Abstract

Introduction: Cottage industry is usually a small-scale industry operated from home by family members using their own equipment. Kashmir has a unique cottage industry of its own which deals with production of many handicrafts, which may lead to a peculiar pattern of skin diseases in these artisans. Aim: The aim of this study was to find out the pattern of skin disorders in the cottage industry workers of Kashmir valley, with primary focus on the occupation-related dermatoses and to identify the most common cutaneous manifestation in these workers. Materials and Methods: This was a cross-sectional descriptive study in which 1062 cottage industry workers engaged in different crafts were screened. A detailed history taking and examination was carried out in each worker and the diagnosis was made on clinical grounds. Wherever deemed necessary, relevant investigations were done to establish the nature of the disease. Results: A total of 1062 workers were evaluated for the presence of skin disorders. The male-to-female ratio was 1:1.5. The mean age of the study group was 30.3 years ± 10.79 years, with maximum number of workers (164) belonging to the crewel embroidery industry. The mean duration of work was 6.4 ± 2.08 hours/day. A total of 953 workers (89.7%) had cutaneous manifestations, with callosities being the most common finding seen in 371 workers (35%), followed by cumulative insult dermatitis seen in 201 workers (19%). Conclusion: Cottage industry of Kashmir valley is a unique occupational group where a high percentage of workers had cutaneous manifestations related to their occupation, with callosities being the most common finding. Information and better knowledge regarding these dermatoses are important in devising strategies to improve the health scenario of these workers. Simple measures such as proper use of instruments, use of protective gloves, guarded use of chemicals, and hand washing may be very beneficial in reducing the burden of health problems in these workers.

Keywords: Callosities, cottage industry, occupational dermatoses

Introduction

A cottage industry is usually a small-scale industry operated from home by family members using their own equipment. Kashmir has a unique cottage industry of its own which deals with production of many handicrafts. These include walnut wood carving, the world famous Kashmiri shawl weaving and embroidery, carpet weaving, Papier mâché, and metal ware industry. The raw material used coupled by the type of equipment and chemicals employed, workmanship, dyeing, delicate design, and excellence of finish are all factors that can contribute toward a peculiar pattern of skin diseases in these artisans. Walnut wood carving, indigenous to Kashmir, employs a process of hand carving done in various styles by means of varied tools.[1] The Kashmiri shawl can be categorized into two main types—the loom woven or Kani shawl and the needle embroidered or Sozni shawl.[2] A hand-knotted carpet is made purely by hand using either wool or silk and very simple tools which include a blade, an iron comb, and a pair of short scissors.[1] Papier mâché involves ornamentation over smoothed out surfaces made from paper pulp or layers of paper with the help of different colors and sometimes using gold powder.[2] Metal ware industry of Kashmir mainly employs copper, brass, and silver.[2] Plenty of growth of willow in Kashmir has made the willow wicker craft deeply rooted in local folk tradition. The containers are made from straw grass and twigs.[2] A namdha is a piece of pressed felt made either out of mixing wool and cotton in different proportions or entirely from wool.[1] Crewel embroidery and chain stitch employ the use of an arı, a small hooked awl, which is inserted...
through the cloth in the form of a loop and is then pulled through the surface of the cloth to form a stitch.\[1\] Tapestry is a delicate and delightful rug of Kashmir. In making a tapestry piece, a process that involves the stitching on canvass has to be carefully done with needle on frames of different sizes.\[3\]

Few studies have been carried out in different parts of the world on carpet weavers and wood carvers, however, there is no study till date which has demonstrated the pattern of skin diseases in this particular group. Hence, this study aimed to fill these lacunae so that better understanding and recognition of skin disorders in this population could be obtained, and subsequent preventive measures can be taken to reduce the morbidity and work losses as well as prevent recurrence.

