J. Berth-Jones and F. Cambazard et al., 2007. Management of chronic hand eczema. Contact Dermatitis, 57: 203-210.
125. Kucharekova, M., P.C.M.V.D. Kerkhof and P.G.M.V.D. Valk, 2003. A randomized comparison of an emollient containing skin-related lipids with a petrolatum-based emollient as adjunct in the treatment of chronic hand dermatitis. Contact Dermatitis, 48: 293-299.
126. Williams, C., S.M. Wilkinson, P. McShane, J. Lewis, D. Pennington, S. Pierce and C. Fernandez, 2010. A double-blind, randomized study to assess the effectiveness of different moisturizers in preventing dermatitis induced by hand washing to simulate healthcare use. Br. J. Dermatol., 162: 1088-1092.
127. Schliemann, S., D. Kelterer, A. Bauer, S.M. John and C. Skudlik *et al*., 2008. Tacrolimus ointment in the treatment of occupationally induced chronic hand dermatitis. Contact Dermatitis, 58: 299-306.
128. Ruzicka, T., C.W. Lynde, G.B.E. Jemec, T. Diepgen and J. Berth-Jones *et al*., 2008. Efficacy and safety of oral alitretinoin (9-cis retinoic acid) in patients with severe chronic hand eczema refractory to topical corticosteroids: Results of a randomized, double-blind, placebo-controlled, multicentre trial. Br. J. Dermatol., 158: 808-817.
129. Jungbauer, F.H.W., J.J.V.D. Harst, J.W. Groothoff and P.J. Coenraads, 2004. Skin protection in nursing work: Promoting the use of gloves and hand alcohol. Contact Dermatitis, 51: 135-140.
130. Coevorden, A.M.V., 2004. Overview of studies of treatment for hand eczema the EDEN hand eczema survey. Br. J. Dermatol. 151: 446-451.
131. Li, L., G. Liu and J. Wang, 2008. Etiology and prognosis of hand eczema in a dermatology clinic in China: A follow-up study. Contact Dermatitis, 58: 88-92.
132. Lerbaek, A., K.O. Kyvik, H. Ravn, T. Menné and T. Agner, 2008. Clinical characteristics and consequences of hand eczema-an 8-year follow-up study of a population-based twin cohort. Contact Dermatitis, 58: 210-216.
133. Agner, T., K.E. Andersen, F.M. Brandao and D.P. Bruynzeel *et al* ., 2009. Contact sensitisation in hand eczema patients-relation to subdiagnosis, severity and quality of life: A multi-centre study. Contac.t Dermatitis., 61: 291-296
134. Hald, M., T. Agner, J. Blands and J.D. Johansen, 2009. Delay in medical attention to hand eczema: A follow-up study. Br. J. Dermatol., 161: 1294-300.
135. Hald, M., T. Agner, J. Blands, H. Ravn and J.D. Johansen, 2009. Allergens associated with severe symptoms of hand eczema and a poor prognosis. Contact Dermatitis, 61: 101-108.
136. Cvetkovski, R.S., R. Zachariae, H. Jensen, J. Olsen, J.D. Johansen and T. Agner, 2006. Quality of life and depression in a population of occupational hand eczema patients. Contact Dermatitis, 54: 106-111.
137. Huda, M.M. and U.K. Paul, 1996. Patch testing in contact dermatitis of hands and feet. Indian. J. Dermatol. Venereol. Leprol., 62: 361-362.
138. SUSKIND, R.R., 1963. The housewife and her exposure to washing products. Arch. Dermatol., 88: 130-134.
139. Spoo, J. and P. Elsner, 2001. Cement burns: A review 1960–2000. Contact Dermatitis, 45: 68-71.
140. Shenoi, D.S., C.R. Srinivas and C. Balachandran, 1994. Results of patch testing with a standard series of allergens at Manipal. Ind. J. Dermatol. Venereol. Leprol., 3: 133-135.
141. Brasch, J., A. Schnuch and W. Uter, 2008. The profile of patch test reactions to common contact allergens is related to sex. Contact. Dermatitis., 58: 37-41.

142. Hald, M., T. Agner, J. Blands, N.K. Veien and G. Laurberg *et al*., 2009. Clinical severity and prognosis of hand eczema. Br. J. Dermatol., 160: 1229-1236.
143. Park, K., 2009. Park's Textbook of Preventive and Social Medicine. 19Ed Edn., M/S Banarsidas Bhanot Jabalpur., Pages: 70.
144. Peltonen, L., 1979. Nickel sensitivity in the general population. Contact Dermatitis, 5: 27-32.