Materials and Methods

This study was a cross-sectional (descriptive) study in which the workplace of the cottage industry workers in different parts of Kashmir valley was surveyed. In order to ensure that appropriate coverage of the valley was done as well as to avoid any individual or selection bias, Kashmir valley was divided into three regions, i.e., north, south, and central. From each region, a district was randomly selected, and in that district again, a block was randomly selected. All handicraft units in that particular block were visited. The cottage industry workers in various parts of Kashmir valley including carpet weavers, shawl weavers, wood carvers, papier mâché workers, metal workers, willow wicker workers, embroiders, tapestry workers, and namdha makers were included in this study. A questionnaire was developed and required data from each worker was obtained in the local language. A detailed general physical as well as systemic and dermatologic examination was performed. Relevant investigations were carried out in selected patients wherever deemed necessary such as KOH smear and patch testing. Patch testing was done with the Indian standard series approved by Contact and Occupational Dermatitis Forum of India (CODFI), and interpretation was done according to the guidelines laid down by the International Contact Dermatitis Research Group (ICDRG).\[3\]

Results

A total of 1062 workers involved in the cottage industry of Kashmir were evaluated for the presence of skin disorders. 422 were males and 640 were females, which accounted for 39.7% and 60.3% of the total workers, respectively, giving a male:female ratio of 1:1.5.

The mean age of the study group was 30.3 ± 10.79 years, ranging from 12 to 70 years. Maximum number of male workers (128) belonged to the 31–40 years age group. Among the female workers, the most common age group was 21–30 years, with 365 females in that age group, as seen in Table 1.

The maximum number of workers (164) belonged to the crewel embroidery industry. The frequency of workers in individual industries is detailed in Table 2. Some workers were found to be engaged in more than one industry. The workers in each industry used the corresponding instruments required in that particular craft. A total of 346 workers (32.6%) were using chemicals whereas the rest 716 (67.4%) did not use any chemicals.

The duration of work in the workers evaluated ranged from a minimum of 0.25 years to a maximum of 50 years, with the median duration of work being 5 years. The mean hours of work per day was found to be 6.4 ± 2.08 hours/day, ranging from a minimum of 1 hour/day to a maximum of 12 hours/day.

The cutaneous manifestations observed in the study group were divided into occupational and non-occupational dermatoses, as detailed in Table 3. The occupational dermatoses seen were callosities in 371 workers (35%), cumulative insult dermatitis in 201 workers (19%), scar at sites of repeated friction in 76 workers (7.2%), allergic contact dermatitis (ACD) in 47 workers (4.4%), and black/brown staining of hands in 18 workers (1.7%). Among the non-occupational dermatoses, we observed melasma in 259 workers (24.4%), followed by ephelides in 196 workers (18.5%), acne vulgaris in 118 workers (11.1%), rosacea in 58 workers (5.5%), and endogenous eczema in 30 workers (2.8%), as detailed in Table 3.

No investigation was done in 1003 workers (94.4%), 12 workers were subjected to KOH smear to confirm the

### Table 1: Age and sex distribution of workers

| Age   | Male | Female | Total |
|-------|------|--------|-------|
| 11-20 | 40   | 142    | 182   |
| 21-30 | 119  | 365    | 484   |
| 31-40 | 128  | 95     | 223   |
| 41-50 | 87   | 33     | 120   |
| 51-60 | 42   | 5      | 47    |
| 61-70 | 6    | 0      | 6     |
| Total | 422  | 640    | 1062  |

### Table 2: Frequency of workers in various industries

| Industry                        | Frequency | Percent (%) |
|---------------------------------|-----------|-------------|
| Crewel embroidery               | 164       | 15.4        |
| Needle (sozni) work             | 137       | 12.9        |
| Loom (Kani) shawl weaving       | 123       | 11.6        |
| Wood carving                    | 103       | 9.7         |
| Carpet weaving                  | 103       | 9.7         |
| Papier mâché                    | 93        | 8.8         |
| Tapestry                        | 80        | 7.5         |
| Chain stitch embroidery         | 73        | 6.9         |
| Willow wicker industry          | 71        | 6.7         |
| Copper ware industry            | 70        | 6.6         |
| Namdha designer                 | 46        | 4.3         |
| Namdha maker                    | 45        | 4.2         |
Table 3: Pattern of cutaneous manifestations in the study group

| Cutaneous manifestations                                      | No. of workers (percentage) |
|---------------------------------------------------------------|-----------------------------|
| **Occupational dermatoses**                                   |                             |
| Friction related injury                                       |                             |
| Callosities                                                   | 371 (35)                    |
| Scar at site of trauma                                        | 76 (7.2)                    |
| Eczema                                                        |                             |
| Cumulative insult dermatitis                                  | 201 (19)                    |
| Allergic contact dermatitis                                   | 47 (4.4)                    |
| Pigmentary changes                                            |                             |
| Black/brown staining of hands                                 | 18 (1.7)                    |
| **Non occupational dermatoses**                              |                             |
| Pigmentary disorders                                          |                             |
| Melasma                                                       | 259 (24.4)                  |
| Ephelides                                                     | 196 (18.5)                  |
| Vitiligo vulgaris                                             | 20 (1.9)                    |
| Post-inflammatory hyperpigmentation                           | 9 (0.8)                     |
| Acne and related disorders                                    |                             |
| Acne vulgaris                                                 | 118 (11.1)                  |
| Rosacea                                                       | 58 (5.5)                    |
| Eczema                                                        |                             |
| Endogenous eczema                                             | 30 (2.8)                    |
| Infections                                                    |                             |
| Pityriasis versicolor                                         | 12 (1.1)                    |
| Verruca vulgaris                                              | 10 (0.9)                    |
| Scabies                                                       | 6 (0.6)                     |
| Tinea corporis                                                | 4 (0.4)                     |
| Herpes virus infections                                       | 4 (0.4)                     |
| Papulosquamous diseases                                       |                             |
| Psoriasis vulgaris                                            | 12 (1.1)                    |
| Ichthyosis vulgaris                                           | 1 (0.1)                     |
| Others                                                        |                             |
| Polymorphic light eruption                                    | 16 (1.5)                    |
| Milia                                                         | 16 (1.5)                    |
| Achrochordons                                                 | 9 (0.8)                     |
| Xanthelasma palpebrarum                                       | 6 (0.6)                     |
| Papular urticaria                                             | 3 (0.3)                     |
| Urticaria                                                     | 1 (0.1)                     |
| Lichen planus                                                 | 1 (0.1)                     |

The most common cutaneous manifestation in our study were callosities found in 371 workers (35%) with 76 workers (20.5%) belonging to the carpet weaving industry, followed by 65 workers (17.5%) in wood carving industry and 53 workers (14.3%) in copper ware industry. Callosities were seen in 238 males (56.4% of all male workers) and 133 female workers (20.8% of all female workers). Thus, carpet weavers were found to have the highest incidence of callosities, as has also been reported by Noorbala et al.[7] Callosities on the hands most commonly occur as distinctive occupational stigmata in many trades and professions.[8,9] Although the number of workers with callosities in our study was less as compared to a survey of solid waste handlers done by Gellin,[10] where there was a 75% prevalence of palmar calluses, nevertheless the site of callosities in our study was very specific to the type of industry and equipment used. Callosities have been reported to be highly specific, as in a study done on screwdriver operators.[11]

In carpet weaving, the artisan uses a loom composed of two horizontal beams, between which the wrap threads are tightened with the help of iron rods. Callosities were specifically seen over the dorsal aspect of proximal interphalangeal joints of middle, ring and little fingers of right hand in carpet weavers owing to the constant contact and friction of these sites with threads while working on the loom as seen in [Figure 1]. In addition, these workers along with wood carvers and copper ware workers had callosities over the palmar aspect of third, fourth, or fifth metacarpophalangeal joint, which could be attributed to the holding of instruments in the hands which leads to repeated friction over these sites.

Discussion

The cottage industry of Kashmir is a distinctive occupational group in which 1062 workers were evaluated in our study. We observed a high percentage of cutaneous manifestations in our study group, which were classified as occupational dermatoses and non-occupational dermatoses, as detailed in Table 3. Non-occupational dermatoses included melasma, ephelides, acne vulgaris, rosacea, endogenous eczema, vitiligo vulgaris, polymorphic light eruption, infections, papulosquamous disorders, etc. These dermatoses are otherwise common in the native population, as has been reported in various studies carried out in Kashmir valley.[4,5] Therefore, we have focused our study on the occupation-related dermatoses observed in the study group.

Occupational dermatoses (OD) is any alteration of the skin, mucosa, and adnexa, which is directly or indirectly caused, conditioned, maintained, or aggravated by agents present in the occupational activity or work environment.[6] In industrialized countries, OD corresponds to 60% of the occupational diseases. Occupational dermatoses is determined by the interaction of two groups of factors, namely, indirect or predisposing causes and direct causes, which are constituted by biological, physical, chemical, or mechanical agents found in the work environment, acting directly on the skin and causing or aggravating a pre-existing dermatosis.[6]

Diagnosis, and 47 patients with suspected contact dermatitis were subjected to patch test. KOH smear was positive in 8 (66.7%) out of the 12 workers tested, with 4 cases having tinea corporis and 4 with onychomycosis as the final diagnosis. In the 47 workers, patch test results were positive in 17 workers (36.2%). The most common allergen identified was paraphenylenediamine followed by nickel sulphate and parthenium.

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76 workers (7.2%), which were most common in the industries using an ari for their work, especially crewel embroidery, where the prevalence was highest with 33 workers (43.4%), followed by namdha designing where 16 workers (21.1%) were involved, kani shawl weaving with 13 affected workers (17.1%), and 10 workers (13.2%) of chain stitch embroidery showing these changes. While using the ari, the workers hold the wooden part of the ari in their hands in between the thumb and middle, ring, and little finger and keep the metal part of the ari in contact with the palmar surface of the distal phalanx of the right index finger. Because there is repeated friction at this site during work, we noticed a depressed linear scar over the palmar surface of the right index finger in these workers. We referred to this finding as the “ari mark.” This finding is quite characteristically seen in workers using the ari. Figure 2 illustrates the manner in which the ari is held in the hand, and the resulting linear scar corresponding to the constant contact with the metallic part of ari.

Cumulative insult dermatitis was seen in 201 workers (19%) with maximum incidence among wood carvers where 42 workers (21%) were involved. This type of dermatitis develops as a result of a series of repeated and damaging insults to the skin. These insults may include both chemical irritants and a variety of harmful physical factors such as friction, microtrauma, low humidity, the desiccant effects of powder, soil or water, and temperature. In our study, the most common site of cumulative insult dermatitis were the hands, especially the dominant hand of the workers. In wood carving industry, due to constant work with wood and chemicals and because of handling of various instruments, the prevalence has been found to be high. Figure 3 shows cumulative insult dermatitis in a wood worker.

Allergic contact dermatitis was reported in 47 workers (4.4%) in our study. The prevalence of contact dermatitis in our study group was less as compared to that reported by Singhi et al.,[13] (7.7%) which could be attributed to the unique nature of this industry. In our study, the positive patch test reactions were obtained in 36.2% cases, which is comparable to a study by Mathur et al.[14] and Hassan et al.[15]

Another finding in our study was black/brown staining of skin of the hands, which was seen in 18 workers (1.7%) all of whom were males. There was no female worker with this finding. This finding was seen in only three industries with 14 workers (77.8%) belonging to copper ware industry followed by wood carving and willow wicker industry. This can be attributed to the use of raw materials, such as copper, in these industries, which the workers grind and clean producing dust, which leads to black stains on their hands. In the woodcarving and willow wicker industry, the dust produced during the use of wood is responsible for the brown staining of the hands in these workers.

Although the present study has helped us in forming an idea about the health problems in this occupational group, a small sample size has been a limitation in understanding the extent to which the exposure to raw materials, instruments, and chemicals affects the health of these workers.

**Conclusion**

Dermatological disorders are common in cottage industry workers, and a high percentage of workers had occupation related dermatoses in our study group. The distinctive nature of the cottage industry with repeated friction and trauma at work along with use of chemicals are mainly responsible for these dermatoses, with callosities being the most common finding in our study. Information and better
knowledge of these dermatoses is important in devising strategies to improve the health scenario of these workers. Simple measures such as proper use of instruments, use of protective gloves, guarded use of chemicals, and hand washing can be very beneficial in reducing the burden of health problems in these workers. We recommend that, owing to the peculiar nature of the cottage industry of Kashmir, further studies should be carried out in these workers with a larger sample size because it will help us in better understanding of the diseases in this occupational group.

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Conflicts of interest
There are no conflicts of interest.

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